YASKAWA

iQpump®605 DRIVE

USER GUIDE

INTELLIGENT PUMP CONTROLLER

CATALOG CODE:

WM65Wxxxxxxx

CAPACITIES:

208 V class: 2.2 to 110 kW (3 to 150 HP)
480 V class: 2.2 to 450 kW (3 to 600 HP)

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1

Electrical Installation

This chapter explains how to wire the control circuit terminals, motor, and power supply.

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1.1 Electrical Installation

⚠DANGER

Electrical Shock Hazard

Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, remove the covers before measuring for dangerous voltages to make sure that the drive is safe.

If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.

⚠WARNING

Electrical Shock Hazard

De-energize the drive and wait 5 minutes minimum until the Charge LED turns off. Remove the front cover and terminal cover to do work on wiring, circuit boards, and other parts. Use terminals for their correct function only.

Incorrect wiring, incorrect ground connections, and incorrect repair of protective covers can cause death or serious injury.

Correctly ground the drive before you turn on the EMC filter switch.

If you touch electrical equipment that is not grounded, it can cause serious injury or death.

Use the terminals for the drive only for their intended purpose. Refer to the technical manual for more information about the I/O terminals.

Wiring and grounding incorrectly or modifying the cover may damage the equipment or cause injury.

◆ Standard Connection Diagram

⚠WARNING

Sudden Movement Hazard

Set the MFDI parameters before you close control circuit switches.

Incorrect Run/Stop circuit sequence settings can cause serious injury or death from moving equipment.

Correctly wire the start/stop and safety circuits before you energize the drive.

If you momentarily close a digital input terminal, it can start a drive that is programmed for 3-Wire control and cause serious injury or death from moving equipment.

When you use a 3-Wire sequence, set *A1-03 = 3330 [Initialize Parameters = 3-Wire Initialization]* and make sure that *b1-17 = 0 [Run Command at Power Up = Disregard Existing RUN Command]*.

If you do not correctly set the drive parameters for 3-Wire operation before you energize the drive, the motor can suddenly rotate in reverse when you energize the drive.

⚠WARNING

Check the I/O signals and the external sequences for the drive before you set the Application Preset function.

When you set the Application Preset function (*A1-06 ≠ 0*), it changes the I/O terminal functions for the drive and it can cause equipment to operate unusually. This can cause serious injury or death.

Fire Hazard

Install sufficient branch circuit short circuit protection as specified by applicable codes and this manual. The drive is suitable for circuits that supply not more than 100,000 RMS symmetrical amperes, 240 Vac maximum (208 V Class), 480 Vac maximum (480 V Class).

Incorrect branch circuit short circuit protection can cause serious injury or death.

NOTICE

When the input voltage is 440 V or higher or the wiring distance is longer than 100 m (328 ft), make sure that the motor insulation voltage is sufficient or use an inverter-duty motor or vector-duty motor with reinforced insulation.

Motor winding and insulation failure can occur.

Note:

Do not connect the AC control circuit ground to the drive enclosure. Incorrect ground wiring can cause the control circuit to operate incorrectly.

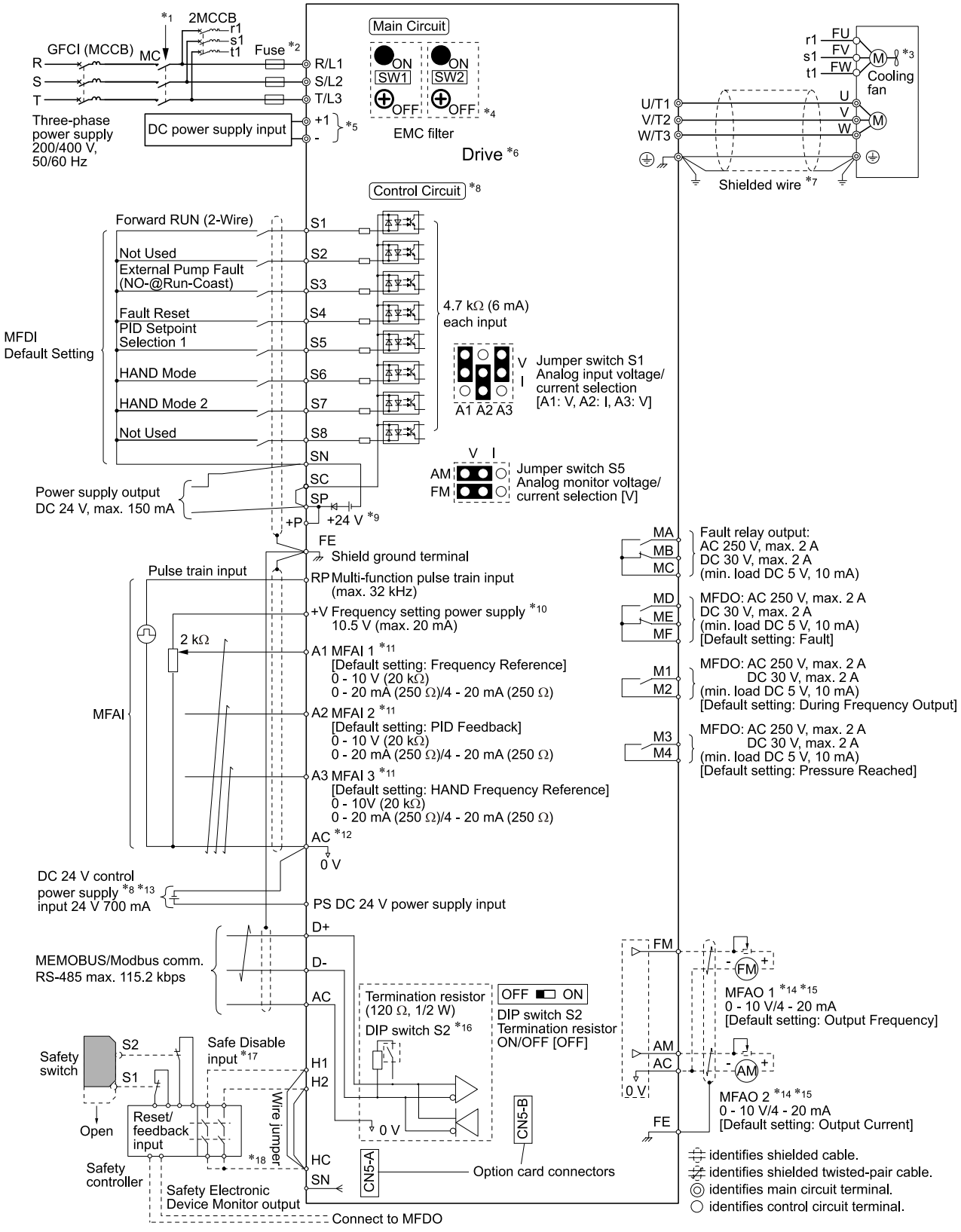

Figure 1.1 Standard Drive Connection Diagram

*1 Set the wiring sequence to de-energize the drive with the fault relay output. If the drive outputs a fault during fault restart when you use the fault restart function, set *L5-02 = 1 [Fault Contact at Restart Select = Always Active]* to de-energize the drive. Be careful when you use a cut-off sequence. The default setting for *L5-02* is *0 [Active Only when Not Restarting]*.

*2 Use branch circuit protection devices as recommended in this manual.

*3 Cooling fan wiring is not necessary for self-cooling motors.

*4 EMC filter switches are only available on drive models 2xxxC and 4xxxC with the built-in EMC filter for C2.

NOTICE

Damage to Equipment

When you use the drive with a non-grounding, high-resistance grounding, or asymmetric-grounding network, put the EMC Filter screw or screws in the OFF position to disable the built-in EMC filter.

If you do not disable the built-in EMC filter, it will cause damage to the drive.

*5 Connect DC power supply input to terminals - and +1.

⚠WARNING

Fire Hazard

Only connect factory-recommended devices or circuits to drive terminals - and +1. Do not connect AC power to these terminals.

Incorrect wiring can cause damage to the drive and serious injury or death from fire.

*6 Make sure that you wire the motor and main circuit correctly.
*7 Use braided shield cable for the drive and motor wiring, or run the wiring through a metal conduit.
*8 Connect a 24 V power supply to terminals PS-AC to operate the control circuit while the main circuit power supply is OFF.
*9 To set the MFDI power supply (Sinking/Sourcing Mode or internal/external power supply), install or remove a jumper between terminals SC-SP or SC-SN depending on the application.

NOTICE

Damage to Equipment

Do not close the circuit between terminals SP-SN.

If you close the circuits between terminals SC-SP and terminals SC-SN at the same time, it will cause damage to the drive.

- Sinking Mode, Internal power supply: Install the jumper to close the circuit between terminals SC-SP.

NOTICE

Damage to Equipment

Do not close the circuit between terminals SC-SN.

If you close the circuits between terminals SC-SP and terminals SC-SN at the same time, it will cause damage to the drive.

- Sourcing Mode, Internal power supply: Install the jumper to close the circuit between terminals SC-SN.

NOTICE

Damage to Equipment

Do not close the circuit between terminals SC-SP.

If you close the circuits between terminals SC-SP and terminals SC-SN at the same time, it will cause damage to the drive.

- External power supply: Remove the jumper from the MFDI terminals. It is not necessary to close the circuit between terminals SC-SP and terminals SC-SN.

*10 The maximum output current capacity for terminal +V on the control circuit is 20 mA.

NOTICE

Damage to Equipment

Do not install a jumper between terminals +V and AC.

A closed circuit between these terminals will cause damage to the drive.

*11 Jumper switch S1 sets terminals A1, A2, and A3 for voltage or current input signal. The default setting for S1 is voltage input (“V” side) for A1 and A3 and current input (“I” side) for A2.

*12

NOTICE

Do not ground the AC control circuit terminals and only connect the AC terminals as specified by the product instructions.

If you connect the AC terminals incorrectly, it can cause damage to the drive.

*13 Connect the positive lead from an external 24 Vdc power supply to terminal PS and the negative lead to terminal AC.

NOTICE

Connect terminals PS and AC correctly for the 24 V power supply.

If you connect the wires to the incorrect terminals, it will cause damage to the drive.

*14 Use multi-function analog monitor outputs with analog frequency meters, ammeters, voltmeters, and wattmeters. Do not use monitor outputs with feedback-type signal devices.

*15 Jumper switch S5 sets terminal FM and AM for voltage or current output. The default setting for S5 is voltage output (“V” side).

*16 Set DIP switch S2 to “ON” to enable the termination resistor in the last drive in a MEMOBUS/Modbus network.

*17 Use only Sourcing Mode for Safe Disable input.

*18 Disconnect the jumpers between H1 and HC and H2 and HC to use the Safe Disable input.

2

Startup Procedure and Test Run

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2.1 Keypad: Names and Functions

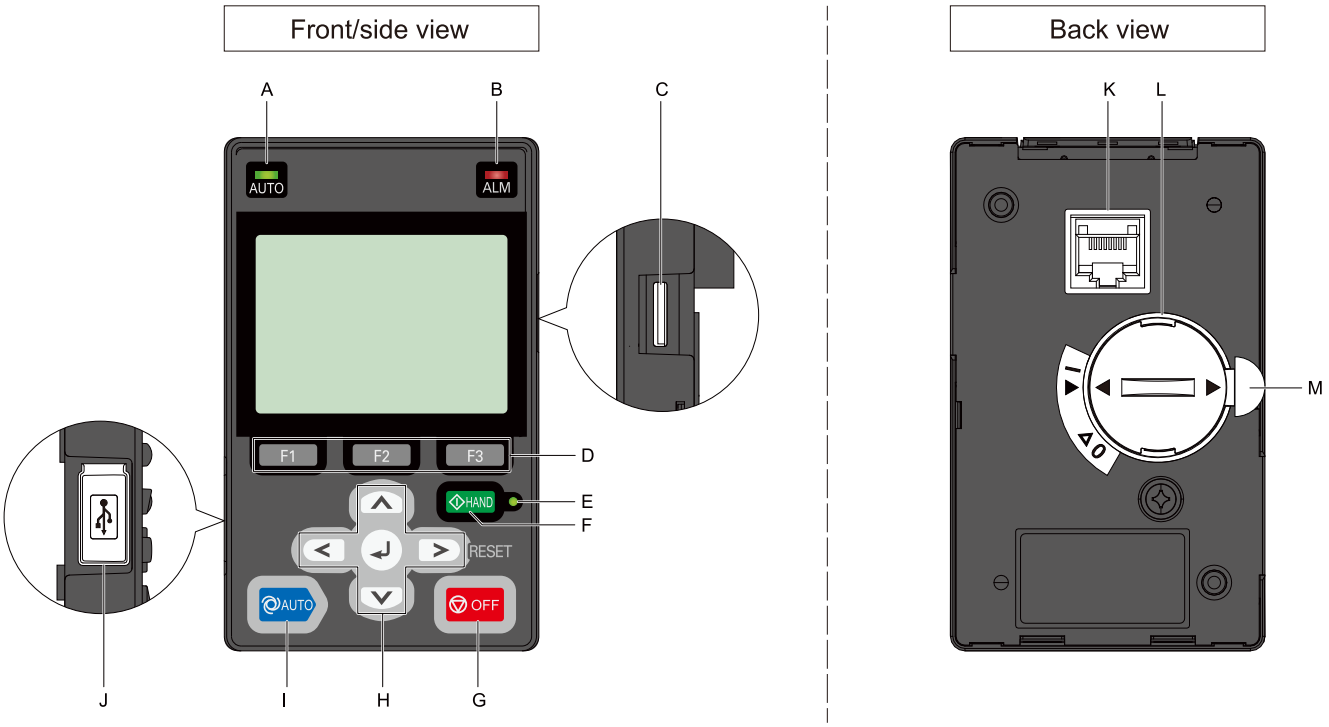


Figure 2.1 Keypad

Table 2.1 Keypad: Names and Functions

No.	Name	Function
A	AUTO LED *1* 	Illuminates to show that the drive is in AUTO Mode.
B	ALM LED 	Illuminates when the drive detects a fault. Flashes when the drive detects: • An alarm • An oPE parameter setting error • A fault or alarm during Auto-Tuning The LED turns off when there are no drive faults or alarms.
C	microSD Card Insertion Slot	The insertion point for a microSD card.
D	Function Keys (F1, F2, F3) 	The menu shown on the keypad sets the functions for function keys. The name of each function is in the lower half of the display window.
E	HAND LED *1* 	Illuminates to show that the drive is in HAND Mode.
F	HAND Key 	Sets drive operation to HAND Mode. The drive uses the *Y5-01 [HAND Frequency Reference Source]* setting.
G	OFF Key 	Stops drive operation. **Note:** The OFF key has highest priority. Push  to stop the motor even when a Run command is active at an external Run command source. Set *o2-02 = 0 [OFF Key Function Selection = Disabled]* to disable  priority. You can only disable  when *b1-02/b1-16 = 1, 2, or 3 [Run Command Selection 1/Run Command Selection 2 = Digital Input, Serial Communications, or Option PCB]*.

No.	Name	Function
H	Left Arrow Key	Moves the cursor to the left. Navigates to the Standard Monitor menu from the Home screen.
	Up Arrow Key/Down Arrow Key	• Scrolls up or down to display the next item or the previous item. • Selects parameter numbers, and increments or decrements setting values. • Scrolls through 18 custom monitors set in *o1-24*, *o1-27* to *o1-35*, and *o1-90* to *o1-97* from the Home screen.
	Right Arrow Key (RESET)	• Moves the cursor to the right. • Continues to the next screen. • Clears drive faults. • Navigates to the Parameter Group Shortcuts from the Home screen.
	ENTER Key	• Enters parameter values and settings. • Selects menu items to move the user between keypad displays. • Selects each mode, parameter, and set value.
I	AUTO Key	Sets drive operation to AUTO Mode. The drive uses the *b1-01 [Frequency Reference Selection 1]* and *b1-02 [Run Command Selection 1]* settings. **Note:** Push HAND on the keypad to set the drive to HAND Mode before you use the keypad to operate the motor.
J	USB Terminal	For factory adjustment.
K	RJ-45 Connector	Uses an RJ-45 8-pin straight through UTP CAT5e extension cable or keypad connector to connect to the drive.
L	Clock Battery Cover	Cover for the clock battery. **Note:** The battery included with the keypad is for operation check. It may be exhausted earlier than the expected battery life described in the manual. To replace the battery, use a Hitachi Maxell "CR2016 Lithium Manganese Dioxide Lithium Battery" or an equivalent battery with these properties: • Nominal voltage: 3 V • Operating temperature range: -20 °C to +85 °C (-4 °F to +185 °F)
M	Insulation Sheet	An insulating sheet is attached to the keypad battery to prevent battery drain. Remove the insulation sheet before you use the keypad for the first time.

*1 Refer to *AUTO LED and HAND LED Indications on page 16* for more information about AUTO LED and HAND LED indications.

◆ LCD Display

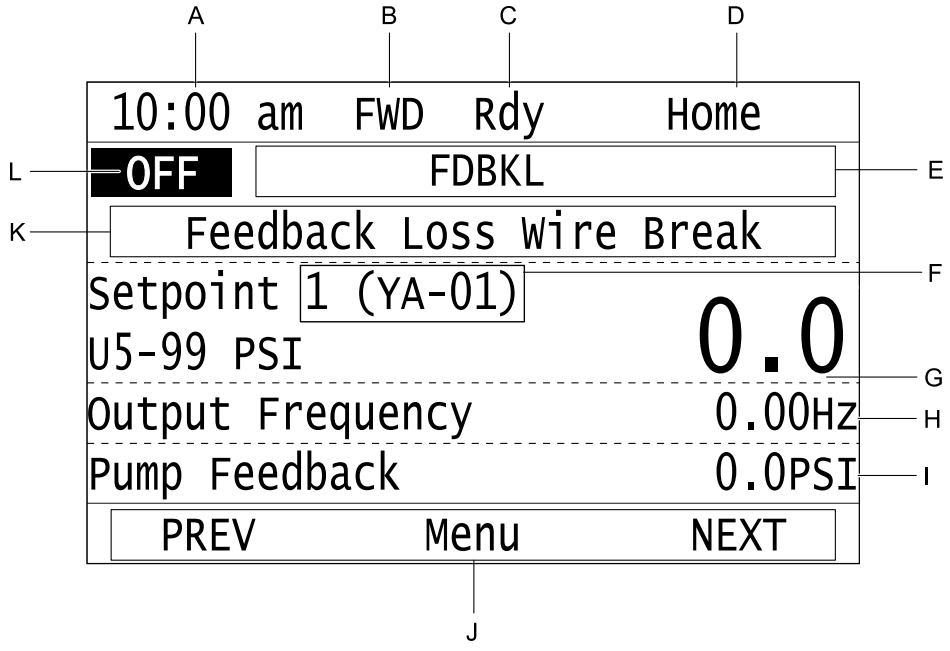


Figure 2.2 LCD Display Indications

Table 2.2 LCD Display Indications and Meanings

Symbol	Name	Description
A	Time display area	Shows the current time. Set the time in the Initial Setup menu.
B	Forward/Reverse run indication	Shows direction of motor rotation. • FWD: Shown when set to Forward run. • REV: Shown when set to Reverse run. **Note:** In DriveWorksEZ operation, FWD or REV flash.
C	Ready	The screen will show Rdy when the drive is ready for operation or when the drive is running.
D	Mode display area	Shows the name of the current mode or screen.
E	Alarm codes and drive status messages display area	Shows an alarm/fault code, drive name/number or message of drive status.
F	Setpoint source indication	Shows the current setpoint source. • Setpoint 1 (YA-01): Parameter *YA-01* • Setpoint 2 (YA-02): Parameter *YA-02* • Setpoint 3 (YA-03): Parameter *YA-03* • Setpoint 4 (YA-04): Parameter *YA-04* • Setpoint (AI): Analog input terminal • Setpoint (FREF): Frequency reference • Setpoint (COM): MEMOBUS/Modbus communications • Setpoint (PULSE): Pulse train input terminal (terminal RP) • Setpoint (EMOV): Emergency Override PID This area will also show the current frequency reference source when applicable. • KPD: Keypad • AI: Analog input terminal (terminals A1 to A3) • COM: MEMOBUS/Modbus communications • OPT: Option card • RP: Pulse train input terminal (terminal RP)
G	Data display area	Shows parameter values, monitor values, and details of the results of operations.
H	Custom Monitor 2 Data display area	Single line monitor showing the monitor name, value, and unit of the monitor programmed *o1-25 [Custom Monitor 2]*.
I	Custom Monitor 3 Data display area	Single line monitor showing the monitor name, value, and unit of the monitor programmed in *o1-26 [Custom Monitor 3]*.
J	Function keys 1 to 3 (F1 to F3)	The function names shown in this area will change when the selected screen changes. Push one of the function keys F1 to F3 on the keypad to do the function. **Note:** • When F1 shows "PREV", pushing the F1 key will cycle the currently displayed monitor in the middle of the screen to the previous monitor in the cycling list. • When F3 shows "NEXT", pushing the F3 key will cycle the currently displayed monitor in the middle of the screen to the next monitor in the cycling list.
K	Alarm and message texts display area	Shows a fault, minor fault, alarm, or error name and message text. **Note:** When the drive must show a fault, alarm, or error and a message on the keypad at the same time, the keypad will switch between the alarm code and message text in 2-second intervals.
L	HOA mode or alternative Run command source indication	• OFF: The drive is operating in OFF Mode. • AUTO: The drive is operating in AUTO Mode. • HAND: The drive is operating in HAND Mode. • JOG: The drive is operating in JOG Mode. • EMOV: The drive is operating in Emergency Override Mode.

◆ AUTO LED and HAND LED Indications

Table 2.3 AUTO LED and HAND LED Indications

AUTO LED	HAND LED	Status
OFF	OFF	OFF Mode
OFF	ON	HAND Mode

AUTO LED	HAND LED	Status
OFF	Long blink (50% duty)	HAND Mode • When the Frequency Reference is 0 or during deceleration • *H1-xx = 70 [Drive Enable No Run Cycle]* removed while HAND MFDI closed
OFF	Double blink	HAND Mode • When an MFDI sends a Fast Stop signal to stop the drive • When you clear the Run command and enter the Run command again during the time set in *C1-02 [Deceleration Time 1]* • Drive Enable Command removed while HAND MFDI closed • OFF pressed while running in HAND from MFDI • Exited Emergency Override with HAND MFDI closed
ON	OFF	AUTO Mode
Long blink (50% duty)	OFF	AUTO Mode • When the Frequency Reference is 0 or during deceleration • During PI Sleep • When *b1-02/b1-16 = 7/8/9* and AUTO is pressed, waiting for RUN command (from External/Serial/Option) • When *b1-02/b1-16 = 7/8/9* and Run command given (from External/Serial/Option) and waiting for AUTO press • When *b1-02/b1-16 = 7/8/9* and the HAND MFDI is removed while the Run command is present • When *b1-02/b1-16 = 0*, AUTO is pressed and *H1-xx = 70 [Drive Enable No Run Cycle]* is opened
Double blink	OFF	AUTO Mode • When an MFDI sends a Fast Stop signal to stop the drive • Drive Enable input removed while an external Run command is present • *b1-02/b1-16 = 1/2/3* and *Y5-03 = 0 [HAND/AUTO Switchover During Run]* and HAND MFDI is opened while external run input is present • Drive exits Emergency Override operation with an external Run command present

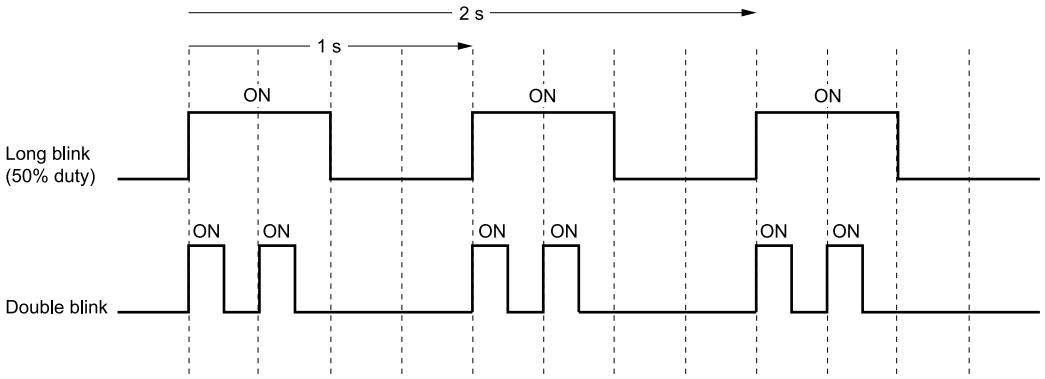


Figure 2.3 AUTO LED and HAND LED Timing Status

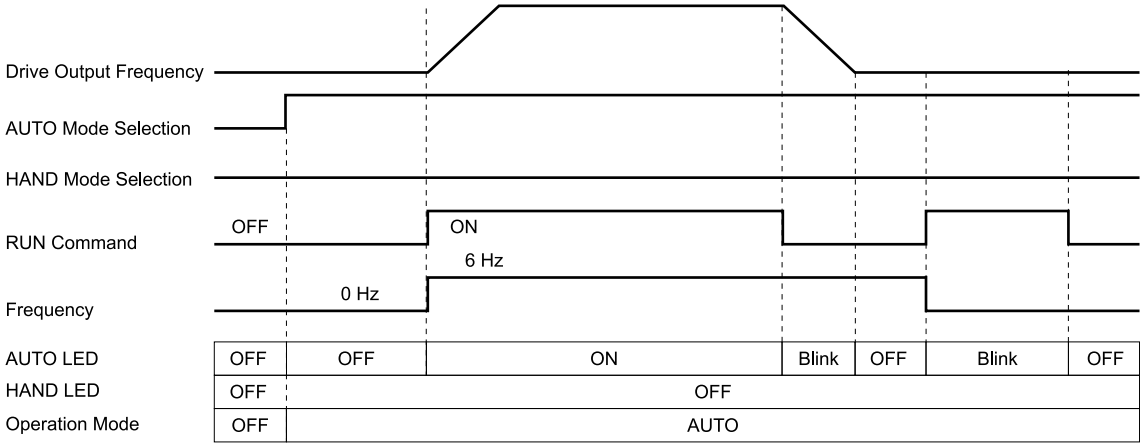


Figure 2.4 LEDs and Drive Operation in AUTO Mode

◆ Keypad Mode and Menu Displays

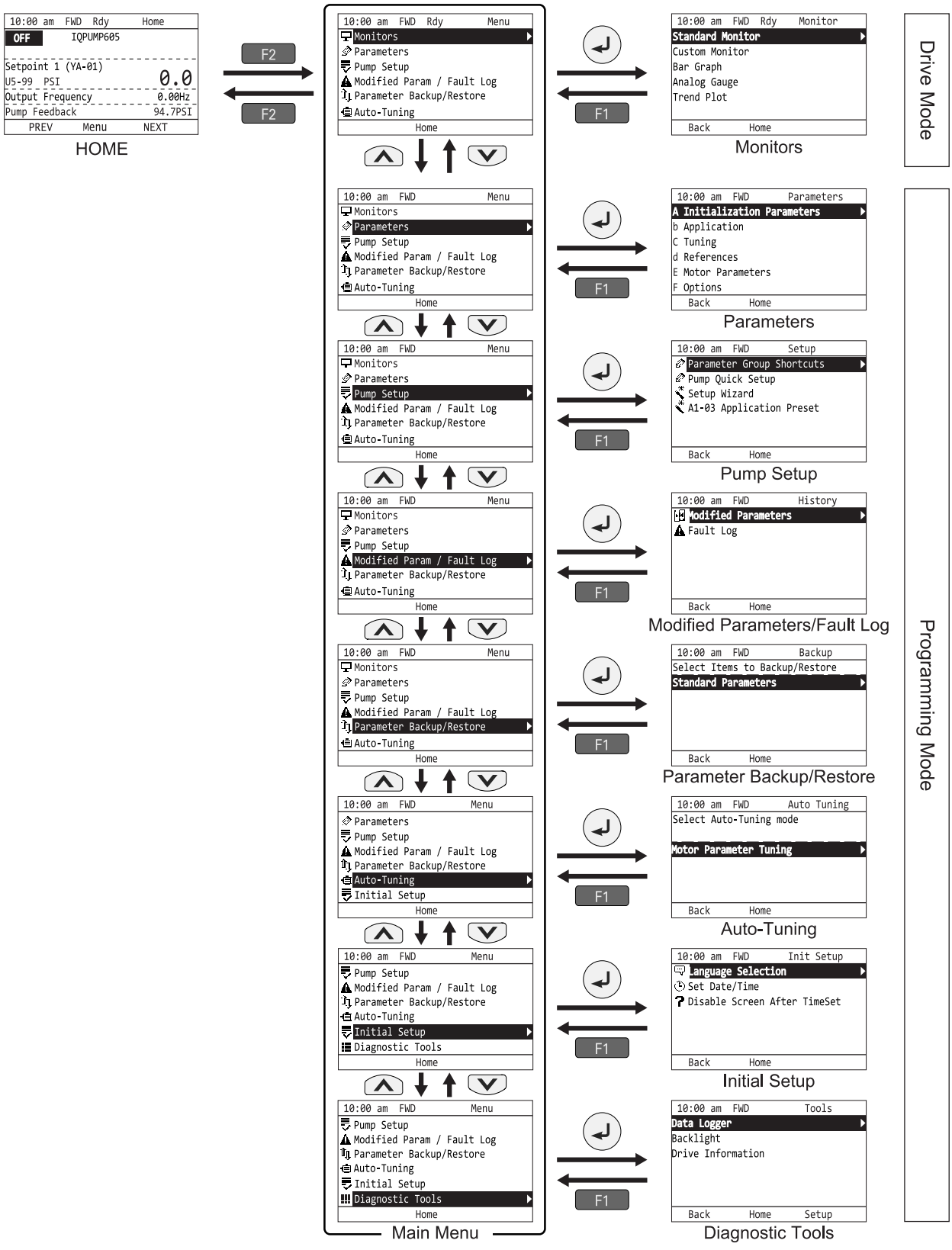


Figure 2.5 Keypad Functions and Display Levels

Note:

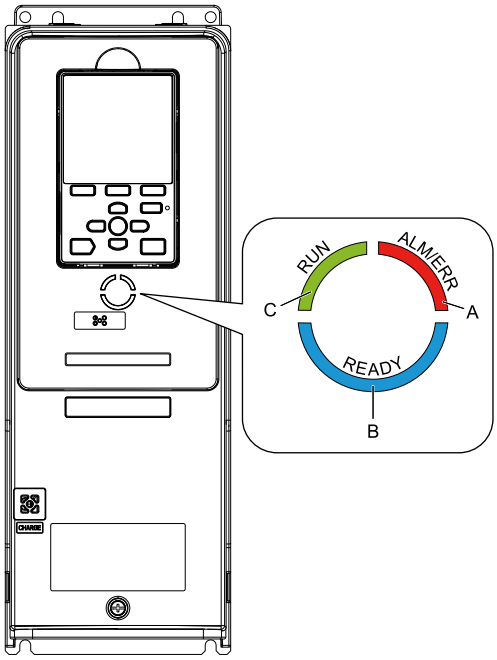
- Energize the drive with factory defaults to show the Initial Setup screen. Push F2 (Home) to show the HOME screen.
  – Select [TURN OFF power up setup screen] from the [Disable Screen After TimeSet] setting to not display the Initial Setup screen.
- Push < from the Home screen to show drive monitors.
- Push ↵ to set *U5-99/YA-01 [Reference 1]* when you set *b1-01 = 0 [Frequency Reference Selection 1 = Keypad]*.
- The keypad will show [Rdy] when the drive is in Drive Mode. The drive is prepared to accept a Run command.
- The drive will not accept a Run command in Programming Mode in the default setting. Set *b1-08 [Run Command Select in PRG Mode]* to accept or reject a Run command from an external source while in Programming Mode.
  – Set *b1-08 = 0 [Disregard RUN while Programming]* to reject the Run command from an external source while in Programming Mode (default).
  – Set *b1-08 = 1 [Accept RUN while Programming]* to accept the Run command from an external source while in Programming Mode.
  – Set *b1-08 = 2 [Allow Programming Only at Stop]* to prevent changes from Drive Mode to Programming Mode while the drive is operating.

Table 2.4 Drive Mode Screens and Functions

Mode	Keypad Screen	Function
Drive Mode	Monitors	Sets monitor items to display.
Programming Mode	Parameters	Changes parameter settings.
	Pump Setup	Shows Parameter Group Shortcuts, Pump Quick Setup, and Wizards.
	Modified Parameters/Fault Log	Shows modified parameters and fault history.
	Parameter Backup/Restore	Saves parameters to the keypad as backup.
	Auto-Tuning	Auto-Tunes the drive.
	Initial Setup	Changes initial settings.
	Diagnostic Tools	Sets data logs and backlight.

2.2 LED Status Ring

The LED Status Ring on the drive cover shows the drive operating status.



A - ALM/ERR **C - RUN**
B - Ready

LED		Status	Description
A	ALM/ERR	Illuminated	The drive detects a fault.
		Flashing *1	The drive detects: • An alarm • An oPE parameter setting error • An Auto-Tuning error **Note:** If the drive detects a fault and an alarm at the same time, the LED will illuminate to identify a fault.
		OFF	There are no drive faults or alarms.
B	Ready	Illuminated	The drive is operating or is prepared for operation.
		Flashing *1	The drive is in *STo [Safe Torque OFF]* condition.
		Flashing Quickly *1	The voltage of the main circuit power supply dropped, and only the external 24 V power supply is providing the power to the drive.
		OFF	• The drive detects a fault. • There is no fault and the drive received a Run command, but the drive cannot operate. For example, in Programming Mode.

LED		Status	Description
C	RUN	Illuminated	The drive is in regular operation.
		Flashing *1	• The drive is decelerating to stop. • The drive received a Run command with a frequency reference of 0 Hz. • The drive received a DC Injection Braking command. • *H1-xx = 70 [Drive Enable No Run Cycle]* removed while HAND MFDI closed. • When *b1-02/b1-16 = 7/8/9* and AUTO is pressed, waiting for RUN command (from External/Serial/Option). • When *b1-02/b1-16 = 7/8/9* and Run command given (from External/Serial/Option) and waiting for AUTO press. • When *b1-02/b1-16 = 7/8/9* and the HAND MFDI is removed while the Run command is present. • When *b1-02/b1-16 = 0*, AUTO is pressed and *H1-xx = 70 [Drive Enable No Run Cycle]* is opened.
		Flashing Quickly *1	• The drive received a Run command from the MFDI terminals when *b1-02 = 0 [Run Command Selection 1 = Keypad]* and you changed the setting to *b1-02 = 1 or 7 [Digital Input or AUTO Command + Term Run]*. • The drive received a Run command from the MFDI terminals when the drive is not in Drive Mode. • The drive received a Fast Stop command. • The safety function shuts off the drive output. • You pushed OFF on the keypad when the drive is operated from a REMOTE source. • The drive is energized with an active Run command and *b1-17 = 0 [Run Command at Power Up = Disregard Existing RUN Command]*. • The drive is set to coast-to-stop with timer (*b1-03 = 3 [Stopping Method Selection = Coast to Stop with Timer]*), and the Run command is disabled then enabled during the Run wait time. • Drive Enable Command removed while HAND MFDI closed. • OFF pressed while running in HAND from MFDI. • Exited Emergency Override with HAND MFDI closed. • Drive Enable input removed while an external Run command is present. • *b1-02/b1-16 = 1/2/3* and *Y5-03 = 0 [HAND/AUTO Switchover During Run]* and HAND MFDI is opened while external run input is present. • Drive exits Emergency Override operation with an external Run command present.
		OFF	The motor is stopped.

*1 Refer to Figure 2.6 for the difference between “flashing” and “flashing quickly”.

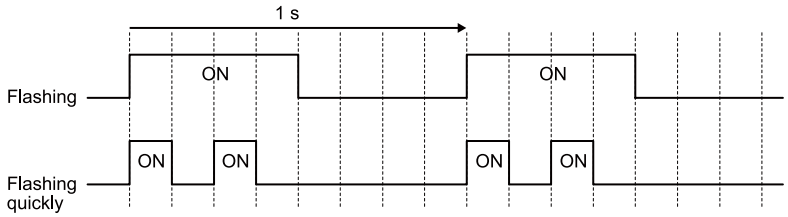


Figure 2.6 LED Flashing Statuses

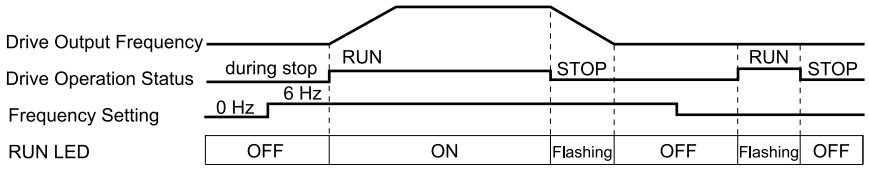


Figure 2.7 Relation between RUN LED and Drive Operation

2.3 Parameter Group Shortcuts

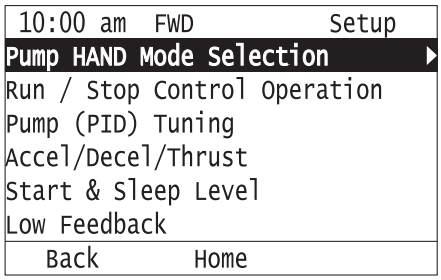
The drive has 16 Parameter Group Shortcuts that are accessible from the HOME screen. These Parameter Groups show commonly used iQpump605 functions and their corresponding parameters to allow for faster access and modification.

This section shows the procedure to access the Parameter Group Shortcuts menu.

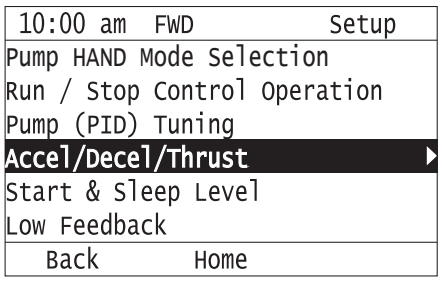
1. Push F2 (Home) to show the HOME screen.

Note:
- The keypad will show [Home] in the top right corner when the HOME screen is active.
- If [Home] is not shown on F2, push F1 (Back) to show [Home] on F2.

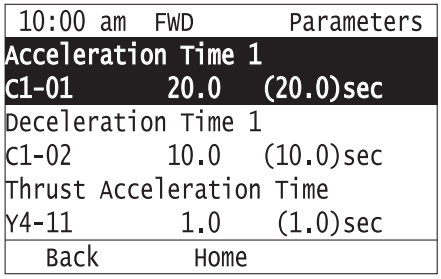
2. Push ➔.



3. Push ▲ or ▼ to select one of the Parameter Group Shortcuts , then push ↵.



4. Push ▲ or ▼ to select [A Initialization Parameters], then push ↵.



5. You can now edit the parameters in the Parameter Group Shortcut that you selected.

◆ Parameter Group Shortcut Selections and Contents

This table lists the 16 Parameter Group Shortcuts and the corresponding accessible parameters in each shortcut:

Table 2.5 Parameter Group Shortcut Selections

Shortcut Group	Parameter	Description
Pump HAND Mode Selection	Y5-01	HAND Frequency Reference Source
	Y5-02	HAND Frequency Reference 1
	Y5-03	HAND/AUTO Switchover During Run
	Y5-04	Operation HAND Key
	Y5-05	HAND Frequency Reference 2
	Y5-06	HAND Reference Prime Loss Level
	Y5-07	HAND Reference Prime Loss Lvl 2
	Y5-09	HAND MOP Selection
	Y4-10	AUTO Key Memory At Power Down
Run / Stop Control Operation	b1-01	Frequency Reference Selection 1
	b1-02	Run Command Selection 1
	b1-03	Stopping Method Selection
	b1-04	Reverse Operation Selection
	b1-11	Run Delay @ Stop (Backspin)
	b1-14	Phase Order Selection
	Y4-10	AUTO Key Memory At Power Down
	Y4-17	Utility Start Delay
Pump (PID) Tuning	b5-01	PID Mode Setting
	b5-02	Proportional Gain (P)
	b5-03	Integral Time (I)
	b5-09	PID Output Level Selection
Accel/Decel/Thrust	C1-01	Acceleration Time 1
	C1-02	Deceleration Time 1
	Y4-11	Thrust Acceleration Time
	Y4-12	Thrust Frequency
	Y4-13	Thrust Deceleration Time
Start & Sleep Level	Y1-04	Sleep Wake-up Level
	Y1-05	Sleep Wake-up Level Delay Time
	Y1-06	Minimum Speed
	Y2-03	Sleep Delay Time
	Y2-05	Sleep Boost Level
	Y2-06	Sleep Boost Hold Time
	Y2-07	Sleep Boost Max Time
Low Feedback	Y1-08	Low Feedback Level
	Y1-09	Low Feedback Lvl Fault Dly Time
	Y1-10	Low Feedback Selection
	L5-40	Low Feedback Flt Retry Selection
	L5-43	LowFeedback Fault Retry Attempts
	L5-46	Low Feedback Fault Restart time

Shortcut Group	Parameter	Description
High Feedback	Y1-11	High Feedback Level
	Y1-12	High Feedback Lvl Fault Dly Time
	Y1-13	High Feedback Selection
	L5-41	Hi Feedback Flt Retry Selection
	L5-44	Hi Feedback Fault Retry Attempts
	L5-47	High Feedback Fault Restart time
Setpoint Not Met	Y1-15	Maximum Setpoint Difference
	Y1-16	Not Maintaining Setpoint Time
	Y1-17	Not Maintaining Setpoint Sel
	L5-50	Setpoint Not Met Fault Retry Sel
	L5-54	Setpoint Not Met Retry Attempts
	L5-58	Setpoint Not Met Restart Time
Dry Run/Loss of Prime	Y1-18	Prime Loss Detection Method
	Y1-19	Prime Loss Level
	Y1-20	Prime Loss Time
	Y1-22	Prime Loss Selection
	Y1-23	Prime Loss Max Restart Time
	L5-51	Loss of Prime Fault Retry Select
	L5-55	Loss of Prime Flt Retry Attempts
Pre-Charge	Y4-01	Pre-Charge Level
	Y4-02	Pre-Charge Frequency
	Y4-03	Pre-Charge Time
	Y4-05	Pre-Charge Loss Of Prime Level
	Y4-06	Pre-Charge Frequency 2
	Y4-07	Pre-Charge Time 2
	Y4-08	Pre-Charge Loss Of Prime Level 2
Output Current Limit	YC-01	Output Current Limit Select
	YC-02	Current Limit
Pump Over Cycle	Y2-10	Max Cycling Protection Allowed
	Y2-11	Cycling Count Decrement Time
	Y2-12	Over Cycle Mode
	L5-52	Over Cycle Fault Retry Selection
	L5-56	Over Cycle Fault Retry Attempts
	L5-59	Over Cycle Fault Restart Time
Auto-Restart	L5-01	Number of Auto-Restart Attempts
	L5-04	Interval Method Restart Time
Single Phase Foldback	YC-10	Single Phase Foldback Sel
	YC-11	Ripple Regulator Setpoint
Multiple Setpoints	YA-01	Setpoint 1
	YA-02	Setpoint 2
	YA-03	Setpoint 3
	YA-04	Setpoint 4

Shortcut Group	Parameter	Description
Edit Default Drive Name	o1-83	Drive Name
	o1-84	Drive Name Unit Number

3

Network Communications

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3.1 Fieldbus Network Support

You can use the PLC to control and monitor the drive through the network. The drive has a standard RS-485 interface (MEMOBUS/Modbus communications). Install a separately sold communication option on the drive to support other network communications.

◆ Available Communication Options

Refer to Table 3.1 for the fieldbus networks that are compatible with the drive. Contact Yaskawa or your nearest sales representative to order a communication option.

Note:

Some fieldbus connectors may not fit the space of the drive. Contact Yaskawa or your nearest sales representative for information about the applicable connector type.

Table 3.1 Available Fieldbus Network

Type of Communications	Option Models	Type of Communications	Option Models
LonWorks	SI-W3	PROFIBUS-DP	SI-P3
Modbus TCP/IP	JOHB-SMP3	BACnet MS/TP	SI-B3
PROFINET	JOHB-SMP3	Metasys N2/APOGEE FLN (P1)	SI-J3
EtherNet/IP	JOHB-SMP3	BACnet/IP	JOHB-SMP3

3.2 MEMOBUS/Modbus Communications

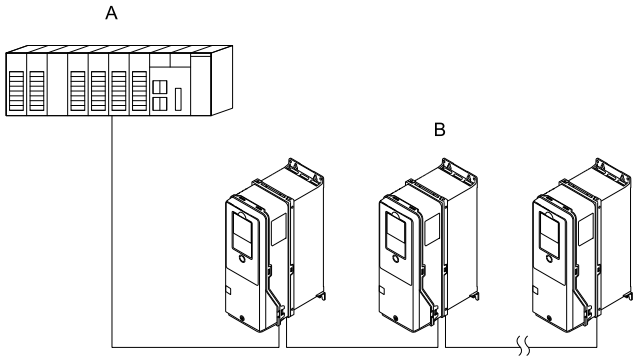
This section gives detailed information about the parameters, error codes and communication procedures for MEMOBUS/Modbus communications.

◆ Configure Master/Slave

You can use the MEMOBUS/Modbus protocol for serial communication with programmable controllers (PLC).

The MEMOBUS/Modbus communication uses one master (PLC) and a maximum of 31 slave drives. Serial communications usually starts with a signal from the master to the slave drives.

A slave drive that receives a command from the master does the specified function and then sends a response back to the master. You must set the address number for each slave drive before you start signal communications to make sure that the master uses the correct address numbers.



A - Master (PLC) **B - Slave (drive)**

Figure 3.1 PLC and Drive Connection Example

◆ Communication Specifications

Table 3.2 lists the specifications for the MEMOBUS/Modbus communications.

Table 3.2 MEMOBUS/Modbus Specifications

Item	Specification
Interface	RS-485
Synchronization method	Asynchronous (start-stop synchronization)
Communication parameter	Communications speed:1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 57.6, 76.8, 115.2 kbps
	Data length: 8 bit (fixed)
	Parity: even, odd, none
	Stop bit 1 bit (fixed)
Communication protocol	MEMOBUS/Modbus standard (RTU mode only)
Number of possible units to connect	Maximum: 31 units

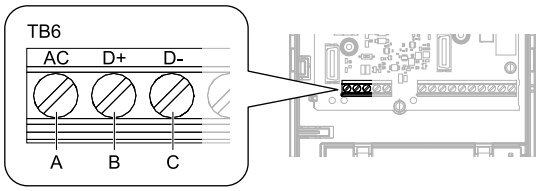
◆ Communication with the PLC

This section gives information about the settings for the termination resistor and how to connect to MEMOBUS/Modbus communications. MEMOBUS/Modbus communications uses an RS-485 interface (2-wire configuration).

■ Connect Communications Cable

Use this procedure to start communication between the PLC and drive.

1. De-energize the drive then connect the communications cable to the PLC and the drive. The drive uses terminal TB6 for MEMOBUS/Modbus communications.



A - Terminal AC: Signal ground
B - Terminal D+: Communication input/output (+)
C - Terminal D-: Communication input/output (-)

Figure 3.2 Communications Cable Connection Terminal (TB6)

Note:
Isolate the communications wiring from the main circuit wiring and other high-power wiring. Use shielded wires for the communications wiring and connect cable sheaths to the ground terminal of the drive. Incorrect wiring procedures could cause drive malfunction because of electrical interference.

2. Install the termination resistor on the network termination slave drive. Set the DIP switch S2 to the ON position to enable the termination resistor on the drive.
3. Energize the drive.
4. Use the drive keypad to set the necessary communications parameters *H5-01 to H5-12*.
   - *H5-01 [Drive Node Address]*
   - *H5-02 [Communication Speed Selection]*
   - *H5-03 [Communication Parity Selection]*
   - *H5-04 [Stopping Method after Com Error]*
   - *H5-05 [Comm Fault Detection Select]*
   - *H5-06 [Drive Transmit Wait Time]*
   - *H5-09 [CE Detection Time]*
   - *H5-10 [Modbus Register 0025H Unit Sel]*
   - *H5-11 [Communications ENTER Func Select]*
   - *H5-12 [Run Command Method Selection]*
5. De-energize the drive and wait for the keypad display to turn off or set *H5-20 = 1 [Communication Parameters Reload = Reload Now]*.
6. Energize the drive.

The drive is prepared to start communication with the PLC.

■ Set the Termination Resistor

You must enable the termination resistor on the slave terminal of the drive to use MEMOBUS/Modbus communications. Use DIP switch S2 on the terminal block to enable and disable the built-in termination resistor. Refer to Figure 3.3 for an example of how to set DIP switch S2. Use the tip of a tweezers or a jig with a tip width of 0.8 mm (0.03 in) to set the DIP switch. When you install the drive in the terminal of the communication line, set DIP switch S2 to ON. Set DIP switch S2 to OFF on all other drives.

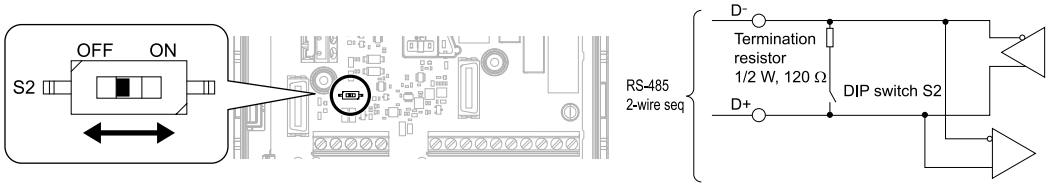


Figure 3.3 MEMOBUS/Modbus Communication Terminal and DIP Switch S2

■ Wiring Diagram for More than One Drive

Figure 3.4 shows how to wire more than one connected drive with using MEMOBUS/Modbus communications.

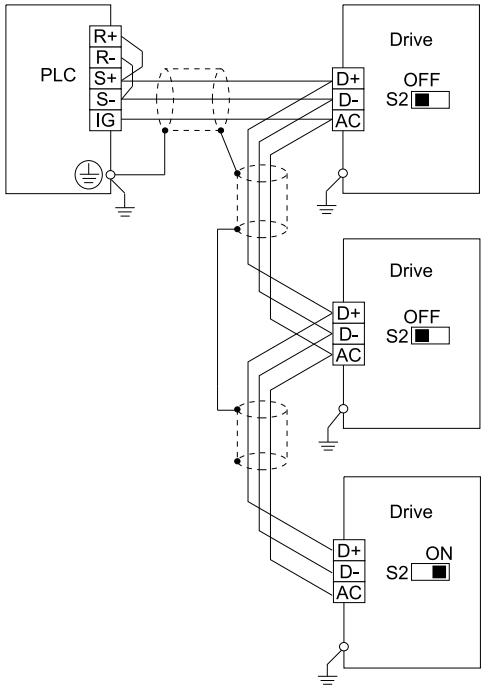


Figure 3.4 Wiring Diagram for More than One Drive

Note:

Set DIP switch S2 to the ON position on the last drive of the MEMOBUS/Modbus communication network to enable the termination resistor.

◆ MEMOBUS/Modbus Drive Operations

Drive parameters will apply to the settings when the drive is running during MEMOBUS/Modbus communications. This section gives information about the available functions and their related parameters.

■ Executable Functions

A PLC can do these operations with MEMOBUS/Modbus communications. Parameter settings (except *H5-xx*) do not have an effect on the availability of these operations.

- Monitor the drive status and operate the drive
- Set and view parameters
- Fault Reset
- Multi-function input setting (The input command from MEMOBUS/Modbus communications and MFDI terminals (S1 to S8) are linked by a logical OR operation.)

■ Drive Control

Select the external command that sets the frequency references and motor run/stop with MEMOBUS/Modbus communications. Use the information in Table 3.3 to set the parameters as specified by the application.

Table 3.3 Necessary Parameter Settings for Drive Control from MEMOBUS/Modbus

External Reference Selection	No.	Name	Setting Value
External reference 1	b1-01	Frequency Reference Selection 1	*2 [Memobus/Modbus Communications]*
	b1-02	Run Command Selection 1	*2 [Memobus/Modbus Communications]*
External reference 2	b1-15	Frequency Reference Selection 2	*2 [Memobus/Modbus Communications]*
	b1-16	Run Command Selection 2	*2 [Memobus/Modbus Communications]*

For more information about operation mode selection, refer to *[Frequency Reference Selection 1]* and *b1-02 [Run Command Selection 1]*. Refer to *H1-xx = 2 [MFDI Function Select = External Reference 1/2 Selection]* for more information about external commands.

◆ Communications Timing

To prevent overrun of the slave side, the master cannot send a message to the same drive for a selected length of time.

To prevent overrun of the master side, the slave cannot send a response message to the master for a selected length of time.

This section gives information about message timing.

■ Command Message from Master to Slave

To prevent data loss and overrun, after the master receives a message from the slave, the master cannot send the same type of command message to the same slave for a selected length of time. The minimum wait time is different for each type of message. Refer to Table 3.4 to find the minimum wait times.

Table 3.4 Minimum Wait Time to Send a Message

Command Type	Example	Minimum Wait Time
1	• Operation commands (Run command, stop command) • I/O settings • Reading the motor and parameter setting values	5 ms *1
2	Writing a parameter	H5-11 = 0: 50 ms H5-11 = 1: 200 ms *1
3	Writing of modified data with the Enter command	200 ms to 2 s, depending on the number of parameters that were changed *1
4	Enter with storage to drive EEPROM after initialization	5 s

*1 When the drive receives a message in the minimum wait time, it does command type 1 and sends a response message. If the drive receives command type 2 or command type 3 messages in the minimum wait time, it will trigger a communications error or the drive will ignore the command.

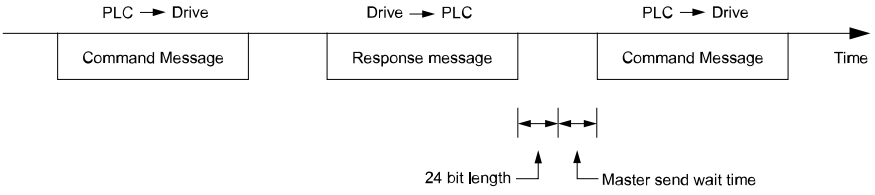


Figure 3.5 Minimum Wait Time to Send a Message

You must set the timer in the master to measure the length of time for the slave to respond to the master. If you set the timer, but the slave does not send a response message in a specified length of time, the master will send the message again.

■ Response Message from Slave

The slave receives the command message from the master then processes the data it received. The slave then waits for the time set in *H5-06 [Drive Transmit Wait Time]* then sends a response message to the master. If overrun occurs on the master, increase the wait time set in *H5-06*.

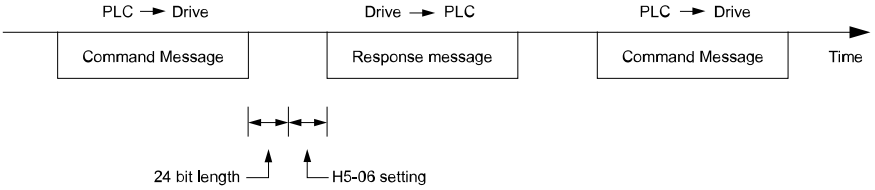


Figure 3.6 Response Wait Time

◆ Message Format

■ Communication Message Description

In MEMOBUS/Modbus communications, the master sends commands to the slave, then the slave responds. The master and slave send their messages in the configuration in Figure 3.7. The length of the data changes when the description of the command (function) changes.

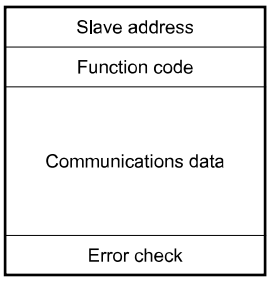


Figure 3.7 Message Format

■ Slave Address

Set the slave address of the drive to 00 to FF (Hex.). When the slave address is 00 (Hex), the master sends the command and all slaves receive the command.

The slave will not send a response message to the master.

■ Function Code

There are five function codes that set commands. Table 3.5 shows the different codes.

Table 3.5 Function Codes

Function Code (Hex.)	Subfunction Code (Hex.)	Function	Command Message		Response Message	
			Minimum Data Length (byte)	Maximum Data Length (byte)	Minimum Data Length (byte)	Maximum Data Length (byte)
03	-	Read Multiple Holding Registers	8	8	7	37
08	-	Loopback Test	8	8	8	8
10	-	Writing to Multiple Holding Registers	11	41	8	8
5A	-	Writing to Multiple Holding Registers / Reading the Register Indicated	11	41	17	17
67	010D	Reading the Contents of Non-Consecutive Holding Registers	10	248	10	248
	010E	Writing to Non-Consecutive Holding Registers	14	250	8	8

■ Communications Data

Communications data is a series of data that uses the combination of the communications register number and the data for these registers. The data length changes when the description of the command changes. For a loopback test, it switches to test code.

The communications register for the drive has a 2-byte length. Data that is written to the register for the drive is usually 2 bytes. Register data that is read from the drive is also 2 bytes.

■ Error Check

Error check uses the CRC-16 method to detect transmission errors. Use the procedure in this section to calculate CRC-16.

Command Data

When the drive receives data, it will make sure that there are no errors in the data. The drive uses the procedure below to calculate CRC-16, then the drive compares that data with the CRC-16 value in the message. If the CRC-16 values do not agree, the drive will not execute a command message.

When you calculate CRC-16 in MEMOBUS/Modbus communications, make sure that you set the start value as FFFF (Hex.). All 16 bits must be 1.

Use this procedure to calculate CRC-16:

1. Make sure that the start value is FFFF (Hex.).
2. Calculate the FFFF (Hex.) start value and the XOR of the slave address (exclusive OR).
3. Move the step 2 results one column to the right. Do this shift until the carry bit is 1.
4. When the carry bit is 1, calculate XOR via the result from the above step 3 and A001 (Hex.).
5. Do steps 3 and 4 until the 8th shift to the right.
6. Use the result of step 5 to calculate the XOR and the data of the following messages (function code, register address, data). Do steps 3 to 5 until the last data, then calculate.
7. The result of the last right shift or the value of the last XOR calculation is the result for CRC-16.

Table 3.6 lists examples of the CRC-16 calculation of slave address 02 (Hex.) and function code 03 (Hex.). The calculated results of CRC-16 for this section is D140 (Hex.).

Note:

The calculation example only gives information about some error checks with CRC-16. The drive will do the same error checks for the next data.

Table 3.6 CRC-16 Calculation Example

Description	Calculation	Overflow	Description	Calculation	Overflow
Initial value (FFFF (Hex.))	1111 1111 1111 1111	-	Function code 03 (Hex.)	0000 0011	-
Address 02 (Hex.)	0000 0010	-	XOR w result	1000 0001 0011 1101	-
XOR w initial value	1111 1111 1111 1101		Shift 1	0100 0000 1001 1110	1
Shift 1	0111 1111 1111 1110	1	XOR w A001 (Hex.)	1010 0000 0000 0001	-
XOR w A001 (Hex.)	1010 0000 0000 0001	-	XOR result	1110 0000 1001 1111	-
XOR result	1101 1111 1111 1111	-	Shift 2	0111 0000 0100 1111	1
Shift 2	0110 1111 1111 1111	1	XOR w A001 (Hex.)	1010 0000 0000 0001	-
XOR w A001 (Hex.)	1010 0000 0000 0001	-	XOR result	1101 0000 0100 1110	-
XOR result	1100 1111 1111 1110	-	Shift 3	0110 1000 0010 0111	0
Shift 3	0110 0111 1111 1111	0	Shift 4	0011 0100 0001 0011	1
Shift 4	0011 0011 1111 1111	1	XOR w A001 (Hex.)	1010 0000 0000 0001	-
XOR w A001 (Hex.)	1010 0000 0000 0001	-	XOR result	1001 0100 0001 0010	-
XOR result	1001 0011 1111 1110	-	Shift 5	0100 1010 0000 1001	0
Shift 5	0100 1001 1111 1111	0	Shift 6	0010 0101 0000 0100	1
Shift 6	0010 0100 1111 1111	1	XOR w A001 (Hex.)	1010 0000 0000 0001	-
XOR w A001 (Hex.)	1010 0000 0000 0001	-	XOR result	1000 0101 0000 0101	-
XOR result	1000 0100 1111 1110	-	Shift 7	0100 0010 1000 0010	1
Shift 7	0100 0010 0111 1111	0	XOR w A001 (Hex.)	1010 0000 0000 0001	-
Shift 8	0010 0001 0011 1111	1	XOR result	1110 0010 1000 0011	-
XOR w A001 (Hex.)	1010 0000 0000 0001	-	Shift 8	0111 0001 0100 0001	1
XOR result	1000 0001 0011 1110	-	XOR w A001 (Hex.)	1010 0000 0000 0001	-

Description	Calculation	Overflow	Description	Calculation	Overflow
Perform operations with next data (function code)			XOR result	1101 0001 0100 0000	-
			CRC-16	1101 0001 0100 0000	-
				D 1 4 0 (Lower) (Upper)	-
			Continue from here with next data.		

Response Data

The drive does the CRC-16 calculation for the response message and makes sure that the data does not have errors. Make sure that the calculated value is the same value as the CRC-16 in the response message.

◆ Examples of Messages for Commands/Responses

The items in this section are examples of messages for commands/responses.

■ Read Multiple Holding Registers

Uses function code 03 (Hex.) to read the contents of a maximum of 16 holding registers.

Table 3.7 shows example messages when the drive reads status signal from the drive of slave 2, the error contents, fault contents, and frequency references.

Table 3.7 Message Example When Reading the Contents of Holding Register

Byte	Command Message		Setting Data (Hex.)	Response Message (Normal)		Setting Data (Hex.)	Response Message (Fault)		Setting Data (Hex.)
0	Slave address		02	Slave address		02	Slave address		02
1	Function code		03	Function code		03	Function code		83
2	Starting No.	Upper	00	Data Qty		08	Error code		03
3		Lower	20	First storage register	Upper	00	CRC-16	Upper	F1
4	Data Qty	Upper	00		Lower	65		Lower	31
5		Lower	04	Next storage register	Upper	00	-		
6	CRC-16	Upper	45		Lower	00	-		
7		Lower	F0	Next storage register	Upper	00	-		
8	-				Lower	00	-		
9	-			Next storage register	Upper	01	-		
10	-				Lower	F4	-		
11	-			CRC-16	Upper	AF	-		
12	-				Lower	82	-		

■ Loopback Test

The loopback test uses function code 08 (Hex.) and returns the command message as a response message. This test checks communication between the master and slave. The test code and data can use desired values.

Table 3.8 shows examples of messages given out when the loopback test is done with the drive of slave 1.

Table 3.8 Message Examples from the Loopback Test

Byte	Command Message		Setting Data (Hex.)	Response Message (Normal)		Setting Data (Hex.)
0	Slave address		01	Slave address		01
1	Function code		08	Function code		08
2	Test code	Upper	00	Test code	Upper	00
3		Lower	00		Lower	00
4	Data	Upper	A5	Data	Upper	A5
5		Lower	37		Lower	37

Byte	Command Message		Setting Data (Hex.)	Response Message (Normal)		Setting Data (Hex.)
6	CRC-16	Upper	DA	CRC-16	Upper	DA
7		Lower	8D		Lower	8D

■ Writing to Multiple Holding Registers

You can write the data that you set to the number of holding registers set in function code 10 (hex). You must configure the number of the holding registers and each 8 higher bits and 8 lower bits in order in the command message for the write data. You can write to a maximum of 16 holding registers.

Table 3.9 shows example messages when you use the PLC to set Forward run in the drive of slave 1 with a 60.00 Hz frequency reference.

When you rewrite the parameter value with the write command through the *H5-11 [Comm ENTER Command Mode]* setting, you must use the Enter command to save and enable the contents of the changes. Refer to *Enter Command on page 39* for more information.

Table 3.9 Message Example When Writing to Multiple Holding Registers

Byte	Command Message		Setting Data (Hex.)	Response Message (When Normal)		Setting Data (Hex.)	Response Message (When There is a Fault)		Setting Data (Hex.)
0	Slave address		01	Slave address		01	Slave address		01
1	Function code		10	Function code		10	Function code		90
2	Starting No.	Upper	00	Starting No.	Upper	00	Error code		02
3		Lower	01		Lower	01	CRC-16	Upper	CD
4	Data Quantity	Upper	00	Data Quantity	Upper	00		Lower	C1
5		Lower	02		Lower	02	-		
6	Byte No.		04	CRC-16	Upper	10	-		
7	First data Data Quantity	Upper	00		Lower	08	-		
8		Lower	01	-			-		
9	Next data	Upper	17	-			-		
10		Lower	70	-			-		
11	CRC-16	Upper	6D	-			-		
12		Lower	B7	-			-		

Note:

The number of bytes set in the command message set the data quantity × 2 during the command message. The response message uses the same formula.

■ Reading from More than One Holding Register/Reading the Indicated Register

The drive uses function code 5A (Hex.) to write to more than one register, then it reads the contents of four holding registers at the same time.

The function for writing to more than one register is the same as the function for function code 10 (Hex.). You can write to a maximum of 16 holding registers.

The four holding registers to be read from are specified in *H5-25 to H5-28 [Function 5A Register x Selection]*.

Table 3.10 shows example messages when you write to more than one holding register or when you read more than one command register. Table 3.10 uses this register data for the examples:

- The drive for slave 1 is set for Forward run with a frequency reference of 60.00 Hz.
- The setting in *H5-25* to *H5-28* and the data in the specified holding registers are as follows.
  - *H5-25* = 0044H: *U1-05 [Motor Speed]* = 60.00 Hz (6000 = 1770H)
  - *H5-26* = 0045H: *U1-06 [Output Voltage]* = 200.0 V (2000 = 07D0H)
  - *H5-27* = 0042H: *U1-03 [Output Current]* = 50% of drive rated current (100% = 8192, 50% = 4096 = 1000H)
  - *H5-28* = 0049H: *U1-10 [Input Terminal Status]* = 00H

When you rewrite the parameter value with the write command through the *H5-11 [Comm ENTER Command Mode]* setting, you must use the Enter command to save and enable the contents of the changes. Refer to *Enter Command on page 39* for more information.

Table 3.10 Message Example When Reading from More than One Holding Register/Reading the Indicated Register

Byte	Command Message			Response Message (when normal)			Response Message (when there is a fault)		
			Setting Data (Hex.)			Setting Data (Hex.)			Setting Data (Hex.)
0	Slave address		01	Slave address		01	Slave address		01
1	Function Code		5A	Function Code		5A	Function Code		DA
2	Starting No.	Upper	00	Register status		0F	Register status		0F
3		Lower	01	Data in holding register 1 selected with *H5-25*	Upper	17	Data in holding register 1 selected with *H5-25*	Upper	17
4	Data Qty	Upper	00		Lower	70		Lower	70
5		Lower	02	Data in holding register 2 selected with *H5-26*	Upper	07	Data in holding register 2 selected with *H5-26*	Upper	07
6	Byte No.		04		Lower	D0		Lower	D0
7	First data	Upper	00	Data in holding register 3 selected with *H5-27*	Upper	10	Data in holding register 3 selected with *H5-27*	Upper	10
8		Lower	01		Lower	00		Lower	00
9	Next data	Upper	17	Data in holding register 4 selected with *H5-28*	Upper	00	Data in holding register 4 selected with *H5-28*	Upper	00
10		Lower	70		Lower	00		Lower	00
11	CRC-16	Upper	4F	Starting No.	Upper	00	Error Codes		02
12		Lower	43		Lower	01	CRC-16	Upper	E9
13	-			Data Qty	Upper	00		Lower	6C
14	-				Lower	02	-		
15	-			CRC-16	Upper	AC	-		
16	-				Lower	D0	-		

Note:
The number of bytes set in the command message set the data quantity × 2 during the command message.

Register status	
bit 0	Data in register 1 selected with *H5-25* 1: Successfully read the register 0: Register read error
bit 1	Data in register 2 selected with *H5-26* 1: Successfully read the register 0: Register read error
bit 2	Data in register 3 selected with *H5-27* 1: Successfully read the register 0: Register read error
bit 3	Data in register 4 selected with *H5-28* 1: Successfully read the register 0: Register read error
bit 4	Not used
bit 5	Not used
bit 6	Not used
bit 7	Not used

■ Reading the Contents of Non-Consecutive Holding Registers

The drive uses function code 67 (Hex.) and subfunction code 010D (Hex.) to read data with a maximum of 120 holding registers.

You must give the holding register number from which to read separately.

Table 3.11 shows example messages when you read the frequency reference and torque limit from the drive for slave 1. Table 3.11 uses these specified holding registers data for the examples.

- 0024H:*U1-01 [Frequency Reference]* = 60.00 Hz (6000 = 1770H)
- 0028H:*U1-09 [Torque Reference]* = 100.0% (1000 = 03E8H)

Table 3.11 Message Example When Reading the Contents of Non-Consecutive Holding Registers

Byte	Command Message			Response Message (when normal)			Response Message (when there is a fault)		
			Setting Data (Hex.)			Setting Data (Hex.)			Setting Data (Hex.)
0	Slave address		01	Slave address		01	Slave address		01
1	Function Code		67	Function Code		67	Function Code		E7
2	Subfunction Code	Upper	01	Subfunction Code	Upper	01	Error Codes		02
3		Lower	0D		Lower	0D	CRC-16	Upper	EA
4	Data Qty	Upper	00	Byte No.	Upper	00		Lower	31
5		Lower	02		Lower	04	-		
6	Holding register 1 No.	Upper	00	Holding register 1 data	Upper	17	-		
7		Lower	24		Lower	70	-		
8	Holding register 2 No.	Upper	00	Holding register 2 data	Upper	03	-		
9		Lower	28		Lower	E8	-		
10	CRC-16	Upper	8B	CRC-16	Upper	47	-		
11		Lower	29		Lower	ED	-		

Note:

The number of bytes set within the response message sets twice the number of data contained in the command message.

■ Writing to Non-Consecutive Holding Registers

The drive uses function code 67 (Hex.) and subfunction code 010E (Hex.) to read data with a maximum of 60 holding registers.

You must give the holding register number from which to write separately.

Table 3.12 shows example messages when you write the frequency reference and torque limit from the drive for slave 1. Table 3.12 uses these specified holding registers data for the examples.

- 0002H: Frequency Reference = 60.00 Hz (6000 = 1770H)
- 0004H: Torque Limit = 150.0% (1500 = 05DCH)

When you rewrite the parameter value with the write command through the *H5-11 [Comm ENTER Command Mode]* setting, you must use the Enter command to save and enable the contents of the changes. Refer to *Enter Command on page 39* for more information.

Table 3.12 Message Example When Writing to Non-Consecutive Holding Registers

Byte	Command Message			Response Message (when normal)			Response Message (when there is a fault)		
			Setting Data (Hex.)			Setting Data (Hex.)			Setting Data (Hex.)
0	Slave address		01	Slave address		01	Slave address		01
1	Function Code		67	Function Code		67	Function Code		E7
2	Subfunction Code	Upper	01	Subfunction Code	Upper	01	Error Codes		02
3		Lower	0E		Lower	0E	CRC-16	Upper	EA
4	Data Qty	Upper	00	Data Qty	Upper	00		Lower	31
5		Lower	02		Lower	02	-		

Byte	Command Message			Response Message (when normal)			Response Message (when there is a fault)
			Setting Data (Hex.)			Setting Data (Hex.)	Setting Data (Hex.)
6	Byte No.	Upper	00	CRC-16	Upper	D5	-
7		Lower	04		Lower	FC	-
8	Holding register 1 No.	Upper	00	-			-
9		Lower	02	-			-
10	Holding register 1 data	Upper	17	-			-
11		Lower	70	-			-
12	Holding register 2 No.	Upper	00	-			-
13		Lower	04	-			-
14	Holding register 2 data	Upper	05	-			-
15		Lower	DC	-			-
16	CRC-16	Upper	55	-			-
17		Lower	59	-			-

Note:
The number of bytes set in the command message set the data quantity × 2 during the command message.

◆ Enter Command

When you use MEMOBUS/Modbus communications to write parameters from the PLC to the drive, *H5-11 [Comm ENTER Command Mode]* lets you use the Enter command to enable these parameters. This section gives information about the Enter command.

■ Types of Enter Commands

The drive supports the two Enter commands shown in Table 3.13.

Write 0 to register number 0900 or 0910 (Hex.) to enable the Enter command. You can only write to these registers. If you read to these registers, it will cause an error.

Table 3.13 Types of Enter Commands

Register No. (Hex.)	Description
0900	When you write parameter data to the EEPROM, you will enable the data on the RAM at the same time. This process saves the parameter changes even if you de-energize the drive.
0910	This updates the data on the RAM, but does not write data to the EEPROM. If you de-energize the drive, you will lose the parameter changes.

Note:
- You can write the EEPROM to the drive a maximum of 100,000 times. Do not frequently execute the Enter command (0900 (Hex.)) that is written to EEPROM.
- The Enter command register is write-only. If this register is read, it will cause a Register Number Error (02 (Hex.)).
- When the command data or broadcast message is transmitted to the drive, the Enter command is not necessary.

■ Functions of the Enter Command when Replacing a Previous Generation Drive

When you replace a previous generation Yaskawa drive with this product, you must set the Enter command function for this product the same as the previous product. The Enter command function is different for Yaskawa G7, F7-series, and V7-series drives.

Use *H5-11* to set the Enter command function:

- When replacing G7 and F7 series drives, set *H5-11 = 0 [ENTER Command Required]*.
- When replacing V7 series drives, set *H5-11 = 1 [ENTER Command Not Required]*.
- When replacing 1000-series drives, set *H5-11* to the same value as the drive you replaced.

Table 3.14 Enter Command Function Differences

H5-11 Settings	H5-11 = 0	H5-11 = 1
The drive you replaced	G7, F7	V7
Time when the parameter settings are enabled	When the drive receives the Enter command from the master	When you change the parameter settings
Upper and lower limit check	Checks the upper and lower limits and considers the related parameter settings.	Checks the upper and lower limit of the changed parameter only.
Default setting of related parameters	Will not change related parameter settings. You must change the parameters manually.	Automatically changes the default settings for the related parameters.
Fault detection when you set more than one parameter	Accepts and responds as usual to correct setting data if the data contains parameter setting errors. The drive discards the disabled setting data, but will not return an error message.	If there is a setting error in a parameter, the drive responds with a fault. The drive discards the data that was sent.

◆ Self-Diagnostics

The drive can use Self-Diagnostics to verify the hardware transceiver on the control circuit board. Self-Diagnostics connects the transmission terminal to the reception terminal on the control circuit and transmits the data to itself to make sure that the drive can communicate correctly.

Use this procedure to do Self-Diagnostics:

⚠ DANGER Electrical Shock Hazard

Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, remove the covers before measuring for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.

1. Energize the drive.
2. Set *H1-06 = 67 [Terminal S6 Function Selection = Communications Test Mode]*.
3. De-energize the drive.
4. Connect a jumper between control circuit terminals S6 and SN.

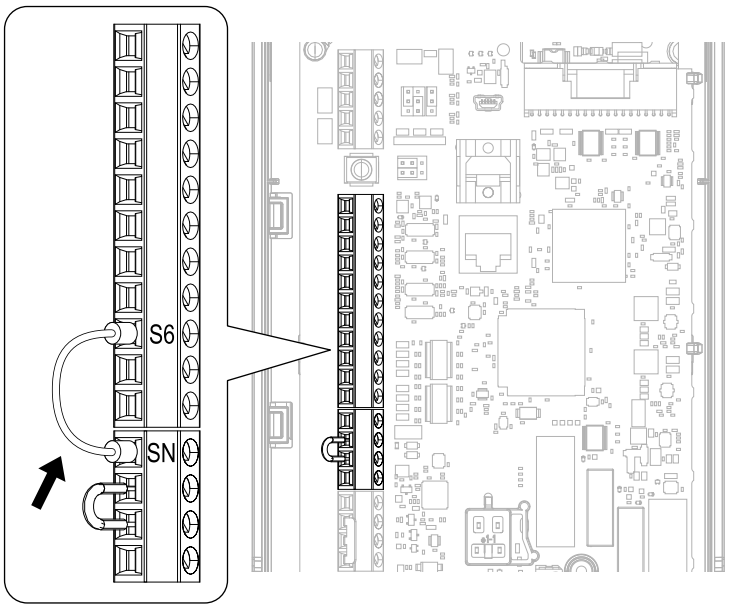


Figure 3.8 Self-Diagnostics Jumper Terminals

5. Energize the drive.

6. When normal, the keypad will show *PASS [Modbus Communication Test]*.

Note:
If there is an error, the keypad will show *CE [Modbus Communication Error]*. Disconnect the drive from the network and test the drive again. If the error stays, there is a possible hardware problem. If there is no error, there is a possible network wiring problem.

7. De-energize the drive.
8. Disconnect the wire jumper between terminals S6 and SN. Set terminal S6 to its initial function.

Self-Diagnostics is complete and the drive returns to its usual function.

◆ Communications Data Table

Command Data on page 41, *Monitor Data on page 46*, and *Broadcast Messages on page 59* show the communications data. The data types are command data, monitor data, and broadcast message.

Refer to the Parameter List for parameter communications registers.

■ Command Data

You can read and write command data.

Note:
Set the reserved bit to 0. Do not write the data in the reserved register or the monitor register.

Table 3.15 MEMOBUS/Modbus Communications Command Data

Register No. (Hex.)	Description	
0000	Reserved	
0001	Run command, multi-function input command	
	bit 0	When *H5-12 = 0*, Forward run/stop 1: Forward run, 0: Stop When *H5-12 = 1*, run/stop 1: Run, 0: Stop
	bit 1	When *H5-12 = 0*, Reverse run/stop 1: Reverse run, 0: Stop When *H5-12 = 1*, Forward/Reverse run 1: Reverse, 0: Forward run
	bit 2	External fault 1: EF0 [Option Card External Fault]
	bit 3	Fault Reset Procedure 1: Reset command
	bit 4	Multi-function input 1 When *H1-01 = 40 [Forward Run Command (2-Wire Seq)]*, the multi-function input command is "ComRef". **Note:** When you switch the bit ON as ComRef, the frequency reference source changes to MEMOBUS/Modbus communications. When you connect a communication option to the drive, the frequency reference source gives priority to the communications option.
	bit 5	Multi-function input 2 When the multi-function input command is *H1-02 = 41 [Reverse Run Command (2-Wire Seq)]*, bit 5 is "ComCtrl". **Note:** 1. When you switch the bit ON as ComCtrl, the Run Command source changes to MEMOBUS/Modbus communications. When you connect a communication option to the drive, the Run Command source gives priority to the communications option. 2. If the Run Command Selection is set to Keypad (*b1-02/b1-16 = 0*), the "ComCtrl" input command is ignored.
	bit 6	Multi-function input 3
	bit 7	Multi-function input 4
	bit 8	Multi-function input 5
	bit 9	Multi-function input 6
	bit A	Multi-function input 7
	bit B	Multi-function input 8
	bit C - F	Reserved
0002	Frequency reference	*o1-03 [Frequency Display Unit Selection]* (unsigned) sets the units.
0003	Output voltage gain	Units: 0.1 % Setting range: 20 (2.0%) to 2000 (200.0%), the default value at energize: 1000 (100.0%)
0004	Torque reference/torque limit (0.1% signed)	
0005	Torque compensation (0.1% signed)	
0006	PID setpoint (0.01% signed)	
0007	Setting for the multi-function analog monitor output terminal 1 (10 V/4000 H)	
0008	Setting for the multi-function analog monitor output terminal 2 (10 V/4000 H)	

Register No. (Hex.)	Description	
0009	MFDO setting	
	bit 0	MFDO (terminal M1-M2) 1: ON, 0: OFF
	bit 1	MFDO (terminal M3-M4) 1: ON, 0: OFF
	bit 2	MFDO (terminal MD-ME-MF) 1: ON, 0: OFF
	bit 3 - 5	Reserved
	bit 6	1: bit 7 function is enabled
	bit 7	Fault relay output (terminal MA/MB-MC) 1: ON, 0: OFF
	bit 8 - F	Reserved
000A - 000C	Reserved	
000D	PI2 Control Setpoint	Units: 0.01% Setting range: -100.00% to +100.00% To enable this function, set MEMOBUS register 000F, bit 4 = 1.
000E	Reserved	
000F	Command selection setting	
	bit 0	Reserved
	bit 1	PID control target input 1: Enables target values from MEMOBUS/Modbus
	bit 2	Torque reference/torque limit input 1: Enables setting values from MEMOBUS/Modbus
	bit 3	Torque compensation input 1: Enables setting values from MEMOBUS/Modbus
	bit 4	PI2 control target input 1: Enables setting values from MEMOBUS/Modbus
	bit 5	PID feedback from the MEMOBUS/Modbus 1: Enables PID feedback (15FF (Hex.)) from MEMOBUS/Modbus
	bit 6 - B	Reserved
	bit C	Terminal S5 input for broadcast message 1: Enabled, 0: Disabled
	bit D	Terminal S6 input for broadcast message 1: Enabled, 0: Disabled
	bit E	Terminal S7 input for broadcast message 1: Enabled, 0: Disabled
	bit F	Terminal S8 input of broadcast message 1: Enabled, 0: Disabled
0010 - 001A	Reserved	
001B	Analog monitor option AO-A3 analog output 1 value (10 V/4000 (Hex.))	
001C	Analog monitor option AO-A3 analog output 2 value (10 V/4000 (Hex.))	
001D	Digital output option DO-A3 output value (binary)	
001E - 001F	Reserved	
15C0	bit 0	Extended multi-function input command 1
	bit 1	Extended multi-function input command 2
	bit 2	Extended multi-function input command 3
	bit 3 - F	Reserved

Register No. (Hex.)	Description	
15DF	bit 0	Speed Search from Fmax 1: Enables Speed Search from Fmax • This is the same function as *H1-xx = 61 [MFDI Function Selection = Speed Search from Fmax]*. It operates according to the command and OR operation from the MFDI terminals.
	bit 1	Baseblock command 1: Enables baseblock command • This is the same function as *H1-xx = 8 [Baseblock Command (N.O.)]*. It operates according to the command and OR operation from the MFDI terminals.
	bit 2	Baseblock command - Without message 1: Enables baseblock command • This is the same function as *H1-xx = 8 [Baseblock Command (N.O.)]*. • The keypad does not show the *bb [Baseblock]* alarm message. The ALM LED does not flash.
	bit 3	Coast-to-stop command 1: Enables coast-to-stop command • The drive shuts off the output and the motor coasts to stop at the leading edge of bit 3. • To restart the drive, set bit 3 to 0 and enter the Run command again.
	bit 4	Ramp to stop command 1: Enables ramp to stop command • The drive ramps to stop in the selected deceleration time at the leading edge of bit 4. • To restart the drive, set bit 4 to 0 and enter the Run command again.
	bit 5	Fast stop command 1: Enables fast stop command • This is the same function as *H1-xx = 15 [Fast Stop (N.O.)]*. It operates according to the command and OR operation from the MFDI terminals.
	bit 6	Soft start input reset 1: Enables soft start input reset • When bit 6 is 1, the input to the soft starter will be 0. The drive decelerates the motor in the selected deceleration time. When bit 6 is 0, the motor accelerates to the previous frequency reference. • *U1-01 [Frequency Reference]* shows the set frequency reference.
	bit 7	Soft start output reset 1: Enables soft start output reset • When bit 7 is 1, the output from the soft starter will be 0. • When bit 6 is 0, the motor accelerates to the previous frequency reference.
	bit 8	Accel/decel ramp hold command 1: Enables accel/decel ramp hold command • This is the same function as *H1-xx = A [Accel/Decel Ramp Hold]*. It operates according to the command and OR operation from the MFDI terminals.
	bit 9	JOG command 1: Enables JOG command • This is the same function as *H1-xx = 6 [Jog Reference Selection]*. It operates according to the command and OR operation from the MFDI terminals.
	bit A	Forward Jog 1: Enables FJOG command • This is the same function as *H1-xx = 12 [Forward Jog]*. It operates according to the command and OR operation from the MFDI terminals.
	bit B	Reverse Jog 1: Enables RJOG command • This is the same function as *H1-xx = 13 [Reverse Jog]*. It operates according to the command and OR operation from the MFDI terminals.
	bit C	PID Disable command 1: Enables PID Disable command • This the same function as *H1-xx = 19 [PID Disable]*. It operates according to the command and OR operation from the MFDI terminals.
	bit D - F	Reserved
15E0	bit 1	Mbus Reg 15E0h bit0 Output Func When you do not set functions to *H2-40 to H2-42*, set them to *F [Not Used]*.
	bit 2	Mbus Reg 15E0h bit1 Output Func When you do not set functions to *H2-40 to H2-42*, set them to *F [Not Used]*.
	bit 3	Mbus Reg 15E0h bit2 Output Func When you do not set functions to *H2-40 to H2-42*, set them to *F [Not Used]*.
15FF	PID setpoint (0.01% signed)	

Register No. (Hex.)	Description	
3004	Time Setting Setting range: 0000 to 2359 (decimal), the default value at energize: 0000 Sets the hour and the minute in HHMM format. • HH: 00 to 23 (decimal) • MM: 00 to 59 (decimal)	
3005	Year and Day Setting Setting range: 1600 to 9906 (decimal), the default value at energize: 1600 Sets the year and the day of the week in YYDW format. • YY: the last two digits of the year from 16 to 99 (decimal) • DW: the day of the week – Sunday: 00 – Monday: 01 – Tuesday: 02 – Wednesday: 03 – Thursday: 04 – Friday: 05 – Saturday: 06	
3006	Date Setting Setting range: 101 to 1231 (decimal), the default setting at energize: 101 Sets the month and the date in MMDD format. • MM: 01 to 12 (decimal) • DD: 01 to 31 (decimal)	
3007	Date and Time Information Setting Setting range: 0 to 8 (decimal), the default value at energize: 8 Sets the values specified in 3004H to 3006H as the date and time. • Command Data: 1 • Response Data: 0 (normal), 8 (fault)	
302F	RTC Information Setting Uses the values specified in 3004H to 3006H to update the drive date or time instead of the RTC operator. To enable this function, set MEMOBUS register 3030H, bit 0 = 1. When you set 3030H, bit 1 = 1 and if you do not input 0 to this register in 2 min, the drive does not update the date or time and TIE fault occurs. • Command Data: 0	
3030	RTC Function Enable	
	bit 0	RTC Enter Enable 1: Enabled, 0: Disabled
	bit 1	RTC TIE Fault Enable 1: Enabled, 0: Disabled
	bit 2 - F	Reserved
3A93	WM605 Function Bits	
	bit 0	RTC Disable
	bit 1	Dynamic Noise Control Disable
	bit 2	Reserved
	bit 3	EM Override Freq Reference: Use 3A94H
	bit 4	EM Override PID Feedback: Use 3A95H
	bit 5	EM Override PID Setpoint: Use 3A96H
	bit 6 - F	Reserved
3A94	Emergency Override Frequency Reference Frequency reference used during Emergency Override operation when you set *S6-02 = 0 or 1 [Emergency Override Ref Selection = Use Frequency Reference or System PID Mode]* and bit 3 of MEMOBUS register 3A93H. The *o1-03 [Frequency Display Unit Selection]* setting changes the unit and scale of the input value. The upper limit value of this register is the maximum frequency of the drive set in *E1-04 [Maximum Output Frequency]* (*E9-02 [Maximum Speed]* when *A1-02 = 8 [Control Method Selection = EZOLV]*).	

Register No. (Hex.)	Description
3A95	Emergency Override PID Feedback PID feedback used during Emergency Override operation when you set *S6-02 = 2 or 3 [System PID Mode or Independent PID Mode]* and bit 4 of MEMOBUS register 3A93H. When *S6-02 = 2*, these parameters set the unit of the input value: • *Y1-03 [Feedback Device Scaling]* • *b5-39 [PID User Unit Display Digits]* • *Y1-02 [System Units]* When *S6-02 = 3*, these parameters set the unit of the input value: • *S6-03 [EMOVR Independent PID Scale]* • *S6-04 [EMOVR Independent PID Unit]* • *S6-05 [EMOVR Independent PID Unit Digit]*
3A96	Emergency Override PID Setpoint PID Setpoint used during Emergency Override operation when you set *S6-02 = 2 or 3* and bit 5 of MEMOBUS register 3A93H. When *S6-02 = 2*, these parameters set the unit of the input value: • *Y1-03* • *b5-39* • *Y1-02* When *S6-02 = 3*, these parameters set the unit of the input value: • *S6-03* • *S6-04* • *S6-05*

■ Monitor Data

You can only read monitor data.

Table 3.16 Monitor Data for MEMOBUS/Modbus Communication

Register No. (Hex.)	Description	
0020	Drive Status 1	
	bit 0	During Run 1: During run, 0: During stop
	bit 1	During reverse 1: During reverse, 0: Forward run
	bit 2	Drive ready 1: Ready, 0: Not ready
	bit 3	Faults 1: Fault
	bit 4	Data Setting Error 1: oPExx error
	bit 5	MFDO (terminal M1-M2) 1: ON, 0: OFF
	bit 6	MFDO (terminal M3-M4) 1: ON, 0: OFF
	bit 7	MFDO (terminal MD-ME-MF) 1: ON, 0: OFF
	bit 8 - B	Reserved
	bit C	SToF [Safe Torque OFF Hardware] 1: One of Safety input 1 (terminal H1-HC) and Safety input 2 (terminal H2-HC) is OFF (open) and the other is ON (closed).
	bit D	STo [Safe Torque OFF] 1: Both Safety input 1 (terminal H1-HC) and Safety input 2 (terminal H2-HC) are OFF (open)
	bit E	ComRef status 1: Enabled
	bit F	ComCtrl status 1: Enabled
0021	Fault Description 1	
	bit 0	oC [Overcurrent], GF [Ground Fault], SC [Short Circuit/IGBT Failure]
	bit 1	ov [Overvoltage]
	bit 2	oL2 [Drive Overloaded]
	bit 3	oH1 [Heatsink Overheat], oH2 [External Overheat (H1-XX=B)]
	bit 4 - 6	Reserved
	bit 7	EF0 [Option Card External Fault], EF1 to EF8 [Pump Fault]
	bit 8	CPFxx [Hardware Fault] **Note:** Includes *oFx*.
	bit 9	oL1 [Motor Overload], oL3, oL4 [Overtorque Detection 1/2], UL3, UL4 [Undertorque Detection 1/2]
	bit A	oS [Overspeed], dEv [Speed Deviation]
	bit B	During Uv [Undervoltage] detection
	bit C	Uv1 [DC Bus Undervoltage], Uv2 [Control Power Undervoltage], Uv3 [Soft Charge Answerback Fault]
	bit D	LF [Output Phase Loss], PF [Input Phase Loss]
	bit E	CE [Modbus Communication Error], bUS [Option Communication Error]
	bit F	oPr [Keypad Connection Fault]

Register No. (Hex.)	Description	
0022	Fault Contents	
	bit 0	1: During data writing, during motor switching
	bit 1 - 2	Reserved
	bit 3	1: Upper/Lower Limit Fault
	bit 4	1: Data Integrity Fault
	bit 5	1: During EEPROM writing
	bit 6 - F	Reserved
0023	U1-01 [Frequency Reference] **Note:** *o1-03 [Frequency Display Unit Selection]* sets the units.	
0024	U1-02 [Output Frequency] **Note:** *o1-03 [Frequency Display Unit Selection]* sets the units.	
0025	U1-06 [Output Voltage] (units: 0.1 V) **Note:** Use *H5-10 [Modbus Register 0025H Unit Sel]* to change the setting unit.	
0026	U1-03 [Output Current] (units: 0.1 A)	
0027	U1-08 [Output Power]	
0028	U1-09 [Torque Reference]	
0029	Fault Description 2	
	bit 0	SC [Short Circuit/IGBT Failure]
	bit 1	GF [Ground Fault]
	bit 2	PF [Input Phase Loss]
	bit 3	LF [Output Phase Loss]
	bit 4 - 5	Reserved
	bit 6	oH4 [Motor Overheat Fault (PTC Input)]
	bit 7 - F	Reserved
002A	Minor Fault Description 1	
	bit 0 - 1	Reserved
	bit 2	EF [FWD/REV Run Command Input Error]
	bit 3	bb [Baseblock]
	bit 4	oL3 [Overtorque 1], oL4 [Overtorque Detection 2]
	bit 5	oH [Heatsink Overheat]
	bit 6	ov [Overvoltage]
	bit 7	Uv [Undervoltage]
	bit 8	Reserved
	bit 9	CE [Run at H5-34 (CE Go-To-Freq)]
	bit A	bUS [Option Communication Error]
	bit B	UL3/UL4 [Undertorque Detection 1/2]
	bit C	oH3 [Motor Overheat (PTC Input)]
	bit D - E	Reserved
	bit F	CALL [Serial Comm Transmission Error]

Register No. (Hex.)	Description	
002B	U1-10 [Input Terminal Status]	
	bit 0	1: Control circuit terminal S1 ON
	bit 1	1: Control circuit terminal S2 ON
	bit 2	1: Control circuit terminal S3 ON
	bit 3	1: Control circuit terminal S4 ON
	bit 4	1: Control circuit terminal S5 ON
	bit 5	1: Control circuit terminal S6 ON
	bit 6	1: Control circuit terminal S7 ON
	bit 7	1: Control circuit terminal S8 ON
	bit 8 - F	Reserved
002C	Drive Status 2	
	bit 0	During Run 1: During Run
	bit 1	During zero speed 1: During zero speed
	bit 2	Speed agreement 1: During agreement
	bit 3	User-defined speed agreement 1: During agreement
	bit 4	Frequency Detection 1 1: Output frequency ≤ L4-01
	bit 5	Frequency Detection 2 1: Output frequency ≥ L4-01
	bit 6	Drive ready 1: Run ready
	bit 7	During low voltage detection 1: During detection
	bit 8	During baseblock 1: Drive output during baseblock
	bit 9	Frequency reference mode 1: No communication option, 0: Communication option
	bit A	Run command mode 1: No communication option, 0: Communication option
	bit B	During overtorque/undertorque 1, 2 detection
	bit C	Frequency reference loss 1: Loss
	bit D	Executing Auto-Restart 1: Restart Enabled
	bit E	Faults 1: Fault generated
	bit F	MEMOBUS/Modbus communications timeout 1: At Timeout Includes CE Go To Frequency alarm

Register No. (Hex.)	Description	
002D	U1-11 [Output Terminal Status]	
	bit 0	MFDO (terminal M1-M2) 1: ON, 0: OFF
	bit 1	MFDO (terminal M3-M4) 1: ON, 0: OFF
	bit 2	MFDO (terminal MD-ME-MF) 1: ON, 0: OFF
	bit 3 - 6	Reserved
	bit 7	Fault relay output (terminal MA/MB-MC) 1: ON, 0: OFF
	bit 8 - F	Reserved
002E - 0030	Reserved	
0031	U1-07 [DC Bus Voltage] (unit: 1 V)	
0032	U1-09 [Torque Reference] (unit: 1%)	
0033	Reserved	
0034	Product code 1 [ASCII], product type (iQpump605 = 0B)	
0035	Product code 2 [ASCII], product type (iQpump605 = 65)	
0036 - 0037	Reserved	
0038	PID Feedback: Unsigned, input is equivalent to 100%/maximum output frequency (Units: 0.1%)	
0039	PID Input: Signed, ±100%/±maximum output frequency (Units: 0.1%)	
003A	PID Output: Signed, ±100%/±maximum output frequency (Units: 0.1%)	
003B - 003C	Reserved	
003D	Communications error description **Note:** The drive saves the description of the communications error until you reset the fault.	
	bit 0	CRC Error
	bit 1	Data Length Error
	bit 2	Reserved
	bit 3	Parity Error
	bit 4	Overrun Error
	bit 5	Framing Error
	bit 6	Timeout
	bit 7 - F	Reserved
003E	Output Frequency	Units: min^{-1} or r/min **Note:** Set *E2-04, E4-04, E5-04, E9-08 [Motor Pole Count]*.
003F		0.01% units
0040 - 004A	Used with *U1-xx [Operation Status Monitors]*. Refer to the *U Monitor* for parameter details.	

Register No. (Hex.)	Description	
004B	U1-12 [Drive Status]	
	bit 0	1: During Run
	bit 1	1: During zero speed
	bit 2	1: During reverse
	bit 3	1: During reset signal input
	bit 4	1: During speed agreement
	bit 5	1: Drive operation ready
	bit 6	1: Minor Fault
	bit 7	1: Fault
	bit 8	1: oPExx [Operation Error] generation
	bit 9	1: Recovery from momentary power loss, 0: Power recovery
	bit A	1: Motor 2 Selection
	bit B	Reserved
	bit C	AUTO Mode
	bit D	HAND Mode
	bit E	1: ComRef status/ NetRef status
	bit F	1: ComCtrl status/ NetCtrl status
004C - 007E	Use with *U1-xx, U4-xx, U5-xx, U6-xx [Monitors]*. Refer to “U2: Fault Trace” and “U3: Fault History” for more information.	
007F	Minor fault code (Refer to “Minor fault description” for more information about the minor fault codes.)	
0080 - 0097	Use with *U2-xx, U3-xx [Monitors]*. Refer to “U Monitor” for more information, and refer to “Fault Trace/Fault History Descriptions” for more information about register values.	
0098 - 0099	U4-01 [Total VFD Run Time] Example: When *U4-01* is 12345, 0098 (Hex.) = 1234 and 0099 (Hex.) = 5.	
009A - 009B	U4-03 [Fan Elapsed Time] Example: When *U4-03* is 12345, 009A (Hex.) = 1234 and 009B (Hex.) = 5.	
009C - 00AA	Reserved	
00AB	Drive rated current **Note:** The unit of display is different for different models. • 0.01 A: 2011 to 2046, 4005 to 4014 • 0.1 A: 2059 to 2396, 4021 to 4720	
00AC	U1-05 [Motor Speed]	Units: min^{-1} or r/min **Note:** Set *E9-08 [Motor Pole Count]*.
00AD		Units: 0.01%
00AE, 00AF	Reserved	
00B0	Option codes connected to CN5-A	The drive stores option codes in the register. DI-A3 = 0001 (Hex.) DO-A3 = 0002 (Hex.) AI-A3 = 0003 (Hex.) AO-A3 = 0004 (Hex.) SI-B3 = 1002 (Hex.) SI-W3 = 1003 (Hex.) SI-J3 = 1009 (Hex.) SI-P3 = 5350 (Hex.) JOHB-SMP3 (Modbus TCP/IP) = 1005 (Hex.) JOHB-SMP3 (EtherNet/IP) = 1006 (Hex.) JOHB-SMP3 (PROFINET) = 1006 (Hex.) JOHB-SMP3 (BACnet/IP) = 100C (Hex.)
00B1 - 00B4	Reserved	

Register No. (Hex.)	Description	
00B5	U1-16 [SFS Output Freq]	Units: min^{-1} or r/min **Note:** Set *E2-04, E4-04, E5-04, E9-08 [Motor Pole Count]*.
00B6		Units: 0.01%
00B7	Frequency reference monitor	Units: min^{-1} or r/min **Note:** Set *E2-04, E4-04, E5-04, E9-08 [Motor Pole Count]*.
00B8		Units: 0.01%
00B9 - 00BE	Reserved	
00BF	Operation error number *xx* of *oPExx* is displayed.	
00C0	Fault Description 3	
	bit 0	Reserved
	bit 1	Uv1 [DC Bus Undervoltage]
	bit 2	Uv2 [Control Power Undervoltage]
	bit 3	Uv3 [Soft Charge Answerback Fault]
	bit 4	SC [Short Circuit/IGBT Failure]
	bit 5	GF [Ground Fault]
	bit 6	oC [Overcurrent]
	bit 7	ov [Overvoltage]
	bit 8	oH [Heatsink Overheat]
	bit 9	oH1 [Heatsink Overheat]
	bit A	oL1 [Motor Overload]
	bit B	oL2 [Drive Overloaded]
	bit C	oL3 [Overtorque Detection 1]
	bit D	oL4 [Overtorque Detection 2]
	bit E - F	Reserved
00C1	Fault Description 4	
	bit 0	EF3 [Pump Fault (Terminal S3)]
	bit 1	EF4 [Pump Fault (Terminal S4)]
	bit 2	EF5 [Pump Fault (Terminal S5)]
	bit 3	EF6 [Pump Fault (Terminal S6)]
	bit 4	EF7 [Pump Fault (Terminal S7)]
	bit 5	EF8 [Pump Fault (Terminal S8)]
	bit 6	Reserved
	bit 7	oS [Overspeed]
	bit 8	dEv [Speed Deviation]
	bit 9	Reserved
	bit A	PF [Input Phase Loss]
	bit B	LF [Output Phase Loss]
	bit C	oH3 [Motor Overheat (PTC Input)]
	bit D	oPr [Keypad Connection Fault]
	bit E	Err [EEPROM Write Error]
	bit F	oH4 [Motor Overheat Fault (PTC Input)]

Register No. (Hex.)	Description	
00C2	Fault Description 5	
	bit 0	CE [Modbus Communication Error]
	bit 1	bUS [Option Communication Error]
	bit 2 - 5	Reserved
	bit 6	EF0 [Option Card External Fault]
	bit 7	Reserved
	bit 8	UL3 [Undertorque Detection 1]
	bit 9	UL4 [Undertorque Detection 2]
	bit A	oL7 [High Slip Braking Overload]
	bit B - E	Reserved
	bit F	Hardware Fault (includes *oFx* fault)
00C3	Fault Description 6	
	bit 0 - 4	Reserved
	bit 5	LF2 [Output Current Imbalance]
	bit 6	STPo [Motor Step-Out Detected]
	bit 7 - 9	Reserved
	bit A	SEr [Speed Search Retries Exceeded]
	bit B - F	Reserved
00C4	Fault Description 7	
	bit 0	Reserved
	bit 1	EF1 [Pump Fault (Terminal S1)]
	bit 2	EF2 [Pump Fault (Terminal S2)]
	bit 3 - 4	Reserved
	bit 5	CoF [Current Offset Fault]
	bit 6 - 7	Reserved
	bit 8	dWFL [DriveWorksEZ Fault]
	bit 9	dWF1 [EEPROM Memory DWEZ Data Error]
	bit A	dWF2 [DriveWorksEZ Fault 2]
	bit B	dWF3 [DriveWorksEZ Fault 3]
	bit C - F	Reserved
00C5	Fault Description 8	
	bit 0	Reserved
	bit 1	nSE [Node Setup Error]
	bit 2 - 8	Reserved
	bit 9	UL6 [Underload or Belt Break Detected]
	bit A	dv7 [Polarity Judge Timeout]
	bit B - F	Reserved
00C6 - 00C7	Reserved	

Register No. (Hex.)	Description	
00C8	Minor Fault Description 2	
	bit 0	Uv [Undervoltage]
	bit 1	ov [Overvoltage]
	bit 2	oH [Heatsink Overheat]
	bit 3	Overheat Alarm (oH2)
	bit 4	oL3 [Overtorque 1]
	bit 5	oL4 [Overtorque 2]
	bit 6	EF [FWD/REV Run Command Input Error]
	bit 7	bb [Baseblock]
	bit 8	EF3 [Pump Fault (Terminal S3)]
	bit 9	EF4 [Pump Fault (Terminal S4)]
	bit A	EF5 [Pump Fault (Terminal S5)]
	bit B	EF6 [Pump Fault (Terminal S6)]
	bit C	EF7 [Pump Fault (Terminal S7)]
	bit D	EF8 [Pump Fault (Terminal S8)]
	bit E	Reserved
	bit F	oS [Overspeed]
00C9	Minor Fault Description 3	
	bit 0	dEv [Speed Deviation]
	bit 1	Reserved
	bit 2	oPr [Keypad Connection Fault]
	bit 3	CE [Run at H5-34 (CE Go-To-Freq)]
	bit 4	bUS [Option Communication Error]
	bit 5	CALL [Serial Comm Transmission Error]
	bit 6	oL1 [Motor Overload]
	bit 7	oL2 [Drive Overloaded]
	bit 8	Reserved
	bit 9	EF0 [Option Card External Fault]
	bit A	rUn [Motor Switch during Run]
	bit B	Reserved
	bit C	CALL [Serial Comm Transmission Error]
	bit D	UL3 [Undertorque Detection 1]
	bit E	UL4 [Undertorque Detection 2]
	bit F	SE [Modbus Test Mode Error]
00CA	Minor Fault Description 4	
	bit 0	L24v [Loss of External Power 24 Supply]
	bit 1	oH3 [Motor Overheat (PTC Input)]
	bit 2 - 7	Reserved
	bit 8	CyPo [Cycle Power to Accept Changes]
	bit 9	dnE [Drive Disabled]
	bit A - F	Reserved

Register No. (Hex.)	Description	
00CB	Minor Fault Description 5	
	bit 0	Reserved
	bit 1	AEr [Station Address Setting Error]
	bit 2	Reserved
	bit 3	HCA [High Current Alarm]
	bit 4	LT-1 [Cooling Fan Maintenance Time]
	bit 5	LT-2 [Capacitor Maintenance Time]
	bit 6 - 7	Reserved
	bit 8	EF1 [Pump Fault (Terminal S1)]
	bit 9	EF2 [Pump Fault (Terminal S2)]
	bit A	SToF [Safe Torque OFF Hardware]
	bit B - F	Reserved
00CC	Minor Fault Description 6	
	bit 0	Reserved
	bit 1	TrPC [IGBT Maintenance Time (90%)]
	bit 2	LT-3 [SoftChargeBypassRelay MainteTime]
	bit 3	LT-4 [IGBT Maintenance Time (50%)]
	bit 4 - 7	Reserved
	bit 8	dWAL [DriveWorksEZ Alarm]
	bit 9	dWA2 [DriveWorksEZ Alarm 2]
	bit A	dWA3 [DriveWorksEZ Alarm 3]
	bit B - C	Reserved
	bit D	UL6 alarm [Underload or Belt Break Detected]
	bit E	Reserved
	bit F	AFBL [Analog Fbk Lost, Switched to Net]
00CD	Reserved	
00CE	bit 0 - 5	Reserved
	bit 6	EOF [Emergency Override FWD]
	bit 7	EOR [Emergency Override REV]
	bit 8 - F	Reserved
00CF	Reserved	

Register No. (Hex.)	Description	
00D0	CPF Contents 1	
	bit 0 - 1	Reserved
	bit 2	CPF02 [Control Circuit Error]
	bit 3	CPF03 [Control Circuit Error]
	bit 4 - 5	Reserved
	bit 6	CPF06 [Control Circuit Error]
	bit 7	CPF07 [Control Circuit Error]
	bit 8	CPF08 [Control Circuit Error]
	bit 9 - A	Reserved
	bit B	CPF11 [Control Circuit Error]
	bit C	CPF12 [Control Circuit Error]
	bit D	CPF13 [Control Circuit Error]
	bit E	CPF14 [Control Circuit Error]
	bit F	Reserved
00D1	CPF Contents 2	
	bit 0	CPF16 [Control Circuit Error]
	bit 1	CPF17 [Control Circuit Error]
	bit 2	CPF18 [Control Circuit Error]
	bit 3	CPF19 [Control Circuit Error]
	bit 4	CPF20 [Control Circuit Error]
	bit 5	CPF21 [Control Circuit Error]
	bit 6	CPF22 [Control Circuit Error]
	bit 7	CPF23 [Control Circuit Error]
	bit 8	CPF24 [Control Circuit Error]
	bit 9	Reserved
	bit A	CPF26 [Control Circuit Error]
	bit B	CPF27 [Control Circuit Error]
	bit C	CPF28 [Control Circuit Error]
	bit D	CPF29 [Control Circuit Error]
	bit E	CPF30 [Control Circuit Error]
	bit F	CPF31 [Control Circuit Error]
00D2	CPF Contents 3	
	bit 0	CPF32 [Control Circuit Error]
	bit 1	CPF33 [Control Circuit Error]
	bit 2	CPF34 [Control Circuit Error]
	bit 3	CPF35 [Control Circuit Error]
	bit 4	CPF36 [Control Circuit Error]
	bit 5	CPF37 [Control Circuit Error]
	bit 6	CPF38 [Control Circuit Error]
	bit 7	CPF39 [Control Circuit Error]
	bit 8 - F	Reserved
00D3 - 00D7	Reserved	

Register No. (Hex.)	Description	
00D8	oFA0x Description (CN5-A)	
	bit 0	oFA00 [Option Not Compatible with Port]
	bit 1	oFA01 [Option Fault/Connection Error]
	bit 2 - 4	Reserved
	bit 5	oFA05 [Option A/D Error]
	bit 6	oFA06 [Option Communication Error]
	bit 7 - F	Reserved
00D9	oFA1x Description (CN5-A)	
	bit 0	oFA10 [Option RAM Error]
	bit 1	oFA11 [Option Ope Mode Error]
	bit 2	oFA12 [Drive Receive CRC Error]
	bit 3	oFA13 [Drive Receive Frame Error]
	bit 4	oFA14 [Drive Receive Abort Error]
	bit 5	oFA15 [Option Receive CRC Error]
	bit 6	oFA16 [Option Receive Frame Error]
	bit 7	oFA17 [Option Receive Abort Error]
	bit 8 - F	Reserved
00DA	Reserved	
00DB	oFA3x Description (CN5-A)	
	bit 0	oFA30 [COM ID Error]
	bit 1	oFA31 [Type Code Error]
	bit 2	oFA32 [SUM Check Error]
	bit 3	oFA33 [Option Receive Time Over]
	bit 4	oFA34 [Memobus Time Over]
	bit 5	oFA35 [Drive Timeout Waiting for Response]
	bit 6	oFA36 [CI Check Error]
	bit 7	oFA37 [Drive Timeout Waiting for Response]
	bit 8	oFA38 [Control Reference Error]
	bit 9	oFA39 [Drive Timeout Waiting for Response]
	bit A	oFA40 [CtrlResSel 1Err]
	bit B	oFA41 [Drive Timeout Waiting for Response]
	bit C	oFA42 [CtrlResSel 2Err]
	bit D	oFA43 [Drive Timeout Waiting for Response]
	bit E - F	Reserved
00DC	oFb0x Description (CN5-B)	
	bit 0	oFb00 [Option Not Compatible with Port]
	bit 1	oFb01 [Option Fault/Connection Error]
	bit 2	oFb02 [Duplicate Options]
	bit 3 - 4	Reserved
	bit 5	oFb05 [Option A/D Error]
	bit 6	oFb06 [Option Communication Error]
	bit 7 - F	Reserved

Register No. (Hex.)	Description	
00DD	oFb1x Description (CN5-B)	
	bit 0	oFb10 [Option RAM Error]
	bit 1	oFb11 [Option Ope Mode Error]
	bit 2	oFb12 [Drive Receive CRC Error]
	bit 3	oFb13 [Drive Receive Frame Error]
	bit 4	oFb14 [Drive Receive Abort Error]
	bit 5	oFb15 [Option Receive CRC Error]
	bit 6	oFb16 [Option Receive Frame Error]
	bit 7	oFb17 [Option Receive Abort Error]
	bit 8 - F	Reserved
00DE - 00DF	Reserved	
00E0	oFb3x Description (CN5-B)	
	bit 0	oFb30 [COM ID Error]
	bit 1	oFb31 [Type Code Error]
	bit 2	oFb32 [SUM Check Error]
	bit 3	oFb33 [Option Receive Time Over]
	bit 4	oFb34 [Memobus Time Over]
	bit 5	oFb35 [Drive Receive Time Over 5]
	bit 6	oFb36 [CI Check Error]
	bit 7	oFb37 [Drive Receive Time Over 5]
	bit 8	oFb38 [Control Reference Error]
	bit 9	oFb39 [Drive Receive Time Over 5]
	bit A	oFb40 [CtrlResSel 1Err]
	bit B	oFb41 [Drive Receive Time Over 5]
	bit C	oFb42 [CtrlResSel 2Err]
	bit D	oFb43 [Drive Receive Time Over 5]
	bit E - F	Reserved
00E1 - 00E4	Reserved	
00E5	Minor Fault Description 9	
	bit 0	EP24v [External Power 24V Supply]
	bit 1 - 3	Reserved
	bit 4	bAT [Keypad Battery Low Voltage]
	bit 5 - 7	Reserved
	bit 8	TiM [Keypad Time Not Set]
	bit 9	bCE [Bluetooth Communication Error]
	bit A - E	Reserved
	bit F	Bu-Fb [Main Fdbk Lost Using Backup Fdbk]
00E6 - 00E9	Reserved	

Register No. (Hex.)	Description	
00EA	Fault Description 11	
	bit 0	TiM [Keypad Time Not Set]
	bit 1	bAT [Keypad Battery Low Voltage]
	bit 2- 3	Reserved
	bit 4	ov2 [DC Bus Overvoltage 2]
	bit 5- D	Reserved
	bit E	SCF [Safety Circuit Fault]
	bit F	Reserved
00EB - 00ED	Reserved	
00EE	Fault Description 12	
	bit 0	HLCE [High Level Communication Errors]
	bit 1	Reserved
	bit 2	Fan1 [Drive Cooling Fan Fault]
	bit 3 - 4	Reserved
	bit 5	bCE [Bluetooth Communication Fault]
	bit 6 - F	Reserved
00EF - 00F4	Reserved	
00F5	Fault Description 14	
	bit 0	SPL [Suction Pressure Feedback Loss]
	bit 1	LWL [Low Water Level Digital Input]
	bit 2	HWL [High Water Level Digital Input]
	bit 3	VLTS [Volute Thermostat Fault]
	bit 4	SPCNR [Single Phase Converter Not Ready]
	bit 5	Reserved
	bit 6	PSE [JOHB-SMP3 Protocol Set Error]
	bit 7 - F	Reserved
00F6 - 00FA	Reserved	
00FB	Output Current **Note:** The unit of display is different for different models. • 0.01 A: 2011 to 2046, 4005 to 4014 • 0.1 A: 2059 to 2396, 4021 to 4720	

■ Broadcast Messages

Broadcast messages are available as read-only.

The undefined bit signal in the broadcast operation signal uses the local data signal.

Table 3.17 Broadcast Messages for MEMOBUS/Modbus Communication

Register No. (Hex.)	Description	
0001	Operation signal	
	bit 0	Run command 1: Run, 0: Stop
	bit 1	Reverse run command 1: Reverse, 0: Forward run
	bit 2 - 3	Reserved
	bit 4	External fault 1: EF0 [Option Card External Fault]
	bit 5	Fault Reset 1: Reset command
	bit 6 - B	Reserved
	bit C	MFDI terminal S5 input
	bit D	MFDI terminal S6 input
	bit E	MFDI terminal S7 input
	bit F	MFDI terminal S8 input
0002	Frequency reference	30000/100%

■ Fault Trace/Fault History Contents

Table 3.18 lists the fault codes that the commands from monitors *[U2-xx, U3-xx]* read.

Table 3.18 Fault Trace/Fault History Contents

Fault Code (Hex.)	Name
0002	Uv1 [DC Bus Undervoltage]
0003	Uv2 [Control Power Undervoltage]
0004	Uv3 [Soft Charge Answerback Fault]
0005	SC [Short Circuit/IGBT Failure]
0006	GF [Ground Fault]
0007	oC [Overcurrent]
0008	ov [Overvoltage]
0009	oH [Heatsink Overheat]
000A	oH1 [Heatsink Overheat]
000B	oL1 [Motor Overload]
000C	oL2 [Drive Overloaded]
000D	oL3 [Overtorque Detection 1]
000E	oL4 [Overtorque Detection 2]
0011	EF3 [External Fault (Terminal S3)]
0012	EF4 [External Fault (Terminal S4)]
0013	EF5 [External Fault (Terminal S5)]
0014	EF6 [External Fault (Terminal S6)]
0015	EF7 [External Fault (Terminal S7)]
0016	EF8 [External Fault (Terminal S8)]
0018	oS [Overspeed]
0019	dEv [Speed Deviation]
001B	PF [Input Phase Loss]

Fault Code (Hex.)	Name
001C	LF [Output Phase Loss]
001D	oH3 [Motor Overheat (PTC Input)]
001E	oPr [Keypad Connection Fault]
001F	Err [EEPROM Write Error]
0020	oH4 [Motor Overheat Fault (PTC Input)]
0021	CE [Modbus Communication Error]
0022	bUS [Option Communication Error]
0027	EF0 [Option Card External Fault]
0029	UL3 [Undertorque Detection 1]
002A	UL4 [Undertorque Detection 2]
002B	oL7 [High Slip Braking Overload]
0030	Includes oFx Fault [Hardware Fault]
0036	LF2 [Output Current Imbalance]
0037	STPo [Motor Step-Out Detected]
003B	SEr [Speed Search Retries Exceeded]
0042	EF1 [External Fault (Terminal S1)]
0043	EF2 [External Fault (Terminal S2)]
0046	CoF [Current Offset Fault]
0047	PE1 [PLC Fault 1]
0048	PE2 [PLC Fault 2]
0052	nSE [Node Setup Error]
005A	UL6 [Underload or Belt Break Detected]

Fault Code (Hex.)	Name
005B	dv7 [Polarity Judge Timeout]
0081 - 0084 0087 - 0089 008C - 008F 0091 - 0099 009B - 00A8	CPF00 - CPF39 [Control Circuit Error]
0101	oFA00 [Option Not Compatible with Port]
0102 - 0107 0111 - 0118 0131 - 013E	oFA01 - oFA43 [Option Fault/Connection Error]
0201	oFb00 [Option Not Compatible with Port]
0202 - 0207 0211 - 0218	oFb01 - oFb17 [Option Fault/Connection Error]
0401	TiM [Keypad Time Not Set]
0402	bAT [Keypad Battery Low Voltage]
0405	ov2 [DC Bus Overvoltage 2]
040F	SCF [Safety Circuit Fault]
0411	HLCE [High Level Communication Errors]
0413	FAn1 [Drive Cooling Fan Failure]

Fault Code (Hex.)	Name
0416	bCE [Bluetooth Communication Fault]
0420	AuxFB [PI Aux Feedback Level Loss]
0421	DIFF [Differential Feedback Exceeded]
0422	FDBKL [WIRE Break]
0423	HFB [High Feedback Sensed]
0424	HiAux [High PI Aux Feedback Level]
0425	LFB [Low Feedback Sensed]
0426	LoAux [Low PI Aux Feedback Level]
0427	LOP [Loss of Prime]
0429	NMS [Setpoint Not Met]
042A	OD [Output Disconnect]
042B	VLTS [Volute Thermostat Fault]
0432	LWL [Low Water Level Digital Input]
0433	HWL [High Water Level Digital Input]
0435	SPCNR [Single Phase Converter Not Ready]
0437	PSE [JOHB-SMP3 Protocol Set Error]

■ Minor Fault/Alarm Contents

Table 3.19 lists the minor fault/alarm codes that communications register (007F (Hex.)) reads.

Table 3.19 Minor Fault/Alarm Contents (007 (Hex.))

Minor Fault/ Alarm Code (Hex.)	Name
0001	Uv [Undervoltage]
0002	ov [Overvoltage]
0003	oH [Heatsink Overheat]
0004	oH2 [External Overheat (H1-XX=B)]
0005	oL3 [Overtorque 1]
0006	oL4 [Overtorque 2]
0007	EF [FWD/REV Run Command Input Error]
0008	bb [Baseblock]
0009	EF3 [External Fault (Terminal S3)]
000A	EF4 [External Fault (Terminal S4)]
000B	EF5 [External Fault (Terminal S5)]
000C	EF6 [External Fault (Terminal S6)]
000D	EF7 [External Fault (Terminal S7)]
000E	EF8 [External Fault (Terminal S8)]
0010	oS [Overspeed]
0011	dEv [Speed Deviation]
0014	CE [Modbus Communication Error]
0015	bUS [Option Communication Error]
001A	EF0 [Option Card External Fault]
001B	rUn [Motor Switch during Run]
001D	CALL [Serial Comm Transmission Error]

Minor Fault/ Alarm Code (Hex.)	Name
001E	UL3 [Undertorque Detection 1]
001F	UL4 [Undertorque Detection 2]
0020	SE [Modbus Test Mode Error]
0021	L24v [Loss of External Power 24 Supply]
0022	oH3 [Motor Overheat (PTC Input)]
0029	CyPo [Cycle Power to Accept Changes]
002A	dnE [Drive Disabled]
0032	AEr [Station Address Setting Error]
0034	HCA [High Current Alarm]
0035	LT-1 [Cooling Fan Maintenance Time]
0036	LT-2 [Capacitor Maintenance Time]
0039	EF1 [External Fault (Terminal S1)]
003A	EF2 [External Fault (Terminal S2)]
003B	SToF [Safe Torque OFF Hardware]
0042	TrPC [IGBT Maintenance Time (90%)]
0043	LT-3 [SoftChargeBypassRelay MainteTime]
0044	LT-4 [IGBT Maintenance Time (50%)]
0047	Input Phase Loss
004E	UL6 [Underload or Belt Break Detected]
0067	EOF [Emergency Override FWD]
0068	EOR [Emergency Override REV]

Minor Fault/ Alarm Code (Hex.)	Name
0081	EP24v [External Power 24V Supply]
0085	bAT [Keypad Battery Low Voltage]
0089	TiM [Keypad Time Not Set]
008A	bCE [Bluetooth Communication Error]
0090	Bu-Fb [Main Fdbk Lost Using Backup Fdbk]
0091	BuFbl [Backup Fdbk Lost Chk/Repl Xducer]
0092	CE [Run at H5-34 (CE Go-To-Freq)]
0093	DIFF [Differential Feedback Exceeded]
0094	FDBKL [Feedback Loss Wire Break]
0095	FLGT [Feedback Loss, Go To Freq b5-83]
0096	HIAUX [High PI Aux Feedback Level]
0097	HIFB [High Feedback Sensed]
0099	LOAUX [Low PI Aux Feedback Level]
009A	LOFB [Low Feedback Sensed]
009B	LOP [Loss of Prime]

Minor Fault/ Alarm Code (Hex.)	Name
009C	NMS [Setpoint Not Met]
009D	OD [Output Disconnect]
009E	FR<MS [Freq Ref < Minimum Speed (Y1-06)]
009F	FR<TH [Freq. Reference < Thrust (Y4-12)]
00A3	AUdiS [Low WL/SP/PI Aux FB Drv Disabled]
00A4	AUXFB [PI Aux Feedback Level Loss]
00A5	AUFbL [WL/SP/PI Aux Fdbk Lost Using Net]
00A6	BuDif [Main Fdbk Lost, Using Diff Fdbk]
00A7	LCP [Low City Pressure]
00A8	LSP [Low Suction Pressure]
00A9	LWT [Low Water In Tank]
00D8	R-DNE [Remote Drive Disable]
00DC	DS [De-Scale/De-Rag Active]
00DD	SPCNR [Single Phase Converter Not Ready]
00E9	WFR [Waiting for Run]

◆ Error Codes

■ MEMOBUS/Modbus Communications Error Code List

Table 3.20 lists the MEMOBUS/Modbus communications error codes.

When an error occurs, remove the cause of the error and restart communications.

Table 3.20 MEMOBUS/Modbus Communications Error Codes

Error Code (Hex.)	Name	Cause
01	Function Code Error	The PLC set a function code that was not 03, 08, or 10 (Hex.)
02	Register Number Error	• The register number that is trying to access is not registered. • A starting number that was not 0001 or 0002 (Hex.) was set when broadcasting.
03	Bit Count Error	• Read and write data quantities are more than the 1 to 16 range. (Command message data quantity is disabled.) • The data that was read from non-consecutive holding registers contained more than 120 bytes. • The data to be written to non-consecutive holding registers contained more than 60 bytes. • In the write mode, the number of bytes in the message is not the number of data × 2.
21	Data Setting Error	• Writing control data or parameters made the settings go out of the permitted setting range. • A parameter setting error occurred when writing a parameter.
22	Write Mode Error	• Tried to write a disabled parameter during run. • When there was a *CPF06 [Control Circuit Error]*, the master tried to write a parameter other than one of these: – *A1-00 [Language Selection]* – *A1-01 [Access Level Selection]* – *A1-02 [Control Method Selection]* – *A1-03 [Initialize Parameters]* – *A1-04 [Password]* – *A1-05 [Password Setting]* – *E1-03 [V/f Pattern Selection]* – *o2-04 [Drive Model (KVA) Selection]* • Writes the read-only data.
23	DC Bus Undervoltage Write Error	During *Uv [DC Bus Undervoltage]*, a *Uv* write disabled parameter was written.

Error Code (Hex.)	Name	Cause
24	Error Writing Data During Parameter Processing	Tried to write a parameter from the master during parameter processing on the drive side.
25	Writing into EEPROM Disabled	Writing into EEPROM write is disabled, but EEPROM write was executed from MEMOBUS/Modbus communications. When this error occurs, the keypad shows a message and the drive continues operation.

■ No Response from Slave

The slave ignores the command message from the master and will not send a response message in these conditions:

- When a communications error (overrun, framing, parity, CRC-16) is detected in the command message.
- When the slave address in the command message and the slave address for the drive side do not agree (Use *H5-01 [Drive Node Address]* to set the slave address of the drive)
- When the time interval between the data of which the message is composed is longer than 24 bits
- When the data length for the command message is not accurate

Note:

- If the keypad shows *CALL [Serial Comm Transmission Error]*, refer to "Troubleshooting" to remove the cause of the error, and try to do communications again. If the keypad does not show *CALL*, check *U1-19 [MEMOBUS/Modbus Error Code]* for the error and error type.
- If you execute the write function code when the slave address in the command message is 00 (Hex.), all of the slaves will execute the write command, but they will not send response messages to the master.

4

Troubleshooting

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4.1 Section Safety

⚠DANGER

Electrical Shock Hazard

Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, remove the covers before measuring for dangerous voltages to make sure that the drive is safe.

If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.

⚠WARNING

Electrical Shock Hazard

Do not operate the drive when covers are missing. Replace covers and shields before you operate the drive. Use the drive only as specified by the instructions.

Some figures in this section include drives without covers or safety shields to more clearly show the inside of the drive. If covers or safety shields are missing from the drive, it can cause serious injury or death.

Always ground the motor-side grounding terminal.

If you do not ground the equipment correctly, it can cause serious injury or death if you touch the motor case.

After the drive blows a fuse or trips a GFCI, do not immediately energize the drive or operate peripheral devices. Wait for the time specified on the warning label at a minimum and make sure that all indicators are OFF. Then check the wiring and peripheral device ratings to find the cause of the problem. If you do not know the cause of the problem, contact Yaskawa before you energize the drive or peripheral devices.

If you do not fix the problem before you operate the drive or peripheral devices, it can cause serious injury or death.

Only let approved personnel install, wire, maintain, examine, replace parts, and repair the drive.

If personnel are not approved, it can cause serious injury or death.

Do not wear loose clothing or jewelry when you do work on the drive. Tighten loose clothing and remove all metal objects, for example watches or rings.

Loose clothing can catch on the drive and jewelry can conduct electricity and cause serious injury or death.

Do not remove covers or touch circuit boards while the drive is energized.

If you touch the internal components of an energized drive, it can cause serious injury or death.

Do not modify the drive body or drive circuitry.

Modifications to drive body and circuitry can cause serious injury or death, will cause damage to the drive, and will void the warranty. Yaskawa is not responsible for modifications of the product made by the user.

Fire Hazard

Tighten all terminal screws to the correct tightening torque.

Connections that are too loose or too tight can cause incorrect operation and damage to the drive. Incorrect connections can also cause death or serious injury from fire.

Tighten screws at an angle in the specified range shown in this manual.

If you tighten the screws at an angle not in the specified range, you can have loose connections that can cause damage to the terminal block or start a fire and cause serious injury or death.

⚠WARNING

Damage to Equipment

Do not apply incorrect voltage to the main circuit of the drive. Operate the drive in the specified range of the input voltage on the drive nameplate.

Voltages that are higher than the permitted nameplate tolerance can cause damage to the drive.

Fire Hazard

Do not put flammable or combustible materials on top of the drive and do not install the drive near flammable or combustible materials. Attach the drive to metal or other noncombustible material.

Flammable and combustible materials can start a fire and cause serious injury or death.

Crush Hazard

Wear eye protection when you do work on the drive.

If you do not use correct safety equipment, it can cause serious injury or death.

Use a crane or hoist to move large drives when necessary.

If you try to move a large drive without a crane or hoist, it can cause serious injury or death.

NOTICE

Damage to Equipment

When you touch the drive and circuit boards, make sure that you observe correct electrostatic discharge (ESD) procedures.

If you do not follow procedures, it can cause ESD damage to the drive circuitry.

Do not break the electrical connection between the drive and the motor when the drive is outputting voltage.

Incorrect equipment sequencing can cause damage to the drive.

Make sure that all connections are correct after you install the drive and connect peripheral devices.

Incorrect connections can cause damage to the drive.

Note:

Do not use unshielded wire for control wiring. Use shielded, twisted-pair wires and ground the shield to the ground terminal of the drive. Unshielded wire can cause electrical interference and unsatisfactory system performance.

4.2 Types of Faults, Minor Faults, Alarms, and Errors

If the drive or motor do not operate correctly, check the drive keypad for a code or message.

If problems occur that are not identified in this manual, contact the nearest Yaskawa representative with this information:

- Drive model
- Drive software version
- Date of purchase
- Description of the problem (such as failure conditions)

Table 4.1 contains descriptions of the different types of faults, minor faults, alarms, and errors that can occur during drive operation.

Contact Yaskawa if there is damage to the drive. Contact information is on the back cover of the manual.

Table 4.1 Types of Faults, Minor Faults, Alarms, and Errors

Type	Drive Response
Faults	When the drive detects a fault, it will cause these conditions: • The keypad shows the fault code and  and ALM/ERR of the LED Status Ring illuminate continuously. • The keypad shows the fault code and  and ALM/ERR on the LED Status Ring illuminate continuously when *o2-24 = 0 or 1 [LED Light Function Selection = Enable Status Ring & Keypad LED or LED Status Ring Disable]*. • The drive shuts off output, and the motor coasts to a stop. Some faults let the user select a motor stopping method. • Fault relay output MA-MC will turn ON, and MB-MC will turn OFF. The drive will not operate until you clear the fault with a Fault Reset and the drive goes back to usual status.
Minor Faults/Alarms	When the drive detects a minor fault or an alarm, it will cause these conditions: • The keypad shows the alarm code and  and ALM/ERR on the LED Status Ring flash when *o2-24 = 0 or 1*. • The drive will continue to operate the motor. Some alarms let the user select a motor stopping method. • If the drive detects a minor fault, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Select = Alarm]* will switch ON. If you do not set parameters *H2-01 to H2-03* , the drive will not trigger MFDO terminals when it detects a minor fault. • The drive will not output a minor fault signal when it detects an alarm. It is not necessary to do Fault Reset.
Operation Errors	An error occurs when parameter settings do not agree or a parameter combination is incorrect. The drive will not operate until you set the parameters correctly. When the drive detects an operation error, these conditions will result: • The keypad shows the error code. • Multi-function outputs do not output an alarm signal. Find the parameters that caused the error and correct the settings.
Auto-Tuning Errors	An error occurs during Auto-Tuning. When the drive detects a tuning error, it will cause these conditions: • The keypad shows the error code. • Multi-function outputs do not output an alarm signal. • The motor coasts to stop. Remove the cause of the error and do Auto-Tuning again.
Copy Function Errors	An error occurs when you use the keypad for a backup, restore, or verify operation. When the drive detects a copy function error, it will cause these conditions: • The keypad shows the error code. • Multi-function outputs do not output an alarm signal. Push a key on the keypad to clear the error. Remove the cause of the error and try the backup, restore, or verify operation again.

Note:

If there is no information on the display when you energize the keypad, there can be a connection error. Remove the keypad and connect it again to make sure that you correctly connected the cable between the drive and the keypad.

4.3 List of Fault, Minor Fault, Alarm, and Error Codes

Table 4.2 shows the possible fault, minor fault, alarm, and error codes.

The display codes are in alphabetical order. Search the table for the code shown on the keypad, and identify its causes and possible solutions.

Note:

The number in parentheses adjacent to the code in the table identifies the fault code or minor fault code (hex. number) that was read during MEMOBUS/Modbus communications.

Example: AEr (0032)

Table 4.2 List of Fault, Minor Fault, Alarm, and Error Codes

Display (Hex.)	Name	ALM LED	Type	Ref.
Accum (00DF)	Accumulated Level Reached	Flashing	Alarm	104
Accum (0468)	Accumulated Level Reached	Illuminated	Fault	77
AEr (0032)	Station Address Setting Error	Flashing	Alarm	104
AFBL (00A2)	Analog Fdbk Lost Switched to Net	Flashing	Alarm	104
AJA (00E3)	Anti-Jam Active	Flashing	Alarm	104
AJF (046B)	Anti-Jam Fault	Illuminated	Fault	77
ALRC (00EC)	Accum Lvl Reached Cycle Run Cmd	Flashing	Alarm	104
AUdiS (00A3)	Low WL/SP/PI Aux FB Drv Disabled	Flashing	Alarm	104
AUFbL (00A5)	WL/SP/PI Aux Fdbk Lost Using Net	Flashing	Alarm	104
AuxFB (00A4)	PI Aux Feedback Level Loss	Flashing	Alarm	104
AuxFB (0420)	PI Aux Feedback Level Loss	Illuminated	Fault	77
bAT (0085)	Keypad Battery Low Voltage	Flashing	Alarm	104
bAT (0402)	Keypad Battery Low Voltage	Illuminated	Fault	77
bb (0008)	Baseblock	Flashing	Alarm	105
bCE (008A)	Bluetooth Communication Error	Flashing	Alarm	105
bCE (0416)	Bluetooth Communication Fault	Illuminated	Fault	77
BuDif (00A6)	Main Fdbk Lost, Using Diff Fdbk	Flashing	Alarm	105
Bu-Fb (0090)	Main Fdbk Lost Using Backup Fdbk	Flashing	Alarm	105
BuFbl (0091)	Backup Fdbk Lost Chk/Repl Xducer	Flashing	Alarm	105
bUS (0015)	Option Communication Error	Flashing	Alarm	105
bUS (0022)	Option Communication Error	Illuminated	Fault	77
bUSy	Busy	-	Not an alarm.	106
CALL (001D)	Serial Comm Transmission Error	Flashing	Alarm	106
CE (0092)	Run at H5-34 (CE Go-To-Freq)	Flashing	Alarm	106
CE (0014)	Modbus Communication Error	Flashing	Alarm	106
CE (0021)	Modbus Communication Error	Illuminated	Fault	78
CoF (0046)	Current Offset Fault	Illuminated	Fault	78
CPEr	Control Mode Mismatch	-	Backup Function Runtime Error	128
CPF00 (0081)	Control Circuit Error	Illuminated	Fault	78
CPF01 (0082)	Control Circuit Error	Illuminated	Fault	78
CPF02 (0083)	A/D Conversion Error	Illuminated	Fault	78
CPF03 (0084)	Control Board Connection Error	Illuminated	Fault	79
CPF06 (0087)	EEPROM Memory Data Error	Illuminated	Fault	79
CPF07 (0088)	Terminal Board Connection Error	Illuminated	Fault	79

Display (Hex.)	Name	ALM LED	Type	Ref.
CPF08 (0089)	Terminal Board Connection Error	Illuminated	Fault	79
CPF11 (008C)	RAM Fault	Illuminated	Fault	79
CPF12 (008D)	FLASH Memory Fault	Illuminated	Fault	79
CPF13 (008E)	Watchdog Circuit Exception	Illuminated	Fault	79
CPF14 (008F)	Control Circuit Fault	Illuminated	Fault	80
CPF16 (0091)	Clock Fault	Illuminated	Fault	80
CPF17 (0092)	Timing Fault	Illuminated	Fault	80
CPF18 (0093)	Control Circuit Fault	Illuminated	Fault	80
CPF19 (0094)	Control Circuit Fault	Illuminated	Fault	80
CPF20 (0095)	Control Circuit Error	Illuminated	Fault	80
CPF21 (0096)	Control Circuit Error	Illuminated	Fault	80
CPF22 (0097)	Hybrid IC Error	Illuminated	Fault	80
CPF23 (0098)	Control Board Connection Error	Illuminated	Fault	81
CPF24 (0099)	Drive Unit Signal Fault	Illuminated	Fault	81
CPF26 (009B)	BB Circuit Error	Illuminated	Fault	81
CPF27 (009C)	PWM Set Reg Error	Illuminated	Fault	81
CPF28 (009D)	PWM Pattern Error	Illuminated	Fault	81
CPF29 (009E)	On-Delay Error	Illuminated	Fault	81
CPF30 (009F)	BB On Error	Illuminated	Fault	81
CPF31 (00A0)	ASIC Code Error	Illuminated	Fault	81
CPF32 (00A1)	ASIC Startup Error	Illuminated	Fault	82
CPF33 (00A2)	Watch-dog Eror	Illuminated	Fault	82
CPF34 (00A3)	Power/Clock Eror	Illuminated	Fault	82
CPF35 (00A4)	Ext A/D Conv Error	Illuminated	Fault	82
CPF36 (00A5)	ASIC COM Error	Illuminated	Fault	82
CPF37 (00A6)	ASIC COM Error	Illuminated	Fault	82
CPF38 (00A7)	EEPROM Data Error	Illuminated	Fault	82
CPF39 (00A8)	CPU-ASIC Communication Error	Illuminated	Fault	82
CPyE	Error Writing Data	-	Backup Function Runtime Error	128
CrST	Cannot Reset	Flashing	Not an alarm.	107
CSEr	Control Mode Mismatch	-	Backup Function Runtime Error	128
CyPo (0029)	Cycle Power to Accept Changes	Flashing	Alarm	107
dEv (0011)	Speed Deviation	Flashing	Alarm	107
dEv (0019)	Speed Deviation	Illuminated	Fault	83
dFPS	Drive Model Mismatch	-	Backup Function Runtime Error	128
DIFF (0093)	Differential Feedback Exceeded	Flashing	Alarm	107
DIFF (0421)	Differential Feedback Exceeded	Illuminated	Fault	83
dnE (002A)	Drive Disabled	Flashing	Alarm	107
DRA (00E4)	De-Rag Active	Flashing	Alarm	107
DRF (046C)	De-Rag Fault	Illuminated	Fault	83
DS (00DC)	De-Scale/De-Rag Active	Flashing	Alarm	108
dv7 (005B)	Polarity Judge Timeout	Illuminated	Fault	83
dWAL (0049)	DriveWorksEZ Alarm	Flashing	Alarm	108

Display (Hex.)	Name	ALM LED	Type	Ref.
dWA2 (004A)	DriveWorksEZ Alarm 2	Flashing	Alarm	108
dWA3 (004B)	DriveWorksEZ Alarm 3	Flashing	Alarm	108
dWF1 (004A)	EEPROM Memory DWEZ Data Error	Illuminated	Fault	83
dWFL (0049)	DriveWorksEZ Fault	Illuminated	Fault	83
dWF2 (004B)	DriveWorksEZ Fault 2	Illuminated	Fault	83
dWF3 (004C)	DriveWorksEZ Fault 3	Illuminated	Fault	83
EF (0007)	FWD/REV Run Command Input Error	Flashing	Alarm	108
EF0 (001A)	Option Card External Fault	Flashing	Alarm	108
EF0 (0027)	Option Card External Fault	Illuminated	Fault	84
EF1 (0039)	Pump Fault (Terminal S1)	Flashing	Alarm	108
EF1 (0042)	Pump Fault (Terminal S1)	Illuminated	Fault	84
EF2 (003A)	Pump Fault (Terminal S2)	Flashing	Alarm	108
EF2 (0043)	Pump Fault (Terminal S2)	Illuminated	Fault	84
EF3 (0009)	Pump Fault (Terminal S3)	Flashing	Alarm	108
EF3 (0011)	Pump Fault (Terminal S3)	Illuminated	Fault	84
EF4 (000A)	Pump Fault (Terminal S4)	Flashing	Alarm	109
EF4 (0012)	Pump Fault (Terminal S4)	Illuminated	Fault	84
EF5 (000B)	Pump Fault (Terminal S5)	Flashing	Alarm	109
EF5 (0013)	Pump Fault (Terminal S5)	Illuminated	Fault	84
EF6 (000C)	Pump Fault (Terminal S6)	Flashing	Alarm	109
EF6 (0014)	Pump Fault (Terminal S6)	Illuminated	Fault	84
EF7 (000D)	Pump Fault (Terminal S7)	Flashing	Alarm	109
EF7 (0015)	Pump Fault (Terminal S7)	Illuminated	Fault	85
EF8 (000E)	Pump Fault (Terminal S8)	Flashing	Alarm	109
EF8 (0016)	Pump Fault (Terminal S8)	Illuminated	Fault	85
End1	Excessive Rated Voltage Setting	Flashing	An Auto-Tuning Error	125
End2	Iron Core Saturation Coefficient	Flashing	An Auto-Tuning Error	125
End3	Rated Current Setting Alarm	Flashing	An Auto-Tuning Error	125
End4	Adjusted Slip Calculation Error	Flashing	An Auto-Tuning Error	125
End5	Resistance Tuning Error	Flashing	An Auto-Tuning Error	125
End6	Leakage Inductance Alarm	Flashing	An Auto-Tuning Error	125
End7	No-Load Current Alarm	Flashing	An Auto-Tuning Error	125
End8	HFI Alarm	Flashing	An Auto-Tuning Error	125
End9	Initial Pole Detection Alarm	Flashing	An Auto-Tuning Error	126
EOF (0067)	Emergency Override FWD	Flashing	Alarm	109
EOR (0068)	Emergency Override REV	Flashing	Alarm	110
EP24v (0081)	External Power 24V Supply	Flashing	Alarm	110
Er-01	Motor Data Error	Flashing	An Auto-Tuning Error	126
Er-02	Drive in an Alarm State	Flashing	An Auto-Tuning Error	126
Er-03	STOP Button was Pressed	Flashing	An Auto-Tuning Error	126
Er-04	Line-to-Line Resistance Error	Flashing	An Auto-Tuning Error	126
Er-05	No-Load Current Error	Flashing	An Auto-Tuning Error	126
Er-08	Rated Slip Error	Flashing	An Auto-Tuning Error	127

Display (Hex.)	Name	ALM LED	Type	Ref.
Er-09	Acceleration Error	Flashing	An Auto-Tuning Error	127
Er-12	Current Detection Error	Flashing	An Auto-Tuning Error	127
Er-13	Leakage Inductance Error	Flashing	An Auto-Tuning Error	127
Er-18	Back EMF Error	Flashing	An Auto-Tuning Error	127
Er-19	PM Inductance Error	Flashing	An Auto-Tuning Error	127
Er-20	Stator Resistance Error	Flashing	An Auto-Tuning Error	127
Er-25	HighFreq Inject Param Tuning Err	Flashing	An Auto-Tuning Error	127
Err (001F)	EEPROM Write Error	Illuminated	Fault	85
FAn1 (0413)	Drive Cooling Fan Fault	Illuminated	Fault	85
FDBKL (0094)	Feedback Loss Wire Break	Flashing	Alarm	110
FDBKL (0422)	WIRE Break	Illuminated	Fault	85
FLGT (0095)	Feedback Loss, Go To Freq b5-83	Flashing	Alarm	110
FMLST (00E5)	Net Flow Meter Lost:Check Source	Flashing	Alarm	110
FR<MS (009E)	Freq Ref < Minimum Speed (Y1-06)	Flashing	Alarm	110
FR<TH (009F)	Freq. Reference < Thrust (Y4-12)	Flashing	Alarm	111
GF (0006)	Ground Fault	Illuminated	Fault	86
HCA (0034)	High Current Alarm	Flashing	Alarm	111
HFB (0423)	High Feedback Sensed	Illuminated	Fault	86
HiAux (0096)	High PI Aux Feedback Level	Flashing	Alarm	111
HiAux (0424)	High PI Aux Feedback Level	Illuminated	Fault	86
HIFB (0097)	High Feedback Sensed	Flashing	Alarm	111
HiFlo (00E0)	High Flow	Flashing	Alarm	111
HiFlo (046A)	High Flow	Illuminated	Fault	86
HiSuc (00AE)	High Suction Pressure	Flashing	Alarm	111
HiSuc (042F)	High Suction Pressure	Illuminated	Fault	86
HLCE (0411)	High Level Communication Errors	Illuminated	Fault	86
HWL (0433)	High Water Level Digital Input	Illuminated	Fault	87
iFEr	Communication Err	-	Backup Function Runtime Error	128
L24v (0021)	Loss of External Power 24 Supply	Flashing	Alarm	111
LCP (00A7)	Low City Pressure	Flashing	Alarm	112
LF (001C)	Output Phase Loss	Illuminated	Fault	87
LF2 (0036)	Output Current Imbalance	Illuminated	Fault	87
LFB (0425)	Low Feedback Sensed	Illuminated	Fault	87
LoAux (0099)	Low PI Aux Feedback Level	Flashing	Alarm	112
LoAux (0426)	Low PI Aux Feedback Level	Illuminated	Fault	87
LOFB (009A)	Low Feedback Sensed	Flashing	Alarm	112
LoG	Com Error / Abnormal SD Card	Flashing	Alarm	112
LOP (009B)	Loss of Prime	Flashing	Alarm	112
LOP (0427)	Loss of Prime	Illuminated	Fault	88
LoSuc (00AD)	Low Suction Pressure	Flashing	Alarm	112
LoSuc (042E)	Low Suction Pressure	Illuminated	Fault	88
LowFl (00DE)	Low Flow	Flashing	Alarm	112
LowFl (0467)	Low Flow	Illuminated	Fault	88

Display (Hex.)	Name	ALM LED	Type	Ref.
LowWL (00AC)	Low Water Level	Flashing	Alarm	113
LowWL (042D)	Low Water Level	Illuminated	Fault	88
LSP (00A8)	Low Suction Pressure	Flashing	Alarm	113
LT-1 (0035)	Cooling Fan Maintenance Time	Flashing	Alarm	113
LT-2 (0036)	Capacitor Maintenance Time	Flashing	Alarm	113
LT-3 (0043)	SoftChargeBypassRelay MainteTime	Flashing	Alarm	113
LT-4 (0044)	IGBT Maintenance Time (50%)	Flashing	Alarm	113
LWL (0432)	Low Water Level Digital Input	Illuminated	Fault	88
LWT (00A9)	Low Water In Tank	Flashing	Alarm	113
MSL (0428)	Net Master Lost	Illuminated	Fault	88
ndAT	Error Received Data	-	Backup Function Runtime Error	128
NETSC (00A1)	NETSCAN Waiting for Master	Flashing	Alarm	113
NMS (009C)	Setpoint Not Met	Flashing	Alarm	113
NMS (0429)	Setpoint Not Met	Illuminated	Fault	88
nSE (0052)	Node Setup Error	Illuminated	Fault	89
oC (0007)	Overcurrent	Illuminated	Fault	89
OD (009D)	Output Disconnect	Flashing	Alarm	114
OD (042A)	Output Disconnect	Illuminated	Fault	90
oFA00 (0101)	Option Not Compatible with Port	Illuminated	Fault	90
oFA01 (0102)	Option Fault/Connection Error	Illuminated	Fault	90
oFA02 (0103)	Duplicate Options	Illuminated	Fault	90
oFA03 (0104)	Diagnostic Error	Illuminated	Fault	90
oFA04 (0105)	Flash Write Mode	Illuminated	Fault	90
oFA05 (0106)	Option A/D Error	Illuminated	Fault	91
oFA06 (0107)	Option Communication Error	Illuminated	Fault	91
oFA10 (0111)	Option RAM Error	Illuminated	Fault	91
oFA11 (0112)	Option Ope Mode Error	Illuminated	Fault	91
oFA12 (0113)	Drive Receive CRC Error	Illuminated	Fault	91
oFA13 (0114)	Drive Receive Frame Error	Illuminated	Fault	91
oFA14 (0115)	Drive Receive Abort Error	Illuminated	Fault	91
oFA15 (0116)	Option Receive CRC Error	Illuminated	Fault	91
oFA16 (0117)	Option Receive Frame Error	Illuminated	Fault	92
oFA17 (0118)	Option Receive Abort Error	Illuminated	Fault	92
oFA30 (0131)	COM ID Error	Illuminated	Fault	92
oFA31 (0132)	Type Code Error	Illuminated	Fault	92
oFA32 (0133)	SUM Check Error	Illuminated	Fault	92
oFA33 (0134)	Option Receive Time Over	Illuminated	Fault	92
oFA34 (0135)	Memobus Time Over	Illuminated	Fault	92
oFA35 (0136)	Drive Receive Time Over 1	Illuminated	Fault	92
oFA36 (0137)	CI Check Error	Illuminated	Fault	93
oFA37 (0138)	Drive Receive Time Over 2	Illuminated	Fault	93
oFA38 (0139)	Control Reference Error	Illuminated	Fault	93
oFA39 (013A)	Drive Receive Time Over 3	Illuminated	Fault	93

Display (Hex.)	Name	ALM LED	Type	Ref.
oFA40 (013B)	CtrlResSel 1Err	Illuminated	Fault	93
oFA41 (013C)	Drive Receive Time Over 4	Illuminated	Fault	93
oFA42 (013D)	CtrlResSel 2Err	Illuminated	Fault	93
oFA43 (013E)	Drive Receive Time Over 5	Illuminated	Fault	93
oFb00 (0201)	Option Not Compatible with Port	Illuminated	Fault	94
oFb01 (0202)	Option Fault/Connection Error	Illuminated	Fault	94
oFb02 (0203)	Duplicate Options	Illuminated	Fault	94
oFb03 (0204)	Diagnostic Error	Illuminated	Fault	94
oFb04 (0205)	Flash Write Mode	Illuminated	Fault	94
oFb05 (0206)	Option A/D Error	Illuminated	Fault	94
oFb06 (0207)	Option Communication Error	Illuminated	Fault	94
oFb10 (0211)	Option RAM Error	Illuminated	Fault	94
oFb11 (0212)	Option Ope Mode Error	Illuminated	Fault	94
oFb12 (0213)	Drive Receive CRC Error	Illuminated	Fault	95
oFb13 (0214)	Drive Receive Frame Error	Illuminated	Fault	95
oFb14 (0215)	Drive Receive Abort Error	Illuminated	Fault	95
oFb15 (0216)	Option Receive CRC Error	Illuminated	Fault	95
oFb16 (0217)	Option Receive Frame Error	Illuminated	Fault	95
oFb17 (0218)	Option Receive Abort Error	Illuminated	Fault	95
oH (0003)	Heatsink Overheat	Flashing	Alarm	114
oH (0009)	Heatsink Overheat	Illuminated	Fault	95
oH1 (000A)	Heatsink Overheat	Illuminated	Fault	96
oH2 (0004)	External Overheat (H1-XX=B)	Flashing	Alarm	114
oH3 (001D)	Motor Overheat (PTC Input)	Illuminated	Fault	96
oH3 (0022)	Motor Overheat (PTC Input)	Flashing	Alarm	114
oH4 (0020)	Motor Overheat Fault (PTC Input)	Illuminated	Fault	96
oL1 (000B)	Motor Overload	Illuminated	Fault	96
oL2 (000C)	Drive Overload	Illuminated	Fault	97
oL3 (0005)	Overtorque 1	Flashing	Alarm	115
oL3 (000D)	Overtorque Detection 1	Illuminated	Fault	98
oL4 (0006)	Overtorque 2	Flashing	Alarm	115
oL4 (000E)	Overtorque Detection 2	Illuminated	Fault	98
oL7 (002B)	High Slip Braking Overload	Illuminated	Fault	98
oPE01	Drive Capacity Setting Fault	Flashing	Parameter Setting Error	119
oPE02	Parameter Range Setting Error	Flashing	Parameter Setting Error	119
oPE03	Multi-Function Input Setting Err	Flashing	Parameter Setting Error	119
oPE05	Run Cmd/Freq Ref Source Sel Err	Flashing	Parameter Setting Error	121
oPE07	Analog Input Selection Error	Flashing	Parameter Setting Error	122
oPE08	Parameter Selection Error	Flashing	Parameter Setting Error	122
oPE09	PID Control Selection Fault	Flashing	Parameter Setting Error	123
oPE10	V/f Data Setting Error	Flashing	Parameter Setting Error	123
oPE11	Carrier Frequency Setting Error	Flashing	Parameter Setting Error	123
oPE16	Energy Saving Constants Error	Flashing	Parameter Setting Error	123

Display (Hex.)	Name	ALM LED	Type	Ref.
oPE33	Digital Output Selection Error	Flashing	Parameter Setting Error	124
oPE35	Network WL/SP/PI Aux Mode	Flashing	Parameter Setting Error	124
oPE43	Flow Meter Input	Flashing	Parameter Setting Error	124
oPE44	Water Level / Suct Pres / PI Aux	Flashing	Parameter Setting Error	124
oPr (001E)	Keypad Connection Fault	Illuminated	Fault	98
oS (0010)	Overspeed	Flashing	Alarm	115
oS (0018)	Overspeed	Illuminated	Fault	99
ov (0002)	DC Bus Overvoltage	Flashing	Alarm	115
ov (0008)	Overvoltage	Illuminated	Fault	99
ov2 (0405)	DC Bus Overvoltage 2	Illuminated	Fault	99
ovEr	Too Many Parameters Changed	-	Not an alarm.	115
PASS	Modbus Communication Test	Flashing	Not an alarm.	115
PE1 (0047)	PLC Fault 1	Illuminated	Fault	99
PE2 (0048)	PLC Fault 2	Illuminated	Fault	100
PF (0047)	Input Phase Loss	Flashing	Alarm	115
PF (001B)	Input Phase Loss	Illuminated	Fault	100
POC (00E2)	Pump Over Cycle	Flashing	Alarm	116
POC (0469)	Pump Over Cycle	Illuminated	Fault	100
PSE (0437)	JOHB-SMP3 Protocol Set Error	Illuminated	Fault	100
rdEr	Error Reading Data	-	Backup Function Runtime Error	128
R-DNE (00D8)	Remote Drive Disable	Flashing	Alarm	116
rUn (001B)	Motor Switch during Run	Flashing	Alarm	116
SC (0005)	Short Circuit/IGBT Failure	Illuminated	Fault	100
SCF (040F)	Safety Circuit Fault	Illuminated	Fault	101
SE (0020)	Modbus Test Mode Error	Flashing	Alarm	116
SEr (003B)	Speed Search Retries Exceeded	Illuminated	Fault	101
SPCNR (00DD)	Single Phase Converter Not Ready	Flashing	Alarm	116
SPCNR (0435)	Single Phase Converter Not Ready	Illuminated	Fault	101
SPL (00B0)	Suction Pressure Feedback Loss	Flashing	Alarm	116
SPL (0431)	Suction Pressure Feedback Loss	Illuminated	Fault	101
STo (003C)	Safe Torque OFF	-	Alarm	116
SToF (003B)	Safe Torque OFF	Flashing	Alarm	117
STPo (0037)	Motor Step-Out Detected	Illuminated	Fault	101
TiM (0089)	Keypad Time Not Set	Flashing	Alarm	117
TiM (0401)	Keypad Time Not Set	Illuminated	Fault	101
TrPC (0042)	IGBT Maintenance Time (90%)	Flashing	Alarm	117
UL3 (001E)	Undertorque Detection 1	Flashing	Alarm	117
UL3 (0029)	Undertorque Detection 1	Illuminated	Fault	102
UL4 (001F)	Undertorque Detection 2	Flashing	Alarm	117
UL4 (002A)	Undertorque Detection 2	Illuminated	Fault	102
UL6 (004E)	Underload or Belt Break Detected	Flashing	Alarm	117
UL6 (005A)	Underload or Belt Break Detected	Illuminated	Fault	102
Uv (0001)	DC Bus Undervoltage	Flashing	Alarm	117

Display (Hex.)	Name	ALM LED	Type	Ref.
Uv1 (0002)	DC Bus Undervoltage	Illuminated	Fault	102
Uv2 (0003)	Control Power Undervoltage	Illuminated	Fault	102
Uv3 (0004)	Soft Charge Answerback Fault	Illuminated	Fault	103
vAEr	Voltage Class, Capacity Mismatch	-	Backup Function Runtime Error	129
vFyE	Parameters do not Match	-	Backup Function Runtime Error	129
VLTS (042B)	Volute Thermostat Fault	Illuminated	Fault	103
WFR (00E9)	Waiting for Run	Flashing	Alarm	118
WLL (00AF)	Water Level Feedback Loss	Flashing	Alarm	118
WLL (0430)	Water Level Feedback Loss	Illuminated	Fault	103

4.4 Fault

This section gives information about some of the causes and possible solutions of faults. You must use the Fault Reset operation to remove the fault before you can operate the drive. Use the information in this table to remove the cause of the fault.

Code	Name	Causes	Possible Solutions
Accum	Accumulated Level Reached	Accumulated volume has is more than the *Y6-11* to *Y6-14* settings and *Y6-15 = 2 or 3 [Accumulated Volume Behavior = Fault (and Digital Output) or Fault + MFDO + Accum Reset]*	Set *Y6-05 = 7770 [Flow Accumulation Set Reset = Reset Accumulation]* or via Reset Accumulation digital input).
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
AJF	Anti-Jam Fault	The drive could not clear the debris from the impeller in fewer than the number of tries set in *Y7-02 [Anti-Jam Cycle Count]*. Display text for Anti-Jam function is set to Anti-Jam *[Y7-09 = 0]*.	• Check for correct pump operation. • Adjust the *Y7-03 [AJ Detection Current Lvl @ Start]* level or the *Y7-02* counts. • If text is incorrect check *Y7-09 [Anti-Jam Display Text Selection]*.
Note: • Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
AuxFB	PI Aux Feedback Level Loss	The analog input from the terminal set for *PI Auxiliary Control Feedback Level [H3-xx = 27]* is more than 21 mA or less than 3 mA for longer than 1 s.	Repair transducer or wiring.
Note: • Do a Fault Reset to clear the fault. • Parameter *YF-19 [PI Aux Ctrl Feedback WireBreak]* sets the Auto Restart function of this error.			
Code	**Name**	**Causes**	**Possible Solutions**
bAT	Keypad Battery Low Voltage	The keypad battery voltage is low.	Replace the keypad battery.
Note: Use *o4-24 [bAT Detection Selection]* to enable/disable *bAT* detection.			
Code	**Name**	**Causes**	**Possible Solutions**
bCE	Bluetooth Communication Fault	The smartphone or tablet with DriveWizard Mobile or DriveWizard installed is too far from the keypad.	Use the smartphone or tablet 10 m (32.8 ft) or nearer to the keypad. **Note:** *bCE* can occur when the smartphone or tablet is 10 m (32.8 ft) or nearer to the keypad depending on the specifications of the smartphone or tablet.
		Radio waves from a different device are causing interference with communications between the smartphone or tablet and keypad.	Make sure that no device around the keypad uses the same radio bandwidth (2400 MHz to 2480 MHz), and prevent radio interference.
Note: • The drive detects this error when you use the Bluetooth LCD keypad to operate the drive from a smartphone or tablet. • Do a Fault Reset to clear the fault. • Set the stopping method for this fault in *o2-27 [bCE Detection Selection]*.			
Code	**Name**	**Causes**	**Possible Solutions**
bUS	Option Communication Error	The drive did not receive a signal from the controller.	Correct wiring errors.
		The communications cable wiring is incorrect.	
		There is a short-circuit in the communications cable or the communications cable is not connected.	• Repair short circuits and connect cables. • Replace the defective communications cable.
		Electrical interference caused a communication data error.	• Examine the control circuit lines, main circuit lines, and ground wiring, and decrease the effects of electrical interference. • Make sure that a magnetic contactor is not the source of the electrical interference, then use a Surge Protective Device if necessary. • Use only the recommended cables or other shielded line. Ground the shield on the controller side or the drive input power side. • Separate the communication wiring from drive power lines, and install a noise filter to the input side of the power supply for communication. • Decrease the effects of electrical interference from the controller.
		The option is incorrectly installed to the drive.	Correctly install the option to the drive.

Code	Name	Causes	Possible Solutions
		The option is damaged.	If the fault continues and the wiring is correct, replace the option.

Note:
• The drive detects this error if the Run command or frequency reference is assigned to the option card.
• Do a Fault Reset to clear the fault.
• If the drive detects this error, the drive will operate the motor as specified by the stopping method set in *F6-01 [Communication Error Selection]*.

Code	Name	Causes	Possible Solutions
CE	Modbus Communication Error	The communications cable wiring is incorrect.	Correct wiring errors.
		There is a short circuit in the communications cable or the communications cable is not connected.	• Repair short circuits and connect cables. • Replace the defective communications cable.
		Electrical interference caused a communication data error.	• Examine the control circuit lines, main circuit lines, and ground wiring, and decrease the effects of electrical interference. • Make sure that a magnetic contactor is not the source of the electrical interference, then use a Surge Protective Device if necessary. • Use only the recommended cables or other shielded line. Ground the shield on the controller side or the drive input power side. • Separate the communication wiring from drive power lines, and install a noise filter to the input side of the power supply for communication. • Decrease the effects of electrical interference from the controller.

Note:
• The drive detects this error if it does not correctly receive control data for the *CE* detection time set to *H5-09 [CE Detection Time]*.
• Do a Fault Reset to clear the fault.
• If the drive detects this error, the drive will operate the motor as specified by the stopping method set in *H5-04 [Communication Error Stop Method]*.

Code	Name	Causes	Possible Solutions
CoF	Current Offset Fault	The drive starts operation while the induced voltage stays in the motor (during coasting to a stop or after fast deceleration).	• Make a sequence that does not restart operation when induced voltage stays in the motor. • Set *b3-01 = 1 [Speed Search at Start Selection = Enabled]*. • Use *Speed Search from Fmax or Fref [H1-xx = 61, 62]* to do a speed search through one of the external terminals. **Note:** When controlling the PM motor, External Speed Search commands 1 and 2 operate the same.
		A drive hardware problem occurred.	• Do a Fault Reset to clear the fault or de-energize the drive. • If the fault stays, replace the drive.

Code	Name	Causes	Possible Solutions
CPF00	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.

Note:
• Do a Fault Reset to clear the fault.
• Fault trace is not available for these faults.

Code	Name	Causes	Possible Solutions
CPF01	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.

Note:
• Do a Fault Reset to clear the fault.
• Fault trace is not available for these faults.

Code	Name	Causes	Possible Solutions
CPF02	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.

Note:
• Do a Fault Reset to clear the fault.
• Fault trace is not available for these faults.

Code	Name	Causes	Possible Solutions
CPF03	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF06	Control Circuit Error (EEPROM memory Data Error)	The drive power supply was de-energized while a communication option entered a parameter Write command.	Set *A1-03 = 2220, 3330 [Initialize Parameters = 2-Wire Initialization, 3-Wire Initialization]* and initialize the drive.
		An EEPROM peripheral circuit error occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about how to replace the control board, contact Yaskawa or your nearest sales representative.
Note: • The drive detects this error if there is an error in the data written to the drive EEPROM. • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF07	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF08	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF11	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF12	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF13	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			

Code	Name	Causes	Possible Solutions
CPF14	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF16	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF17	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF18	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF19	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF20	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF21	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF22	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			

Code	Name	Causes	Possible Solutions
CPF23	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF24	Control Circuit Error (Drive Unit Signal Fault)	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF26	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF27	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF28	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF29	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF30	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF31	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			

Code	Name	Causes	Possible Solutions
CPF32	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF33	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF34	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF35	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF36	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF37	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF38	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
CPF39	Control Circuit Error	A drive hardware problem occurred.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			

Code	Name	Causes	Possible Solutions
dEv	Speed Deviation	The load is too heavy.	Decrease the load.
		Acceleration and deceleration times are set too short.	Increase the values set in *C1-01 to C1-04 [Acceleration/ Deceleration Time]*.
		The *dEv* detection level settings are incorrect.	Adjust *F1-10 [Speed Deviation Detection Level]* and *F1-11 [Speed Deviation Detect DelayTime]*.
		The load is locked up.	Examine the machine.
		The holding brake is stopping the motor.	Release the holding brake.

Note:
• The drive detects this error if the difference between the detected speed and the speed reference is more than the setting of *F1-10* for longer than *F1-11*.
• Do a Fault Reset to clear the fault.
• If the drive detects this error, the drive will operate the motor as specified by the stopping method set in *F1-04 [Speed Deviation Detection Select]*.

Code	Name	Causes	Possible Solutions
DIFF	Differential Feedback Exceeded	The difference between the PID Feedback and *Differential Level Source [H3-xx = 2D]* is more than the level set in *Y4-18 [Differential Level]* for the time set in *Y4-19 [Differential Lvl Detection Time]*.	• Replace the feedback transducer or transducers. • Make sure that the settings of *Y4-18 [Differential Level] to Y4-20 [Differential Level Detection Sel]* are correct.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
DRF	De-Rag Fault	The drive could not clear the debris from the impeller in fewer than the number of tries set in *Y7-02 [Anti-Jam Cycle Count]*. Display text for Anti-Jam function is set to De-Rag *[Y7-09 = 1]*.	• Check for correct pump operation. • Adjust the *Y7-03 [AJ Detection Current Lvl @ Start]* level or the *Y7-02* counts. • If text is incorrect check *Y7-09 [Anti-Jam Display Text Selection]*.

Note:
• Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
dv7	Polarity Judge Timeout	There is a disconnection in the motor coil winding.	Measure the motor line-to-line resistance and replace the motor if a coil is disconnected.
		The screws on the drive output terminals are loose.	Tighten the terminal screws to the correct tightening torque.

Note:
• The drive detects this error if it cannot detect polarity in a pre-set length of time.
• Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
dWF1	EEPROM Memory DWEZ Data Error	There is an error in the EEPROM peripheral circuit.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
		There is a problem with the EEPROM data.	Set *A1-03 = 2220, 3330 [Initialize Parameters = 2-Wire Initialization, 3-Wire Initialization]* to initialize the drive, then upload the DriveWorksEZ project to the drive again.

Note:
• The drive detects this error if there is an error in the DriveWorksEZ program that was saved to EEPROM.
• Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
dWFL	DriveWorksEZ Fault	There was a fault in the DriveWorksEZ program.	Examine the DriveWorksEZ program and remove the cause of the fault. This is not a drive fault.

Note:
• Do a Fault Reset to clear the fault.
• This fault is ignored during Emergency Override

Code	Name	Causes	Possible Solutions
dWF2	DriveWorksEZ Fault 2	There was a fault in the DriveWorksEZ program.	Examine the DriveWorksEZ program and remove the cause of the fault. This is not a drive fault.

Note:
• Do a Fault Reset to clear the fault.
• This fault is ignored during Emergency Override

Code	Name	Causes	Possible Solutions
dWF3	DriveWorksEZ Fault 3	There was a fault in the DriveWorksEZ program.	Examine the DriveWorksEZ program and remove the cause of the fault. This is not a drive fault.

Note:
• Do a Fault Reset to clear the fault.
• This fault is ignored during Emergency Override

Code	Name	Causes	Possible Solutions
EF0	Option Card External Fault	The communication option received an external fault from the controller.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input from the controller.
		A programming error occurred on the controller side.	Examine the operation of the controller program.

Note:
• The drive detects this fault if the alarm function on the external device side is operating.
• Do a Fault Reset to clear the fault.
• If the drive detects this fault, it will operate the motor as specified by the stop method set in *F6-03 [Comm External Fault (EF0) Select]*.

Code	Name	Causes	Possible Solutions
EF1	Pump Fault (Terminal S1)	MFDI terminal S1 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S1.
		Pump Fault [H1-01 = 20 to 2B] is set to MFDI terminal S1, but the terminal is not in use.	Correctly set the MFDI.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
EF2	Pump Fault (Terminal S2)	MFDI terminal S2 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S2.
		Pump Fault [H1-02 = 20 to 2B] is set to MFDI terminal S2, but the terminal is not in use.	Correctly set the MFDI.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
EF3	Pump Fault (Terminal S3)	MFDI terminal S3 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S3.
		Pump Fault [H1-03 = 20 to 2B] is set to MFDI terminal S3, but the terminal is not in use.	Correctly set the MFDI.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
EF4	Pump Fault (Terminal S4)	MFDI terminal S4 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S4.
		Pump Fault [H1-04 = 20 to 2B] is set to MFDI terminal S4, but the terminal is not in use.	Correctly set the MFDI.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
EF5	Pump Fault (Terminal S5)	MFDI terminal S5 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S5.
		Pump Fault [H1-05 = 20 to 2B] is set to MFDI terminal S5, but the terminal is not in use.	Correctly set the MFDI.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
EF6	Pump Fault (Terminal S6)	MFDI terminal S6 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S6.

Code	Name	Causes	Possible Solutions
		Pump Fault [H1-06 = 20 to 2B] is set to MFDI terminal S6, but the terminal is not in use.	Correctly set the MFDI.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
EF7	Pump Fault (Terminal S7)	MFDI terminal S7 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S7.
		Pump Fault [H1-07 = 20 to 2B] is set to MFDI terminal S7, but the terminal is not in use.	Correctly set the MFDI.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
EF8	Pump Fault (Terminal S8)	MFDI terminal S8 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S8.
		Pump Fault [H1-08 = 20 to 2B] is set to MFDI terminal S8, but the terminal is not in use.	Correctly set the MFDI.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
Err	EEPROM Write Error	There was a problem with the EEPROM hardware.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. Contact Yaskawa or your nearest sales representative to replace the board.
		Electrical interference corrupted the data while it was writing to the EEPROM of the drive.	• Push ENTER Key. • Set the parameters again.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
FAn1	Drive Cooling Fan Fault	The cooling fan stopped operating correctly.	• Examine cooling fan operation. • Re-energize the drive. • Examine *U4-03 [Fan Elapsed Time]* and *U4-04 [Fan Life Mon]*. If the performance life of the cooling fan is expired or if there is damage to the fan, replace the fan.
		The circulation fan is damaged.	• Examine circulation fan operation. • Re-energize the drive. • Examine *U4-03 [Fan Elapsed Time]* and *U4-04 [Fan Life Mon]*. If there is damage to the circulation fan or if the performance life of the fan is expired, replace the fan.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
FDBKL	WIRE Break	The analog input from the terminal set for *PID Feedback [H3-xx = B]* is more than 21mA or less than 3mA for longer than 1 s in these conditions: • *b5-82 = 2 [Feedback Loss 4 ~ 20mA Detect Sel = Fault]* • *b5-01 ≠ 0 [PID Mode Setting ≠ Disabled]* • *H3-01, H3-09, or H3-05 = 2 [Terminal A1/A2/A3 Signal Level Selection = 4 to 20 mA]*	Make sure that you install the PID feedback source and it operates correctly.

Note:
• Do a Fault Reset to clear the fault.
• If the drive detects this fault, it will operate the motor as specified by the settings of *b5-82*.
• Parameter *L5-42 [Feedback Loss Fault Retry Select]* sets the Auto Restart function of this fault.

Code	Name	Causes	Possible Solutions
GF	Ground Fault	Overheating caused damage to the motor or the motor insulation is not satisfactory.	Measure the motor insulation resistance, and replace the motor if there is electrical conduction or unserviceable insulation.
		The motor main circuit cable is contacting ground to make a short circuit.	• Examine the motor main circuit cable for damage, and repair short circuits. • Measure the resistance between the motor main circuit cable and the ground terminal. If there is electrical conduction, replace the cable.
		An increase in the stray capacitance of the cable and the ground terminal caused an increase in the leakage current.	• If the wiring length of the cable is more than 100 m, decrease the carrier frequency. • Decrease the stray capacitance.
		There was a problem with the drive hardware.	Replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.

Note:
• The drive detects this fault if a current short to ground was more than 50% of rated current on the output side of the drive.
• Do a Fault Reset to clear the fault.
• *L5-08 [Fault Reset Enable Select Grp2]* disables the Auto Restart function.

Code	Name	Causes	Possible Solutions
HFB	High Feedback Sensed	The feedback level is more than the level set in *Y1-11 [High Feedback Level]* for the time set in *Y1-12 [High Feedback Lvl Fault Dly Time]*.	• Decrease the feedback level less than *Y1-11*. • Set *Y1-11* and *Y1-12* correctly.

Note:
• Do a Fault Reset to clear the fault.
• If the drive detects this fault, it will respond as specified by the setting of *Y1-13 [High Feedback Selection]*.
• Parameter *L5-41 [Hi Feedback Flt Retry Selection]* sets the Auto Restart function of this fault.

Code	Name	Causes	Possible Solutions
HiAux	High PI Aux Feedback Level	PI Auxiliary Feedback is more than the level set in *YF-12 [PI Aux Control High Level Detect]* for the time set in *YF-13 [PI Aux High Level Detection Time]* in these conditions: • The drive is running. • The output frequency > 0.	• Decrease the PI Auxiliary Feedback level less than *YF-12*. • Set *YF-12* and *YF-13* correctly.

Note:
• Do a Fault Reset to clear the fault.
• Parameter *YF-14 [PI Aux Control Hi Level Det Sel]* sets the Auto Restart function of this error.

Code	Name	Causes	Possible Solutions
HiFlo	High Flow	Flow rate was more the level set in *Y6-17 [High Flow Level]* for longer than the time set in *Y6-18 [High Flow Detection Time]* and *Y6-19 = 2 or 3 [High Flow Behavior = Fault (and Digital Output) or Auto-Restart (time set by Y6-10)]*.	Reprogram *Y6-17* to *Y6-19* if flow rate is acceptable.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
HiSuc	High Suction Pressure	Suction pressure is more than the level set in *YE-12 [High Suction Pressure Det Level]* for longer than the time set in *YE-13 [High Suction Pressure Det Time]*, and the drive is running (AUTO or HAND) and *YE-14 = 2 or 3 [High Suction Pressure Behavior = Fault (and Digital Output) or Auto-Restart (time set by YE-15)]*.	Decrease suction pressure.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
HLCE	High Level Communication Errors	Communication data error occurred between the option and the master drive when you use Gateway function. The master drive detects *oFxxx* and the slave drive detects *HLCE*.	Examine the wiring between the option and the master drive and remove the cause of the fault.

Note:
This fault occurs when the drive is a slave drive in Gateway Mode *[F6-16 ≠ 0]* and communication is lost from the master.

Code	Name	Causes	Possible Solutions
HWL	High Water Level Digital Input	• The digital input terminal set to *H1-xx = BC [MFDI Function Selection = High Water Level]* activated or is defective. • The digital input terminal set to *H1-xx = 1BC [! High Water Level]* deactivated or is defective.	• Decrease the water level. • Adjust the terminal set to *H1-xx = BC or 1BC*.

Note:
• Do a Fault Reset to clear the fault.
• Parameter *Y1-36 [High/Low Water DI Fault Det Sel]* sets when the drive detects this fault.
• The drive must not be in a high water level condition to do Auto-Restart.
• Parameter *L5-64 [High Water Level Fault Retry Sel]* sets the Auto Restart function of this fault.

Code	Name	Causes	Possible Solutions
LF	Output Phase Loss	The motor main circuit cable is disconnected.	Connect motor main circuit cable wiring. Correct wiring errors in the main circuit drive input power.
		There is a disconnection in the motor coil winding.	If a coil is disconnected, measure the motor Line-to-Line Resistance and replace the motor.
		The screws on the drive output terminals are loose.	Tighten the terminal screws to the correct tightening torque.
		The rated output current of the motor is less than 5% of the drive rated current.	Examine the drive capacity or the motor output to be applied.
		You are trying to use a single-phase motor.	The drive cannot operate a single-phase motor.
		The output transistor in the drive is damaged.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.

Note:
• The drive detects this fault if phase loss occurs on the output side of the drive.
• Do a Fault Reset to clear the fault.
• Set *L8-07 [Output Phase Loss Protection Sel]* to enable and disable *LF* detection.

Code	Name	Causes	Possible Solutions
LF2	Output Current Imbalance	Phase loss occurred in the wiring on the output side of the drive.	Examine for wiring errors or disconnected wires on the output side of the drive, and repair problems.
		The output terminal screws of the drive are loose.	Tighten the terminal screws to the correct tightening torque.
		There is not balance between the three phases of the PM motor impedance.	• Measure the Line-to-Line Resistance for each motor phase and make sure that resistance is equal in the three phases, and that all wires are connected correctly. • Replace the motor.
		The drive output circuit is broken.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.

Note:
• The drive detects this fault if there is not balance between the three phases of the output current from the PM motor.
• Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
LFB	Low Feedback Sensed	The feedback level is less than the level set in *Y1-08 [Low Feedback Level]* for the time set in *Y1-09 [Low Feedback Lvl Fault Dly Time]*.	• Increase the feedback level to more than *Y1-08*. • Set *Y1-08* and *Y1-09* correctly.

Note:
• Do a Fault Reset to clear the fault.
• If the drive detects this fault, it will respond as specified by the setting of *Y1-10 [Low Feedback Selection]*.
• Parameter *L5-40 [Low Feedback Flt Retry Selection]* sets the Auto Restart function of this fault.

Code	Name	Causes	Possible Solutions
LoAux	Low PI Aux Feedback Level	When the drive is running, PI Auxiliary Feedback is less than the level set in *YF-09 [PI Aux Control Low Lvl Detection]* for the time set in *YF-10 [PI Aux Control Low Lvl Det Time]*.	• Increase the PI Auxiliary Feedback level to be more than *YF-09*. • Set *YF-09* and *YF-10* correctly.

Note:
• Do a Fault Reset to clear the fault.
• Parameter *YF-11 [PI Aux Control Low Level Det Sel]* sets the Auto Restart function of this fault.

Code	Name	Causes	Possible Solutions
LOP	Loss of Prime	The drive used the *Y1-18 [Prime Loss Detection Method]* setting and measured a pump load that is less than the level set in *Y1-19 [Prime Loss Level]* for the time set in *Y1-20 [Prime Loss Time]*, and the output frequency is *Y1-21 [Prime Loss Activation Freq]* or more.	• Examine for a dry well, air in the system, or no water in the system. Use preferred priming method suggested by the pump manufacturer to restart the pump. • When there is resistance in the pump, let the system pump water again. • Set *Y1-18* to *Y1-21* correctly.
Note: • Do a Fault Reset to clear the fault. • If the drive detects this fault, it will respond as specified by the setting of *Y1-22 [Prime Loss Selection]*. • Parameters *L5-51 [Loss of Prime Fault Retry Select]* and *Y1-23 [Prime Loss Max Restart Time]* set the Auto Restart function of this fault.			
Code	**Name**	**Causes**	**Possible Solutions**
LoSuc	Low Suction Pressure	Suction pressure is less than the level set in *YE-09 [Low Suction Pressure Det Level]* for longer than the time set in *YE-10 [Low Suction Pressure Det Time]*, and the drive is running (AUTO or HAND) and *YE-11 = 2 or 3 [Low Suction Pressure Behavior = Fault (and Digital Output) or Auto-Restart (time set by YE-15)]*.	Increase suction pressure.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
LowFl	Low Flow	Flow rate was below the level set in *Y6-06 [Low Flow Level]* for longer than the time set in *Y6-07 [Low Flow Detection Time]* and *Y6-09 = 2 or 3 [Low Flow Behavior = Fault (and Digital Output) or Auto-Restart (time set by Y6-10)]*.	Reprogram *Y6-06* to *Y6-09* if flow rate is acceptable.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
LowWL	Low Water Level	Water level is below the level set in *Yd-09 [Low Water Level Detection Level]* for longer than the time set in *Yd-10 [Low Water Level Detection Time]*, and the drive is running (AUTO or HAND) with *Yd-11 = 2 or 3 [Low Water Level Behavior = Fault (and Digital Output) or Auto-Restart (time set by Yd-12)]*.	Increase the water level.
Code	**Name**	**Causes**	**Possible Solutions**
LWL	Low Water Level Digital Input	• The digital input terminal set to *H1-xx = BB [MFDI Function Selection = Low Water Level]* activated or is defective. • The digital input terminal set to *H1-xx = 1BB [! Low Water Level]* deactivated or is defective.	• Increase the water level. • Adjust the terminal set to *H1-xx = BB or 1BB*.
Note: • Do a Fault Reset to clear the fault. • Parameter *Y1-36 [High/Low Water DI Fault Det Sel]* sets when the drive detects this fault. • The drive must not be in a low water level condition to do Auto-Restart. • Parameter *L5-61 [Low Water Level Fault Retry Sel]* sets the Auto Restart function of this fault.			
Code	**Name**	**Causes**	**Possible Solutions**
MSL	Net Master Lost	No message received from the master in the time specified in *Y9-28 [NETSCAN Alarm Time]* when *Y9-27 = 3 [Network Recovery = Fault MSL]*.	• Increase *Y9-28* to account for network latency. • Make sure that there is a drive on the network that has *Y1-01 = 3 [Multiplex Mode = Network Multiplex]* and *Y9-27 = 0 [Network Recovery = Automatic]*. • Check network connections and verify *H5-01 [Drive Node Address]* and *Y9-25 [Highest Node Address]* for all drives on the network.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
NMS	Setpoint Not Met	The feedback deviates from the setpoint at a level more than *Y1-15 [Maximum Setpoint Difference]* for the time set in *Y1-16 [Not Maintaining Setpoint Time]*.	• Examine for a blocked impeller, over cycling, or broken pipe. • Set *Y1-15* and *Y1-16* correctly.
Note: • Do a Fault Reset to clear the fault. • If the drive detects this fault, it will respond as specified by the setting of *Y1-17 [Not Maintaining Setpoint Sel]*. • Parameter *L5-50 [Setpoint Not Met Fault Retry Sel]* sets the Auto Restart function of this fault.			

Code	Name	Causes	Possible Solutions
nSE	Node Setup Error	The drive received a Run command while the Node Setup function was active.	Stop the drive when the Node Setup function is in use.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
oC	Overcurrent	The load is too large.	• Measure the current flowing into the motor. • Replace the drive with a larger capacity model if the current value is more than the drive rated current. • Decrease the load or replace with a larger drive to prevent sudden changes in the current level.
		Overheating caused damage to the motor or the motor insulation is not satisfactory.	Measure the motor insulation resistance, and replace the motor if there is electrical conduction or unserviceable insulation.
		The motor main circuit cable is contacting ground to make a short circuit.	• Examine the motor main circuit cable for damage, and repair short circuits. • Measure the resistance between the motor main circuit cable and the ground terminal. If there is electrical conduction, replace the cable.
		A short circuit or ground fault on the drive output side caused damage to the output transistor of the drive.	• Make sure that there is not a short circuit in terminals - and terminals U/T1, V/T2, and W/T3. • If there is a short circuit, contact Yaskawa or your nearest sales representative.
		The acceleration time is too short.	• Calculate the torque necessary during acceleration related to the load inertia and the specified acceleration time. • Increase the values set in *C1-01 or C1-03 [Acceleration Times]* to get the necessary torque. • Increase the values set in *C2-01 to C2-04 [S-Curve Characteristics]* to get the necessary torque. • Replace the drive with a larger capacity model.
		The drive is trying to operate a specialized motor or a motor that is larger than the maximum applicable motor output of the drive.	• Examine the motor nameplate, the motor, and the drive to make sure that the drive rated current is larger than the motor rated current. • Replace the drive with a larger capacity model.
		A magnetic contactor was switched at the output.	Set the operation sequence to not turn ON or OFF the magnetic contactor while the drive is outputting voltage.
		The V/f pattern settings are incorrect.	• Examine the ratios between the V/f pattern frequency and voltage. Decrease the voltage if it is too high compared to the frequency. • Adjust *E1-04 to E1-10 [V/f Pattern Parameters]*. For motor 2, adjust *E3-04 to E3-10*.
		The torque compensation gain is too large.	Decrease the value set in *C4-01 [Torque Compensation Gain]* to make sure that the motor does not stall.
		Electrical interference caused a problem.	Examine the control circuit lines, main circuit lines, and ground wiring, and decrease the effects of electrical interference.
		The gain during overexcitation operation is too large.	• Find the time when the fault occurs. • If the fault occurs at the same time as overexcitation operation, decrease the value set in *n3-13 [OverexcitationBraking (OEB) Gain]* and consider the motor flux saturation.
		The drive received a Run command while the motor was coasting.	• Examine the sequence and input the Run command after the motor fully stops. • Set *b3-01 = 1 [Speed Search at Start Selection = Enabled]* or set *H1-xx = 61, 62 [Speed Search from Fmax or Fref]* to input speed search commands from the MFDI terminals.
		The motor code setting is incorrect for PM Control Methods.	• Enter the correct motor code to *E5-01 [PM Motor Code Selection]* as specified by the PM motor. • For specialized motors, refer to the motor test report and set *E5-xx [PM Motor Settings]* correctly.
		The current flowing in the motor is more than the value set in *L8-27 [Overcurrent Detection Gain]* for PM Control Methods.	Correct the value set in *L8-27*.
		The control method is set incorrectly for the motor.	Set *A1-02 [Control Method Selection]* correctly.
		The motor main circuit cable is too long.	Replace the drive with a larger capacity model.
		Speed search does not complete at start when *A1-02 = 8 [EZ Vector Control]* and you use an induction motor.	When *E9-01 = 0 [Motor Type Selection = Induction (IM)]*, set *b3-24 = 2 [Speed Search Method Selection = Current Detection Speed Search]*.
		The relay or contactor on the soft-charge bypass relay is damaged.	• Re-energize the drive. • If the fault stays, replace the control board or the drive.

Code	Name	Causes	Possible Solutions
		An overcurrent condition occurred during overexcitation deceleration.	• Decrease the value set in *n3-13 [OverexcitationBraking (OEB) Gain]*. • Decrease the value set in *n3-21 [HSB Current Suppression Level]*.
		You are using a premium efficiency motor.	Set these parameters: • *b3-03 [Speed Search Deceleration Time]* = default value × 2 • *L2-03 [Minimum Baseblock Time]* = default value × 2 • *L2-04 [Powerloss V/f Recovery Ramp Time]* = default value × 2

Note:
• This fault occurs if the drive sensors detect a drive output current more than the specified overcurrent detection level.
• Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
OD	Output Disconnect	The output circuit between the drive and the motor is open, and the drive output current is less than 5% of *E2-01 [Motor Rated Current (FLA)]*.	Close the disconnected output circuit between the drive and the motor.

Note:
• Do a Fault Reset to clear the fault.
• If the drive detects this fault, it will respond as specified by the setting of *Y4-42 [Output Disconnect Detection Sel]*.

Code	Name	Causes	Possible Solutions
oFA00	Option Not Compatible with Port	The option connected to connector CN5-A is not compatible.	Connect the option to the correct connector.
		• The DIP switches on the JOHB-SMP3 Multi-Protocol Ethernet Card are at factory default settings. • The DIP switches on the JOHB-SMP3 are not set to a valid protocol. • The DIP switches on the JOHB-SMP3 are set to a valid protocol that is not supported by the drive.	Remove power from the drive, wait for the charge light to go out, then set the DIP switches on the JOHB-SMP3 to the desired protocol.
		The option failed. Check the LED flash pattern on the option as specified by the option manual.	Replace the option.

Note:
• Do a Fault Reset to clear the fault.
• Fault trace is not available for these faults.

Code	Name	Causes	Possible Solutions
oFA01	Option Fault/Connection Error	The option card connected to connector CN5-A is not compatible.	1. De-energize the drive. 2. Refer to the option card manual and correctly connect the option card to the connector on the drive.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
oFA02	Duplicate Options	The same option cards or the same type of option cards are connected to connectors CN5-A and B.	Connect the option card to the correct connector.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
oFA03	Diagnostic Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
oFA04	Flash Write Mode	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
oFA05	Option A/D Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA06	Option Communication Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA10	Option RAM Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA11	Option Ope Mode Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA12	Drive Receive CRC Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA13	Drive Receive Frame Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA14	Drive Receive Abort Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA15	Option Receive CRC Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			

Code	Name	Causes	Possible Solutions
oFA16	Option Receive Frame Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA17	Option Receive Abort Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA30	COM ID Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA31	Type Code Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA32	SUM Check Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA33	Option Receive Time Over	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA34	Memobus Time Over	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA35	Drive Receive Time Over 1	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			

Code	Name	Causes	Possible Solutions
oFA36	CI Check Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA37	Drive Receive Time Over 2	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA38	Control Reference Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA39	Drive Receive Time Over 3	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA40	CtrlResSel 1Err	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA41	Drive Receive Time Over 4	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA42	CtrlResSel 2Err	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFA43	Drive Receive Time Over 5	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			

Code	Name	Causes	Possible Solutions
oFb00	Option Not Compatible with Port	The option connected to connector CN5-B is not compatible.	Connect the option to the correct connector. **Note:** The communication options cannot connect to connector CN5-B.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for these faults.			
Code	**Name**	**Causes**	**Possible Solutions**
oFb01	Option Fault/Connection Error	The option card connected to connector CN5-B was changed during operation.	1. De-energize the drive. 2. Refer to the option card manual and correctly connect the option card to the connector on the drive.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFb02	Duplicate Options	The same option cards or the same type of option cards are connected to connectors CN5-A and B.	Connect the option card to the correct connector.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFb03	Diagnostic Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFb04	Flash Write Mode	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFb05	Option A/D Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFb06	Option Communication Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFb10	Option RAM Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFb11	Option Ope Mode Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			

Code	Name	Causes	Possible Solutions
oFb12	Drive Receive CRC Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFb13	Drive Receive Frame Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFb14	Drive Receive Abort Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFb15	Option Receive CRC Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFb16	Option Receive Frame Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oFb17	Option Receive Abort Error	A fault occurred in the option card.	1. De-energize the drive. 2. Make sure that the option card is correctly connected to the connector. 3. If the problem continues, replace the option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
oH	Heatsink Overheat	The ambient temperature is high and the heatsink temperature of the drive is more than the value set in *L8-02 [Overheat Alarm Level]*.	• Measure the ambient temperature. • Increase the airflow in the control panel. • Install a cooling device (cooling fan or air conditioner) to lower the ambient temperature. • Remove objects near the drive that are producing too much heat.
		The load is too heavy.	• Measure the output current. • Decrease the load. • Decrease the value set in *C6-02 [Carrier Frequency Selection]*.
		The internal cooling fan of the drive stopped.	1. Use the procedures in this manual to replace the cooling fan. 2. Set *o4-03 = 0 [Fan Operation Time Setting = 0 h]*.
Note: • The drive detects this fault if the heatsink temperature of the drive is more than the value set in *L8-02*. • Do a Fault Reset to clear the fault. • If the drive detects this fault, it will operate the motor as specified by the Stopping Method set in *L8-03 [Overheat Pre-Alarm Selection]*.			

Code	Name	Causes	Possible Solutions
oH1	Heatsink Overheat	The ambient temperature is high and the heatsink temperature of the drive is more than the *oH1* detection level.	• Measure the ambient temperature. • Increase the airflow in the control panel. • Install a cooling device (cooling fan or air conditioner) to lower the ambient temperature. • Remove objects near the drive that are producing too much heat.
		The load is too heavy.	• Measure the output current. • Decrease the load. • Decrease the value set in *C6-02 [Carrier Frequency Selection]*.

Note:
• The drive detects this fault if the heatsink temperature of the drive is more than the *oH1* detection level. *o2-04 [Drive Model (KVA) Selection]* determines the *oH1* detection level.
• Do a Fault Reset to clear the fault.
• *L5-08 [Fault Reset Enable Select Grp2]* disables the Auto Restart function.

Code	Name	Causes	Possible Solutions
oH3	Motor Overheat (PTC Input)	The thermistor wiring that detects motor temperature is defective.	Correct wiring errors.
		A fault occurred on the machine. Example: The machine is locked.	Examine the machine and remove the cause of the fault
		The motor has overheated.	• Check the load level, acceleration/deceleration time, and motor start/stop frequency (cycle time). • Decrease the load. • Increase the values set in *C1-01 to C1-04 [Acceleration/Deceleration Times]*. • Set *E2-01 [Motor Rated Current (FLA)]* correctly to the value specified by the motor nameplate. • Make sure that the motor cooling system is operating correctly, and repair or replace it if it is damaged. • Adjust *E1-04 to E1-10 [V/f Pattern Parameters]*. For motor 2, adjust *E3-04 to E3-10*. Decrease the values set in *E1-08 [Mid Point A Voltage]* and *E1-10 [Minimum Output Voltage]*. **Note:** If the values set in *E1-08* and *E1-10* are too low, the overload tolerance will decrease at low speeds.

Note:
• When *H3-02 or H3-10 = E [MFAI Function Selection = Motor Temperature (PTC Input)]*, the drive detects this fault if the motor overheat signal entered to analog input terminals A1, A2, or A3 is more than the alarm detection level.
• Do a Fault Reset to clear the fault.
• If the drive detects this fault, it will operate the motor as specified by the Stopping Method set in *L1-03 [Motor Thermistor oH Alarm Select]*.

Code	Name	Causes	Possible Solutions
oH4	Motor Overheat Fault (PTC Input)	The motor has overheated.	• Check the load level, acceleration/deceleration time, and motor start/stop frequency (cycle time). • Decrease the load. • Increase the values set in *C1-01 to C1-04 [Acceleration/Deceleration Times]*. • Set *E2-01 [Motor Rated Current (FLA)]* correctly to the value specified by the motor nameplate. • Make sure that the motor cooling system is operating correctly, and repair or replace it if it is damaged. • Adjust *E1-04 to E1-10 [V/f Pattern Parameters]*. For motor 2, adjust *E3-04 to E3-10*. Decrease the values set in *E1-08 [Mid Point A Voltage]* and *E1-10 [Minimum Output Voltage]*. **Note:** If *E1-08* and *E1-10* are set too low, the overload tolerance will decrease at low speeds.

Note:
• The drive detects this fault if the motor overheat signal that was entered to an analog input terminals A1, A2, or A3 is more than the alarm detection level. (If *H3-02 or H3-10= E [MFAI Function Select = Motor Temperature (PTC Input)]* was set.)
• Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
oL1	Motor Overload	The load is too heavy.	Decrease the load. **Note:** Reset *oL1* when *U4-16 [Motor oL1 Level]* < 100.
		The acceleration/deceleration times or cycle times are too short.	• Examine the acceleration/deceleration times and the motor start/stop frequencies (cycle times). • Increase the values set in *C1-01 to C1-04 [Acceleration/Deceleration Times]*.

Code	Name	Causes	Possible Solutions
		Overload occurred while running at low speed.	• Decrease the load when running at low speed. • Increase the motor speed. • If the motor is run frequently at low speeds, replace the motor with a larger motor or use a drive-dedicated motor. **Note:** For general-purpose motors, overload can occur while running at low speed when operating at below the rated current.
		L1-01 [Motor Overload (oL1) Protection] is set incorrectly.	Set *L1-01* in as specified by the motor qualities for a drive-dedicated motor.
		The V/f pattern does not fit the motor qualities.	• Examine the ratios between the V/f pattern frequency and voltage. Decrease the voltage if it is too high compared to the frequency. • Adjust *E1-04 to E1-10 [V/f Pattern Parameters]*. For motor 2, adjust *E3-04 to E3-10*. Decrease the values set in *E1-08 [Mid Point A Voltage]* and *E1-10 [Minimum Output Voltage]*. **Note:** If the values set in *E1-08* and *E1-10* are too low, the overload tolerance will decrease at low speeds.
		E1-06 [Base Frequency] is set incorrectly.	Set *E1-06* to the rated frequency shown on the motor nameplate.
		One drive is operating more than one motor.	Set *L1-01 = 0 [Motor Overload (oL1) Protection = Disabled]*, connect thermal overload relay to each motor to prevent damage to the motor.
		The electronic thermal protector qualities and the motor overload properties do not align.	• Examine the motor qualities and set *L1-01 [Motor Overload (oL1) Protection]* correctly. • Connect a thermal overload relay to the motor.
		The electronic thermal protector is operating at an incorrect level.	Set *E2-01 [Motor Rated Current (FLA)]* correctly to the value specified by the motor nameplate.
		There is increased motor loss from overexcitation operation.	• Lower the value set in *n3-13 [OverexcitationBraking (OEB) Gain]*. • Set *L3-04 ≠ 4 [Stall Prevention during Decel ≠ Overexcitation/ High Flux]*. • Set *n3-23 = 0 [Overexcitation Braking Operation = Disabled]*.
		The speed search-related parameters are set incorrectly.	• Examine the settings for all speed search related parameters. • Adjust *b3-03 [Speed Search Deceleration Time]*. • Set *b3-24 = 1 [Speed Search Method Selection = Speed Estimation]* after Auto-Tuning.
		Phase loss in the input power supply is causing the output current to change.	Make sure that there is no phase loss, and repair problems.
		Overload occurred during overexcitation deceleration.	• Decrease the value set in *n3-13 [OverexcitationBraking (OEB) Gain]*. • Decrease the value set in *n3-21 [HSB Current Suppression Level]*.

Note:
• The drive detects this fault if the electronic thermal protector of the drive started the motor overload protection.
• Do a Fault Reset to clear the fault.
• *L5-07 [Fault Reset Enable Select Grp1]* disables the Auto Restart function.

Code	Name	Causes	Possible Solutions
oL2	Drive Overload	The load is too large.	Decrease the load.
		The acceleration/deceleration times or cycle times are too short.	• Examine the acceleration/deceleration times and the motor start/ stop frequencies (cycle times). • Increase the values set in *C1-01 to C1-04 [Acceleration/ Deceleration Times]*.
		The V/f pattern does not fit the motor qualities.	• Examine the ratios between the V/f pattern frequency and voltage. Decrease the voltage if it is too high compared to the frequency. • Adjust *E1-04 to E1-10 [V/f Pattern Parameters]*. Decrease the values set in *E1-08 [Mid Point A Voltage]* and *E1-10 [Minimum Output Voltage]*. For motor 2, adjust *E3-04 to E3-10*. **Note:** If the values set in *E1-08* and *E1-10* are too low, the overload tolerance will decrease at low speeds.
		The drive capacity is too small.	Replace the drive with a larger capacity model.
		Overload occurred while running at low speed.	• Decrease the load when running at low speed. • Replace the drive with a larger capacity model. • Decrease the value set in *C6-02 [Carrier Frequency Selection]*.

Code	Name	Causes	Possible Solutions
		The torque compensation gain is too large.	Decrease the value set in *C4-01 [Torque Compensation Gain]* to make sure that the motor does not stall.
		The speed search-related parameters are set incorrectly.	• Examine the settings for all speed search-related parameters. • Adjust *b3-03 [Speed Search Deceleration Time]*. • Set *b3-24 = 1 [Speed Search Method Selection = Speed Estimation]* after Auto-Tuning.
		Phase loss in the input power supply is causing the output current to change.	• Correct errors with the wiring for main circuit drive input power. • Make sure that there is no phase loss, and repair problems.
		Overload occurred during overexcitation deceleration.	• Decrease the value set in *n3-13 [OverexcitationBraking (OEB) Gain]*. • Decrease the value set in *n3-21 [HSB Current Suppression Level]*.

Note:
• The drive detects this fault if the electronic thermal protector of the drive started the drive overload protection.
• Do a Fault Reset to clear the fault.
• *L5-07 [Fault Reset Enable Select Grp1]* disables the Auto Restart function.

Code	Name	Causes	Possible Solutions
oL3	Overtorque Detection 1	A fault occurred on the machine. Example: The machine is locked.	Examine the machine and remove the cause of the fault.
		The parameters are incorrect for the load.	Adjust *L6-02 [Torque Detection Level 1]* and *L6-03 [Torque Detection Time 1]* settings.

Note:
• The drive detects this fault if the drive output current is more than the level set in *L6-02* for longer than *L6-03*.
• Do a Fault Reset to clear the fault.
• If the drive detects this fault, it will operate the motor as specified by the Stopping Method set in *L6-01 [Torque Detection Selection 1]*.
• *L5-07 [Fault Reset Enable Select Grp1]* disables the Auto Restart function.

Code	Name	Causes	Possible Solutions
oL4	Overtorque Detection 2	A fault occurred on the machine. Example: The machine is locked.	Examine the machine and remove the cause of the fault.
		The parameters are incorrect for the load.	Adjust *L6-05 [Torque Detection Level 2]* and *L6-06 [Torque Detection Time 2]* settings.

Note:
• The drive detects this fault if the drive output current is more than the level set in *L6-05* for longer than *L6-06*.
• Do a Fault Reset to clear the fault.
• If the drive detects this fault, it will operate the motor as specified by the Stopping Method set in *L6-04 [Torque Detection Selection 2]*.
• *L5-07 [Fault Reset Enable Select Grp1]* disables the Auto Restart function.

Code	Name	Causes	Possible Solutions
oL7	High Slip Braking Overload	The load inertia is too large.	Decrease deceleration times in *C1-02 and C1-04 [Deceleration Times]* for applications that do not use High Slip Braking.
		An external force on the load side rotated the motor.	
		Something is preventing deceleration on the load side.	
		The value set in *n3-04 [HSB Overload Time]* is too small.	• Increase the value set in *n3-04*. • Connect a thermal overload relay to the motor, and set *n3-04 = 1200 s (maximum value)*.

Note:
• The drive detects this fault if the output frequency is constant for longer than *n3-04*.
• Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
oPr	Keypad Connection Fault	The keypad is not securely connected to the connector on the drive.	Examine the connection between the keypad and the drive.
		The connection cable between the drive and the keypad is disconnected.	• Remove the keypad and connect it again. • If the cable is damaged, replace it.

Note:
• The drive detects this fault if these conditions are correct:
– *o2-06 = 1 [Keypad Disconnect Detection = Enabled]*.
– *b1-02 = 0 [Run Command Selection 1 = Keypad]*, or the drive is operating in HAND Mode with the keypad.
• Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
oS	Overspeed	There is overshoot.	Decrease *C5-01 [ASR Proportional Gain 1]* and increase *C5-02 [ASR Integral Time 1]*.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
ov	Overvoltage	Deceleration time is too short and regenerative energy is flowing from the motor into the drive.	• Set *L3-04 = 1 [Stall Prevention during Decel = General Purpose]*. • Increase the values set in *C1-02 or C1-04 [Deceleration Times]*. • Perform Deceleration Rate Auto-Tuning.
		The acceleration time is too short.	• Make sure that sudden drive acceleration does not cause the fault. • Increase the values set in *C1-01 or C1-03 [Acceleration Times]*. • Increase the value set in *C2-02 [S-Curve Time @ End of Accel]*. • Set *L3-11 = 1 [Overvoltage Suppression Select = Enabled]*.
		The drive output cable or motor is shorted to ground (the current short to ground is charging the main circuit capacitor of the drive through the power supply).	1. Examine the motor main circuit cable, terminals, and motor terminal box, and then remove ground faults. 2. Re-energize the drive.

		If the drive detects *ov* in these conditions, the speed search-related parameters are incorrect:
		• During speed search
		• During momentary power loss recovery
		• When the drive starts again automatically
		• When you set *A1-02 = 0 [Control Method Selection = V/f Control]* and do rotational Auto-Tuning
		• You are using a premium efficiency motor
			• Examine the settings for all speed search related parameters.
			• Set *b3-19 ≠ 0 [Speed Search Restart Attempts ≠ 0 times]*.
			• Adjust *b3-03 [Speed Search Deceleration Time]* setting.
			• Do Stationary Auto-Tuning for Line-to-Line Resistance and then set *b3-24 = 1 [Speed Search Method Selection = Speed Estimation]*.
			• Increase the value set in *L2-04 [Powerloss V/f Recovery Ramp Time]*.
			• Set these parameters:
			  • *b3-03 [Speed Search Deceleration Time]* = default value × 2
			  • *L2-03 [Minimum Baseblock Time]* = default value × 2
			  • *L2-04 [Powerloss V/f Recovery Ramp Time]* = default value × 2

		The power supply voltage is too high.	Decrease the power supply voltage to align with the drive rated voltage.
		Electrical interference caused a drive malfunction.	• Examine the control circuit lines, main circuit lines, and ground wiring, and decrease the effects of electrical interference. • Make sure that a magnetic contactor is not the source of the electrical interference, then use a Surge Protective Device if necessary.
		The load inertia is set incorrectly.	• Examine the load inertia settings with KEB, overvoltage suppression, or stall prevention during deceleration. • Adjust *L3-25 [Load Inertia Ratio]* to align with the qualities of the machine.
		There is motor hunting.	• Adjust *n1-02 [Hunting Prevention Gain Setting]* settings. • Adjust *n8-45 [Speed Feedback Detection Gain]* and *n8-47 [Pull-in Current Comp Filter Time]* settings.
		Speed search does not complete at start when you use an induction motor in EZOLV control.	When *E9-01 = 0 [Motor Type Selection = Induction (IM)]*, set *b3-24 = 2 [Speed Search Method Selection = Current Detection 2]*.

Note:
• The drive detects this error if the DC bus voltage is more than the *ov* detection level while the drive is running.
• The *ov* detection level is approximately 410 V with 208 V class drives. The detection level is approximately 820 V with 480 V class drives.
• Do a Fault Reset to clear the fault.
• Parameter *L5-08 [Fault Reset Enable Select Grp2]* disables the Auto Restart function.

Code	Name	Causes	Possible Solutions
ov2	DC Bus Overvoltage 2	The wiring is too long and DC bus voltage is too large.	• Shorten the shielded motor cable. • Decrease the carrier frequency. • If the power supply has a neutral ground, switch on the internal EMC filter.

Note:
• The drive detects this fault when the DC bus voltage increases to more than the Stall Prevention Level during Deceleration for the time set in *S6-23 [OV2 Detect Time]*.
• Do a Fault Reset to clear the fault.
• This fault is resettable, but will not auto-restart.

Code	Name	Causes	Possible Solutions
PE1	PLC Fault 1	The communication option detected a fault.	Refer to the manual for the communication option card.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
PE2	PLC Fault 2	The communication option detected a fault.	Refer to the manual for the communication option card.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
PF	Input Phase Loss	There is a phase loss in the drive input power.	Correct errors with the wiring for main circuit drive input power.
		There is loose wiring in the drive input power terminals.	Tighten the terminal screws to the correct tightening torque.
		The drive input power voltage is changing too much.	• Examine the input power for problems. • Make the drive input power stable. • If the input power supply is good, examine the magnetic contactor on the main circuit side for problems.
		There is unsatisfactory balance between voltage phases.	• Examine the input power for problems. • Make the drive input power stable. • Set *L8-05 = 0 [Input Phase Loss Protection Sel = Disabled]*.
		The main circuit capacitors have become unserviceable.	• Examine the capacitor maintenance time in monitor *U4-05 [Capacitor Life Mon]*. If *U4-05* is more than 90%, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative. • If drive input power is correct and the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: • The drive detects this error if the DC bus voltage changes irregularly without regeneration. • Do a Fault Reset to clear the fault. • Use *L8-05* to enable and disable *PF* detection.			
Code	**Name**	**Causes**	**Possible Solutions**
POC	Pump Over Cycle	Pump in the system exceeded the number cycles from normal operation to sleep mode set in *Y2-10 [Max Cycling Protection Allowed]* in the time set in *Y2-11 [Cycling Count Decrement Time]*.	Adjust sleep parameters to prevent the system from over cycling between normal operation and sleep mode.
Note: Do a Fault Reset to clear the fault. Parameter *L5-52 [Over Cycle Fault Retry Selection]* determines whether this fault can be auto-restarted			
Code	**Name**	**Causes**	**Possible Solutions**
PSE	JOHB-SMP3 Protocol Set Error	• The DIP switches on the JOHB-SMP3 Multi-Protocol Ethernet Card are at factory default settings. • The DIP switches on the JOHB-SMP3 are not set to a valid protocol.	Remove power from the drive, wait for the charge light to go out, then set the DIP switches on the JOHB-SMP3 to the desired protocol. **Note:** Refer to the instructions packaged with the JOHB-SMP3 for more information about DIP switch settings.
Note: Do a Fault Reset to clear the fault.			
Code	**Name**	**Causes**	**Possible Solutions**
SC	Short Circuit/IGBT Failure	Overheating caused damage to the motor or the motor insulation is not satisfactory.	Measure the motor insulation resistance, and replace the motor if there is electrical conduction or unserviceable insulation.
		The motor main circuit cable is contacting ground to make a short circuit.	• Examine the motor main circuit cable for damage, and repair short circuits. • Measure the resistance between the motor main circuit cable and the ground terminal. If there is electrical conduction, replace the cable.
		A short circuit or ground fault on the drive output side caused damage to the output transistor of the drive.	• Make sure that there is not a short circuit in terminals +1 and terminals U/T1, V/T2, and W/T3. Make sure that there is not a short circuit in terminals - and terminals U/T1, V/T2, and W/T3. • If there is a short circuit, contact Yaskawa or your nearest sales representative.
		When *A1-02 = 5 [Control Method Selection = OLV/PM]*, the output current is more than the value set in *L8-27 [Overcurrent Detection Gain]*.	Set *L8-27* correctly.
Note: • The drive detects this error if there is a short circuit or ground fault on the drive output side, or an IGBT failure. • Do a Fault Reset to clear the fault.			

Code	Name	Causes	Possible Solutions
SCF	Safety Circuit Fault	The safety circuit is broken.	• Make sure that you ground the drive correctly and re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.

Code	Name	Causes	Possible Solutions
SEr	Speed Search Retries Exceeded	The speed search-related parameters are set incorrectly.	• Decrease *b3-10 [Speed Estimation Detection Gain]*. • Increase *b3-17 [Speed Est Retry Current Level]*. • Increase *b3-18 [Speed Est Retry Detection Time]*. • Do Auto-Tuning again.
		The motor is coasting in the opposite direction of the Run command.	Set *b3-14 = 1 [Bi-directional Speed Search = Enabled]*.

Note:
• The drive detects this error if the number of speed search restarts is more than *b3-19 [Speed Search Restart Attempts]*.
• Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
SPCNR	Single Phase Converter Not Ready	When *YC-14 = 0 [Behavior when SPC is Not Ready = Coast to Stop - Fault]*, the digital input set to *H1-xx = BE [MFDI Function Selection = Single Phase Converter Ready NC]* deactivated to show the attached converter is faulted or not ready.	• Examine the wiring between the drive and converter. • Examine the error code on converter.

Note:
• Do a Fault Reset to clear the fault.
• The drive must not be in an *SPCNR* condition to do Auto-Restart.

Code	Name	Causes	Possible Solutions
SPL	Suction Pressure Feedback Loss	Wire Break detection for suction pressure. The analog input programmed for *Water Level / Suct Pres Feedback* is less than 3 mA or more than 21 mA for longer than 1 second and *YE-19 = 2 or 3 [Suction Pressure Fdbk Wire Break = Fault (and Digital Output) or Auto-Restart (time set by YE-38)]*.	• Repair level sensor. • Repair wiring.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
STPo	Motor Step-Out Detected	The motor code is set incorrectly for PM Control Methods.	• Set *E5-01 [PM Motor Code Selection]* correctly as specified by the motor. • For specialized motors, refer to the motor test report and set *E5-xx* correctly.
		The load is too large.	• Increase the value set in *n8-55 [Motor to Load Inertia Ratio]*. • Increase the value set in *n8-51 [Pull-in Current @ Acceleration]*. If the drive detects *STPo* during deceleration when increasing the value set in *n8-51*, set the value of *n8-79 [Pull-in Current @ Deceleration]* lower than *n8-51*. • Decrease the load. • Replace the drive and motor with larger capacity models.
		The load inertia is too large.	Increase the value set in *n8-55*.
		The acceleration/deceleration times are too short.	• Increase the values set in *C1-01 to C1-04 [Acceleration/ Deceleration Times]*. • Increase the value set in *C2-01 [S-Curve Time @ Start of Accel]*.
		Speed response is too slow.	Increase the value set in *n8-55*.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
TiM	Keypad Time Not Set	There is a battery in the keypad, but the date and time are not set.	Use the keypad to set the date and time.

Note:
• Do a Fault Reset to clear the fault.
• Parameter *o4-24 [bAT Detection Selection]* enables and disables *TiM* detection.

Code	Name	Causes	Possible Solutions
UL3	Undertorque Detection 1	A fault occurred on the machine. Example: There is a broken pulley belt.	Examine the machine and remove the cause of the fault.
		The parameters are incorrect for the load.	Adjust *L6-02 [Torque Detection Level 1]* and *L6-03 [Torque Detection Time 1]* settings.

Note:
• The drive detects this error if the drive output current is less than the level set in *L6-02* for longer than *L6-03*.
• Do a Fault Reset to clear the fault.
• If the drive detects this error, it will operate the motor as specified by the Stopping Method set in *L6-01 [Torque Detection Selection 1]*.

Code	Name	Causes	Possible Solutions
UL4	Undertorque Detection 2	A fault occurred on the machine. Example: There is a broken pulley belt.	Examine the machine and remove the cause of the fault.
		The parameters are incorrect for the load.	Adjust *L6-05 [Torque Detection Level 2]* and *L6-06 [Torque Detection Time 2]* settings.

Note:
• The drive detects this error if the drive output current is less than the level set in *L6-05* for longer than *L6-06*.
• Do a Fault Reset to clear the fault.
• If the drive detects this error, it will operate the motor as specified by the Stopping Method set in *L6-04 [Torque Detection Selection 2]*.

Code	Name	Causes	Possible Solutions
UL6	Underload or Belt Break Detected	The output current decreased less than the motor underload curve set in *L6-14 [Motor Underload Level @ Min Freq]* for longer than the time set in *L6-03 [Torque Detection Time 1]*.	Adjust the *L6-14* setting to set the output current to stay the level more than the motor underload curve during usual operations.

Note:
Do a Fault Reset to clear the fault.

Code	Name	Causes	Possible Solutions
Uv1	DC Bus Undervoltage	There is a phase loss in the drive input power.	Correct errors with the wiring for main circuit drive input power.
		There is loose wiring in the drive input power terminals.	Tighten the terminal screws to the correct tightening torque.
		The drive input power voltage is changing too much.	• Examine the input power for problems. • Make the drive input power stable. • If the input power supply is good, examine the magnetic contactor on the main circuit side for problems.
		There was a loss of power.	Use a better power supply.
		The main circuit capacitors have become unserviceable.	Examine the capacitor maintenance time in monitor *U4-05 [Capacitor Life Mon]*. If *U4-05* is more than 90%, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
		The relay or contactor on the soft-charge bypass relay is damaged.	*U4-06 [PreChargeRelayMon]* shows the performance life of the soft-charge bypass relay. If *U4-06* is more than 90%, replace the board or the drive. For information about replacing the board, contact Yaskawa or your nearest sales representative.

Note:
• The drive detects this error if the DC bus voltage decreases below the level set in *L2-05 [Undervoltage Detection Lvl (Uv1)]* while the drive is running.
• The *Uv1* detection level is approximately 190 V for a 208 V class drives. The detection level is approximately 380 V for 480 V class drives. The detection level is approximately 350 V when *E1-01 [Input AC Supply Voltage]* < 400.
• Do a Fault Reset to clear the fault.
• Fault trace is not available for this fault.
• *L5-08 [Fault Reset Enable Select Grp2]* disables the Auto Restart function.

Code	Name	Causes	Possible Solutions
Uv2	Control Power Undervoltage	The value set in *L2-02 [Power Loss Ride Through Time]* increased and the momentary power loss recovery unit is not connected to the drive.	Connect the momentary power loss recovery unit to the drive.
		There was a problem with the drive hardware.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.

Note:
• The drive detects this error if the control power supply voltage decreases.
• Do a Fault Reset to clear the fault.
• Fault trace is not available for this fault.

Code	Name	Causes	Possible Solutions
Uv3	Soft Charge Answerback Fault	The relay or contactor on the soft-charge bypass relay is damaged.	• Re-energize the drive. • If the fault stays, replace the control board or the drive. • Check monitor *U4-06 [PreChargeRelayMon]*, which shows the performance life of the soft-charge bypass relay. If *U4-06* is more than 90%, replace the board or the drive. For information about replacing the board, contact Yaskawa or your nearest sales representative.
		Air inside the drive is too hot.	Check the ambient temperature of the drive.
Note: • Do a Fault Reset to clear the fault. • Fault trace is not available for this fault.			
Code	**Name**	**Causes**	**Possible Solutions**
VLTS	Volute Thermostat Fault	The digital input from the terminal set for *Volute Thermostat Fault [H1-xx = 88 or 188]* is active.	Examine the wiring or wait for the motor to cool.
Note: • Do a Fault Reset to clear the fault. • Parameter *L5-53 [VoluteThermostat Fault Retry Sel]* sets the Auto Restart function of this fault.			
Code	**Name**	**Causes**	**Possible Solutions**
WLL	Water Level Feedback Loss	Wire Break detection for water level. The Analog input programmed for Water Level / Suction Pressure is less than 3 mA or is more than 21 mA for longer than 1 second with *Yd-16 ≠ 0 [Water Level Feedback Wire Break ≠ No Display]*.	• Repair level sensor. • Repair wiring.

4.5 Minor Faults/Alarms

This section gives information about the causes and possible solutions when a minor fault or alarm occurs. Use the information in this table to remove the cause of the minor fault or alarm.

Code	Name	Causes	Possible Solutions
Accum	Accumulated Level Reached	Accumulated volume has is more than the *Y6-11* to *Y6-14* settings and *Y6-15 = 1 or 4 [Accumulated Volume Behavior = Alarm (and Digital Output) or Stop + Alarm + MFDO]*	Set *Y6-05 = 7770 [Flow Accumulation Set Reset = Reset Accumulation]* or via Reset Accumulation digital input).
Code	**Name**	**Causes**	**Possible Solutions**
AEr	Station Address Setting Error	The node address for the communication option is not in the permitted setting range.	For CANopen communication, set *F6-35 [CANopen Node ID Selection]* correctly.
Note: If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
AFBL	Analog Fdbk Lost Switched to Net	Defective or broken analog input source.	Make sure that the PID Feedback source is installed and working correctly. If there is no PID Feedback source, set *Y9-02 = 3 [System Feedback Source = Network Only]* to have it always read from the Network PID Feedback of another drive.
		H3-0x ≠ B [PID Feedback]	Set *H3-0x = B [PID Feedback]* if the analog input source is to be used for PID Feedback. When the drive does not have an analog PID Feedback source, set *Y9-02 = 3* .
Note: If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
AJA	Anti-Jam Active	The drive is doing the Anti-Jam function.	The alarm will clear when the function is complete.
Note: If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
ALRC	Accum Lvl Reached Cycle Run Cmd	Accumulated volume has is more than the *Y6-11* to *Y6-14* settings and *Y6-15 = 5 [Accumulated Volume Behavior = Stop + Alarm + MFDO + AccumReset]*	Cycle the Run command.
Code	**Name**	**Causes**	**Possible Solutions**
AUdiS	Low WL/SP/PI Aux FB Drv Disabled	Drive is not allowed to run in MEMOBUS Multiplex when *Y9-51 = 1 [WaterLvl/SuctPres/PI Aux TurnOff = Enabled]*, WL/SP/PI Aux Feedback is below the *Yd-06/YE-06/YF-06* setting, and the drive is stopped or running as a Lag drive.	• Confirm the setting of *Yd-06/YE-06/YF-06*. • Wait for the WL/SP/PI Aux Control Feedback to recover.
Note: If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
AUFbL	WL/SP/PI Aux Fdbk Lost Using Net	Defective or broken analog input source. The drive detected a wire break with the PI Auxiliary Control Feedback Level analog signal *[H3-xx = 27]* or the Water Level / Suction Pressure analog signal *[H3-xx = 3B]*.	• Make sure that the Water Level/Suction Pressure/PI Auxiliary Control Feedback source is installed and working correctly. • Confirm that Water Level/Suction Pressure/PI Auxiliary Control Feedback Wire break Behavior parameter *Yd-16/YE-19/YF-19* is set correctly • If there is no analog feedback, set *Y9-50 = 3 [WaterLvl/SuctPres/PI Aux Source = Network Only]* so that it will always read from the Water Level/Suction Pressure/PI Auxiliary Control Feedback network of another drive.
Note: If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
AuxFB	PI Aux Feedback Level Loss	The analog input from the terminal set to *H3-xx = 27 [MFAI Function Selection = PI Auxiliary Control Feedback Level]* is more than 21 mA or less than 3 mA for longer than 1 s.	Repair transducer or wiring.
Note: If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
bAT	Keypad Battery Low Voltage	The keypad battery voltage is low.	Replace the keypad battery.
Note: • If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate. • Set *o4-24 [bAT Detection Selection]* to enable/disable *bAT* detection.			

Code	Name	Causes	Possible Solutions
bb	Baseblock	An external baseblock command was entered through one of the MFDI terminals Sx, and the drive output stopped as shown by an external baseblock command.	Examine the external sequence and timing of the baseblock command input.

Note:
The drive will not output a minor fault signal for this alarm.

Code	Name	Causes	Possible Solutions
bCE	Bluetooth Communication Error	The smartphone or tablet with DriveWizard Mobile or DriveWizard is too far from the keypad.	Move to 10 m (32.8 ft) or less from the keypad. **Note:** *bCE* can occur when the smartphone or tablet is 10 m (32.8 ft) or nearer to the keypad for different smartphone and tablet specifications.
		Radio waves from a different device are causing interference with communications between the smartphone or tablet and keypad.	Make sure that no device around the keypad uses the same radio bandwidth (2400 MHz to 2480 MHz), and prevent radio interference.

Note:
• The drive detects this error when you use a smartphone or tablet and a Bluetooth LCD keypad to operate the drive.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• Use *o2-27 [bCE Detection selection]* to enable and disable *bCE* detection.

Code	Name	Causes	Possible Solutions
BuDif	Main Fdbk Lost, Using Diff Fdbk	Parameter *Y4-41 = 1 [Diff Lvl Src Fdbk Backup Select = Enabled]* and the drive detected a wire-break on the analog input terminal set for *PID Feedback [H3-xx = B]*.	Examine the connection of the Main PID Feedback Transducer.
		Main PID Feedback Transducer is broken.	Replace Main PID Feedback Transducer.

Note:
• The drive detects this error if it does not receive the *PID Feedback* signal and it uses *Differential Feedback [H3-xx = 2D]* as backup.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
Bu-Fb	Main Fdbk Lost Using Backup Fdbk	The drive detected wire-break on the analog input terminal set to *H3-xx = B [MFAI Function Selection = PID Feedback]*.	Examine the connection of the Main PID Feedback Transducer.
		Main PID Feedback Transducer is broken.	Replace Main PID Feedback Transducer.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
BuFbl	Backup Fdbk Lost Chk/Repl Xducer	The drive detected wire-break on the analog input terminal set for *PID Feedback Backup [H3-xx = 24]*.	Examine the connection of the Differential PID Feedback transducer.
		Backup PID Feedback Transducer is broken.	Replace Backup PID Feedback Transducer.
		Parameter *Y4-41 = 1 [Diff Lvl Src Fdbk Backup Select = Enabled]* and the drive detected a wire-break on the analog input terminal set for *Differential Level Source [H3-xx = 2D]*.	Examine the connection of the Differential PID Feedback transducer.
		Parameter *Y4-41 = 1* and the Differential PID Feedback Transducer is broken.	• Replace the Differential PID Feedback Transducer. • Set *Y4-41 = 0 [Disabled]*.

Note:
• The drive detects this error if it does not receive the *PID Feedback Backup* signal.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
bUS	Option Communication Error	The communications cable wiring is incorrect.	Correct wiring errors.
		There is a short-circuit in the communications cable or the communications cable is not connected.	• Repair short circuits and connect cables. • Replace the defective communications cable.
		Electrical interference caused a communication data error.	• Examine the control circuit lines, main circuit lines, and ground wiring, and decrease the effects of electrical interference. • Make sure that a magnetic contactor is not the source of the electrical interference, then use a Surge Protective Device if necessary. • Use only the recommended cables or other shielded line. Ground the shield on the controller side or the drive input power side. • Separate the communication wiring from drive power lines, and install a noise filter to the input side of the power supply for communication. • Decrease the effects of electrical interference from the controller.
		The option card is incorrectly installed to the drive.	Correctly install the option card to the drive.

Code	Name	Causes	Possible Solutions
		The option card is damaged.	If the alarm continues and the wiring is correct, replace the option card.

Note:
• The drive detects this error if the Run command or frequency reference is assigned to the option card.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• If the drive detects this error, it will operate the motor as specified by the stopping method set in *F6-01 [Communication Error Selection]*.

Code	Name	Causes	Possible Solutions
bUSy	Busy	You set the drive to use MEMOBUS/Modbus communications to change parameters, but you used the keypad to change parameters.	Use MEMOBUS/Modbus communications to enter the enter command, then use the keypad to change the parameter.
		You tried to change a parameter while the drive was changing setting.	Wait until the process is complete.

Code	Name	Causes	Possible Solutions
CALL	Serial Comm Transmission Error	The communications cable wiring is incorrect.	Correct wiring errors.
		There is a short circuit in the communications cable or the communications cable is not connected.	• Repair the short-circuited or disconnected portion of the cable. • Replace the defective communications cable.
		A programming error occurred on the controller side.	Examine communications at start-up and correct programming errors.
		There is damage to the communications circuitry.	• Do a self-diagnostics check. • If the problem continues, replace the control board or the drive. Contact Yaskawa or your nearest sales representative to replace the control board.
		The termination resistor setting for MEMOBUS/ Modbus communications is incorrect.	On the last drive in a MEMOBUS/Modbus network, set DIP switch S2 to the ON position to enable the termination resistor.

Note:
• The drive detects this error if it does not correctly receive control data from the controller when energizing the drive.
• If the drive detects this error, the terminal assigned to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• If the drive detects this error, it will not be able to run in AUTO or Jog. HAND Mode operation is allowed.
• Parameter *H5-33 [Power-up CALL Alarm]* enables or disables the detection of this alarm at power-up.

Code	Name	Causes	Possible Solutions
CE	Modbus Communication Error	The communications cable wiring is incorrect.	Correct wiring errors.
		There is a short circuit in the communications cable or the communications cable is not connected.	• Repair short circuits and connect cables. • Replace the defective communications cable.
		Electrical interference caused a communication data error.	• Examine the control circuit lines, main circuit lines, and ground wiring, and decrease the effects of electrical interference. • Make sure that a magnetic contactor is not the source of the electrical interference, then use a Surge Protective Device if necessary. • Use only the recommended cables or other shielded line. Ground the shield on the controller side or the drive input power side. • Separate the communication wiring from drive power lines, and install a noise filter to the input side of the power supply for communication. • Decrease the effects of electrical interference from the controller.
		The communication protocol is not compatible.	• Examine the values set in *H5-xx*. • Examine the settings on the controller side and correct the difference in communication conditions.
		The value set in *H5-09 [CE Detection Time]* is too small for the communications cycle.	• Change the controller software settings. • Increase the value set in *H5-09*.
		The controller software or hardware is causing a communication problem.	Examine the controller and remove the cause of the problem.

Note:
• This alarm is a different alarm from *CE [Run at H5-34 (CE Go-To-Freq)]*. The keypad will show this alarm when:
– *H5-04 ≠ 4 [Communication Error Stop Method ≠ Run at H5-34 (CE Go-To-Freq)]*
– *H5-04 = 4* but the drive cannot operate at the selected frequency
• The drive detects this error if it does not correctly receive control data for the *CE* detection time set to *H5-09*.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• If the drive detects this error, it will operate the motor as specified by the stopping method set in *H5-04*.

Code	Name	Causes	Possible Solutions
CE	Run at H5-34 (CE Go-To-Freq)	The communications cable wiring is incorrect.	Correct wiring errors.
		There is a short circuit in the communications cable or the communications cable is not connected.	• Repair short circuits and connect cables. • Replace the defective communications cable.

Code	Name	Causes	Possible Solutions
		Electrical interference caused a communication data error.	• Examine the control circuit lines, main circuit lines, and ground wiring, and decrease the effects of electrical interference. • Make sure that a magnetic contactor is not the source of the electrical interference, then use a Surge Protective Device if necessary. • Use only recommended shielded line. Ground the shield on the controller side or on the drive input power side. • Separate the communication wiring from drive power lines, and install a noise filter to the input side of the power supply for communication. • Decrease the effects of electrical interference from the controller.
		The communication protocol is not compatible.	• Examine the values set in *H5-xx*. • Examine the settings on the controller side and correct the difference in communication conditions.
		The value set in *H5-09 [CE Detection Time]* is too small for the communications cycle.	• Make sure that the settings are compatible. • Change the software settings in the PLC. • Increase the value set in *H5-09*.
		The controller software or hardware is causing a communication problem.	Examine the controller and remove the cause of the problem.

Note:
• This alarm is a different alarm from the standard *CE [Modbus Communication Error]*. The keypad will show this alarm only when *H5-04 = 4 [Communication Error Stop Method = Run at H5-34 (CE Go-To-Freq)]*. If the drive cannot operate at the selected frequency, the keypad will show the standard *CE* alarm.
• The drive detects this error if it does not correctly receive control data for the *CE* detection time set to *H5-09*.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
CrST	Cannot Reset	The drive received a fault reset command when a Run command was active.	Turn off the Run command then de-energize and re-energize the drive.

Code	Name	Causes	Possible Solutions
CyPo	Cycle Power to Accept Changes	Although *F6-15 = 1 [Comm. Option Parameters Reload = Reload Now]*, the drive does not update the communication option parameters.	Re-energize the drive to update the communication option parameters.

Code	Name	Causes	Possible Solutions
dEv	Speed Deviation	The load is too heavy	Decrease the load.
		Acceleration and deceleration times are set too short.	Increase the values set in *C1-01 to C1-04 [Acceleration/ Deceleration Time]*.
		The *dEv* detection level settings are incorrect.	Adjust *F1-10 [Speed Deviation Detection Level]* and *F1-11 [Speed Deviation Detect DelayTime]*.
		The load is locked up.	Examine the machine.
		The holding brake is stopping the motor.	Release the holding brake.

Note:
• The drive detects this error if the difference between the detected speed and the speed reference is more than the setting of *F1-10* for longer than *F1-11*.
• If the drive detects this error, the terminal assigned to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will be ON.
• If the drive detects this error, the drive will operate the motor as specified by the stopping method set in *F1-04 [Speed Deviation Detection Select]*.

Code	Name	Causes	Possible Solutions
DIFF	Differential Feedback Exceeded	The difference between the PID Feedback and *Differential Level Source [H3-xx = 2D]* is more than the level set in *Y4-18 [Pre-Charge Loss of Prime Level 2]* for the time set in *Y4-19 [Differential Lvl Detection Time]*.	• Replace the feedback transducer or transducers. • Set *Y4-18* and *Y4-19* correctly.

Note:
• If the drive detects this error, it will respond as specified by the setting of *Y4-20 [Differential Level Detection Sel]*.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
dnE	Drive Disabled	A terminal set for *H1-xx = 6A [MFDI Function Selection = Drive Enable]* deactivated.	Examine the operation sequence.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
DRA	De-Rag Active	The drive is doing the De-Rag function.	The alarm will clear when the function is complete.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
dWAL	DriveWorksEZ Alarm	There was an error in the DriveWorksEZ program.	Examine the DriveWorksEZ program and remove the cause of the error. This is not a drive fault.
Note: If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
dWA2	DriveWorksEZ Alarm 2	There was an error in the DriveWorksEZ program.	Examine the DriveWorksEZ program and remove the cause of the error. This is not a drive fault.
Note: If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
dWA3	DriveWorksEZ Alarm 3	There was an error in the DriveWorksEZ program.	Examine the DriveWorksEZ program and remove the cause of the error. This is not a drive fault.
Note: If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
DS	De-Scale/De-Rag Active	The terminal is set to *H2-xx = C5 or 1C5 [MFDO Function Selection De-Scale or !De-Scale]* and the set length of run time elapsed.	• If you do not want to do De-Scale/De-Rag, set *Y8-01 = 0 [De-Scale Operation Selection = Disabled]*. • Adjust the *Y8-08 [Run Time before De-Scale]* setting.
Note: If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
EF	FWD/REV Run Command Input Error	The drive received a forward command and a reverse command at the same time for longer than 0.5 s.	Examine the forward and reverse command sequence and correct the problem.
Note: • If the drive detects *EF*, the motor will ramp to stop. • If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
EF0	Option Card External Fault	The communication option card received an external fault from the controller.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input from the controller.
		Programming error occurred on the controller side.	Examine the operation of the controller program.
Note: • The drive detects this error if the alarm function on the external device side is operating. • If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate. • Use *F6-03 [Comm External Fault (EF0) Select]* to set the stopping method for this fault.			
Code	**Name**	**Causes**	**Possible Solutions**
EF1	Pump Fault (Terminal S1)	MFDI terminal S1 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S1.
		Pump Fault [H1-01 = 2C to 2F] is set to MFDI terminal S1, but the terminal is not in use.	Correctly set the MFDI.
Note: If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
EF2	Pump Fault (Terminal S2)	MFDI terminal S2 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S2.
		Pump Fault [H1-02 = 2C to 2F] is set to MFDI terminal S2, but the terminal is not in use.	Correctly set the MFDI.
Note: If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
EF3	Pump Fault (Terminal S3)	MFDI terminal S3 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S3.

Code	Name	Causes	Possible Solutions
		Pump Fault [H1-03 = 2C to 2F] is set to MFDI terminal S3, but the terminal is not in use.	Correctly set the MFDI.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
EF4	Pump Fault (Terminal S4)	MFDI terminal S4 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S4.
		Pump Fault [H1-04 = 2C to 2F] is set to MFDI terminal S4, but the terminal is not in use.	Correctly set the MFDI.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
EF5	Pump Fault (Terminal S5)	MFDI terminal S5 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S5.
		Pump Fault [H1-05 = 2C to 2F] is set to MFDI terminal S5, but the terminal is not in use.	Correctly set the MFDI.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
EF6	Pump Fault (Terminal S6)	MFDI terminal S6 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S6.
		Pump Fault [H1-06 = 2C to 2F] is set to MFDI terminal S6, but the terminal is not in use.	Correctly set the MFDI.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
EF7	Pump Fault (Terminal S7)	MFDI terminal S7 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S7.
		Pump Fault [H1-07 = 2C to 2F] is set to MFDI terminal S7, but the terminal is not in use.	Correctly set the MFDI.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
EF8	Pump Fault (Terminal S8)	MFDI terminal S8 caused an external fault through an external device.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input in the MFDI.
		The wiring is incorrect.	Correctly connect the signal line to MFDI terminal S8.
		Pump Fault [H1-08 = 2C to 2F] is set to MFDI terminal S8, but the terminal is not in use.	Correctly set the MFDI.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
EOF	Emergency Override FWD	The digital input terminal set to *H1-xx = AF [MFDI Function Selection = Emergency Override FWD]* activated.	When the emergency condition is gone, deactivate the digital input set to *Emergency Override FWD*.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
EOR	Emergency Override REV	The digital input terminal set to *H1-xx = B0 [MFDI Function Selection = Emergency Override REV]* activated.	When the emergency condition is gone, deactivate the digital input set to *Emergency Override REV*.
Note: If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
EP24v	External Power 24V Supply	The voltage of the main circuit power supply decreased, and the 24 V power supply is supplying power to the drive.	• Examine the main circuit power supply. • Turn ON the main circuit power supply to run the drive.
Note: • Set *o2-26 [Ext. Power 24V Supply Display]* to enable or disable *EP24v* detection. • The drive will not output an alarm signal for this alarm.			
Code	**Name**	**Causes**	**Possible Solutions**
FDBKL	Feedback Loss Wire Break	The analog input from the terminal set to *H3-xx = B [MFAI Function Selection = PID Feedback]* is more than 21 mA or less than 3 mA for longer than 1 s in these conditions: • *b5-82 = 1 [Feedback Loss 4 ~ 20mA Detect Sel = Alarm Only]* • *b5-01 ≠ 0 [PID Mode Setting ≠ Disabled]* • *H3-01, H3-09, or H3-05 = 2 [Terminal A1/A2/A3 Signal Level Selection = 4 to 20 mA]*	Make sure that you install the PID feedback source and it operates correctly.
Note: • If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate. • If the drive detects this error, it will operate the motor as specified by the settings of *b5-82*. • Parameter *L5-42 [Feedback Loss Fault Retry Select]* sets the Auto Restart function of this error.			
Code	**Name**	**Causes**	**Possible Solutions**
FLGT	Feedback Loss, Go To Freq b5-83	The analog input from the terminal set to *H3-xx = B [MFAI Function Selection = PID Feedback]* is more than 21 mA or less than 3 mA for longer than 1 s in these conditions: • *b5-82 = 3 [Feedback Loss 4 ~ 20mA Detect Sel = Run At b5-83]* • *b5-01 ≠ 0 [PID Mode Setting ≠ Disabled]* • *H3-01, H3-09, or H3-05 = 2 [Terminal A1/A2/A3 Signal Level Selection = 4 to 20 mA]*	Make sure that you install the PID feedback source and it operates correctly.
Note: • If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate. • If the drive detects this error, it will operate the motor at the speed set in *b5-83 [Feedback Loss Goto Frequency]* as specified by the setting of *b5-82*.			
Code	**Name**	**Causes**	**Possible Solutions**
FMLST	Net Flow Meter Lost:Check Source	There is no drive on the MEMOBUS Network with a valid Flow Meter source. When *Y1-01 = 3 [Multiplex Mode = Network Multiplex]*, *Y6-01 [Flow Meter Scaling] > 0.0* and *Y9-40 = 0 [Flow Rate Source = Network]*, the Flow Meter function needs a valid Flow Rate from the network that is originating from another drive that also has *Y6-01 > 0.0* with *Y9-40 = 0*.	• If the drive has an operational Flow Meter connected to an analog or pulse input terminal, set *Y9-40 = 0 [Analog]*. • If another drive on the MEMOBUS Network has a Flow meter connected to an analog or pulse input terminal, confirm that drive is online with *Y6-01 > 0.0* and *Y9-40 = 0*.
Code	**Name**	**Causes**	**Possible Solutions**
FR<MS	Freq Ref < Minimum Speed (Y1-06)	The drive frequency reference setting is less than the value set in *Y1-06 [Minimum Speed]* in these conditions: • The drive is not in PI Mode • The drive is running • *Minimum Speed* is enabled (*Y1-06 > 0.00*) • *Y1-06 > Y4-12 [Thrust Frequency]*	Increase the frequency reference to a value more than *Y1-06*.
Note: • If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate. • If the drive detects this error, it internally sets the frequency reference to the value set in *Y1-06*.			

Code	Name	Causes	Possible Solutions
FR<TH	Freq. Reference < Thrust (Y4-12)	The drive frequency reference setting is less than the value set in *Y4-12 [Thrust Frequency]* in these conditions: • The drive is not in PI Mode • The drive is running • *Thrust* is enabled (*Y4-11 [Thrust Acceleration Time] > 0.00* and *Y4-12 > Y1-06 [Minimum Speed]*)	Increase the frequency reference to a value more than *Y4-12*.

Note:
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• If the drive detects this error, it internally sets the frequency reference to the value set in *Y4-12*.

Code	Name	Causes	Possible Solutions
HCA	High Current Alarm	The load is too heavy.	• Decrease the load for applications with repetitive starts and stops. • Replace the drive with a larger capacity model.
		The acceleration time is too short.	• Calculate the torque necessary during acceleration related to the load inertia and the specified acceleration time. • Increase the values set in *C1-01 or C1-03 [Acceleration Times]* until you get the necessary torque. • Increase the values set in *C2-01 to C2-04 [S-Curve Characteristics]* until you get the necessary torque. • Replace the drive with a larger capacity model.
		The drive is trying to operate a specialized motor or a motor that is larger than the maximum applicable motor output of the drive.	• Examine the motor nameplate, the motor, and the drive to make sure that the drive rated current is larger than the motor rated current. • Replace the drive with a larger capacity model.
		The current level temporarily increased because of speed search after a momentary power loss or while trying to Auto Restart.	If speed search or Auto Restart cause an increase in current, the drive can temporarily show this alarm. The time that the drive shows the alarm is short. No more steps are necessary to clear the alarm.

Note:
• The drive detects this error if the drive output current is more than the overcurrent alarm level (150% of the rated current).
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
HiAux	High PI Aux Feedback Level	PI Auxiliary Feedback is more than the level set in *YF-12 [PI Aux Control High Level Detect]* for the time set in *YF-13 [PI Aux High Level Detection Time]* in these conditions: • The drive is running. • The output frequency > 0.	• Decrease the PI Auxiliary Feedback level to less than *YF-12*. • Set *YF-12* and *YF-13* correctly.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
HIFB	High Feedback Sensed	The feedback level is more than the level set in *Y1-11 [High Feedback Level]*.	• Decrease the feedback level to less than *Y1-11 - Y1-14 [Hysteresis Level]*. • Set *Y1-11* and *Y1-12* correctly.

Note:
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• If the drive detects this error, it will respond as specified by the setting of *Y1-13 [High Feedback Selection]*.

Code	Name	Causes	Possible Solutions
HiFlo	High Flow	Flow rate was more the level set in *Y6-17 [High Flow Level]* for longer than the time set in *Y6-18 [High Flow Detection Time]* and *Y6-19 = 1 [High Flow Behavior = Alarm (and Digital Output)]*.	Reprogram *Y6-17* to *Y6-19* if flow rate is acceptable.

Code	Name	Causes	Possible Solutions
HiSuc	High Suction Pressure	Suction pressure is more than the level set in *YE-12 [High Suction Pressure Det Level]* for longer than the time set in *YE-13 [High Suction Pressure Det Time]*, and the drive is running (AUTO or HAND) and *YE-14 = 1 [High Suction Pressure Behavior = Alarm (and Digital Output)]*.	Decrease suction pressure.

Code	Name	Causes	Possible Solutions
L24v	Loss of External Power 24 Supply	The voltage of the backup 24 V power supply has decreased. The main circuit power supply is operating correctly.	• Examine the external 24 V power supply for disconnected wires and wiring errors and repair the problems. • Examine the external 24 V power supply for problems.

Note:
• Set *o2-23 [External 24V Powerloss Detection]* to enable or disable *L24v* detection.
• The drive will not output an alarm signal for this alarm.

Code	Name	Causes	Possible Solutions
LCP	Low City Pressure	Insufficient pressure is present on the inlet to the pump in these conditions: • *Y4-24 = 0 [Low City Alarm Text = Low City Pressure]* • The terminal set for *H1-xx = B8 or 1B8 [MFDI Function Selection = Low City Pressure or !Low City Pressure]* activates	• Examine the pressure switch contact for correct operation. • Examine control wiring to drive terminal strip from pressure switch contact. • Make sure that suction pressure is present with an isolated measuring device. • Set *Y4-22 [Low City On-Delay Time]* and *Y4-23 [Low City Off-Delay Time]* correctly. • Deactivate the digital input terminals set to *H1-xx = B8 or 1B8*.
Note: • If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate. • If the drive detects this error during run, it coasts to stop and does not operate until the digital input has deactivated for the time set in *Y4-22*.			
Code	**Name**	**Causes**	**Possible Solutions**
LoAux	Low PI Aux Feedback Level	When the drive is running, PI Auxiliary Feedback is less than the level set in *YF-09 [PI Aux Control Low Lvl Detection]* for the time set in *YF-10 [PI Aux Control Low Lvl Det Time]*.	• Increase the PI Auxiliary Feedback level more than *YF-09*. • Set *YF-09* and *YF-10* correctly.
Note: If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
LOFB	Low Feedback Sensed	The feedback level is less than the level set in *Y1-08 [Low Feedback Level]* for the time set in *Y1-09 [Low Feedback Lvl Fault Dly Time]*.	• Increase the feedback level to more than *Y1-08 + Y1-14 [High Feedback Hysteresis Level]*. • Set *Y1-08* and *Y1-09* correctly.
Note: • If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate. • If the drive detects this fault, it will respond as specified by the setting of *Y1-10 [Low Feedback Selection]*.			
Code	**Name**	**Causes**	**Possible Solutions**
LoG	Com Error / Abnormal SD Card	There is not a micro SD card in the keypad.	Put a micro SD card in the keypad.
		• The drive is connected to USB. • The number of log communication files is more than 1000. • The micro SD card does not have available memory space. • The line number data in a log communication file was changed. • A communication error between the keypad and drive occurred during a log communication.	Set *o5-01 = 0 [Log Start/Stop Selection = OFF]*.
		You started short-term data logging on a keypad that does not support short-term data logs.	• Connect a keypad that supports short-term data logs. **Note:** The LCD keypad and Bluetooth LCD keypad with REV: H or later support short-term data logging. The keypad version "REV" is located on the nameplate on the back of the keypad. • Set *o5-00 = 0 [Log Type = Long Term Log]* • Set *o5-01 = 0 [Log Start/Stop Selection = OFF]*.
Note: If the drive detects this error, the terminal set to *H2-01 to H2-03 = 6A [MFDO Function Selection = Data Logger Error]* will activate.			
Code	**Name**	**Causes**	**Possible Solutions**
LOP	Loss of Prime	The drive used the method set in *Y1-18 [Prime Loss Detection Method]* to detect that the pump load is less than the level set in *Y1-19 [Prime Loss Level]* for the time set in *Y1-20 [Prime Loss Time]*, and the output frequency is *Y1-21 [Prime Loss Activation Freq]* or more.	• Examine a dry well, air in the system, or no water in the system. Use preferred priming method suggested by the pump manufacturer to restart the pump. • When there is resistance in the pump, allow the system to pump water again. • Set *Y1-18* to *Y1-21* correctly.
Note: • If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate. • If the drive detects this fault, it will respond as specified by the setting of *Y1-22 [Prime Loss Selection]*.			
Code	**Name**	**Causes**	**Possible Solutions**
LoSuc	Low Suction Pressure	Suction pressure is less than the level set in *YE-09 [Low Suction Pressure Det Level]* for longer than the time set in *YE-10 [Low Suction Pressure Det Time]*, and the drive is running (AUTO or HAND) and *YE-11 = 1 [Low Suction Pressure Behavior = Alarm (and Digital Output)]*.	Increase suction pressure.
Code	**Name**	**Causes**	**Possible Solutions**
LowFl	Low Flow	Flow rate was below the level set in *Y6-06 [Low Flow Level]* for longer than the time set in *Y6-07 [Low Flow Detection Time]* and *Y6-09 = 1 [Low Flow Behavior = Alarm (and Digital Output)]*.	Reprogram *Y6-06* to *Y6-09* if flow rate is acceptable.

Code	Name	Causes	Possible Solutions
LowWL	Low Water Level	Water level is below the level set in *Yd-09 [Low Water Level Detection Level]* with *Yd-11 = 1 [Low Water Level Behavior = Alarm (and Digital Output)]*.	Increase the water level.

Code	Name	Causes	Possible Solutions
LSP	Low Suction Pressure	An external input has indicated that an insufficient suction pressure condition exists in these conditions: • *Y4-24 = 1 [Low City Alarm Text = Low Suction Pressure]* • The terminal set for *H1-xx = B8 or 1B8 [MFDI Function Selection = Low City Pressure or !Low City Pressure]* activates	• Examine the pressure switch contact for correct operation. • Examine control wiring to drive terminal strip from pressure switch contact. • Make sure that suction pressure is present with an isolated measuring device. • Increase the system pressure. • Set *Y4-22 [Low City On-Delay Time]* and *Y4-23 [Low City Off-Delay Time]* correctly. • Deactivate the digital input terminals set to *H1-xx = B8 or 1B8*.

Note:
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• If the drive detects this error during run, it coasts to stop and does not operate until the digital input has deactivated for the time set in *Y4-22*.

Code	Name	Causes	Possible Solutions
LT-1	Cooling Fan Maintenance Time	The cooling fan is at 90% of its performance life estimate.	1. Replace the cooling fan. 2. Set *o4-03 = 0 [Fan Operation Time Setting = 0 h]* to reset the cooling fan operation time.

Note:
When the performance life estimate is expired, the terminal set to *H2-01 to H2-03 = 2F [MFDO Function Selection = Maintenance Notification]* will activate.

Code	Name	Causes	Possible Solutions
LT-2	Capacitor Maintenance Time	The capacitors for the main circuit and control circuit are at 90% of their performance life estimate.	Replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.

Note:
When the performance life estimate is expired, the terminal set to *H2-01 to H2-03 = 2F [MFDO Function Selection = Maintenance Notification]* will activate.

Code	Name	Causes	Possible Solutions
LT-3	SoftChargeBypassRelay MainteTime	The soft charge bypass relay is at 90% of its performance life estimate.	Replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.

Note:
When the performance life estimate is expired, the terminal set to *H2-01 to H2-03 = 2F [MFDO Function Selection = Maintenance Notification]* will activate.

Code	Name	Causes	Possible Solutions
LT-4	IGBT Maintenance Time (50%)	The IGBT is at 50% of its performance life estimate.	Check the load, carrier frequency, and output frequency.

Note:
When the performance life estimate is expired, the terminal set to *H2-01 to H2-03 = 2F [MFDO Function Selection = Maintenance Notification]* will activate.

Code	Name	Causes	Possible Solutions
LWT	Low Water In Tank	An external input has indicated that the water level in the tank is too low in these conditions: • *Y4-24 = 2 [Low City Alarm Text = Low Water in Tank]* • The terminal set for *H1-xx = B8 or 1B8 [MFDI Function Selection = Low City Pressure or !Low City Pressure]* activates	• Examine the pressure switch contact for correct operation. • Examine control wiring to drive terminal strip from pressure switch contact. • Make sure that suction pressure is present with an isolated measuring device. • Increase the water level. • Set *Y4-22 [Low City On-Delay Time]* and *Y4-23 [Low City Off-Delay Time]* correctly. • Deactivate the digital input terminals set to *H1-xx = B8 or 1B8*.

Note:
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• If the drive detects this error during run, it coasts to stop and does not operate until the digital input has deactivated for the time set in *Y4-22*.

Code	Name	Causes	Possible Solutions
NETSC	NETSCAN Waiting for Master	No message received from the master within the time specified in *Y9-28 [NETSCAN Alarm Time]*.	• Increase *Y9-28* to account for network latency. • Make sure that there is a drive on the network with *Y1-01 = 3 [Multiplex Mode = Contactor Multiplex]* and *Y9-27 = 0 [Network Recovery = Automatic]*.

Code	Name	Causes	Possible Solutions
NMS	Setpoint Not Met	The feedback deviates from the setpoint at a level more than *Y1-15 [Maximum Setpoint Difference]* for the time set in *Y1-16 [Not Maintaining Setpoint Time]*.	• Examine for a blocked impeller, over cycling, or broken pipe. • Set *Y1-15* and *Y1-16* correctly.

Note:
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• If the drive detects this error, it will respond as specified by the setting of *Y1-17 [Not Maintaining Setpoint Sel]*.

Code	Name	Causes	Possible Solutions
OD	Output Disconnect	The output circuit between the drive and the motor is open, and the drive output current is less than 5% of *E2-01 [Motor Rated Current (FLA)]*.	• Close the disconnected output circuit between the drive and the motor. • If you do not use a motor disconnect, set *Y4-42 = 0 [Disabled]*.

Note:
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• If the drive detects this error, it will respond as specified by the setting of *Y4-42 [Output Disconnect Detection Sel]*.

Code	Name	Causes	Possible Solutions
oH	Heatsink Overheat	The ambient temperature is high and the heatsink temperature is more than the *L8-02 [Overheat Alarm Level]*.	• Measure the ambient temperature. • Increase the airflow around the drive. • Install a cooling device (cooling fan or air conditioner) to decrease the ambient temperature. • Remove objects near the drive that are producing too much heat.
		There is not sufficient airflow around the drive.	• Give the drive the correct installation space as shown in the manual. • Make sure that there is sufficient circulation around the control panel. • Examine the drive for dust or other unwanted materials that could clog the cooling fan. • Remove unwanted materials that prevent air circulation.
		The internal cooling fan or fans stopped.	1. Replace the cooling fan. 2. Set *o4-03 = 0 [Fan Operation Time Setting = 0 h]* to reset the cooling fan operation time.

Note:
• The drive detects this error if the heatsink temperature of the drive is more than *L8-02*.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• Use *L8-03 [Overheat Pre-Alarm Selection]* to the stopping method for this fault.

Code	Name	Causes	Possible Solutions
oH2	External Overheat (H1-XX=B)	An external device sent an *oH2* alarm.	1. Find the external device that output the overheat alarm. 2. Remove the cause of the problem. 3. Clear the *Overheat Alarm (oH2) [H1-xx = B]* in MFDI terminals S1 to S8.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
oH3	Motor Overheat (PTC Input)	The thermistor wiring that detects motor temperature is defective.	Correct wiring errors.
		A fault occurred on the machine. Example: The machine is locked.	Examine the machine and remove the cause of the fault
		The motor has overheated.	• Check the load level, acceleration/deceleration time, and motor start/stop frequency (cycle time). • Decrease the load. • Increase the values set in *C1-01 to C1-04 [Acceleration/ Deceleration Times]*. • Set *E2-01 [Motor Rated Current (FLA)]* correctly to the value specified by the motor nameplate. • Make sure that the motor cooling system is operating correctly, and repair or replace it if it is damaged. • Adjust *E1-04 to E1-10 [V/f Pattern Parameters]*. For motor 2, adjust *E3-04 to E3-10*. Decrease the values set in *E1-08 [Mid Point A Voltage]* and *E1-10 [Minimum Output Voltage]*. **Note:** If the values set in *E1-08* and *E1-10* are too low, the overload tolerance will decrease at low speeds.

Note:
• When *H3-02 or H3-10 = E [MFAI Function Selection = Motor Temperature (PTC Input)]*, the drive detects this fault if the motor overheat signal entered to analog input terminals A1, A2, or A3 is more than the alarm detection level.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• If the drive detects this error, it will operate the motor as specified by the stopping method set in *L1-03 [Motor Thermistor oH Alarm Select]*.

Code	Name	Causes	Possible Solutions
oL3	Overtorque 1	A fault occurred on the machine. Example: The machine is locked.	Examine the machine and remove the cause of the fault.
		The parameters are incorrect for the load.	Adjust *L6-02 [Torque Detection Level 1]* and *L6-03 [Torque Detection Time 1]* settings.

Note:
• The drive detects this fault if the drive output current is more than the level set in *L6-02* for longer than *L6-03*.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• Use *L6-01 [Torque Detection Selection 1]* to set the conditions that trigger the minor fault.

Code	Name	Causes	Possible Solutions
oL4	Overtorque 2	A fault occurred on the machine. Example: The machine is locked.	Examine the machine and remove the cause of the fault.
		The parameters are incorrect for the load.	Adjust *L6-05 [Torque Detection Level 2]* and *L6-06 [Torque Detection Time 2]* settings.

Note:
• The drive detects this error if the drive output current is more than the level set in *L6-05* for longer than *L6-06*.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• Use *L6-04 [Torque Detection Selection 2]* to set the conditions that trigger the minor fault.

Code	Name	Causes	Possible Solutions
oS	Overspeed	There is overshoot.	Decrease *C5-01 [ASR Proportional Gain 1]* and increase *C5-02 [ASR Integral Time 1]*.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
ov	DC Bus Overvoltage	The drive output cable or motor is shorted to ground (the current short to ground is charging the main circuit capacitor of the drive through the power supply).	1. Examine the motor main circuit cable, terminals, and motor terminal box, and then remove ground faults. 2. Re-energize the drive.
		The power supply voltage is too high.	Decrease the power supply voltage to align with the drive rated voltage.
		Electrical interference caused a drive malfunction.	• Examine the control circuit lines, main circuit lines, and ground wiring, and minimize the effects of noise. • Find the source of the noise. If a magnetic contactor is the source, use Surge Protective Device if necessary. • Set *L5-01 ≠ 0 [Number of Auto-Restart Attempts ≠ 0 times]*.

Note:
• The drive detects this error if the DC bus voltage is more than the *ov* detection level when the Run command has not been input (while the drive is stopped).
• The *ov* detection level is approximately 410 V with 208 V class drives. The detection level is approximately 820 V with 480 V class drives.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
ovEr	Too Many Parameters Changed	You tried to change more than 150 parameters.	Make sure that parameters that do not have an effect on drive operation are at their default settings. **Note:** • You can change 150 parameters maximum. • If you change parameters that have dependencies, the drive can detect *ovEr* when the number of changed parameters is fewer than 150.

Code	Name	Causes	Possible Solutions
PASS	Modbus Communication Test	The MEMOBUS/Modbus communications test is complete.	The *PASS* display will turn off after communications test mode is cleared.

Code	Name	Causes	Possible Solutions
PF	Input Phase Loss	There is a phase loss in the drive input power.	Correct errors with the wiring for main circuit drive input power.
		Loose wiring in the input power terminals.	Tighten the terminal screws to the correct tightening torque.
		The drive input power voltage is changing too much.	• Examine the input power for problems. • Make the drive input power stable.
		Unsatisfactory balance between voltage phases.	• Examine the input power for problems. • Make the drive input power stable. • If the input power supply is good, examine the magnetic contactor on the main circuit side for problems.

Code	Name	Causes	Possible Solutions
		The main circuit capacitors are unserviceable.	• Examine the capacitor maintenance time in monitor *U4-05 [Capacitor Life Mon]*. • If *U4-05* is more than 90%, replace the capacitor. Contact Yaskawa or your nearest sales representative for more information.
			• Examine the input power for problems. • Re-energize the drive. • If the alarm stays, replace the circuit board or the drive. Contact Yaskawa or your nearest sales representative for more information.

Note:
• The drive detects this error if the DC bus voltage changes irregularly without regeneration.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• Use *L8-05 [Input Phase Loss Protection Sel]* to enable and disable PF detection.

Code	Name	Causes	Possible Solutions
POC	Pump Over Cycle	Pump in the system exceeded the number cycles from normal operation to sleep mode set in *Y2-10 [Max Cycling Protection Allowed]* in the time set in *Y2-11 [Cycling Count Decrement Time]*.	Adjust sleep parameters to prevent the system from over cycling between normal operation and sleep mode.

Code	Name	Causes	Possible Solutions
R-DNE	Remote Drive Disable	• The digital input set to *H1-xx = BD [MFDI Function Selection = Remote Drive Disable]* activated. • The digital input set to *H1-xx = 1BD [!Remote Drive Disable]* deactivated.	Examine the statuses of the digital input terminals set to *H1-xx = BD or 1BD*

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
rUn	Motor Switch during Run	The drive received a *Motor 2 Selection [H1-xx = 16]* during run.	Make sure that the drive receives the Motor 2 Selection while the drive is stopped.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
SE	Modbus Test Mode Error	MEMOBUS/Modbus communications self-diagnostics *[H1-xx = 67]* was done while the drive was running.	Stop the drive and do MEMOBUS/Modbus communications self-diagnostics.

Note:
If drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
SPCNR	Single Phase Converter Not Ready	When *YC-14 = 1 [Behavior when SPC is Not Ready = Coast to Stop - Alarm]*, the digital input set to *H1-xx = BE [MFDI Function Selection = Single Phase Converter Ready NC]* deactivated to show that the attached converter is faulted or not ready.	• Examine the wiring between the drive and converter. • Examine the error code on converter.

Note:
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• The De-Scale and Contactor Multiplex functions will be reset when this alarm is active.

Code	Name	Causes	Possible Solutions
SPL	Suction Pressure Feedback Loss	Wire Break detection for suction pressure. The analog input programmed for *Water Level / Suct Pres Feedback* is less than 3 mA or more than 21 mA for longer than 1 second and *YE-19 = 1 [Suction Pressure Fdbk Wire Break = Alarm (and Digital Output)]*.	• Repair level sensor. • Repair wiring.

Code	Name	Causes	Possible Solutions
STo	Safe Torque OFF	Safe Disable inputs H1-HC and H2-HC are open.	• Make sure that the Safe Disable signal is input from an external source to terminal H1-HC and H2-HC. • When the Safe Disable function is not in use, use a jumper to connect terminals H1-HC and H2-HC.
		There is internal damage to the two Safe Disable channels.	Replace the board or the drive. Contact Yaskawa or your nearest sales representative to replace the board.

Note:
• The drive will not output an alarm signal for this alarm.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 21 [MFDO Function Selection = Safe Torque OFF]* will activate.

Code	Name	Causes	Possible Solutions
SToF	Safe Torque OFF Hardware	One of the two terminals H1-HC or H2-HC received the Safe Disable input signal.	• Make sure that the Safe Disable signal is input from an external source to terminals H1-HC or H2-HC. • When the Safe Disable function is not in use, use a jumper to connect terminals H1-HC and H2-HC.
		The Safe Disable input signal is wired incorrectly.	
		There is internal damage to one Safe Disable channel.	Replace the board or the drive. Contact Yaskawa or your nearest sales representative to replace the board.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
TiM	Keypad Time Not Set	There is a battery in the keypad, but you have not set the date and time.	Use the keypad to set the date and time.

Note:
• Parameter *o4-24 [bAT Detection selection]* enables and disables *TiM* detection.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
TrPC	IGBT Maintenance Time (90%)	The IGBT is at 90% of its performance life estimate.	Replace the IGBT or the drive. For more information, contact Yaskawa or your nearest sales representative.

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
UL3	Undertorque Detection 1	A fault occurred on the machine. Example: There is a broken pulley belt.	Examine the machine and remove the cause of the fault.
		The parameters are incorrect for the load.	Adjust *L6-02 [Torque Detection Level 1]* and *L6-03 [Torque Detection Time 1]* settings.

Note:
• The drive detects this error if the drive output current is less than the level set in *L6-02* for longer than *L6-03*.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• If the drive detects this error, it will operate the motor as specified by the Stopping Method set in *L6-01 [Torque Detection Selection 1]*.

Code	Name	Causes	Possible Solutions
UL4	Undertorque Detection 2	A fault occurred on the machine. Example: There is a broken pulley belt.	Examine the machine and remove the cause of the fault.
		The parameters are incorrect for the load.	Adjust *L6-05 [Torque Detection Level 2]* and *L6-06 [Torque Detection Time 2]* settings.

Note:
• The drive detects this error if the drive output current is less than the level set in *L6-05* for longer than *L6-06*.
• If detected, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.
• If the drive detects this error, it will operate the motor as specified by the Stopping Method set in *L6-04 [Torque Detection Selection 2]*.

Code	Name	Causes	Possible Solutions
UL6	Underload or Belt Break Detected	The output current decreased less than the motor underload curve set in *L6-14 [Motor Underload Level @ Min Freq]* for longer than the time set in *L6-03 [Torque Detection Time 1]*.	Examine parameters *L6-13 [Motor Underload Curve Select]* and *L6-14*.
		The belt has broken disconnecting the motor from the load.	

Note:
If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
Uv	Undervoltage	The drive input power voltage is changing too much.	• Examine the input power for problems. • Make the drive input power stable. • If the input power supply is good, examine the magnetic contactor on the main circuit side for problems.
		There is a phase loss in the drive input power.	Correct errors with the wiring for main circuit drive input power.
		There is loose wiring in the drive input power terminals.	Tighten the terminal screws to the correct tightening torque.
		There was a loss of power.	Use a better power supply.
		The main circuit capacitors have become unserviceable.	Examine the capacitor maintenance time in monitor *U4-05 [Capacitor Life Mon]*. If *U4-05* is more than 90%, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.

Code	Name	Causes	Possible Solutions
		The drive input power transformer is too small and voltage drops when the power is switched on.	• Check for an alarm when a molded-case circuit breaker, Leakage Breaker (ELCB or GFCI) (with overcurrent protective function), or magnetic contactor is ON. • Check the capacity of the drive power supply transformer.
		Air inside the drive is too hot.	Check the ambient temperature of the drive.
		The Charge LED is broken.	Replace the control board or the entire drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.

Note:
• The drive detects this error if one of these conditions is correct when the Run command has not been input (while the drive is stopped).
– The DC bus voltage < *L2-05 [Undervoltage Detection Lvl (Uv1)]*.
– The Contactor that prevents inrush current in the drive was opened.
– There is low voltage in the control drive input power.
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
WFR	Waiting for Run	The drive has *Drive Enable No Run Cycle* active (closed) on the digital input and the drive is OFF.	Examine the operation sequence.

Note:
• If the drive detects this error, the terminal set to *H2-01 to H2-03 = 10 [MFDO Function Selection = Alarm]* will activate.

Code	Name	Causes	Possible Solutions
WLL	Water Level Feedback Loss	Wire Break detection for water level. The Analog input programmed for Water Level / Suction Pressure is less than 3 mA or is more than 21 mA for longer than 1 second with *Yd-16 = 1 [Water Level Feedback Wire Break = Alarm Only]*.	• Repair level sensor. • Repair wiring.

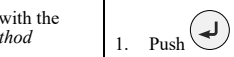
4.6 Parameter Setting Errors

Parameter setting errors occur when multiple parameter settings do not agree, or when parameter setting values are not correct. Refer to the table in this section, examine the parameter setting that caused the error, and remove the cause of the error. You must first correct the parameter setting errors before you can operate the drive. The drive will not send notification signals for the faults and alarms when these parameter setting errors occur.

Code	Name	Causes	Possible Solutions
oPE01	Drive Capacity Setting Error	The value set in *o2-04 [Drive Model (KVA) Selection]* does not agree with the drive model.	Set *o2-04* to the correct value.
Code	**Name**	**Causes**	**Possible Solutions**
oPE02	Parameter Range Setting Error	Parameters settings are not in the applicable setting range.	1. Push (↵) to show *U1-18 [oPE Fault Parameter]*, and find parameters that are not in the applicable setting range. 2. Correct the parameter settings. **Note:** If more than one error occurs at the same time, other *oPExx* errors have priority over *oPE02*.
		You set *E2-01 ≤ E2-03 [Motor Rated Current (FLA) ≤ Motor No-Load Current]*.	Make sure that *E2-01 > E2-03*. **Note:** If it is necessary to set *E2-01 < E2-03*, first lower the value set in *E2-03*, and then set *E2-01*.
		The settings for these parameters do not agree: • *L8-12 [Ambient Temperature Setting] = 60 °C* and *L8-35 = 1 or 3 [Installation Method Selection = Side-by-Side Mounting or IP55/UL Type 12]* for models 2011 to 2169 and 4005 to 4156 • *L8-35 = 1 or 3* for models 2211 to 2396 and 4180 to 4720	Set *L8-35 = 0 or 2 [IP20/UL Open Type or IP20/UL Type 1]*.
		You set *S3-09 < S3-10 [PI2 Control Output Upper Limit < PI2 Control Output Lower Limit]*.	Make sure that *S3-09 > S3-10* at all times.
		You set *S3-13 > S3-15 [PI2 Control Low Feedback Lvl > PI2 Control High Feedback Lvl]*.	Make sure that *S3-13 < S3-15* at all times.
		H2-xx = D3 [Harmonic Filter Output] and *n1-13 = 0 [DC Bus Stabilization Control = Disabled]* while *A1-02 = 0 or 8 (Control Method Selection= V/f or EZ Vector Control]*.	Set *n1-13 = 1 [Enabled]* or de-program digital output *D3*.
		One of the following conflicting parameters has been set: • *Y1-01 = 3 [Multiplex Mode = Network Multiplex]* and *F6-16 ≠ 0 [Gateway Mode ≠ Disabled]*. • *Y1-01 = 3 [Multiplex Mode = Network Multiplex]* and *A1-07 ≠ 0 [DriveWorksEZ Function Selection ≠ DWEZ Disabled]*. • *Q7-01 ≠ 0 [Remote I/O Slave Address ≠ 0]* and *H1-xx ≠ 9F [Multi-Function Digital Input ≠ DWEZ Disabled]*.	When *Y1-01 = 3*, set *F6-16 = 0*, or disable DriveWorksEZ while *Q1-07 ≠ 0*.
Code	**Name**	**Causes**	**Possible Solutions**
oPE03	Multi-Function Input Setting Err	The settings for these parameters do not agree: • *F3-10 to F3-25 [Terminal D1 to DF Function Selection]* • *H1-01 to H1-08 [Terminals S1 to S8 Function Selection]* • *H7-01 to H7-04 [Virtual Multi-Function Inputs 1 to 4]*	Correct the parameter settings.
		The settings for MFDIs overlap. **Note:** This does not include *H1-xx = 20 to 2F [MFDI Function Selection = Ext Pump Fault]* and *[Reserved]*.	Set the parameters correctly to prevent MFDI function overlap.
		These pairs of MFDI functions are not set to Digital Inputs (*H1-xx*, *F3-10 to F3-25*, and *H7-01 to H7-04*) at the same time: • Setting values *10 [Up Command]* and *11 [Down Command]* • Setting values *75 [Up 2 Command]* and *76 [Down 2 Command]* • Setting values *42 [Run Command (2-Wire Sequence 2)]* and *43 [FWD/REV (2-Wire Sequence 2)]*	Set the MFDI pairs.

Code	Name	Causes	Possible Solutions
		A minimum of two of these MFDI combinations are set to Digital Inputs (*H1-xx*, *F3-10 to F3-25*, and *H7-01 to H7-04*) at the same time: • Setting values *10 [Up Command]* and *11 [Down Command]* • Setting values *75 [Up 2 Command]* and *76 [Down 2 Command]* • Setting value *A [Accel/Decel Ramp Hold]* • Setting value *1E [Reference Sample Hold]*	Remove the function settings that are not in use.
		The parameter settings are enabled at the same time. • *b5-01 [PID Mode Setting]* • *H1-xx = 10 [Up Command]* • *H1-xx = 11 [Down Command]*	• Set *b5-01 = 0 [Disabled]*. • Remove the function Up/Down command settings.
		These commands are set in Digital Inputs (*H1-xx*, *F3-10 to F3-25*, and *H7-01 to H7-04*) at the same time: • Setting values *61 [Speed Search from Fmax]* and *62 [Speed Search from Fref]* • Setting values *65, 66, 7A, 7B [KEB Ride-Thru 1 or 2 Activate]* and *68 [High Slip Braking (HSB) Activate]* • Setting values *16 [Motor 2 Selection]* and *1A [Accel/Decel Time Selection 2]* • Setting values *65, 66 [KEB Ride-Thru 1 Activate]* and *7A, 7B [KEB Ride-Thru 2 Activate]* • Setting values *40, 41 [Forward RUN (2-Wire), Reverse RUN (2-Wire)]* and *42, 43 [Run Command (2-Wire Sequence 2), FWD/REV (2-Wire Sequence 2)]* • Setting values *60 [DC Injection Braking Command]* and *6A [Drive Enable]* • Setting values *16 [Motor 2 Selection]* and *75,j 76 [Up 2 Command, Down 2 Command]*	Remove the function settings that are not in use.
		These groups of MFDI functions are not set to Digital Inputs (*H1-xx*, *F3-10 to F3-25*, and *H7-01 to H7-04*) at the same time: • Setting values *C7 [PID Setpoint Selection 1], C8 [PID Setpoint Selection 2],* and *C9 [PID Setpoint Selection 3]* • Setting values *C0 [Dedicated Multi-Setpoint YA-02], C1 [Dedicated Multi-Setpoint YA-03], C2 [Dedicated Multi-Setpoint YA-04], C3 [Dedicated Multi-Setpoint YA-05], C4 [Dedicated Multi-Setpoint YA-06], C5 [Dedicated Multi-Setpoint YA-07],* and *C6 [Dedicated Multi-Setpoint YA-08]*	Set the MFDI groups correctly.
		Two of these three MFDI functions are set to Digital Inputs (*H1-xx*, *F3-10 to F3-25*, and *H7-01 to H7-04*) at the same time: • Setting value *50 [Motor Pre-heat 2]* • Setting value *60 [DC Injection Braking Command]* • Setting value *6A [Drive Enable]*	Remove the function setting that are not in use and use only one function.
		Settings for N.C. and N.O. input *[H1-xx]* for these functions were selected at the same time: • Setting value *15 [Fast Stop (N.O.)]* • Setting value *17 [Fast Stop (N.C.)]*	Remove one of the function settings.
		These settings were entered while *H1-xx = 2 [External Reference 1/2 Selection]*: • *b1-15 = 4 [Frequency Reference Selection 2 = Pulse Train Input]* • *H6-01 ≠ 0 [Terminal RP Pulse Train Function ≠ Frequency Reference]*	Set *H6-01 = 0*.
		These settings were entered while *H1-xx = 2 [External Reference 1/2 Selection]*: • *b1-15 = 3 [Option PCB]* or *b1-16 = 3 [Run Command Selection 2 = Option PCB]* • No option card is connected to the drive.	Connect an input option card to the drive.
		These settings were entered while *H1-xx = 2 [External Reference 1/2 Selection]*: • *b1-15 = 1 [Analog Input]* • *H3-02 ≠ 0 [Terminal A1 Function Selection ≠ Frequency Reference]* or *H3-10 ≠ 0 [Terminal A2 Function Selection ≠ Frequency Reference]*	Set *H3-02 = 0* or *H3-10 = 0*.

Code	Name	Causes	Possible Solutions
		These MFDI/MFDO functions are set at the same time: • *H1-xx ≠ 6A [Drive Enable]* and *H1-xx ≠ 70 [Drive Enable No Run Cycle]* • *H2-xx = 38 [Drive Enabled]*	• Set *H1-xx = 6A or 70*. • Change the MFDO setting.
		These MFDI functions are set at the same time: • *H1-xx = 6A [Drive Enable]* • *H1-xx = 70 [Drive Enable No Run Cycle]*	Remove one of the function settings.
		These MFDI functions are set at the same time: • *H1-xx = 67 [Communications Test Mode]* • *H1-xx = AF or B0 [Emergency Override FWD or Emergency Override REV]*	Remove one of the function settings.
		These parameters are set at the same time: • *H1-xx = 62 [Speed Search from Fref]* • *H5-22 = 1 [Speed Search from MODBUS = Enabled]*	Remove one of the function settings.
		These parameters are set at the same time: • *H1-xx = 70 [Drive Enable No Run Cycle]* • *b1-02 ≠ 0 [Run Command Selection 1 ≠ Keypad]*	Remove the *H1-xx = 70* function setting or set *b1-02 = 0*.
		These parameters are set at the same time: • *H1-xx = 70 [Drive Enable No Run Cycle]* • *b1-16 ≠ 0 [Run Command Selection 2 ≠ Keypad]*	Remove the *H1-xx = 70* function setting or set *b1-16 = 0*.
		These parameters are set at the same time: • *H1-xx = 70 [Drive Enable No Run Cycle]* • *H1-xx = 0 [3-Wire Sequence]*	Remove one of the function settings.
		Parameter *S3-01 ≠ 0 [PI2 Control Enable Selection ≠ Disabled]* and MFDI set for *H1-xx = AD [Select PI2 Control PI Parameters]* is ON.	• Set *S3-01 = 0* to use *H1-xx = AD* for the adjustments of *S3-06 [PI2 Control Proportional Gain]* and *S3-07 [PI2 Control Integral Time]* instead of the primary PI controller Proportional and Integral adjustments. • When PI2 Control is necessary, remove the MFDI function setting.
Code	**Name**	**Causes**	**Possible Solutions**
oPE05	Run Cmd/Freq Ref Source Sel Err	The setting to assign the Run command or frequency reference to an option card or the pulse train input is incorrect.	Correct the parameter settings.
		b1-01 = 3 [Frequency Reference Selection 1 = Option PCB] is set, but there is no option card connected to the drive.	Connect an option card to the drive.
		b1-02 = 3 [Run Command Selection 1 = Option PCB] is set, but there is no option card connected to the drive.	
		These parameters are set at the same time: • *b1-01 = 4 [Pulse Train Input]* • *H6-01 ≠ 0 [Terminal RP Pulse Train Function ≠ Frequency Reference]*	Set *H6-01 = 0*.
		These parameters are set at the same time: • *F3-01 = 6 [Digital Input Function Selection = BCD (5-digit), 0.01 Hz]* • *F3-03 = 0, 1 [Digital Input Data Length Select = 8-bit, 12-bit]*	Set *F3-03 = 2 [16-bit]*.
		These parameters are set at the same time: • *b1-01 = 3 [Frequency Reference Selection 1= Option PCB]* • *F2-01 = 0 or 2 [Analog Input Function Selection = 3 Independent Channels or 3 Additional Channels]*	Correct the parameter settings.
		These parameters are set and there is an AI-A3 option card connected to the drive: • *H1-xx = 2 [External Reference 1/2 Selection]* • *b1-15 = 3 [Frequency Reference Selection 2 = Option PCB]* • *F2-01 = 0 [Analog Input Function Selection = 3 Independent Channels]*	Correct the parameter settings.

Code	Name	Causes	Possible Solutions
oPE07	Analog Input Selection Error	The settings for *H3-02, H3-06, H3-10 [MFAI Function Selection]* and *H7-30 [Virtual Analog Input Selection]* overlap.	Set *H3-02, H3-06, H3-10, and H7-30* correctly to prevent overlap. **Note:** It is possible to set these functions to multiple analog input terminals at the same time: • Setting value *0 [Frequency Reference]* • Setting values *F and 1F [Not Used]*
		These parameters are set at the same time: • *H3-02, H3-06, H3-10, H7-30 = B [PID Feedback]* • *H6-01 = 1 [Terminal RP Pulse Train Function = PID Feedback Value]*	Remove the function settings that are not in use.
		These parameters are set at the same time: • *H3-02, H3-06, H3-10, H7-30 = C [PID Setpoint]* • *H6-01 = 2 [PID Setpoint Value]*	
		These parameters are set at the same time: • *H3-02, H3-06, H3-10, H3-40, H3-41, H3-42, H7-30 = 24 [PID Feedback Backup]* • *Y4-41 = 1 [Diff Lvl Src Fdbk Backup Select = Enabled]*	• Use only *H3-xx = 2D [Differential Level Source]* as a backup PID feedback and remove the function setting of *H3-xx = 24*. • Use *H3-xx = 24* as a backup PID feedback and set *Y4-41 = 0 [Disabled]* to not let the drive use *H3-xx = 2D* as a backup PID feedback.
		These parameters are set at the same time when *F2-01 = 2 [Analog Input Function Selection = 3 Additional Channels]*: • *F2-05, F2-09, F2-13 [Terminal Vx Function Selection], H3-40, H3-41, H3-42 = B [PID Feedback]* • *H6-01 = 1*	• Remove the function settings that are not in use. • When you use *H6-01* and *F2-05*, *F2-09*, *F2-13* at the same time, set *F2-01 ≠ 2*.
		These parameters are set at the same time when *F2-01 = 2*: • *F2-05, F2-09, F2-13, H3-40, H3-41, H3-42 = C [PID Setpoint]* • *H6-01 = 2*	
		The settings for *F2-05, F2-09, and F2-13* overlap when *F2-01 = 2*.	• Set the parameters correctly to prevent overlap. • Set *F2-01 ≠ 2*.
		The settings for *F2-05, F2-09, F2-13* and the settings for these parameters overlap when *F2-01 = 2*: • *H3-02, H3-06, H3-10* • *H3-40, H3-41, H3-42* • *H7-30*	
		The settings for these parameters overlap: • *H3-02, H3-06, H3-10* • *H3-40, H3-41, H3-42* • *H7-30*	Set these parameters correctly to prevent overlap
Code	**Name**	**Causes**	**Possible Solutions**
oPE08	Parameter Selection Error	You set a function that is not compatible with the control method set in *A1-02 [Control Method Selection]*.	1. Push  to show *U1-18 [oPE Fault Parameter]*, and find parameters that are not in the applicable setting range. 2. Correct the parameter settings. **Note:** If more than one error occurs at the same time, other *oPExx* errors have priority over *oPE02*.
		When *A1-02 = 0 [V/f]*, you set these parameters: • *S1-01 = 1 [Dynamic Noise Control = Enabled]* • *Y4-42 ≠ 0 [Output Disconnect Detection Sel ≠ Disabled]*	Set *S1-01 = 0* or *Y4-42 = 0*.
		When *A1-02 = 0 [V/f]*, you used *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]*.	Correct the parameter setting.
		When *A1-02 = 5 [OLV/PM]*, you set *E5-02 to E5-07 [PM Motor Parameters] = 0*.	• Set *E5-01 [PM Motor Code Selection]* correctly as specified by the motor. • For specialized motors, refer to the motor test report and set *E5-xx* correctly.
		When *A1-02 = 5*, you used these parameter settings: • *E5-09 = 0.0 [PM Back-EMF Vpeak (mV/(rad/s)) = 0.0 mV/(rad/s)]* • *E5-24 = 0.0 [PM Back-EMF L-L Vrms (mV/rpm) = 0.0 mV/min^{-1}]*	Set *E5-09* or *E5-24* to the correct value.
		When *A1-02 = 5*, you set *E5-09 ≠ 0* and *E5-24 ≠ 0*.	Set *E5-09 = 0* or *E5-24 = 0*.

Code	Name	Causes	Possible Solutions
		When *A1-02 = 8 [EZOLV]*, you used these parameter settings: • *E9-01 = 1, 2 [Motor Type Selection = Permanent Magnet (PM), Synchronous Reluctance (SynRM)]* • *b3-24 = 2 [Speed Search Method Selection = Current Detection 2]*	When *E9-01 = 1 or 2*, set *b3-24 = 1 [Speed Estimation]*.
		You set *L6-02 [Torque Detection Level 1] < L6-14 [Motor Underload Level @ Min Freq]*.	Set parameters to be *L6-02 ≥ L6-14*.
Code	**Name**	**Causes**	**Possible Solutions**
oPE09	PID Control Selection Fault	These parameters are set at the same time: • *b5-01 = 1* • *b5-11 = 1 [PID Output Reverse Selection = Negative Output Accepted]* And one of these parameters is set: • *d2-02 ≠ 0.0 [Frequency Reference Lower Limit ≠ 0.0%]* • *Y1-06 ≠ 0.0 [Minimum Speed ≠ 0.0%]* • *Y4-12 ≠ 0.0 [Thrust Frequency ≠ 0.0%]* • *Y1-01 ≠ 0 [Multiplex Mode ≠ Drive Only]* • *Yd-01 ≠ 0 [Water Level Selection ≠ Disabled]* • *YE-01 ≠ 0 [Suction Pressure Control Select ≠ Disabled]* • *YF-01≠ 0 [PI Aux Control Selection ≠ Disabled]*	Correct the parameter settings.
		These parameters are set at the same time: • *Y2-01 = 5 [Sleep Level Type = Output Frequency (non-PID)]* • *Y2-02 [Sleep Level]* > 0.0 Hz • *Y4-17 [Utility Start Delay Time]* > 0.0 min	Correct the parameter settings.
Note: The drive detects this error if the PID control function selection is incorrect. (When *b5-01 = 1 [PID Mode Setting = Standard]*)			
Code	**Name**	**Causes**	**Possible Solutions**
oPE10	V/f Data Setting Error	The parameters that set the V/f pattern do not satisfy these conditions: • For motor 1: *E1-09 ≤ E1-07 < E1-06 ≤ E1-11 ≤ E1-04 [Minimum Output Frequency ≤ Mid Point A Frequency < Base Frequency ≤ Mid Point B Frequency ≤ Maximum Output Frequency]* • For motor 2: *E3-09 ≤ E3-07 < E3-06 ≤ E3-11 ≤ E3-04 [Minimum Output Frequency ≤ Mid Point A Frequency < Base Frequency ≤ Mid Point B Frequency ≤ Maximum Output Frequency]*	Set the parameters correctly to satisfy the conditions.
Code	**Name**	**Causes**	**Possible Solutions**
oPE11	Carrier Frequency Setting Error	These parameters are set at the same time: • *C6-05 > 6 [Carrier Freq Proportional Gain > 6]* • *C6-04 > C6-03 [Carrier Frequency Lower Limit > Carrier Frequency Upper Limit]* **Note:** When *C6-05 < 7*, *C6-04* becomes disabled. *C6-03* stays active.	Set *C6-02 to C6-05* correctly.
		C6-02 to C6-05 settings are not in the applicable setting range.	
Code	**Name**	**Causes**	**Possible Solutions**
oPE16	Energy Saving Constants Error	The Energy Saving parameters are not set in the applicable setting range.	Make sure that *E5-xx* is set correctly as specified by the motor nameplate data.
		These parameters are set at the same time: • *b8-01 = 1 [Energy Saving Control Selection = Enabled]* • *S1-01 = 1 [Dynamic Noise Control = Enabled]*	Disable Energy Saving Control or Dynamic Noise Control.

Code	Name	Causes	Possible Solutions
oPE33	Digital Output Selection Error	These two parameters are set at the same time: • *H2-60 ≠ F [Term M1-M2 Secondary Function ≠ Not Used]* • *H2-01 = 1xx [Term M1-M2 Function Selection = Inverse output of xx]*	Clear the *H2-01 to H2-03 = 1xx [Inverse output of xx]* settings. **Note:** It is not possible to set *H2-01 to H2-03 = 1xx [Inverse output of xx]* when using output functions for logic operations (*H2-60, H2-63, H2-66 ≠ F*).
		These two parameters are set at the same time: • *H2-63 ≠ F [Term M3-M4 Secondary Function ≠ Not Used]* • *H2-02 = 1xx [Term M3-M4 Function Selection = Inverse output of xx]*	
		These two parameters are set at the same time: • *H2-66 ≠ F [Term MD-ME-MF Secondary Function ≠ Not Used]* • *H2-03 = 1xx [Term MD-ME-MF Function Selection = Inverse output of xx]*	
Code	**Name**	**Causes**	**Possible Solutions**
oPE35	Network WL/SP/PI Aux Mode	These two parameters are set at the same time: • *Y9-51 = 1 [WaterLvl/SuctPres/PI Aux TurnOff = Enabled]* • *Y9-50 ≠ 0 [WaterLvl/SuctPres/PI Aux Source ≠ Analog Only]*	Confirm the settings for *Y9-50* and *Y9-51*.
		These two parameters are set at the same time: • *Y9-51 = 1 [WaterLvl/SuctPres/PI Aux TurnOff = Enabled]* • *YE-01 ≠ 0 [Suction Pressure Control Select ≠ Disabled]*	Confirm the settings for *YE-01* and *Y9-51*.
Code	**Name**	**Causes**	**Possible Solutions**
oPE43	Flow Meter Input	These two parameters are set at the same time: • *H6-01 = 5 [Terminal RP Pulse Train Function = Flow Meter]* • *H3-xx = 3A [MFAI = Flow Meter]*	De-program one of the flow meter inputs.
		Flow Meter Scaling is set to zero and flow meter is being used as PID feedback. *Y6-01 = 0 [Flow Meter Scaling = 0.0]*, *Y1-02 = 25 System Units = Flow (Use Y6-04)]*, and *b5-01 = 1 [PID Mode Setting = Standard]*.	• Adjust *Y6-01*. • Reprogram *Y1-02* or *b5-01*.
Code	**Name**	**Causes**	**Possible Solutions**
oPE44	Water Level / Suct Pres / PI Aux	More than one of the following parameters have been set to a non-zero value: • *Yd-01 [Water Level Selection]* • *YE-01 [Suction Pressure Control Select]* • *YF-01 [PI Aux Control Selection]*	Confirm the settings for *Yd-01, YF-01* and *YE-01*.
		Water Level / Suct Pres Feedback MFAI and PI Auxiliary Control Feedback MFAI have been programmed simultaneously.	Confirm the *H3-xx* settings.

4.7 Auto-Tuning Errors

This table gives information about errors detected during Auto-Tuning. If the drive detects an Auto-Tuning error, the keypad will show the error and the motor will coast to stop. The drive will not send notification signals for faults and alarms when Auto-Tuning errors occur.

Two types of Auto-Tuning errors are: *Endx* and *Erx*. *Endx* identifies that Auto-Tuning has successfully completed with calculation errors. Find and repair the cause of the error and do Auto-Tuning again, or set the motor parameters manually. You can use the drive in the application if you cannot find the cause of the *Endx* error.

Erx identifies that Auto-Tuning was not successful. Find and repair the cause of the error and do Auto-Tuning again.

Code	Name	Causes	Possible Solutions
End1	Excessive Rated Voltage Setting	The torque reference was more than 20% during Auto-Tuning or the no-load current that was measured after Auto-Tuning is more than 80%.	• Make sure that the input motor nameplate data is correct. • Do Auto-Tuning again and correctly set the motor nameplate data. • If you can uncouple the motor and load, remove the motor from the machine and do Rotational Auto-Tuning again. • If you cannot uncouple the motor and load, use the results from Auto-Tuning.
Code	**Name**	**Causes**	**Possible Solutions**
End2	Iron Core Saturation Coefficient	The motor nameplate data entered during Auto-Tuning is incorrect.	• Make sure that the input motor nameplate data is correct. • Do Auto-Tuning again and correctly set the motor nameplate data.
Code	**Name**	**Causes**	**Possible Solutions**
End3	Rated Current Setting Alarm	The rated current value is incorrect.	Do Auto-Tuning again and set the correct rated current shown on the motor nameplate.
Code	**Name**	**Causes**	**Possible Solutions**
End4	Adjusted Slip Calculation Error	The Auto-Tuning results were not in the applicable parameter setting range.	• Make sure the input motor nameplate data is correct. • Do Rotational Auto-Tuning again and correctly set the motor nameplate data. • If you cannot uncouple the motor and load, do Stationary Auto-Tuning 2.
		The motor rated slip that was measured after Stationary Auto-Tuning was 0.2 Hz or lower.	
		The secondary resistor measurement results were not in the applicable range.	
Code	**Name**	**Causes**	**Possible Solutions**
End5	Resistance Tuning Error	The Auto-Tuning results of the Line-to-Line Resistance were not in the applicable range.	• Make sure that the input motor nameplate data is correct. • Examine and repair damaged motor wiring.
Code	**Name**	**Causes**	**Possible Solutions**
End6	Leakage Inductance Alarm	The Auto-Tuning results were not in the applicable parameter setting range.	Make sure that the input motor nameplate data is correct, and do Auto-Tuning again.
		A1-02 [Control Method Selection] setting is not applicable.	• Examine the value set in *A1-02*. • Make sure that the input motor nameplate data is correct, and do Auto-Tuning again.
Code	**Name**	**Causes**	**Possible Solutions**
End7	No-Load Current Alarm	The Auto-Tuning results of the motor no-load current value were not in the applicable range.	Examine and repair damaged motor wiring.
		Auto-Tuning results were less than 5% of the motor rated current.	Make sure that the input motor nameplate data is correct, and do Auto-Tuning again.
Code	**Name**	**Causes**	**Possible Solutions**
End8	HFI Alarm	• Inductance saliency ratio (*E5-07*/*E5-06*) is too small. • The drive cannot find the *n8-36 [HFI Frequency Level for L Tuning]* value.	• Set the correct value on the motor nameplate to *E5-xx [PM Motor Settings]* or do rotational/stationary Auto-Tuning. • When it is necessary to set *n8-35 = 1 [Initial Pole Detection Method = High Frequency Injection]*, make sure that there is no unusual noise in the low speed range (10% or less) and that the motor does not rotate in reverse at start. **Note:** If the drive detects *End8*, it will automatically set *n8-35 =0 [Pull-in]*. Do not change the settings unless necessary.

Code	Name	Causes	Possible Solutions
End9	Initial Pole Detection Alarm	The drive cannot calculate the correct value for *n8-84 [Polarity Detection Current]* during High Frequency Injection Tuning.	When *n8-35 = 1 [Initial Pole Detection Method = High Frequency Injection]*, make sure that the motor does not rotate in reverse at start. **Note:** If the drive detects *End9*, it will automatically set *n8-35 =0 [Pull-in]*. Do not change the settings unless necessary.
Code	**Name**	**Causes**	**Possible Solutions**
Er-01	Motor Data Error	The motor nameplate data entered during Auto-Tuning is incorrect.	• Make sure that the motor nameplate data is correct. • Do Auto-Tuning again and correctly set the motor nameplate data.
		The combination of the motor rated power and motor rated current do not match.	• Examine the combination of drive capacity and motor output. • Do Auto-Tuning again, and correctly set the motor rated power and motor rated current.
		The combination of the motor rated current that was entered during Auto-Tuning and *E2-03 [Motor No-Load Current]* do not match.	• Examine the motor rated current and the no-load current. • Set *E2-03* correctly. • Do Auto-Tuning again, and correctly set the motor rated current.
		The combination of the setting values of Motor Base Frequency and Motor Base Speed do not match.	Do Auto-Tuning again, and correctly set the Motor Base Frequency and Motor Base Speed.
Code	**Name**	**Causes**	**Possible Solutions**
Er-02	Drive in an Alarm State	The motor nameplate data entered during Auto-Tuning is incorrect.	• Make sure that the motor nameplate data entered in Auto-Tuning is correct. • Do Auto-Tuning again and correctly set the motor nameplate data.
		You did Auto-Tuning while the drive had a minor fault or alarm.	Clear the minor fault or alarm and do Auto-Tuning again.
		There is a defective motor cable or cable connection.	Examine and repair motor wiring.
		The load is too large.	• Decrease the load. • Examine the machine area to see if, for example, the motor shaft is locked.
		The drive detected a minor fault during Auto-Tuning.	1. Stop Auto-Tuning. 2. Examine the minor fault code and remove the cause of the problem. 3. Do Auto-Tuning again.
Code	**Name**	**Causes**	**Possible Solutions**
Er-03	OFF Button was Pressed	You pushed the OFF button during Auto-Tuning.	Auto-Tuning did not complete correctly. Do Auto-Tuning again.
Code	**Name**	**Causes**	**Possible Solutions**
Er-04	Line-to-Line Resistance Error	The Auto-Tuning results were not in the applicable parameter setting range.	• Examine and repair motor wiring. • Disconnect the machine from the motor and do Rotational Auto-Tuning again.
		Auto-Tuning did not complete in a pre-set length of time.	
		There is a defective motor cable or cable connection.	
		The motor nameplate data entered during Auto-Tuning is incorrect.	• Make sure that the input motor nameplate data is correct. • Do Auto-Tuning again and correctly set the motor nameplate data.
Code	**Name**	**Causes**	**Possible Solutions**
Er-05	No-Load Current Error	The Auto-Tuning results were not in the applicable parameter setting range.	• Examine and repair motor wiring. • Disconnect the machine from the motor and do Rotational Auto-Tuning again.
		Auto-Tuning did not complete in a pre-set length of time.	
		The motor nameplate data entered during Auto-Tuning is incorrect.	• Make sure that the input motor nameplate data is correct. • Do Auto-Tuning again and correctly set the motor nameplate data.
		Rotational Auto-Tuning was done with a load that was more than 30% of the rating connected to the motor.	• Disconnect the machine from the motor and do Rotational Auto-Tuning again. • If you cannot uncouple the motor and load, make sure that the load is less than 30% of the motor rating. If a mechanical brake is installed in the motor, release the brake during Rotational Auto-Tuning.

Code	Name	Causes	Possible Solutions
Er-08	Rated Slip Error	The motor nameplate data entered during Auto-Tuning is incorrect.	• Make sure that the input motor nameplate data is correct. • Do Auto-Tuning again and correctly set the motor nameplate data.
		Auto-Tuning did not complete in a pre-set length of time.	• Examine and repair the motor wiring. • If the motor and machine are connected during Rotational Auto-Tuning, decouple the motor from the machinery.
		The Auto-Tuning results were not in the applicable parameter setting range.	
		Rotational Auto-Tuning was done with a load that was more than 30% of the rating connected to the motor.	• Disconnect the machine from the motor and do Rotational Auto-Tuning again. • If you cannot uncouple the motor and load, make sure that the load is less than 30% of the motor rating. If a mechanical brake is installed in the motor, release the brake during Rotational Auto-Tuning.
Code	**Name**	**Causes**	**Possible Solutions**
Er-09	Acceleration Error	The motor did not accelerate for the specified acceleration time.	1. Increase the value set in *C1-01 [Acceleration Time 1]*. 2. Disconnect the machine from the motor and do Rotational Auto-Tuning again.
		Rotational Auto-Tuning was done with a load that was more than 30% of the rating connected to the motor.	• Disconnect the machine from the motor and do Rotational Auto-Tuning again. • If you cannot uncouple the motor and load, make sure that the load is less than 30% of the motor rating. If a mechanical brake is installed in the motor, release the brake during Rotational Auto-Tuning.
Code	**Name**	**Causes**	**Possible Solutions**
Er-12	Current Detection Error	There is a phase loss in the drive input power. (U/T1, V/T2, W/T3)	Examine and repair motor wiring.
		The current exceeded the current rating of the drive.	• Check the motor wiring for any short circuits between the wires. • Check and turn ON any magnetic contactors used between motors. • Replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
		The output current is too low.	
		You tried Auto-Tuning without a motor connected to the drive.	Connect the motor and do Auto-Tuning.
		There was a current detection signal error.	Replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Code	**Name**	**Causes**	**Possible Solutions**
Er-13	Leakage Inductance Error	The motor rated current value is incorrect.	Correctly set the rated current indicated on the motor nameplate and do Auto-Tuning again.
		The drive could not complete tuning for leakage inductance in fewer than 300 s.	Examine and repair motor wiring.
Code	**Name**	**Causes**	**Possible Solutions**
Er-18	Back EMF Error	The result of the induced voltage tuning was not in the applicable range.	1. Make sure that the input motor nameplate data is correct. 2. Do Auto-Tuning again and correctly set the motor nameplate data.
Code	**Name**	**Causes**	**Possible Solutions**
Er-19	PM Inductance Error	The Auto-Tuning results of the PM motor inductance were not in the applicable range.	1. Make sure that the input motor nameplate data is correct. 2. Do Auto-Tuning again and correctly set the motor nameplate data.
Code	**Name**	**Causes**	**Possible Solutions**
Er-20	Stator Resistance Error	The Auto-Tuning results of the PM Motor Stator Resistance were not in the applicable range.	1. Make sure that the input motor nameplate data is correct. 2. Do Auto-Tuning again and correctly set the motor nameplate data.
Code	**Name**	**Causes**	**Possible Solutions**
Er-25	HighFreq Inject Param Tuning Err	The motor data is incorrect.	Do Stationary Auto-Tuning again. **Note:** If the drive detects *Er-25* after you do Stationary Auto-Tuning, it is possible that the motor cannot use high frequency injection. For more information, contact Yaskawa or your nearest sales representative.

4.8 Backup Function Operating Mode Display and Errors

◆ Operating Mode Display

When you use the backup function from the keypad, the keypad will show messages related to the current operation. These messages will not identify errors in the drive operation.

Keypad Display	Name	Display	State
Drive and Keypad mismatch. Should the parameters be restored?	Detection of inconsistency between the drive and keypad	Normally displayed	The drive detected the connection of a keypad from a different drive. Select [Yes] to copy parameters backed up in the keypad to the connected drive.
Restore Restore from keypad	Restoring parameters	Flashing	The parameters stored in the keypad have been restored to the drive.
End	Backup/restore/verify operation ended normally	Normally displayed	The parameter backup, restore, or verify operation ended normally.
Backup Backup from Drive	Backing up parameters	Flashing	The parameters stored in the drive are being backed up to the keypad.
Verify Keypad & Drive	Verifying parameters	Flashing	The parameter settings stored in the keypad and the parameter settings in the drive align or are being compared.

◆ Backup Function Runtime Errors

When an error occurs, the keypad shows a code to identify the error.

The table in this section shows the error codes. Refer to this table to remove the cause of the errors.

Note:

Push any key on the keypad to clear an error.

Code	Name	Causes	Possible Solutions
CPEr	Control Mode Mismatch	The keypad setting and drive setting for *A1-02 [Control Method Selection]* do not agree.	1. Set *A1-02* on the drive to the same value that is on the keypad. 2. Restore the parameters.
Code	**Name**	**Causes**	**Possible Solutions**
CPyE	Error Writing Data	Parameter restore did not end correctly.	Restore the parameters.
Code	**Name**	**Causes**	**Possible Solutions**
CSEr	Control Mode Mismatch	The keypad is broken.	Replace the keypad.
Code	**Name**	**Causes**	**Possible Solutions**
dFPS	Drive Model Mismatch	You tried to restore parameters to a different drive model than the one that you backed up.	1. Examine the drive model that you used to back up the parameters. 2. Restore the parameters.
Code	**Name**	**Causes**	**Possible Solutions**
iFEr	Keypad Communication Error	There was a communications error between the keypad and the drive.	Examine the connector or cable connection.
Code	**Name**	**Causes**	**Possible Solutions**
ndAT	Error Received Data	The parameter settings for model and specifications (power supply voltage and capacity) are different between the keypad and the drive.	1. Make sure that drive model and the value set in *o2-04 [Drive Model (KVA) Selection]* agree. 2. Restore the parameters.
		The parameters are not stored in the keypad.	1. Connect a keypad that has the correct parameters. 2. Restore the parameters.
Code	**Name**	**Causes**	**Possible Solutions**
PWEr	DWEZ Password Mismatch	The password set in the backup operation with Qx-xx *[DriveWorksEZ Parameters]* and *Rx-xx [DriveWorksEZ Connections]* is incorrect.	Set the DWEZ PC software password supplied by Yaskawa for the DWEZ program user ID downloaded to the drive.
Code	**Name**	**Causes**	**Possible Solutions**
rdEr	Error Reading Data	You tried to back up the data when *o3-02 = 0 [Copy Allowed Selection = Disabled]*.	Set *o3-02 = 1 [Enabled]* and back up again.

Code	Name	Causes	Possible Solutions
vAEr	Voltage Class, Capacity Mismatch	The power supply specifications or drive capacity parameter settings are different between the keypad and the drive.	1. Make sure that drive model and the value set in *o2-04 [Drive Model (KVA) Selection]* agree. 2. Restore the parameters.
Code	**Name**	**Causes**	**Possible Solutions**
vFyE	Parameters do not Match	The parameters that are backed up in the keypad and the parameters in the drive are not the same.	1. Restore or backup the parameter again. 2. Verify the parameters.

4.9 Status Messages

The HOA keypad will show these status messages on line 1 of the keypad display during the conditions listed below. These are not faults or alarms.

Keypad Display	Description
Current Limit Foldback	Drive output speed is being limited due to the output current limit. Decrease the load or replace with higher capacity drive.
De-staging Lag in XXX min *1	De-stage is in progress. X indicates the length of time before de-stage takes place. One or more of the de-stage conditions have been met: • High Feedback Quick De-stage • Low Feedback Quick De-stage • Normal De-stage • Low Water Level De-stage • Suction Pressure De-stage • PI Auxiliary Control De-stage Adjust parameter settings if de-stage is not desired given the system conditions.
Digital Out Dly: Exit in XXXmin *1	The drive is delaying the start of the motor and the Lube Pump digital output is energized with *Y4-29 = 1 [Lube Pump Text = Digital Out Delay]*. Wait or cycle the Run command. Verify setting of *Y4-31 [Lube Pump Time]*.
Flow Rate Limit Foldback	Drive output speed is being limited due to too much (*Y6-26 = 1 [Flow Rate Limit Selection = Enabled]*) or not enough (*Y6-26 = 2 [Enabled - Low Limit]*) Flow Rate (*UA-83*). If the Flow Rate Limiter is activating incorrectly, confirm and adjust Flow Rate parameters *Y6-01, Y6-26, Y6-27, Y6-28* and/or *Y6-29*.
Level Control Active	*Yd-01 = 1 [Water Level Selection = Enabled]* and is active. Set *Yd-01 = 0 [Disabled]* or adjust *Yd-25 [Water Lvl Ctrl Activation Level]*.
Lube Pump Active: Exit in XXXmin *1	The drive is delaying the start of the motor and the Lube Pump digital output is energized with *Y4-29 = 0 [Lube Pump Text = Lube Pump]*. Wait or cycle the Run command. Verify setting of *Y4-31 [Lube Pump Time]*.
Net Drv Err: Check Faulted Drive	Another drive in the network has a system fault (*NMS, HFB, HWL, LFB, LWL, LowFl, HiFlo, or ACCUM*). Another drive in the network has a *Low City Pressure* alarm. Check the other drives in the system.
Net FB Lost: Check FB Source	Network PID Feedback has been lost. No valid analog PID feedback source can be found on the network. Repair the source of network feedback or add an analog source.
Net WL/SP/PI Aux Feedback Lost	Network source for Water Level, Suction Control Pressure, or Aux PI Feedback has been lost. Valid analog source for Water Level, Suction Control Pressure, or Aux PI Feedback cannot be found on the network. Check the source on drives configured with *Y9-50 ≠ 3 [WaterLvl/SuctPres/PI Aux Source ≠ Network Only]*.
Network Pre-Charge Active	Pre-Charge is active on another networked drive. If the MFDI was previously open, drive will enter Pre-Charge if required.
Network Start Delay: Y9-29	System was on the Pump Off Network state and a drive has been put on AUTO Mode. The iQpump MEMOBUS network is waiting for *Y9-29 [Network AUTO Start Delay]* to elapse.
[o1-83 value *2] XX	Parameter *o1-83 > 0 [Drive Name]*. The "XX" on the screen will be replaced *o1-84 [Drive Name Unit Number]* value when *o1-84 > 0*. Change *o1-83* or *o1-84* settings.
PI Aux Control Active	*YF-01 = 2 [PI Aux Control Selection = Enabled]* and is active. Set *YF-01 = 0 [Disabled]* or adjust *YF-25 [PI Aux Control Activation Level]*.
Pre-Charge: Exit in XXX min *1	Pre-Charge active. X indicates time left before Pre-Charge exits due to timers (*Y4-03* + *Y4-07*). Pressure Feedback is low. Adjust the Pre-Charge parameters.
PrimerPump Activ: Exit in XXXmin *1	The drive is delaying the start of the motor and the Lube Pump digital output is energized with *Y4-29 = 2 [Lube Pump Text = Primer Pump]*. Wait or cycle the Run command. Verify setting of *Y4-31 [Lube Pump Time]*.
Scrn Mtr Starter: Exit in XXXmin *1	The drive is delaying the start of the motor and the Lube Pump digital output is energized with *Y4-29 = 3 [Lube Pump Text = Screen Motor Starter]*. Wait or cycle the Run command. Verify setting of *Y4-31 [Lube Pump Time]*.

Keypad Display	Description
Seq Timer Set: Wait for RUN Cmd	Sequence Timers are programmed to run the drive but there is no Run Command.
Sequence Timer Active: IDLE	Sequence Timers are programmed to run the drive, the Run Command is applied, but the timer has not started yet.
Sequence Timer 1: RUN	Sequence Timers are programmed to run the drive, the Run Command is applied and the timer is running the drive. The active timer number is displayed.
Single Phase Foldback	The drive is limiting output speed because of too much DC Bus voltage ripple. The drive lost an input phase, or for a single phase application, the motor is drawing too much load. Make sure that all input phases are present and decrease the output load.
Sleep Active Minimum Water Level	Water Level Control caused the drive to sleep. The water level was below the *Yd-04 [Minimum Water Level]* level for longer than the *Yd-05 [Water Level Sleep Delay Time]* time and forced the drive to go into a sleep condition. Confirm Water Level sleep settings.
Sleep Active Min Suct Pressure	Drive is in sleep due to Suction Pressure Control. The Suction Pressure dropped below the YE-04 level for more than the YE-05 time, forcing the drive to go to a sleep condition. Confirm Suction Pressure sleep parameter settings.
Sleep AUTO→Off AUTO Cmd to RUN	Drive switched to OFF due to entering sleep with *Y2-15 = 1 or 2 [Sleep AUTO → OFF Selection = Enabled or Enabled with Timer]*. Issue a Run command.
Staging Lag in XXX min *1	Stage is in progress. X indicates the length of time before staging takes place. The conditions for staging a new drive have been met. Adjust parameter settings if staging is not desired given the system conditions.
Suction Control Active	*YE-01 = 1 [Suction Pressure Control Select = Suction Pressure (PSI)]* and is active. Set *YE-01 = 0 [Disabled]* or adjust *YE-25 [Suc Pres Ctrl Activation Level]*.
Vacuum Control Active	*YE-01 = 2 [Suction Pressure Control Select = Vacuum ("Hg)]* and is active. Set *YE-01 = 0 [Disabled]* or adjust *YE-25 [Suc Pres Ctrl Activation Level]*.

*1 Unit changes to “sec” for values less than or equal to 180 seconds.
*2 The text shown here will be different for different *o1-83* values.

4.10 Diagnosing and Resetting Faults

When a fault occurs and the drive stops, do the procedures in this section to remove the cause of the fault, then re-energize the drive.

◆ Fault and Power Loss Occur at the Same Time

⚠ WARNING Crush Hazard
Wear eye protection when you do work on the drive.
If you do not use correct safety equipment, it can cause serious injury or death.

⚠ WARNING Electrical Shock Hazard
After the drive blows a fuse or trips a GFCI, do not immediately energize the drive or operate peripheral devices. Wait for the time specified on the warning label at a minimum and make sure that all indicators are OFF. Then check the wiring and peripheral device ratings to find the cause of the problem. If you do not know the cause of the problem, contact Yaskawa before you energize the drive or peripheral devices.
If you do not fix the problem before you operate the drive or peripheral devices, it can cause serious injury or death.

1. Supply power to the control circuit from the external 24 V input.
2. Use monitor parameters *U2-xx [Fault Trace]* to show the fault code and data about the operating status of the drive immediately before the fault occurred.
3. Use the information in the Troubleshooting tables to remove the fault.

Note:
1. To find the faults that were triggered, check the fault history in *U2-02 [Previous Fault]*. To find information about drive status (such as frequency, current, and voltage) when the faults were triggered, check *U2-03 to U2-20*.
2. If the fault display stays after you re-energize the drive, remove the cause of the fault and reset.

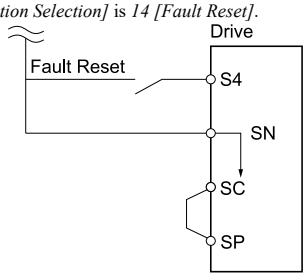
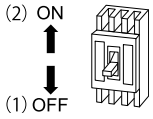
◆ Fault Occurs Without Power Loss

1. Examine the fault code shown on the keypad.
2. Use the information in the Troubleshooting tables to remove the fault.
3. Do a fault reset.

◆ Fault Reset

If a fault occurs, you must remove the cause of the fault and re-energize the drive. Table 4.3 lists the different methods to reset the drive after a fault.

Table 4.3 Fault Reset Methods

Methods	Description
Method 1	While the keypad is showing the fault or alarm code, push F1 (Reset) or > on the keypad.
Method 2	Switch ON the MFDI terminal set to *H1-xx = 14 [MFDI Function Select = Fault Reset]*. **Note:** The default setting for *H1-04 [Terminal S4 Function Selection]* is *14 [Fault Reset]*. 
Method 3	1. De-energize the drive main circuit power supply. 2. Energize the drive again after the keypad display goes out. 

Note:

If the drive receives a Run command from a communication option or control circuit terminal, the drive will not reset the fault. Remove the Run command then try to clear the fault. If you do a fault reset when the drive has a Run command, the keypad will show minor fault *CrST [Remove RUN Command to Reset]*.

4.11 Troubleshooting Without Fault Display

Note:

Make sure that you use a keypad with FLASH number 1004 or later. Keypads with FLASH numbers 1003 and earlier will not show characters correctly.

If the drive or motor operate incorrectly, but the keypad does not show a fault or error code, refer to the items in this section.

If there is no display on the keypad and no lights illuminate on the keypad, replace the keypad, control board, or external cooling fan. If the keypad display error stays, replace the drive. For information about replacing the keypad, control board, and external cooling fan, contact Yaskawa or your nearest sales representative.

- Motor hunting and oscillation
- Unsatisfactory motor torque
- Unsatisfactory speed precision
- Unsatisfactory motor torque and speed response
- Motor noise

◆ Typical Problems

Symptom	Reference
The Parameter Settings Will Not Change	134
The Motor Does Not Rotate After Entering Run Command	135
The Motor Rotates in the Opposite Direction from the Run Command	136
The Motor Rotates in Only One Direction	136
The Motor Is Too Hot	136
oPE02 Error Occurs When Decreasing the Motor Rated Current Setting	137
The Correct Auto-Tuning Mode Is Not Available	137
The Motor Stalls during Acceleration or Accel/Decel Time Is Too Long	137
The Drive Frequency Reference Is Different than the Controller Frequency Reference Command	138
The Motor Speed Is Not Stable When Using a PM Motor	138
There Is Too Much Motor Oscillation and the Rotation Is Irregular	138
There Is Audible Noise from the Drive or Motor Cables When the Drive Is Energized	138
The Ground Fault Circuit Interrupter (GFCI) Trips During Run	139
Motor Rotation Causes Unexpected Audible Noise from Connected Machinery	139
Motor Rotation Causes Oscillation or Hunting	139
PID Output Fault	139
The Starting Torque Is Not Sufficient	139
The Motor Rotates after the Drive Output Is Shut Off	140
The Output Frequency Is Lower Than the Frequency Reference	140
The Motor Is Making an Audible Noise	140
The Motor Will Not Restart after a Loss of Power	140

◆ The Parameter Settings Will Not Change

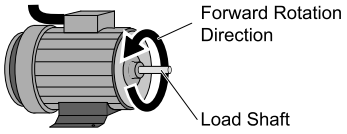
Causes	Possible Solutions
The drive is operating the motor (the drive is in Drive Mode).	Stop the drive and change to Programming Mode.
Parameter *A1-01 = 0 [Access Level Selection = Operation Only]*.	Set *A1-01 = 2 [Access Level Selection = Advanced Level]* or *A1-01 = 3 [Expert Level]*.
Parameter *H1-xx = 1B [MFDI Function Selection = Programming Lockout]*.	Activate the terminals to which *H1-xx = 1B* is set, and then change the parameters.

Causes	Possible Solutions
You entered an incorrect password in *A1-04 [Password]*.	• Enter the correct password to *A1-04* again. • If you forgot the password, set the password again with *A1-04* and *A1-05 [Password Setting]*. **Note:** If you set the password, you cannot change these parameters until the password aligns: • *A1-01 [Access Level Selection]* • *A1-02 [Control Method Selection]* • *A1-03 [Initialize Parameters]* • *A2-01 to A2-32 [User Parameter 1 to User Parameter 32]*
The drive detected *Uv [Undervoltage]*.	• View *U1-07 [DC Bus Voltage]* to see the power supply voltage. • Examine the main circuit wiring.

◆ The Motor Does Not Rotate After Entering Run Command

Causes	Possible Solutions
The drive is not in Drive Mode.	1. Make sure that the keypad shows [Rdy]. 2. If the keypad does not show [Rdy], go back to the Home screen.
Auto-Tuning completed.	Go back to the Home screen on the keypad. **Note:** When Auto-Tuning completes, the drive changes to Programming Mode. The drive will not accept a Run command unless the drive is in Drive Mode.
The drive received a fast stop command.	Turn off the fast stop input signal.
The settings for the source that supplies the Run command are incorrect.	Set *b1-02 [Run Command Selection 1]* correctly.
The frequency reference source is set incorrectly.	Set *b1-01 [Frequency Reference Selection 1]* correctly.
There is defective wiring in the control circuit terminals.	• Correctly wire the drive control circuit terminals. • View *U1-10 [Input Terminal Status]* for input terminal status.
The settings for voltage input and current input of the master frequency reference are incorrect.	Examine these analog input terminal signal level settings: • Terminal A1: Jumper switch S1 and *H3-01 [Terminal A1 Signal Level Select]* • Terminal A2: Jumper switch S1 and *H3-09 [Terminal A2 Signal Level Select]* • Terminal A3: Jumper switch S1 and *H3-05 [Terminal A3 Signal Level Select]*
The selection for the sinking/sourcing mode and the internal/external power supply is incorrect.	• For sinking mode, close the circuit between terminals SC-SP with a wire jumper. • For sourcing mode, close the circuit between terminals SC-SN with a wire jumper. • For external power supply, remove the wire jumper.
The frequency reference is too low.	• View *U1-01 [Freq Reference]*. • Increase the frequency reference to a value higher than *E1-09 [Minimum Output Frequency]*.
The MFAI setting is incorrect.	• Make sure that the functions set to the MFAI are correct. The frequency reference is 0 when *H3-02, H3-10, H3-06 = 1 [MFAI Function Selection = Frequency Gain]* and voltage (current) is not input. • View *U1-13 to U1-15 [Terminal A1, A2, A3 Input Voltage]* to see if the analog input values set to terminals A1, A2, and A3 are applicable.
You pushed OFF.	Turn the Run command OFF then ON from an external input. **Note:** • When you push OFF during operation, the drive will ramp to stop. Set *o2-02 = 0 [STOP Key Function Selection = Disabled]* to disable the OFF function. • You can only disable OFF when *b1-02/b1-16 = 1, 2, or 3 [Run Command Selection 1/Run Command Selection 2 = Digital Input, Serial Communications, or Option PCB]*.
The 2-wire sequence and 3-wire sequence are set incorrectly.	• Set one of the parameters *H1-03 to H1-08 [Terminals S3 to S8 Function Select]* to *0 [3-Wire Sequence]* to enable the 3-wire sequence. • If a 2-wire sequence is necessary, make sure that *H1-03 to H1-08 ≠ 0*.
Parameter *b1-02 = 7, 8, or 9 [Run Command Selection 1 = AUTO Command + Term Run, AUTO Command + Serial Run, or AUTO Command + Option Run]* and you did not push the AUTO key for the external run.	Push the AUTO key.

◆ The Motor Rotates in the Opposite Direction from the Run Command

Causes	Possible Solutions
The phase wiring between the drive and motor is incorrect.	• Examine the wiring between the drive and motor. • Connect drive output terminals U/T1, V/T2, and W/T3 in the correct sequence to agree with motor terminals U, V, and W. • Switch two motor cables U, V, and W to reverse motor direction.
The forward direction for the motor is set incorrectly.	• Connect drive output terminals U/T1, V/T2, and W/T3 in the correct sequence to agree with motor terminals U, V, and W. • Switch two motor cables U, V, and W to reverse motor direction.  **Figure 4.1 Forward Rotating Motor** **Note:** • For Yaskawa motors, the forward direction is counterclockwise when looking from the motor shaft side. • Refer to the motor specifications, and make sure that the forward rotation direction is correct for the application. The forward rotation direction of motors can be different for different motor manufacturers and types.
The signal connections for forward run and reverse run on the drive control circuit terminals and control panel side are incorrect.	Correctly wire the control circuit.
The motor is running at almost 0 Hz and the Speed Search estimated the speed to be in the opposite direction.	Set *b3-14 = 0 [Bi-directional Speed Search = Disabled]*, then the drive will only do speed search in the specified direction.

◆ The Motor Rotates in Only One Direction

Causes	Possible Solutions
The drive will not let the motor rotate in reverse.	Set *b1-04 = 0 [Reverse Operation Selection = Reverse Enabled]*.
The drive did not receive a Reverse run signal and 3-Wire sequence is selected.	Activate the terminals to which *H1-xx = 0 [3-Wire Sequence]* is set, and then enable reverse operation.

◆ The Motor Is Too Hot

Causes	Possible Solutions
The load is too heavy.	• Decrease the load. • Increase the acceleration and deceleration times. • Examine the values set in *L1-01 [Motor Overload (oL1) Protection]*, *L1-02 [Motor Overload Protection Time]*, and *E2-01 [Motor Rated Current (FLA)]*. • Use a larger motor. **Note:** The motor also has a short-term overload rating. Examine this rating carefully before setting drive parameters.
The motor is running continuously at a very low speed.	• Change the run speed. • Use a drive-dedicated motor.
The drive is operating in a vector control mode, but Auto-Tuning has not been done.	• Do Auto-Tuning. • Calculate motor parameter and set motor parameters. • Set *A1-02 = 0 [Control Method Selection = V/f Control]*.
The voltage insulation between motor phases is not sufficient.	• Use a motor with a voltage tolerance that is higher than the maximum voltage surge. • Use a drive-dedicated motor that is rated for use with AC drives for applications that use a motor on drives rated higher than 480 V class. • Install an AC reactor on the output side of the drive and set *C6-02 = 1 [Carrier Frequency Selection = 2.0 kHz]*. **Note:** When the motor is connected to the drive output terminals U/T1, V/T2, and W/T3, surges occur between the drive switching and the motor coils. These surges can be three times the drive input power supply voltage (600 V for a 208 V class drive, 1200 V for a 480 V class drive).
The air around the motor is too hot.	• Measure the ambient temperature. • Decrease the temperature in the area until it is in the specified temperature range.
The motor fan stopped or is clogged.	• Clean the motor fan. • Make the drive environment better.

◆ oPE02 Error Occurs When Decreasing the Motor Rated Current Setting

Causes	Possible Solutions
Motor rated current and the motor no-load current setting in the drive are incorrect.	• You are trying to set the motor rated current in *E2-01 [Motor Rated Current (FLA)]* to a value lower than the no-load current set in *E2-03 [Motor No-Load Current]*. • Make sure that value set in *E2-01* is higher than *E2-03*. • If it is necessary to set *E2-01* lower than *E2-03*, first decrease the value set to *E2-03*, then change the *E2-01* setting as necessary.

◆ The Correct Auto-Tuning Mode Is Not Available

Causes	Possible Solutions
The desired Auto-Tuning mode is not available for the selected control mode.	Change the motor control method with parameter *A1-02 [Control Method Selection]*.

◆ The Motor Stalls during Acceleration or Accel/Decel Time Is Too Long

Causes	Possible Solutions
The drive and motor system reached the torque limit or current suppression will not let the drive accelerate.	• Decrease the load. • Use a larger motor. **Note:** Although the drive has a Stall Prevention function and a Torque Compensation Limit function, accelerating too fast or trying to drive a load that is too large can exceed the limits of the motor.
Torque limit is set incorrectly.	Set the torque limit correctly.
The acceleration time setting is too short.	Examine the values set in *C1-01, C1-03, C1-05, or C1-07 [Acceleration Times]* and set them to applicable values.
The load is too heavy.	• Increase the acceleration time. • Examine the mechanical brake and make sure that it is fully releasing. • Decrease the load to make sure that the output current stays less than the motor rated current. • Use a larger motor. **Note:** • In extruder and mixer applications, the load can increase as the temperature decreases. • Although the drive has a Stall Prevention function and a Torque Compensation Limit function, accelerating too fast or trying to drive a load that is too large can exceed the limits of the motor.
The frequency reference is low.	• Examine *E1-04 [Maximum Output Frequency]* and increase the setting if it is set too low. • Examine *U1-01 [Frequency Reference]* for the correct frequency reference. • Examine the multi-function input terminals to see if a frequency reference signal switch has been set. • Examine the low gain level set in *H3-03, H3-11, H3-07 [Terminal A1, A2, A3 Gain Setting]* when you use MFAI.
The frequency reference is set incorrectly.	When *H3-02, H3-06, H3-10 = 1 [MFAI Function Selection = Frequency Gain]* are set, see if voltage (current) has been set. • Check the values set in *H3-02, H3-06, and H3-10*. • Use *U1-13 to U1-15 [Terminal A1, A2, A3 Input Voltage]* to make sure that the analog input values set to terminals A1, A2, and A3 are applicable.
The motor characteristics and drive parameter settings are not compatible.	• Set the correct V/f pattern to agree with the characteristics of the motor. • Examine the V/f pattern set in *E1-03 [V/f Pattern Selection]*. • Perform Rotational Auto-Tuning.
The drive is operating in vector control mode, but Auto-Tuning is not completed.	• Do Auto-Tuning. • Calculate motor data and reset motor parameters. • Set *A1-02 = 0 [Control Method Selection = V/f Control]*.
The Stall Prevention level during acceleration setting is too low.	Increase the value set in *L3-02 [Stall Prevent Level during Accel]*. **Note:** If the *L3-02* value is too low, the acceleration time can be unsatisfactorily long.
The Stall Prevention level during run setting is too low.	Increase the value set in *L3-06 [Stall Prevent Level during Run]*. **Note:** If the *L3-06* value is too low, speed will decrease while the drive outputs torque.
Drive reached the limitations of the V/f motor control method.	• When the motor cable is longer than 50 m (164 ft), do Auto-Tuning for line-to-line resistance. • Set the V/f pattern to “High Starting Torque”. • Use a Vector Control method. **Note:** V/f control method does not provide high torque at low speeds.

◆ The Drive Frequency Reference Is Different than the Controller Frequency Reference Command

Causes	Possible Solutions
The analog input gain and bias for the frequency reference input are set incorrectly.	Examine the gain and bias settings for the analog inputs that set the frequency reference. • Terminal A1: *H3-03 [Terminal A1 Gain Setting]*, *H3-04 [Terminal A1 Bias Setting]* • Terminal A2: *H3-11 [Terminal A2 Gain Setting]*, *H3-12 [Terminal A2 Bias Setting]* • Terminal A3: *H3-07 [Terminal A3 Gain Setting]*, *H3-08 [Terminal A3 Bias Setting]*
The drive is receiving frequency bias signals from analog input terminals A1 to A3 and the sum of all signals makes the frequency reference.	• Examine parameters *H3-02, H3-10, H3-06 [MFAI Function Select]*. If two or more of these parameters are set to *0*, change the settings. • Use *U1-13 to U1-15 [Terminal A1, A2, A3 Input Voltage]* to make sure that the analog input values set to terminals A1, A2, and A3 are applicable.
The motor rotates faster than the frequency reference at low speed.	Set *E1-09 > 0 [Minimum Output Frequency]*. **Note:** • The recommended setting for *E1-09* is 0.5 Hz. • When frequency reference < *E1-09*, the drive output will turn OFF.
PID control is enabled.	If PID control is not necessary, set *b5-01 = 0 [PID Mode Setting = Disabled]*. **Note:** When PID control is enabled, the drive adjusts the output frequency as specified by the target value. The drive will only accelerate to the maximum output frequency set in *E1-04 [Maximum Output Frequency]* while PID control is active.

◆ The Motor Speed Is Not Stable When Using a PM Motor

Causes	Possible Solutions
Parameter *E5-01 [PM Motor Code Selection]* is set incorrectly.	Refer to “Motor Performance Fine-Tuning” in the technical manual.
The drive is operating the motor at more than the specified speed control range.	Examine the speed control range and adjust the speed.
The motor is hunting.	Adjust these parameters to have the largest effect: • *n8-55 [Motor to Load Inertia Ratio]* • *n8-45 [Speed Feedback Detection Gain]* • *C4-02 [Torque Compensation Delay Time]*
Hunting occurs at start.	Increase the value set in *C2-01 [S-Curve Time @ Start of Accel]*.
Too much current is flowing through the drive.	Set *E5-01* correctly as specified by the motor. For special-purpose motors, enter the correct value to *E5-xx* as specified by the motor test report.

◆ There Is Too Much Motor Oscillation and the Rotation Is Irregular

Causes	Possible Solutions
Unsatisfactory balance of motor phases.	• Make sure that the drive input power voltage supplies stable power. • Set *L8-05 = 0 [Input Phase Loss Protect Select = Disabled]*.
The motor is hunting.	Set *n1-01 = 1 [Hunting Prevention Selection = Enabled]*.

◆ There Is Audible Noise from the Drive or Motor Cables when You Energize the Drive

Causes	Possible Solutions
The relay switching in the drive is making too much noise.	• Use *C6-02 [Carrier Frequency Selection]* to decrease the carrier frequency. • Connect a noise filter to the input side of the drive power supply. • Connect a noise filter to the output side of the drive. • Isolate the control circuit wiring from the main circuit wiring. • Use a metal cable gland to wire the drive. • Shield the periphery of the drive with metal. • Make sure that the drive and motor are grounded correctly. • Make sure that ground faults have not occurred in the wiring or motor.

◆ The Ground Fault Circuit Interrupter (GFCI) Trips During Run

Causes	Possible Solutions
There is too much leakage current from the drive.	• Increase the GFCI sensitivity or use GFCI with a higher threshold. • Use *C6-02 [Carrier Frequency Selection]* to decrease the carrier frequency. • Decrease the length of the cable used between the drive and the motor. • Install a noise filter or AC reactor on the output side of the drive. Set *C6-02 = 1 [2.0 kHz]* when connecting an AC reactor. • Disable the internal EMC filter.

◆ Motor Rotation Causes Unexpected Audible Noise from Connected Machinery

Causes	Possible Solutions
The carrier frequency and the resonant frequency of the connected machinery are the same.	• Adjust *C6-02 to C6-05 [Carrier Frequency]*. • Set *C6-02 = 1 to 6 [Carrier Frequency Selection = Frequency other than Swing PWM]*. **Note:** If *C6-02 = 7 to A [Carrier Frequency Selection = Swing PWM]*, the drive will not know if the noise comes from the drive or the machine.
The drive output frequency and the resonant frequency of the connected machinery are the same.	• Adjust *d3-01 to d3-04 [Jump Frequency]*. • Put the motor on a rubber pad to decrease vibration.

◆ Motor Rotation Causes Oscillation or Hunting

Causes	Possible Solutions
The frequency reference is assigned to an external source, and there is electrical interference in the signal.	Make sure that electrical interference does not have an effect on the signal lines. • Isolate control circuit wiring from main circuit wiring. • Use twisted-pair cables or shielded wiring for the control circuit.
The cable between the drive and motor is too long.	• Do Auto-Tuning. • Make the wiring as short as possible.
The PID parameters are not sufficiently adjusted.	Adjust *b5-xx [PID control]*.

◆ PID Output Fault

Causes	Possible Solutions
There is no PID feedback input.	• Examine the MFAI terminal settings. • See if *H3-02, H3-10, H3-06 = B [MFAI Function Select = PID Feedback]* is set. • Make sure that the MFAI terminal settings agree with the signal inputs. • Examine the connection of the feedback signal. • Make sure that *b5-xx [PID Control]* is set correctly. **Note:** If there is no PID feedback input to the terminal, the detected value is 0, which causes a PID fault and also causes the drive to operate at maximum frequency.
The detection level and the target value do not agree.	Use *H3-03, H3-11, H3-07 [Terminal A1, A2, A3 Gain Setting]* to adjust PID target and feedback signal scaling. **Note:** PID control keeps the difference between the target value and detection value at 0. Set the input level for the values relative to each other.
Reverse drive output frequency and speed detection. When output frequency increases, the sensor detects a speed decrease.	Set *b5-09 = 1 [PID Output Level Selection = Reverse output (reverse acting)]*.

◆ The Starting Torque Is Not Sufficient

Causes	Possible Solutions
Auto-Tuning has not been done in vector control method.	Do Auto-Tuning.
The control method was changed after doing Auto-Tuning.	Do Auto-Tuning again.
Stationary Auto-Tuning for Line-to-Line Resistance was done.	Do Rotational Auto-Tuning.

◆ The Motor Rotates after the Drive Output Is Shut Off

Causes	Possible Solutions
DC Injection Braking is too low and the drive cannot decelerate correctly.	• Increase the value set in *b2-02 [DC Injection Braking Current]*. • Increase the value set in *b2-04 [DC Inject Braking Time at Stop]*.
The stopping method makes the drive coast to stop.	Set *b1-03 = 0 or 2 [Stopping Method Selection = Ramp to Stop, DC Injection Braking to Stop]*.

◆ The Output Frequency Is Lower Than the Frequency Reference

Causes	Possible Solutions
The frequency reference is in the Jump frequency range.	Adjust *d3-01 to d3-03 [Jump Frequency 1 to 3]* and *d3-04 [Jump Frequency Width]*. **Note:** Enabling the Jump frequency prevents the drive from outputting the frequencies specified in the Jump range.
The upper limit for the frequency reference has been exceeded.	Set *E1-04 [Maximum Output Frequency]*, *d2-01 [Frequency Reference Upper Limit]*, and *Y1-40 [Maximum Speed]* to the best values for the application. **Note:** This calculation supplies the upper value for the output frequency: The smaller of *E1-04* × *d2-01* / 100 or *Y1-40*.
A large load triggered Stall Prevention function during acceleration.	• Decrease the load. • Adjust *L3-02 [Stall Prevent Level during Accel]*.
L3-01 = 3 [Stall Prevention during Accel = Current Limit Method] has been set.	1. Make sure that the V/f pattern and motor parameter settings are appropriate, and set them correctly. 2. If this does not solve the problem, and it is not necessary to limit the current level of stall during acceleration, adjust *L3-02*. 3. If this does not solve the problem, set *L3-01 = 1 [Enabled]*.
The motor is rotating at this speed: *b2-01 [DC Injection/Zero SpeedThreshold]* ≤ Motor Speed < *E1-09 [Minimum Output Frequency]*	Set *E1-09* < *b2-01*.

◆ The Motor Is Making an Audible Noise

Causes	Possible Solutions
100% of the rated output current of the drive was exceeded while operating at low speeds.	• If the sound is coming from the motor, set *L8-38 = 0 [Carrier Frequency Reduction = Disabled]*. • If *oL2 [Drive Overloaded]* occurs frequently after setting *L8-38 = 0*, replace the drive with a high-capacity drive.

◆ The Motor Will Not Restart after a Loss of Power

Causes	Possible Solutions
The drive did not receive a Run command after applying power.	• Examine the sequence and wiring that enters the Run command. • Set up a relay to make sure that the Run command stays enabled during a loss of power.
For applications that use 3-wire sequence, the momentary power loss continued for a long time, and the relay that keeps the Run command has been switched off.	Examine the wiring and circuitry for the relay that keeps the Run command enabled during the momentary power loss ride-thru time.

5

Parameter List

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5.1 How to Read the Parameter List

◆ Icons and Terms that Identify Parameters and Control Methods

Icon	Description
V/f	The parameter is available when operating the drive with V/f Control.
OLV/PM	The parameter is available when operating the drive with Open Loop Vector Control for PM.
EZOLV	The parameter is available when operating the drive with EZ Open Loop Vector Control.
Hex.	Hexadecimal numbers that represent MEMOBUS addresses to change parameters over network communication.
RUN	You can change the parameter setting during Run.
Expert	The parameter is available in Expert Mode only. *1

*1 Set *A1-01 = 3 [Access Level Selection = Expert Level]* to show and set Expert Mode parameters on the keypad.

Note:

Gray icons identify parameters that are not available in the specified control method.

5.2 Parameter Groups

Represents the type of product parameters.

Parameters	Name
A1	Initialization
A2	User Parameters
b1	Operation Mode Selection
b2	DC Injection Braking and Short Circuit Braking
b3	Speed Search
b4	Timer Function
b5	PID Control
b6	Dwell Function
b8	Energy Saving
C1	Accel & Decel Time
C2	S-Curve Characteristics
C3	Slip Compensation
C4	Torque Compensation
C5	Auto Speed Regulator (ASR)
C6	Carrier Frequency
d1	Frequency Reference
d2	Reference Limits
d3	Jump Frequency
d4	Frequency Ref Up/Down & Hold
d6	Field Weakening
E1	V/f Pattern for Motor 1
E2	Motor Parameters
E3	V/f Pattern for Motor 2
E4	Motor 2 Parameters
E5	PM Motor Settings
E9	Motor Setting
F2	Analog Input Option
F3	Digital Input Option
F4	Analog Output Option
F5	Digital Output Option
F6	Communication Options
F7	Ethernet Options
H1	Digital Inputs
H2	Digital Outputs
H3	Analog Inputs
H4	Analog Outputs
H5	Modbus Communication
H6	Pulse Train Input
H7	Virtual Inputs / Outputs

Parameters	Name
L1	Motor Protection
L2	Power Loss Ride Through
L3	Stall Prevention
L4	Speed Detection
L5	Fault Restart
L6	Torque Detection
L7	Torque Limit
L8	Drive Protection
L9	Drive Protection 2
n1	Hunting Prevention
n3	High Slip/Overexcite Braking
n7	EZ Drive
n8	PM Motor Control Tuning
o1	Keypad Display
o2	Keypad Operation
o3	Copy Keypad Function
o4	Maintenance Monitors
o5	Log Function
Q	DriveWorksEZ Parameters
R	DWEZ Connection 1-20
S1	Dynamic Noise Control
S2	Sequence Run Timers
S3	PI2 Control
S6	Protection
U1	Operation Status Monitors
U2	Fault Trace
U3	Fault History
U4	Maintenance Monitors
U5	PID Monitors
U6	Operation Status Monitors
U8	DriveWorksEZ Monitors
UA	Multiplex
Y1	Application Basics
Y2	PID Sleep and Protection
Y3	Contactor Multiplex
Y4	Application Advanced
Y5	HAND/OFF/AUTO Operation
Y6	Flow Meter Setup
Y7	Anti-Jam

Parameters	Name
Y8	De-Scale/De-Rag
Y9	Network Multiplex Options
YA	Preset Setpoint
YC	Foldback Features

Parameters	Name
Yd	Water Level Control
YE	Suction Pressure Control
YF	PI Auxiliary Control

5.3 A: Initialization Parameters

◆ A1: Initialization

No. (Hex.)	Name	Description	Default (Range)
A1-00 (0100) RUN	Language Selection	V/f OLV/PM EZOLV Sets the language for the LCD keypad. **Note:** When you use *A1-03 [Initialize Parameters]* to initialize the drive, the drive will not reset this parameter. 0 : English 3 : French 5 : Spanish 6 : Portuguese	0 (0, 3, 5, 6)
A1-01 (0101) RUN	Access Level Selection	V/f OLV/PM EZOLV Sets user access to parameters. The access level controls which parameters the keypad will display and which parameters the user can set. 0 : Operation Only 1 : User Parameters 2 : Advanced Level 3 : Expert Level 4 : Lock Parameters	2 (0 - 4)
A1-02 (0102)	Control Method Selection	V/f OLV/PM EZOLV Sets the control method for the drive application and the motor. 0 : V/f Control 5 : PM Open Loop Vector 8 : EZ Vector Control	0 (0 - 8)
A1-03 (0103)	Initialize Parameters	V/f OLV/PM EZOLV Sets parameters to default values. 0 : No Initialization 1110 : User Initialization 2220 : 2-Wire Initialization 3330 : 3-Wire Initialization 6008 : Pressure Control 6009 : Pump Down Level Control 6011 : Vertical Turbine Pressure Ctl 6012 : Pivot Panel Vert. Turbine Ctl 6013 : Advanced Pressure Control 6014 : Pivot Panel Submersible 6015 : Pivot Panel Pump Command 6016 : Pivot Panel Sub. Pump Command 7005 : Serial Comms External HOA 7006 : Serial Comms HOA Keys 7770 : General Purpose 7771 : Sub. Pump General Purpose **Note:** • Selections 6009, 6011, 6012, 6013, 6014, 6015, 6016, 7005, 7006 and 7771 are available only when *A1-02 = 0 [Control Method = V/f Control]*. After you initialize the drive, the drive automatically sets *A1-03 = 0*. • User Parameters can save the parameter values for your application and use these values as default values for drive initialization. • To use the 2 motor switchover function, first turn OFF the terminal to which *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]* is set, then change the *A1-03* setting. An incorrect procedure will trigger *oPE08 [Parameter Selection Error]*.	0 (0 - 7771)
A1-04 (0104)	Password	V/f OLV/PM EZOLV Entry point for the password set in *A1-05 [Password Setting]*. The user can view the settings of parameters that are locked without entering the password. Enter the correct password in this parameter to change parameter settings.	0000 (0000 - 9999)
A1-05 (0105)	Password Setting	V/f OLV/PM EZOLV Set the password to lock parameters and prevent changes to parameter settings. Enter the correct password in *A1-04 [Password]* to unlock parameters and accept changes.	0000 (0000 - 9999)

No. (Hex.)	Name	Description	Default (Range)
A1-06 (0127)	Application Preset	V/f OLV/PM EZOLV Sets the drive to operate in selected application conditions. **Note:** You cannot set this parameter. This parameter functions as a monitor only. 0 : Pressure Control 1 : General Purpose 2 : Sub. Pump General Purpose 3 : Pivot Panel Pump Command 4 : Pivot Panel Sub. Pump Command 5 : Serial Comms External HOA 6 : Serial Comms HOA Keys 8 : Pressure Control 9 : Pump Down Level Control 11 : Vertical Turbine Pressure Ctl 12 : Pivot Panel Vert. Turbine Ctl 13 : Advanced Pressure Control 14 : Pivot Panel Submersible	0 (0 - 14)
A1-07 (0128) Expert	DriveWorksEZ Function Selection	V/f OLV/PM EZOLV If the frequency reference changes for more than the level set to this parameter, then the bias value will be held. The value is set as a percentage of the maximum output frequency. 0 : DWEZ Disabled 1 : DWEZ Enabled 2 : Enabled/Disabled wDigital Input **Note:** • When DWEZ is enabled *[A1-07 ≠ 0]*, the FWD or REV display at the top of the keypad screen will flash. • When DWEZ is enabled *[A1-07 ≠ 0]*, the drive saves *Qx-xx [DriveWorksEZ Parameters]* to *A2-17 to A2-32*.	0 (0 - 2)
A1-11 (111D) Expert	Firmware Update Lock	V/f OLV/PM EZOLV Protects the drive firmware. When you enable the protection, you cannot update the drive firmware. 0 : Disabled 1 : Enabled	0 (0, 1)
A1-12 (1564)	Bluetooth ID	V/f OLV/PM EZOLV Sets the password necessary to use Bluetooth to control the drive with a smartphone or tablet.	- (0000 - 9999)

◆ A2: User Parameters

No. (Hex.)	Name	Description	Default (Range)
A2-01 (0106)	User Parameter 1	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 1 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	A1-02 (Determined by A1-01, A1-02)
A2-02 (0107)	User Parameter 2	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 2 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	b1-01 (Determined by A1-01, A1-02)
A2-03 (0108)	User Parameter 3	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 3 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	b1-02 (Determined by A1-01, A1-02)
A2-04 (0109)	User Parameter 4	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 4 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	b1-03 (Determined by A1-01, A1-02)
A2-05 (010A)	User Parameter 5	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 5 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	C1-01 (Determined by A1-01, A1-02)
A2-06 (010B)	User Parameter 6	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 6 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	C1-02 (Determined by A1-01, A1-02)

No. (Hex.)	Name	Description	Default (Range)
A2-07 (010C)	User Parameter 7	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 7 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	C6-02 (Determined by A1-01, A1-02)
A2-08 (010D)	User Parameter 8	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 8 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	d1-01 (Determined by A1-01, A1-02)
A2-09 (010E)	User Parameter 9	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 9 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	d1-02 (Determined by A1-01, A1-02)
A2-10 (010F)	User Parameter 10	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 10 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	d1-03 (Determined by A1-01, A1-02)
A2-11 (0110)	User Parameter 11	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 11 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	d1-04 (Determined by A1-01, A1-02)
A2-12 (0111)	User Parameter 12	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 12 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	d1-17 (Determined by A1-01, A1-02)
A2-13 (0112)	User Parameter 13	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 13 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	E1-01 (Determined by A1-01, A1-02)
A2-14 (0113)	User Parameter 14	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 14 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	E1-03 (Determined by A1-01, A1-02)
A2-15 (0114)	User Parameter 15	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 15 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	E1-04 (Determined by A1-01, A1-02)
A2-16 (0115)	User Parameter 16	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 16 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	E1-05 (Determined by A1-01, A1-02)
A2-17 (0116)	User Parameter 17	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 17 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	E1-06 (Determined by A1-01, A1-02)
A2-18 (0117)	User Parameter 18	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 18 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	E1-09 (Determined by A1-01, A1-02)
A2-19 (0118)	User Parameter 19	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 19 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	E1-13 (Determined by A1-01, A1-02)
A2-20 (0119)	User Parameter 20	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 20 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	E2-01 (Determined by A1-01, A1-02)
A2-21 (011A)	User Parameter 21	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 21 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	E2-04 (Determined by A1-01, A1-02)
A2-22 (011B)	User Parameter 22	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 22 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	E2-11 (Determined by A1-01, A1-02)

No. (Hex.)	Name	Description	Default (Range)
A2-23 (011C)	User Parameter 23	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 23 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	H4-02 (Determined by A1-01, A1-02)
A2-24 (011D)	User Parameter 24	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 24 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	L1-01 (Determined by A1-01, A1-02)
A2-25 (011E)	User Parameter 25	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 25 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	L3-04 (Determined by A1-01, A1-02)
A2-26 (011F)	User Parameter 26	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 26 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	- (Determined by A1-01, A1-02)
A2-27 (0120)	User Parameter 27	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 27 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	- (Determined by A1-01, A1-02)
A2-28 (0121)	User Parameter 28	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 28 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	- (Determined by A1-01, A1-02)
A2-29 (0122)	User Parameter 29	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 29 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	- (Determined by A1-01, A1-02)
A2-30 (0123)	User Parameter 30	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 30 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	- (Determined by A1-01, A1-02)
A2-31 (0124)	User Parameter 31	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 31 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	- (Determined by A1-01, A1-02)
A2-32 (0125)	User Parameter 32	V/f OLV/PM EZOLV Sets the parameter number to be shown for number 32 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	- (Determined by A1-01, A1-02)
A2-33 (0126)	User Parameter Auto Selection	V/f OLV/PM EZOLV Sets the automatic save feature for changes to parameters *A2-17 to A2-32 [User Parameters 17 to 32]*. 0 : Disabled: Manual Entry Required 1 : Enabled: Auto Save Recent Parms	0 (0, 1)

5.4 b: Application

◆ b1: Operation Mode Selection

No. (Hex.)	Name	Description	Default (Range)
b1-01 (0180)	Frequency Reference Selection 1	V/f OLV/PM EZOLV Sets the input method for the frequency reference. 0 : Keypad 1 : Analog Input 2 : Memobus/Modbus Communications 3 : Option PCB 4 : Pulse Train Input	0 (0 - 4)
b1-02 (0181)	Run Command Selection 1	V/f OLV/PM EZOLV Sets the input method for the Run command. 0 : Keypad 1 : Digital Input 2 : Serial Communications 3 : Option PCB 7 : AUTO Command + Term Run 8 : AUTO Command + Serial Run 9 : AUTO Command + Option Run	0 (0 - 9)
b1-03 (0182)	Stopping Method Selection	V/f OLV/PM EZOLV Sets the method to stop the motor after removing a Run command or entering a Stop command. 0 : Ramp to Stop 1 : Coast to Stop 2 : DC Injection Braking to Stop 3 : Coast to Stop with Timer **Note:** When *A1-02 = 5 or 8 [Control Method Selection = OLV/PM or EZOLV]*, the setting range is 0, 1, 3.	1 (0 - 3)
b1-04 (0183)	Reverse Operation Selection	V/f OLV/PM EZOLV Sets the reverse operation function. Disable reverse operation in fan or pump applications where reverse rotation is dangerous. 0 : Reverse Enabled 1 : Reverse Disabled	1 (0, 1)
b1-08 (0187)	Run Command Select in PRG Mode	V/f OLV/PM EZOLV Sets the conditions for the drive to accept a Run command entered from an external source when using the keypad to set parameters. 0 : Disregards Existing RUN Command 1 : Accept RUN while Programming 2 : Allow Programming Only at Stop	0 (0 - 2)
b1-11 (01DF)	Run Delay @ Stop (Backspin)	V/f OLV/PM EZOLV Sets the amount of time that the drive will not accept the Run command again after the Run command is removed. **Note:** • This parameter will operate when the drive goes to sleep then wakes up. • The time set in this parameter does not apply for faults or Auto-Restarts. • When there is an active Run command while the time set in *b1-11* is active, the keypad will show a *[Start Delay: b1-11 Timer Active]* message.	0.0 s (0.0 - 6000.0 s)
b1-12 (01E0)	Run Delay Memory Selection	V/f OLV/PM EZOLV Sets how the drive saves Run Delay Timer to the EEPROM during power loss. 0 : Disabled 1 : Only at Stop 2 : Running & Stop	2 (0 - 2)
b1-14 (01C3)	Phase Order Selection	V/f OLV/PM EZOLV Sets the phase order for output terminals U/T1, V/T2, and W/T3. This parameter can align the Forward Run command from the drive and the forward direction of the motor without changing wiring. **Note:** When you use *A1-03 [Initialize Parameters]* to initialize the drive, the drive will not reset this parameter. 0 : Standard 1 : Switch Phase Order	0 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
b1-15 (01C4)	Frequency Reference Selection 2	V/f OLV/PM EZOLV Sets the input method for the frequency reference. 0 : Keypad 1 : Analog Input 2 : Memobus/Modbus Communications 3 : Option PCB 4 : Pulse Train Input	0 (0 - 4)
b1-16 (01C5)	Run Command Selection 2	V/f OLV/PM EZOLV Sets the input method for Run Command 2 when the user switches the control circuit terminals ON/OFF to change the Run command source. 0 : Keypad 1 : Digital Input 2 : Serial Communications 3 : Option PCB 7 : AUTO Command + Term Run 8 : AUTO Command + Serial Run 9 : AUTO Command + Option Run	0 (0 - 9)
b1-17 (01C6)	Run Command at Power Up	V/f OLV/PM EZOLV Sets drive response when the CPU changes from de-energized to energized and there is an active Run command. Set this parameter in applications where energizing or de-energizing the drive enables the Run command. When the CPU stays energized during loss of power, *L2-01 [Power Loss Ride Through Select]* sets operation. 0 : Disregard Existing RUN Command 1 : Accept Existing RUN Command	1 (0, 1)
b1-40 (3BCF)	Deceleration Abort Time	V/f OLV/PM EZOLV Sets the maximum time until the drive shuts off the output to decelerate to stop. **Note:** Set this parameter to 0.0 s to disable this function.	0.0 s (0.0 - 6000.0 s)

◆ b2: DC Injection Braking and Short Circuit Braking

No. (Hex.)	Name	Description	Default (Range)
b2-01 (0189)	DC Injection/Zero SpeedThreshold	V/f OLV/PM EZOLV Sets the frequency to start DC Injection Braking or Short Circuit Braking near the end of a stop ramp. **Note:** This parameter is available when *b1-03 = 0 [Stopping Method Selection = Ramp to Stop]*.	Determined by A1-02 (0.0 - 10.0 Hz)
b2-02 (018A)	DC Injection Braking Current	V/f OLV/PM EZOLV Sets the DC Injection Braking current as a percentage of the drive rated current.	50% (0 - 100%)
b2-03 (018B)	DC Inject Braking Time at Start	V/f OLV/PM EZOLV Sets the DC Injection Braking Time at start.	0.00 s (0.00 - 10.00 s)
b2-04 (018C)	DC Inject Braking Time at Stop	V/f OLV/PM EZOLV Sets the DC Injection Braking Time at stop.	Determined by A1-02 (0.00 - 10.00 s)
b2-09 (01E1)	Pre-heat Current 2	V/f OLV/PM EZOLV Sets the percentage of motor rated output current used with MFDI *H1-xx = 50 [MFDI Function Selection = Motor Pre-heat 2]* for the motor pre-heat function.	5% (0 - 100%)
b2-12 (01BA)	Short Circuit Brake Time @ Start	V/f OLV/PM EZOLV Sets the Short Circuit Braking time at start.	0.00 s (0.00 - 25.50 s)
b2-13 (01BB)	Short Circuit Brake Time @ Stop	V/f OLV/PM EZOLV Sets the Short Circuit Braking time at stop.	Determined by A1-02 (0.00 - 25.50 s)
b2-18 (0177)	Short Circuit Braking Current	V/f OLV/PM EZOLV Sets the Short Circuit Braking Current as a percentage of the motor rated current. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the motor rated current. • *A1-02 = 5 [OLV/PM]*: *E5-03 [PM Motor Rated Current (FLA)]* • *A1-02 = 8 [EZOLV]*: *E9-06 [Motor Rated Current (FLA)]*	100.0% (0.0 - 200.0%)

◆ b3: Speed Search

No. (Hex.)	Name	Description	Default (Range)
b3-01 (0191)	Speed Search at Start Selection	V/f OLV/PM EZOLV Sets the drive to do a Speed Search each time the drive receives a Run command. 0 : Disabled 1 : Enabled	0 (0, 1)
b3-02 (0192)	SpeedSearch Deactivation Current	V/f OLV/PM EZOLV Sets the current level that stops Speed Search as a percentage of the drive rated output current. Usually it is not necessary to change this setting.	120% (0 - 200%)
b3-03 (0193)	Speed Search Deceleration Time	V/f OLV/PM EZOLV Sets the deceleration time during Speed Search operation. Set the length of time to decelerate from the maximum output frequency to the minimum output frequency. **Note:** When *A1-02 = 8 [Control Method Selection = EZOLV]*, this parameter takes effect only in Expert Mode.	2.0 s (0.1 - 10.0 s)
b3-04 (0194)	V/f Gain during Speed Search	V/f OLV/PM EZOLV Sets the ratio used to reduce the V/f during searches to reduce the output current during speed searches.	Determined by o2-04 (10 - 100)
b3-05 (0195)	Speed Search Delay Time	V/f OLV/PM EZOLV Sets the Speed Search delay time to activate a magnetic contactor installed between the drive and motor.	0.2 s (0.0 - 100.0 s)
b3-06 (0196) Expert	Speed Estimation Current Level 1	V/f OLV/PM EZOLV Sets the level of current that flows to the motor during Speed Estimation Speed Search as a coefficient of the motor rated current. Usually it is not necessary to change this setting.	Determined by o2-04 (0.0 - 2.0)
b3-07 (0197) Expert	Speed Estimation Current Level 2	V/f OLV/PM EZOLV Sets the level of current that flows to the motor during Speed Estimation Speed Search as a coefficient of *E2-03 [Motor No-Load Current]* or *E4-03 [Motor 2 Rated No-Load Current]*. Usually it is not necessary to change this setting.	1.0 (0.0 - 3.0)
b3-08 (0198)	Speed Estimation ACR P Gain	V/f OLV/PM EZOLV Sets the proportional gain for the automatic current regulator during Speed Estimation Speed Search. Also adjusts speed search responsiveness. Usually it is not necessary to change this setting.	Determined by A1-02 and o2-04 (0.00 - 6.00)
b3-09 (0199)	Speed Estimation ACR I Time	V/f OLV/PM EZOLV Sets the integral time for the automatic current regulator during Speed Estimation Speed Search. Also adjusts speed search responsiveness. Usually it is not necessary to change this setting.	Determined by A1-02 when A1-02 ≠ 5 20.0 when A1-02 = 5 (0.0 - 1000.0 ms)
b3-10 (019A) Expert	Speed Estimation Detection Gain	V/f OLV/PM EZOLV Sets the gain to correct estimated frequencies from Speed Estimation Speed Search. **Note:** When *A1-02 = 8 [Control Method Selection = EZOLV]*, the default setting is 1.00 and the setting range is 1.00 - 1.10.	1.05 (1.00 - 1.20)
b3-11 (019B) Expert	Spd Est Method Switch-over Level	V/f OLV/PM EZOLV Uses the quantity of voltage in the motor to automatically switch the search method within the type of speed measurement. **Note:** • 208 V class at 100% = 200 V • 480 V class at 100% = 400 V	5.0% (0.5 - 100.0%)
b3-12 (019C) Expert	Speed Search Current Deadband	V/f OLV/PM EZOLV Sets the minimum current detection level during Speed Search. If the drive does not do Speed Estimation, increase this setting in 0.1-unit increments.	determined by o2-04 (2.0 - 10.0)

No. (Hex.)	Name	Description	Default (Range)
b3-14 (019E)	Bi-directional Speed Search	V/f OLV/PM EZOLV Sets the direction of Speed Search to the direction of the frequency reference or in the motor rotation direction as detected by the drive. 0 : Disabled 1 : Enabled **Note:** • The initial value of *b3-14* is different for different *A1-02 [Control Method Selection]* settings when you set these parameters: –*A1-02 = 0, 8 [Control Method Selection = V/f, EZOLV]* –*E9-01 = 0 [Motor Type Selection = Induction (IM)]* –*b3-24 = 1 [Speed Search Method Selection = Speed Estimation Speed Search]* • The initial value of *b3-14* is 0 when you set these parameters: –*A1-02 = 0, 8* –*E9-01 = 0* –*b3-24 = 2 [Current Detection 2]* • The initial value of *b3-14* is different for different *A1-02 [Control Method Selection]* settings when you set these parameters: –*A1-02 = 8 [EZOLV]* –*E9-01 = 1, 2 [Permanent Magnet (PM), Synchronous Reluctance (SynRM)]* • When you change *A1-02*, *b3-24*, and *E9-01*, also set *b3-14*.	Determined by A1-02, b3-24, and E9-01 (0, 1)
b3-17 (01F0) Expert	Speed Est Retry Current Level	V/f OLV/PM EZOLV Sets the current level for the search retry function in Speed Estimation Speed Search as a percentage where drive rated current is a setting value of 100%.	110% (0 - 200%)
b3-18 (01F1) Expert	Speed Est Retry Detection Time	V/f OLV/PM EZOLV Sets the length of time that the drive will wait to retry Speed Estimation Speed Search when too much current flow stopped the Speed Search.	0.10 s (0.00 - 1.00 s)
b3-19 (01F2)	Speed Search Restart Attempts	V/f OLV/PM EZOLV Sets the number of times to restart Speed Search if Speed Search does not complete.	3 times (0 - 10 times)
b3-24 (01C0)	Speed Search Method Selection	V/f OLV/PM EZOLV Sets the Speed Search method when you start the motor or when you return power after a momentary power loss. **Note:** • The default setting is different for different control methods. –*A1-02 = 0 [Control Method Selection = V/f]*: 2 –*A1-02 = 8 [EZOLV]* and *E9-01 = 0 [Motor Type Selection = Induction (IM)]*: 2 –*A1-02 = 8* and *E9-01 ≠ 0*: 1 • When *A1-02 = 8* and *E9-01 = 1, 2*, set *b3-24 = 1*. If *b3-24 = 2*, the drive will detect *oPE08 [Parameter Selection Error]*. 1 : Speed Estimation 2 : Current Detection 2	Determined by A1-02 (1, 2)
b3-25 (01C8) Expert	Speed Search Wait Time	V/f OLV/PM EZOLV Sets the length of time the drive will wait to start the Speed Search Retry function.	0.5 s (0.0 - 30.0 s)
b3-26 (01C7) Expert	Direction Determination Level	V/f OLV/PM EZOLV Sets the level to find the motor rotation direction. Increase the value if the drive cannot find the direction.	1000 (40 to 60000)
b3-27 (01C9) Expert	Speed Search RUN/BB Priority	V/f OLV/PM EZOLV Sets the conditions necessary to start Speed Search. 0 : SS Only if RUN Applied Before BB 1 : SS Regardless of RUN/BB Sequence	0 (0, 1)
b3-29 (077C) Expert	Speed Search Back-EMF Threshold	V/f OLV/PM EZOLV Sets the induced voltage for motors that use Speed Search. The drive will start Speed Search when the motor induced voltage level is the same as the setting value. Usually it is not necessary to change this setting.	10% (0 - 10%)
b3-31 (0BC0) Expert	Spd Search Current Reference Lvl	V/f OLV/PM EZOLV Sets the current level that decreases the output current during Current Detection Speed Search.	1.50 (1.50 - 3.50)
b3-32 (0BC1) Expert	Spd Search Current Complete Lvl	V/f OLV/PM EZOLV Sets the current level that completes Speed Search.	1.20 (0.00 - 1.49)
b3-39 (1B8F) Expert	Regen Judgment Lv of Spd Search	V/f OLV/PM EZOLV Sets the level to determine the regenerative state during speed search. Usually it is not necessary to change this setting.	15% (0 - 50%)

No. (Hex.)	Name	Description	Default (Range)
b3-54 (3123)	Search Time	V/f OLV/PM EZOLV Sets the length of time that the drive will run Speed Search.	400 ms (10 - 2000 ms)
b3-55 (3124) Expert	Current Increment Time	V/f OLV/PM EZOLV Sets the length of time that the drive will increase the current from zero current to the setting value of *b3-06 [Speed Estimation Current Level 1]*.	10 ms (10 - 2000 ms)
b3-56 (3126)	InverseRotationSearch WaitTime	V/f OLV/PM EZOLV Sets the wait time until the drive starts inverse rotation search after it completes forward search when you do inverse rotation search during Current Detection Speed Search.	Determined by o2-04 (0.1 - 5.0 s)

◆ b4: Timer Function

No. (Hex.)	Name	Description	Default (Range)
b4-01 (01A3)	Timer Function ON-Delay Time	V/f OLV/PM EZOLV Sets the ON-delay time for the timer input.	0.0 s (0.0 - 3000.0 s)
b4-02 (01A4)	Timer Function OFF-Delay Time	V/f OLV/PM EZOLV Sets the OFF-delay time for the timer input.	0.0 s (0.0 - 3000.0 s)
b4-03 (0B30)	Terminal M1-M2 ON-Delay Time	V/f OLV/PM EZOLV Sets the delay time to activate the contact after the function set in *H2-01* activates.	0.0 s (0.0 - 3000.0 s)
b4-04 (0B31)	Terminal M1-M2 OFF-Delay Time	V/f OLV/PM EZOLV Sets the delay time to deactivate the contact after the function set in *H2-01* deactivates.	0.0 s (0.0 - 3000.0 s)
b4-05 (0B32)	Terminal M3-M4 ON-Delay Time	V/f OLV/PM EZOLV Sets the delay time to activate the contact after the function set in *H2-02* activates.	0.0 s (0.0 - 3000.0 s)
b4-06 (0B33)	Terminal M3-M4 OFF-Delay Time	V/f OLV/PM EZOLV Sets the delay time to deactivate the contact after the function set in *H2-02* deactivates.	0.0 s (0.0 - 3000.0 s)
b4-07 (0B34)	Terminal MD-ME-MF ON-Delay Time	V/f OLV/PM EZOLV Sets the delay time to activate the contact after the function set in *H2-03* activates.	0.0 s (0.0 - 3000.0 s)
b4-08 (0B35)	Terminal MD-ME-MF OFF-Delay Time	V/f OLV/PM EZOLV Sets the delay time to deactivate the contact after the function set in *H2-03* deactivates.	0.0 s (0.0 - 3000.0 s)

◆ b5: PID Control

No. (Hex.)	Name	Description	Default (Range)
b5-01 (01A5)	PID Mode Setting	V/f OLV/PM EZOLV Sets the type of PID control. 0 : Disabled 1 : Standard	1 (0, 1)
b5-02 (01A6) RUN	Proportional Gain (P)	V/f OLV/PM EZOLV Sets the proportional gain (P) that is applied to PID input. **Note:** When *Y1-24 [Level at Full Speed] > 0.0* , this parameter has no effect.	2.00 (0.00 - 25.00)
b5-03 (01A7) RUN	Integral Time (I)	V/f OLV/PM EZOLV Sets the integral time (I) that is applied to PID input.	3.0 s (0.0 - 360.0 s)
b5-04 (01A8) RUN	Integral Limit	V/f OLV/PM EZOLV Sets the upper limit for integral control (I) as a percentage of the Maximum Output Frequency. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]*: *E1-04 [Maximum Output Frequency]* • *A1-02 = 8*: *E9-02 [Maximum Speed]* When *Y1-24 [Level at Full Speed] > 0.0* , this parameter has no effect.	100.0% (0.0 - 100.0%)
b5-05 (01A9) RUN	Derivative Time (D)	V/f OLV/PM EZOLV Sets the derivative time (D) for PID control. This parameter adjusts system responsiveness.	0.00 s (0.00 - 10.00 s)

No. (Hex.)	Name	Description	Default (Range)
b5-06 (01AA) RUN	PID Output Limit	V/f OLV/PM EZOLV Sets the maximum possible output from the PID controller as a percentage of the Maximum Output Frequency. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]*: *E1-04 [Maximum Output Frequency]* • *A1-02 = 8*: *E9-02 [Maximum Speed]*	100.0% (0.0 - 100.0%)
b5-07 (01AB) RUN	PID Offset Adjustment	V/f OLV/PM EZOLV Sets the offset for the PID control output as a percentage of the Maximum Output Frequency. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]*: *E1-04 [Maximum Output Frequency]* • *A1-02 = 8*: *E9-02 [Maximum Speed]*	0.0% (-100.0 - +100.0%)
b5-08 (01AC) RUN	PID Primary Delay Time Constant	V/f OLV/PM EZOLV Sets the primary delay time constant for the PID control output. Usually it is not necessary to change this setting.	0.00 s (0.00 - 10.00 s)
b5-09 (01AD)	PID Output Level Selection	V/f OLV/PM EZOLV Sets the polarity of the PID output. 0 : Normal Output (Direct Acting) 1 : Reverse Output (Reverse Acting)	0 (0, 1)
b5-10 (01AE) RUN	PID Output Gain Setting	V/f OLV/PM EZOLV Sets the amount of gain to apply to the PID output.	1.00 (0.00 - 25.00)
b5-11 (01AF)	PID Output Reverse Selection	V/f OLV/PM EZOLV Sets the function that enables and disables reverse motor rotation for negative PID control output. 0 : Lower Limit is Zero 1 : Negative Output Accepted	0 (0, 1)
b5-17 (01B5) RUN	PID Accel/Decel Time	V/f OLV/PM EZOLV Raises or lowers the PID setpoint using the acceleration and deceleration times set to the drive. This is a soft-starter for the PID setpoint.	0.0 s (0.0 - 6000.0 s)
b5-34 (019F) RUN	PID Output Lower Limit Level	V/f OLV/PM EZOLV Sets the output lower limit for the PID control as a percentage of the Maximum Output Frequency. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]*: *E1-04 [Maximum Output Frequency]* • *A1-02 = 8*: *E9-02 [Maximum Speed]*	0.0% (-100.0 - +100.0%)
b5-35 (01A0) RUN	PID Input Limit Level	V/f OLV/PM EZOLV Sets the output upper limit for the PID control as a percentage of the Maximum Output Frequency. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]*: *E1-04 [Maximum Output Frequency]* • *A1-02 = 8*: *E9-02 [Maximum Speed]*	1000.0% (0.0 - 1000.0%)
b5-39 (01FF)	PID User Unit Display Digits	V/f OLV/PM EZOLV Sets the number of digits to set and show the PID setpoint. 0 : No Decimal Places (XXXXX) 1 : One Decimal Place (XXXX.X) 2 : Two Decimal Places (XXX.XX) 3 : Three Decimal Places (XX.XXX)	1 (0 - 3)
b5-40 (017F)	Frequency Reference Monitor @PID	V/f OLV/PM EZOLV Sets the contents for monitor *U1-01 [Frequency Reference]* in PID control. 0 : U1-01 Includes PID Output 1 : U1-01 Excludes PID Output	0 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
b5-41 (0160)	PID Output 2 Unit	V/f OLV/PM EZOLV Sets the display units in *U5-14 [PID Out2 Upper 4]* and *U5-15 [PID Out2 Lower 4]*. 0 : "WC: inches of water column 1 : PSI: pounds per square inch 2 : GPM: gallons/min 3 : °F: Fahrenheit 4 : ft^3/min: cubic feet/min 5 : m^3/h: cubic meters/hour 6 : L/h: liters/hour 7 : L/s: liters/sec 8 : bar: bar 9 : Pa: Pascal 10 : °C: Celsius 11 : m: meters 12 : ft: feet 13 : L/min: liters/min 14 : m^3/min: cubic meters/min 15 : "Hg: Inch Mercury 16 : kPa: kilopascal 25 : Flow (Use Y6-04) 48 : %: Percent 49 : Custom(Y1-32~34) 50 : None	50 (0 - 50)
b5-42 (0161) RUN	PID Output 2 Calc Mode	V/f OLV/PM EZOLV Sets how to calculate the original PID output. 0 : Linear 1 : Square Root 2 : Quadratic 3 : Cubic **Note:** Used for *U5-14 [PID Out2 Upper 4]* and *U5-15 [PID Out2 Lower 4]* only.	0 (0 - 3)
b5-43 (0162) RUN	PID Out2 Monitor MAX Upper4 Dig	V/f OLV/PM EZOLV Sets the upper 4 digits of the maximum monitor value. Used with *b5-44 [PID Out2 Monitor MAX Lower4 Dig]* to set maximum monitor value of *U5-14 [PID Out2 Upper 4]* and *U5-15 [PID Out2 Lower 4]* at maximum frequency. **Note:** Used for *U5-14 [PID Out2 Upper 4]* and *U5-15 [PID Out2 Lower 4]* only.	0 (0 - 9999)
b5-44 (0163) RUN	PID Out2 Monitor MAX Lower4 Dig	V/f OLV/PM EZOLV Sets the lower 4 digits of the maximum monitor value. Used with *b5-43 [PID Out2 Monitor MAX Upper4 Dig]* to set maximum monitor value of *U5-14 [PID Out2 Upper 4]* and *U5-15 [PID Out2 Lower 4]* at maximum frequency. **Note:** Used for *U5-14 [PID Out2 Upper 4]* and *U5-15 [PID Out2 Lower 4]* only.	0.00 (0.00 - 99.99)
b5-45 (0164) RUN	PID Out2 Monitor MIN for Linear	V/f OLV/PM EZOLV Sets the minimum display value to show when at zero speed. Only effective when *b5-42 = 0 [PID Output 2 Calc Mode = Linear]*. **Note:** Used for *U5-14 [PID Out2 Upper 4]* and *U5-15 [PID Out2 Lower 4]* only.	0.0 (0.0 - 999.9)
b5-53 (0B8F) RUN	PID Integrator Ramp Limit	V/f OLV/PM EZOLV Sets the responsiveness of PID control when the PID feedback changes quickly.	0.0 Hz (0.0 - 10.0 Hz)
b5-71 (3C22)	Min PID Transducer Scaling	V/f OLV/PM EZOLV Sets the minimum PID level corresponding to the lowest analog input signal level. **Note:** • To enable this parameter, you must set *b5-71 < Y1-03 [PID User Unit Display Scaling]*. If you set *b5-71 > Y1-03*, the drive will disable all PID analog inputs. • Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution.	0.00 (-99.99 - +99.99)
b5-82 (31B0)	Feedback Loss 4 ~ 20mA Detect Sel	V/f OLV/PM EZOLV Sets the drive to do a 4 to 20 mA wire-break detection on the analog input set for PID feedback. 0 : Disabled 1 : Alarm Only 2 : Fault 3 : Run At b5-83	2 (0 - 3)

No. (Hex.)	Name	Description	Default (Range)
b5-83 (31B1) RUN	Feedback Loss GoTo Frequency	V/f OLV/PM EZOLV Sets the speed at which the drive will run if the drive detects a 4 to 20 mA wire-break on the PID Feedback and *b5-82 = 3 [Feedback Loss 4 ~ 20mA Detect Sel = Run At b5-83]*. **Note:** When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the range is 0.0 to 120.0 Hz.	0.0 Hz (0.0 - 400.0 Hz)
b5-84 (31B2) RUN	Feedback Loss Loss Of Prime Lvl	V/f OLV/PM EZOLV Sets the level at which the drive will detect Loss of Prime in the pump. **Note:** • Loss of Prime condition occurs when the measured quantity set by *Y1-18 [Prime Loss Detection Method]* decreases to this level for the time set in *Y1-20 [Loss of Prime Time]* and the output frequency is at the *Y4-02 [Pre-Charge Frequency]* level. • The drive will respond to the Loss of Prime condition as specified by *Y1-22 [Loss of Prime Selection]*. • Display unit and scaling are dependent on System Units.	0.0 A (0.0 - 1000.0 A)
b5-85 (31B3) RUN	Feedback Loss GoTo Freq Timeout	V/f OLV/PM EZOLV When *b5-82 = 3 [Feedback Loss 4 ~ 20mA Detect Sel = Run At b5-83]* and the Feedback signal is lost, the drive will run at the *b5-83 [Feedback Loss Goto Frequency]* speed for this length of time, after which the drive will fault on *FDBKL [WIRE Break]*. **Note:** Set this parameter to 0 s to disable the function.	0 s (0 - 6000 s)
b5-86 (31B4) RUN	Feedback Loss Start Delay	V/f OLV/PM EZOLV When you initiate a Run command, the drive will wait for this length of time before it will fault on *FDBKL [WIRE Break]* or use parameter *b5-83 [Feedback Loss Goto Frequency]*.	0.0 s (0.0 - 120.0 s)

◆ b6: Dwell Function

No. (Hex.)	Name	Description	Default (Range)
b6-01 (01B6)	Dwell Reference at Start	V/f OLV/PM EZOLV Sets the output frequency that the drive will hold momentarily when the motor starts.	0.0 (Determined by A1-02)
b6-02 (01B7)	Dwell Time at Start	V/f OLV/PM EZOLV Sets the length of time that the drive will hold the output frequency when the motor starts.	0.0 s (0.0 - 10.0 s)
b6-03 (01B8)	Dwell Reference at Stop	V/f OLV/PM EZOLV Sets the output frequency that the drive will hold momentarily when ramping to stop the motor.	0.0 (Determined by A1-02)
b6-04 (01B9)	Dwell Time at Stop	V/f OLV/PM EZOLV Sets the length of time for the drive to hold the output frequency when ramping to stop the motor.	0.0 s (0.0 - 10.0 s)

◆ b8: Energy Saving

No. (Hex.)	Name	Description	Default (Range)
b8-01 (01CC)	Energy Saving Control Selection	V/f OLV/PM EZOLV Sets the Energy-saving control function. 0 : Disabled 1 : Enabled	0 (0, 1)
b8-04 (01CF) Expert	Energy Saving Coefficient Value	V/f OLV/PM EZOLV Sets the Energy-saving control coefficient to maintain maximum motor efficiency. The default setting is for Yaskawa motors. **Note:** • When you do Rotational Auto-Tuning, the drive will automatically set the energy-saving coefficient. • The minimum values and the maximum values are different for different drive models. −2011 to 2024, 4005 and 4008: 0.0 - 2000.0 −2031 to 2396, 4011 to 4720: 0.00 - 655.00	Determined by E2-11 and o2-04 (0.00 - 655.00)
b8-05 (01D0) Expert	Power Detection Filter Time	V/f OLV/PM EZOLV Sets the time constant to measure output power.	20 ms (0 - 2000 ms)
b8-06 (01D1) Expert	Search Operation Voltage Limit	V/f OLV/PM EZOLV Sets the voltage limit for Search Operation as a percentage of the motor rated voltage.	0% (0 - 100%)

No. (Hex.)	Name	Description	Default (Range)
b8-19 (0B40) Expert	E-Save Search Frequency	V/f OLV/PM EZOLV Sets the frequency of Energy-saving control search operations. Usually it is not necessary to change this setting.	Determined by A1-02 (10 - 300 Hz)
b8-20 (0B41) Expert	E-Save Search Width	V/f OLV/PM EZOLV Sets the amplitude of Energy-saving control search operations.	1.0 degrees (0.1 - 5.0 degrees)
b8-28 (0B8B) Expert	Over Excitation Action Selection	V/f OLV/PM EZOLV Sets the function for excitation operation. 0 : Disabled 1 : Enabled	0 (0, 1)
b8-29 (0B8C)	Energy Saving Priority Selection	V/f OLV/PM EZOLV Sets the priority of drive response between changes to the load or Energy-saving control. Enable this to prioritize energy-saving control. Disable this to prioritize tracking related to fast load changes, and prevent motor stall. 0 : Priority: Drive Response 1 : Priority: Energy Savings	0 (0, 1)

5.5 C: Tuning

◆ C1: Accel & Decel Time

No. (Hex.)	Name	Description	Default (Range)
C1-01 (0200) RUN	Acceleration Time 1	V/f OLV/PM EZOLV Sets the length of time to accelerate from zero to maximum output frequency. **Note:** When *C1-10 = 0 [Accel/Decel Time Setting Units = 0.01 s (0.00 to 600.00 s)]*, the setting range is 0.00 to 600.00 s.	20.0 s (0.0 - 6000.0 s)
C1-02 (0201) RUN	Deceleration Time 1	V/f OLV/PM EZOLV Sets the length of time to decelerate from maximum output frequency to zero. **Note:** When *C1-10 = 0 [Accel/Decel Time Setting Units = 0.01 s (0.00 to 600.00 s)]*, the setting range is 0.00 to 600.00 s.	10.0 s (0.0 - 6000.0 s)
C1-03 (0202) RUN	Acceleration Time 2	V/f OLV/PM EZOLV Sets the length of time to accelerate from zero to maximum output frequency. **Note:** When *C1-10 = 0 [Accel/Decel Time Setting Units = 0.01 s (0.00 to 600.00 s)]*, the setting range is 0.00 to 600.00 s.	10.0 s (0.0 - 6000.0 s)
C1-04 (0203) RUN	Deceleration Time 2	V/f OLV/PM EZOLV Sets the length of time to decelerate from maximum output frequency to zero. **Note:** When *C1-10 = 0 [Accel/Decel Time Setting Units = 0.01 s (0.00 to 600.00 s)]*, the setting range is 0.00 to 600.00 s.	10.0 s (0.0 - 6000.0 s)
C1-05 (0204) RUN	Acceleration Time 3	V/f OLV/PM EZOLV Sets the length of time to accelerate from zero to maximum output frequency. **Note:** • Set *A1-02 = 0 [Control Method Selection = V/f Control]* and *H1-xx =16 [MFDI Function Selection = Motor 2 Selection]* to enable this parameter. • When *C1-10 = 0 [Accel/Decel Time Setting Units = 0.01 s (0.00 to 600.00 s)]*, the setting range is 0.00 to 600.00 s.	10.0 s (0.0 - 6000.0 s)
C1-06 (0205) RUN	Deceleration Time 3	V/f OLV/PM EZOLV Sets the length of time to decelerate from maximum output frequency to zero. **Note:** • Set *A1-02 = 0 [Control Method Selection = V/f Control]* and *H1-xx =16 [MFDI Function Selection = Motor 2 Selection]* to enable this parameter. • When *C1-10 = 0 [Accel/Decel Time Setting Units = 0.01 s (0.00 to 600.00 s)]*, the setting range is 0.00 to 600.00 s.	10.0 s (0.0 - 6000.0 s)
C1-07 (0206) RUN	Acceleration Time 4	V/f OLV/PM EZOLV Sets the length of time to accelerate from zero to maximum output frequency. **Note:** When *C1-10 = 0 [Accel/Decel Time Setting Units = 0.01 s (0.00 to 600.00 s)]*, the setting range is 0.00 to 600.00 s.	10.0 s (0.0 - 6000.0 s)
C1-08 (0207) RUN	Deceleration Time 4	V/f OLV/PM EZOLV Sets the length of time to decelerate from maximum output frequency to zero. **Note:** When *C1-10 = 0 [Accel/Decel Time Setting Units = 0.01 s (0.00 to 600.00 s)]*, the setting range is 0.00 to 600.00 s.	10.0 s (0.0 - 6000.0 s)
C1-09 (0208) RUN	Fast Stop Time	V/f OLV/PM EZOLV Sets the length of time that the drive will decelerate to zero for a Fast Stop. **Note:** If you decelerate the drive too quickly, the drive will detect an *ov [Overvoltage]* fault and shut off the output, and the motor will coast to stop. To prevent motor coasting and stop the motor quickly and safely, make sure to set a Fast Stop time in *C1-09*.	10.0 s (0.0 - 6000.0 s)
C1-10 (0209)	Accel/Decel Time Setting Units	V/f OLV/PM EZOLV Sets the setting units for *C1-01 to C1-08 [Accel/Decel Times 1 to 4]*, *C1-09 [Fast Stop Time]*, *L2-06 [Kinetic Energy Backup Decel Time]*, and *L2-07 [Kinetic Energy Backup Accel Time]*. 0 : 0.01 s (0.00 to 600.00 s) 1 : 0.1 s (0.0 to 6000.0 s)	1 (0, 1)
C1-11 (020A)	Accel/Decel Time Switching Frequency	V/f OLV/PM EZOLV Sets the frequency at which the drive will automatically change acceleration and deceleration times.	Determined by A1-02 (0.0 - 400.0 Hz)

◆ C2: S-Curve Characteristics

No. (Hex.)	Name	Description	Default (Range)
C2-01 (020B)	S-Curve Time @ Start of Accel	V/f OLV/PM EZOLV Sets the S-curve acceleration time at start.	Determined by A1-02 (0.00 - 10.00 s)
C2-02 (020C)	S-Curve Time @ End of Accel	V/f OLV/PM EZOLV Sets the S-curve acceleration time at completion.	0.20 s (0.00 - 10.00 s)
C2-03 (020D)	S-Curve Time @ Start of Decel	V/f OLV/PM EZOLV Sets the S-curve deceleration time at start.	0.20 s (0.00 - 10.00 s)
C2-04 (020E)	S-Curve Time @ End of Decel	V/f OLV/PM EZOLV Sets the S-curve deceleration time at completion.	0.00 s (0.00 - 10.00 s)

◆ C3: Slip Compensation

No. (Hex.)	Name	Description	Default (Range)
C3-01 (020F) RUN Expert	Slip Compensation Gain	V/f OLV/PM EZOLV Sets the gain for the slip compensation function. Usually it is not necessary to change this setting. **Note:** Correctly set these parameters before you change the slip compensation gain: • *E2-01 [Motor Rated Current (FLA)]* • *E2-02 [Motor Rated Slip]* • *E2-03 [Motor No-Load Current]*	0.0 (0.0 - 2.5)
C3-02 (0210) RUN Expert	Slip Compensation Delay Time	V/f OLV/PM EZOLV Sets the slip compensation delay time when speed is unstable or when the slip compensation response is too slow. Usually it is not necessary to change this setting.	Determined by A1-02 (0 - 10000 ms)
C3-03 (0211) Expert	Slip Compensation Limit	V/f OLV/PM EZOLV Sets the upper limit for the slip compensation function as a percentage of the motor rated slip.	200% (0 - 250%)
C3-04 (0212) Expert	Slip Compensation at Regen	V/f OLV/PM EZOLV Sets the slip compensation function during regenerative operation. 0 : Disabled 1 : Enabled Above 6Hz 2 : Enabled Above Defined Range	0 (0 - 2)
C3-21 (033E) RUN Expert	Motor 2 Slip Compensation Gain	V/f OLV/PM EZOLV Sets the gain for the motor 2 slip compensation function. Usually it is not necessary to change this setting. **Note:** • Set *A1-02 = 0 [Control Method Selection = V/f Control]* and *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]* to enable this parameter. • Correctly set these parameters before you change the slip compensation gain: –*E4-01 [Motor 2 Rated Current]* –*E4-02 [Motor 2 Rated Slip]* –*E4-03 [Motor 2 Rated No-Load Current]*	0.0 (0.0 - 2.5)
C3-22 (0241) RUN Expert	Motor 2 Slip Comp Delay Time	V/f OLV/PM EZOLV Sets the slip compensation delay time for motor 2 when speed is unstable or when the slip compensation response is too slow. Usually it is not necessary to change this setting. **Note:** Set *A1-02 = 0 [Control Method Selection = V/f Control]* and *H1-xx =16 [MFDI Function Selection = Motor 2 Selection]* to enable this parameter.	2000 (0 - 10000 ms)
C3-23 (0242) Expert	Motor 2 Slip Compensation Limit	V/f OLV/PM EZOLV Sets the upper limit for the slip compensation function as a percentage of the motor 2 rated slip. **Note:** Set *A1-02 = 0 [Control Method Selection = V/f Control]* and *H1-xx =16 [MFDI Function Selection = Motor 2 Selection]* to enable this parameter.	200% (0 - 250%)

No. (Hex.)	Name	Description	Default (Range)
C3-24 (0243) Expert	Motor 2 Slip Comp during Regen	V/f OLV/PM EZOLV Sets the slip compensation during regenerative operation function for motor 2. 0 : Disabled 1 : Enabled Above 6Hz 2 : Enabled Above Defined Range **Note:** Set *A1-02 = 0 [Control Method Selection = V/f Control]* and *H1-xx =16 [MFDI Function Selection = Motor 2 Selection]* to enable this parameter.	0 (0 - 2)
C3-29 (1B5D) RUN Expert	Slip Compensation Gain @ Low Spd	V/f OLV/PM EZOLV Sets the slip compensation gain at low speed. Usually it is not necessary to change this setting.	0.0 (0.0 - 2.5)

◆ C4: Torque Compensation

No. (Hex.)	Name	Description	Default (Range)
C4-01 (0215) RUN	Torque Compensation Gain	V/f OLV/PM EZOLV Sets the gain for the torque compensation function. Use this parameter value for motor 1 when you operate multiple motors. **Note:** If *A1-02 = 8 [Control Method Selection = EZOLV]*, you cannot change the setting while the drive is running.	Determined by A1-02 (0.00 - 2.50)
C4-02 (0216) RUN	Torque Compensation Delay Time	V/f OLV/PM EZOLV Sets the torque compensation delay time. Usually it is not necessary to change this setting. **Note:** When *A1-02 = 5, 8 [Control Method Selection = OLV/PM, EZOLV]*, you cannot change the setting while the drive is running.	Determined by A1-02 (0 - 60000 ms)
C4-07 (0341) RUN	Motor 2 Torque Compensation Gain	V/f OLV/PM EZOLV Sets the gain for motor 2 torque compensation function when you use the Motor Switch function.	1.00 (0.00 - 2.50)
C4-23 (1583) Expert	Current Control Gain	V/f OLV/PM EZOLV Sets the Current control gain. Usually it is not necessary to change this parameter.	1.00 (0.50 - 2.50)

◆ C5: Auto Speed Regulator (ASR)

No. (Hex.)	Name	Description	Default (Range)
C5-01 (021B) RUN	ASR Proportional Gain 1	V/f OLV/PM EZOLV Sets the gain to adjust ASR response.	Determined by A1-02 (0.00 - 300.00)
C5-02 (021C) RUN	ASR Integral Time 1	V/f OLV/PM EZOLV Sets the ASR integral time.	Determined by A1-02 (0.000 - 60.000 s)
C5-03 (021D) RUN	ASR Proportional Gain 2	V/f OLV/PM EZOLV Sets the gain to adjust ASR response.	Determined by A1-02 (0.00 - 300.00)
C5-04 (021E) RUN	ASR Integral Time 2	V/f OLV/PM EZOLV Sets the ASR integral time.	Determined by A1-02 (0.000 - 60.000 s)
C5-06 (0220)	ASR Delay Time	V/f OLV/PM EZOLV Sets the filter time constant of the torque reference output from the speed loop. Usually it is not necessary to change this setting.	Determined by A1-02 (0.000 - 0.500 s)
C5-07 (0221)	ASR Gain Switchover Frequency	V/f OLV/PM EZOLV Sets the frequency where the drive will switch between these parameters: *C5-01 and C5-03 [ASR Proportional Gain 1/2]* *C5-02 and C5-04 [ASR Integral Time 1/2]*	Determined by A1-02 (Determined by A1-02)
C5-08 (0222)	ASR Integral Limit	V/f OLV/PM EZOLV Set the upper limit of the ASR integral amount as a percentage of the rated load.	400% (0 - 400%)

◆ C6: Carrier Frequency

No. (Hex.)	Name	Description	Default (Range)
C6-02 (0224)	Carrier Frequency Selection	V/f OLV/PM EZOLV Sets the carrier frequency for the transistors in the drive. 1 : 2.0 kHz 2 : 5.0 kHz 3 : 8.0 kHz 4 : 10.0 kHz 5 : 12.5 kHz 7 : Swing PWM1 (Audible Sound 1) 8 : Swing PWM2 (Audible Sound 2) 9 : Swing PWM3 (Audible Sound 3) A : Swing PWM4 (Audible Sound 4) B : Leakage Current Rejection PWM F : User Defined (C6-03 to C6-05) **Note:** • The carrier frequency for Swing PWM 1 to 4 is equivalent to 2.0 kHz. Swing PWM applies a special PWM pattern to decrease the audible noise. • When *A1-02 = 5 or 8 [Control Method Selection = OLV/PM or EZOLV]*, you cannot set to *7 to A* • Setting *B* uses a PWM pattern that decreases the leakage current that the drive detects over long wiring distances. This can help decrease alarm detection and decrease problems with the current monitor from leakage current over long wiring distances.	Determined by A1-02 and o2-04 (Determined by A1-02)
C6-03 (0225)	Carrier Frequency Upper Limit	V/f OLV/PM EZOLV Sets the upper limit of the carrier frequency. Set *C6-02 = F [Carrier Frequency Selection = User Defined (C6-03 to C6-05)]* to set this parameter.	Determined by C6-02 (1.0 - 12.5 kHz)
C6-04 (0226)	Carrier Frequency Lower Limit	V/f OLV/PM EZOLV Sets the lower limit of the carrier frequency. Set *C6-02 = F [Carrier Frequency Selection = User Defined (C6-03 to C6-05)]* to set this parameter.	Determined by C6-02 (1.0 - 12.5 kHz)
C6-05 (0227)	Carrier Freq Proportional Gain	V/f OLV/PM EZOLV Sets the proportional gain for the carrier frequency. Set *C6-02 = F [Carrier Frequency Selection = User Defined (C6-03 to C6-05)]* to set this parameter.	Determined by C6-02 (0 - 99)

5.6 d: Reference Settings

◆ d1: Frequency Reference

No. (Hex.)	Name	Description	Default (Range)
d1-01 (0280) RUN	Reference 1	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-02 (0281) RUN	Reference 2	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-03 (0282) RUN	Reference 3	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-04 (0283) RUN	Reference 4	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-05 (0284) RUN	Reference 5	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-06 (0285) RUN	Reference 6	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-07 (0286) RUN	Reference 7	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-08 (0287) RUN	Reference 8	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-09 (0288) RUN	Reference 9	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-10 (028B) RUN	Reference 10	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-11 (028C) RUN	Reference 11	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-12 (028D) RUN	Reference 12	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-13 (028E) RUN	Reference 13	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-14 (028F) RUN	Reference 14	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-15 (0290) RUN	Reference 15	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-16 (0291) RUN	Reference 16	V/f OLV/PM EZOLV Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-17 (0292) RUN	Jog Reference	V/f OLV/PM EZOLV Sets the Jog frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*. Set *H1-xx = 6 [MFDI Function Selection = Jog Reference Selection]* to use the Jog frequency reference.	6.00 Hz (0.00 - 400.00 Hz)

◆ d2: Reference Limits

No. (Hex.)	Name	Description	Default (Range)
d2-01 (0289)	Frequency Reference Upper Limit	V/f OLV/PM EZOLV Sets maximum limit for all frequency references. The maximum output frequency is 100%. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]*: *E1-04 [Maximum Output Frequency]* • *A1-02 = 8*: *E9-02 [Motor Max Revolutions]*	100.0% (0.0 - 110.0%)
d2-02 (028A)	Frequency Reference Lower Limit	V/f OLV/PM EZOLV Sets minimum limit for all frequency references. The maximum output frequency is 100%. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]*: *E1-04 [Maximum Output Frequency]* • *A1-02 = 8*: *E9-02 [Motor Max Revolutions]*	0.0% (0.0 - 110.0%)
d2-03 (0293)	Analog Frequency Ref Lower Limit	V/f OLV/PM EZOLV Sets the lower limit for the master frequency reference (the first frequency of the multi-step speed reference) as a percentage. The maximum output frequency is 100%. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8*: *E1-04 [Maximum Output Frequency]* • *A1-02 = 8*: *E9-02 [Maximum Speed]*	0.0% (0.0 - 110.0%)

◆ d3: Jump Frequency

No. (Hex.)	Name	Description	Default (Range)
d3-01 (0294)	Jump Frequency 1	V/f OLV/PM EZOLV Sets the median value of the frequency band that the drive will avoid. **Note:** • When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the upper limit is 120 Hz. • Set this parameter to 0.0 Hz to disable the Jump frequency.	0.0 Hz (0.0 - 400.0 Hz)
d3-02 (0295)	Jump Frequency 2	V/f OLV/PM EZOLV Sets the median value of the frequency band that the drive will avoid. **Note:** • When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the upper limit is 120 Hz. • Set this parameter to 0.0 Hz to disable the Jump frequency.	0.0 Hz (0.0 - 400.0 Hz)
d3-03 (0296)	Jump Frequency 3	V/f OLV/PM EZOLV Sets the median value of the frequency band that the drive will avoid. **Note:** • When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the upper limit is 120 Hz. • Set this parameter to 0.0 Hz to disable the Jump frequency.	0.0 Hz (0.0 - 400.0 Hz)
d3-04 (0297)	Jump Frequency Width	V/f OLV/PM EZOLV Sets the width of the frequency band that the drive will avoid.	1.0 Hz (Determined by A1-02)

◆ d4: Frequency Ref Up/Down & Hold

No. (Hex.)	Name	Description	Default (Range)
d4-01 (0298)	Freq Reference Hold Selection	V/f OLV/PM EZOLV Sets the function that saves the frequency reference after a Stop command or when de-energizing the drive. Set *H1-xx [MFDI Function Selection]* to one of these values to enable this parameter: • *A [Accel/Decel Ramp Hold]* • *10/11 [Up/Down Command]* • *75/76 [Up/Down 2 Command]* 0 : Disabled 1 : Enabled	0 (0, 1)
d4-03 (02AA) RUN	Up/Down 2 Bias Step Frequency	V/f OLV/PM EZOLV Sets the bias that the Up/Down 2 function adds to or subtracts from the frequency reference.	0.00 Hz (0.00 - 99.9.9 Hz)

No. (Hex.)	Name	Description	Default (Range)
d4-04 (02AB) RUN	Up/Down 2 Ramp Selection	V/f OLV/PM EZOLV Sets the acceleration and deceleration times for the Up/Down 2 function to apply the bias to the frequency reference. 0 : Use Selected Accel/Decel Time 1 : Use Accel/Decel Time 4	0 (0, 1)
d4-05 (02AC) RUN	Up/Down 2 Bias Mode Selection	V/f OLV/PM EZOLV Sets the function that saves the bias value to the drive when you open or close the two Up/Down 2 Commands *[H1-xx = 75, 76]*. Set *d4-03 [Up/Down 2 Bias Step Frequency] = 0.00* before you set this parameter. 0 : Hold when Neither Up/Down Closed 1 : Reset when Neither / Both Closed	0 (0, 1)
d4-06 (02AD)	Up/Down 2 Bias Mode Selection	V/f OLV/PM EZOLV Saves the bias value from the Up/Down 2 Command where the maximum output frequency is 100%. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]: E1-04 [Maximum Output Frequency]* • *A1-02 = 8: E9-02 [Maximum Speed]*	0.0% (-99.9 - 100.0%)
d4-07 (02AE) RUN	Analog Freq Ref Fluctuate Limit	V/f OLV/PM EZOLV If the frequency reference changes for more than the level set to this parameter, then the bias value will be held. The value is set as a percentage of the maximum output frequency. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]: E1-04 [Maximum Output Frequency]* • *A1-02 = 8: E9-02 [Maximum Speed]*	1.0% (0.1 - 100.0%)
d4-08 (02AF) RUN	Up/Down 2 Bias Upper Limit	V/f OLV/PM EZOLV Sets the upper limit of the Up/Down 2 bias as a percentage of the maximum output frequency. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]: E1-04 [Maximum Output Frequency]* • *A1-02 = 8: E9-02 [Maximum Speed]*	100.0% (0.0 - 100.0%)
d4-09 (02B0) RUN	Up/Down 2 Bias Lower Limit	V/f OLV/PM EZOLV Sets the lower limit of the Up/Down 2 bias as a percentage of the maximum output frequency. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]: E1-04 [Maximum Output Frequency]* • *A1-02 = 8: E9-02 [Maximum Speed]*	0.0% (-99.9 - 0.0%)
d4-10 (02B6)	Up/Down Freq Lower Limit Select	V/f OLV/PM EZOLV Sets the lower frequency limit for the Up/Down function. 0 : Greater of d2-02 or Analog 1 : d2-02	0 (0, 1)

◆ d6: Field Weakening

No. (Hex.)	Name	Description	Default (Range)
d6-01 (02A0)	Field Weakening Level	V/f OLV/PM EZOLV Sets the drive output voltage as a percentage of *E1-05 [Maximum Output Voltage]* when *H1-xx = 63 [Field Weakening]* is activated.	80% (0 - 100%)
d6-02 (02A1)	Field Weakening Frequency Limit	V/f OLV/PM EZOLV Sets the minimum output frequency to start field weakening.	0.0 Hz (0.0 - 400.0 Hz)

5.7 E: Motor Parameters

◆ E1: V/f Pattern for Motor 1

No. (Hex.)	Name	Description	Default (Range)
E1-01 (0300)	Input AC Supply Voltage	V/f OLV/PM EZOLV Sets the drive input voltage. **NOTICE** **Damage to Equipment** **Set *E1-01 [Input AC Supply Voltage]* to align with the drive input voltage (not motor voltage).** **If this parameter is incorrect, the protective functions of the drive will not operate correctly and it can cause damage to the drive.**	208 V Class: 240 V, 480 V Class: 480 V (208 V Class: 155 - 255 V, 480 V Class: 310 - 510 V)
E1-03 (0302)	V/f Pattern Selection	V/f OLV/PM EZOLV Sets the V/f pattern for the drive and motor. You can use one of the preset patterns or you can make a custom pattern. 0 : Const Trq, 50Hz base, 50Hz max 1 : Const Trq, 60Hz base, 60Hz max 2 : Const Trq, 50Hz base, 60Hz max 3 : Const Trq, 60Hz base, 72Hz max 4 : VT, 50Hz, 65% Vmid reduction 5 : VT, 50Hz, 50% Vmid reduction 6 : VT, 60 Hz, 65% Vmid reduction 7 : VT, 60Hz, 50% Vmid reduction 8 : High Trq, 50Hz, 25% Vmin boost 9 : High Trq, 50Hz, 65% Vmin boost A : High Trq, 60Hz, 25% Vmin boost B : High Trq, 60Hz, 65% Vmin boost C : High Freq, 60Hz base, 90Hz max D : High Freq, 60Hz base, 120Hz max E : High Freq, 60Hz base, 180Hz max F : Custom **Note:** • Set the correct V/f pattern for the application and operation area. An incorrect V/f pattern can decrease motor torque and increase current from overexcitation. • Parameter *A1-03 [Initialize Parameters]* will not initialize the value of *E1-03*.	F (Determined by A1-02)
E1-04 (0303)	Maximum Output Frequency	V/f OLV/PM EZOLV Sets the maximum output frequency for the V/f pattern.	Determined by A1-02 and E5-01 (Determined by A1-02 and E5-01)
E1-05 (0304)	Maximum Output Voltage	V/f OLV/PM EZOLV Sets the maximum output voltage for the V/f pattern.	208 V Class: 230.0 V, 480 V Class: 460.0 V (208 V Class: 0.0 - 255.0 V, 480 V Class: 0.0 - 510.0 V)
E1-06 (0305)	Base Frequency	V/f OLV/PM EZOLV Sets the base frequency for the V/f pattern.	Determined by A1-02 and E5-01 (0.0 - E1-04)
E1-07 (0306)	Mid Point A Frequency	V/f OLV/PM EZOLV Sets a middle output frequency for the V/f pattern.	Determined by E1-03 (0.0 - E1-04)
E1-08 (0307)	Mid Point A Voltage	V/f OLV/PM EZOLV Sets a middle output voltage for the V/f pattern.	Determined by o2-04 (208 V Class: 0.0 - 255.0 V, 480 V Class: 0.0 - 510.0 V)
E1-09 (0308)	Minimum Output Frequency	V/f OLV/PM EZOLV Sets the minimum output frequency for the V/f pattern.	Determined by A1-02 and E5-01 (Determined by A1-02, E1-04, and E5-01)
E1-10 (0309)	Minimum Output Voltage	V/f OLV/PM EZOLV Sets the minimum output voltage for the V/f pattern.	Determined by E1-03 (208 V Class: 0.0 - 255.0 V, 480 V Class: 0.0 - 510.0 V)
E1-11 (030A) Expert	Mid Point B Frequency	V/f OLV/PM EZOLV Sets a middle output frequency for the V/f pattern.	0.0 Hz (0.0 - E1-04)

No. (Hex.)	Name	Description	Default (Range)
E1-12 (030B) Expert	Mid Point B Voltage	V/f OLV/PM EZOLV Sets a middle point voltage for the V/f pattern.	0.0 V (208 V Class: 0.0 - 255.0 V, 480 V Class: 0.0 - 510.0 V)
E1-13 (030C) Expert	Base Voltage	V/f OLV/PM EZOLV Sets the base voltage for the V/f pattern.	0.0 V (208 V Class: 0.0 - 255.0 V, 480 V Class: 0.0 - 510.0 V)

◆ E2: Motor Parameters

No. (Hex.)	Name	Description	Default (Range)
E2-01 (030E)	Motor Rated Current (FLA)	V/f OLV/PM EZOLV Sets the motor rated current in amps.	Determined by o2-04 (10% to 200% of the drive rated current)
E2-02 (030F)	Motor Rated Slip	V/f OLV/PM EZOLV Sets motor rated slip.	Determined by o2-04 (0.000 - 20.000 Hz)
E2-03 (0310)	Motor No-Load Current	V/f OLV/PM EZOLV Sets the no-load current for the motor in amps when operating at the rated frequency and the no-load voltage.	Determined by o2-04 (0 to E2-01)
E2-04 (0311)	Motor Pole Count	V/f OLV/PM EZOLV Sets the number of motor poles.	2 (2 - 120)
E2-05 (0312)	Motor Line-to-Line Resistance	V/f OLV/PM EZOLV Sets the line-to-line resistance for the motor stator windings.	Determined by o2-04 (0.000 - 65.000 Ω)
E2-06 (0313)	Motor Leakage Inductance	V/f OLV/PM EZOLV Sets the voltage drop from motor leakage inductance when the motor is operating at the rated frequency and rated current. This value is a percentage of Motor Rated Voltage.	Determined by o2-04 (0.0 - 60.0%)
E2-10 (0317)	Motor Iron Loss	V/f OLV/PM EZOLV Sets the motor iron loss.	Determined by o2-04 (0 - 65535 W)
E2-11 (0318)	Motor Rated Power	V/f OLV/PM EZOLV Sets the motor rated output in the units from *o1-58 [Motor Power Unit Selection]*.	Determined by o2-04 (0.00 - 650.00 HP)

◆ E3: V/f Pattern for Motor 2

No. (Hex.)	Name	Description	Default (Range)
E3-01 (0319)	Motor 2 Control Mode Selection	V/f OLV/PM EZOLV Sets the control method for motor 2. **Note:** Parameter *L1-01 [Motor Overload (oL1) Protection]* sets the protection operation of *oL1 [Motor Overload]* the same as Motor 1. 0 : V/f Control	0 (0)
E3-04 (031A)	Motor 2 Maximum Output Frequency	V/f OLV/PM EZOLV Set the maximum output frequency for the motor 2 V/f pattern.	Determined by E3-01 (40.0 - 400.0 Hz)
E3-05 (031B)	Motor 2 Maximum Output Voltage	V/f OLV/PM EZOLV Sets the maximum output voltage for the motor 2 V/f pattern.	Determined by E3-01 (208 V Class: 0.0 - 255.0 V, 480 V Class: 0.0 - 510.0 V)
E3-06 (031C)	Motor 2 Base Frequency	V/f OLV/PM EZOLV Sets the base frequency for the motor 2 V/f pattern.	Determined by E3-01 (0.0 - E3-04)
E3-07 (031D)	Motor 2 Mid Point A Frequency	V/f OLV/PM EZOLV Sets a middle output frequency for the motor 2 V/f pattern.	Determined by E3-01 (0.0 - E3-04)
E3-08 (031E)	Motor 2 Mid Point A Voltage	V/f OLV/PM EZOLV Sets a middle output voltage for the motor 2 V/f pattern.	Determined by E3-01 (208 V Class: 0.0 - 255.0 V, 480 V Class: 0.0 - 510.0 V)
E3-09 (031F)	Motor 2 Minimum Output Frequency	V/f OLV/PM EZOLV Sets the minimum output frequency for the motor 2 V/f pattern.	Determined by E3-01 (0.0 - E3-04)
E3-10 (0320)	Motor 2 Minimum Output Voltage	V/f OLV/PM EZOLV Sets the minimum output voltage for the motor 2 V/f pattern.	Determined by E3-01 (208 V Class: 0.0 - 255.0 V, 480 V Class

No. (Hex.)	Name	Description	Default (Range)
E3-11 (0345) Expert	Motor 2 Mid Point B Frequency	V/f OLV/PM EZOLV Sets a middle output frequency for the motor 2 V/f pattern. Set this parameter to adjust the V/f pattern for the constant output range. Usually it is not necessary to change this parameter.	0.0 Hz (0.0 - E3-04)
E3-12 (0346) Expert	Motor 2 Mid Point B Voltage	V/f OLV/PM EZOLV Sets a middle output voltage for the motor 2 V/f pattern. Set this parameter to adjust the V/f pattern for the constant output range. Usually it is not necessary to change this parameter.	0.0 V (208 V Class: 0.0 - 255.0 V, 480 V Class: 0.0 - 510.0 V)
E3-13 (0347) Expert	Motor 2 Base Voltage	V/f OLV/PM EZOLV Sets the base voltage for the motor 2 V/f pattern. Set this parameter to adjust the V/f pattern for the constant output range. Usually it is not necessary to change this parameter.	0.0 V (208 V Class: 0.0 - 255.0 V, 480 V Class: 0.0 - 510.0 V)

◆ E4: Motor 2 Parameters

No. (Hex.)	Name	Description	Default (Range)
E4-01 (0321)	Motor 2 Rated Current	V/f OLV/PM EZOLV Sets the motor rated current for motor 2 in amps.	Determined by o2-04 (10% to 200% of the drive rated current)
E4-02 (0322)	Motor 2 Rated Slip	V/f OLV/PM EZOLV Sets the motor rated slip for motor 2.	Determined by o2-04 (0.000 - 20.000 Hz)
E4-03 (0323)	Motor 2 Rated No-Load Current	V/f OLV/PM EZOLV Sets the no-load current for motor 2 in amps when operating at the rated frequency and the no-load voltage.	Determined by o2-04 (Less than 0 - E4-01)
E4-04 (0324)	Motor 2 Motor Poles	V/f OLV/PM EZOLV Sets the number of poles for motor 2.	2 (2 - 120)
E4-05 (0325)	Motor 2 Line-to-Line Resistance	V/f OLV/PM EZOLV Sets the line-to-line resistance for the motor 2 stator windings.	Determined by o2-04 (0.000 - 65.000 Ω)
E4-06 (0326)	Motor 2 Leakage Inductance	V/f OLV/PM EZOLV Sets the voltage drop from motor 2 leakage inductance as a percentage of Motor Rated Voltage when motor 2 operates at the rated frequency and rated current.	Determined by o2-04 (0.0 - 60.0%)
E4-10 (0340)	Motor 2 Iron Loss	V/f OLV/PM EZOLV Sets the motor iron loss for motor 2.	Determined by o2-04 (0 - 65535 W)
E4-11 (0327)	Motor 2 Rated Power	V/f OLV/PM EZOLV Sets the motor rated power in the units from *o1-58 [Motor Power Unit Selection]*.	Determined by o2-04 (0.00 - 650.00 HP)

◆ E5: PM Motor Settings

No. (Hex.)	Name	Description	Default (Range)
E5-01 (0329)	PM Motor Code Selection	V/f OLV/PM EZOLV Sets the motor code for Yaskawa PM motors. The drive uses the motor code to automatically set some parameters to their correct settings.	FFFF (0000 - FFFF)
E5-02 (032A)	PM Motor Rated Power	V/f OLV/PM EZOLV Sets the PM motor rated output in the units set in *o1-58 [Motor Power Unit Selection]*.	Determined by o2-04 (0.13 - 650.00 HP)
E5-03 (032B)	PM Motor Rated Current (FLA)	V/f OLV/PM EZOLV Sets the PM motor rated current (FLA).	Determined by o2-04 (10% to 200% of the drive rated current)
E5-04 (032C)	PM Motor Pole Count	V/f OLV/PM EZOLV Sets the number of PM motor poles.	4 (2 - 120)
E5-05 (032D)	PM Motor Resistance (ohms/phase)	V/f OLV/PM EZOLV Sets the resistance per phase of a PM motor. Set 50% of the line-to-line resistance.	0.100 Ω (0.000 - 65.000 Ω)
E5-06 (032E)	PM d-axis Inductance (mH/phase)	V/f OLV/PM EZOLV Sets the PM motor d-axis inductance.	1.00 mH (0.00 - 300.00 mH)
E5-07 (032F)	PM q-axis Inductance (mH/phase)	V/f OLV/PM EZOLV Sets the PM motor q-axis inductance.	1.00 mH (0.00 - 600.00 mH)

No. (Hex.)	Name	Description	Default (Range)
E5-09 (0331)	PM Back-EMF Vpeak (mV/(rad/s))	V/f **OLV/PM** EZOLV Sets the peak value of PM motor induced voltage.	0.0 mV/(rad/sec) (0.0 - 2000.0 mV/(rad/s))
E5-24 (0353)	PM Back-EMF L-L Vrms (mV/rpm)	V/f **OLV/PM** EZOLV Sets the RMS value for PM motor line voltage.	0.1 mV/min^{-1} (0.0 - 6500.0 mV/min^{-1})

◆ E9: Motor Setting

No. (Hex.)	Name	Description	Default (Range)
E9-01 (11E4)	Motor Type Selection	V/f OLV/PM **EZOLV** Sets the type of motor. 0 : Induction (IM) 1 : Permanent Magnet (PM) 2 : Synchronous Reluctance (SynRM)	0 (0 - 2)
E9-02 (11E5)	Maximum Speed	V/f OLV/PM **EZOLV** Sets the maximum speed of the motor.	Determined by E9-01 (40.0 - 120.0 Hz)
E9-03 (11E6)	Rated Speed	V/f OLV/PM **EZOLV** Sets the rated rotation speed of the motor.	3600 RPM (100 - 7200 RPM)
E9-04 (11E7)	Base Frequency	V/f OLV/PM **EZOLV** Sets the rated frequency of the motor.	Determined by E9-01 (40.0 - 120.0 Hz)
E9-05 (11E8)	Base Voltage	V/f OLV/PM **EZOLV** Sets the rated voltage of the motor.	208 V Class: 230.0 V, 480 V Class: 460.0 V (208 V Class: 0.0 - 255.0 V, 480 V Class: 0.0 - 510.0 V)
E9-06 (11E9)	Motor Rated Current (FLA)	V/f OLV/PM **EZOLV** Sets the motor rated current in amps.	Determined by E9-01 and o2-04 (10% to 200% of the drive rated current)
E9-07 (11EA)	Motor Rated Power	V/f OLV/PM **EZOLV** Sets the motor rated output in the units from *o1-58 [Motor Power Unit Selection]*.	Determined by E9-02 and o2-04 (0.00 - 650.00 HP)
E9-08 (11EB)	Motor Pole Count	V/f OLV/PM **EZOLV** Sets the number of motor poles.	2 (2 to 120)
E9-09 (11EC)	Motor Rated Slip	V/f OLV/PM **EZOLV** Sets the motor rated slip.	0.000 Hz (0.000 - 20.000 Hz)
E9-10 (11ED)	Motor Line-to-Line Resistance	V/f OLV/PM **EZOLV** Sets the line-to-line resistance for the motor stator windings.	Determined by o2-04 (0.000 - 65.000 Ω)

5.8 F: Options

◆ F2: Analog Input Option

No. (Hex.)	Name	Description	Default (Range)
F2-01 (038F)	Analog Input Function Selection	V/f OLV/PM EZOLV Sets the input method for the analog inputs used with AI-A3. 0 : 3 Independent Channels 1 : 3 Channels Added Together 2 : 3 Additional Channels	0 (0 - 2)
F2-02 (0368) RUN	Analog Input Option Card Gain	V/f OLV/PM EZOLV Sets the analog reference gain as a percentage when the maximum output frequency is 100%. **Note:** • Set *F2-01 = 1 [Analog Input Function Selection = 3 Channels Added Together]* to enable this function. • Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. –*A1-02 ≠ 8 [EZOLV]*: *E1-04 [Maximum Output Frequency]* –*A1-02 = 8*: *E9-02 [Maximum Speed]*	100.0% (-999.9 - +999.9%)
F2-03 (0369) RUN	Analog Input Option Card Bias	V/f OLV/PM EZOLV Sets the analog reference bias as a percentage when the maximum output frequency is 100%. **Note:** • Set *F2-01 = 1 [Analog Input Function Selection = 3 Channels Added Together]* to enable this function. • Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. –*A1-02 ≠ 8 [EZOLV]*: *E1-04 [Maximum Output Frequency]* –*A1-02 = 8*: *E9-02 [Maximum Speed]*	0.0% (-999.9 - +999.9%)
F2-04 (3160)	Terminal V1 Signal Level Select	V/f OLV/PM EZOLV Sets the input signal level for MFAI terminal V1. **Note:** • Set *F2-01 = 2 [Analog Input Function Selection = 3 Additional Channels]* to enable this parameter. • Use DIP switch S1 on the AI-A3 option card to switch between the voltage input or current input to align with the setting of this parameter. 0 : 0 to 10V (Lower Limit at 0) 1 : -10 to +10V (Bipolar Reference) 2 : 4 to 20 mA	0 (0 - 2)
F2-05 (3161)	Terminal V1 Function Selection	V/f OLV/PM EZOLV Sets the function for MFAI terminal V1. **Note:** Set *F2-01 = 2 [Analog Input Function Selection = 3 Additional Channels]* to enable this parameter.	F (4 - 3B)
F2-06 (3162) RUN	Terminal V1 Gain Setting	V/f OLV/PM EZOLV Sets the gain of the analog signal input to MFAI terminal V1. **Note:** Set *F2-01 = 2 [Analog Input Function Selection = 3 Additional Channels]* to enable this parameter.	100.0% (-999.9 - +999.9%)
F2-07 (3163) RUN	Terminal V1 Bias Setting	V/f OLV/PM EZOLV Sets the bias of the analog signal input to MFAI terminal V1. **Note:** Set *F2-01 = 2 [Analog Input Function Selection = 3 Additional Channels]* to enable this parameter.	0.0% (-999.9 - +999.9%)
F2-08 (3164)	Terminal V2 Signal Level Select	V/f OLV/PM EZOLV Sets the input signal level for MFAI terminal V2. **Note:** • Set *F2-01 = 2 [Analog Input Function Selection = 3 Additional Channels]* to enable this parameter. • Use DIP switch S1 on the AI-A3 option card to switch between the voltage input or current input to align with the setting of this parameter. 0 : 0 to 10V (Lower Limit at 0) 1 : -10 to +10V (Bipolar Reference) 2 : 4 to 20 mA	0 (0 - 2)

No. (Hex.)	Name	Description	Default (Range)
F2-09 (3165)	Terminal V2 Function Selection	V/f OLV/PM EZOLV Sets the function for MFAI terminal V2. **Note:** Set *F2-01 = 2 [Analog Input Function Selection = 3 Additional Channels]* to enable this parameter.	F (4 - 3B)
F2-10 (3166) RUN	Terminal V2 Gain Setting	V/f OLV/PM EZOLV Sets the gain of the analog signal input to MFAI terminal V2. **Note:** Set *F2-01 = 2 [Analog Input Function Selection = 3 Additional Channels]* to enable this parameter.	100.0% (-999.9 - +999.9%)
F2-11 (3167) RUN	Terminal V2 Bias Setting	V/f OLV/PM EZOLV Sets the bias of the analog signal input to MFAI terminal V2. **Note:** Set *F2-01 = 2 [Analog Input Function Selection = 3 Additional Channels]* to enable this parameter.	0.0% (-999.9 - +999.9%)
F2-12 (3168)	Terminal V3 Signal Level Select	V/f OLV/PM EZOLV Sets the input signal level for MFAI terminal V3. **Note:** • Set *F2-01 = 2 [Analog Input Function Selection = 3 Additional Channels]* to enable this parameter. • Use DIP switch S1 on the AI-A3 option card to switch between the voltage input or current input to align with the setting of this parameter. 0 : 0 to 10V (Lower Limit at 0) 1 : -10 to +10V (Bipolar Reference) 2 : 4 to 20 mA	0 (0 - 2)
F2-13 (3169)	Terminal V3 Function Selection	V/f OLV/PM EZOLV Sets the function for MFAI terminal V3. **Note:** Set *F2-01 = 2 [Analog Input Function Selection = 3 Additional Channels]* to enable this parameter.	F (4 - 3B)
F2-14 (316A) RUN	Terminal V3 Gain Setting	V/f OLV/PM EZOLV Sets the gain of the analog signal input to MFAI terminal V3. **Note:** Set *F2-01 = 2 [Analog Input Function Selection = 3 Additional Channels]* to enable this parameter.	100.0% (-999.9 - +999.9%)
F2-15 (316B) RUN	Terminal V3 Bias Setting	V/f OLV/PM EZOLV Sets the bias of the analog signal input to MFAI terminal V3. **Note:** Set *F2-01 = 2 [Analog Input Function Selection = 3 Additional Channels]* to enable this parameter.	0.0% (-999.9 - +999.9%)
F2-16 (316C)	V1 Unit Selection	V/f OLV/PM EZOLV Sets the units shown in *U1-21 [AI-A3 Term V1Level]*. 0 : Percent (%) 1 : Units (mA or VDC)	1 (0, 1)
F2-17 (316D)	V2 Unit Selection	V/f OLV/PM EZOLV Sets the units shown in *U1-22 [AI-A3 Term V2Level]*. 0 : Percent (%) 1 : Units (mA or VDC)	1 (0, 1)
F2-18 (316E)	V3 Unit Selection	V/f OLV/PM EZOLV Sets the units shown in *U1-23 [AI-A3 Term V3Level]*. 0 : Percent (%) 1 : Units (mA or VDC)	1 (0, 1)

◆ F3: Digital Input Option

No. (Hex.)	Name	Description	Default (Range)
F3-01 (0390)	Digital Input Function Selection	V/f OLV/PM EZOLV Sets the data format of digital input signals. This parameter is enabled when *o1-03 = 0 or 1 [Frequency Display Unit Selection = 0.01 Hz or 0.01% (100% = E1-04)]*. **Note:** When *o1-03 = 2* or *3 [Revolutions Per Minute (RPM) or User Units (o1-10 & o1-11)]*, the input signal will be BCD. The *o1-03* value sets the setting units. 0 : BCD, 1% units 1 : BCD, 0.1% units 2 : BCD, 0.01% units 3 : BCD, 1 Hz units 4 : BCD, 0.1 Hz units 5 : BCD, 0.01 Hz units 6 : BCD (5-digit), 0.02 Hz 7 : Binary input 8 : Multi-Function Digital Input	8 (0 - 8)
F3-03 (03B9)	Digital Input Data Length Select	V/f OLV/PM EZOLV Sets the number of bits to set the frequency reference with *DI-A3*. 0 : 8-bit 1 : 12-bit 2 : 16-bit	2 (0 - 2)
F3-10 (0BE3) Expert	Terminal D0 Function Selection	V/f OLV/PM EZOLV Sets the function for terminal D0 of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)
F3-11 (0BE4) Expert	Terminal D1 Function Selection	V/f OLV/PM EZOLV Sets the function for terminal D1 of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)
F3-12 (0BE5) Expert	Terminal D2 Function Selection	V/f OLV/PM EZOLV Sets the function for terminal D2 of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)
F3-13 (0BE6) Expert	Terminal D3 Function Selection	V/f OLV/PM EZOLV Sets the function for terminal D3 of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)
F3-14 (0BE7) Expert	Terminal D4 Function Selection	V/f OLV/PM EZOLV Sets the function for terminal D4 of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)
F3-15 (0BE8) Expert	Terminal D5 Function Selection	V/f OLV/PM EZOLV Sets the function for terminal D5 of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)
F3-16 (0BE9) Expert	Terminal D6 Function Selection	V/f OLV/PM EZOLV Sets the function for terminal D6 of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)
F3-17 (0BEA) Expert	Terminal D7 Function Selection	V/f OLV/PM EZOLV Sets the function for terminal D7 of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)
F3-18 (0BEB) Expert	Terminal D8 Function Selection	V/f OLV/PM EZOLV Sets the function for terminal D8 of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)
F3-19 (0BEC) Expert	Terminal D9 Function Selection	V/f OLV/PM EZOLV Sets the function for terminal D9 of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)
F3-20 (0BED) Expert	Terminal DA Function Selection	V/f OLV/PM EZOLV Sets the function for terminal DA of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)
F3-21 (0BEE) Expert	Terminal DB Function Selection	V/f OLV/PM EZOLV Sets the function for terminal DB of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)

No. (Hex.)	Name	Description	Default (Range)
F3-22 (0BEF) Expert	Terminal DC Function Selection	V/f OLV/PM EZOLV Sets the function for terminal DC of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)
F3-23 (0BF0) Expert	Terminal DD Function Selection	V/f OLV/PM EZOLV Sets the function for terminal DD of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)
F3-24 (0BF1) Expert	Terminal DE Function Selection	V/f OLV/PM EZOLV Sets the function for terminal DE of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)
F3-25 (0BF2) Expert	Terminal DF Function Selection	V/f OLV/PM EZOLV Sets the function for terminal DF of the DI-A3 option when *F3-01 = 8 [Digital Input Function Selection = Multi-Function Digital Input]*.	F (1 - 1FF)

◆ F4: Analog Monitor Option

No. (Hex.)	Name	Description	Default (Range)
F4-01 (0391)	Terminal V1 Function Selection	V/f OLV/PM EZOLV Sets the monitor signal output from terminal V1. Set the *x-xx* part of the *Ux-xx [Monitor]*. For example, set *F4-01 = 102* to monitor *U1-02 [Output Frequency]*.	102 (000 - 1098)
F4-02 (0392) RUN	Terminal V1 Gain	V/f OLV/PM EZOLV Sets the gain of the monitor signal that is sent from terminal V1. Sets the analog signal output level from the terminal V1 at 10 V or 20 mA as 100% when an output for monitoring items is 100%.	100.0% (-999.9 - +999.9%)
F4-03 (0393)	Terminal V2 Function Selection	V/f OLV/PM EZOLV Sets the monitor signal output from terminal V2. Set the *x-xx* part of the *Ux-xx [Monitor]*. For example, set *F4-03 = 103* to monitor *U1-03 [Output Current]*.	103 (000 - 1098)
F4-04 (0394) RUN	Terminal V2 Gain	V/f OLV/PM EZOLV Sets the gain of the monitor signal that is sent from terminal V2. Sets the analog signal output level from terminal V2 at 10 V or 20 mA as 100% when an output for monitoring items is 100%.	50.0% (-999.9 - +999.9%)
F4-05 (0395) RUN	Terminal V1 Bias	V/f OLV/PM EZOLV Sets the bias of the monitor signal that is sent from terminal V1. When an output for monitoring items is 0%, this parameter sets the analog signal output level from the V1 terminal as a percentage of 10 V or 20 mA.	0.0% (-999.9 - +999.9%)
F4-06 (0396) RUN	Terminal V2 Bias	V/f OLV/PM EZOLV Sets the bias of the monitor signal that is sent from terminal V2. Set the level of the analog signal sent from the V2 terminal at 10 V or 20 mA as 100% when an output for monitoring items is 0%.	0.0% (-999.9 - +999.9%)
F4-07 (0397)	Terminal V1 Signal Level	V/f OLV/PM EZOLV Sets the output signal level for terminal V1. 0 : 0 to 10 V 1 : -10 to 10 V	0 (0, 1)
F4-08 (0398)	Terminal V2 Signal Level	V/f OLV/PM EZOLV Sets the output signal level for terminal V2. 0 : 0 to 10 V 1 : -10 to 10 V	0 (0, 1)

◆ F5: Digital Output Option

No. (Hex.)	Name	Description	Default (Range)
F5-01 (0399)	Terminal P1-PC Function Select	V/f OLV/PM EZOLV Sets the function of terminal P1-PC on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	0 (0 - 1FF)
F5-02 (039A)	Terminal P2-PC Function Select	V/f OLV/PM EZOLV Sets the function of terminal P2-PC on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	1 (0 - 1FF)

No. (Hex.)	Name	Description	Default (Range)
F5-03 (039B)	Terminal P3-PC Function Select	V/f OLV/PM EZOLV Sets the function of terminal P3-PC on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	2 (0 - 1FF)
F5-04 (039C)	Terminal P4-PC Function Select	V/f OLV/PM EZOLV Sets the function of terminal P4-PC on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	4 (0 - 1FF)
F5-05 (039D)	Terminal P5-PC Function Select	V/f OLV/PM EZOLV Sets the function of terminal P5-PC on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	6 (0 - 1FF)
F5-06 (039E)	Terminal P6-PC Function Select	V/f OLV/PM EZOLV Sets the function of terminal P6-PC on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	37 (0 - 1FF)
F5-07 (039F)	Terminal M1-M2 Function Select	V/f OLV/PM EZOLV Sets the function of terminal M1-M2 on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	F (0 - 1FF)
F5-08 (03A0)	Terminal M3-M4 Function Select	V/f OLV/PM EZOLV Sets the function of terminal M3-M4 on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	F (0 - 1FF)
F5-09 (03A1)	DO-A3 Output Mode Selection	V/f OLV/PM EZOLV Sets the output mode of signals from the DO-A3 option. 0 : Predefined Individual Outputs 1 : Binary Output 2 : Programmable (F5-01 to F5-08)	0 (0 - 2)

◆ F6: Communication Options

No. (Hex.)	Name	Description	Default (Range)
F6-01 (03A2)	Communication Error Selection	V/f OLV/PM EZOLV Sets the method to stop the motor or let the motor continue operating when the drive detects *bUS [Option Communication Error]*. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only 4 : Alarm (Run at d1-04) 5 : Alarm - Ramp Stop	1 (0 - 5)
F6-02 (03A3)	Comm External Fault (EF0) Detect	V/f OLV/PM EZOLV Sets the conditions at which *EF0 [Option Card External Fault]* is detected. 0 : Always Detected 1 : Detected during RUN Only	0 (0, 1)
F6-03 (03A4)	Comm External Fault (EF0) Select	V/f OLV/PM EZOLV Sets the method to stop the motor or let the motor continue operating when the drive detects an *EF0 [Option Card External Fault]*. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only	1 (0 - 3)
F6-04 (03A5)	bUS Error Detection Time	V/f OLV/PM EZOLV Sets the delay time for the drive to detect *bUS [Option Communication Error]*. **Note:** When you install an option card in the drive, the parameter value changes to 0.0 s.	2.0 s (0.0 - 5.0 s)
F6-06 (03A7)	Torque Reference/Limit by Comm	V/f OLV/PM EZOLV Sets the function that enables and disables the torque reference and torque limit received from the communication option. 0 : Disabled 1 : Enabled	0 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
F6-07 (03A8)	Multi-Step Ref @ NetRef/ ComRef	V/f OLV/PM EZOLV Sets the function that enables and disables the multi-step speed reference when the frequency reference source is NetRef or ComRef (communication option card or MEMOBUS/Modbus communications). 0 : Disable Multi-Step References 1 : Enable Multi-Step References	0 (0, 1)
F6-08 (036A)	Comm Parameter Reset @Initialize	V/f OLV/PM EZOLV Sets the function to initialize *F6-xx and F7-xx parameters* when the drive is initialized with *A1-03 [Initialize Parameters]*. 0 : No Reset - Parameters Retained 1 : Reset Back to Factory Default	0 (0, 1)
F6-14 (03BB)	BUS Error Auto Reset	V/f OLV/PM EZOLV Sets the automatic reset function for *bUS [Option Communication Errors]*. 0 : Disable 1 : Enabled	0 (0, 1)
F6-15 (0B5B)	Comm. Option Parameters Reload	V/f OLV/PM EZOLV Sets the update method when you change *F6-xx, F7-xx [Communication Options]*. 0 : Reload at Next Power Cycle 1 : Reload Now 2 : Cancel Reload Request	0 (0 - 2)
F6-16 (0B8A)	Gateway Mode	V/f OLV/PM EZOLV Sets the gateway mode operation and the number of connected slave drives. 0 : Disabled 1 : Enabled: 1 Slave Drives 2 : Enabled: 2 Slave Drives 3 : Enabled: 3 Slave Drives 4 : Enabled: 4 Slave Drives	0 (0 to 4)
F6-30 (03CB)	PROFIBUS-DP Node Address	V/f OLV/PM EZOLV Sets the node address for PROFIBUS-DP communication. Restart the drive after you change the parameter setting. **Note:** Be sure to set an address that is different than all other node addresses. Do not set this parameter to 0.	0 (0 - 125)
F6-31 (03CC)	PROFIBUS-DP Clear Mode Selection	V/f OLV/PM EZOLV Sets what the drive will do after it receives the Clear Mode command. 0 : Reset 1 : Hold Previous State	0 (0, 1)
F6-32 (03CD)	PROFIBUS-DP Data Format Select	V/f OLV/PM EZOLV Sets the data format of PROFIBUS-DP communication. Restart the drive after you change the parameter setting. 0 : PPO Type 1 : Conventional 2 : PPO (bit0) 3 : PPO (Enter) 4 : Conventional (Enter) 5 : PPO (bit0, Enter)	0 (0 - 5)
F6-35 (03D0)	CANopen Node ID Selection	V/f OLV/PM EZOLV Sets the node address for CANopen communication. Restart the drive after you change the parameter setting. **Note:** Be sure to set an address that is different than all other node addresses. Do not set this parameter to *0*. Incorrect parameter settings will cause *AEr [Station Address Setting Error]* errors and the L. ERR LED on the option will come on.	0 (0 - 126)
F6-36 (03D1)	CANopen Communication Speed	V/f OLV/PM EZOLV Sets the CANopen communications speed. Restart the drive after you change the parameter setting. 0 : Auto-detection 1 : 10 kbps 2 : 20 kbps 3 : 50 kbps 4 : 125 kbps 5 : 250 kbps 6 : 500 kbps 7 : 800 kbps 8 : 1 Mbps	6 (0 - 8)

No. (Hex.)	Name	Description	Default (Range)
F6-45 (02FB)	BACnet Node Address	V/f OLV/PM EZOLV Sets the node address for BACnet communication. **Note:** Be sure to set an address that is different than all other node addresses. Do not set this parameter to 0.	1 (0 - 127)
F6-46 (02FC)	BACnet Baud Rate	V/f OLV/PM EZOLV Sets the BACnet communications speed. 0 : 1200 bps 1 : 2400 bps 2 : 4800 bps 3 : 9600 bps 4 : 19.2 kbps 5 : 38.4 kbps 6 : 57.6 kbps 7 : 76.8 kbps 8 : 115.2 kbps	3 (0 - 8)
F6-47 (02FD)	Rx to Tx Wait Time	V/f OLV/PM EZOLV Sets the wait time for the drive to receive and send BACnet communication.	5 ms (5 - 65 ms)
F6-48 (02FE)	BACnet Device Object Identifier0	V/f OLV/PM EZOLV Sets the last word of BACnet communication addresses.	0 (0 - FFFF)
F6-49 (02FF)	BACnet Device Object Identifier1	V/f OLV/PM EZOLV Sets the last word of BACnet communication addresses.	0 (0 - 3F)
F6-50 (03C1)	DeviceNet MAC Address	V/f OLV/PM EZOLV Sets the MAC address for DeviceNet communication. Restart the drive after you change the parameter setting. **Note:** Be sure to set a MAC address that is different than all other node addresses. Do not set this parameter to 0. Incorrect parameter settings will cause *AEr [Station Address Setting Error]* errors and the MS LED on the option will flash.	64 (0 - 64)
F6-51 (03C2)	DeviceNet Baud Rate	V/f OLV/PM EZOLV Sets the DeviceNet communications speed. Restart the drive after you change the parameter setting. 0 : 125 kbps 1 : 250 kbps 2 : 500 kbps 3 : Adjustable from Network 4 : Detect Automatically	4 (0 - 4)
F6-52 (03C3)	DeviceNet PCA Setting	V/f OLV/PM EZOLV Sets the format of data that the DeviceNet communication master sends to the drive.	21 (0 - 255)
F6-53 (03C4)	DeviceNet PPA Setting	V/f OLV/PM EZOLV Sets the format of data that the drive sends to the DeviceNet communication master.	71 (0 - 255)
F6-54 (03C5)	Net Idle Fault Detection	V/f OLV/PM EZOLV Sets the function to detect *EF0 [Option Card External Fault]* when the drive does not receive data from the DeviceNet or EtherNet/IP master. 0 : Enabled 1 : Disabled, No Fault Detection 2 : Vendor Specific 3 : RUN Forward 4 : RUN Reverse	0 (0 - 4)
F6-55 (03C6)	DeviceNet Baud Rate Monitor	V/f OLV/PM EZOLV Sets the function to see the actual DeviceNet communications speed using the keypad. This parameter functions as a monitor only. 0 : 125 kbps 1 : 250 kbps 2 : 500 kbps	0 (0 - 2)
F6-56 (03D7)	DeviceNet Speed Scaling	V/f OLV/PM EZOLV Sets the speed scale for DeviceNet communication.	0 (-15 - +15)
F6-57 (03D8)	DeviceNet Current Scaling	V/f OLV/PM EZOLV Sets the current scale of the DeviceNet communication master.	0 (-15 - +15)
F6-58 (03D9)	DeviceNet Torque Scaling	V/f OLV/PM EZOLV Sets the torque scale of the DeviceNet communication master.	0 (-15 - +15)

No. (Hex.)	Name	Description	Default (Range)
F6-59 (03DA)	DeviceNet Power Scaling	V/f OLV/PM EZOLV Sets the power scale of the DeviceNet communication master.	0 (-15 - +15)
F6-60 (03DB)	DeviceNet Voltage Scaling	V/f OLV/PM EZOLV Sets the voltage scale of the DeviceNet communication master.	0 (-15 - +15)
F6-61 (03DC)	DeviceNet Time Scaling	V/f OLV/PM EZOLV Sets the time scale of the DeviceNet communication master.	0 (-15 - +15)
F6-62 (03DD)	DeviceNet Heartbeat Interval	V/f OLV/PM EZOLV Sets the heartbeat for DeviceNet communication. Set this parameter to 0 to disable the heartbeat function.	0 (0 - 10)
F6-63 (03DE)	DeviceNet Network MAC ID	V/f OLV/PM EZOLV Sets the function to see the actual DeviceNet MAC address using the keypad. This parameter functions as a monitor only.	63 (0 - 63)
F6-64 (03DF)	Dynamic Out Assembly 109 Param1	V/f OLV/PM EZOLV Sets Configurable Output 1 written to the MEMOBUS register.	0000H (0000H - FFFFH)
F6-65 (03E0)	Dynamic Out Assembly 109 Param2	V/f OLV/PM EZOLV Sets Configurable Output 2 written to the MEMOBUS register.	0000H (0000H - FFFFH)
F6-66 (03E1)	Dynamic Out Assembly 109 Param3	V/f OLV/PM EZOLV Sets Configurable Output 3 written to the MEMOBUS register.	0000H (0000H - FFFFH)
F6-67 (03E2)	Dynamic Out Assembly 109 Param4	V/f OLV/PM EZOLV Sets Configurable Output 4 written to the MEMOBUS register.	0000H (0000H - FFFFH)
F6-68 (03E3)	Dynamic In Assembly 159 Param 1	V/f OLV/PM EZOLV Sets Configurable Input 1 read from the MEMOBUS register.	0000H (0000H - FFFFH)
F6-69 (03E4)	Dynamic In Assembly 159 Param 2	V/f OLV/PM EZOLV Sets Configurable Input 2 read from the MEMOBUS register.	0000H (0000H - FFFFH)
F6-70 (03C7)	Dynamic In Assembly 159 Param 3	V/f OLV/PM EZOLV Sets Configurable Input 3 read from the MEMOBUS register.	0000H (0000H - FFFFH)
F6-71 (03C8)	Dynamic In Assembly 159 Param 4	V/f OLV/PM EZOLV Sets Configurable Input 4 read from the MEMOBUS register.	0000H (0000H - FFFFH)
F6-75 (0B20)	Protocol Selection	V/f OLV/PM EZOLV Sets the protocol for the SI-J3 option card. 1 : N2 (Metasys) 2 : P1 (APOGEE FLN)	2 (1, 2)
F6-76 (0B21)	P1/N2 Communications Fault	V/f OLV/PM EZOLV Enables and disables *bUS [Option Communication Error]* fault detection for the SI-J3 option card. 0 : Disabled 1 : Enabled	1 (0, 1)
F6-77 (0B22)	P1/N2 Fault Time	V/f OLV/PM EZOLV Sets the length of time before the drive will clear a *bUS [Option Communication Error]* fault for the SI-J3 option card.	2.0 s (0.0 - 10.0 s)
F6-78 (0B23)	P1/N2 Address	V/f OLV/PM EZOLV Sets the network node address for the SI-J3 option card.	1 (0 - 255)
F6-79 (0B24)	Baud Rate for P1	V/f OLV/PM EZOLV Sets the baud rate for the P1 protocol with the SI-J3 option card. 2 : 4800 bps 3 : 9600 bps	3 (2, 3)

◆ F7: Ethernet Options

No. (Hex.)	Name	Description	Default (Range)
F7-01 (03E5)	IP Address 1	V/f OLV/PM EZOLV Sets the first octet of the IP Address for the device that is connecting to the network. Restart the drive after you change this parameter. **Note:** When *F7-13 = 0 [Address Mode at Startup = Static]*: • Use parameters *F7-01 to F7-04 [IP Address 1 to 4]* to set the IP Address. Be sure to set a different IP address for each drive on the network. • Also set parameters *F7-05 to F7-12 [Subnet Mask 1 to 4, Gateway Address 1 to 4]*.	192 (0 - 255)
F7-02 (03E6)	IP Address 2	V/f OLV/PM EZOLV Sets the second octet of the IP Address for the device that is connecting to the network. Restart the drive after you change this parameter. **Note:** When *F7-13 = 0 [Address Mode at Startup = Static]*: • Use parameters *F7-01 to F7-04 [IP Address 1 to 4]* to set the IP Address. Be sure to set a different IP address for each drive on the network. • Also set parameters *F7-05 to F7-12 [Subnet Mask 1 to 4, Gateway Address 1 to 4]*.	168 (0 - 255)
F7-03 (03E7)	IP Address 3	V/f OLV/PM EZOLV Sets the third octet of the IP Address for the device that is connecting to the network. Restart the drive after you change this parameter. **Note:** When *F7-13 = 0 [Address Mode at Startup = Static]*: • Use parameters *F7-01 to F7-04 [IP Address 1 to 4]* to set the IP Address. Be sure to set a different IP address for each drive on the network. • Also set parameters *F7-05 to F7-12 [Subnet Mask 1 to 4, Gateway Address 1 to 4]*.	1 (0 - 255)
F7-04 (03E8)	IP Address 4	V/f OLV/PM EZOLV Sets the fourth octet of the IP Address for the device that is connecting to the network. Restart the drive after you change this parameter. **Note:** When *F7-13 = 0 [Address Mode at Startup = Static]*: • Use parameters *F7-01 to F7-04 [IP Address 1 to 4]* to set the IP Address. Be sure to set a different IP address for each drive on the network. • Also set parameters *F7-05 to F7-12 [Subnet Mask 1 to 4, Gateway Address 1 to 4]*.	20 (0 - 255)
F7-05 (03E9)	Subnet Mask 1	V/f OLV/PM EZOLV Sets the first octet of the subnet mask of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	255 (0 - 255)
F7-06 (03EA)	Subnet Mask 2	V/f OLV/PM EZOLV Sets the second octet of the subnet mask of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	255 (0 - 255)
F7-07 (03EB)	Subnet Mask 3	V/f OLV/PM EZOLV Sets the third octet of the subnet mask of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	255 (0 - 255)
F7-08 (03EC)	Subnet Mask 4	V/f OLV/PM EZOLV Sets the fourth octet of the subnet mask of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	0 (0 - 255)
F7-09 (03ED)	Gateway Address 1	V/f OLV/PM EZOLV Sets the first octet of the gateway address of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	192 (0 - 255)
F7-10 (03EE)	Gateway Address 2	V/f OLV/PM EZOLV Sets the second octet of the gateway address of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	168 (0 - 255)
F7-11 (03EF)	Gateway Address 3	V/f OLV/PM EZOLV Sets the third octet of the gateway address of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	1 (0 - 255)

No. (Hex.)	Name	Description	Default (Range)
F7-12 (03F0)	Gateway Address 4	V/f OLV/PM EZOLV Sets the fourth octet of the gateway address of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	1 (0 - 255)
F7-13 (03F1)	Address Mode at Startup	V/f OLV/PM EZOLV Sets the method to set option card IP addresses. 0 : Static 1 : BOOTP 2 : DHCP **Note:** • The following setting values are available when using the PROFINET communication option card (SI-EP3). −0: Static −2: DHCP • When *F7-13 = 0*, set parameters *F7-01 to F7-12 [IP Address 1 to Gateway Address 4]* to set the IP Address. Be sure to set a different IP address for each drive on the network.	2 (0 - 2)
F7-14 (03F2)	Duplex Mode Selection	V/f OLV/PM EZOLV Sets the duplex mode setting method. 0 : Half/Half 1 : Auto/Auto 2 : Full/Full 3 : Half/Auto 4 : Half/Full 5 : Auto/Half 6 : Auto/Full 7 : Full/Half 8 : Full/Auto	1 (0 - 8)
F7-15 (03F3)	Communication Speed Selection	V/f OLV/PM EZOLV Sets the communications speed. 10 : 10/10 Mbps 100 : 100/100 Mbps 101 : 10/100 Mbps 102 : 100/10 Mbps	10 (10, 100 - 102)
F7-16 (03F4)	Timeout Value	V/f OLV/PM EZOLV Sets the detection time for a communications timeout. **Note:** Set this parameter to 0.0 to disable the connection timeout function.	0.0 s (0.0 - 30.0 s)
F7-17 (03F5)	EtherNet/IP Speed Scaling Factor	V/f OLV/PM EZOLV Sets the scaling factor for the speed monitor in the EtherNet/IP Class ID 2AH Object.	0 (-15 - +15)
F7-18 (03F6)	EtherNet/IP Current Scale Factor	V/f OLV/PM EZOLV Sets the scaling factor for the output current monitor in the EtherNet/IP Class ID 2AH Object.	0 (-15 - +15)
F7-19 (03F7)	EtherNet/IP Torque Scale Factor	V/f OLV/PM EZOLV Sets the scaling factor for the torque monitor in the EtherNet/IP Class ID 2AH Object.	0 (-15 - +15)
F7-20 (03F8)	EtherNet/IP Power Scaling Factor	V/f OLV/PM EZOLV Sets the scaling factor for the power monitor in the EtherNet/IP Class ID 2AH Object.	0 (-15 - +15)
F7-21 (03F9)	EtherNet/IP Voltage Scale Factor	V/f OLV/PM EZOLV Sets the scaling factor for the voltage monitor in the EtherNet/IP Class ID 2AH Object.	0 (-15 - +15)
F7-22 (03FA)	EtherNet/IP Time Scaling	V/f OLV/PM EZOLV Sets the scaling factor for the time monitor in the EtherNet/IP Class ID 2AH Object.	0 (-15 - +15)
F7-23 (03FB)	Dynamic Out Param 1 for CommCard	V/f OLV/PM EZOLV When you use an Ethernet/IP option, sets Output Assembly 116. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0. When you use a PROFINET option, set this parameter to set to configurable output 1.	0
F7-24 (03FC)	Dynamic Out Param 2 for CommCard	V/f OLV/PM EZOLV When you use an Ethernet/IP option, sets Output Assembly 116. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0. When you use a PROFINET option, set this parameter to set to configurable output 2.	0

No. (Hex.)	Name	Description	Default (Range)
F7-25 (03FD)	Dynamic Out Param 3 for CommCard	V/f OLV/PM EZOLV When you use an Ethernet/IP option, sets Output Assembly 116. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0. When you use a PROFINET option, set this parameter to set to configurable output 3.	0
F7-26 (03FE)	Dynamic Out Param 4 for CommCard	V/f OLV/PM EZOLV Sets Output Assembly 116 when you use an Ethernet/IP option. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0. When you use a PROFINET option, set this parameter to set to configurable output 4.	0
F7-27 (03FF)	Dynamic Out Param 5 for CommCard	V/f OLV/PM EZOLV When you use an Ethernet/IP option, sets Output Assembly 116. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0. When you use a PROFINET option, set this parameter to set to configurable output 5.	0
F7-28 (0370)	Dynamic Out Param 6 for CommCard	V/f OLV/PM EZOLV When you use an Ethernet/IP option, sets Output Assembly 116. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0.	0
F7-29 (0371)	Dynamic Out Param 7 for CommCard	V/f OLV/PM EZOLV When you use an Ethernet/IP option, sets Output Assembly 116. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0.	0
F7-30 (0372)	Dynamic Out Param 8 for CommCard	V/f OLV/PM EZOLV When you use an Ethernet/IP option, sets Output Assembly 116. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0.	0
F7-31 (0373)	Dynamic Out Param 9 for CommCard	V/f OLV/PM EZOLV When you use an Ethernet/IP option, sets Output Assembly 116. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0.	0
F7-32 (0374)	Dynamic Out Param 10 for CommCard	V/f OLV/PM EZOLV When you use an Ethernet/IP option, sets Output Assembly 116. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0.	0
F7-33 (0375)	Dynamic In Param 1 for CommCard	V/f OLV/PM EZOLV Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined. When you use a PROFINET option, set this parameter to set to configurable input 1.	0
F7-34 (0376)	Dynamic In Param 2 for CommCard	V/f OLV/PM EZOLV Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined. When you use a PROFINET option, set this parameter to set to configurable input 2.	0
F7-35 (0377)	Dynamic In Param 3 for CommCard	V/f OLV/PM EZOLV Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined. When you use a PROFINET option, set this parameter to set to configurable input 3.	0
F7-36 (0378)	Dynamic In Param 4 for CommCard	V/f OLV/PM EZOLV Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined. When you use a PROFINET option, set this parameter to set to configurable input 4.	0
F7-37 (0379)	Dynamic In Param 5 for CommCard	V/f OLV/PM EZOLV Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined. When you use a PROFINET option, set this parameter to set to configurable input 5.	0

No. (Hex.)	Name	Description	Default (Range)
F7-38 (037A)	Dynamic In Param 6 for CommCard	V/f OLV/PM EZOLV Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined.	0
F7-39 (037B)	Dynamic In Param 7 for CommCard	V/f OLV/PM EZOLV Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined.	0
F7-40 (037C)	Dynamic In Param 8 for CommCard	V/f OLV/PM EZOLV Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined.	0
F7-41 (037D)	Dynamic In Param 9 for CommCard	V/f OLV/PM EZOLV Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined.	0
F7-42 (037E)	Dynamic In Param 10 for CommCard	V/f OLV/PM EZOLV Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined.	0
F7-43 (1BCE)	PLC Cnxn Close Behavior@Run	V/f OLV/PM EZOLV Sets the operation when the Forward Close command (PLC communication disconnection command) is received from the network during run. **Note:** This parameter is compatible with option software versions PRG: 3003 and later. Refer to *U6-97 [OPT SPARE 4]* to check the option software version. 0 : Continue 1 : Clear RUN Command 2 : bUS Fault (set by F6-01)	0 (0 - 2)
F7-50 (1BC1)	BACnet/IP Port #	V/f OLV/PM EZOLV Sets the UDP port on which the drive will receive incoming BACnet messages.	47808 (1024 - 65535)
F7-51 (1BE9)	BBMD Foreign Register Addr 1	V/f OLV/PM EZOLV Sets the first octet of the IP Address of the BBMD device to which this unit will register as a foreign device.	0 (0 - 255)
F7-52 (1BEA)	BBMD Foreign Register Addr 2	V/f OLV/PM EZOLV Sets the second octet of the IP Address of the BBMD device to which this unit will register as a foreign device.	0 (0 - 255)
F7-53 (1BEB)	BBMD Foreign Register Addr 3	V/f OLV/PM EZOLV Sets the third octet of the IP Address of the BBMD device to which this unit will register as a foreign device.	0 (0 - 255)
F7-54 (1BEC)	BBMD Foreign Register Addr 4	V/f OLV/PM EZOLV Sets the fourth octet of the IP Address of the BBMD device to which this unit will register as a foreign device.	0 (0 - 255)
F7-55 (1BED)	BBMD Foreign Register Port #	V/f OLV/PM EZOLV Sets the UDP port of the BBMD device to which this unit will register.	47808 (1024 - 65535)
F7-56 (1BEE)	BBMD Foreign Register Time	V/f OLV/PM EZOLV Sets the time interval in which this unit will repeat BBMD foreign registration.	3600 s (0 - 65535 s)
F7-57 (1BEF)	BACnet/IP bUS Timeout Value	V/f OLV/PM EZOLV Sets the length of time that this unit will wait after it receives a Run command or frequency reference command before it detects a *bUS* fault.	3600 s (0 - 65535 s)
F7-60 (0780)	PZD1 Write (Control Word)	V/f OLV/PM EZOLV When you use a Profibus option, set the MEMOBUS/Modbus address for PZD1 (PPO output). PZD1 (PPO output) functions as the STW when *F7-60 = 0 to 2*.	0
F7-61 (0781)	PZD2 Write (Frequency Reference)	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD2 (PPO output). PZD2 (PPO output) functions as the HSW when *F7-61 = 0 to 2*.	0
F7-62 (0782)	PZD3 Write	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD3 (PPO output). A value of 0, 1, or 2 will disable the PZD3 (PPO output) write operation to the MEMOBUS/Modbus register.	0

No. (Hex.)	Name	Description	Default (Range)
F7-63 (0783)	PZD4 Write	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD4 (PPO output). A value of 0, 1, or 2 will disable the PZD4 (PPO output) write operation to the MEMOBUS/Modbus register.	0
F7-64 (0784)	PZD5 Write	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD5 (PPO output). A value of 0, 1, or 2 will disable the PZD5 (PPO output) write operation to the MEMOBUS/Modbus register.	0
F7-65 (0785)	PZD6 Write	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD6 (PPO output). A value of 0, 1, or 2 will disable the PZD6 (PPO output) write operation to the MEMOBUS/Modbus register.	0
F7-66 (0786)	PZD7 Write	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD7 (PPO output). A value of 0, 1, or 2 will disable the PZD7 (PPO output) write operation to the MEMOBUS/Modbus register.	0
F7-67 (0787)	PZD8 Write	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD8 (PPO output). A value of 0, 1, or 2 will disable the PZD8 (PPO output) write operation to the MEMOBUS/Modbus register.	0
F7-68 (0788)	PZD9 Write	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD9 (PPO output). A value of 0, 1, or 2 will disable the PZD9 (PPO output) write operation to the MEMOBUS/Modbus register.	0
F7-69 (0789)	PZD10 Write	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD10 (PPO output). A value of 0, 1, or 2 will disable the PZD10 (PPO output) write operation to the MEMOBUS/Modbus register.	0
F7-70 (078A)	PZD1 Read (Status Word)	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD1 (PPO input). PZD1 (PPO input) functions as the ZSW when *F7-70 = 0*.	0
F7-71 (078B)	PZD2 Read (Output Frequency)	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD2 (PPO input). PZD2 (PPO input) functions as the HIW when *F7-71 = 0*.	0
F7-72 (078C)	PZD3 Read	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD3 (PPO input). A value of 0 will disable the PZD3 (PPO input) load operation from the MEMOBUS/Modbus register.	0
F7-73 (078D)	PZD4 Read	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD4 (PPO input). A value of 0 will disable the PZD4 (PPO input) load operation from the MEMOBUS/Modbus register.	0
F7-74 (078E)	PZD5 Read	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD5 (PPO input). A value of 0 will disable the PZD5 (PPO input) load operation from the MEMOBUS/Modbus register.	0
F7-75 (078F)	PZD6 Read	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD6 (PPO input). A value of 0 will disable the PZD6 (PPO input) load operation from the MEMOBUS/Modbus register.	0
F7-76 (0790)	PZD7 Read	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD7 (PPO input). A value of 0 will disable the PZD7 (PPO input) load operation from the MEMOBUS/Modbus register.	0
F7-77 (0791)	PZD8 Read	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD8 (PPO input). A value of 0 will disable the PZD8 (PPO input) load operation from the MEMOBUS/Modbus register.	0
F7-78 (0792)	PZD9 Read	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD9 (PPO input). A value of 0 will disable the PZD9 (PPO input) load operation from the MEMOBUS/Modbus register.	0
F7-79 (0793)	PZD10 Read	V/f OLV/PM EZOLV When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD10 (PPO input). A value of 0 will disable the PZD10 (PPO input) load operation from the MEMOBUS/Modbus register.	0

5.9 H: Terminal Functions

◆ H1: Digital Inputs

No. (Hex.)	Name	Description	Default (Range)
H1-01 (0438)	Terminal S1 Function Selection	V/f OLV/PM EZOLV Sets the function for MFDI terminal S1. **Note:** The default setting is *F* when you initialize the drive for *3-Wire Initialization [A1-03 = 3330]*.	40 (1 - 1FF)
H1-02 (0439)	Terminal S2 Function Selection	V/f OLV/PM EZOLV Sets the function for MFDI terminal S2. **Note:** The default setting is *F* when you initialize the drive for *3-Wire Initialization [A1-03 = 3330]*.	F (1 - 1FF)
H1-03 (0400)	Terminal S3 Function Selection	V/f OLV/PM EZOLV Sets the function for MFDI terminal S3.	26 (0 - 1FF)
H1-04 (0401)	Terminal S4 Function Selection	V/f OLV/PM EZOLV Sets the function for MFDI terminal S4.	14 (0 - 1FF)
H1-05 (0402)	Terminal S5 Function Selection	V/f OLV/PM EZOLV Sets the function for MFDI terminal S5. **Note:** The default setting is *0* when the drive is initialized for *3-Wire Initialization [A1-03 = 3330]*.	C7 (0 - 1FF)
H1-06 (0403)	Terminal S6 Function Selection	V/f OLV/PM EZOLV Sets the function for MFDI terminal S6. **Note:** The default setting is *3* when the drive is initialized for *3-Wire Initialization [A1-03 = 3330]*.	80 (0 - 1FF)
H1-07 (0404)	Terminal S7 Function Selection	V/f OLV/PM EZOLV Sets the function for MFDI terminal S7. **Note:** The default setting is *4* when the drive is initialized for *3-Wire Initialization [A1-03 = 3330]*.	81 (0 - 1FF)
H1-08 (0405)	Terminal S8 Function Selection	V/f OLV/PM EZOLV Sets the function for MFDI terminal S8.	F (0 - 1FF)
H1-21 (0B70) RUN	EF1 Delay Time	V/f OLV/PM EZOLV Sets the amount of time delay applied to the *EF1* fault and alarm. (*20 ≤ H1-01 ≤ 2F*)	0.00 s (0.00 - 300.00 s)
H1-22 (0B71) RUN	EF2 Delay Time	V/f OLV/PM EZOLV Sets the amount of time delay applied to the *EF2* fault and alarm. (*20 ≤ H1-02 ≤ 2F*)	0.00 s (0.00 - 300.00 s)
H1-23 (0B72) RUN	EF3 Delay Time	V/f OLV/PM EZOLV Sets the amount of time delay applied to the *EF3* fault and alarm. (*20 ≤ H1-03 ≤ 2F*)	0.00 s (0.00 - 300.00 s)
H1-24 (0B73) RUN	EF4 Delay Time	V/f OLV/PM EZOLV Sets the amount of time delay applied to the *EF4* fault and alarm. (*20 ≤ H1-04 ≤ 2F*)	0.00 s (0.00 - 300.00 s)
H1-25 (0B74) RUN	EF5 Delay Time	V/f OLV/PM EZOLV Sets the amount of time delay applied to the *EF5* fault and alarm. (*20 ≤ H1-05 ≤ 2F*)	0.00 s (0.00 - 300.00 s)
H1-26 (0B75) RUN	EF6 Delay Time	V/f OLV/PM EZOLV Sets the amount of time delay applied to the *EF6* fault and alarm. (*20 ≤ H1-06 ≤ 2F*)	0.00 s (0.00 - 300.00 s)
H1-27 (0B76) RUN	EF7 Delay Time	V/f OLV/PM EZOLV Sets the amount of time delay applied to the *EF7* fault and alarm. (*20 ≤ H1-07 ≤ 2F*)	0.00 s (0.00 - 300.00 s)
H1-28 (0B77) RUN	EF8 Delay Time	V/f OLV/PM EZOLV Sets the amount of time delay applied to the *EF8* fault and alarm. (*20 ≤ H1-08 ≤ 2F*)	0.00 s (0.00 - 300.00 s)
H1-40 (0B54)	Mbus Reg 15C0h bit0 Input Func	V/f OLV/PM EZOLV Sets the MFDI function assigned to *bit 0* of the MEMOBUS register *15C0 (Hex.)*.	F (1 - 1FF)

No. (Hex.)	Name	Description	Default (Range)
H1-41 (0B55)	Mbus Reg 15C0h bit1 Input Func	V/f OLV/PM EZOLV Sets the MFDI function assigned to *bit 1* of the MEMOBUS register *15C0 (Hex.)*.	F (1 - 1FF)
H1-42 (0B56)	Mbus Reg 15C0h bit2 Input Func	V/f OLV/PM EZOLV Sets the MFDI function assigned to *bit 2* of the MEMOBUS register *15C0 (Hex.)*.	F (1 - 1FF)
H1-61 (39E1) RUN	Terminal S1 On-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S1 to be closed before the drive does the programmed function.	0.0 s (0.0 - 3000.0 s)
H1-62 (39E2) RUN	Terminal S2 On-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S2 to be closed before the drive does the programmed function.	0.0 s (0.0 - 3000.0 s)
H1-63 (39E3) RUN	Terminal S3 On-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S3 to be closed before the drive does the programmed function.	0.0 s (0.0 - 3000.0 s)
H1-64 (39E4) RUN	Terminal S4 On-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S4 to be closed before the drive does the programmed function.	0.0 s (0.0 - 3000.0 s)
H1-65 (39E5) RUN	Terminal S5 On-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S5 to be closed before the drive does the programmed function.	0.0 s (0.0 - 3000.0 s)
H1-66 (39E6) RUN	Terminal S6 On-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S6 to be closed before the drive does the programmed function.	0.0 s (0.0 - 3000.0 s)
H1-67 (39E7) RUN	Terminal S7 On-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S7 to be closed before the drive does the programmed function.	0.0 s (0.0 - 3000.0 s)
H1-68 (39E8) RUN	Terminal S8 On-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S8 to be closed before the drive does the programmed function.	0.0 s (0.0 - 3000.0 s)
H1-71 (39EB) RUN	Terminal S1 Off-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S1 to be open before the drive removes the programmed function.	0.0 s (0.0 - 3000.0 s)
H1-72 (39EC) RUN	Terminal S2 Off-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S2 to be open before the drive removes the programmed function.	0.0 s (0.0 - 3000.0 s)
H1-73 (39ED) RUN	Terminal S3 Off-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S3 to be open before the drive removes the programmed function.	0.0 s (0.0 - 3000.0 s)
H1-74 (39EE) RUN	Terminal S4 Off-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S4 to be open before the drive removes the programmed function.	0.0 s (0.0 - 3000.0 s)
H1-75 (39EF) RUN	Terminal S5 Off-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S5 to be open before the drive removes the programmed function.	0.0 s (0.0 - 3000.0 s)
H1-76 (39F0) RUN	Terminal S6 Off-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S6 to be open before the drive removes the programmed function.	0.0 s (0.0 - 3000.0 s)
H1-77 (39F1) RUN	Terminal S7 Off-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S7 to be open before the drive removes the programmed function.	0.0 s (0.0 - 3000.0 s)
H1-78 (39F2) RUN	Terminal S8 Off-Delay Time	V/f OLV/PM EZOLV Sets the length of time necessary for Terminal S8 to be open before the drive removes the programmed function.	0.0 s (0.0 - 3000.0 s)

■ H1-xx: MFDI Setting Values

Setting Value	Function	Description
0	3-Wire Sequence	V/f OLV/PM EZOLV Sets the direction of motor rotation for 3-wire sequence.
2	External Reference 1/2 Selection	V/f OLV/PM EZOLV Sets the drive to use Run command source 1/2 or Reference command source 1/2 when in REMOTE Mode. ON : *b1-15 [Frequency Reference Selection 2], b1-16 [Run Command Selection 2]* OFF : *b1-01 [Frequency Reference Selection 1], b1-02 [Run Command Selection 1]*
3	Multi-Step Speed Reference 1	V/f OLV/PM EZOLV Uses speed references *d1-01 to d1-16* to set a multi-step speed reference.
4	Multi-Step Speed Reference 2	V/f OLV/PM EZOLV Uses speed references *d1-01 to d1-16* to set a multi-step speed reference.
5	Multi-Step Speed Reference 3	V/f OLV/PM EZOLV Uses speed references *d1-01 to d1-16* to set a multi-step speed reference.
6	Jog Reference Selection	V/f OLV/PM EZOLV Sets the drive to use the JOG Frequency Reference (JOG command) set in *d1-17*. The JOG Frequency Reference (JOG command) overrides *Frequency References 1 to 16 (d1-01 to d1-16)*.
7	Accel/Decel Time Selection 1	V/f OLV/PM EZOLV Sets the drive to use *Acceleration/Deceleration Time 1 [C1-01, C1-02]* or *Acceleration/Deceleration Time 2 [C1-03, C1-04]*.
8	Baseblock Command (N.O.)	V/f OLV/PM EZOLV Sets the command that stops drive output and coasts the motor to stop when the input is ON. ON : Baseblock (drive output stop) OFF : Normal operation
9	Baseblock Command (N.C.)	V/f OLV/PM EZOLV Sets the command that stops drive output and coasts the motor to stop when the input terminal is OFF. ON : Normal operation OFF : Baseblock (drive output stop)
A	Accel/Decel Ramp Hold	V/f OLV/PM EZOLV Momentarily pauses motor acceleration and deceleration when the terminal is turned ON, retains the output frequency that was stored in the drive at the time of the pause, and restarts motor operation.
B	Overheat Alarm (oH2)	V/f OLV/PM EZOLV Sets the drive to show an *oH2 [External Overheat (H1-XX=B)]* alarm when the input terminal is ON. The alarm does not have an effect on drive operation.
C	Analog Terminal Enable Selection	V/f OLV/PM EZOLV Sets the command that enables or disables the terminals selected in *H3-14 [Analog Input Terminal Enable Sel]*. ON : Terminal selected with *H3-14* is enabled OFF : Terminal selected with *H3-14* is disabled
E	ASR Integral Reset	V/f OLV/PM EZOLV Sets the command to reset the integral value and use PI control or P control for the speed control loop. ON : P control OFF : PI control
F	Not Used	V/f OLV/PM EZOLV Use this setting for unused terminals or to use terminals in through mode.
10	Up Command	V/f OLV/PM EZOLV Sets the command to use a push button switch to increase the drive frequency reference. You must also set *Setting 11 [Down Command]*. ON : Increases the frequency reference. OFF : Holds the current frequency reference.
11	Down Command	V/f OLV/PM EZOLV Sets the command to use a push button switch to decrease the drive frequency reference. You must also set *Setting 10 [Up Command]*. ON : Decreases the frequency reference. OFF : Holds the current frequency reference.
12	Forward Jog	V/f OLV/PM EZOLV Sets the command to operate the motor in the forward direction at the Jog Frequency set in *d1-17 [Jog Reference]*.
13	Reverse Jog	V/f OLV/PM EZOLV Sets the command to operate the motor in the reverse direction at the Jog Frequency set in *d1-17 [Jog Reference]*.

Setting Value	Function	Description
14	Fault Reset	V/f OLV/PM EZOLV Sets the command to reset the current fault when the Run command is inactive. **Note:** The drive ignores the fault reset command when the Run command is active. Remove the Run command before trying to reset a fault.
15	Fast Stop (N.O.)	V/f OLV/PM EZOLV Sets the command to ramp to stop in the deceleration time set in *C1-09 [Fast Stop Time]* when the input terminal is activated while the drive is operating.
16	Motor 2 Selection	V/f OLV/PM EZOLV Sets the command for the drive to operate motor 1 or motor 2. Stop the motors before switching. ON : Selects motor 2. OFF : Selects motor 1.
17	Fast Stop (N.C.)	V/f OLV/PM EZOLV Sets the command to ramp to stop in the deceleration time set in *C1-09 [Fast Stop Time]* when the input terminal is activated while the drive is operating.
18	Timer Function	V/f OLV/PM EZOLV Sets the command to start the timer function. Use this setting with *Timer Output [H2-xx = 12]*.
19	PID Disable	V/f OLV/PM EZOLV Sets the command to disable PID control when *b5-01 = 1 [PID Mode Setting = Standard]*. ON : PID control disabled OFF : PID control enabled
1B	Programming Lockout	V/f OLV/PM EZOLV Sets the command to prevent parameter changes when the terminal is OFF. ON : Programming Lockout OFF : Parameter Write Prohibit
1E	Reference Sample Hold	V/f OLV/PM EZOLV Sets the command to sample the frequency reference at terminals A1, A2, or A3 and hold the frequency reference at that frequency.
20	Ext Pump Fault (NO-Always-Ramp)	V/f OLV/PM EZOLV When the terminal activates, the drive ramps to stop in the selected deceleration time. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive always detects external faults whether the drive is stopped or running.
21	Ext Pump Fault (NC-Always-Ramp)	V/f OLV/PM EZOLV When the terminal deactivates, the drive ramps to stop in the selected deceleration time. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive always detects external faults whether the drive is stopped or running.
22	Ext Pump Fault (NO-@Run-Ramp)	V/f OLV/PM EZOLV When the terminal activates during run, the drive ramps to stop in the selected deceleration time. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive does not detect external faults while the drive is stopped.
23	Ext Pump Fault (NC-@Run-Ramp)	V/f OLV/PM EZOLV When the terminal deactivates during run, the drive ramps to stop in the selected deceleration time. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive does not detect external faults while the drive is stopped.
24	Ext Pump Fault (NO-Always-Coast)	V/f OLV/PM EZOLV When the terminal activates, the drive shuts off the output and the motor coasts to stop. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive always detects external faults whether the drive is stopped or running.
25	Ext Pump Fault (NC-Always-Coast)	V/f OLV/PM EZOLV When the terminal deactivates, the drive shuts off the output and the motor coasts to stop. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive always detects external faults whether the drive is stopped or running.
26	Ext Pump Fault (NO-@Run-Coast)	V/f OLV/PM EZOLV When the terminal activates during run, the drive shuts off the output and the motor coasts to stop. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive does not detect external faults while the drive is stopped.
27	Ext Pump Fault (NC-@Run-Coast)	V/f OLV/PM EZOLV When the terminal deactivates during run, the drive shuts off the output and the motor coasts to stop. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive does not detect external faults while the drive is stopped.
28	Ext Pump Fault (NO-Always-FStop)	V/f OLV/PM EZOLV When the terminal activates, the drive stops the motor in the deceleration time set to *C1-09 [Fast Stop Time]*. Fault relay output terminal MA-MC turns ON, and MB-MC turns OFF. Stopped drives and running drives will detect external faults.
29	Ext Pump Fault (NC-Always-FStop)	V/f OLV/PM EZOLV When the terminal deactivates, the drive stops the motor in the deceleration time set to *C1-09 [Fast Stop Time]*. Fault relay output terminal MA-MC turns ON, and MB-MC turns OFF. Stopped drives and running drives will detect external faults.
2A	Ext Pump Fault (NO-@Run-FStop)	V/f OLV/PM EZOLV When the terminal activates during run, the drive stops the motor in the deceleration time set to *C1-09 [Fast Stop Time]*. Fault relay output terminal MA-MC turns ON, and MB-MC turns OFF. Stopped drives will not detect external faults.

Setting Value	Function	Description
2B	Ext Pump Fault (NC-@Run-FStop)	V/f OLV/PM EZOLV When the terminal deactivates during run, the drive stops the motor in the deceleration time set to *C1-09 [Fast Stop Time]*. Fault relay output terminal MA-MC turns ON, and MB-MC turns OFF. Stopped drives will not detect external faults.
2C	Ext Pump Fault (NO-Always-Alarm)	V/f OLV/PM EZOLV When the terminal activates, the keypad shows *EFx [Pump Fault (Terminal Sx)]* and the output terminal set for *Alarm [H2-01 to H2-03 = 10]* activates. The drive continues operation. The drive always detects external faults whether the drive is stopped or running.
2D	Ext Pump Fault (NC-Always-Alarm)	V/f OLV/PM EZOLV When the terminal deactivates, the keypad shows *EFx [Pump Fault (Terminal Sx)]* and the output terminal set for *Alarm [H2-01 to H2-03 = 10]* activates. The drive continues operation. The drive always detects external faults whether the drive is stopped or running.
2E	Ext Pump Fault (NO-@Run-Alarm)	V/f OLV/PM EZOLV When the terminal activates during run, the keypad shows *EFx [Pump Fault (Terminal Sx)]* and the output terminal set for *Alarm [H2-01 to H2-03 = 10]* activates. The drive continues operation. The drive does not detect external faults while the drive is stopped.
2F	Ext Pump Fault (NC-@Run-Alarm)	V/f OLV/PM EZOLV When the terminal deactivates during run, the keypad shows *EFx [Pump Fault (Terminal Sx)]* and the output terminal set for *Alarm [H2-01 to H2-03 = 10]* activates. The drive continues operation. The drive does not detect external faults while the drive is stopped.
30	PID Integrator Reset	V/f OLV/PM EZOLV Sets the command to reset and hold the PID control integral to 0 when the terminal is ON.
31	PID Integrator Hold	V/f OLV/PM EZOLV Sets the command to hold the integral value of the PID control while the terminal is activated.
32	Multi-Step Speed Reference 4	V/f OLV/PM EZOLV Uses speed references *d1-01 to d1-16* to set a multi-step speed reference.
34	PID Soft Starter Disable	V/f OLV/PM EZOLV Sets the PID soft starter function. ON : Disable OFF : Enabled
35	PID Input (Error) Invert	V/f OLV/PM EZOLV Sets the command to turn the terminal ON and OFF to switch the PID input level (polarity).
40	Forward RUN (2-Wire)	V/f OLV/PM EZOLV Sets the Forward Run command for 2-wire sequence 1. Set this function and *H1-xx = 41 [Reverse RUN (2-Wire)]* together. ON : Forward Run OFF : Stop **Note:** • If you turn ON the Forward Run command terminal and the Reverse Run command terminal, it will cause an *EF [FWD/REV Run Command Input Error]* alarm and the motor will ramp to stop. • Initialize the drive with a 2-wire sequence to set the Forward Run command to terminal S1. • This function will not operate at the same time as *H1-xx = 42, 43 [Run Command (2-Wire Sequence 2), FWD/REV (2-Wire Sequence 2)]*.
41	Reverse RUN (2-Wire)	V/f OLV/PM EZOLV Sets the Forward Run command for 2-wire sequence 1. Set this function and *H1-xx = 40 [Forward RUN (2-Wire)]* together. ON : Reverse Run OFF : Stop **Note:** • If you turn ON the Forward Run command terminal and the Reverse Run command terminal, it will cause an *EF [FWD/REV Run Command Input Error]* alarm and the motor will ramp to stop. • Initialize the drive with a 2-wire sequence to set the Reverse Run command to terminal S2. • This function will not operate at the same time as *H1-xx = 42, 43 [Run Command (2-Wire Sequence 2), FWD/REV (2-Wire Sequence 2)]*.
42	Run Command (2-Wire Sequence 2)	V/f OLV/PM EZOLV Sets the Run command for 2-wire sequence 2. Set this function and *H1-xx = 43 [FWD/REV (2-Wire Sequence 2)]* together. ON : Run OFF : Stop **Note:** This function will not operate at the same time as *H1-xx = 40, 41 [Forward RUN (2-Wire), Reverse RUN (2-Wire)]*.
43	FWD/REV (2-Wire Sequence 2)	V/f OLV/PM EZOLV Sets the direction of motor rotation for 2-wire sequence 2. Set this function and *H1-xx = 42 [Run Command (2-Wire Sequence 2)]* together. ON : Reverse Run OFF : Forward Run **Note:** • You must input the Run command to rotate the motor. • This function will not operate at the same time as *H1-xx = 40, 41 [Forward RUN (2-Wire), Reverse RUN (2-Wire)]*.
50	Motor Pre-heat 2	V/f OLV/PM EZOLV Sets the command to apply the motor pre-heat current set in *b2-09 [Pre-heat Current 2]*.

Setting Value	Function	Description
51	Sequence Timer Disable	V/f OLV/PM EZOLV Sets the function for the drive to ignore sequence timers and run normally. ON : Drive ignores sequence timers and runs normally (based on b1-02 source). OFF : Drive follows sequence timer programming
52	Sequence Timer Cancel	V/f OLV/PM EZOLV Sets the function to disable the currently active sequence timer. ON : When the input changes from open to closed, the currently active sequence timer is disabled. Operation will resume with the next scheduled sequence timer. Re-cycling the run command after the current sequence timer has been canceled will re-enable the sequence timer. OFF : Drive follows sequence timer programming.
60	DC Injection Braking Command	V/f OLV/PM EZOLV Sets the command to use DC Injection Braking to stop the motor. **Note:** When *A1-02 = 8 [Control Method Selection = EZOLV]*, this function is available with a PM motor.
61	Speed Search from Fmax	V/f OLV/PM EZOLV Sets the function to use an external reference to start speed search although *b3-01 = 0 [Speed Search Selection at Start = Disabled]* to not allow speed search at start. **Note:** The drive will detect *oPE03 [Multi-Function Input Setting Err]* when *H1-xx = 61 [Speed Search from Fmax]* and *H1-xx = 62 [Speed Search from Fref]* are set at the same time.
62	Speed Search from Fref	V/f OLV/PM EZOLV Sets the function to use an external reference to start speed search although *b3-01 = 0 [Speed Search Selection at Start = Disabled]* to not allow speed search at start. **Note:** The drive will detect *oPE03 [Multi-Function Input Setting Err]* when *H1-xx = 61 [Speed Search from Fmax]* and *H1-xx = 62 [Speed Search from Fref]* are set at the same time.
63	Field Weakening	V/f OLV/PM EZOLV Sets the function to send the Field Weakening Level and Field Weakening Frequency Limit commands set in *d6-01 [Field Weakening Level] and d6-02 [Field Weakening Frequency Limit]* when the input terminal is activated.
65	KEB Ride-Thru 1 Activate (N.C.)	V/f OLV/PM EZOLV Sets operation of the KEB1 function through the KEB Ride-Thru 1 (N.C.). ON : Normal operation OFF : Deceleration during momentary power loss
66	KEB Ride-Thru 1 Activate (N.O.)	V/f OLV/PM EZOLV Sets operation of the KEB1 function through the KEB Ride-Thru 1 (N.O.). ON : Deceleration during momentary power loss OFF : Normal operation
67	Communications Test Mode	V/f OLV/PM EZOLV Sets the function for the drive to self-test RS-485 serial communications operation.
68	High Slip Braking (HSB) Activate	V/f OLV/PM EZOLV Sets the command to use high-slip braking to stop the motor.
6A	Drive Enable	V/f OLV/PM EZOLV Sets the function to show *dnE [Drive Disabled]* on the keypad and ignore Run commands when the terminal is OFF.
70	Drive Enable No Run Cycle	V/f OLV/PM EZOLV Prevents the drive from executing a Run command until the *Drive Enable No Run Cycle* input is closed. The drive will run when the Run and *Drive Enable No Run Cycle* inputs are both closed. If the *Drive Enable No Run Cycle* input is opened while the drive is running, the drive will stop according to the *b1-03* setting. ON : Run command is accepted. OFF : The drive cannot execute a Run command. If a Run command is given while the terminal is OFF, it will trigger a *WFR Waiting for Run* alarm. The drive will be allowed to run when the terminal is ON. If the terminal turns OFF while the drive is already running, the drive will stop according to *b1-03 [Stopping Method Selection]* and it will trigger a *WFR Waiting for Run* alarm. Turning ON the terminal will allow the drive to resume running.
75	Up 2 Command	V/f OLV/PM EZOLV Sets the function to increase the frequency reference bias value to accelerate the motor when the terminal is activated. Set this function and *H1-xx = 76 [Down 2 Command]* together. **Note:** When you use this function, set the optimal bias limit values with *d4-08 [Up/Down 2 Bias Upper Limit]* and *d4-09 [Up/Down 2 Bias Lower Limit]*.
76	Down 2 Command	V/f OLV/PM EZOLV Sets the function to decrease the frequency reference bias value to decelerate the motor when the terminal is activated. Set this function and *H1-xx = 75 [Up 2 Command]* together. **Note:** When you use this function, set the optimal bias limit values with *d4-08 [Up/Down 2 Bias Upper Limit]* and *d4-09 [Up/Down 2 Bias Lower Limit]*.

Setting Value	Function	Description
77	ASR Gain (C5-03) Select	V/f OLV/PM EZOLV Sets the function to switch the ASR proportional gain to *C5-01 [ASR Proportional Gain 1]* or *C5-03 [ASR Proportional Gain 2]*. ON : C5-03 OFF : C5-01
7A	KEB Ride-Thru 2 Activate (N.C.)	V/f OLV/PM EZOLV Sets operation of the KEB2 function through the KEB Ride-Thru 2 (N.C.). ON : Normal operation OFF : Deceleration during momentary power loss
7B	KEB Ride-Thru 2 Activate (N.O.)	V/f OLV/PM EZOLV Sets operation of the KEB2 function through the KEB Ride-Thru 2 (N.O.). ON : Deceleration during momentary power loss OFF : Normal operation
7C	Short Circuit Braking (N.O.)	V/f OLV/PM EZOLV Sets operation of Short Circuit Braking (N.O.). ON : Short Circuit Braking is enabled. OFF : Normal operation **Note:** When *A1-02 = 8 [Control Method Selection = EZOLV]*, this function is available only when you use a PM motor.
7D	Short Circuit Braking (N.C.)	V/f OLV/PM EZOLV Sets operation of Short Circuit Braking (N.C.). ON : Normal operation OFF : Short Circuit Braking is enabled. **Note:** When *A1-02 = 8 [Control Method Selection = EZOLV]*, this function is available only when you use a PM motor.
80	HAND Mode	V/f OLV/PM EZOLV Sets the function to operate the drive in HAND Mode. ON : Drive is operating in HAND Mode. Frequency reference source is determined by *Y5-01 [HAND Frequency Reference Source]* and *Y5-02 [HAND Frequency Reference 1]*. OFF : Drive is not set to be in HAND Mode.
81	HAND Mode 2	V/f OLV/PM EZOLV Sets the function to operate the drive in HAND Mode 2. ON : Drive is operating in HAND Mode 2. Frequency reference is determined by *Y5-05 [HAND Frequency Reference 2]* . OFF : Drive is not set to be in HAND Mode 2.
82	PI Switch to Aux	V/f OLV/PM EZOLV Sets *YF-xx [PI Auxiliary Control]* parameters as primary PI loop parameters and disables *b5-xx [PID Control]*. **Note:** When this input is active, *YF-xx [PI Auxiliary Control]* parameters will always be the primary PI loop parameters. Parameter *YF-20 [PI Aux Main PI Speed Control]* does not have an effect.
88	Volute Thermostat Fault	V/f OLV/PM EZOLV Sets the drive to show the *VLTS [Volute Thermostat Fault]* when the input terminal is ON. **Note:** This function is active when the drive is running.
90 - 97	DWEZ Digital Inputs 1 to 8	V/f OLV/PM EZOLV Sets digital inputs used with DriveWorksEZ. Refer to the DriveWorksEZ online manual for more information.
9F	DWEZ Disable	V/f OLV/PM EZOLV Sets operation of the DriveWorksEZ program saved in the drive. ON : Disabled OFF : Enabled **Note:** Set *A1-07 = 2 [DriveWorksEZ Function Selection = Enabled/Disabled wDigital Input]* to use this function.
A8	PI2 Control Disable	V/f OLV/PM EZOLV Sets the command to disable the PI2 Control function. Parameter *S3-12 [PI2 Control Disable Mode Sel]* sets the output performance. ON : Enabled OFF : Disabled
AA	PI2 Control Inverse Operation	V/f OLV/PM EZOLV Sets the command to change the sign of the PI2 Control input.
AB	PI2 Control Integral Reset	V/f OLV/PM EZOLV Sets the command to reset the PI2 Control integral value. **Note:** This input has priority over *H1-xx = AC [MFDI Function Selection = PI2 Control Integral Hold]*.

Setting Value	Function	Description
AC	PI2 Control Integral Hold	V/f OLV/PM EZOLV Sets the command to lock the PI2 Control integral value.
AD	Select PI2 Control PI Parameters	V/f OLV/PM EZOLV Sets the command to use the *S3-06 [PI2 Control Proportional Gain]* and *S3-07 [PI2 Control Integral Time]* values instead of the *b5-02 [Proportional Gain (P)]* and *b5-03 [Integral Time (I)]* values. Set *S3-01 = 0 [PI2 Control Enable Selection = Disabled]* to enable this function. **Note:** This multi-function input does not have an effect on PI2 Control. Use this input for the primary PI controller (*b5-xx*).
AF	Emergency Override FWD	V/f OLV/PM EZOLV Sets the command to use the speed set in *S6-02 [Emergency Override Ref Selection]* to run the drive in the forward direction.
B0	Emergency Override REV	V/f OLV/PM EZOLV Sets the command to use the speed set in *S6-02 [Emergency Override Ref Selection]* to run the drive in the reverse direction.
B8	Low City Pressure	V/f OLV/PM EZOLV Sets the command to show that there is not sufficient pressure at the inlet to the pump. OFF : Insufficient pressure is present on the inlet to the pump
B9	Disable Pre-charge	V/f OLV/PM EZOLV Sets the command to disable the Pre-charge function. ON : Pre-charge function is disabled
BB	Low Water Level	V/f OLV/PM EZOLV Sets the drive to show an *LWL [Low Water Level]* fault when the input terminal is ON. ON : Low Water Level Fault OFF : Reservoir/Tank is filled to normal level **Note:** • When *Y1-36 = 0 [High/Low Water DI Fault Det Sel = During Run]* , the drive detects an *LWL* fault when the drive is in operation including Sleep Boost and Feedback Drop Detection. • The drive will not detect an *LWL* fault when the drive is in JOG, Pre-Charge, or Emergency Override. • While in Pre-Charge, when you close the Low Water Level digital input, the drive will exit out of Pre-Charge immediately and ignore the *Y4-03 [Pre-Charge Time]* setting.
BC	High Water Level	V/f OLV/PM EZOLV Sets the drive to show an *HWL [High Water Level]* fault when the input terminal is ON. ON : High Water Level Fault OFF : Reservoir/Tank is filled to normal level. **Note:** • When *Y1-36 = 0 [High/Low Water DI Fault Det Sel = During Run]* , the drive detects an *HWL* fault when the drive is in operation including Sleep Boost and Feedback Drop Detection. • The drive will not detect an *HWL* fault when the drive is in JOG, Pre-Charge, or Emergency Override.
BD	Remote Drive Disable	V/f OLV/PM EZOLV Sets the function to stop or prohibit the drive operation when the input terminal is ON. ON : Stops and prohibits the drive from running. OFF : If MFDI was previously ON, drive will enter Pre-Charge mode if it is programmed. **Note:** • Remote Drive Disable function is disabled during Emergency Override. • These functions will activate even when the Remote Drive Disable function is enabled: –*H1-xx = 50 [MFDI Function Selection = Motor Pre-heat 2]* –*H1-xx = 60 [MFDI Function Selection = DC Injection Braking Command]*
BE	Single Phase Converter Ready NC	V/f OLV/PM EZOLV Sets the function to send a signal from Single Phase Converter to the attached drive that the converter is in a NOT READY or FAULTED state when the input terminal is OFF. ON : Single Phase Converter is in a normal state. OFF : Single Phase Converter is in a NOT READY or FAULTED state. **Note:** You can program this function to *H1-01 to H1-08 [Terminal S1 to S8 Function Select]*, but you cannot program this function to: • *H1-40 to H1-42 [Extend MFDI1 to MFDI3 Function Selection]* • *H7-01 to H7-04 [Virtual Multi-Function Input 1 to 4]*
BF	Reset Accumulation	V/f OLV/PM EZOLV Sets the function to reset the accumulated volume to zero. ON : Accumulated volume will be reset to zero (and held at zero if digital input remains closed). OFF : Accumulation will function normally if programmed.
C0	Dedicated Multi-Setpoint YA-02	V/f OLV/PM EZOLV Sets the function to set the PID setpoint to *YA-02 [Setpoint 2]*. ON : *YA-02 [Setpoint 2]* is PID setpoint. OFF : *YA-01 [Setpoint 1]* is PID setpoint. **Note:** If you use this function and one of *H1-xx = C7, C8, or C9 [PID Setpoint Selection 1, 2, or 3]* at the same time, the drive will detect an *oPE03 [Multi-Function Input Setting Err]*.

Setting Value	Function	Description
C1	Dedicated Multi-Setpoint YA-03	V/f OLV/PM EZOLV Sets the function to set the PID setpoint to *YA-03 [Setpoint 3]*. ON : *YA-03 [Setpoint 3]* is PID setpoint. OFF : *YA-01 [Setpoint 1]* is PID setpoint. **Note:** If you use this function and one of *H1-xx = C7, C8, or C9 [PID Setpoint Selection 1, 2, or 3]* at the same time, the drive will detect an *oPE03 [Multi-Function Input Setting Err]*.
C2	Dedicated Multi-Setpoint YA-04	V/f OLV/PM EZOLV Sets the function to set the PID setpoint to *YA-04 [Setpoint 4]*. ON : *YA-04 [Setpoint 4]* is PID setpoint. OFF : *YA-01 [Setpoint 1]* is PID setpoint. **Note:** If you use this function and one of *H1-xx = C7, C8, or C9 [PID Setpoint Selection 1, 2, or 3]* at the same time, the drive will detect an *oPE03 [Multi-Function Input Setting Err]*.
C3	Dedicated Multi-Setpoint YA-05	V/f OLV/PM EZOLV Sets the function to set the PID setpoint to *YA-05 [Setpoint 5]*. ON : *YA-05 [Setpoint 5]* is PID setpoint. OFF : *YA-01 [Setpoint 1]* is PID setpoint. **Note:** If you use this function and one of *H1-xx = C7, C8, or C9 [PID Setpoint Selection 1, 2, or 3]* at the same time, the drive will detect an *oPE03 [Multi-Function Input Setting Err]*.
C4	Dedicated Multi-Setpoint YA-06	V/f OLV/PM EZOLV Sets the function to set the PID setpoint to *YA-06 [Setpoint 6]*. ON : *YA-06 [Setpoint 6]* is PID setpoint. OFF : *YA-01 [Setpoint 1]* is PID setpoint. **Note:** If you use this function and one of *H1-xx = C7, C8, or C9 [PID Setpoint Selection 1, 2, or 3]* at the same time, the drive will detect an *oPE03 [Multi-Function Input Setting Err]*.
C5	Dedicated Multi-Setpoint YA-07	V/f OLV/PM EZOLV Sets the function to set the PID setpoint to *YA-07 [Setpoint 7]*. ON : *YA-07 [Setpoint 7]* is PID setpoint. OFF : *YA-01 [Setpoint 1]* is PID setpoint. **Note:** If you use this function and one of *H1-xx = C7, C8, or C9 [PID Setpoint Selection 1, 2, or 3]* at the same time, the drive will detect an *oPE03 [Multi-Function Input Setting Err]*.
C6	Dedicated Multi-Setpoint YA-08	V/f OLV/PM EZOLV Sets the function to set the PID setpoint to *YA-08 [Setpoint 8]*. ON : *YA-08 [Setpoint 8]* is PID setpoint. OFF : *YA-01 [Setpoint 1]* is PID setpoint. **Note:** If you use this function and one of *H1-xx = C7, C8, or C9 [PID Setpoint Selection 1, 2, or 3]* at the same time, the drive will detect an *oPE03 [Multi-Function Input Setting Err]*.
C7	PID Setpoint Selection 1	V/f OLV/PM EZOLV Sets the function to switch the PID setpoint to *YA-02 [Setpoint 2]*, *YA-04 [Setpoint 4]*, *YA-06 [Setpoint 6]*, or *YA-08 [Setpoint 8]*. Set this function, *H1-xx = C8 [PID Setpoint Selection 2]*, and *H1-xx = C9 [PID Setpoint Selection 3]* at the same time. ON : Sets the function to switch the PID setpoint to *YA-02 [Setpoint 2], YA-04 [Setpoint 4], YA-06 [Setpoint 6]*, or *YA-08 [Setpoint 8]*. OFF : Sets the PID setpoint according to status of all setpoint selection MFDIs. **Note:** If you use this function and one of *H1-xx = C0 to C6 [Dedicated Multi-Setpoint YA-02 to YA-08]* at the same time, the drive will detect an *oPE03 [Multi-Function Input Setting Err]*.
C8	PID Setpoint Selection 2	V/f OLV/PM EZOLV Sets the function to switch the PID setpoint to *YA-03 [Setpoint 3]*, *YA-04 [Setpoint 4]*, *YA-07 [Setpoint 7]*, or *YA-08 [Setpoint 8]*. Set this function, *H1-xx = C7 [PID Setpoint Selection 1]*, and *H1-xx = C9 [PID Setpoint Selection 3]* at the same time. ON : Sets the function to switch the PID setpoint to *YA-03 [Setpoint 3], YA-04 [Setpoint 4], YA-07 [Setpoint 7],* or *YA-08 [Setpoint 8]*. OFF : Sets the PID setpoint according to status of all setpoint selection MFDIs. **Note:** If you use this function and one of *H1-xx = C0 to C6 [Dedicated Multi-Setpoint YA-02 to YA-08]* at the same time, the drive will detect an *oPE03 [Multi-Function Input Setting Err]*.

Setting Value	Function	Description
C9	PID Setpoint Selection 3	V/f OLV/PM EZOLV Sets the function to switch the PID setpoint to *YA-05 [Setpoint 5]*, *YA-06 [Setpoint 6]*, *YA-07 [Setpoint 7]*, or *YA-08 [Setpoint 8]*. Set this function, *H1-xx = C7 [PID Setpoint Selection 1]*, and *H1-xx = C8 [PID Setpoint Selection 2]* at the same time. ON : Sets the function to switch the PID setpoint to *YA-05 [Setpoint 5], YA-06 [Setpoint 6], YA-07 [Setpoint 7],* or *YA-08 [Setpoint 8]*. OFF : Sets the PID setpoint according to status of all setpoint selection MFDIs. **Note:** If you use this function and one of *H1-xx = C0 to C6 [Dedicated Multi-Setpoint YA-02 to YA-08]* at the same time, the drive will detect an *oPE03 [Multi-Function Input Setting Err]*.
188	!Volute Thermostat Fault	V/f OLV/PM EZOLV Sets the drive to show the *VLTS [Volute Thermostat Fault]* when the input terminal is OFF. **Note:** This function is active when the drive is running.
190 -197	!DWEZ Digital Inputs 1 to 8	V/f OLV/PM EZOLV Sets digital inputs used with DriveWorksEZ. Refer to the DriveWorksEZ online manual for more information.
19F	!DWEZ Disable	V/f OLV/PM EZOLV Sets operation of the DriveWorksEZ program saved in the drive. ON : Enabled OFF : Disabled **Note:** Set *A1-07 = 2 [DriveWorksEZ Function Selection = Enabled/Disabled wDigital Input]* to use this function.
1A8	!PI2 Control Disable	V/f OLV/PM EZOLV Sets the command to disable the PI2 Control function. Parameter *S3-12 [PI2 Control Disable Mode Sel]* sets the output performance. ON : Disabled OFF : Enabled
1B8	!Low City Pressure	V/f OLV/PM EZOLV Sets the command to show that there is not sufficient pressure at the inlet to the pump. ON : Insufficient pressure is present on the inlet to the pump
1BB	!Low Water Level	V/f OLV/PM EZOLV Sets the drive to show an *LWL [Low Water Level]* fault when the input terminal is OFF. ON : Reservoir/Tank is filled to normal level. OFF : Low Water Level Fault **Note:** • The drive detects an *LWL* fault when the drive is running including Sleep Boost and Feedback Drop Detection. • The drive will not detect an *LWL* fault when the drive is in JOG, Pre-Charge, or Emergency Override. • While in Pre-Charge, when you close the Low Water Level digital input, the drive will exit out of Pre-Charge immediately and ignore the *Y4-03 [Pre-Charge Time]* setting.
1BC	!High Water Level	V/f OLV/PM EZOLV Sets the drive to show an *HWL [High Water Level]* fault when the input terminal is OFF. ON : Reservoir/Tank is filled to normal level. OFF : High Water Level Fault **Note:** • The drive detects an *HWL* fault when the drive is running. • The drive will not detect an *HWL* fault when the drive is stopped, sleeping, or in Emergency Override.
1BD	!Remote Drive Disable	V/f OLV/PM EZOLV Sets the function to stop or prohibit the drive operation when the input terminal is OFF. ON : If MFDI was previously ON, drive will enter Pre-Charge mode if it is programmed. OFF : Stops and prohibits the drive from running. **Note:** • Remote Drive Disable function is disabled during Emergency Override. • These functions will activate even when the Remote Drive Disable function is enabled: –*H1-xx = 50 [MFDI Function Selection = Motor Pre-heat 2]* –*H1-xx = 60 [MFDI Function Selection = DC Injection Braking Command]*

◆ H2: Digital Outputs

No. (Hex.)	Name	Description	Default (Range)
H2-01 (040B)	Term M1-M2 Function Selection	V/f OLV/PM EZOLV Sets the function for MFDO terminal M1-M2. **Note:** When you do not use the terminal or when you use the terminal in through mode, set this parameter to *F*.	37 (0 - 1FF)
H2-02 (040C)	Term M3-M4 Function Selection	V/f OLV/PM EZOLV Sets the function for MFDO terminal M3-M4. **Note:** When you do not use the terminal or when you use the terminal in through mode, set this parameter to *F*.	42 (0 - 1FF)
H2-03 (040D)	Term MD-ME-MF Function Selection	V/f OLV/PM EZOLV Sets the function for MFDO terminal MD-ME-MF. **Note:** When you do not use this terminal, or when you will use the terminal in through mode, set this parameter to *F*.	E (0 - 1FF)
H2-06 (0437)	Watt Hour Output Unit Selection	V/f OLV/PM EZOLV Sets the unit for the output signal when *H2-01 to H2-03 = 39 [MFDO Function Selection = Watt Hour Pulse Output]*. 0 : 0.1 kWh units 1 : 1 kWh units 2 : 10 kWh units 3 : 100 kWh units 4 : 1000 kWh units	0 (0 - 4)
H2-07 (0B3A) Expert	Modbus Register 1 Address Select	V/f OLV/PM EZOLV Sets the address of the MEMOBUS/Modbus register output to the MFDO terminal.	0001 (0001 - 1FFF)
H2-08 (0B3B) Expert	Modbus Register 1 Bit Select	V/f OLV/PM EZOLV Sets the bit of the MEMOBUS/Modbus register output to the MFDO terminal.	0000 (0000 - FFFF)
H2-09 (0B3C) Expert	Modbus Register 2 Address Select	V/f OLV/PM EZOLV Sets the address of the MEMOBUS/Modbus register output to the MFDO terminal.	0001 (0001 - 1FFF)
H2-10 (0B3D) Expert	Modbus Register 2 Bit Select	V/f OLV/PM EZOLV Sets the bit of the MEMOBUS/Modbus register output to the MFDO terminal.	0000 (0000 - FFFF)
H2-40 (0B58) Expert	Mbus Reg 15E0h bit0 Output Func	V/f OLV/PM EZOLV Sets the MFDO for bit 0 of MEMOBUS register 15E0 (Hex.).	F (0 - 1FF)
H2-41 (0B59) Expert	Mbus Reg 15E0h bit1 Output Func	V/f OLV/PM EZOLV Sets the MFDO for bit 1 of MEMOBUS register 15E0 (Hex.).	F (0 - 1FF)
H2-42 (0B5A) Expert	Mbus Reg 15E0h bit2 Output Func	V/f OLV/PM EZOLV Sets the MFDO for bit 2 of MEMOBUS register 15E0 (Hex.).	F (0 - 1FF)
H2-60 (1B46) Expert	Term M1-M2 Secondary Function	V/f OLV/PM EZOLV Sets the second function for terminal M1-M2. Outputs the logical calculation results of the terminals assigned to functions by *H2-01 [Term M1-M2 Function Selection]*.	F (0 - FF)
H2-61 (1B47) Expert	Terminal M1-M2 Logical Operation	V/f OLV/PM EZOLV Sets the logical operation for the functions set in *H2-01 [Term M1-M2 Function Selection]* and *H2-60 [Term M1-M2 Secondary Function]*.	0 (0 - 8)
H2-62 (1B48) Expert	Terminal M1-M2 Delay Time	V/f OLV/PM EZOLV Sets the minimum on time used to output the logical calculation results from terminal M1-M2.	0.1 s (0.0 - 25.0 s)
H2-63 (1B49) Expert	Term M3-M4 Secondary Function	V/f OLV/PM EZOLV Sets the second function for terminal M3-M4. Outputs the logical calculation results of the terminals assigned to functions by *H2-02 [Term M3-M4 Function Selection]*.	F (0 - FF)

No. (Hex.)	Name	Description	Default (Range)
H2-64 (1B4A) Expert	Terminal M3-M4 Logical Operation	V/f OLV/PM EZOLV Sets the logical operation for the functions set in *H2-02 [Term M3-M4 Function Selection]* and *H2-63 [Term M3-M4 Secondary Function]*.	0 (0 - 8)
H2-65 (1B4B) Expert	Terminal M3-M4 Delay Time	V/f OLV/PM EZOLV Sets the minimum on time used to output the logical calculation results from terminal M3-M4.	0.1 s (0.0 - 25.0 s)
H2-66 (1B4C) Expert	Term MD-ME-MF Secondary Function	V/f OLV/PM EZOLV Sets the second function for terminal MD-ME-MF. Outputs the logical calculation results of the terminals assigned to functions by *H2-03 [Terminal MD-ME-MF Function Selection]*.	F (0 - FF)
H2-67 (1B4D) Expert	Terminal MD-ME-MF Logical Operation	V/f OLV/PM EZOLV Sets the logical operation for the functions set in *H2-03 [Term MD-ME-MF Function Selection]* and *H2-66 [Term MD-ME-MF Secondary Function]*.	0 (0 - 8)
H2-68 (1B4E) Expert	Terminal MD-ME-MF Delay Time	V/f OLV/PM EZOLV Sets the minimum on time used to output the logical calculation results from terminal MD-ME-MF.	0.1 s (0.0 - 25.0 s)

■ H2-xx: MFDO Setting Values

Setting Value	Function	Description
0	During Run	V/f OLV/PM EZOLV The terminal activates when you input a Run command and when the drive is outputting voltage. ON : Drive is running OFF : Drive is stopping
1	Zero Speed	V/f OLV/PM EZOLV The terminal activates when the output frequency < *E1-09 [Minimum Output Frequency]*. **Note:** Parameter *E1-09* is the reference in all control methods. ON : Output frequency < *E1-09*. OFF : Output frequency ≥ *E1-09*.
2	Speed Agree 1	V/f OLV/PM EZOLV The terminal activates when the output frequency is in the range of the frequency reference ± *L4-02 [Speed Agree Detection Width]*. **Note:** The detection function operates in the two motor rotation directions. ON : The output frequency is in the range of "frequency reference ± *L4-02*". OFF : The output frequency does not align with the frequency reference although the drive is running.
3	User-Set Speed Agree 1	V/f OLV/PM EZOLV The terminal activates when the output frequency is in the range of *L4-01 [Speed Agree Detection Level]* ± *L4-02 [Speed Agree Detection Width]* and in the range of the frequency reference ± *L4-02*. **Note:** The detection function operates in the two motor rotation directions. The drive uses the *L4-01* value as the forward/reverse detection level. ON : The output frequency is in the range of "*L4-01* ± *L4-02*" and the range of frequency reference ± *L4-02*. OFF : The output frequency is not in the range of "*L4-01* ± *L4-02*" or the range of frequency reference ± *L4-02*.
4	Frequency Detection 1	V/f OLV/PM EZOLV The terminal deactivates when the output frequency > "*L4-01 [Speed Agree Detection Level]* + *L4-02 [Speed Agree Detection Width]*". After the terminal deactivates, the terminal stays deactivated until the output frequency is at the value of *L4-01*. **Note:** The detection function operates in the two motor rotation directions. The drive uses the *L4-01* value as the forward/reverse detection level. ON : The output frequency < *L4-01*, or the output frequency ≤ "*L4-01* + *L4-02*" OFF : The output frequency > "*L4-01* + *L4-02*"
5	Frequency Detection 2	V/f OLV/PM EZOLV The terminal activates when the output frequency > *L4-01 [Speed Agree Detection Level]*. After the terminal activates, the terminal stays activated until the output frequency is at the value of "*L4-01* - *L4-02 [Speed Agree Detection Width]*". **Note:** The detection function operates in the two motor rotation directions. The drive uses the *L4-01* value as the forward/reverse detection level. ON : The output frequency > *L4-01* OFF : The output frequency < "*L4-01* - *L4-02*", or the output frequency ≤ *L4-01*
6	Drive Ready	V/f OLV/PM EZOLV The terminal activates when the drive is ready and running.

Setting Value	Function	Description
7	DC Bus Undervoltage	V/f OLV/PM EZOLV The terminal activates when the DC bus voltage or control circuit power supply is at the voltage set in *L2-05 [Undervoltage Detection Lvl (Uv1)]* or less. The terminal also activates when there is a fault with the DC bus voltage. ON : The DC bus voltage ≤ *L2-05* OFF : The DC bus voltage > *L2-05*
8	During Baseblock (N.O.)	V/f OLV/PM EZOLV The terminal activates during baseblock. When the drive is in baseblock, the drive output transistor stops switching and does not make DC bus voltage. ON : During baseblock OFF : The drive is not in baseblock.
9	Frequency Reference from Keypad	V/f OLV/PM EZOLV Shows the selected frequency reference source. ON : The keypad is the frequency reference source. OFF : Parameter *b1-01 [Frequency Reference Selection 1]* is the frequency reference source.
B	Torque Detection 1 (N.O.)	V/f OLV/PM EZOLV The terminal activates when the drive detects overtorque or undertorque. ON : The output current/torque > *L6-02 [Torque Detection Level 1]*, or the output current/torque < *L6-02* for longer than the time set in *L6-03 [Torque Detection Time 1]*.
C	Frequency Reference Loss	V/f OLV/PM EZOLV The terminal activates when the drive detects a loss of frequency reference.
E	Fault	V/f OLV/PM EZOLV The terminal activates when the drive detects a fault. **Note:** The terminal will not activate for *CPF00* and *CPF01 [Control Circuit Error]* faults.
F	Not Used	V/f OLV/PM EZOLV Use this setting for unused terminals or to use terminals in through mode. Also use this setting as the PLC contact output via MEMOBUS/Modbus or the communication option. This signal does not function if you do not configure signals from the PLC.
10	Alarm	V/f OLV/PM EZOLV The terminal activates when the drive detects a minor fault.
11	Fault Reset Command Active	V/f OLV/PM EZOLV The terminal activates when the drive receives the Reset command from the control circuit terminal, serial communications, or the communication option.
12	Timer Output	V/f OLV/PM EZOLV Sets the terminal as the timer output. Use this setting with the timer input set in *H1-xx = 18 [MFDI Function Selection = Timer Function]*.
13	Speed Agree 2	V/f OLV/PM EZOLV The terminal activates when the output frequency is in the range of the frequency reference ± *L4-04 [Speed Agree Detection Width (+/-)]*. **Note:** The detection function operates in the two motor rotation directions. ON : The output frequency is in the range of "frequency reference ± *L4-04*". OFF : The output frequency is not in the range of "frequency reference ± *L4-04*".
14	User-Set Speed Agree 2	V/f OLV/PM EZOLV The terminal activates when the output frequency is in the range of *L4-03 [Speed Agree Detection Level (+/-)]* ± *L4-04 [Speed Agree Detection Width (+/-)]* and in the range of the frequency reference ± *L4-04*. **Note:** The detection level set in *L4-03* is a signed value. The drive will only detect in one direction. ON : The output frequency is in the range of "*L4-03* ± *L4-04*" and the range of frequency reference ± *L4-04*. OFF : The output frequency is not in the range of "*L4-03* ± *L4-04*" or the range of frequency reference ± *L4-04*.
15	Frequency Detection 3	V/f OLV/PM EZOLV The terminal deactivates when the output frequency > "*L4-03 [Speed Agree Detection Level (+/-)]* + *L4-04 [Speed Agree Detection Width (+/-)]*". After the terminal deactivates, the terminal stays deactivated until the output frequency is at the value of *L4-03*. **Note:** The detection level set in *L4-03* is a signed value. The drive will only detect in one direction. ON : The output frequency < *L4-03*, or the output frequency ≤ *L4-03* + *L4-04*. OFF : The output frequency > "*L4-03* + *L4-04*".
16	Frequency Detection 4	V/f OLV/PM EZOLV The terminal activates when the output frequency > *L4-03 [Speed Agree Detection Level (+/-)]*. After the terminal activates, the terminal stays activated until the output frequency is at the value of "*L4-03* - *L4-04*". **Note:** The detection level set in *L4-03* is a signed value. The drive will only detect in one direction. ON : The output frequency > *L4-03*. OFF : The output frequency < "*L4-03* - *L4-04*", or the output frequency ≤ *L4-03*.

Setting Value	Function	Description
17	Torque Detection 1 (N.C.)	V/f OLV/PM EZOLV The terminal deactivates when the drive detects overtorque or undertorque. OFF : The output current/torque > *L6-02 [Torque Detection Level 1]*, or the output current/torque < *L6-02* for longer than the time set in *L6-03 [Torque Detection Time 1]*.
18	Torque Detection 2 (N.O.)	V/f OLV/PM EZOLV The terminal activates when the drive detects overtorque or undertorque. ON : The output current/torque > *L6-05 [Torque Detection Level 2]*, or the output current/torque < *L6-05* for longer than the time set in *L6-06 [Torque Detection Time 2]*.
19	Torque Detection 2 (N.C.)	V/f OLV/PM EZOLV The terminal deactivates when the drive detects overtorque or undertorque. OFF : The output current/torque > *L6-05 [Torque Detection Level 2]*, or the output current/torque < *L6-05* for longer than the time set in *L6-06 [Torque Detection Time 2]*.
1A	During Reverse	V/f OLV/PM EZOLV The terminal activates when the motor operates in the reverse direction. ON : The motor is operating in the reverse direction. OFF : The motor is operating in the forward direction or the motor stopped.
1B	During Baseblock (N.C.)	V/f OLV/PM EZOLV The terminal deactivates during baseblock. When the drive is in baseblock, the drive output transistor stops switching and does not make DC bus voltage. ON : The drive is not in baseblock. OFF : During baseblock
1C	Motor 2 Selected	V/f OLV/PM EZOLV The terminal activates when you select motor 2. ON : Motor 2 Selected OFF : Motor 1 Selected
1E	Executing Auto-Restart	V/f OLV/PM EZOLV The terminal activates when the Auto Restart function is trying to restart after a fault.
1F	Motor Overload Alarm (oL1)	V/f OLV/PM EZOLV The terminal activates when the electronic thermal protection value of the motor overload protective function is a minimum of 90% of the detection level.
20	Drive Overheat Pre-Alarm (oH)	V/f OLV/PM EZOLV The terminal activates when the drive heatsink temperature is at the level set with *L8-02 [Overheat Alarm Level]*.
21	Safe Torque OFF	V/f OLV/PM EZOLV The terminal activates (safety stop state) when the safety circuit and safety diagnosis circuit are operating correctly and when terminals H1-HC and H2-HC are OFF (Open). ON : Safety stop state OFF : Safety circuit fault or RUN/READY
2F	Maintenance Notification	V/f OLV/PM EZOLV The terminal activates when drive components are at their estimated maintenance period. Tells you about the maintenance period for these items: • IGBT • Cooling Fan • Capacitor • Soft charge bypass relay
30	During Torque Limit	V/f OLV/PM EZOLV The terminal activates when the torque reference is the torque limit set with *L7 parameters*, *H3-02, H3-06, or H3-10 [MFAI Function Selection]*.
37	During Frequency Output	V/f OLV/PM EZOLV The terminal activates when the drive outputs frequency. ON : The drive is outputting frequency. OFF : The drive is not outputting frequency.
38	Drive Enabled	V/f OLV/PM EZOLV This terminal activates when the *H1-xx = 6A [Drive Enable] or 70 [Drive Enable No Run Cycle]* terminal activates.
39	Watt Hour Pulse Output	V/f OLV/PM EZOLV Outputs the pulse that shows the watt hours.
3A	Drive Overheat Alarm	V/f OLV/PM EZOLV The terminal activates when the drive heatsink temperature is at the *L8-02 [Overheat Alarm Level]* setting while *L8-03 = 4 [Overheat Pre-Alarm Selection = Operate at Reduced Speed (L8-19)]* and the drive is running.
3D	During Speed Search	V/f OLV/PM EZOLV The terminal activates when the drive is doing speed search.

Setting Value	Function	Description
42	Pressure Reached	V/f OLV/PM EZOLV The terminal activates when the pressure feedback is at the Pressure Setpoint.
4A	During KEB Ride-Thru	V/f OLV/PM EZOLV The terminal activates during KEB Ride-Thru.
4B	During Short Circuit Braking	V/f OLV/PM EZOLV The terminal activates during Short Circuit Braking. **Note:** When *A1-02 = 8 [Control Method Selection = EZOLV]*, this function is available only when you use a PM motor.
4C	During Fast Stop	V/f OLV/PM EZOLV The terminal activates when the fast stop is in operation.
4D	oH Pre-Alarm Reduction Limit	V/f OLV/PM EZOLV The terminal activates when *L8-03 = 4 [Overheat Pre-Alarm Selection = Operate at Reduced Speed (L8-19)]* and *oH [Heatsink Overheat]* does not clear after the drive decreases the frequency for 10 cycles.
51	Sequence Timer 1	V/f OLV/PM EZOLV Sets the function to activate Sequence Timer 1. ON : Sequence Timer 1 is active.
52	Sequence Timer 2	V/f OLV/PM EZOLV Sets the function to activate Sequence Timer 2. ON : Sequence Timer 2 is active.
53	Sequence Timer 3	V/f OLV/PM EZOLV Sets the function to activate Sequence Timer 3. ON : Sequence Timer 3 is active.
54	Sequence Timer 4	V/f OLV/PM EZOLV Sets the function to activate Sequence Timer 4. ON : Sequence Timer 4 is active.
58	UL6 Underload Detected	V/f OLV/PM EZOLV The terminal activates when the drive detected *UL6 [Underload or Belt Break Detected]*.
60	Internal Cooling Fan Failure	V/f OLV/PM EZOLV The terminal activates when the drive detects a cooling fan failure in the drive.
61	Pole Position Detection Complete	V/f OLV/PM EZOLV The terminal activates when drive receives a Run command and the drive detects the motor magnetic pole position of the PM motor.
62	Modbus Reg 1 Status Satisfied	V/f OLV/PM EZOLV The terminal activates when the bit specified by *H2-08 [Modbus Register 1 Bit Select]* for the MEMOBUS register address set with *H2-07 [Modbus Register 1 Address Select]* activates.
63	Modbus Reg 2 Status Satisfied	V/f OLV/PM EZOLV The terminal activates when the bit specified by *H2-10 [Modbus Register 2 Bit Select]* for the MEMOBUS register address set with *H2-09 [Modbus Register 2 Address Select]* activates.
69	External Power 24V Supply	V/f OLV/PM EZOLV The terminal activates when there is an external 24V power supply between terminals PS-AC. ON : The external 24V power supply is supplying power. OFF : The external 24V power supply is not supplying power.
6A	Data Logger Error	V/f OLV/PM EZOLV The terminal activates when the drive detects a *LoG [Com Error / Abnormal SD card]*.
71	Low PI2 Control Feedback Level	V/f OLV/PM EZOLV The terminal activates when the PI2 Control Feedback Level is less than *S3-13 [PI2 Control Low Feedback Lvl]*.
72	High PI2 Control Feedback Level	V/f OLV/PM EZOLV The terminal activates when the PI2 Control Feedback Level is more than *S3-15 [PI2 Control High Feedback Lvl]*.
89	Output Current Lim	V/f OLV/PM EZOLV The terminal activates when the output current limit is limiting the drive output speed.
8A	Pump 2 Control	V/f OLV/PM EZOLV Sets the function to do a contactor control for a second pump. ON : Pump 2 Running **Note:** You can use this function only when you set *Y1-01 = 1 [Multiplex Mode = Contactor Multiplex]*.

Setting Value	Function	Description
8B	Pump 3 Control	V/f OLV/PM EZOLV Sets the function to do a contactor control for a third pump. ON : Pump 3 Running **Note:** You can use this function only when you set *Y1-01 = 1 [Multiplex Mode = Contactor Multiplex]* and *Y3-00 [Number of Lag Pumps in System] > 1*.
8C	Pump 4 Control	V/f OLV/PM EZOLV Sets the function to do a contactor control for a fourth pump. ON : Pump 4 Running **Note:** You can use this function only when you set *Y1-01 = 1 [Multiplex Mode = Contactor Multiplex]* and *Y3-00 [Number of Lag Pumps in System]> 2*.
8D	Pump 5 Control	V/f OLV/PM EZOLV Sets the function to do a contactor control for a fifth pump. ON : Pump 5 Running **Note:** You can use this function only when you set *Y1-01 = 1 [Multiplex Mode = Contactor Multiplex]* and *Y3-00 [Number of Lag Pumps in System] > 3*.
8E	Pump 6 Control	V/f OLV/PM EZOLV Sets the function to do a contactor control for a sixth pump. ON : Pump 6 Running **Note:** You can use this function only when you set *Y1-01 = 1 [Multiplex Mode = Contactor Multiplex]* and *Y3-00 [Number of Lag Pumps in System] > 4*.
90 to 92	DWEZ Digital Outputs 1 to 3	V/f OLV/PM EZOLV Sets the DriveWorksEZ digital output. Refer to the DriveWorksEZ online manual for more information.
94	Loss of Prime	V/f OLV/PM EZOLV The terminal activates when the drive is in an *LOP [Loss of Prime]* condition.
95	Volute Thermostat Fault	V/f OLV/PM EZOLV The terminal activates when the terminal set for *H1-xx = 88 [MFDI Function Selection = Volute Thermostat Fault]* is active.
96	High Feedback	V/f OLV/PM EZOLV The terminal activates when the drive is in a High Feedback Condition as specified by *Y1-11 [High Feedback Level]* and *Y1-12 [High Feedback Lvl Fault Dly Time]* and when the drive detects an *HFB [High Feedback Sensed]* fault or an *HIFB [High Feedback Sensed]* alarm.
97	Low Feedback	V/f OLV/PM EZOLV The terminal activates when the drive is in a Low Feedback Condition as specified by *Y1-08 [Low Feedback Level]* and *Y1-09 [Low Feedback Lvl Fault Dly Time]* and when the drive detects an *LFB [Low Feedback Sensed]* fault or an *LOFB [High Feedback Sensed]* alarm.
9E	Low PI Auxiliary Control Level	V/f OLV/PM EZOLV The terminal activates when the PI Aux Feedback Level is less than *YF-09 [PI Aux Control Low Level Detect]* or if the drive detects an *LoAux [Low PI Aux Feedback Level]* fault.
9F	High PI Auxiliary Control Level	V/f OLV/PM EZOLV The terminal activates when the PI Aux Feedback Level is more than *YF-12 [PI Aux Control High Level Detect]* or if the drive detects an *HiAux [High PI Aux Feedback Level]* fault.
A0 to A7	DWEZ Extended Digital Outputs 1 to 8	V/f OLV/PM EZOLV Sets the digital output for the DriveWorksEZ DO-A3 option card. Refer to the DriveWorksEZ online manual for more information.
AA	Utility Delay	V/f OLV/PM EZOLV The terminal activates when the drive is stopped and is waiting for the timer set in *Y4-17 [Utility Start Delay]* to expire.
AB	Thrust Mode	V/f OLV/PM EZOLV The terminal activates when the output frequency is between 0.0 Hz and the value set in *Y4-12 [Thrust Frequency]* and the Thrust Bearing function is active.
AC	Setpoint Not Maintained	V/f OLV/PM EZOLV The terminal activates when the drive detects *NMS [Setpoint Not Met]* condition.

Setting Value	Function	Description
B8	Pump Fault	V/f OLV/PM EZOLV The terminal activates when one of these faults is active: • *LFB Low Feedback Sensed* • *HFB High Feedback Sensed* • *LWL Low Water Level* • *HWL High Water Level* • *POC Pump Over Cycle* • *LowWL Low Water Level* • *VLTS Volute Thermostat Fault* • *NMS Setpoint Not Met* • *EFx Pump Fault (Terminal Sx)*
B9	Transducer Loss	V/f OLV/PM EZOLV The terminal activates when the current into the analog input associated with PID feedback is more than 21 mA or less than 3 mA, or an *FDBKL [WIRE Break]* Fault or an *FDBKL [Feedback Loss Wire Break]* Alarm is active.
BA	WL/SP/PIAux Control Active	V/f OLV/PM EZOLV The terminal activates when Water Level / Suction Pressure / PI Auxiliary Control is affecting the output speed.
BB	Differential Feedback Exceeded	V/f OLV/PM EZOLV The terminal activates when the difference between the PID Feedback and the value from the terminal set for *H3-xx = 2D [Differential Feedback]* is more than *Y4-18 [Differential Level]* for the time set in *Y4-19 [Differential Lvl Detection Time]*.
BC	Sleep Active	V/f OLV/PM EZOLV The terminal activates when the Sleep function is active and the drive is not operating. **Note:** The terminal will not activate for Sleep Boost function.
BD	Start Delay	V/f OLV/PM EZOLV The terminal activates when the Feedback is more than the start level or the Feedback is less than the Inverse PID and the start timer is timing. **Note:** You must set *Y1-04 [Sleep Wake-up Level]* ≠ *0* and *Y1-05 [Sleep Wake-up Level Delay Time]* ≠ *0* to use this function.
BE	Pre-Charge	V/f OLV/PM EZOLV The terminal activates when the drive is in Pre-Charge Mode.
C0	HAND Mode	V/f OLV/PM EZOLV The terminal activates when the drive is in HAND Mode operation.
C1	AUTO Mode	V/f OLV/PM EZOLV The terminal activates when the drive is in AUTO Mode operation.
C2	OFF Mode	V/f OLV/PM EZOLV The terminal activates when the drive is in OFF Mode.
C3	Main Feedback Lost	V/f OLV/PM EZOLV The terminal activates when the drive loses the main PID feedback.
C4	Backup Feedback Lost	V/f OLV/PM EZOLV The terminal activates when the drive loses the backup PID feedback.
C5	De-Scale Active	V/f OLV/PM EZOLV Sets the drive to go into the De-Scale function when the output terminal is ON. ON : De-Scale is running **Note:** De-Scale function is disabled and will be reset during Emergency Override.
C6	Lube Pump	V/f OLV/PM EZOLV Sets the drive to go into the Lube Pump function when the output terminal is ON. ON : This will energize and delay the drive output for the time set in *Y4-31 [Lube Pump Time]* each time the drive is supposed to start. It will energize during Run when *Y4-30 = 1 [Lube Pump During Run = Active During Run]*.
C8	Low Flow	V/f OLV/PM EZOLV The terminal activates when the flow rate is less than *Y6-06 [Low Flow Level]* for *Y6-07 [Low Flow Detection Time]*.
C9	Accumulation Level	V/f OLV/PM EZOLV The terminal activates when the accumulated volume is at or above the level set in *Y6-11 to Y6-14*.
CA	High Flow	V/f OLV/PM EZOLV The terminal activates when the flow rate is higher than *Y6-17 [High Flow Level]* for *Y6-18 [High Flow Detection Time]*.
CB	Low Water Level	V/f OLV/PM EZOLV The terminal activates when the water level feedback is below *Yd-09 [Low Water Level Detection Level]*.
CC	Low Suction Pressure	V/f OLV/PM EZOLV The terminal activates when the Suction Pressure feedback is less than *YE-09 [Low Suction Pressure Det Level]*.

Setting Value	Function	Description
CD	High Suction Pressure	V/f OLV/PM EZOLV The terminal activates when the Suction Pressure feedback is higher than *YE-12 [High Suction Pressure Det Level]*.
CE	Anti-Jam/De-Rag Active	V/f OLV/PM EZOLV The terminal activates when the drive is running in Anti-Jam/De-Rag mode (configured by *Y7-xx*).
CF	Flow Rate Limit	V/f OLV/PM EZOLV The terminal activates when the flow rate (limit) is affecting output speed.
D3	Harmonic Filter Output	V/f OLV/PM EZOLV The terminal activates when the drive exceeds the speed/current conditions set in *Y4-50 [Harmonic Filter Output Selection]*. **Note:** You must set *n1-13 = 1 [DC Bus Stabilization Control = Enabled]* when you program this digital output.
D4	External Fan Switch	V/f OLV/PM EZOLV The terminal activates when the external fan is turned on when drive is running.
100	!During Run	V/f OLV/PM EZOLV The terminal deactivates when you input a Run command and when the drive is outputting voltage. ON : Drive is stopping OFF : Drive is running
101	!Zero Speed	V/f OLV/PM EZOLV The terminal deactivates when the output frequency < *E1-09 [Minimum Output Frequency]*. **Note:** Parameter *E1-09* is the reference in all control methods. ON : Output frequency ≥ value of *E1-09*. OFF : Output frequency < value of *E1-09*.
102	!Speed Agree 1	V/f OLV/PM EZOLV The terminal deactivates when the output frequency is in the range of the frequency reference ± *L4-02 [Speed Agree Detection Width]*. **Note:** The detection function operates in the two motor rotation directions. ON : The output frequency does not align with the frequency reference although the drive is running. OFF : The output frequency is in the range of "frequency reference ± *L4-02*".
103	!User-Set Speed Agree 1	V/f OLV/PM EZOLV The terminal deactivates when the output frequency is in the range of *L4-01 [Speed Agree Detection Level]* ± *L4-02 [Speed Agree Detection Width]* and in the range of the frequency reference ± *L4-02*. **Note:** The detection function operates in the two motor rotation directions. The drive uses the *L4-01* value as the forward/reverse detection level. ON : The output frequency is not in the range of "*L4-01* ± *L4-02*" or the range of frequency reference ± *L4-02*. OFF : The output frequency is in the range of "*L4-01* ± *L4-02*" and the range of frequency reference ± *L4-02*.
104	!Frequency Detection 1	V/f OLV/PM EZOLV The terminal activates when the output frequency > "*L4-01 [Speed Agree Detection Level]* + *L4-02 [Speed Agree Detection Width]*". After the terminal activates, the terminal stays activated until the output frequency is at the value of *L4-01*. **Note:** The detection function operates in the two motor rotation directions. The drive uses the *L4-01* value as the forward/reverse detection level. ON : The output frequency > "*L4-01* + *L4-02*" OFF : The output frequency < *L4-01*, or the output frequency ≤ "*L4-01* + *L4-02*"
105	!Frequency Detection 2	V/f OLV/PM EZOLV The terminal deactivates when the output frequency > *L4-01 [Speed Agree Detection Level]*. After the terminal deactivates, the terminal stays deactivated until the output frequency is at the value of "*L4-01 - L4-02 [Speed Agree Detection Width]*". **Note:** The detection function operates in the two motor rotation directions. The drive uses the *L4-01* value as the forward/reverse detection level. ON : The output frequency < "*L4-01 - L4-02*", or the output frequency ≤ *L4-01* OFF : The output frequency > *L4-01*
106	!Drive Ready	V/f OLV/PM EZOLV The terminal deactivates when the drive is ready and running.
107	!DC Bus Undervoltage	V/f OLV/PM EZOLV The terminal deactivates when the DC bus voltage or control circuit power supply is at the voltage set in *L2-05 [Undervoltage Detection Lvl (Uv1)]* or less. The terminal also deactivates when there is a fault with the DC bus voltage. ON : The DC bus voltage > *L2-05* OFF : The DC bus voltage ≤ *L2-05*
108	!During Baseblock (N.O.)	V/f OLV/PM EZOLV The terminal deactivates during baseblock. When the drive is in baseblock, the drive output transistor stops switching and does not make DC bus voltage. ON : The drive is not in baseblock. OFF : During baseblock.

Setting Value	Function	Description
109	!Frequency Reference from Keypad	V/f OLV/PM EZOLV Shows the selected frequency reference source. ON : Parameter *b1-01 [Frequency Reference Selection 1]* is the frequency reference source. OFF : The keypad is the frequency reference source.
10B	!Torque Detection 1 (N.O.)	V/f OLV/PM EZOLV The terminal deactivates when the drive detects overtorque or undertorque. OFF : The output current/torque > *L6-02 [Torque Detection Level 1]*, or < *L6-02* for longer than the time set with *L6-03 [Torque Detection Time 1]*.
10C	!Frequency Reference Loss	V/f OLV/PM EZOLV The terminal deactivates when the drive detects a loss of frequency reference.
10E	!Fault	V/f OLV/PM EZOLV The terminal deactivates when the drive detects a fault. **Note:** The terminal will not deactivate for *CPF00* and *CPF01 [Control Circuit Error]* faults.
110	!Alarm	V/f OLV/PM EZOLV The terminal deactivates when the drive detects a minor fault.
111	!Fault Reset Command Active	V/f OLV/PM EZOLV The terminal deactivates when the drive receives the Reset command from the control circuit terminal, serial communications, or the communication option.
112	!Timer Output	V/f OLV/PM EZOLV Sets the terminal as the timer output. Use this setting with the timer input set in *H1-xx = 118 [MFDI Function Selection = !Timer Function]*.
113	!Speed Agree 2	V/f OLV/PM EZOLV The terminal deactivates when the output frequency is in the range of the frequency reference ± *L4-04 [Speed Agree Detection Width (+/-)]*. **Note:** The detection function operates in the two motor rotation directions. ON : The output frequency is not in the range of "frequency reference ± *L4-04*". OFF : The output frequency is in the range of "frequency reference ± *L4-04*".
114	!User-Set Speed Agree 2	V/f OLV/PM EZOLV The terminal deactivates when the output frequency is in the range of *L4-03 [Speed Agree Detection Level (+/-)]* ± *L4-04 [Speed Agree Detection Width (+/-)]* and in the range of the frequency reference ± *L4-04*. **Note:** The detection level set in *L4-03* is a signed value. The drive will only detect in one direction. ON : The output frequency is not in the range of "*L4-03* ± *L4-04*" or the range of frequency reference ± *L4-04*. OFF : The output frequency is in the range of "*L4-03* ± *L4-04*" and the range of frequency reference ± *L4-04*.
115	!Frequency Detection 3	V/f OLV/PM EZOLV The terminal activates when the output frequency > "*L4-03 [Speed Agree Detection Level (+/-)]* + *L4-04 [Speed Agree Detection Width (+/-)]*". After the terminal activates, the terminal stays activated until the output frequency is at the value of *L4-03*. **Note:** The detection level set in *L4-03* is a signed value. The drive will only detect in one direction. ON : The output frequency > "*L4-03* + *L4-04*" OFF : The output frequency < *L4-03*, or the output frequency ≤ "*L4-03* + *L4-04*"
116	!Frequency Detection 4	V/f OLV/PM EZOLV The terminal deactivates when the output frequency > *L4-03 [Speed Agree Detection Level (+/-)]*. After the terminal deactivates, the terminal stays deactivated until the output frequency is at the value of "*L4-03* - *L4-04*". **Note:** The detection level set in *L4-03* is a signed value. The drive will only detect in one direction. ON : The output frequency < "*L4-03* - *L4-04*", or the output frequency ≤ *L4-03* OFF : The output frequency > *L4-03*
117	!Torque Detection 1 (N.C.)	V/f OLV/PM EZOLV The terminal activates when the drive detects overtorque or undertorque. ON : The output current/torque > *L6-02 [Torque Detection Level 1]*, or the output current/torque < *L6-02* for longer than the time set in *L6-03 [Torque Detection Time 1]*.
118	!Torque Detection 2 (N.O.)	V/f OLV/PM EZOLV The terminal deactivates when the drive detects overtorque or undertorque. OFF : The output current/torque > *L6-05 [Torque Detection Level 2]*, or the output current/torque < *L6-05* for longer than the time set in *L6-06 [Torque Detection Time 2]*.
119	!Torque Detection 2 (N.C.)	V/f OLV/PM EZOLV The terminal activates when the drive detects overtorque or undertorque. ON : The output current/torque > *L6-05 [Torque Detection Level 2]*, or the output current/torque < *L6-05* for longer than the time set in *L6-06 [Torque Detection Time 2]*.

Setting Value	Function	Description
11A	!During Reverse	V/f OLV/PM EZOLV The terminal deactivates when the motor operates in the reverse direction. ON : The motor is operating in the forward direction or the motor stopped. OFF : The motor is operating in the reverse direction.
11B	!During Baseblock (N.C.)	V/f OLV/PM EZOLV The terminal activates during baseblock. When the drive is in baseblock, the drive output transistor stops switching and does not make DC bus voltage. ON : During baseblock. OFF : The drive is not in baseblock.
11C	!Motor 2 Selected	V/f OLV/PM EZOLV The terminal deactivates when motor 2 is selected. ON : Motor 1 Selection OFF : Motor 2 Selection
11E	!Executing Auto-Restart	V/f OLV/PM EZOLV The terminal deactivates when the Auto Restart function is trying to restart after a fault.
11F	!Motor Overload Alarm (oL1)	V/f OLV/PM EZOLV The terminal deactivates when the electronic thermal protection value of the motor overload protective function is a minimum of 90% of the detection level.
120	!Drive Overheat Pre-Alarm (oH)	V/f OLV/PM EZOLV The terminal deactivates when the drive heatsink temperature is at the level set with *L8-02 [Overheat Alarm Level]*.
121	!Safe Torque OFF	V/f OLV/PM EZOLV The terminal deactivates (safety stop state) when the safety circuit and safety diagnosis circuit are operating correctly and when terminals H1-HC and H2-HC are OFF (Open). ON : Safety circuit fault or RUN/READY OFF : Safety stop state
12F	!Maintenance Notification	V/f OLV/PM EZOLV The terminal deactivates when drive components are at their estimated maintenance period. Tells the user about the maintenance period for these items: • IGBT • Cooling fan • Capacitor • Soft charge bypass relay
130	!During Torque Limit	V/f OLV/PM EZOLV The terminal deactivates when the torque reference is the torque limit set with *L7 parameters*, *H3-02, or H3-10 [MFAI Function Selection]*.
137	!During Frequency Output	V/f OLV/PM EZOLV The terminal deactivates when the drive outputs frequency. ON : The drive is not outputting frequency. OFF : The drive is outputting frequency.
138	!Drive Enabled	V/f OLV/PM EZOLV This terminal deactivates when the *H1-xx = 6A [Drive Enable] or 70 [Drive Enable No Run Cycle]* terminal deactivates.
139	!Watt Hour Pulse Output	V/f OLV/PM EZOLV Outputs the pulse that shows the watt hours.
13A	!Drive Overheat Alarm	V/f OLV/PM EZOLV The terminal deactivates when the drive heatsink temperature is at the *L8-02 [Overheat Alarm Level]* setting while *L8-03 = 4 [Overheat Pre-Alarm Selection = Operate at Reduced Speed (L8-19)]* and the drive is running.
13D	!During Speed Search	V/f OLV/PM EZOLV The terminal deactivates when the drive is doing speed search.
142	!Pressure Reached	V/f OLV/PM EZOLV The terminal deactivates when the pressure feedback is at the Pressure Setpoint.
14A	!During KEB Ride-Thru	V/f OLV/PM EZOLV The terminal deactivates during KEB Ride-Thru.
14B	!During Short Circuit Braking	V/f OLV/PM EZOLV The terminal deactivates during Short Circuit Braking. **Note:** When *A1-02 = 8 [Control Method Selection = EZOLV]*, this function is available only when you use a PM motor.
14C	!During Fast Stop	V/f OLV/PM EZOLV The terminal deactivates when the fast stop is in operation.

Setting Value	Function	Description
14D	!oH Pre-Alarm Reduction Limit	V/f OLV/PM EZOLV The terminal deactivates when *L8-03 = 4 [Overheat Pre-Alarm Selection = Operate at Reduced Speed (L8-19)]* and *oH [Heatsink Overheat]* does not clear after the drive decreases the frequency for 10 cycles.
151	!Sequence Timer 1	V/f OLV/PM EZOLV The terminal deactivates when Sequence Timer 1 is active.
152	!Sequence Timer 2	V/f OLV/PM EZOLV The terminal deactivates when Sequence Timer 2 is active.
153	!Sequence Timer 3	V/f OLV/PM EZOLV The terminal deactivates when Sequence Timer 3 is active.
154	!Sequence Timer 4	V/f OLV/PM EZOLV The terminal deactivates when Sequence Timer 4 is active.
158	!UL6 Underload Detected	V/f OLV/PM EZOLV The terminal deactivates when the drive detected *UL6 [Underload or Belt Break Detected]*.
160	!Internal Cooling Fan Failure	V/f OLV/PM EZOLV The terminal deactivates when the drive detects a cooling fan failure in the drive.
161	!Pole Position Detection Complete	V/f OLV/PM EZOLV The terminal deactivates when drive receives a Run command and the drive detects the motor magnetic pole position of the PM motor.
162	!Modbus Reg 1 Status Satisfied	V/f OLV/PM EZOLV The terminal deactivates when the bit specified by *H2-08 [Modbus Register 1 Bit Select]* for the MEMOBUS register address set with *H2-07 [Modbus Register 1 Address Select]* activates.
163	!Modbus Reg 2 Status Satisfied	V/f OLV/PM EZOLV The terminal deactivates when the bit specified by *H2-10 [Modbus Register 2 Bit Select]* for the MEMOBUS register address set with *H2-09 [Modbus Register 2 Address Select]* activates.
169	!External Power 24V Supply	V/f OLV/PM EZOLV The terminal deactivates when there is an external 24 V power supply between terminals PS-AC. ON : The external 24 V power supply is not supplying power. OFF : The external 24 V power supply is supplying power.
16A	!Data Logger Error	V/f OLV/PM EZOLV The terminal deactivates when the drive detects *LoG [Com Error / Abnormal SD card]*.
171	!Low PI2 Control Feedback Level	V/f OLV/PM EZOLV The terminal deactivates when the PI2 Control Feedback Level is less than *S3-13 [PI2 Control Low Feedback Lvl]*.
172	!High PI2 Control Feedback Level	V/f OLV/PM EZOLV The terminal deactivates when the PI2 Control Feedback Level is more than *S3-15 [PI2 Control High Feedback Lvl]*.
189	!Output Current Lim	V/f OLV/PM EZOLV The terminal deactivates when the output current limit is limiting the drive output speed.
18A	!Pump 2 Control	V/f OLV/PM EZOLV Sets the function to do a contactor control for a second pump. OFF : Pump 2 Running **Note:** You can use this function only when you set *Y1-01 = 1 [Multiplex Mode = Contactor Multiplex]*.
18B	!Pump 3 Control	V/f OLV/PM EZOLV Sets the function to do a contactor control for a third pump. OFF : Pump 3 Running **Note:** You can use this function only when you set *Y1-01 = 1 [Multiplex Mode = Contactor Multiplex]* and *Y3-00 [Number of Lag Pumps in System] > 1*.
18C	!Pump 4 Control	V/f OLV/PM EZOLV Sets the function to do a contactor control for a fourth pump. OFF : Pump 4 Running **Note:** You can use this function only when you set *Y1-01 = 1 [Multiplex Mode = Contactor Multiplex]* and *Y3-00 [Number of Lag Pumps in System]> 2*.
18D	!Pump 5 Control	V/f OLV/PM EZOLV Sets the function to do a contactor control for a fifth pump. OFF : Pump 5 Running **Note:** You can use this function only when you set *Y1-01 = 1 [Multiplex Mode = Contactor Multiplex]* and *Y3-00 [Number of Lag Pumps in System] > 3*.

Setting Value	Function	Description
18E	!Pump 6 Control	V/f OLV/PM EZOLV Sets the function to do a contactor control for a sixth pump. OFF : Pump 6 Running **Note:** You can use this function only when you set *Y1-01 = 1 [Multiplex Mode = Contactor Multiplex]* and *Y3-00 [Number of Lag Pumps in System] > 4*.
190 to 192	!DWEZ Digital Outputs 1 to 3	V/f OLV/PM EZOLV Sets the DriveWorksEZ digital output. Refer to the DriveWorksEZ online manual for more information.
194	!Loss of Prime	V/f OLV/PM EZOLV The terminal deactivates when the drive is in an *LOP [Loss of Prime]* condition.
195	!Volute Thermostat Fault	V/f OLV/PM EZOLV The terminal deactivates when the terminal set for *H1-xx = 88 [MFDI Function Selection = Volute Thermostat Fault]* is active.
196	!High Feedback	V/f OLV/PM EZOLV The terminal deactivates when the drive is in a High Feedback Condition as specified by *Y1-11 [High Feedback Level]* and *Y1-12 [High Feedback Lvl Fault Dly Time]* and when the drive detects an *HFB [High Feedback Sensed]* fault or an *HIFB [High Feedback Sensed]* alarm.
197	!Low Feedback	V/f OLV/PM EZOLV The terminal deactivates when the drive is in a Low Feedback Condition as specified by *Y1-08 [Low Feedback Level]* and *Y1-09 [Low Feedback Lvl Fault Dly Time]* and when the drive detects an *LFB [Low Feedback Sensed]* fault or an *LOFB [High Feedback Sensed]* alarm.
19E	!Low PI Auxiliary Control Level	V/f OLV/PM EZOLV The terminal deactivates when the PI Aux Feedback Level is less than *YF-09 [PI Aux Control Low Level Detect]* or if the drive detects an *LoAux [Low PI Aux Feedback Level]* fault.
19F	!High PI Auxiliary Control Level	V/f OLV/PM EZOLV The terminal deactivates when the PI Aux Feedback Level is more than *YF-12 [PI Aux Control High Level Detect]* or if the drive detects an *HiAux [High PI Aux Feedback Level]* fault.
1A0 to 1A7	!DWEZ Extended Digital Outputs 1 to 8	V/f OLV/PM EZOLV Sets the digital output for the DriveWorksEZ DO-A3 option card. Refer to the DriveWorksEZ online manual for more information.
1AA	!Utility Delay	V/f OLV/PM EZOLV The terminal deactivates when the drive is stopped and is waiting for the timer set in *Y4-17 [Utility Start Delay]* to expire.
1AB	!Thrust Mode	V/f OLV/PM EZOLV The terminal deactivates when the output frequency is between 0.0 Hz and the value set in *Y4-12 [Thrust Frequency]* and the Thrust Bearing function is active.
1AC	!Setpoint Not Maintained	V/f OLV/PM EZOLV The terminal deactivates when the drive detects *NMS [Setpoint Not Met]* condition.
1B8	!Pump Fault	V/f OLV/PM EZOLV The terminal deactivates when one of these faults is active: • *LFB Low Feedback Sensed* • *HFB High Feedback Sensed* • *LWL Low Water Level* • *HWL High Water Level* • *POC Pump Over Cycle* • *LowWL Low Water Level* • *VLTS Volute Thermostat Fault* • *NMS Setpoint Not Met* • *EFx Pump Fault (Terminal Sx)*
1B9	!Transducer Loss	V/f OLV/PM EZOLV The terminal deactivates when the current into the analog input associated with PID feedback is more than 21 mA or less than 3 mA, or an *FDBKL [WIRE Break]* Fault or an *FDBKL [Feedback Loss Wire Break]* Alarm is active.
1BA	!WL/SP/PIAux Control Active	V/f OLV/PM EZOLV The terminal deactivates when Water Level / Suction Pressure / PI Auxiliary Control is affecting the output speed.
1BB	!Differential Feedback Exceeded	V/f OLV/PM EZOLV The terminal deactivates when the difference between the PID Feedback and the value from the terminal set for *H3-xx = 2D [Differential Feedback]* is more than *Y4-18 [Differential Level]* for the time set in *Y4-19 [Differential Lvl Detection Time]*.
1BC	!Sleep Active	V/f OLV/PM EZOLV The terminal deactivates when the Sleep function is active and the drive is not operating. **Note:** The terminal will not deactivate for Sleep Boost function.

Setting Value	Function	Description
1BD	!Start Delay	V/f OLV/PM EZOLV The terminal deactivates when the Feedback is more than the start level or the Feedback is less than the Inverse PID and the start timer is timing. **Note:** You must set *Y1-04 [Sleep Wake-up Level] ≠ 0* and *Y1-05 [Sleep Wake-up Level Delay Time] ≠ 0* to use this function.
1BE	!Pre-Charge	V/f OLV/PM EZOLV The terminal deactivates when the drive is in Pre-Charge Mode.
1C0	!HAND Mode	V/f OLV/PM EZOLV The terminal deactivates when the drive is in HAND Mode operation.
1C1	!AUTO Mode	V/f OLV/PM EZOLV The terminal deactivates when the drive is in AUTO Mode operation.
1C2	!OFF Mode	V/f OLV/PM EZOLV The terminal deactivates when the drive is in OFF Mode.
1C3	!Main Feedback Lost	V/f OLV/PM EZOLV The terminal deactivates when the drive loses the main PID feedback.
1C4	!Backup Feedback Lost	V/f OLV/PM EZOLV The terminal deactivates when the drive loses the backup PID feedback.
1C5	!De-Scale Active	V/f OLV/PM EZOLV Sets the drive to go into the De-Scale function when the output terminal is OFF. OFF : De-Scale is running **Note:** De-Scale function is disabled and will be reset during Emergency Override.
1C6	!Lube Pump	V/f OLV/PM EZOLV Sets the drive to go into the Lube Pump function when the output terminal is OFF. OFF : This will energize and delay the drive output for the time set in *Y4-31 [Lube Pump Time]* each time the drive is supposed to start. It will energize during Run when *Y4-30 = 1 [Lube Pump During Run = Active During Run]*.
1C8	!Low Flow	V/f OLV/PM EZOLV The terminal deactivates when the flow rate is less than *Y6-06 [Low Flow Level]* for *Y6-07 [Low Flow Detection Time]*.
1C9	!Accumulation Level	V/f OLV/PM EZOLV The terminal deactivates when the accumulated volume is at or above the level set in *Y6-11 to Y6-14*.
1CA	!High Flow	V/f OLV/PM EZOLV The terminal deactivates when the flow rate is higher than *Y6-17 [High Flow Level]* for *Y6-18 [High Flow Detection Time]*.
1CB	!Low Water Level	V/f OLV/PM EZOLV The terminal deactivates when the water level feedback is below *Yd-09 [Low Water Level Detection Level]*.
1CC	!Low Suction Pressure	V/f OLV/PM EZOLV The terminal deactivates when the Suction Pressure feedback is less than *YE-09 [Low Suction Pressure Det Level]*.
1CD	!High Suction Pressure	V/f OLV/PM EZOLV The terminal deactivates when the Suction Pressure feedback is higher than *YE-12 [High Suction Pressure Det Level]*.
1CE	!Anti-Jam/De-Rag Active	V/f OLV/PM EZOLV The terminal deactivates when the drive is running in Anti-Jam/De-Rag mode (configured by *Y7-xx*).
1CF	!Flow Rate Limit	V/f OLV/PM EZOLV The terminal deactivates when the flow rate (limit) is affecting output speed.
1D3	!Harmonic Filter Output	V/f OLV/PM EZOLV The terminal deactivates when the drive exceeds the speed/current conditions set in *Y4-50 [Harmonic Filter Output Selection]*. **Note:** You must set *n1-13 = 1 [DC Bus Stabilization Control = Enabled]* when you program this digital output.
1D4	!External Fan Switch	V/f OLV/PM EZOLV The terminal deactivates when the external fan is turned on when drive is running.

◆ H3: Analog Inputs

No. (Hex.)	Name	Description	Default (Range)
H3-01 (0410)	Terminal A1 Signal Level Select	V/f OLV/PM EZOLV Sets the input signal level for MFAI terminal A1. 0 : 0 to 10V (Lower Limit at 0) 2 : 4 to 20 mA 3 : 0 to 20 mA	0 (0 - 3)
H3-02 (0434)	Terminal A1 Function Selection	V/f OLV/PM EZOLV Sets a function for MFAI terminal A1.	0 (0 - 3B)
H3-03 (0411) RUN	Terminal A1 Gain Setting	V/f OLV/PM EZOLV Sets the gain of the analog signal input to MFAI terminal A1.	100.0% (-999.9 - +999.9%)
H3-04 (0412) RUN	Terminal A1 Bias Setting	V/f OLV/PM EZOLV Sets the bias of the analog signal input to MFAI terminal A1.	0.0% (-999.9 - +999.9%)
H3-05 (0413)	Terminal A3 Signal Level Select	V/f OLV/PM EZOLV Sets the input signal level for MFAI terminal A3. 0 : 0-10V (Lower Limit at 0) 2 : 4 to 20 mA 3 : 0 to 20 mA	0 (0 - 3)
H3-06 (0414)	Terminal A3 Function Selection	V/f OLV/PM EZOLV Sets the function for MFAI terminal A3.	2E (0 - 3B)
H3-07 (0415) RUN	Terminal A3 Gain Setting	V/f OLV/PM EZOLV Sets the gain of the analog signal input to MFAI terminal A3.	100.0% (-999.9 - +999.9%)
H3-08 (0416) RUN	Terminal A3 Bias Setting	V/f OLV/PM EZOLV Sets the bias of the analog signal input to MFAI terminal A3.	0.0% (-999.9 - +999.9%)
H3-09 (0417)	Terminal A2 Signal Level Select	V/f OLV/PM EZOLV Sets the input signal level for MFAI terminal A2. 0 : 0-10V (LowLim=0) 2 : 4 to 20 mA 3 : 0 to 20 mA	2 (0 - 3)
H3-10 (0418)	Terminal A2 Function Selection	V/f OLV/PM EZOLV Sets the function for MFAI terminal A2.	B (0 - 3B)
H3-11 (0419) RUN	Terminal A2 Gain Setting	V/f OLV/PM EZOLV Sets the gain of the analog signal input to MFAI terminal A2.	100.0% (-999.9 - +999.9%)
H3-12 (041A) RUN	Terminal A2 Bias Setting	V/f OLV/PM EZOLV Sets the bias of the analog signal input to MFAI terminal A2.	0.0% (-999.9 - +999.9%)
H3-14 (041C)	Analog Input Terminal Enable Sel	V/f OLV/PM EZOLV Sets the enabled terminal or terminals when *H1-xx = C [MFDI Function Select = Analog Terminal Enable Selection]* is ON. 1 : Terminal A1 only 2 : Terminal A2 only 3 : Terminals A1 and A2 4 : Terminal A3 only 5 : Terminals A1 and A3 6 : Terminals A2 and A3 7 : Terminals A1, A2, and A3	7 (1 - 7)
H3-16 (02F0)	Terminal A1 Offset	V/f OLV/PM EZOLV Sets the offset level for analog signals input to terminal A1. Usually it is not necessary to change this setting.	0 (-500 - +500)
H3-17 (02F1)	Terminal A2 Offset	V/f OLV/PM EZOLV Sets the offset level for analog signals input to terminal A2. Usually it is not necessary to change this setting.	0 (-500 - +500)

No. (Hex.)	Name	Description	Default (Range)
H3-18 (02F2)	Terminal A3 Offset	V/f OLV/PM EZOLV Sets the offset level for analog signals input to terminal A3. Usually it is not necessary to change this setting.	0 (-500 - +500)
H3-40 (0B5C) Expert	Mbus Reg 15C1h Input Function	V/f OLV/PM EZOLV Sets the MEMOBUS AI1 function.	F (4 - 2D)
H3-41 (0B5F) Expert	Mbus Reg 15C2h Input Function	V/f OLV/PM EZOLV Sets the MEMOBUS AI2 function.	F (4 - 2D)
H3-42 (0B62) Expert	Mbus Reg 15C3h Input Function	V/f OLV/PM EZOLV Sets the MEMOBUS AI3 function.	F (4 - 2D)
H3-43 (117F) Expert	Mbus Reg Inputs FilterTime Const	V/f OLV/PM EZOLV Sets the time constant to apply a primary delay filter to the MEMOBUS analog input register values.	0.00 s (0.00 - 2.00 s)
H3-45 (335B)	Terminal A1 Filter Time Constant	V/f OLV/PM EZOLV Sets the time constant when applying a primary delay filter to the A1 MFAI terminal.	0.03 s (0.00 - 2.00 s)
H3-46 (335C)	Terminal A2 Filter Time Constant	V/f OLV/PM EZOLV Sets the time constant when applying a primary delay filter to the A2 MFAI terminal.	0.03 s (0.00 - 2.00 s)
H3-47 (335D)	Terminal A3 Filter Time Constant	V/f OLV/PM EZOLV Sets the time constant when applying a primary delay filter to the A3 MFAI terminal.	0.03 s (0.00 - 2.00 s)
H3-48 (335E)	Option V1 Filter Time Constant	V/f OLV/PM EZOLV Sets the time constant when applying a primary delay filter to the AI-A3 Option V1 MFAI terminal.	0.03 s (0.00 - 2.00 s)
H3-49 (335F)	Option V2 Filter Time Constant	V/f OLV/PM EZOLV Sets the time constant when applying a primary delay filter to the AI-A3 Option V2 MFAI terminal.	0.03 s (0.00 - 2.00 s)
H3-50 (3360)	Option V3 Filter Time Constant	V/f OLV/PM EZOLV Sets the time constant when applying a primary delay filter to the AI-A3 Option V3 MFAI terminal.	0.03 s (0.00 - 2.00 s)
H3-61 (336B)	A1 Unit Selection	V/f OLV/PM EZOLV Sets the units shown in *U1-13 [Terminal A1 Level]*. 0 : Percent (%) 1 : Units (mA or VDC)	1 (0, 1)
H3-62 (336C)	A2 Unit Selection	V/f OLV/PM EZOLV Sets the units shown in *U1-14 [Terminal A2 Level]*. 0 : Percent (%) 1 : Units (mA or VDC)	1 (0, 1)
H3-63 (336D)	A3 Unit Selection	V/f OLV/PM EZOLV Sets the units shown in *U1-15 [Terminal A3 Level]*. 0 : Percent (%) 1 : Units (mA or VDC)	1 (0, 1)

■ H3-xx: MFAI Setting Values

Setting Value	Function	Description
0	Frequency Reference	V/f OLV/PM EZOLV The input value from the MFAI terminal set with this function becomes the master frequency reference.
1	Frequency Gain	V/f OLV/PM EZOLV The drive multiplies the analog frequency reference with the input value from the MFAI set with this function.
2	Auxiliary Frequency Reference 1	V/f OLV/PM EZOLV Sets Reference 2 through multi-step speed reference to enable the command reference (Auxiliary Frequency Reference 1) from the analog input terminal set here. This value is a percentage where the Maximum Output Frequency setting is a setting value of 100%. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]*: *E1-04 [Maximum Output Frequency]* • *A1-02 = 8*: *E9-02 [Maximum Speed]*

Setting Value	Function	Description
3	Auxiliary Frequency Reference 2	V/f OLV/PM EZOLV Sets Reference 3 through multi-step speed reference to enable the command reference (Auxiliary Frequency Reference 2) from the analog input terminal set here. This value is a percentage where the Maximum Output Frequency setting is a setting value of 100%. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]*: *E1-04 [Maximum Output Frequency]* • *A1-02 = 8*: *E9-02 [Maximum Speed]*
4	Output Voltage Bias	V/f OLV/PM EZOLV Set this parameter to input a bias signal and amplify the output voltage.
5	Accel/Decel Time Gain	V/f OLV/PM EZOLV Enters a signal to adjust the gain used for *C1-01 to C1-04 [Acceleration/Deceleration Times 1 and 2]* and *C1-09 [Fast Stop Time]* when the full scale analog signal (10 V or 20 mA) is 100%.
6	DC Injection Braking Current	V/f OLV/PM EZOLV Enters a signal to adjust the current level used for DC Injection Braking when the drive rated output current is 100%.
7	Torque Detection Level	V/f OLV/PM EZOLV Enters a signal to adjust the overtorque/undertorque detection level. **Note:** Use this function with *L6-01 [Torque Detection Selection 1]*. This parameter functions as an alternative to *L6-02 [Torque Detection Level 1]*.
8	Stall Prevent Level During Run	V/f OLV/PM EZOLV Enters a signal to adjust the stall prevention level during run if the drive rated current is 100%.
9	Output Frequency Lower Limit	V/f OLV/PM EZOLV Enters a signal to adjust the output frequency lower limit level as a percentage of the maximum output frequency. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]*: *E1-04 [Maximum Output Frequency]* • *A1-02 = 8*: *E9-02 [Maximum Speed]*
B	PID Feedback	V/f OLV/PM EZOLV Enter the PID feedback value as a percentage of the maximum output frequency. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]*: *E1-04 [Maximum Output Frequency]* • *A1-02 = 8*: *E9-02 [Maximum Speed]*
C	PID Setpoint	V/f OLV/PM EZOLV Enters the PID setpoint as a percentage of the maximum output frequency. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]*: *E1-04 [Maximum Output Frequency]* • *A1-02 = 8*: *E9-02 [Maximum Speed]*
D	Frequency Bias	V/f OLV/PM EZOLV Enters the bias value added to the frequency reference as a percentage of the maximum output frequency. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the maximum output frequency. • *A1-02 ≠ 8 [EZOLV]*: *E1-04 [Maximum Output Frequency]* • *A1-02 = 8*: *E9-02 [Maximum Speed]*
E	Motor Temperature (PTC Input)	V/f OLV/PM EZOLV Uses the motor Positive Temperature Coefficient (PTC) thermistor to prevent heat damage to the motor as a percentage of the current value when the 10 V analog signal is input.
F	Not Used	V/f OLV/PM EZOLV Use this setting for unused terminals or to use terminals in through mode.
10	Forward Torque Limit	V/f OLV/PM EZOLV Enters the forward torque limit when the motor rated torque is 100%.
11	Reverse Torque Limit	V/f OLV/PM EZOLV Enters the load torque limit if the motor rated torque is 100%.
12	Regenerative Torque Limit	V/f OLV/PM EZOLV Enters the regenerative torque limit if the motor rated torque is 100%.
15	General Torque Limit	V/f OLV/PM EZOLV Enters the torque limit that is the same for all quadrants for forward, reverse, and regenerative operation if the motor rated torque is 100%.
16	Differential PID Feedback	V/f OLV/PM EZOLV Enters the PID differential feedback value if the full scale analog signal (10 V or 20 mA) is 100%.

Setting Value	Function	Description
1F	Not Used	V/f OLV/PM EZOLV Use this setting for unused terminals or to use terminals in through mode.
24	PID Feedback Backup	V/f OLV/PM EZOLV Enters the PID Feedback Backup signal for the drive to use when it loses the primary PID feedback set for *H3-xx = B [PID Feedback]*. **Note:** The full-scale of the analog signal goes from *b5-71 [Min PID Transducer Scaling]* to *Y1-03 [PID User Unit Display Scaling]*.
25	PI2 Control Setpoint	V/f OLV/PM EZOLV Enters the PI2 Control setpoint level as a percentage of the *S3-02 [PI2 Control Transducer Scale]* value. **Note:** Parameters *S3-03 [PI2 Control Decimal Place Pos]* and *S3-04 [PI2 Control Unit Selection]* set the resolution and unit.
26	PI2 Control Feedback	V/f OLV/PM EZOLV Enters the PI2 Control feedback level as a percentage of the *S3-02 [PI2 Control Transducer Scale]* value. **Note:** Parameters *S3-03 [PI2 Control Decimal Place Pos]* and *S3-04 [PI2 Control Unit Selection]* set the resolution and unit.
27	PI Auxiliary Control Feedback	V/f OLV/PM EZOLV Enters the PI Auxiliary Control feedback value when *YF-01 = 1 [PI Aux Control Selection = Enabled]*. **Note:** • The full-scale of the analog signal goes from *YF-35 [PI Auxiliary Minimum Transducer Scale]* to *YF-02 [PI Aux Control Transducer Scale]*. • Parameter *YF-22 [PI Aux Level Decimal Place Pos]* sets the resolution.
2B	Emergency Override PID Feedback	V/f OLV/PM EZOLV This input is the PID Feedback source when Emergency Override is running in PID mode (*S6-02 = 2 or 3 [Emergency Override Ref Selection = System PID Mode or Independent PID Mode]*). **Note:** • When *S6-02 = 2 [Emergency Override Ref Selection = System PID Mode]*, the full-scale of the analog signal goes from *b5-71 [Min PID Transducer Scaling]* to *Y1-03 [PID User Unit Display Scaling]*. • When *S6-02 = 3 [Independent PID Mode]*, the full-scale of the analog signal goes from *b5-71* to *S6-03 [EMOVR Independent PID Scale]*. • When you set MEMOBUS register 3A93h bit 4, register 3A95h becomes the Emergency Override Feedback source.
2C	Emergency Override PID Setpoint	V/f OLV/PM EZOLV This input is the PID Setpoint source when Emergency Override is running in PID mode (*S6-02 = 2 or 3 [Emergency Override Ref Selection = System PID Mode or Independent PID Mode]*). **Note:** • When *S6-02 = 2 [Emergency Override Ref Selection = System PID Mode]*, the full-scale of the analog signal goes from *b5-71 [Min PID Transducer Scaling]* to *Y1-03 [PID User Unit Display Scaling]*. • When *S6-02 = 3 [Independent PID Mode]*, the full-scale of the analog signal goes from *b5-71* to *S6-03 [EMOVR Independent PID Scale]*. • When you set MEMOBUS register 3A93h bit 5, register 3A96h becomes the Emergency Override Setpoint source.
2D	Differential Level Source	V/f OLV/PM EZOLV Enters a feedback value to calculate the Differential Level between the *Differential Level Source* feedback and the primary *PID Feedback [H3-xx = B]*. **Note:** The full-scale of the analog signal goes from *b5-71 [Min PID Transducer Scaling]* to *Y1-03 [PID User Unit Display Scaling]*.
2E	HAND Frequency Reference	V/f OLV/PM EZOLV HAND mode Frequency Reference while *Y5-01 = 0*.
30	DWEZ Analog Input 1	V/f OLV/PM EZOLV Use with DriveWorksEZ. Refer to the DriveWorksEZ online manual for more information.
31	DWEZ Analog Input 2	V/f OLV/PM EZOLV Use with DriveWorksEZ. Refer to the DriveWorksEZ online manual for more information.
32	DWEZ Analog Input 3	V/f OLV/PM EZOLV Use with DriveWorksEZ. Refer to the DriveWorksEZ online manual for more information.
3A	Flow Meter	V/f OLV/PM EZOLV Analog input source for supplying the flow rate to the Flow Meter function. Full scale: *Y6-01*.
3B	Water Level / Suct Pres Feedback	V/f OLV/PM EZOLV Supplies the feedback for Water Level Control / Suction Pressure Control / Vacuum Control depending on which control is enabled.

◆ H4: Analog Outputs

No. (Hex.)	Name	Description	Default (Range)
H4-01 (041D)	Terminal FM Analog Output Select	V/f OLV/PM EZOLV Sets the monitoring number (Ux-xx) to be output from MFAO terminal FM. Set the *x-xx* part of the *Ux-xx [Monitor]*. For example, set *H4-01 = 102* to monitor *U1-02 [Output Frequency]*.	102 (000 - 1098)
H4-02 (041E) RUN	Terminal FM Analog Output Gain	V/f OLV/PM EZOLV Sets the gain of the monitor signal that is sent from MFAO terminal FM. Sets the analog signal output level from the terminal FM at 10 V or 20 mA as 100% when an output for monitoring items is 100%.	100.0% (-999.9 - +999.9%)
H4-03 (041F) RUN	Terminal FM Analog Output Bias	V/f OLV/PM EZOLV Sets the bias of the monitor signal that is sent from MFAO terminal FM. Set the level of the analog signal sent from terminal FM at 10 V or 20 mA as 100% when an output for monitoring items is 0%.	0.0% (-999.9 - +999.9%)
H4-04 (0420)	Terminal AM Analog Output Select	V/f OLV/PM EZOLV Sets the monitoring number (Ux-xx) to be output from MFAO terminal AM. Set the *x-xx* part of the *Ux-xx [Monitor]*. For example, set *H4-04 = 103* to monitor *U1-03 [Output Current]*.	103 (000 - 1299)
H4-05 (0421) RUN	Terminal AM Analog Output Gain	V/f OLV/PM EZOLV Sets the gain of the monitor signal that is sent from MFAO terminal AM. When an output for monitoring items is 0%, this parameter sets the analog signal output level from the AM terminal at 10 V or 20 mA as 100%.	50.0% (-999.9 - +999.9%)
H4-06 (0422) RUN	Terminal AM Analog Output Bias	V/f OLV/PM EZOLV Sets the bias of the monitor signal that is sent from MFAO terminal AM. When an output for monitoring items is 0%, this parameter sets the analog signal output level from the AM terminal at 10 V or 20 mA as 0%.	0.0% (-999.9 - +999.9%)
H4-07 (0423)	Terminal FM Signal Level Select	V/f OLV/PM EZOLV Sets the MFAO terminal FM output signal level. **Note:** Set jumper S5 on the control circuit terminal block accordingly when you change this parameter. 0 : 0 to 10 Vdc 2 : 4 to 20 mA	0 (0, 2)
H4-08 (0424)	Terminal AM Signal Level Select	V/f OLV/PM EZOLV Sets the MFAO terminal AM output signal level. **Note:** Set jumper S5 on the control circuit terminal block accordingly when you change this parameter. 0 : 0 to 10 Vdc 2 : 4 to 20 mA	0 (0, 2)
H4-20 (0B53)	Analog Power Monitor 100% Level	V/f OLV/PM EZOLV Sets the level at 10 V when you set *U1-08 [Output Power]* for analog output.	0.00 kW (0.00 - 650.00 kW)

◆ H5: Modbus Communication

No. (Hex.)	Name	Description	Default (Range)
H5-01 (0425)	Drive Node Address	V/f OLV/PM EZOLV Sets the communication slave address for drives. **Note:** • Re-energize the drive or set *H5-20 = 1 [Communication Parameters Reload = Reload Now]* after you change the parameter setting. • Setting 0 will not let the drive respond to MEMOBUS/Modbus communications. • When *Y1-01 = 3 [Multiplex Mode = Network Multiplex]*, range is dependent on *Y9-25 [Highest Node Address]*.	1FH (0 - FFH)
H5-02 (0426)	Communication Speed Selection	V/f OLV/PM EZOLV Sets the communications speed for MEMOBUS/Modbus communications. **Note:** Re-energize the drive or set *H5-20 = 1 [Communication Parameters Reload = Reload Now]* after you change the parameter setting. 0 : 1200 bps 1 : 2400 bps 2 : 4800 bps 3 : 9600 bps 4 : 19.2 kbps 5 : 38.4 kbps 6 : 57.6 kbps 7 : 76.8 kbps 8 : 115.2 kbps	3 (0 - 8)
H5-03 (0427)	Communication Parity Selection	V/f OLV/PM EZOLV Sets the communications parity used for MEMOBUS/Modbus communications. **Note:** Re-energize the drive or set *H5-20 = 1 [Communication Parameters Reload = Reload Now]* after you change the parameter setting. 0 : No parity 1 : Even parity 2 : Odd parity	0 (0 - 2)
H5-04 (0428)	Communication Error Stop Method	V/f OLV/PM EZOLV Sets the motor Stopping Method when the drive detects a Modbus Communication Error condition. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only 4 : Run at H5-34 (CE Go-To-Freq)	3 (0 - 4)
H5-05 (0429)	Comm Fault Detection Selection	V/f OLV/PM EZOLV Sets the function that detects *CE [Modbus Communication Error]* issues during MEMOBUS/Modbus communications. 0 : Disabled 1 : Enabled	1 (0, 1)
H5-06 (042A)	Drive Transmit Wait Time	V/f OLV/PM EZOLV Sets the time to wait to send a response message after the drive receives a command message from the master. **Note:** Restart the drive after changing the parameter setting.	5 ms (0 - 65 ms)
H5-09 (0435)	CE Detection Time	V/f OLV/PM EZOLV Sets the detection time for *CE [Modbus Communication Error]* issues when communication stops.	2.0 s (0.0 - 10.0 s)
H5-10 (0436)	Modbus Register 0025H Unit Sel	V/f OLV/PM EZOLV Sets the unit of measure used for the MEMOBUS/Modbus communications monitor register 0025H (output voltage reference monitor). 0 : 0.1 V units 1 : 1 V units	0 (0, 1)
H5-11 (043C)	Comm ENTER Command Mode	V/f OLV/PM EZOLV Sets the function to make the Enter command necessary to change parameters through MEMOBUS/Modbus communications. 0 : ENTER Command Required 1 : ENTER Command Not Required	0 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
H5-12 (043D)	Run Command Method Selection	V/f OLV/PM EZOLV Sets the input method for the Run command when *b1-02 = 2 [Run Command Selection 1 = Memobus/Modbus Communications]* or *b1-16 = 2 [Run Command Selection 2 = Memobus/Modbus Communications]*. 0 : FWD/Stop, REV/Stop 1 : Run/Stop, FWD/REV	0 (0, 1)
H5-18 (11A2)	Motor Speed Filter over Comms	V/f OLV/PM EZOLV Sets the filter time constant used when monitoring motor speed during MEMOBUS/Modbus communications or with a communication option.	0 ms (0 - 100 ms)
H5-20 (0B57)	Communication Parameters Reload	V/f OLV/PM EZOLV Sets the function to immediately enable updated MEMOBUS/Modbus communications parameters. 0 : Reload at Next Power Cycle 1 : Reload Now	0 (0, 1)
H5-22 (11CF)	Speed Search from MODBUS	V/f OLV/PM EZOLV Enables the MEMOBUS/Modbus communication register Speed Search function (bit0 of 15DFH). 0 : Disabled 1 : Enabled	0 (0, 1)
H5-25 (1589) RUN Expert	Function 5A Register 1 Selection	V/f OLV/PM EZOLV Returns the contents of the specified MEMOBUS/Modbus communications register when responding to the master device.	0044H (U1-05) (0000H - FFFFH)
H5-26 (158A) RUN Expert	Function 5A Register 2 Selection	V/f OLV/PM EZOLV Returns the contents of the specified MEMOBUS/Modbus communications register when responding to the master device.	0045H (U1-06) (0000H - FFFFH)
H5-27 (158B) RUN Expert	Function 5A Register 3 Selection	V/f OLV/PM EZOLV Returns the contents of the specified MEMOBUS/Modbus communications register when responding to the master device.	0042H (U1-03) (0000H - FFFFH)
H5-28 (158C) RUN Expert	Function 5A Register 4 Selection	V/f OLV/PM EZOLV Returns the contents of the specified MEMOBUS/Modbus communications register when responding to the master device.	0049H (U1-10) (0000H - FFFFH)
H5-33 (3FB3)	Power-up CALL Alarm	V/f OLV/PM EZOLV Enables and disables *CALL [Serial Comm Transmission Error]* alarm detection. 0 : Disabled 1 : Enabled	1 (0, 1)
H5-34 (3FB4) RUN	Comm Error (CE) Go-To-Frequency	V/f OLV/PM EZOLV Sets the speed at which the drive will run when *H5-04 = 4 [Communication Error Stop Method = Run at H5-34]* and there is a *CE*.	0.0 Hz (0.0 - 400.0 Hz)
H5-35 (3FB5) RUN	Comm Error (CE) Go-To-Timeout	V/f OLV/PM EZOLV When *H5-04 = 4 [Communication Error Stop Method = Run at H5-34]* and a *CE* is present, the drive will run at the *H5-34 [Comm Error (CE) Go-To-Frequency]* speed for this length of time before it triggers a *CE* fault. **Note:** Set this parameter to 0 s to disable the time-out.	0 s (0 - 6000 s)
H5-36 (3FB6)	CE Fault Restart Select	V/f OLV/PM EZOLV Sets the drive to restart (*L5-01 [Number of Auto-Restart Attempts]*) after a *CE* fault. 0 : No Retry 1 : Retry	0 (0, 1)

◆ H6: Pulse Train Input

No. (Hex.)	Name	Description	Default (Range)
H6-01 (042C)	Terminal RP Pulse Train Function	V/f OLV/PM EZOLV Sets the function for pulse train input terminal RP. 0 : Frequency Reference 1 : PID Feedback Value 2 : PID Setpoint Value 5 : Flow Meter	0 (0 - 5)
H6-02 (042D) RUN	Terminal RP Frequency Scaling	V/f OLV/PM EZOLV Sets the frequency of the pulse train input signal used when the item selected with *H6-01 [Terminal RP Pulse Train Function]* is input at 100%.	1440 Hz (100 - 32000 Hz)
H6-03 (042E) RUN	Terminal RP Function Gain	V/f OLV/PM EZOLV Sets the gain used when the function in *H6-01 [Terminal RP Pulse Train Function]* is input to terminal RP.	100.0% (0.0 - 1000.0%)
H6-04 (042F) RUN	Terminal RP Function Bias	V/f OLV/PM EZOLV Sets the bias used when the function in *H6-01 [Terminal RP Pulse Train Function]* is input to terminal RP. Sets a value at the time when the pulse train is 0 Hz.	0.0% (-100.0 - 100.0%)
H6-05 (0430) RUN	Terminal RP Filter Time	V/f OLV/PM EZOLV Sets the time constant for the pulse train input primary delay filters.	0.50 s (0.00 - 2.00 s)
H6-08 (043F)	Terminal RP Minimum Frequency	V/f OLV/PM EZOLV Sets the minimum frequency of the pulse train signal that terminal RP can detect.	0.5 Hz (0.1 - 1000.0 Hz)

◆ H7: Virtual Inputs / Outputs

No. (Hex.)	Name	Description	Default (Range)
H7-00 (116F) Expert	Virtual MFIO selection	V/f OLV/PM EZOLV Sets the function to enable and disable the virtual I/O function. Set this parameter to 1 to operate the virtual I/O function. 0 : Disabled 1 : Enabled	0 (0, 1)
H7-01 (1185) Expert	Virtual Multi-Function Input 1	V/f OLV/PM EZOLV Sets the function that enters the virtual input set in *H7-10 [Virtual Multi-Function Output 1]*. **Note:** Settings *1B [Programming Lockout]*, *11B [!Programming Lockout]*, and *BE [Single Phase Converter Ready NC]* are not available.	F (1 - 1FF)
H7-02 (1186) Expert	Virtual Multi-Function Input 2	V/f OLV/PM EZOLV Sets the function that enters the virtual input set in *H7-12 [Virtual Multi-Function Output 2]*. **Note:** Settings *1B [Programming Lockout]*, *11B [!Programming Lockout]*, and *BE [Single Phase Converter Ready NC]* are not available.	F (1 - 1FF)
H7-03 (1187) Expert	Virtual Multi-Function Input 3	V/f OLV/PM EZOLV Sets the function that enters the virtual input set in *H7-14 [Virtual Multi-Function Output 3]*. **Note:** Settings *1B [Programming Lockout]*, *11B [!Programming Lockout]*, and *BE [Single Phase Converter Ready NC]* are not available.	F (1 - 1FF)
H7-04 (1188) Expert	Virtual Multi-Function Input 4	V/f OLV/PM EZOLV Sets the function that enters the virtual input set in *H7-16 [Virtual Multi-Function Output 4]*. **Note:** Settings *1B [Programming Lockout]*, *11B [!Programming Lockout]*, and *BE [Single Phase Converter Ready NC]* are not available.	F (1 - 1FF)
H7-10 (11A4) Expert	Virtual Multi-Function Output 1	V/f OLV/PM EZOLV Sets the function for virtual digital output 1.	F (0 - 1FF)
H7-11 (11A5) Expert	Virtual Output 1 Delay Time	V/f OLV/PM EZOLV Sets the minimum ON time for virtual digital output 1.	0.1 s (0.0 - 25.0 s)

No. (Hex.)	Name	Description	Default (Range)
H7-12 (11A6) Expert	Virtual Multi-Function Output 2	V/f OLV/PM EZOLV Sets the function for virtual digital output 2.	F (0 - 1FF)
H7-13 (11A7) Expert	Virtual Output 2 Delay Time	V/f OLV/PM EZOLV Sets the minimum ON time for virtual digital output 2.	0.1 s (0.0 - 25.0 s)
H7-14 (11A8) Expert	Virtual Multi-Function Output 3	V/f OLV/PM EZOLV Sets the function for virtual digital output 3.	F (0 - 1FF)
H7-15 (11A9) Expert	Virtual Output 3 Delay Time	V/f OLV/PM EZOLV Sets the minimum ON time for virtual digital output 3.	0.1 s (0.0 - 25.0 s)
H7-16 (11AA) Expert	Virtual Multi-Function Output 4	V/f OLV/PM EZOLV Sets the function for virtual digital output 4.	F (0 - 1FF)
H7-17 (11AB) Expert	Virtual Output 4 Delay Time	V/f OLV/PM EZOLV Sets the minimum ON time for virtual digital output 4.	0.1 s (0.0 - 25.0 s)
H7-30 (1177) Expert	Virtual Analog Input Selection	V/f OLV/PM EZOLV Sets the virtual analog input function.	F (0 - 2D)
H7-31 (1178) RUN Expert	Virtual Analog Input Gain	V/f OLV/PM EZOLV Sets the virtual analog input gain.	100.0% (-999.9 - 999.9%)
H7-32 (1179) RUN Expert	Virtual Analog Input Bias	V/f OLV/PM EZOLV Sets the virtual analog input bias.	0.0% (-999.9 - 999.9%)
H7-40 (1163) Expert	Virtual Analog Out Signal Select	V/f OLV/PM EZOLV Sets the signal level of the virtual analog output. 0 : 0 to 100% (Absolute Value) 1 : -100 to 100% 2 : 0 to 100% (Lower Limit at 0)	0 (0 - 2)
H7-41 (1164) Expert	Virtual Analog Output Function	V/f OLV/PM EZOLV Sets the monitor to be output from the virtual analog output. Set the *x-xx* part of the *Ux-xx [Monitor]*. For example, set *H7-41 = 102* to monitor *U1-02 [Output Frequency]*.	102 (0 - 1098)
H7-42 (1165) Expert	Virtual Analog Output FilterTime	V/f OLV/PM EZOLV Sets the time constant for a primary filter of the virtual analog output.	0.00 s (0.00 - 2.00 s)

5.10 L: Protection Functions

◆ L1: Motor Protection

No. (Hex.)	Name	Description	Default (Range)
L1-01 (0480)	Motor Overload (oL1) Protection	V/f OLV/PM EZOLV Sets the motor overload protection with electronic thermal protectors. 0 : Disabled 1 : Variable Torque 2 : Constant Torque 10:1 Speed Range 3 : Constant Torque 100:1 SpeedRange 4 : PM Variable Torque 5 : PM Constant Torque 6 : Variable Torque (50Hz) **Note:** When only one motor is connected to a drive, set *L1-01 = 1 to 6 [Enabled]*. External thermal relays are not necessary in these conditions.	Determined by A1-02 (0 - 6)
L1-02 (0481)	Motor Overload Protection Time	V/f OLV/PM EZOLV Sets the operation time for the electronic thermal protector of the drive to prevent damage to the motor. Usually it is not necessary to change this setting.	1.0 min (0.1 - 5.0 min)
L1-03 (0482)	Motor Thermistor oH Alarm Select	V/f OLV/PM EZOLV Sets drive operation when the PTC input signal entered into the drive is at the *oH3 [Motor Overheat (PTC Input)]* detection level. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only	3 (0 - 3)
L1-04 (0483)	Motor Thermistor oH Fault Select	V/f OLV/PM EZOLV Sets the drive operation when the PTC input signal to the drive is at the *oH4 [Motor Overheat Fault (PTC Input)]* detection level. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09)	1 (0 - 2)
L1-05 (0484)	Motor Thermistor Filter Time	V/f OLV/PM EZOLV Sets the primary delay time constant for the PTC input signal entered to the drive. This parameter prevents accidental motor overheat faults.	0.20 s (0.00 - 10.00 s)
L1-08 (1103)	oL1 Current Level	V/f OLV/PM EZOLV Sets the reference current for the motor 1 thermal overload detection. When the current level > 0.0 A, you cannot set this value < 10% of drive rated current.	0.0 A (0.0 A or 10% to 150% of the drive rated current)
L1-09 (1104)	oL1 Current Level for Motor 2	V/f OLV/PM EZOLV Sets the reference current for the motor 2 thermal overload detection. When the current level > 0.0 A, you cannot set this value < 10% of drive rated current.	0.0 A (0.0 A or 10 to150% of the drive rated current)
L1-13 (046D)	Motor Overload Memory Selection	V/f OLV/PM EZOLV Sets the function that keeps the current electronic thermal protector value after power loss. 0 : Disabled 1 : Enabled 2 : Enabled, using RTC **Note:** The drive saves *oL* status, time and date when there is a power loss. The drive uses this information and time of power up to calculate *oL*.	2 (0 - 2)
L1-22 (0768) Expert RUN	Leakage Current Filter Time1	V/f OLV/PM EZOLV Sets the leakage current detection reduction filter time constant during constant speed run. **Note:** You can set this parameter when *C6-02 = B [Carrier Frequency Selection = Leakage Current Detection Reduction Rate PWM]*.	20.0 s (0.0 - 60.0 s)
L1-23 (0769) Expert RUN	Leakage Current Filter Time2	V/f OLV/PM EZOLV Sets the leakage current detection reduction filter time constant during acceleration/deceleration. **Note:** • You can set this parameter when *C6-02 = B [Carrier Frequency Selection = Leakage Current Detection Reduction Rate PWM]*. • When the setting value increases, the current monitor also starts up slowly. Examine the relevant sequence for problems.	20 s (0.0 - 60.0 s)

◆ L2: Power Loss Ride Through

No. (Hex.)	Name	Description	Default (Range)
L2-01 (0485)	Power Loss Ride Through Select	V/f OLV/PM EZOLV Sets the drive operation after a momentary power loss. 0 : Disable 1 : Enabled 2 : Enabled while CPU Power Active 3 : Kinetic Energy Backup: L2-02 4 : Kinetic Energy Backup: CPU Power 5 : Kinetic Energy Backup: DecelStop **Note:** When the CPU is inactive, *b1-17 [Run Command at Power Up]* sets operation at power up.	2 (0 - 5)
L2-02 (0486)	Power Loss Ride Through Time	V/f OLV/PM EZOLV Sets the maximum time that the drive will wait until it tries to restart after power loss.	Determined by o2-04 (0.0 - 25.5 s)
L2-03 (0487)	Minimum Baseblock Time	V/f OLV/PM EZOLV Sets the minimum time to continue the drive output block (baseblock) after a baseblock.	Determined by o2-04 (0.1 - 5.0 s)
L2-04 (0488)	Powerloss V/f Recovery Ramp Time	V/f EZOLV Sets the time for the drive output voltage to go back to the correct voltage after it completes speed searches.	Determined by o2-04 (0.0 - 5.0 s)
L2-05 (0489)	Undervoltage Detection Lvl (Uv1)	V/f OLV/PM EZOLV Sets the voltage at which the drive triggers a *Uv1 [DC Bus Undervoltage]* fault or at which it activates the KEB function. Usually it is not necessary to change this setting. **NOTICE** **Damage to Equipment** **When you set this parameter to a value lower than the default, you must install an AC reactor on the input side of the power supply.** **If you do not install an AC reactor, it will cause damage to the drive circuitry.**	Determined by o2-04 and E1-01 (208 V Class: 150 - 220 V, 480 V Class: 300 - 440 V)
L2-06 (048A) Expert	Kinetic Energy Backup Decel Time	V/f OLV/PM EZOLV Sets the deceleration time during KEB operation to decrease the maximum output frequency to 0.	0.0 s (0.0 - 6000.0 s)
L2-07 (048B) Expert	Kinetic Energy Backup Accel Time	V/f OLV/PM EZOLV Sets the acceleration time to return the frequency to the frequency reference before a power loss after canceling KEB operation.	0.0 s (0.0 - 6000.0 s)
L2-08 (048C) Expert	Frequency Gain at KEB Start	V/f EZOLV Sets the quantity of output frequency reduction used when KEB operation starts as a percentage of the motor rated slip before starting KEB operation.	100% (0 - 300%)
L2-09 (048D) Expert	KEB Minimum Frequency Level	V/f EZOLV Sets the quantity of output frequency reduction used as a percentage of *E2-02 [Motor Rated Slip]* when KEB operation starts.	20% (0 - 100%)
L2-10 (048E) Expert	Minimum KEB Time	V/f OLV/PM EZOLV Sets the minimum length of time to operate the KEB after the drive detects a momentary power loss.	50 ms (0 - 25500 ms)
L2-11 (0461) Expert	KEB DC Bus Voltage Setpoint	V/f OLV/PM EZOLV Sets the target value that controls the DC bus voltage to a constant level in Single Drive KEB Ride-Thru 2. Sets the DC bus voltage level that completes the KEB operation for all other KEB methods.	Determined by E1-01 (Determined by E1-01)
L2-29 (0475) Expert	Kinetic Energy Backup Method	V/f OLV/PM EZOLV Sets the KEB function operation mode. 0 : Single Drive KEB Ride-Thru 1 1 : Single Drive KEB Ride-Thru 2 3 : System KEB Ride-Thru 2	0 (0 - 3)
L2-30 (045E) Expert	KEB Zero Speed Operation	V/f OLV/PM EZOLV Sets the operation when the output frequency decreases below the zero level (DC braking injection starting frequency) during KEB deceleration when *L2-01 = 3 to 5 [Power Loss Ride Through Select = Kinetic Energy Backup: L2-02, Kinetic Energy Backup: CPU Power, or Kinetic Energy Backup: DecelStop]*. 0 : Baseblock 1 : DC/SC Braking	0 (0, 1)
L2-31 (045D) Expert	KEB Start Voltage Offset Level	V/f OLV/PM EZOLV Sets the KEB start voltage offset.	Determined by A1-02 (208 V Class: 0 - 100 V, 480 V Class: 0 - 200 V)

◆ L3: Stall Prevention

No. (Hex.)	Name	Description	Default (Range)
L3-01 (048F)	Stall Prevention during Accel	V/f OLV/PM EZOLV Sets the method of Stall Prevention During Acceleration. 0 : Disabled 1 : Enabled 2 : Intelligent (Ignore Accel Ramp)	1 (0 - 2)
L3-02 (0490)	Stall Prevent Level during Accel	V/f OLV/PM EZOLV Sets the output current level to activate the Stall Prevention function during acceleration as a percentage of the drive rated output current. **Note:** • When *L8-38 = 4 [Carrier Frequency Reduction = Enabled for All Speeds/Overheat]*, the default is set to 120% of drive rated current. • If you use a motor that is small compared to the drive and the motor stalls, decrease the setting value. • When you operate the motor in the constant power range, set *L3-03 [Stall Prevent Limit during Accel]*.	Determined by L8-38 (0 - 120%)
L3-03 (0491)	Stall Prevent Limit during Accel	V/f OLV/PM EZOLV Sets the lower limit for the stall prevention level used in the constant output range as a percentage of the drive rated output current.	50% (0 - 100%)
L3-04 (0492)	Stall Prevention during Decel	V/f OLV/PM EZOLV Sets the method that the drive will use to prevent overvoltage faults when decelerating. **Note:** The setting range changes when the *A1-02 [Control Method Selection]* value changes: • When *A1-02 = 5 [OLV/PM]*, the setting range is *0 to 2*. • When *A1-02 = 8 [EZOLV]*, the setting range is *0, 1*. 0 : Disabled 1 : General Purpose 2 : Intelligent (Ignore Decel Ramp) 4 : Overexcitation/High Flux 5 : Overexcitation/High Flux 2	0 (Determined by A1-02)
L3-05 (0493)	Stall Prevention during RUN	V/f OLV/PM EZOLV Sets the function to enable and disable Stall Prevention During Run. **Note:** • An output frequency lower than 6 Hz will disable Stall Prevention during Run. The *L3-05* and *L3-06 [Stall Prevent Level during Run]* settings do not have an effect. • The default setting changes when the *A1-02 [Control Method Selection]* value changes: –*A1-02 = 0, 5 [V/f, OLV/PM]*: 2 –*A1-02 = 8 [EZOLV]*: 3 0 : Disabled 1 : Deceleration Time 1 (C1-02) 2 : Deceleration Time 2 (C1-04) 3 : Intelligent	0 (Determined by A1-02)
L3-06 (0494)	Stall Prevent Level during Run	V/f OLV/PM EZOLV Sets the output current level to enable the Stall Prevention function during operation as a percentage of the drive rated output current. **Note:** • When *L8-38 = 4 [Carrier Frequency Reduction = Enabled for All Speeds/Overheat]*, the default is set to 120% of drive rated current. • This parameter is applicable when *L3-05 = 1, 2 [Stall Prevention during RUN = Deceleration Time 1 (C1-02), Deceleration Time 2 (C1-04)]*. • When *L3-23 = 1 [Stall P Reduction at Constant HP = Automatic Reduction @ CHP Region]*, the drive will automatically decrease the level in the constant output range.	Determined by L8-38 (5 - 120%)
L3-11 (04C7)	Overvoltage Suppression Select	V/f OLV/PM EZOLV Sets the overvoltage suppression function. 0 : Disabled 1 : Enabled	0 (0, 1)
L3-17 (0462)	DC Bus Regulation Level	V/f OLV/PM EZOLV Sets the target value for the DC bus voltage when the overvoltage suppression function and the Decel Stall Prevention function (Intelligent Stall Prevention) are active.	208 V Class: 375 V, 480 V Class: 750 V (208 V Class: 150 - 400 V, 480 V Class: 300 - 800 V)
L3-20 (0465) Expert	DC Bus Voltage Adjustment Gain	V/f OLV/PM EZOLV Sets the proportional gain used to control the DC bus voltage.	Determined by A1-02 (0.00 - 5.00)
L3-21 (0466) Expert	OVSuppression Accel/Decel P Gain	V/f OLV/PM EZOLV Sets the proportional gain to calculate acceleration and deceleration rates.	1.00 (0.10 - 10.00)

No. (Hex.)	Name	Description	Default (Range)
L3-22 (04F9)	PM Stall Prevention Decel Time	V/f **OLV/PM** EZOLV Sets the momentary deceleration time that the drive will use when it tries to accelerate a PM motor and detected motor stalls. This function is applicable when *L3-01 = 1 [Stall Prevention during Accel = Enabled]*.	0.0 s (0.0 - 6000.0 s)
L3-23 (04FD)	Stall P Reduction at Constant HP	**V/f** OLV/PM EZOLV Sets the function to automatically decrease the Stall Prevention Level during Run for Constant Horse Power (CHP) part of the speed range. 0 : Use L3-06 for Entire Speed Range 1 : Automatic Reduction @ CHP Region	0 (0, 1)
L3-24 (046E) Expert	Motor Accel Time @ Rated Torque	**V/f** **OLV/PM** **EZOLV** Sets the motor acceleration time to reach the maximum frequency at the motor rated torque for stopped single-drive motors.	Determined by o2-04, E2-11, and E5-01 (0.001 - 10.000 s)
L3-25 (046F) Expert	Load Inertia Ratio	**V/f** **OLV/PM** **EZOLV** Sets the ratio between motor inertia and machine inertia.	1.0 (0.1 - 1000.0)
L3-26 (0455) Expert	Additional DC Bus Capacitors	**V/f** **OLV/PM** **EZOLV** Sets the capacity for external main circuit capacitors. Usually it is not necessary to change this setting. Sets this parameter when you use the KEB Ride-Thru function.	0 µF (0 to 65000 µF)
L3-27 (0456)	Stall Prevention Detection Time	**V/f** **OLV/PM** **EZOLV** Sets a delay time between reaching the Stall Prevention level and starting the Stall Prevention function.	50 ms (0 - 5000 ms)
L3-35 (0747) Expert	Speed Agree Width for Auto Decel	**V/f** **OLV/PM** **EZOLV** Sets the width for speed agreement when *L3-04 = 2 [Stall Prevention during Decel = Intelligent (Ignore Decel Ramp)]*. Usually it is not necessary to change this setting.	0.00 Hz (0.00 - 1.00 Hz)

◆ L4: Speed Detection

No. (Hex.)	Name	Description	Default (Range)
L4-01 (0499)	Speed Agree Detection Level	**V/f** **OLV/PM** **EZOLV** Sets the level to detect speed agree or motor speed when *H2-01 to H2-03 = 2, 3, 4, 5 [MFDO Function Selection = Speed Agree 1, User-Set Speed Agree 1, Frequency Detection 1, Frequency Detection 2]*.	0.0 Hz (0.0 - 400.0 Hz)
L4-02 (049A)	Speed Agree Detection Width	**V/f** **OLV/PM** **EZOLV** Sets the width to detect speed agree or motor speed when *H2-01 to H2-03 = 2, 3, 4, 5 [MFDO Function Selection = Speed Agree 1, User-Set Speed Agree 1, Frequency Detection 1, Frequency Detection 2]*.	2.0 Hz (0.0 - 20.0 Hz)
L4-03 (049B)	Speed Agree Detection Level (+/-)	**V/f** **OLV/PM** **EZOLV** Sets the speed agree detection level or motor speed detection level when *H2-01 to H2-03 = 13, 14, 15, 16 [MFDO Function Selection = Speed Agree 2, User-Set Speed Agree 2, Frequency Detection 3, Frequency Detection 4]*.	0.0 Hz (-400.0 - +400.0 Hz)
L4-04 (049C)	Speed Agree Detection Width (+/-)	**V/f** **OLV/PM** **EZOLV** Sets the width to detect speed agree or motor speed when *H2-01 to H2-03 = 13, 14, 15, 16 [MFDO Function Selection = Speed Agree 2, User-Set Speed Agree 2, Frequency Detection 3, Frequency Detection 4]*.	2.0 Hz (0.0 - 20.0 Hz)
L4-05 (049D)	Fref Loss Detection Selection	**V/f** **OLV/PM** **EZOLV** Sets the operation when the drive detects a loss of frequency reference. 0 : Stop 1 : Run at (L4-06 x Last Reference)	0 (0, 1)
L4-06 (04C2)	Frequency Reference @Loss of Ref	**V/f** **OLV/PM** **EZOLV** Sets the frequency reference as a percentage to continue drive operation after it detects a frequency reference loss. The value is a percentage of the frequency reference before the drive detected the loss.	80.0% (0.0 - 100.0%)
L4-07 (0470)	Speed Agree Detection Selection	**V/f** **OLV/PM** **EZOLV** Sets the condition that activates speed detection. 0 : No Detection during Baseblock 1 : Detection Always Enabled	0 (0, 1)

◆ L5: Fault Restart

No. (Hex.)	Name	Description	Default (Range)
L5-01 (049E)	Number of Auto-Restart Attempts	V/f OLV/PM EZOLV Sets the number of times that the drive will try to restart.	5 (0 - 10 times)
L5-02 (049F)	Fault Contact at Restart Select	V/f OLV/PM EZOLV Sets the function that sends signals to the MFDO terminal set for *Fault [H2-xx = E]* while the drive is automatically restarting. 0 : Active Only when Not Restarting 1 : Always Active	0 (0, 1)
L5-04 (046C)	Interval Method Restart Time	V/f OLV/PM EZOLV Sets the time interval between each Auto Restart attempt.	20.0 s (0.5 - 3600.0 s)
L5-07 (0B2A)	Fault Reset Enable Select Grp1	V/f OLV/PM EZOLV Use these 4 digits to set the Auto Restart function for *oL1* to *oL4*. From left to right, the digits set *oL1*, *oL2*, *oL3*, and *oL4*, in order. 0000 : Disabled 0001 : Enabled (—/—/—/oL4) 0010 : Enabled (—/—/oL3/—) 0011 : Enabled (—/—/oL3/oL4) 0100 : Enabled (—/oL2/—/—) 0101 : Enabled (—/oL2/—/oL4) 0110 : Enabled (—/oL2/oL3/—) 0111 : Enabled (—/oL2/oL3/oL4) 1000 : Enabled (oL1/—/—/—) 1001 : Enabled (oL1/—/—/oL4) 1010 : Enabled (oL1/—/oL3/—) 1011 : Enabled (oL1/—/oL3/oL4) 1100 : Enabled (oL1/oL2/—/—) 1101 : Enabled (oL1/oL2/—/oL4) 1110 : Enabled (oL1/oL2/oL3/—) 1111 : Enabled (oL1/oL2/oL3/oL4)	1111 (0000 - 1111)
L5-08 (0B2B)	Fault Reset Enable Select Grp2	V/f OLV/PM EZOLV Use these 4 digits to set the Auto Restart function for *Uv1*, *ov*, *oH1*, and *GF*. From left to right, the digits set *Uv1*, *ov*, *oH1*, and *GF*, in order. 0000 : Disabled 0001 : Enabled (—/–/—/GF) 0010 : Enabled (—/–/oH1/–) 0011 : Enabled (—/–/oH1/GF) 0100 : Enabled (—/ov/—/–) 0101 : Enabled (—/ov/—/GF) 0110 : Enabled (—/ov/oH1/–) 0111 : Enabled (—/ov/oH1/GF) 1000 : Enabled (Uv1/–/—/–) 1001 : Enabled (Uv1/–/—/GF) 1010 : Enabled (Uv1/–/oH1/–) 1011 : Enabled (Uv1/–/oH1/GF) 1100 : Enabled (Uv1/ov/—/–) 1101 : Enabled (Uv1/ov/—/GF) 1110 : Enabled (Uv1/ov/oH1/–) 1111 : Enabled (Uv1/ov/oH1/GF)	1111 (0000 - 1111)
L5-40 (3670)	Low Feedback Flt Retry Selection	V/f OLV/PM EZOLV Sets the drive to do an Auto Restart when the drive detects an *LFB [Low Feedback Sensed]* fault. 0 : No Retry 1 : Retry	0 (0, 1)
L5-41 (3671)	Hi Feedback Flt Retry Selection	V/f OLV/PM EZOLV Sets the drive to do an Auto Restart when the drive detects an *HFB [High Feedback Sensed]* fault. 0 : No Retry 1 : Retry	0 (0, 1)
L5-42 (3672)	Feedback Loss Fault Retry Select	V/f OLV/PM EZOLV Sets the drive to try an Auto Restart when the drive detects an *FDBKL [WIRE Break]* fault. 0 : No Retry 1 : Retry	0 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
L5-43 (3673)	LowFeedback Fault Retry Attempts	V/f OLV/PM EZOLV Sets the number of restart attempts when the drive detects an *LFB Low Feedback Sensed* condition.	3 (0 - 10)
L5-44 (3674)	Hi Feedback Fault Retry Attempts	V/f OLV/PM EZOLV Sets the number of restart attempts when the drive detects an *HFB High Feedback Sensed* condition.	3 (0 - 10)
L5-45 (3675)	Fdbk Loss Fault Retry Attempts	V/f OLV/PM EZOLV Sets the number of restart attempts when the drive detects a *FBL Feedback Loss* condition.	3 (0 - 10)
L5-46 (3676)	Low Feedback Fault Restart Time	V/f OLV/PM EZOLV Sets the time interval between each *LFB Low Feedback Sensed* auto-restart attempt.	20.0 s (0.5 -3600.0 s)
L5-47 (3677)	Hi Feedback Fault Restart Time	V/f OLV/PM EZOLV Sets the time interval between each *HFB High Feedback Sensed* auto-restart attempt.	20.0 s (0.5 -3600.0 s)
L5-48 (3678)	Feedback Loss Fault Restart Time	V/f OLV/PM EZOLV Sets the time interval between each *FDBKL Feedback Loss* auto-restart attempt.	20.0 s (0.5 -3600.0 s)
L5-49 (3679)	Fault Retry Speed Search Select	V/f OLV/PM EZOLV Sets the drive to do a speed search at the start of a Fault Retry. 0 : Disabled 1 : Enabled	0 (0, 1)
L5-50 (367A)	Setpoint Not Met Fault Retry Sel	V/f OLV/PM EZOLV Sets the drive to try an Auto Restart when it detects an *NMS [SetPoint Not Met]* fault. 0 : No Retry 1 : Retry	0 (0, 1)
L5-51 (367B)	Loss of Prime Fault Retry Select	V/f OLV/PM EZOLV Sets the drive to try an Auto Restart if it detects an *LOP [Loss Of Prime]* fault. 0 : No Retry 1 : Retry 2 : Infinite Retries	0 (0 - 2)
L5-52 (367C)	Over Cycle Fault Retry Selection	V/f OLV/PM EZOLV Sets the drive to try an Auto Restart if it detects an *POC [Pump Over Cycle]* fault. 0 : No Retry 1 : Retry 2 : Infinite Retries	0 (0 - 2)
L5-53 (3251)	VoluteThermostat Fault Retry Sel	V/f OLV/PM EZOLV Sets the drive to try an Auto Restart if it detects a *VLTS [Volute Thermostat Fault]* fault. **Note:** The drive will only restart after the Thermostat digital input de-activates and the *L5-60 [Volute Thermostat Restart Time]* timer is expired. 0 : No Retry 1 : Retry	0 (0, 1)
L5-54 (367E)	Setpoint Not Met Retry Attempts	V/f OLV/PM EZOLV Sets the number restart attempts when the drive detects an *NMS Setpoint Not Met* condition.	3 (0 - 10)
L5-55 (367F)	Loss of Prime Flt Retry Attempts	V/f OLV/PM EZOLV Sets the number restart attempts when the drive detects an *LOP Loss of Prime* condition. If *L5-51 = 2 [Loss of Prime Fault Retry Select = Infinite Retries]*, the drive will ignore this parameter.	3 (0 - 10)
L5-56 (3680)	Over Cycle Fault Retry Attempts	V/f OLV/PM EZOLV Sets the number of restart attempts when the drive detects an *POC Pump Over Cycle* condition. **Note:** When *L5-52 = 2 [Over Cycle Fault Retry Selection = Infinite Retries]*, the drive will ignore this parameter.	3 (0 - 10)
L5-57 (3681)	Volute Thermostat Retry Attempts	V/f OLV/PM EZOLV Sets the number restart attempts when the drive detects a *VLTS [Volute Thermostat Fault]* condition.	3 (0 - 10)
L5-58 (3682)	Setpoint Not Met Restart Time	V/f OLV/PM EZOLV Sets the time interval between each *NMS Setpoint Not Met* auto-restart attempt.	20.0 s (0.5 - 3600.0 s)
L5-59 (3683)	Over Cycle Fault Restart Time	V/f OLV/PM EZOLV Sets the time interval between each *POC Pump Over Cycle* auto-restart attempt.	20.0 s (0.5 -3600.0 s)
L5-60 (3684)	Volute Thermostat Restart Time	V/f OLV/PM EZOLV Sets the time interval between each *VLTS [Volute Thermostat Fault]* auto-restart attempt.	20.0 s (0.5 - 3600.0 s)
L5-61 (3685)	Low Water Level Fault Retry Sel	V/f OLV/PM EZOLV Sets the auto-restart function after the drive detects an *LWL Low Water Level Digital Input* fault. 0 : No Retry 1 : Retry	0 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
L5-62 (3686)	Low Water Level Retry Attempts	V/f OLV/PM EZOLV Sets the number restart attempts when the drive detects a *LWL Low Water Level Digital Input* condition.	3 (0 - 10)
L5-63 (3687)	Low Water Level Restart Time	V/f OLV/PM EZOLV Sets the time interval between each *LWL Low Water Level Digital Input* auto-restart attempt. **Note:** If the *LWL* fault condition stays after the time set in this parameter, the drive will not try to auto-restart until the fault condition is removed.	20.0 s (0.5 - 3600.0 s)
L5-64 (3688)	High Water Level Fault Retry Sel	V/f OLV/PM EZOLV Sets the auto-restart function after the drive detects an *HWL High Water Level Digital Input* fault. 0 : No Retry 1 : Retry	0 (0, 1)
L5-65 (3689)	High Water Level Retry Attempts	V/f OLV/PM EZOLV Sets the number restart attempts when the drive detects a *HWL High Water Level Digital Input* condition.	3 (0 - 10)
L5-66 (368A)	High Water Level Restart Time	V/f OLV/PM EZOLV Sets the time interval between each *HWL High Water Level Digital Input* auto-restart attempt. **Note:** If the *HWL* fault condition stays after the time set in this parameter, the drive will not try to auto-restart until the fault condition is removed.	20.0 s (0.5 - 3600.0 s)

◆ L6: Torque Detection

No. (Hex.)	Name	Description	Default (Range)
L6-01 (04A1)	Torque Detection Selection 1	V/f OLV/PM EZOLV Sets torque detection conditions that will trigger an overtorque or undertorque response from the drive. 0 : Disabled 1 : oL @ Speed Agree - Alarm only 2 : oL @ RUN - Alarm only 3 : oL @ Speed Agree - Fault 4 : oL @ RUN - Fault 5 : UL @ Speed Agree - Alarm only 6 : UL @ RUN - Alarm only 7 : UL @ Speed Agree - Fault 8 : UL @ RUN - Fault 9 : UL6 @ Speed Agree - Alarm only 10 : UL6 @ RUN - Alarm only 11 : UL6 @ Speed Agree - Fault 12 : UL6 @ RUN - Fault	0 (0 - 12)
L6-02 (04A2)	Torque Detection Level 1	V/f OLV/PM EZOLV Sets the detection level for Overtorque/Undertorque Detection 1. In V/f control, drive rated output current = 100% value. In vector control, motor rated torque = 100% value.	15% (0 - 300%)
L6-03 (04A3)	Torque Detection Time 1	V/f OLV/PM EZOLV Sets the detection time for Overtorque/Undertorque Detection 1.	10.0 s (0.0 - 10.0 s)
L6-04 (04A4)	Torque Detection Selection 2	V/f OLV/PM EZOLV Sets the speed range that detects overtorque and undertorque and the operation of drives (operation status) after detection. 0 : Disabled 1 : oL @ Speed Agree - Alarm only 2 : oL @ RUN - Alarm only 3 : oL @ Speed Agree - Fault 4 : oL @ RUN - Fault 5 : UL @ Speed Agree - Alarm only 6 : UL @ RUN - Alarm only 7 : UL @ Speed Agree - Fault 8 : UL @ RUN - Fault	0 (0 - 8)
L6-05 (04A5)	Torque Detection Level 2	V/f OLV/PM EZOLV Sets the detection level for Overtorque/Undertorque Detection 2. In V/f control, drive rated output current = 100% value. In vector control, motor rated torque = 100% value.	150% (0 - 300%)

No. (Hex.)	Name	Description	Default (Range)
L6-06 (04A6)	Torque Detection Time 2	V/f OLV/PM EZOLV Sets the detection time for Overtorque/Undertorque Detection 2.	0.1 s (0.0 - 10.0 s)
L6-13 (062E)	Motor Underload Curve Select	V/f OLV/PM EZOLV Sets the motor underload protection (*UL6 [Undertorque Detection 6]*) based on motor load and sets the level of *L6-02 [Torque Detection Level 1]* to refer to Fbase or Fmax. 0 : Base Frequency Enable 1 : Max Frequency Enable	0 (0, 1)
L6-14 (062F)	Motor Underload Level @ Min Freq	V/f OLV/PM EZOLV Sets the *UL6 [Undertorque Detection 6]* detection level at minimum frequency by percentage of drive rated current. **Note:** If you set this parameter < *L6-02 [Torque Detection Level 1]*, it will trigger an *oPE08* error.	15% (0 - 300%)

◆ L7: Torque Limit

No. (Hex.)	Name	Description	Default (Range)
L7-01 (04A7) RUN	Forward Torque Limit	V/f OLV/PM EZOLV Sets the torque limit value for forward motoring as a percentage, where motor rated torque is the 100% value.	200% (0 - 300%)
L7-02 (04A8) RUN	Reverse Torque Limit	V/f OLV/PM EZOLV Sets the torque limit value for reversed motoring as a percentage, where motor rated torque is the 100% value.	200% (0 - 300%)
L7-03 (04A9) RUN	Forward Regenerative Trq Limit	V/f OLV/PM EZOLV Sets the torque limit value for forward regenerative conditions as a percentage of the motor rated torque.	200% (0 - 300%)
L7-04 (04AA) RUN	Reverse Regenerative Trq Limit	V/f OLV/PM EZOLV Sets the torque limit value for reversed regenerative conditions as a percentage of the motor rated torque.	200% (0 - 300%)
L7-16 (044D)	Torque Limit Process at Start	V/f OLV/PM EZOLV Assigns a time filter to allow the torque limit to build at start. 0 : Disabled 1 : Enabled	1 (0, 1)

◆ L8: Drive Protection

No. (Hex.)	Name	Description	Default (Range)
L8-02 (04AE)	Overheat Alarm Level	V/f OLV/PM EZOLV Sets the *oH* detection level temperature.	Determined by o2-04 (50 - 150 °C)
L8-03 (04AF)	Overheat Pre-Alarm Selection	V/f OLV/PM EZOLV Sets drive operation if it detects an *oH* alarm. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only 4 : Operate at Reduced Speed (L8-19)	3 (0 - 4)
L8-05 (04B1)	Input Phase Loss Protection Sel	V/f OLV/PM EZOLV Sets the function to enable and disable input phase loss detection. 0 : Disabled 1 : Enabled	1 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
L8-07 (04B3)	Output Phase Loss Protection Sel	V/f OLV/PM EZOLV Sets the function to enable and disable output phase loss detection. The drive starts output phase loss detection when the output current decreases to less than 5% of the drive rated current. **Note:** The drive can incorrectly start output phase loss detection in these conditions: • The motor rated current is very small compared to the drive rating. • The drive is operating a PM motor with a small load. 0 : Disabled 1 : Fault when one phase is lost 2 : Fault when two phases are lost	1 (0 - 2)
L8-09 (04B5)	Output Ground Fault Detection	V/f OLV/PM EZOLV Sets the function to enable and disable ground fault protection. 0 : Disabled 1 : Enabled	Determined by o2-04 (0, 1)
L8-10 (04B6)	Heatsink Fan Operation Selection	V/f OLV/PM EZOLV Sets operation of the heatsink cooling fan. 0 : During Run, w/ L8-11 Off-Delay 1 : Always On 2 : Temperature-Dependent Fan Ctrl.	0 (0 - 2)
L8-11 (04B7)	Heatsink Fan Off-Delay Time	V/f OLV/PM EZOLV Sets the length of time that the drive will wait before it stops the cooling fan after it cancels the Run command when *L8-10 = 0 [Heatsink Fan Operation Selection = During Run, w/ L8-11 Off-Delay]*.	300 s (0 - 300 s)
L8-12 (04B8)	Ambient Temperature Setting	V/f OLV/PM EZOLV Sets the ambient temperature of the drive installation area. **Note:** The setting range changes when the *L8-35 [Installation Method Selection]* setting changes. • When *L8-35 = 0 or 2 [IP20/UL Open Type or IP20/UL Type 1]*: -10 °C ~ +60 °C • When *L8-35 = 1 or 3 [Side-by-Side Mounting or IP55/UL Type 12]*: -10 °C ~ +50 °C	40 °C (Determined by L8-35)
L8-15 (04BB)	Drive oL2 @ Low Speed Protection	V/f OLV/PM EZOLV Sets the function to decrease the drive overload level at which the drive will trigger *oL2 [Drive Overload]* during low speed operation (6 Hz or slower) to prevent damage to the main circuit transistors. **Note:** Contact Yaskawa or your nearest sales representative before disabling this function at low speeds. If you frequently operate drives with high output current in low speed ranges, it can cause heat stress and decrease the life span of drive IGBTs. 0 : Disabled (No Additional Derate) 1 : Enabled (Reduced oL2 Level)	1 (0, 1)
L8-18 (04BE)	Software Current Limit Selection	V/f OLV/PM EZOLV Set the software current limit selection function to prevent damage to the main circuit transistor caused by too much current. 0 : Disabled 1 : Enabled	0 (0, 1)
L8-19 (04BF)	Freq Reduction @ oH Pre-Alarm	V/f OLV/PM EZOLV Sets the ratio at which the drive derates the frequency reference during an *oH* alarm.	90.0% (10.0 - 100.0%)
L8-27 (04DD)	Overcurrent Detection Gain	V/f OLV/PM EZOLV Sets the PM motor overcurrent detection level as a percentage of the motor rated current value. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the motor rated current. • *A1-02 ≠ 8[EZOLV]*: *E5-03 [PM Motor Rated Current (FLA)]* • *A1-02 = 8*: *E9-06 [Motor Rated Current (FLA)]*	300.0% (0.0 - 1000.0%)
L8-29 (04DF)	Output Unbalance Detection Sel	V/f OLV/PM EZOLV Sets the function to detect *LF2 [Output Current Imbalance]*. 0 : Disabled 1 : Enabled	1 (0, 1)
L8-31 (04E1)	LF2 Detection Time	V/f OLV/PM EZOLV Sets the LF2 [Output Current Imbalance] detection time.	3 (1 – 100)
L8-35 (04EC)	Installation Method Selection	V/f OLV/PM EZOLV Sets the type of drive installation. 0 : IP20/UL Open Type 1 : Side-by-Side Mounting 2 : IP20/UL Type 1 3 : IP55/UL Type 12	Determined by the drive (0 - 3)

No. (Hex.)	Name	Description	Default (Range)
L8-38 (04EF)	Carrier Frequency Reduction	V/f OLV/PM EZOLV Sets the carrier frequency reduction function. The drive decreases the carrier frequency when the output current is more than a specified level. 0 : Disabled 1 : Enabled below 6 Hz 2 : Enabled for All Speeds 3 : Enable at Overload 4 : Enabled for All Speeds/Overheat **Note:** Setting *0 [Disabled]* is available when *A1-02 = 5 or 8 [Control Method Selection = PM Open Loop Vector or EZ Vector Control]*.	4 (0 - 4)
L8-41 (04F2)	High Current Alarm Selection	V/f OLV/PM EZOLV Sets the function to cause an *HCA [High Current Alarm]* when the output current is more than 150% of the drive rated current. 0 : Disabled 1 : Enabled	0 (0, 1)
L8-90 (0175) Expert	STPo Detection Level (Low Speed)	V/f OLV/PM EZOLV Sets the detection level that the control fault must be equal to or more than to cause an *STPo [Motor Step-Out Detected]*.	0 times (0 - 5000 times)
L8-97 (3104)	Carrier Freq Reduce during OH	V/f OLV/PM EZOLV Sets the function to decrease carrier frequency during oH pre-alarm. 0 : Disabled 1 : Enabled	0 (0, 1)

◆ L9: Drive Protection 2

No. (Hex.)	Name	Description	Default (Range)
L9-16 (11DC) Expert	FAn1 Detect Time	V/f OLV/PM EZOLV Sets the detection time for *FAn1 [Drive Cooling Fan Fault]*. Yaskawa recommends that you do not change this parameter value.	4.0 s (0.0 - 30.0 s)

5.11 n: Special Adjustment

◆ n1: Hunting Prevention

No. (Hex.)	Name	Description	Default (Range)
n1-01 (0580)	Hunting Prevention Selection	V/f OLV/PM EZOLV Sets the function to prevent hunting. 0 : Disabled 1 : Enabled (Normal)	1 (0, 1)
n1-02 (0581) Expert	Hunting Prevention Gain Setting	V/f OLV/PM EZOLV Sets the performance of the hunting prevention function. Usually it is not necessary to change this parameter.	1.00 (0.00 - 2.50)
n1-03 (0582) Expert	Hunting Prevention Time Constant	V/f OLV/PM EZOLV Sets the primary delay time constant of the hunting prevention function. Usually it is not necessary to change this parameter.	Determined by o2-04 (0 - 500 ms)
n1-05 (0530) Expert	Hunting Prevent Gain in Reverse	V/f OLV/PM EZOLV Sets the performance of the hunting prevention function. This parameter adjusts Reverse run. Usually it is not necessary to change this parameter.	0.00 (0.00 - 2.50)
n1-13 (1B59) Expert	DC Bus Stabilization Control	V/f OLV/PM EZOLV Sets the oscillation suppression function for the DC bus voltage. 0 : Disabled 1 : Enabled	0 (0, 1)
n1-14 (1B5A) Expert	DC Bus Stabilization Time	V/f OLV/PM EZOLV Adjusts the responsiveness of the oscillation suppression function for the DC bus voltage. Set *n1-13 = 1 [DC Bus Stabilization Control = Enabled]* to enable this parameter.	100.0 ms (0.0 - 500.0 ms)

◆ n3: High Slip/Overexcite Braking

No. (Hex.)	Name	Description	Default (Range)
n3-01 (0588) Expert	HSB Deceleration Frequency Width	V/f OLV/PM EZOLV Sets the amount by which the output frequency is to be lowered during high-slip braking, as a percentage of *E1-04 [Maximum Output Frequency]*, which represents the 100% value.	5% (1 - 20%)
n3-02 (0589) Expert	HSB Current Limit Level	V/f OLV/PM EZOLV Sets the maximum current output during high-slip braking as a percentage, where *E2-01 [Motor Rated Current (FLA)]* is 100%. Also sets the current suppression to prevent exceeding drive overload tolerance. **Note:** When *L8-38 = 4 [Carrier Frequency Reduction = Enabled for All Speeds/Overheat]*, the default is set to 120% of drive rated current.	Determined by L8-38 (0 - 120%)
n3-03 (058A) Expert	HSB Dwell Time at Stop	V/f OLV/PM EZOLV Sets the dwell time, a length of time when high-slip braking is ending and during which the motor speed decreases and runs at a stable speed. For a set length of time, the drive will hold the actual output frequency at the minimum output frequency set in *E1-09*.	1.0 s (0.0 - 10.0 s)
n3-04 (058B) Expert	HSB Overload Time	V/f OLV/PM EZOLV Sets the time used to detect *oL7 [High Slip Braking Overload]*, which occurs when the output frequency does not change during high-slip braking. Usually it is not necessary to change this parameter.	40 s (30 - 1200 s)
n3-13 (0531) Expert	OverexcitationBraking (OEB) Gain	V/f OLV/PM EZOLV Sets the gain value that the drive multiplies by the V/f pattern output value during overexcitation deceleration to calculate the overexcitation level.	1.10 (1.00 - 1.40)
n3-14 (0532) Expert	OEB High Frequency Injection	V/f OLV/PM EZOLV Sets the function that injects harmonic signals during overexcitation deceleration. 0 : Disabled 1 : Enabled	0 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
n3-21 (0579) Expert	HSB Current Suppression Level	V/f OLV/PM EZOLV Sets the upper limit of the current that is suppressed at the time of overexcitation deceleration as a percentage of the drive rated current.	100% (0 - 150%)
n3-23 (057B) Expert	Overexcitation Braking Operation	V/f OLV/PM EZOLV Sets the direction of motor rotation where the drive will enable overexcitation. 0 : Disabled 1 : Enabled Only when Rotating FWD 2 : Enabled Only when Rotating REV	0 (0 - 2)

◆ n7: EZ Drive

No. (Hex.)	Name	Description	Default (Range)
n7-01 (3111) Expert	Damping Gain for Low Frequency	V/f OLV/PM EZOLV Sets the oscillation suppression gain for the low speed range.	1.0 (0.1 - 10.0)
n7-05 (3115) Expert	Response Gain for Load Changes	V/f OLV/PM EZOLV Sets the response gain related to changes in the load.	50 (10 - 1000)
n7-07 (3117) Expert	Speed Calculation Gain1	V/f OLV/PM EZOLV Sets the speed calculation gain during usual operation. Usually it is not necessary to change this setting.	15.0 (1.0 - 50.0)
n7-08 (3118) Expert	Speed Calculation Gain2	V/f OLV/PM EZOLV Sets the speed calculation gain during a speed search. **Note:** When *E9-01 = 1 [Motor Type Selection = Permanent Magnet (PM)]*, the setting range is 1.0 - 80.0.	25.0 (1.0 - 50.0)
n7-10 (311A) Expert	Pull-in Current Switching Speed	V/f OLV/PM EZOLV Parameter *n8-51 [Pull-in Current @ Acceleration]*, is in effect when the output frequency is ≤ *n7-10*, where the speed is set as a percentage of rated speed. **Note:** • The value set in *n8-51 [Pull-in Current @ Acceleration]* is enabled for speeds that are not higher than *n7-10* during deceleration. The value set in *b8-01 [Energy Saving Control Selection]* is enabled for speeds higher than *n7-10*. • If there is a large quantity of oscillation when you operate in the low speed range, increase the setting value. • When it is most important to save energy in the low speed range, decrease the setting value.	10.0% (0.0 - 100.0%)
n7-11 (311B) Expert	Drv Mode Switch Hysteresis Band	V/f OLV/PM EZOLV Sets the hysteresis level for Switching Speed set in *n7-10 [Pull-in Current Switching Speed]*. When the speed is lower than *n7-10* + *n7-11* during acceleration, the drive enables pull-in current. **Note:** • The value set in *n8-51 [Pull-in Current @ Acceleration]* is enabled for speeds that are not higher than *n7-10* + *n7-11* during acceleration. The value set in *b8-01 [Energy Saving Control Selection]* is enabled for speeds higher than *n7-10* + *n7-11*. • If there is a large quantity of oscillation when you operate in the low speed range, increase the setting value. • When it is most important to save energy in the low speed range, decrease the setting value.	5.0% (1.0 - 20.0%)
n7-13 (311D) Expert	Pull-in Current Switching Time	V/f OLV/PM EZOLV Sets a time to enable the pull-in current commands. If there is a large quantity of oscillation at speeds around *n7-10 [Pull-in Current Switching Speed]*, decrease the setting in decrements of 20 ms.	100 ms (0 - 1000 ms)
n7-17 (3122) Expert	Resistance TemperatureCorrection	V/f OLV/PM EZOLV Sets the function to adjust for changes in the motor resistance value caused by changes in the temperature. 0 : Invalid 1 : Valid (Only 1 time) 2 : Valid (Every time)	1 (0 to 2)

◆ n8: PM Motor Control Tuning

No. (Hex.)	Name	Description	Default (Range)
n8-23 (0556) Expert	ACR q Gain @PoleEst	V/f OLV/PM EZOLV Sets the proportional gain for current regulator q-axis control when the drive estimates the initial pole. Usually it is not necessary to change this setting.	0 (0 - 2000)
n8-24 (0557) Expert	ACR q Integral Time @PoleEst	V/f OLV/PM EZOLV Sets the integral time for current regulator q-axis control when the drive estimates the initial pole. Usually it is not necessary to change this setting.	0.0 ms (0.0 - 100.0 ms)
n8-25 (0558) Expert	ACR q Limit @PoleEst	V/f OLV/PM EZOLV Sets the q-axis limit of the current regulator when the drive estimates the initial pole. Usually it is not necessary to change this setting.	0% (0 - 150%)
n8-26 (0559) Expert	ACR d Gain @PoleEst	V/f OLV/PM EZOLV Sets the proportional gain for current regulator d-axis control when the drive estimates the initial pole. Usually it is not necessary to change this setting.	500 (0 - 2000)
n8-27 (055A) Expert	ACR d Integral Time @PoleEst	V/f OLV/PM EZOLV Sets the integral time for current regulator d-axis control when the drive estimates the initial pole. Usually it is not necessary to change this setting.	0.0 ms (0.0 - 100.0 ms)
n8-28 (055B) Expert	ACR d Lim @PoleEst	V/f OLV/PM EZOLV Sets the d-axis limit of the current regulator when the drive estimates the initial pole. Usually it is not necessary to change this setting.	100% (0 - 150%)
n8-35 (0562) Expert	Initial Pole Detection Method	V/f OLV/PM EZOLV Sets how the drive detects the position of the rotor at start. **Note:** • When you operate an SPM motor, set *n8-35 = 0*. When you operate an IPM motor, set *n8-35 = 0 to 2*. • When you set *n8-35 = 1*, do High Frequency Injection Auto-Tuning. 0 : Pull-in 1 : High Frequency Injection	0 (0, 1)
n8-36 (0563) Expert	HFI Frequency Level for L Tuning	V/f OLV/PM EZOLV Sets the injection frequency for high frequency injection. **Note:** • Set *n8-35 = 1 [Initial Pole Detection Method = High Frequency Injection]* to enable this parameter. • The drive automatically calculates this value when High Frequency Injection Auto-Tuning completes successfully.	500 Hz (200 - 1000 Hz)
n8-37 (0564) Expert	HFI Voltage Amplitude Level	V/f OLV/PM EZOLV Sets the high frequency injection amplitude as a percentage where 200 V = 100% for 208 V class drives and 400 V = 100% for a 480 V class drives. Usually it is not necessary to change this setting. **Note:** • Set *n8-35 = 1 [Initial Pole Detection Method = High Frequency Injection]* to enable this parameter. • The drive automatically calculates this value when High Frequency Injection Auto-Tuning completes successfully.	20.0% (0.0 - 50.0%)
n8-39 (0566) Expert	HFI LPF Cutoff Freq	V/f OLV/PM EZOLV Sets the low-pass filter shut-off frequency for high frequency injection. **Note:** • Set *n8-35 = 1 [Initial Pole Detection Method = High Frequency Injection]* to enable this parameter. • The drive automatically calculates this value when High Frequency Injection Auto-Tuning completes successfully.	250 Hz (0 - 1000 Hz)
n8-41 (0568) Expert	HFI P Gain	V/f OLV/PM EZOLV Sets the response gain for the high frequency injection speed estimation. **Note:** • Set *n8-35 = 1 [Initial Pole Detection Method = High Frequency Injection]* to enable this parameter. • Set *n8-41 > 0.0* for IPM motors.	2.5 (-10.0 - +10.0)
n8-42 (0569) Expert	HFI I Time	V/f OLV/PM EZOLV Sets the integral time constant for the high frequency injection speed estimation. Usually it is not necessary to change this setting. **Note:** Set *n8-35 = 1 [Initial Pole Detection Method = High Frequency Injection]* to enable this parameter.	0.10 s (0.00 - 9.99 s)
n8-45 (0538) Expert	Speed Feedback Detection Gain	V/f OLV/PM EZOLV Sets the internal speed feedback detection reduction unit gain as a magnification value. Usually it is not necessary to change this setting.	0.80 (0.00 - 10.00)

No. (Hex.)	Name	Description	Default (Range)
n8-46 (0539) Expert	PM Phase Compensation Gain	V/f **OLV/PM** EZOLV Sets the gain to compensate for phase differences. Usually it is not necessary to change this setting.	0.3 (0.0 - 10.0)
n8-47 (053A) Expert	Pull-in Current Comp Filter Time	V/f **OLV/PM** EZOLV Sets the time constant the drive uses to align the pull-in current reference value with the actual current value. Usually it is not necessary to change this setting.	5.0 s (0.0 - 100.0 s)
n8-48 (053B) Expert	Pull-in/Light Load Id Current	V/f **OLV/PM** EZOLV Sets the d-axis current that flows to the motor during run at constant speed as a percentage where *E5-03 [PM Motor Rated Current (FLA)]* = 100%.	30% (0 - 200%)
n8-49 (053C) Expert	Heavy Load Id Current	V/f **OLV/PM** EZOLV Sets the d-axis current to that the drive will supply to the motor to run it at a constant speed with a heavy load. Considers *E5-03 [PM Motor Rated Current (FLA)]* to be 100%. Usually it is not necessary to change this setting.	Determined by E5-01 (-200.0 - +200.0%)
n8-50 (053D) Expert	Medium Load Iq Level (High)	V/f **OLV/PM** EZOLV Sets the load current level to start high efficiency control as a percentage of *E5-03 [PM Motor Rated Current (FLA)]*. Usually it is not necessary to change this setting.	80% (50 - 255%)
n8-51 (053E) Expert	Pull-in Current @ Acceleration	V/f **OLV/PM** **EZOLV** Sets the pull-in current allowed to flow during acceleration/deceleration as a percentage of the motor rated current. **Note:** Parameter *A1-02 [Control Method Selection]* selects which parameter is the motor rated current. • *A1-02 = 5 [OLV/PM]*: *E5-03 [PM Motor Rated Current (FLA)]* • *A1-02 = 8 [EZOLV]*: *E9-06 [Motor Rated Current (FLA)]*	Determined by A1-02 (0 - 200%)
n8-52 (053F) Expert	ACR P Gain	V/f **OLV/PM** EZOLV Sets the proportional gain of the current regulator. Usually it is not necessary to change this setting.	10.0 (-100.0 - 100.0)
n8-54 (056D) Expert	Voltage Error Compensation Time	V/f **OLV/PM** EZOLV Sets the time constant that the drive uses when adjusting for voltage errors.	1.00 s (0.00 - 10.00 s)
n8-55 (056E) Expert	Motor to Load Inertia Ratio	V/f **OLV/PM** EZOLV Sets the ratio between motor inertia and machine inertia. 0 : Below 1:10 1 : Between 1:10 and 1:30 2 : Between 1:30 and 1:50 3 : Beyond 1:50	0 (0 - 3)
n8-56 (056F) Expert	PM High Performance Selection	V/f **OLV/PM** EZOLV Usually it is not necessary to change this setting. Sets the high efficiency control method for IPM motor. 0 : Disabled 1 : Enabled (Vd) 2 : Enabled (Vd & Vq)	1 (0 - 2)
n8-62 (057D) Expert	Output Voltage Limit Level	V/f **OLV/PM** **EZOLV** Sets the output voltage limit to prevent saturation of the output voltage. Usually it is not necessary to change this parameter. **Note:** • When *A1-02 = 8 [Control Method Selection = EZOLV]*, this parameter is available in Expert Mode. • When *A1-02 = 8*, the default setting is: –208 V Class: 230.0 V –480 V Class: 460.0 V	208 V Class: 200.0 V, 480 V Class: 400.0 V (208 V Class: 0.0 - 240.0 V, 480 V Class: 0.0 - 480.0 V)
n8-63 (057E) Expert	Output Voltage Limit P Gain	V/f **OLV/PM** EZOLV Sets the proportional gain for output voltage control. Usually it is not necessary to change this setting.	1.00 (0.00 - 100.00)
n8-64 (057F) Expert	Output Voltage Limit I Time	V/f **OLV/PM** EZOLV Sets the integral time for output voltage control. Usually it is not necessary to change this setting.	0.040 s (0.000 - 5.000)
n8-65 (065C) Expert	Speed Fdbk Gain @ oV Suppression	V/f **OLV/PM** EZOLV Sets the gain of internal speed feedback detection suppression while the overvoltage suppression function is operating as a magnification value. Usually it is not necessary to change this parameter.	1.50 (0.00 - 10.00)
n8-66 (0235) Expert	Output Voltage Limit Filter Time	V/f **OLV/PM** EZOLV Sets the filter time constant for output voltage control. Usually it is not necessary to change this setting.	0.020 s (0.000 - 5.000)

No. (Hex.)	Name	Description	Default (Range)
n8-74 (05C3)	Light Load Iq Level	V/f OLV/PM EZOLV Set *n8-48 [Pull-in/Light Load Id Current]* to the percentage of load current (q-axis current) that you will apply, where *E5-03 [PM Motor Rated Current (FLA)]* = a setting value of 100%.	30% (0 - 255%)
n8-75 (05C4)	Medium Load Iq Level (low)	V/f OLV/PM EZOLV Set *n8-78 [Medium Load Id Current]* to the percentage of load current (q-axis current) that you will apply, where *E5-03 [PM Motor Rated Current (FLA)]* = a setting value of 100%.	50% (0 - 255%)
n8-76 (05CD) Expert	Id Switching Filter Time	V/f OLV/PM EZOLV Sets the filter time constant for d-axis current reference. Usually it is not necessary to change this setting.	200 ms (0 - 5000 ms)
n8-77 (05CE)	Heavy Load Iq Level	V/f OLV/PM EZOLV Set *n8-49 [Heavy Load Id Current]* to the percentage of load current (q-axis current) that you will apply, where *E5-03 [PM Motor Rated Current (FLA)]* = a setting value of 100%.	90% (0 - 255%)
n8-78 (05F4)	Medium Load Id Current	V/f OLV/PM EZOLV Sets the level of the pull-in current for mid-range loads.	0% (-200 - +200%)
n8-79 (05FE) Expert	Pull-in Current @ Deceleration	V/f OLV/PM EZOLV Sets the pull-in current that can flow during deceleration as a percentage of the *E5-03 [PM Motor Rated Current (FLA)]*. **Note:** When *n8-79 = 0*, the drive will use the value set in *n8-51 [Pull-in Current @ Acceleration]*.	50% (0 - 200%)
n8-84 (02D3) Expert	Polarity Detection Current	V/f OLV/PM EZOLV Sets the current for processing an estimation of the initial motor magnetic pole as a percentage, where *E5-03 [PM Motor Rated Current]* is the 100% value.	100% (0 - 150%)
n8-88 (02BD) Expert	Vout Limit Switching Level	V/f OLV/PM EZOLV Sets the current level at which output voltage limit sequence selection occurs as a percentage where *E5-03 [PM Motor Rated Current]* is 100%. Normally there is no need to change this setting.	400% (0 - 400%)
n8-89 (02BE) Expert	Vout Limit Switching Hysteresis	V/f OLV/PM EZOLV Sets the hysteresis width of the current level at which output voltage limit sequence selection occurs as a percentage where *E5-03 [PM Motor Rated Current]* is 100%. Normally there is no need to change this setting.	3% (0 - 400%)
n8-90 (02BF) Expert	Vout Limit Switching Speed	V/f OLV/PM EZOLV Sets the speed level at which output voltage limit sequence selection occurs as a percentage where *E1-04 [Maximum Output Frequency]* is 100%. Usually it is not necessary to change this setting.	200% (0 - 200%)
n8-91 (02F7) Expert	Id Limit at Voltage Saturation	V/f OLV/PM EZOLV Sets the limit value of feedback output voltage limit Id operation. Usually it is not necessary to change this setting.	-50% (-200 - 0%)

5.12 o: Keypad-Related Settings

◆ o1: Keypad Display

No. (Hex.)	Name	Description	Default (Range)
o1-03 (0502)	Frequency Display Unit Selection	V/f OLV/PM EZOLV Sets the display units for the frequency reference and output frequency. 0 : 0.01Hz units 1 : 0.01% units 2 : min^{-1} (r/min) unit 3 : User Units (o1-09 -o1-11)	0 (0 - 3)
o1-05 (0504) RUN	LCD Contrast Adjustment	V/f OLV/PM EZOLV Sets the contrast of the LCD display on the keypad.	5 (0 - 10)
o1-09 (051C)	Freq. Reference Display Units	V/f OLV/PM EZOLV Sets the unit of display for the frequency reference parameters and frequency-related monitors when *o1-03 = 3 [Frequency Display Unit Selection = User Units (o1-09 ~ o1-11)]*. 0 : “WC: inches of water column 1 : PSI: pounds per square inch 2 : GPM: gallons/min 3 : °F: Fahrenheit 4 : ft^3/min: cubic feet/min 5 : m^3/h: cubic meters/hour 6 : L/h: liters/hour 7 : L/s: liters/sec 8 : bar: bar 9 : Pa: Pascal 10 : °C: Celsius 11 : m: meters 12 : ft: feet 13 : L/min: liters/min 14 : m^3/min: cubic meters/min 15 : “Hg: Inch Mercury 16 : kPa: kilopascal 48 : %: Percent 49 : Custom(o1-13~15) 50 : None	50 (0 - 50)
o1-10 (0520)	User Units Maximum Value	V/f OLV/PM EZOLV Sets the value that the drive shows as the maximum output frequency.	Determined by o1-03 (1 - 60000)
o1-11 (0521)	User Units Decimal Position	V/f OLV/PM EZOLV Sets the number of decimal places for frequency reference and monitor values. 0 : No Decimal Places (XXXXX) 1 : One Decimal Place (XXXX.X) 2 : Two Decimal Places (XXX.XX) 3 : Three Decimal Places (XX.XXX)	Determined by o1-03 (0 - 3)
o1-13 (3105)	Freq. Reference Custom Unit 1	V/f OLV/PM EZOLV Sets the first character of the custom unit display when *o1-03 = 3 [Frequency Display Unit Selection = User Units]* and *o1-09 = 49 [Freq. Reference Display Units = Custom (o1-13~15)]*.	41 (20 - 7A)
o1-14 (3106)	Freq. Reference Custom Unit 2	V/f OLV/PM EZOLV Sets the second character of the custom unit display when *o1-03 = 3 [Frequency Display Unit Selection = User Units]* and *o1-09 = 49 [Freq. Reference Display Units = Custom (o1-13~15)]*.	41 (20 - 7A)
o1-15 (3107)	Freq. Reference Custom Unit 3	V/f OLV/PM EZOLV Sets the third character of the custom unit display when *o1-03 = 3 [Frequency Display Unit Selection = User Units]* and *o1-09 = 49 [Freq. Reference Display Units = Custom (o1-13~15)]*.	41 (20 - 7A)
o1-18 (310A)	User Defined Parameter 1	V/f OLV/PM EZOLV Lets you set values to use as reference information.	0 (0 - 999)
o1-19 (310B)	User Defined Parameter 2	V/f OLV/PM EZOLV Lets you set values to use as reference information.	0 (0 - 999)
o1-24 (11AD) RUN	Custom Monitor 1	V/f OLV/PM EZOLV Sets Custom Monitor 1 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	101 (0, 101 - 1098)

No. (Hex.)	Name	Description	Default (Range)
o1-25 (11AE) RUN	Custom Monitor 2	V/f OLV/PM EZOLV Sets Custom Monitor 2 to be displayed on the home screen. This monitor is not in the cycling list.	102 (0, 101 - 1098)
o1-26 (11AF) RUN	Custom Monitor 3	V/f OLV/PM EZOLV Sets Custom Monitor 3 to be displayed on the home screen. This monitor is not in the cycling list.	1091 (0, 101 - 1098)
o1-27 (11B0) RUN	Custom Monitor 4	V/f OLV/PM EZOLV Sets Custom Monitor 4 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	103 (0, 101 - 1099)
o1-28 (11B1) RUN	Custom Monitor 5	V/f OLV/PM EZOLV Sets Custom Monitor 5 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list. **Note:** Default is 116 *[U1-16]* for V/f and OLV/PM control methods.	105 (0, 101 - 1099)
o1-29 (11B2) RUN	Custom Monitor 6	V/f OLV/PM EZOLV Sets Custom Monitor 6 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	106 (0, 101 - 1099)
o1-30 (11B3) RUN	Custom Monitor 7	V/f OLV/PM EZOLV Sets Custom Monitor 7 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	107 (0, 101 - 1099)
o1-31 (11B4) RUN	Custom Monitor 8	V/f OLV/PM EZOLV Sets Custom Monitor 8 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	108 (0, 101 - 1099)
o1-32 (11B5) RUN	Custom Monitor 9	V/f OLV/PM EZOLV Sets Custom Monitor 9 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	110 (0, 101 - 1299)
o1-33 (11B6) RUN	Custom Monitor 10	V/f OLV/PM EZOLV Sets Custom Monitor 10 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	111 (0, 101 - 1099)
o1-34 (11B7) RUN	Custom Monitor 11	V/f OLV/PM EZOLV Sets Custom Monitor 11 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	113 (0, 101 - 1099)
o1-35 (11B8) RUN	Custom Monitor 12	V/f OLV/PM EZOLV Sets Custom Monitor 12 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	114 (0, 101 - 1099)
o1-36 (11B9) RUN	LCD Backlight Brightness	V/f OLV/PM EZOLV Sets the intensity of the LCD keypad backlight.	5 (1 - 5)
o1-37 (11BA) RUN	LCD Backlight ON/OFF Selection	V/f OLV/PM EZOLV Sets the automatic shut off function for the LCD backlight. 0 : OFF 1 : ON	1 (0, 1)
o1-38 (11BB) RUN	LCD Backlight Off-Delay	V/f OLV/PM EZOLV Sets the time until the LCD backlight automatically turns off.	60 s (10 - 300 s)
o1-39 (11BC) RUN	Show Initial Setup Screen	V/f OLV/PM EZOLV Sets the function to show the LCD keypad initial setup screen each time you energize the drive. This parameter is only available with an LCD keypad. 0 : TURN OFF power up setup screen 1 : KEEP ON power up setup screen	1 (0, 1)
o1-58 (3125)	Motor Power Unit Selection	V/f OLV/PM EZOLV Sets the setting unit for parameters that set the motor rated power. 0 : kW 1 : HP	1 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
o1-83 (31BD)	Drive Name	V/f OLV/PM EZOLV Selects the text to be displayed on the top line of the Status Monitor as the drive name. 0 : Disabled - No Text 1 : IQPUMP605 2 : iQpump 3 : Auxiliary Pump 4 : Backup Pump 5 : Booster Pump 6 : Canal Pump 7 : Chopper Pump 8 : Emergency Pump 9 : High Service Pump 10 : Irrigation Pump 11 : Jockey Pump 12 : Lift Pump 13 : Main Feed Pump 14 : Prog. Cavity Pump 15 : Pump 16 : Reservoir Pump 17 : Slurry Pump 18 : Standby Pump 19 : Storage Tank 20 : Submersible Pump 21 : Sump Pump 22 : Transfer Pump 23 : Trash Pump 24 : Vert. Turbine Pump 25 : Well Pump 26 : Zone 27 : North Pump 28 : South Pump 29 : East Pump 30 : West Pump 31 : NW Pump 32 : NE Pump 33 : SW Pump 34 : SE Pump	1 (0 - 34)
o1-84 (31BE)	Drive Name Unit Number	V/f OLV/PM EZOLV Selects the unit number to be displayed on the top line of the Status Monitor. The unit number will show up as a 2–digit number (zero-filled). **Note:** A setting of 0 removes the unit number from the drive name (no number displayed).	0 (0 - 99)
o1-90 (31C4) RUN	Custom Monitor 13	V/f OLV/PM EZOLV Sets Custom Monitor 13 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	115 (0, 101 - 1099)
o1-91 (31C5) RUN	Custom Monitor 14	V/f OLV/PM EZOLV Sets Custom Monitor 14 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	125 (0, 101 - 1099)
o1-92 (31C6) RUN	Custom Monitor 15	V/f OLV/PM EZOLV Sets Custom Monitor 15 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	401 (0, 101 - 1099)
o1-93 (31C7) RUN	Custom Monitor 16	V/f OLV/PM EZOLV Sets Custom Monitor 16 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	1002 (0, 101 - 1099)
o1-94 (31C8) RUN	Custom Monitor 17	V/f OLV/PM EZOLV Sets Custom Monitor 17 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	1003 (0, 101 - 1099)
o1-95 (31C9) RUN	Custom Monitor 18	V/f OLV/PM EZOLV Sets Custom Monitor 18 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	1099 (0, 101 - 1099)

No. (Hex.)	Name	Description	Default (Range)
o1-96 (31CA) RUN	Custom Monitor 19	V/f OLV/PM EZOLV Sets Custom Monitor 19 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	0 (0, 101 - 1099)
o1-97 (31CB) RUN	Custom Monitor 20	V/f OLV/PM EZOLV Sets Custom Monitor 20 to be displayed on the home screen. A setting of 0 removes this custom monitor from the cycling list.	0 (0, 101 - 1099)

◆ o2: Keypad Operation

No. (Hex.)	Name	Description	Default (Setting Range)
o2-02 (0506)	OFF Key Function Selection	V/f OLV/PM EZOLV Sets the function to use the OFF key on the keypad to stop the drive when the Run command source for the drive is REMOTE (external) and not assigned to the keypad. 0 : Disabled 1 : Enabled	1 (0, 1)
o2-03 (0507)	User Parameter Default Value	V/f OLV/PM EZOLV Sets the function to keep the settings of changed parameters as user parameter defaults to use during initialization. 0 : No change 1 : Set defaults 2 : Clear all	0 (0 - 2)
o2-04 (0508)	Drive Model (KVA) Selection	V/f OLV/PM EZOLV Sets the Drive Model code. Set this parameter after you replace the control board.	Determined by the drive (-)
o2-05 (0509)	Home Mode Freq Ref Entry Mode	V/f OLV/PM EZOLV Sets the function that makes it necessary to push ↵ to use the keypad to change the frequency reference value while in Drive Mode. 0 : ENTER Key Required 1 : Immediate / MOP-style	0 (0, 1)
o2-06 (050A)	Keypad Disconnect Detection	V/f OLV/PM EZOLV Sets the function that stops the drive if you disconnect the keypad connection cable from the drive or if you damage the cable while the keypad is the Run command source. 0 : Disabled 1 : Enabled	1 (0, 1)
o2-07 (0527)	Keypad RUN Direction @ Power-up	V/f OLV/PM EZOLV Sets the direction of motor rotation when the drive is energized and the keypad is the Run command source. 0 : Forward 1 : Reverse	0 (0, 1)
o2-09 (050D)	Reserved	-	-
o2-19 (061F)	Parameter Write during Uv	V/f OLV/PM EZOLV Enables and disables the function to change parameter settings during a *Uv [DC Bus Undervoltage]* condition. 0 : Disabled 1 : Enabled	0 (0, 1)
o2-23 (11F8) RUN	External 24V Powerloss Detection	V/f OLV/PM EZOLV Sets the function to give a warning if the backup external 24 V power supply turns off when the main circuit power supply is in operation. 0 : Disabled 1 : Enabled	0 (0, 1)
o2-24 (11FE)	LED Light Function Selection	V/f OLV/PM EZOLV Sets the function to show the LED status rings and keypad LED lamps. **Note:** When you use *A1-03 [Initialize Parameters]* to initialize the drive, the drive will not reset this parameter. 0 : Enable Status Ring & Keypad LED 1 : LED Status Ring Disable 2 : Keypad LED Light Disable	0 (0 - 2)

No. (Hex.)	Name	Description	Default (Setting Range)
o2-26 (1563)	Alarm Display at Ext. 24V Power	V/f OLV/PM EZOLV When you connect a backup external 24 V power supply, this parameter sets the function to trigger an alarm when the main circuit power supply voltage decreases. **Note:** The drive will not run when it is operating from one 24-V external power supply. 0 : Disabled 1 : Enabled	1 (0, 1)
o2-27 (1565)	bCE Detection Selection	V/f OLV/PM EZOLV Sets drive operation if the Bluetooth device is disconnected when you operate the drive in Bluetooth Mode. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use *C1-09*) 3 : Alarm Only 4 : No Alarm Display	3 (0 - 4)

◆ o3: Copy Keypad Function

No. (Hex.)	Name	Description	Default (Range)
o3-01 (0515)	Copy Keypad Function Selection	V/f OLV/PM EZOLV Sets the function that saves and copies drive parameters to a different drive with the keypad. 0 : Copy Select 1 : Backup (drive → keypad) 2 : Restore (keypad → drive) 3 : Verify (check for mismatch) 4 : Erase (backup data of keypad)	0 (0 - 4)
o3-02 (0516)	Copy Allowed Selection	V/f OLV/PM EZOLV Sets the copy function when *o3-01 = 1 [Copy Keypad Function Selection = Backup (drive → keypad)]*. 0 : Disabled 1 : Enabled	1 (0, 1)
o3-04 (0B3E)	Select Backup/Restore Location	V/f OLV/PM EZOLV Sets the storage location for drive parameters when you back up and restore parameters. This parameter is only available when using an LCD keypad. 0 : Memory Location 1 1 : Memory Location 2 2 : Memory Location 3 3 : Memory Location 4	0 (0 - 3)
o3-05 (0BDA)	Select Items to Backup/ Restore	V/f OLV/PM EZOLV Sets which parameters are backed up, restored, and referenced. This parameter is only available with an LCD keypad. 0 : Standard Parameters 1 : Standard + DWEZ Parameters	Determined by A1-07 (0, 1)
o3-06 (0BDE)	Auto Parameter Backup Selection	V/f OLV/PM EZOLV Sets the function that automatically backs up parameters. This parameter is only available when using an LCD keypad. 0 : Disabled 1 : Enabled	1 (0, 1)
o3-07 (0BDF)	Auto Parameter Backup Interval	V/f OLV/PM EZOLV Sets the interval at which the automatic parameter backup function saves parameters from the drive to the keypad. **Note:** This parameter is only available when using an LCD keypad. 0 : Every 10 minutes 1 : Every 30 minutes 2 : Every 60 minutes 3 : Every 12 hours	1 (0 - 3)

◆ o4: Maintenance Monitors

No. (Hex.)	Name	Description	Default (Range)
o4-01 (050B)	Elapsed Operating Time Setting	V/f OLV/PM EZOLV Sets the initial value of the cumulative drive operation time in 10-hour units.	0 h (0 - 9999 h)
o4-02 (050C)	Elapsed Operating Time Selection	V/f OLV/PM EZOLV Sets the condition that counts the cumulative operation time. 0 : U4-01 Shows Total Power-up Time 1 : U4-01 Shows Total RUN Time	1 (0, 1)
o4-03 (050E)	Fan Operation Time Setting	V/f OLV/PM EZOLV Sets the value from which to start the cumulative drive cooling fan operation time in 10-hour units.	0 h (0 - 9999 h)
o4-05 (051D)	Capacitor Maintenance Setting	V/f OLV/PM EZOLV Sets the *U4-05 [Capacitor Life Mon]* monitor value.	0% (0 - 150%)
o4-07 (0523)	Softcharge Relay Maintenance Set	V/f OLV/PM EZOLV Sets the *U4-06 [PreChargeRelayMon]* monitor value.	0% (0 - 150%)
o4-09 (0525)	IGBT Maintenance Setting	V/f OLV/PM EZOLV Sets the *U4-07 [IGBT Maintenance]* monitor value.	0% (0 - 150%)
o4-11 (0510)	Fault Trace/History Init (U2/U3)	V/f OLV/PM EZOLV Resets the records of Monitors *U2-xx [Fault Trace]* and *U3-xx [Fault History]*. 0 : Disabled 1 : Enabled	0 (0, 1)
o4-12 (0512)	kWh Monitor Initialization	V/f OLV/PM EZOLV Resets the monitor values for *U4-10 [kWh, Lower 4 Digits]* and *U4-11 [kWh, Upper 5 Digits]*. 0 : No Reset 1 : Reset	0 (0, 1)
o4-13 (0528)	RUN Command Counter @ Initialize	V/f OLV/PM EZOLV Resets the monitor values for *U4-02 [Total Run Commands]*, *U4-24 [Number of Runs (Low)]*, and *U4-25 [Number of Runs (High)]*. 0 : No Reset 1 : Reset	0 (0, 1)
o4-22 (154F) RUN	Time Format	V/f OLV/PM EZOLV Sets the time display format. This parameter is only available when using an LCD keypad. 0 : 24 Hour Clock 1 : 12 Hour Clock 2 : 12 Hour JP Clock **Note:** When you use *A1-03 [Initialize Parameters]* to initialize the drive, the drive will not reset this parameter.	1 (0 - 2)
o4-23 (1550) RUN	Date Format	V/f OLV/PM EZOLV Sets the date display format. This parameter is only available on an LCD keypad. 0 : YYYY/MM/DD 1 : DD/MM/YYYY 2 : MM/DD/YYYY **Note:** When you use *A1-03 [Initialize Parameters]* to initialize the drive, the drive will not reset this parameter.	2 (0 - 2)
o4-24 (310F) RUN	bAT Detection Selection	V/f OLV/PM EZOLV Sets operation when the drive detects *bAT [Keypad Battery Low Voltage]* and *TiM [Keypad Time Not Set]*. 0 : Disable 1 : Enable (Alarm Detected) 2 : Enable (Fault Detected)	0 (0 - 2)

◆ o5: Log Function

No. (Hex.)	Name	Description	Default (Range)
o5-00 (1E81) RUN	Log Type	V/f OLV/PM EZOLV Sets the type of data log function. This parameter is only available when using an LCD keypad. 0 : Long Term Log 1 : Short Term Log	0 (0 - 1)
o5-01 (1551) RUN	Log Start/Stop Selection	V/f OLV/PM EZOLV Sets the data log function. This parameter is only available when using an LCD keypad. 0 : OFF 1 : ON	0 (0 - 1)
o5-02 (1552) RUN	Log Sampling Interval	V/f OLV/PM EZOLV Sets the data log sampling cycle. This parameter is only available when using an LCD keypad. **Note:** • You cannot set a time that ends in an odd number. • The default setting and range are different for different *o5-00* settings. - *o5-00 = 0 [Log Type = Long Term Log]*: 1000 ms (100 - 6000 ms) - *o5-00 = 1 [Short Term Log]*: 10 ms (2 - 98 ms)	o5-00 = 0: 1000 ms, o5-00 = 1: 10 ms (o5-00 = 0: 100 - 6000 ms, o5-00 = 1: 2 - 98 ms)
o5-03 (1553) RUN	Log Monitor Data 1	V/f OLV/PM EZOLV Sets the data log monitor. This parameter is only available on an LCD keypad.	101 (000, 101 - 1299)
o5-04 (1554) RUN	Log Monitor Data 2	V/f OLV/PM EZOLV Sets the data log monitor. This parameter is only available on an LCD keypad.	102 (000, 101 - 1299)
o5-05 (1555) RUN	Log Monitor Data 3	V/f OLV/PM EZOLV Sets the data log monitor. This parameter is only available on an LCD keypad.	103 (000, 101 - 1299)
o5-06 (1556) RUN	Log Monitor Data 4	V/f OLV/PM EZOLV Sets the data log monitor. This parameter is only available on an LCD keypad.	107 (000, 101 - 1299)
o5-07 (1557) RUN	Log Monitor Data 5	V/f OLV/PM EZOLV Sets the data log monitor. This parameter is only available on an LCD keypad.	108 (000, 101 - 1299)
o5-08 (1558) RUN	Log Monitor Data 6	V/f OLV/PM EZOLV Sets the data log monitor. This parameter is only available on an LCD keypad. **Note:** When *A1-02 = 0 or 5 [Control Method Selection = V/f, OLV/PM]*, the default setting is *0*.	114 (000, 101 - 1299)
o5-09 (1559) RUN	Log Monitor Data 7	V/f OLV/PM EZOLV Sets the data log monitor. This parameter is only available on an LCD keypad.	1090 (000, 101 - 1299)
o5-10 (155A) RUN	Log Monitor Data 8	V/f OLV/PM EZOLV Sets the data log monitor. This parameter is only available on an LCD keypad.	1091 (000, 101 - 1299)
o5-11 (155B) RUN	Log Monitor Data 9	V/f OLV/PM EZOLV Sets the data log monitor. This parameter is only available on an LCD keypad.	112 (000, 101 - 1299)
o5-12 (155C) RUN	Log Monitor Data 10	V/f OLV/PM EZOLV Sets the data log monitor. This parameter is only available on an LCD keypad.	111 (000, 101 - 1299)
o5-15 (1E82) RUN	Trigger Type Selection	V/f OLV/PM EZOLV Sets the type of trigger for the short-term data log. This parameter is only available when using an LCD keypad. 0 : Digital Trigger 1 : Analog Trigger	0 (0 - 1)
o5-16 (1E83) RUN	Digital Trigger Object	V/f OLV/PM EZOLV Selects the function to set for the digital trigger target (0 - FF) from the setting values for multi-function digital outputs. This parameter is only available when using an LCD keypad.	E (0 - FF)
o5-17 (1E84) RUN	Analog Trigger Object	V/f OLV/PM EZOLV Selects the monitor (*Ux-xx*) to set for the analog trigger (0 - 1299) target. This parameter is only available when using an LCD keypad.	102 (0 - 1299)

No. (Hex.)	Name	Description	Default (Range)
o5-18 (1E85) RUN	Analog Trigger Level	V/f OLV/PM EZOLV Sets the level to compare with the analog trigger target. This parameter is only available when using an LCD keypad.	0.0% (-999.9% - +999.9%)
o5-19 (1E86) RUN	Trigger Condition	V/f OLV/PM EZOLV Selects the condition that detects the trigger. This parameter is only available when using an LCD keypad. 0 : Rising Edge 1 : Falling Edge	0 (0 - 1)
o5-20 (1E87) RUN	Pre-Trigger Setting	V/f OLV/PM EZOLV Sets the percentage of data to save before the drive detects the trigger for the short-term data log. This parameter is only available when using an LCD keypad.	90% (0% - 100%)
o5-21 (1E88) RUN	Trend Log Sampling Time Selection	V/f OLV/PM EZOLV Selects the sampling cycle for the trend log to save data before the drive detects the trigger. The trend log works with the short-term data log. This parameter is only available when using an LCD keypad. 0 : Trend Log Disabled 1 : 0.1 s (About 1 hour) 2 : 1 s (About 10 hours) 3 : 10 s (About 100 hours) 4 : 60 s (About 600 hours)	0 (0 - 4)

5.13 Q: DriveWorksEZ Parameters

◆ Q1-01 to Qx-xx: Reserved for DriveWorksEZ

No. (Hex.)	Name	Description
Q1-01 to Qx-xx (1600 - xxxx)	Reserved for DriveWorksEZ	V/f OLV/PM EZOLV These parameters are reserved for use with DriveWorksEZ.

5.14 R: DWEZ Connection 1-20

◆ R1-01 to R1-40: DriveWorksEZ Connection Parameters 1 to 20 (Upper / Lower)

No. (Hex.)	Name	Description
R1-01 to R1-40 (1840 - 1867)	DriveWorksEZ Connection Parameters 1 to 20 (Upper / Lower)	V/f OLV/PM EZOLV DriveWorksEZ Connection Parameters 1 to 20 (Upper / Lower)

5.15 S: Special Applications

◆ S1: Dynamic Noise Control

No. (Hex.)	Name	Description	Default (Range)
S1-01 (3200) Expert	Dynamic Noise Control	V/f OLV/PM EZOLV Sets the function that decreases the output voltage in variable torque applications to decrease audible noise. 0 : Disabled 1 : Enabled	0 (0, 1)
S1-02 (3201) Expert	Voltage Reduction Rate	V/f OLV/PM EZOLV Sets the rate at which the drive will decrease the output voltage as a percentage of the V/f pattern when operating with no load.	50.0% (50.0 - 100.0%)
S1-03 (3202) Expert	Voltage Restoration Level	V/f OLV/PM EZOLV Sets the level at which the drive will start to restore the voltage as a percentage of the drive rated torque.	20.0% (0.0 - 90.0%)
S1-04 (3203) Expert	Voltage Restoration Off Level	V/f OLV/PM EZOLV Sets the level at which voltage restoration for the V/f pattern is complete as a percentage of the drive rated torque. If the output is more than *S1-04*, the drive will control the voltage as specified by the V/f pattern setting. **Note:** The lower limit of this parameter is the value of *S1-03 [Voltage Restoration Level]* + 10.0%.	50.0% (10.0 - 100.0%)
S1-05 (3204) Expert	Volt Restore Sensitivity Time K	V/f OLV/PM EZOLV Sets the level of sensitivity of the output torque and LPF time constant for the voltage reduction rate. You can adjust the level of sensitivity with the load response.	1.000 s (0.000 - 3.000 s)
S1-06 (3205) Expert	Volt Restore Impact Load Time K	V/f OLV/PM EZOLV Sets the voltage restoration time constant when you add an impact load.	0.050 s (0.000 - 1.000 s)
S1-07 (324C) Expert	Output Phase Loss Level	V/f OLV/PM EZOLV Decreases the output phase loss level when Dynamic Noise control is active.	100.0% (10.0 - 100.0%)

◆ S2: Sequence Run Timers

No. (Hex.)	Name	Description	Default (Range)
S2-01 (3206)	Timer 1 Start Time	V/f OLV/PM EZOLV Sets the start time for timer 1. **Note:** • Default is when *o4-22 = 1 [Time Format = 12 Hour Clock]*. When *o4-22 = 0 [24 Hour Clock]*, default is 00:00. When *o4-22 = 2 [12 Hour JP Clock]*, default is 00:00 AM. • Range is when *o4-22 = 1*. When *o4-22 = 0*, range is 00:00 to 24:00. When *o4-22 = 2*, range is 00:00 AM to 11:59 PM.	12:00 (12:00 AM - 11:59 PM)
S2-02 (3207)	Timer 1 Stop Time	V/f OLV/PM EZOLV Sets the stop time for timer 1. **Note:** • Default is when *o4-22 = 1 [Time Format = 12 Hour Clock]*. When *o4-22 = 0 [24 Hour Clock]*, default is 00:00. When *o4-22 = 2 [12 Hour JP Clock]*, default is 00:00 AM. • Range is when *o4-22 = 1*. When *o4-22 = 0*, range is 00:00 to 24:00. When *o4-22 = 2*, range is 00:00 AM to 11:59 PM.	12:00 (12:00 AM - 11:59 PM)

No. (Hex.)	Name	Description	Default (Range)
S2-03 (3208)	Timer 1 Day Selection	V/f OLV/PM EZOLV Sets the days for which sequence timer 1 is active. 0 : Timer Disabled 1 : Daily 2 : Mon - Fri 3 : Sat - Sun 4 : Monday 5 : Tuesday 6 : Wednesday 7 : Thursday 8 : Friday 9 : Saturday 10 : Sunday	0 (0 - 10)
S2-04 (3209)	Timer 1 Sequence Selection	V/f OLV/PM EZOLV Sets the drive response when sequence timer 1 is active. 0 : Digital Out Only 1 : Run 2 : Run - PID Disable 3 : Allow Alternation	0 (0 - 3)
S2-05 (320A)	Timer 1 Reference Source	V/f OLV/PM EZOLV Selects the frequency reference source to run the drive when sequence timer 1 is active (only applicable when *S2-04 > 0 [Timer 1 Sequence Selection ≠ Digital Out Only]*). 0 : Operator (d1-01/YA-01) 1 : Operator (d1-02/YA-02) 2 : Operator (d1-03/YA-03) 3 : Operator (d1-04/YA-04) 4 : Terminals 5 : Serial Com 6 : Option PCB 7 : Pulse Input 8 : Set by b1-01/b1-15 9 : Operator (d1-05/YA-05) 10 : Operator (d1-06/YA-06) 11 : Operator (d1-07/YA-07) 12 : Operator (d1-08/YA-08) **Note:** For reference source 0 to 3, the drive will use *d1-xx* frequency reference when PID mode is disabled and *YA-xx* setpoint when PID is enabled.	8 (0 - 12)
S2-06 (320B)	Timer 2 Start Time	V/f OLV/PM EZOLV Sets the start time for timer 2. **Note:** • Default is when *o4-22 = 1 [Time Format = 12 Hour Clock]*. When *o4-22 = 0 [24 Hour Clock]*, default is 00:00. When *o4-22 = 2 [12 Hour JP Clock]*, default is 00:00 AM. • Range is when *o4-22 = 1*. When *o4-22 = 0*, range is 00:00 to 24:00. When *o4-22 = 2*, range is 00:00 AM to 11:59 PM.	12:00 (12:00 AM - 11:59 PM)
S2-07 (320C)	Timer 2 Stop Time	V/f OLV/PM EZOLV Sets the stop time for timer 2. **Note:** • Default is when *o4-22 = 1 [Time Format = 12 Hour Clock]*. When *o4-22 = 0 [24 Hour Clock]*, default is 00:00. When *o4-22 = 2 [12 Hour JP Clock]*, default is 00:00 AM. • Range is when *o4-22 = 1*. When *o4-22 = 0*, range is 00:00 to 24:00. When *o4-22 = 2*, range is 00:00 AM to 11:59 PM.	12:00 (12:00 AM - 11:59 PM)
S2-08 (320D)	Timer 2 Day Selection	V/f OLV/PM EZOLV Sets the days for which sequence timer 2 is active. 0 : Timer disabled 1 : Daily 2 : Mon - Fri 3 : Sat - Sun 4 : Monday 5 : Tuesday 6 : Wednesday 7 : Thursday 8 : Friday 9 : Saturday 10 : Sunday	0 (0 - 10)

No. (Hex.)	Name	Description	Default (Range)
S2-09 (320E)	Timer 2 Sequence Selection	V/f OLV/PM EZOLV Sets the drive response when sequence timer 2 is active. 0 : Digital Out Only 1 : Run 2 : Run - PID Disable 3 : Allow Alternation	0 (0 - 3)
S2-10 (320F)	Timer 2 Reference Source	V/f OLV/PM EZOLV Selects the frequency reference source to run the drive when sequence timer 2 is active (only applicable when *S2-09 > 0 [Timer 2 Sequence Selection ≠ 0]*). 0 : Operator (d1-01/YA-01) 1 : Operator (d1-02/YA-02) 2 : Operator (d1-03/YA-03) 3 : Operator (d1-04/YA-04) 4 : Terminals 5 : Serial Com 6 : Option PCB 7 : Pulse Input 8 : Set by b1-01/b1-15 9 : Operator (d1-05/YA-05) 10 : Operator (d1-06/YA-06) 11 : Operator (d1-07/YA-07) 12 : Operator (d1-08/YA-08) **Note:** For reference source 0 to 3, the drive will use *d1-xx* frequency reference when PID mode is disabled and *YA-xx* setpoint when PID is enabled.	8 (0 - 12)
S2-11 (3210)	Timer 3 Start Time	V/f OLV/PM EZOLV Sets the start time for timer 3. **Note:** • Default is when *o4-22 = 1 [Time Format = 12 Hour Clock]*. When *o4-22 = 0 [24 Hour Clock]*, default is 00:00. When *o4-22 = 2 [12 Hour JP Clock]*, default is 00:00 AM. • Range is when *o4-22 = 1*. When *o4-22 = 0*, range is 00:00 to 24:00. When *o4-22 = 2*, range is 00:00 AM to 11:59 PM.	12:00 (12:00 AM - 11:59 PM)
S2-12 (3211)	Timer 3 Stop Time	V/f OLV/PM EZOLV Sets the stop time for timer 3. **Note:** • Default is when *o4-22 = 1 [Time Format = 12 Hour Clock]*. When *o4-22 = 0 [24 Hour Clock]*, default is 00:00. When *o4-22 = 2 [12 Hour JP Clock]*, default is 00:00 AM. • Range is when *o4-22 = 1*. When *o4-22 = 0*, range is 00:00 to 24:00. When *o4-22 = 2*, range is 00:00 AM to 11:59 PM.	12:00 (12:00 AM - 11:59 PM)
S2-13 (3212)	Timer 3 Day Selection	V/f OLV/PM EZOLV Sets the days for which sequence timer 3 is active. 0 : Timer Disabled 1 : Daily 2 : Mon - Fri 3 : Sat - Sun 4 : Monday 5 : Tuesday 6 : Wednesday 7 : Thursday 8 : Friday 9 : Saturday 10 : Sunday	0 (0 - 10)
S2-14 (3213)	Timer 3 Sequence Selection	V/f OLV/PM EZOLV Sets the drive response when sequence timer 3 is active. 0 : Digital Out Only 1 : Run 2 : Run - PID Disable 3 : Allow Alternation	0 (0 - 3)

No. (Hex.)	Name	Description	Default (Range)
S2-15 (3214)	Timer 3 Reference Source	V/f OLV/PM EZOLV Selects the frequency reference source to run the drive when sequence timer 3 is active (only applicable when *S2-14 > 0 [Timer 3 Sequence Selection ≠ Digital Out Only]*). 0 : Operator (d1-01/YA-01) 1 : Operator (d1-02/YA-02) 2 : Operator (d1-03/YA-03) 3 : Operator (d1-04/YA-04) 4 : Terminals 5 : Serial Com 6 : Option PCB 7 : Pulse Input 8 : Set by b1-01/b1-15 9 : Operator (d1-05/YA-05) 10 : Operator (d1-06/YA-06) 11 : Operator (d1-07/YA-07) 12 : Operator (d1-08/YA-08) **Note:** For reference source 0 to 3, the drive will use *d1-xx* frequency reference when PID mode is disabled and *YA-xx* setpoint when PID is enabled.	8 (0 - 12)
S2-16 (3215)	Timer 4 Start Time	V/f OLV/PM EZOLV Sets the start time for timer 4. **Note:** • Default is when *o4-22 = 1 [Time Format = 12 Hour Clock]*. When *o4-22 = 0 [24 Hour Clock]*, default is 00:00. When *o4-22 = 2 [12 Hour JP Clock]*, default is 00:00 AM. • Range is when *o4-22 = 1*. When *o4-22 = 0*, range is 00:00 to 24:00. When *o4-22 = 2*, range is 00:00 AM to 11:59 PM.	12:00 (12:00 AM - 11:59 PM)
S2-17 (3216)	Timer 4 Stop Time	V/f OLV/PM EZOLV Sets the stop time for timer 4. **Note:** • Default is when *o4-22 = 1 [Time Format = 12 Hour Clock]*. When *o4-22 = 0 [24 Hour Clock]*, default is 00:00. When *o4-22 = 2 [12 Hour JP Clock]*, default is 00:00 AM. • Range is when *o4-22 = 1*. When *o4-22 = 0*, range is 00:00 to 24:00. When *o4-22 = 2*, range is 00:00 AM to 11:59 PM.	12:00 (12:00 AM - 11:59 PM)
S2-18 (3217)	Timer 4 Day Selection	V/f OLV/PM EZOLV Sets the days for which sequence timer 4 is active. 0 : Timer disabled 1 : Daily 2 : Mon - Fri 3 : Sat - Sun 4 : Monday 5 : Tuesday 6 : Wednesday 7 : Thursday 8 : Friday 9 : Saturday 10 : Sunday	0 (0 - 10)

No. (Hex.)	Name	Description	Default (Range)
S2-19 (3218)	Timer 4 Sequence Selection	V/f OLV/PM EZOLV Sets the drive response when sequence timer 4 is active. 0 : Digital Out Only 1 : Run 2 : Run - PID Disable 3 : Allow Alternation	0 (0 - 3)
S2-20 (3219)	Timer 4 Reference Source	V/f OLV/PM EZOLV Selects the frequency reference source to run the drive when sequence timer 4 is active (only applicable when *S2-19 > 0 [Timer 4 Sequence Selection ≠ Digital Out Only]*). 0 : Operator (d1-01/YA-01) 1 : Operator (d1-02/YA-02) 2 : Operator (d1-03/YA-03) 3 : Operator (d1-04/YA-04) 4 : Terminals 5 : Serial Com 6 : Option PCB 7 : Pulse Input 8 : Set by b1-01/b1-15 9 : Operator (d1-05/YA-05) 10 : Operator (d1-06/YA-06) 11 : Operator (d1-07/YA-07) 12 : Operator (d1-08/YA-08) **Note:** For reference source 0 to 3, the drive will use *d1-xx* frequency reference when PID mode is disabled and *YA-xx* setpoint when PID is enabled.	8 (0 - 12)

◆ S3: PI2 Control

No. (Hex.)	Name	Description	Default (Range)
S3-01 (321A) RUN	PI2 Control Enable Selection	V/f OLV/PM EZOLV Sets when the PI Auxiliary Control function is enabled: 0 : Disabled 1 : Always 2 : Drive Running 3 : Motor Running	0 (0 - 3)
S3-02 (321B) RUN	PI2 Control Transducer Scale	V/f OLV/PM EZOLV Sets the full scale (10 V or 20 mA) output of the pressure transducer that is connected to the analog input terminals programmed for PI2 (Setpoint or Feedback). **Note:** Parameters *S3-04 [PI2 Control Unit Selection]*, *S3-03 [PI2 Control Decimal Place Pos]*, and *S3-02 [PI2 Control Transducer Scale]* set the unit, resolution, and upper limit.	100.00 (1.00 - 600.00)
S3-03 (321C) RUN	PI2 Control Decimal Place Pos	V/f OLV/PM EZOLV Sets the decimal place display for secondary PI units. 0 : No Decimal Places (XXXXX) 1 : One Decimal Place (XXXX.X) 2 : Two Decimal Places (XXX.XX) 3 : Three Decimal Places (XX.XXX)	2 (0 - 3)

No. (Hex.)	Name	Description	Default (Range)
S3-04 (321D) RUN	PI2 Control Unit Selection	V/f OLV/PM EZOLV Sets the units displayed for the PI2 Control parameters and monitor. 0 : “WC: inches of water column 1 : PSI: pounds per square inch 2 : GPM: gallons/min 3 : °F: Fahrenheit 4 : ft³/min: cubic feet/min 5 : m³/h: cubic meters/hour 6 : L/h: liters/hour 7 : L/s: liters/sec 8 : bar: bar 9 : Pa: Pascal 10 : °C: Celsius 11 : m: meters 12 : ft: feet 13 : L/min: liters/min 14 : m³/min: cubic meters/min 15 : “Hg: Inch Mercury 16 : kPa: kilopascal 48 : %: Percent 49 : Custom(S3-18~20) 50 : None	48 (0 - 50)
S3-05 (321E) RUN	PI2 Control Setpoint	V/f OLV/PM EZOLV Sets the PI2 Control target setpoint. **Note:** Parameters *S3-04 [PI2 Control Unit Selection]*, *S3-03 [PI2 Control Decimal Place Pos]*, and *S3-02 [PI2 Control Transducer Scale]* set the unit, resolution, and upper limit.	0.00 (0.00 - 600.00)
S3-06 (321F) RUN	PI2 Control Proportional Gain	V/f OLV/PM EZOLV Sets the proportional gain of the PI2 Control. Set this parameter to 0.00 to disable proportional control.	1.00 (0.00 - 25.00)
S3-07 (3220) RUN	PI2 Control Integral Time	V/f OLV/PM EZOLV Sets the integral time for the suction pressure control. Set this parameter to 0.00 to disable the integrator.	1.0 s (0.0 - 360.0 s)
S3-08 (3221) RUN	PI2 Control Integral Max Limit	V/f OLV/PM EZOLV Sets the maximum output possible from the integrator.	100.0% (0.0 - 100.0%)
S3-09 (3222) RUN	PI2 Control Output Upper Limit	V/f OLV/PM EZOLV Sets the maximum output possible from the PI Auxiliary Control function.	100.0% (0.0 - 100.0%)
S3-10 (3223) RUN	PI2 Control Output Lower Limit	V/f OLV/PM EZOLV Sets the minimum output possible from the PI Auxiliary Control function.	0.0% (-100.0 - +100.0%)
S3-11 (3224) RUN	PI2 Control Output Level Sel	V/f OLV/PM EZOLV Sets the PI2 controller output direction. 0 : Direct Acting (Normal Output) 1 : Inverse Acting (Reverse Output)	0 (0, 1)
S3-12 (3225) RUN	PI2 Control Disable Mode Sel	V/f OLV/PM EZOLV Sets what *U5-20 [PI2 Control Output]* will output when disabled. 0 : No Output (0%) 1 : Lower Limit (S3-10) 2 : Setpoint	0 (0 - 2)
S3-13 (3226) RUN	PI2 Control Low Feedback Lvl	V/f OLV/PM EZOLV Sets the secondary PI low feedback detection level. **Note:** Parameters *S3-04 [PI2 Control Unit Selection]*, *S3-03 [PI2 Control Decimal Place Pos]*, and *S3-02 [PI2 Control Transducer Scale]* set the unit, resolution, and upper limit.	0.00 (0.00 - 600.00)
S3-14 (3227) RUN	PI2 Control Low Feedback Time	V/f OLV/PM EZOLV Sets the secondary PI low feedback detection delay time in seconds.	1.0 s (0.0 - 25.5 s)

No. (Hex.)	Name	Description	Default (Range)
S3-15 (3228) RUN	PI2 Control High Feedback Lvl	V/f OLV/PM EZOLV Sets the secondary PI high feedback detection level. **Note:** Parameters *S3-04 [PI2 Control Unit Selection]*, *S3-03 [PI2 Control Decimal Place Pos]*, and *S3-02 [PI2 Control Transducer Scale]* set the unit, resolution, and upper limit.	100.00 (0.00 - 600.00)
S3-16 (3229) RUN	PI2 Control High Feedback Time	V/f OLV/PM EZOLV Sets the secondary PI high feedback detection delay time in seconds.	1.0 s (0.0 - 25.5 s)
S3-17 (322A) RUN	PI2 Control Feedback Det Sel	V/f OLV/PM EZOLV Sets when the low and high feedback detection multifunction outputs (71h and 72h) for PI2 Control are active. 0 : While PI2 Control Enabled 1 : Always **Note:** Feedback level detection compares PI2 Control Feedback from analog input *H3-xx = 26 [MFAI Function Selection = PI2 Control Feedback]* to these parameters: • *S3-13 [PI2 Control Low Feedback Lvl]* for low feedback level detection • *S3-15 [PI2 Control High Feedback Lvl]* for high feedback level detection	0 (0, 1)
S3-18 (322B) RUN	PI2 Control Custom Unit 1	V/f OLV/PM EZOLV Sets the first character of the PI2 Control custom unit display when *S3-04 = 49 [PI2 Control Unit Selection = Custom(S3-18~20)]*.	41 (20 - 7A)
S3-19 (322C) RUN	PI2 Control Custom Unit 2	V/f OLV/PM EZOLV Sets the second character of the PI2 Control custom unit display when *S3-04 = 49 [PI2 Control Unit Selection = Custom(S3-18~20)]*.	41 (20 - 7A)
S3-20 (322D) RUN	PI2 Control Custom Unit 3	V/f OLV/PM EZOLV Sets the third character of the PI2 Control custom unit display when *S3-04 = 49 [PI2 Control Unit Selection = Custom(S3-18~20)]*.	41 (20 - 7A)

◆ S6: Protection

No. (Hex.)	Name	Description	Default (Range)
S6-01 (3236)	Emergency Override Speed	V/f OLV/PM EZOLV Sets the speed command for emergency override mode when *S6-02 = 0 [Emergency Override Ref Selection = Use S6-01 Reference]*. **Note:** • When *A1-02 = 8 [Control Method Selection = EZOLV]*, *E1-09 [Minimum Output Frequency]* (*E9-04 [Base Frequency]*) sets the lower limit, and *E1-04 [Maximum Output Frequency]* (*E9-02 [Maximum Speed]*) sets the upper limit. • Parameter default is lower-limited to *E1-09* (*E9-04* when *A1-02 = 8*). The default setting will automatically increase when *E1-09* (*E9-04*) > *S6-01*.	1.50 Hz (1.50 - 60.00 Hz)
S6-02 (3237)	Emergency Override Ref Selection	V/f OLV/PM EZOLV Sets the Emergency Override Speed Source: 0 : Use S6-01 Reference 1 : Use Frequency Reference 2 : System PID Mode 3 : Independent PID Mode	0 (0 - 3)
S6-03 (323A)	EMOVR Independent PID Scale	V/f OLV/PM EZOLV Sets the scaling on the Emergency PID Feedback and Setpoint (if programmed) Analog Inputs. **Note:** • *S6-05 [EMOVR Independent PID Unit Digit]* sets the resolution for this parameter. • *S6-04 [EMOVR Independent PID Unit]* sets the units for this parameter.	100.00 (0.10 - 600.00)

No. (Hex.)	Name	Description	Default (Range)
S6-04 (323B)	EMOVR Independent PID Unit	V/f OLV/PM EZOLV 0 : “WC: inches of water column 1 : PSI: pounds per square inch 2 : GPM: gallons/min 3 : °F: Fahrenheit 4 : ft^3/min: cubic feet/min 5 : m^3/h: cubic meters/hour 6 : L/h: liters/hour 7 : L/s: liters/sec 8 : bar: bar 9 : Pa: Pascal 10 : °C: Celsius 11 : m: meters 12 : ft: feet 13 : L/min: liters/min 14 : m^3/min: cubic meters/min 15 : “Hg: Inch Mercury 16 : kPa: kilopascal 48 : %: Percent 49 : Custom(Y1-32~34) 50 : None	48 (0 - 50)
S6-05 (323C)	EMOVR Independent PID Unit Digit	V/f OLV/PM EZOLV Sets the number of digits for *S6-06 [EMOVR PID Setpoint]* when *S6-02 = 3[Emergency Override Ref Selection = Independent PID Mode]*. 0 : No Decimal Places (XXXXX) 1 : One Decimal Place (XXXX.X) 2 : Two Decimal Places (XXX.XX) 3 : Three Decimal Places (XX.XXX)	2 (0 - 3)
S6-06 (323D) RUN	EMOVR PID Setpoint	V/f OLV/PM EZOLV Sets the PID Setpoint when *S6-02 = 3[Emergency Override Ref Selection = Independent PID Mode]*. **Note:** When *S6-02 = 3*: units and resolution are dependent on *S6-04 [EMOVR Independent PID Unit]* and *S6-05 [EMOVR Independent PID Unit Digit]*. Value is internally limited to 300% of *S6-03 [EMOVR Independent PID Scale]*.	0.00 (0 - 600.00)
S6-07 (323E)	EMOVR Fault Suppression Mode	V/f OLV/PM EZOLV Sets the drive to let Emergency Override disable faults during operation. 0 : Fault Suppression 1 : Test Mode	0 (0, 1)
S6-08 (323F)	EMOVR Drive Enable Input Mode	V/f OLV/PM EZOLV Sets whether the Drive Enable Input (if programmed) must be inactive (drive is disabled) for Emergency Override to function. 0 : Drive Enable Status Ignored 1 : EMOVRun Only When Drive Disabled **Note:** You must program Drive Enable to a Digital Input for this parameter to have an effect.	0 (0, 1)
S6-09 (3240)	Emergency Override Min Speed	V/f OLV/PM EZOLV When Emergency Override is active, the output frequency is lower-limited to this value. **Note:** When *A1-02 = 8 [Control Method Selection = EZOLV]*, the range is 0.00 to 120.00 Hz.	0.00 Hz (0.00 - 400.00 Hz)
S6-10 (3241)	Emergency Override Max Speed	V/f OLV/PM EZOLV When Emergency Override is active, the output frequency is upper-limited to this value. **Note:** • When *A1-02 = 8 [Control Method Selection = EZOLV]*, the range is 0.00 to 120.00 Hz. • Set this parameter to 0.00 Hz to disable the limit.	0.00 Hz (0.00 - 400.00 Hz)
S6-23 (324E)	OV2 Detect Time	V/f OLV/PM EZOLV Sets the detection time of *ov2 [DC Bus Overvoltage 2]* in 0.1 s increments. **Note:** Set this parameter to 0.0 s to disable *ov2* detection.	10.0 s (0.0 - 1200.0 s)

5.16 Y: Application Features

◆ Y1: Application Basics

No. (Hex.)	Name	Description	Default (Range)
Y1-01 (3C00)	Multiplex Mode	V/f OLV/PM EZOLV Sets the base operation mode of the drive controller. 0 : Drive Only 1 : Contactor Multiplex 3 : Network Multiplex	0 (0 - 3)
Y1-02 (3C01)	System Units	V/f OLV/PM EZOLV Sets the units the drive will use for standard PID. 0 : “WC: inches of water column 1 : PSI: pounds per square inch 2 : GPM: gallons/min 3 : °F: Fahrenheit 4 : ft^3/min: cubic feet/min 5 : m^3/h: cubic meters/hour 6 : L/h: liters/hour 7 : L/s: liters/sec 8 : bar: bar 9 : Pa: Pascal 10 : °C: Celsius 11 : m: meters 12 : ft: feet 13 : L/min: liters/min 14 : m^3/min: cubic meters/min 15 : “Hg: Inch Mercury 16 : kPa: kilopascal 25 : Flow (Use Y6-04) 48 : %: Percent 49 : Custom(Y1-32~34) 50 : None	1 (0 - 50)
Y1-03 (3C02)	Feedback Device Scaling	V/f OLV/PM EZOLV Sets the value that the drive sets or shows as the PID setpoint when at maximum output frequency. **Note:** Unit set by *Y1-02 [System Units]*, resolution set by *b5-39 [PID User Unit Display Digits]*.	145.0 (0.1 - 6000.0)
Y1-04 (3C03) RUN	Sleep Wake-up Level	V/f OLV/PM EZOLV Sets the level that feedback must be less than for the time set in *Y1-05 [Sleep Wake-up Level Delay Time]* to start the system. This level also sets the wake up level when the drive is in Sleep Mode. When *Y1-04 < 0*, the feedback level must decrease this amount to less than the setpoint. **Note:** • When PID operates in reverse mode, the feedback value must increase to more than the start level for the time set in *Y1-05* for the system to start. • When *Y2-01 = 5 [Sleep Level Type = Output Frequency (non-PID)]*, the drive will ignore this parameter. • Unit set by *Y1-02 [System Units]*, resolution set by *b5-39 [PID User Unit Display Digits]*. • When *Y1-01 = 3 [Multiplex Mode = Network Multiplex]*, function is active only on the first drive in the network. Drives that are staging or in alternation will not undergo this process. • Range is 0.0 to 999.9 with a sign-bit “-” or “+” to identify Delta to Setpoint. • Set this parameter to 0.0 to disable the function.	0.0 (-999.9 - +999.9)
Y1-05 (3C04) RUN	Sleep Wake-up Level Delay Time	V/f OLV/PM EZOLV Sets the drive to start the System again when the feedback decreases to less than *Y1-04 [Sleep Wake-up Level]* for the time set in this parameter.	1.0 s (0.0 - 3600.0 s)

No. (Hex.)	Name	Description	Default (Range)
Y1-06 (3C05) RUN	Minimum Speed	V/f OLV/PM EZOLV Sets the minimum frequency at which the drive will run. The drive applies this setting to HAND and AUTO Modes. **Note:** • When *Y1-07 = 1 [Minimum Speed Units = RPM]* the default is 2400 RPM. When *A1-03 = 6011 or 6012 [Initialize Parameters = Vertical Turbine Pressure Ctl or Pivot Panel Vert. Turbine Ctl]* the default is 900 RPM. • The unit, decimal place, and setting range change when *Y1-07 [Minimum Speed Units]* changes: –*Y1-07 = 0 (Hz)*: The setting range is 0.0 Hz to a Maximum Frequency set by *E1-04, E3-04* or *E9-02.* –*Y1-07 = 1 (RPM)*: The setting range is 0 RPM to a Maximum Frequency set by *E1-04, E3-04* or *E9-02* in RPM. • The minimum speed used by the drive will be the highest value of these: –*Y4-12 [Thrust Frequency]* –*d2-02 [Frequency Reference Lower Limit]* –*Y1-06 [Minimum Speed]* –*S6-09 [Emergency Override Minimum Speed]* (during Emergency Override operation only) • When *A1-03 = 6011 [Vertical Turbine Pressure Ctl]* or *6012 [Pivot Panel Vert. Turbine Ctrl]*, the drive will ignore this parameter when running in HAND Mode.	40.0 Hz Determined by Y1-07
Y1-07 (3C06)	Minimum Speed Units	V/f OLV/PM EZOLV Sets the units and decimal place for *Y1-06 [Minimum Speed]*. 0 : Hz 1 : RPM **Note:** Changing *Y1-07* will set *Y1-06 [Minimum Speed]* to the default value.	0 (0, 1)
Y1-08 (3C07) RUN	Low Feedback Level	V/f OLV/PM EZOLV Sets the lower detection level for the PID feedback. **Note:** • Unit set by *Y1-02 [System Units]*, resolution set by *b5-39 [PID User Unit Display Digits]*. • Range is 0.0 to 999.9 with a sign-bit "-" to identify Delta to Setpoint.	0.0 (0.0 - 999.9)
Y1-09 (3C08) RUN	Low Feedback Lvl Fault Dly Time	V/f OLV/PM EZOLV Sets the delay time for the drive to detect an *LFB [Low Feedback Sensed]* fault after the feedback level decreases to less than the value set in *Y1-08 [Low Feedback Level]*. **Note:** Set *Y1-10 = 0 [Low Feedback Selection = Fault (and Digital Output)]* to enable this parameter.	10 s (0 - 3600 s)
Y1-10 (3C09)	Low Feedback Selection	V/f OLV/PM EZOLV Sets the drive response when the feedback decreases to less than *Y1-08 [Low Feedback Level]* for longer than the time set in *Y1-09 [Low Feedback Lvl Fault Dly Time]*. 0 : Fault (and Digital Output) 1 : Alarm (and Digital Output) 2 : Digital Output Only	0 (0 - 2)
Y1-11 (3C0A) RUN	High Feedback Level	V/f OLV/PM EZOLV Sets the upper detection level for the PID feedback. **Note:** • Unit set by *Y1-02 [System Units]*, resolution set by *b5-39 [PID User Unit Display Digits]*. • Range is 0.0 to 999.9 with a sign-bit "+" to identify Delta to Setpoint.	0.0 (0.0 - 999.9)
Y1-12 (3C0B) RUN	High Feedback Lvl Fault Dly Time	V/f OLV/PM EZOLV Sets the delay time between when the drive detects high feedback until the drive faults on an *HFB [High Feedback Sensed]* fault. **Note:** This parameter is effective only when *Y1-13 = 0 [High Feedback Selection = Fault (and Digital Output)]*.	5 s (0 - 3600 s)
Y1-13 (3C0C)	High Feedback Selection	V/f OLV/PM EZOLV Sets the drive response when the feedback increased to more than *Y1-11 [High Feedback Level]* for longer than the time set in *Y1-12 [High Feedback Lvl Fault Dly Time]*. 0 : Fault (and Digital Output) 1 : Alarm (and Digital Output) 2 : Digital Output Only	0 (0 - 2)
Y1-14 (3C0D) RUN	Feedback Hysteresis Level	V/f OLV/PM EZOLV Sets the hysteresis level for low and high level feedback detection. **Note:** Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution.	0.0 (0.0 - 10.0)

No. (Hex.)	Name	Description	Default (Range)
Y1-15 (3C0E) RUN	Maximum Setpoint Difference	V/f OLV/PM EZOLV Sets a percentage of difference between the setpoint and the feedback. The difference must be more than this value for the time set in *Y1-16 [Not Maintaining Setpoint Time]* to trigger the drive response set in *Y1-17 [Not Maintaining Setpoint Sel]*. **Note:** • Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution. • If there is a fault, the drive will coast to a stop. • Set this parameter to 0.0 to disable the function.	0.0 (0.0 - 6000.0)
Y1-16 (3C0F) RUN	Not Maintaining Setpoint Time	V/f OLV/PM EZOLV Sets the delay time before a Setpoint Not Met condition occurs. The drive must detect the setpoint difference set in *Y1-15 [Maximum Setpoint Difference]* before the timer will start. **Note:** Set *Y1-15 = 0 [Maximum Setpoint Difference = 0]* to disable this function.	60 s (0 - 3600 s)
Y1-17 (3C10)	Not Maintaining Setpoint Sel	V/f OLV/PM EZOLV Sets the drive response when the feedback increases to more or decreases to less than the setpoint for more than the amount set in *Y1-15 [Maximum Setpoint Difference]*. 0 : Fault (and Digital Output) 1 : Alarm (and Digital Output) 2 : Digital Output Only	0 (0 - 2)
Y1-18 (3C11)	Prime Loss Detection Method	V/f OLV/PM EZOLV Sets the units and quantity that the drive will use to determine *LOP [Loss of Prime]*. 0 : Current (A) 1 : Power (kW) 2 : Torque (%)	0 (0 - 2)
Y1-19 (3C12) RUN	Prime Loss Level	V/f OLV/PM EZOLV Sets the level to detect the *LOP [Loss of Prime]* in the pump during RUN or Sleep Boost Mode. **Note:** *Y1-18 [Prime Loss Detection Method]* selection sets the units for this parameter.	0.0 (0.0 - 1000.0)
Y1-20 (3C13) RUN	Prime Loss Time	V/f OLV/PM EZOLV Sets the delay time before the drive detects an *LOP [Loss of Prime]* condition. The timer starts when the drive detects the conditions in *Y1-18 [Prime Loss Detection Method]* and *Y1-19 [Prime Loss Level]*.	20 s (0 - 600 s)
Y1-21 (3C14)	Prime Loss Activation Freq	V/f OLV/PM EZOLV Sets the frequency level above which the drive enables Loss of Prime detection. **Note:** • When *A1-02 = 8 [Control Method Selection = EZOLV]*, the upper limit is the Hz equivalent of *E9-02 [Maximum Speed]*. • When *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]* for Motor 2, the upper limit is the larger value between *E1-04 [Maximum Output Frequency]* and *E3-04 [Motor 2 Maximum Output Frequency]*.	0.0 Hz (0.0 - E1-04 Hz)
Y1-22 (3C15)	Prime Loss Selection	V/f OLV/PM EZOLV Sets the drive response when the drive is in the Loss of Prime condition. 0 : Fault (and Digital Output) 1 : Alarm (and Digital Output) 2 : Digital Output Only	0 (0 - 2)
Y1-23 (3C16)	Prime Loss Max Restart Time	V/f OLV/PM EZOLV Sets the time in minutes that the drive will wait before it tries a restart after a restart fails or after it does not do a restart because of a fault.	0.2 min (0.2 - 6000.0 min)
Y1-24 (3C17) RUN	Level at Full Speed	V/f OLV/PM EZOLV Sets the level used to override the programmed P-gain *[b5-02]* and I-limit *[b5-04]* with calculated values based on Sleep level, Wake-up level, Minimum Pump Speed, Transducer Scaling, and Maximum Frequency. The value programmed in this parameter should be the target level when at full-speed operation. **Note:** • When this parameter is set to 0.0, the function is disabled and the PID will use the programmed P-gain and I-limit. • Parameters *Y1-02 [PID Unit Display Selection], Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, range, and resolution.	0.0 (0.0 - 6000.0)
Y1-32 (3FCF)	System Unit Custom Character 1	V/f OLV/PM EZOLV Sets the first character of the custom unit display when *Y1-02 = 49 [System Units = Custom(Y1-32~34)]* or when *b5-41 = 49 [PID Output 2 Unit = Custom (Y1-32~34)]*.	41 (20 - 7A)
Y1-33 (3FD0)	System Unit Custom Character 2	V/f OLV/PM EZOLV Sets the second character of the custom unit display when *Y1-02 = 49 [System Units = Custom(Y1-32~34)]* or when *b5-41 = 49 [PID Output 2 Unit = Custom (Y1-32~34)]*.	41 (20 - 7A)

No. (Hex.)	Name	Description	Default (Range)
Y1-34 (3FD1)	System Unit Custom Character 3	V/f OLV/PM EZOLV Sets the third character of the custom unit display when *Y1-02 = 49 [System Units = Custom(Y1-32~34)]* or when *b5-41 = 49 [PID Output 2 Unit = Custom (Y1-32~34)]*.	41 (20 - 7A)
Y1-36 (3C23)	High/Low Water DI Fault Det Sel	V/f OLV/PM EZOLV Sets when the MFDI terminals set for *H1-xx = BB or BC [Low Water Level or High Water Level]* will be active to detect the *LWL [Low Water Level]* and *HWL [High Water Level]* faults. 0 : During Run 1 : Always **Note:** • The drive will not detect *LWL* and *HWL* faults during Emergency Override. • The drive will not detect *LWL* until Pre-Charge is complete. The drive will also not detect the fault during JOG. • The drive cannot Auto-Restart the faults until the drive is no longer in a low or high water level condition. If the time set for *L5-04 [Interval Method Restart Time]* passes but the low or high water level condition is not cleared, the drive will continue to stay in the Auto-Restart state.	0 (0, 1)
Y1-37 (3C24)	External Fan Delay Off Time	V/f OLV/PM EZOLV Sets the delay time after the drive is turned off and before the External Fan Switch MFDO is deactivated.	5.0 min (0.0 - 60.0 min)
Y1-40 (3C27) RUN	Maximum Speed	V/f OLV/PM EZOLV Sets the maximum speed. **Note:** This parameter is not effective when *Y1-40 = 0.0 Hz* or *Y1-40 > E1-04 [Maximum Output Frequency] × d2-01 [Frequency Reference Upper Limit]*.	0.0 Hz (Determined by A1-02)

◆ Y2: PID Sleep and Protection

No. (Hex.)	Name	Description	Default (Range)
Y2-01 (3C64)	Sleep Level Type	V/f OLV/PM EZOLV Sets the data source that the drive uses to know when to activate the Sleep Function. 0 : Output Frequency 1 : Output Current 2 : Feedback 3 : Output Speed (RPM) 4 : Flow Meter 5 : Output Frequency (non-PID) **Note:** • Feedback depends on PID direction operation. • When the Sleep Function is active, the keypad will show the “Sleep” Alarm.	0 (0 - 5)
Y2-02 (3C65) RUN	Sleep Level	V/f OLV/PM EZOLV Sets the level that the level type set in *Y2-01 [Sleep Level Type]* must be at for the time set in *Y2-03 [Sleep Delay Time]* for the drive to enter Sleep Mode. **Note:** • When you set this parameter to 0.0, this function will not be active. • This function is active only when the drive operates in AUTO Mode. • When *Y2-01 = 5 [Output Frequency (non-PID)]*, the drive will disable the Sleep function when you set this parameter to 0.0. • When *Y2-01 ≠ 5*, the drive will set the sleep level to the largest value from *d2-02 [Frequency Reference Lower Limit]*, *Y1-06 [Minimum Speed]*, and *Y4-12 [Thrust Frequency]* when you set this parameter to 0.0.	0.0 (0.0 - 6000.0)
Y2-03 (3C66) RUN	Sleep Delay Time	V/f OLV/PM EZOLV Sets the delay time before the drive enters Sleep Mode when the drive is at the sleep level set in *Y2-02 [Sleep Level]*.	5 s (0 - 3600 s)
Y2-04 (3C67) RUN	Sleep Activation Level	V/f OLV/PM EZOLV Sets the level above which the output frequency must increase to activate the Sleep Function when *Y2-01 = 0, 3, or 5 [Sleep Level Type = Output Frequency, Output Speed (RPM), or Output Frequency (non-PID)]*. **Note:** • When you set this parameter to 0.0, this function will not be active, and the Sleep Function will activate above the minimum speed (largest value from *d2-02 [Frequency Reference Lower Limit]*, *Y1-06 [Minimum Speed]*, and *Y4-12 [Thrust Frequency]*). • The unit for this parameter is usually Hz. When *Y2-01 = 3 [Sleep Level Type = Output Speed (RPM)]*, the unit is RPM.	0.0 (0.0 - 6000.0)

No. (Hex.)	Name	Description	Default (Range)
Y2-05 (3C68) RUN	Sleep Boost Level	V/f OLV/PM EZOLV Sets the quantity of boost that the drive applies to the setpoint before it goes to sleep. **Note:** • Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution. • Set this parameter to 0.0 to disable Sleep Boost Function.	0.0 (0.0 - 6000.0)
Y2-06 (3C69) RUN	Sleep Boost Hold Time	V/f OLV/PM EZOLV Sets the length of time that the drive will keep the boosted pressure before it goes to sleep.	5.0 s (0.5 - 160.0 s)
Y2-07 (3C6A) RUN	Sleep Boost Max Time	V/f OLV/PM EZOLV Sets the length of time that the system (feedback) has to reach the boosted setpoint. The system must reach the boosted setpoint in the time set in this parameter, or it will go to sleep.	20.0 s (1.0 - 160.0 s)
Y2-08 (3C6B) RUN	Delta Feedback Drop Level	V/f OLV/PM EZOLV Sets the level of the PID Error (set-point minus feedback) to deactivate the Sleep Mode operation. **Note:** • Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution. • Set this parameter to 0.0 to disable the function.	0.0 (0.0 - 6000.0)
Y2-09 (3C6C) RUN	Feedback Drop Detection Time	V/f OLV/PM EZOLV Sets the time during which the software monitors the feedback to detect a flow/no-flow condition. Refer to *Y2-08 [Delta Feedback Drop Level]* for more information.	10.0 s (0.0 - 3600.0 s)
Y2-10 (3C6D) RUN	Max Cycling Protection Allowed	V/f OLV/PM EZOLV Maximum number of cycles allowed within time specified in *Y2-11 [Cycling Count Decrement Time]* before the system faults on *POC [Pump Over Cycle]*. One cycle is defined when the drive transfers from normal operation in AUTO Mode to Sleep Mode. Set this parameter to 0 to disable the function. **Note:** • When *Y1-01 = 3 [Multiplex Mode = Network Multiplex]*, this function is active when there is only one drive running in the network. Set this parameter to 0 to disable the function.	0 (0 - 10)
Y2-11 (3C6E) RUN	Cycling Count Decrement Time	V/f OLV/PM EZOLV Sets the time for which the drive needs to be running in AUTO Mode before the cycle counter is decremented. One cycle is defined when the drive transfers from normal operation in AUTO Mode to sleep mode. When no cycling occurs within the programmed time, the drive will decrease the internal cycle register.	300 s (0 - 3600 s)
Y2-12 (3C6F)	Over Cycle Mode	V/f OLV/PM EZOLV Sets how the drive will respond when it detects an Over Cycle condition. 0 : Disabled 1 : Alarm 2 : Fault 3 : AUTO Setpoint Compensation	0 (0 - 3)
Y2-13 (3C70)	Setpoint Compensation	V/f OLV/PM EZOLV Sets the amount of setpoint the drive will compensate when there is too much cycling. **Note:** Units set by *Y1-02 [System Units]*, internal scaling by *Y1-03 [Feedback Device Scaling]*, and resolution by *b5-39 [PID User Unit Display Digits]*	0.0 (0.0 - 6000.0)
Y2-14 (3C71)	Maximum Setpoint Compensation	V/f OLV/PM EZOLV Sets the maximum allowed setpoint compensation for the over cycling function. **Note:** Units set by *Y1-02 [System Units]*, internal scaling by *Y1-03 [Feedback Device Scaling]*, and resolution by *b5-39 [PID User Unit Display Digits]*	0.0 (0.0 - 6000.0)
Y2-15 (3C72) RUN	Sleep AUTO → OFF Selection	V/f OLV/PM EZOLV Selects if sleep is allowed with *Y1-04 Sleep Wake-up Level] = 0.0* and also cause the drive to switch to OFF when sleep conditions are met. 0 : Disabled 1 : Enabled 2 : Enabled with Timer	0 (0 - 2)
Y2-16 (3C73) RUN	Sleep AUTO → OFF Delay Timer	V/f OLV/PM EZOLV Set the length of time that the drive will sleep before the drive will switch to OFF when sleep conditions are met. The timer begins after Sleep Boost and Feedback Drop are complete.	0 s (0 - 3600 s)
Y2-23 (3C7A) RUN	Anti-No-Flow Bandwidth	V/f OLV/PM EZOLV Sets the quantity of PI error bandwidth that the drive uses to detect an Anti- No-Flow condition. **Note:** Do not set this parameter value too high, because operation can become unstable.	0.40% (0.00 - 2.00%)

No. (Hex.)	Name	Description	Default (Range)
Y2-24 (3C7B) RUN	Anti-No-Flow Detection Time	V/f OLV/PM EZOLV Sets the time delay before the drive starts the increased deceleration rate after it detects Anti-No-Flow.	10.0 s (1.0 - 60.0 s)
Y2-25 (3C7C) RUN	Anti-No-Flow Release Level	V/f OLV/PM EZOLV Sets the amount below the setpoint which the feedback must decrease before the drive will disengage Anti-No-Flow and return to normal PI operation. **Note:** Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution.	3.0 (0.0 - 100.0)

◆ Y3: Contactor Multiplex

No. (Hex.)	Name	Description	Default (Range)
Y3-00 (3CC7)	Number of Lag Pumps in System	V/f OLV/PM EZOLV Sets the number of lag pumps present.	1 (1 - 5)
Y3-01 (3CC8)	Lag Pump Staging Method	V/f OLV/PM EZOLV Sets the method to add contactor lag pumps to the system. 0 : Output Frequency 1 : Feedback 2 : Feedback + Output Frequency	0 (0 - 2)
Y3-02 (3CC9)	Lag Pump Shutdown Method	V/f OLV/PM EZOLV Sets the method to remove contactor pumps from the system. 0 : Output Frequency 1 : Feedback 2 : Feedback + Output Frequency	0 (0 - 2)
Y3-03 (3CCA) RUN	Multiplex Max Speed Staging Lvl	V/f OLV/PM EZOLV Sets the maximum level used for the multiplex pumping operation. **Note:** • This parameter is active only when *Y3-01 = 0 or 2 [Lag Pump Staging Method = Output Frequency or Feedback + Output Frequency]*. • When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the upper limit is the Hz equivalent of *E9-02 [Maximum Speed]*. While you set *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]*, the upper limit is the greater of the *E1-04 [Maximum Output Frequency]* value and the *E3-04 [Motor 2 Maximum Output Frequency]* value.	59.0 Hz (0 - E1-04 Hz)
Y3-04 (3CCB) RUN	Add Lag Pump Delta Level	V/f OLV/PM EZOLV Sets the level used for the multiplex pumping operation. **Note:** • This parameter is active only when *Y3-01 = 1 or 2 [Lag Pump Staging Method = Feedback or Feedback + Output Frequency]*. • Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution. • To prevent excessive cycling, do not set this level too close to the system setpoint.	0.0 (0.0 - 6000.0)
Y3-05 (3CCC) RUN	Add Lag Pump Delay Time	V/f OLV/PM EZOLV Sets the delay time before the drive adds a pump to the system.	2 s (0 - 3600 s)
Y3-06 (3CCD) RUN	Freq Reduction after Staging	V/f OLV/PM EZOLV Sets the upper limit of the output frequency after a lag pump is staged.	0.0 Hz (0.0 - 30.0 Hz)
Y3-07 (3CCE) RUN	Freq Reduction Time after Stage	V/f OLV/PM EZOLV Sets the amount of time that the output frequency will be limited after lag pump is staged. **Note:** Set this parameter to 0.0 s to disable this function.	0.0 s (0.0 - 240.0 s)

No. (Hex.)	Name	Description	Default (Range)
Y3-08 (3CCF) RUN	Shutdown Lag Pump Delta Level	V/f OLV/PM EZOLV Sets the shutdown level used for the multiplex pumping operation. **Note:** • This parameter is active only when *Y3-02 = 1 or 2 [Lag Pump Shutdown Method = Feedback or Feedback + Output Frequency]*. • Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution. • These parameters set the Pump Shutdown Frequency: –*Y3-50 [Pump 2 Shutdown Frequency]* –*Y3-60 [Pump 3 Shutdown Frequency]* –*Y3-70 [Pump 4 Shutdown Frequency]* –*Y3-80 [Pump 5 Shutdown Frequency]* –*Y3-90 [Pump 6 Shutdown Frequency]* • To prevent excessive cycling, do not set this level too close to the system setpoint.	0.0 (0.0 - 6000.0)
Y3-09 (3CD0) RUN	Shutdown Lag Pump Delay Time	V/f OLV/PM EZOLV Sets the delay time before the drive shuts down one of the lag pump.	5 s (0 - 3600 s)
Y3-10 (3CD1) RUN	Max Setpoint Boost@ De-stage	V/f OLV/PM EZOLV Sets the maximum amount of boost that can be added to the setpoint after a de-stage occurs. **Note:** Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution.	0.0 (-200.0 - +200.0)
Y3-11 (3CD2) RUN	Setpoint Boost Time	V/f OLV/PM EZOLV Sets the amount of time that the setpoint will remain boosted after lag pump is de-staged. **Note:** Set this parameter to 0.0 s to disable this function.	5.0 s (0.0 - 60.0 s)
Y3-12 (3CD3) RUN	Multi Pump Setpoint Increase	V/f OLV/PM EZOLV Sets the system setpoint increase each time a new pump is brought online. **Note:** Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution.	0.0 (0.0 - 6000.0)
Y3-13 (3CD4) RUN	Multi Pump Setpoint Decrease	V/f OLV/PM EZOLV Sets the system setpoint decrease each time a new pump is brought online. **Note:** Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution.	0.0 (0.0 - 6000.0)
Y3-14 (3CD5) RUN	Multiplex Stabilization Time	V/f OLV/PM EZOLV Sets the time used to stabilize the system when the drive adds or shuts down a pump during multiplex operation. **Note:** • When a pump is added, the stabilize timer temporarily disables the lead/lag functionality for the programmed time to prevent pump cycling. • Set *Y1-01 = 1 [Multiplex Mode = Contactor Multiplex]* to enable this function. Time pump protection and lead/lag control is suspended during stabilization time. • During stabilization time, the pump protection and staging/de-staging is suspended.	2 s (0 - 3600 s)
Y3-15 (3CD6) RUN	High Feedback Quick De-stage	V/f OLV/PM EZOLV Sets the High Feedback level that will trigger a quick de-stage. The quick de-stage uses an internal 2 s delay. **Note:** • Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution. • Set this parameter to 0.0 to disable this function. • This function is intended for *b5-09 = 0 [PID Output Level Selection = Direct Acting]* only. If you use this function when *b5-09 = 1 [Reverse Acting]*, it may cause pumps to de-stage incorrectly.	0.0 (0.0 - 6000.0)
Y3-16 (3CD7) RUN	Low Feedback Quick De-stage	V/f OLV/PM EZOLV Sets the Low Feedback level that will trigger a quick de-stage. The quick de-stage uses an internal 2 s delay. **Note:** • Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution. • Set this parameter to 0.0 to disable this function. • This function is intended for *b5-09 = 1 [PID Output Level Selection = Reverse Acting]* only. If you use this function when *b5-09 = 0 [Direct Acting]*, it may cause pumps to de-stage incorrectly.	0.0 (0.0 - 6000.0)

No. (Hex.)	Name	Description	Default (Range)
Y3-30 (3CE5)	Stage Selection Mode	V/f OLV/PM EZOLV Sets the method of staging for the pumps. 0 : Sequential 1 : Stop History	0 (0, 1)
Y3-31 (3CE6)	De-stage Selection Mode	V/f OLV/PM EZOLV Sets the method to remove contactor pumps. 0 : Last In, First Out 1 : First In, First Out	0 (0, 1)
Y3-40 (3CEF)	Pre-Charge Helper Pump Select	V/f OLV/PM EZOLV Sets which of the lag pumps can come on during Pre-Charge. 0 : Disabled 2 : Pump 2 (MFDO 8A) 3 : Pump 3 (MFDO 8B) 4 : Pump 4 (MFDO 8C) 5 : Pump 5 (MFDO 8D) 6 : Pump 6 (MFDO 8E)	0 (0 - 6)
Y3-41 (3CF0)	Pre-Charge Helper Pump Time	V/f OLV/PM EZOLV Sets how long the helper pump specified in *Y3-40 [Pre-Charge Helper Pump Select]* is energized. **Note:** Set this parameter to 0.0 to disable this function.	0.0 min (0.0 - 3600.0 min)
Y3-42 (3CF1)	Helper Pump after Pre-Charge	V/f OLV/PM EZOLV Sets whether the helper pump that was used in *Y3-40 [Pre-Charge Helper Pump Select]* turns off or maintains its state when Pre-Charge is finished: 0 : Turn Off 1 : Continue	0 (0, 1)
Y3-43 (3CF2)	Pre-Charge Helper On-Delay Time	V/f OLV/PM EZOLV Sets how long the drive is in the Pre-Charge mode before the helper pump specified in *Y3-40 [Pre-Charge Helper Pump Select]* energized.	2.0 min (0.0 - 600.0 min)
Y3-50 (3CF9) RUN	Pump 2 Shutdown Frequency	V/f OLV/PM EZOLV Sets the shutdown frequency used for Pump 2 in multiplex pumping operation. **Note:** • This parameter is active only when *Y3-02 = 0 or 2 [Lag Pump Shutdown Method = Output Frequency or Feedback + Output Frequency]*. • When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the upper limit is the Hz equivalent of *E9-02 [Maximum Speed]*. While you set *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]*, the upper limit is the greater of the *E1-04 [Maximum Output Frequency]* value and the *E3-04 [Motor 2 Maximum Output Frequency]* value.	40.0 Hz (0.0 - E1-04 Hz)
Y3-60 (3CC3) RUN	Pump 3 Shutdown Frequency	V/f OLV/PM EZOLV Sets the shutdown frequency used for Pump 3 in multiplex pumping operation. **Note:** • This parameter is active only when *Y3-02 = 0 or 2 [Lag Pump Shutdown Method = Output Frequency or Feedback + Output Frequency]*. • When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the upper limit is the Hz equivalent of *E9-02 [Maximum Speed]*. While you set *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]*, the upper limit is the greater of the *E1-04 [Maximum Output Frequency]* value and the *E3-04 [Motor 2 Maximum Output Frequency]* value.	40.0 Hz (0.0 - E1-04 Hz)
Y3-70 (3CC4) RUN	Pump 4 Shutdown Frequency	V/f OLV/PM EZOLV Sets the shutdown frequency used for Pump 4 in multiplex pumping operation. **Note:** • This parameter is active only when *Y3-02 = 0 or 2 [Lag Pump Shutdown Method = Output Frequency or Feedback + Output Frequency]*. • When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the upper limit is the Hz equivalent of *E9-02 [Maximum Speed]*. While you set *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]*, the upper limit is the greater of the *E1-04 [Maximum Output Frequency]* value and the *E3-04 [Motor 2 Maximum Output Frequency]* value.	40.0 Hz (0.0 - E1-04 Hz)

No. (Hex.)	Name	Description	Default (Range)
Y3-80 (3CC5) RUN	Pump 5 Shutdown Frequency	V/f OLV/PM EZOLV Sets the shutdown frequency used for Pump 5 in multiplex pumping operation. **Note:** • This parameter is active only when *Y3-02 = 0 or 2 [Lag Pump Shutdown Method = Output Frequency or Feedback + Output Frequency]*. • When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the upper limit is the Hz equivalent of *E9-02 [Maximum Speed]*. While you set *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]*, the upper limit is the greater of the *E1-04 [Maximum Output Frequency]* value and the *E3-04 [Motor 2 Maximum Output Frequency]* value.	40.0 Hz (0.0 - E1-04 Hz)
Y3-90 (3CC6) RUN	Pump 6 Shutdown Frequency	V/f OLV/PM EZOLV Sets the shutdown frequency used for Pump 6 in multiplex pumping operation. **Note:** • This parameter is active only when *Y3-02 = 0 or 2 [Lag Pump Shutdown Method = Output Frequency or Feedback + Output Frequency]*. • When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the upper limit is the Hz equivalent of *E9-02 [Maximum Speed]*. While you set *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]*, the upper limit is the greater of the *E1-04 [Maximum Output Frequency]* value and the *E3-04 [Motor 2 Maximum Output Frequency]* value.	40.0 Hz (0.0 - E1-04 Hz)

◆ Y4: Application Advanced

No. (Hex.)	Name	Description	Default (Range)
Y4-01 (3CFA) RUN	Pre-Charge Level	V/f OLV/PM EZOLV Sets the level at which the drive will activate the pre-charge function when the drive is running at the frequency set in *Y4-02 [Pre-Charge Frequency]*. **Note:** • The drive will exit Pre-Charge when one of these conditions is true: –The feedback level increases to more than *Y4-01* –The pre-charge time set in *Y4-03 [Pre-Charge Time]* expires –Low Water Level digital input is deactivated *[BB]* –Disable Pre-Charge digital input is activated *[B9]*. • Units are set by *Y1-02 [System Units]* and resolution is set by *b5-39 [PID User Unit Display Digits]* and upper limited to 200% of *Y1-03 [PID User Unit Display Scaling]*.	0.0 (0.0 - 6000.0)
Y4-02 (3CFB) RUN	Pre-Charge Frequency	V/f OLV/PM EZOLV Sets the frequency at which the pre-charge function will operate. **Note:** • When *A1-02 = 8 [Control Method Selection = EZOLV]*, the upper limit is the Hz equivalent of *E9-02 [Maximum Speed]*. • When *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]* for Motor 2, the upper limit is the larger value between *E1-04 [Maximum Output Frequency]* and *E3-04 [Motor 2 Maximum Output Frequency]*.	0.0 Hz (0.0 - E1-04 Hz)
Y4-03 (3CFC) RUN	Pre-Charge Time	V/f OLV/PM EZOLV Sets the length of time that the Pre-Charge function will run. **Note:** • When *Y1-01 = 3 [Multiplex Mode = Network Multiplex]*, this function is active only on the first drive to run in the network. Set this parameter to 0.0 to disable the function.	0.0 min (0.0 - 3600.0 min)
Y4-05 (3CFE) RUN	Pre-Charge Loss of Prime Level	V/f OLV/PM EZOLV Detects loss of prime in the pump. If the measured quantity set in *Y1-18 [Prime Loss Detection Method]* is less than the level set in this parameter for the length of time set in *Y1-20 [Prime Loss Time]* and the output frequency is at the level set in *Y4-02 [Pre-Charge Frequency]*, it will trigger a "Loss Of Prime" condition . **Note:** • Parameter *Y1-18 [Prime Loss Detection Method]* sets units. • The drive will respond to the "Loss of Prime" condition based on *Y1-22 [Prime Loss Selection]*.	0.0 (0.0 - 1000.0)
Y4-06 (3CFF) RUN	Pre-Charge Frequency 2	V/f OLV/PM EZOLV Sets the frequency reference that the drive uses when the Pre-Charge 2 function is active. **Note:** • When *A1-02 = 8 [Control Method Selection = EZOLV]*, the upper limit is the Hz equivalent of *E9-02 [Maximum Speed]*. • When *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]* for Motor 2, the upper limit is the larger value between *E1-04 [Maximum Output Frequency]* and *E3-04 [Motor 2 Maximum Output Frequency]*.	0.0 Hz (0 - E1-04 Hz)
Y4-07 (3D00) RUN	Pre-Charge Time 2	V/f OLV/PM EZOLV Sets the length of time that the drive will spend at the Pre-Charge Frequency 2 speed during Pre-Charge. **Note:** Set this parameter to 0.0 to disable the function.	0.0 min (0 - 3600.0 min)

No. (Hex.)	Name	Description	Default (Range)
Y4-08 (3D01) RUN	Pre-Charge Loss of Prime Level 2	V/f OLV/PM EZOLV Detects loss of prime in the pump. If the measured quantity set in *Y1-18 [Prime Loss Detection Method]* is less than the level set in this parameter for the length of time set in *Y1-20 [Prime Loss Time]* and the output frequency is at the level set in *Y4-06 [Pre-Charge Frequency 2]*, it will trigger a "Loss Of Prime" condition . **Note:** • Parameter *Y1-18 [Prime Loss Detection Method]* sets units. • The drive will respond to the "Loss of Prime" condition based on *Y1-22 [Prime Loss Selection]*.	0.0 (0 - 1000.0)
Y4-10 (3D03)	AUTO Key Memory at Power Down	V/f OLV/PM EZOLV Sets whether the drive will save the AUTO key of the keypad on power-down. 0 : Disabled 1 : Enabled	0 (0, 1)
Y4-11 (3D04) RUN	Thrust Acceleration Time	V/f OLV/PM EZOLV Sets the time at which the drive output frequency will ramp up to the reference frequency set in *Y4-12 [Thrust Frequency]*.	1.0 s (0.0 - 600.0 s)
Y4-12 (3D05) RUN	Thrust Frequency	V/f OLV/PM EZOLV Sets the Thrust Frequency that the drive will use to know which acceleration and deceleration time to use. The drive will accelerate to this frequency in the *Y4-11 [Thrust Acceleration Time]* time and decelerate from this frequency in the *Y4-13 [Thrust Deceleration Time]* time. **Note:** • When *A1-02 = 8 [Control Method Selection = EZOLV]*, the upper limit is the Hz equivalent of *E9-02 [Maximum Speed]*. • When *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]* for Motor 2, the upper limit is the larger value between *E1-04 [Maximum Output Frequency]* and *E3-04 [Motor 2 Maximum Output Frequency]*. • When *A1-03 = 6011 [Vertical Turbine Pressure Ctl]* or *6012 [Pivot Panel Vert. Turbine Ctrl]*, the drive will ignore this parameter when running in HAND Mode.	30.0 Hz (0.0 - E1-04 Hz)
Y4-13 (3D06) RUN	Thrust Deceleration Time	V/f OLV/PM EZOLV Sets the length of time necessary for the drive to go from the Thrust Frequency in *Y4-12 [Thrust Frequency]* to stop when Thrust Mode is active.	2.5 s (0.0 - 600.0 s)
Y4-17 (3D0A) RUN	Utility Start Delay	V/f OLV/PM EZOLV Sets the length of time that the drive will delay starting when there is a Run command at power-up. **Note:** Set this parameter to 0.0 to disable the function.	0.2 min (0.0 - 1000.0 min)
Y4-18 (3D0B) RUN	Differential Level	V/f OLV/PM EZOLV Sets the maximum difference that the drive will allow when it subtracts the Differential Feedback from the Primary PID Feedback. **Note:** • The drive will respond as specified by the setting in *Y4-20 [Differential Level Detection Selection]* when the difference increases to more than the value set in this parameter for the time set in *Y4-19 [Differential Level Detection Time]*. • Parameters *Y1-02 [System Units]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution. • Set this parameter to 0.00 to disable Differential Feedback Detection.	10.0 (0.0 - 6000.0)
Y4-19 (3D0C) RUN	Differential Lvl Detection Time	V/f OLV/PM EZOLV Sets the length of time that the difference between PID Feedback and the Differential Feedback must be more than *Y4-18 [Differential Level]* before the drive will respond as specified by *Y4-20 [Differential Level Detection Selection]*.	10 s (0 - 3600 s)
Y4-20 (3D0D) RUN	Differential Level Detection Sel	V/f OLV/PM EZOLV Sets the drive response during a Differential Level Detected condition. 0 : Fault (and Digital Out) 1 : Alarm (and Digital Out) 2 : Digital Out Only	0 (0 - 2)
Y4-22 (3D0F) RUN	Low City On-Delay Time	V/f OLV/PM EZOLV Sets the length of time that the drive will wait to stop when the drive detects a Low City Pressure condition.	10 s (1 - 1000 s)
Y4-23 (3D10) RUN	Low City Off-Delay Time	V/f OLV/PM EZOLV Sets the length of time that the drive will wait to start again after you clear a Low City Pressure condition.	5 s (0 - 1000 s)
Y4-24 (3D11) RUN	Low City Alarm Text	V/f OLV/PM EZOLV Sets the alarm message to show on the keypad when the drive detects a Low City Pressure condition. 0 : Low City Pressure 1 : Low Suction Pressure 2 : Low Water in Tank	0 (0 - 2)

No. (Hex.)	Name	Description	Default (Range)
Y4-29 (3D16) RUN	Lube Pump Text	V/f OLV/PM EZOLV Selects the display text when Lube Pump is active. It also changes the text for the Lube Pump Digital Output selection *[H2-xx = C6]*. 0 : Lube Pump 1 : Digital Out Delay 2 : Primer Pump 3 : Screen Motor Starter	0 (0 - 3)
Y4-30 (3D17) RUN	Lube Pump During Run	V/f OLV/PM EZOLV When enabled, the Lube Pump digital output *[H2-xx = C6]* stays activated after the timer expires and the drive starts to run normally. The output will deactivate only when the drive stops, faults, or sleeps. 0 : Disabled 1 : Active During Run	0 (0 - 1)
Y4-31 (3D18) RUN	Lube Pump Time	V/f OLV/PM EZOLV Sets the length of time that the drive output is delayed and the Lube Pump digital output *[H2-xx = C6]* is energized before the drive will run. Set this parameter to 0.0 to disable the feature.	0.0 s (0.0 - 3000.0 s)
Y4-32 (3D19) RUN	Pre-Charge Level 2	V/f OLV/PM EZOLV For normal PI operation and during Pre-Charge 2, if the PI Feedback signal is more than the level set in this parameter, Pre-Charge 2 is cancelled and the drive resumes normal operation. For inverse PI operation and during Pre-Charge 2, if the PI Feedback signal is less than the level set in this parameter, Pre-Charge 2 is cancelled and the drive resumes normal operation. When this parameter is set to *0*, Pre-Charge 2 still runs when *Y4-07 ≠ 0.0 [Pre-Charge Time 2]*, but the drive uses *Y4-01 [Pre-Charge Level]* to determine when normal operation should resume. **Note:** Units are set by *Y1-02 [System Units]* and resolution is set by *b5-39 [PID User Unit Display Digits]* and upper limited to 200% of *Y1-03 [PID User Unit Display Scaling]*.	0.0 (0 - 6000.0)
Y4-36 (3D1D) RUN	Pressure Reached Exit Conditions	V/f OLV/PM EZOLV Sets how the digital output responds to Feedback changes after it activates. 0 : Hysteresis Above & Below 1 : Hysteresis 1-Way	1 (0, 1)
Y4-37 (3D1E) RUN	Pressure Reached Hysteresis Lvl	V/f OLV/PM EZOLV Sets the hysteresis level that will cause the drive to exit the Pressure Reached condition. **Note:** Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution.	3.0 (0.1 - 100.0)
Y4-38 (3D1F) RUN	Pressure Reached On Delay Time	V/f OLV/PM EZOLV Sets the length of time that the drive will wait before it activates the Pressure Reached condition.	1.0 s (0.1 - 60.0 s)
Y4-39 (3D20) RUN	Pressure Reached Off Delay Time	V/f OLV/PM EZOLV Sets the length of time that the drive will wait before it deactivates the Pressure Reached condition.	1.0 s (0.1 - 60.0 s)
Y4-40 (3D21) RUN	Pressure Reached Detection Sel	V/f OLV/PM EZOLV Sets the drive status that triggers the Pressure Reached Detection digital output. 0 : Always 1 : Drive Running 2 : Run Command	0 (0 - 2)
Y4-41 (3D22) RUN	Diff Lvl Src Fdbk Backup Select	V/f OLV/PM EZOLV Sets the function to enable or disable *Differential Level Source [H3-xx = 2D]* as the backup transducer if there is a failure with the primary PID Feedback transducer *[H3-xx = B]* and the PID Feedback Backup transducer *[H3-xx = 24]* is not available. 0 : Disabled 1 : Enabled	0 (0, 1)
Y4-42 (3D23)	Output Disconnect Detection Sel	V/f OLV/PM EZOLV Sets the drive response when you open the output disconnect then connect it again. 0 : Disabled 1 : Alarm - Speed Search 2 : Alarm - Start at Zero 3 : Fault **Note:** When the Output Disconnect is active, the drive internally disables Output Phase Loss Detection of more than one phase.	0 (0 - 3)
Y4-43 (3D24)	Output Disconnect Inject Current	V/f OLV/PM EZOLV Sets the level of DC injection current during output disconnect as a percentage of the drive rated current.	30% (5 - 50%)

No. (Hex.)	Name	Description	Default (Range)
Y4-50 (3D2B)	Harmonic Filter Output Selection	V/f OLV/PM EZOLV Sets how the harmonic filter output will close. 0 : Speed 1 : Current 2 : Speed + Current	0 (0 - 2)
Y4-51 (3D2C)	HFO Speed Point	V/f OLV/PM EZOLV Sets the speed point that must be exceeded to close the harmonic filter output (as a percentage of maximum frequency). **Note:** Depending on control method, maximum frequency is *E1-04 [Maximum Output Frequency], E3-04 [Motor 2 Maximum Output Frequency]*, or *E9-02 [Maximum Speed]*.	70% (0 - 100%)
Y4-52 (3D2D)	HFO Current Point	V/f OLV/PM EZOLV Sets the current point that must be exceeded to close the harmonic filter output (as a percentage of motor rated current). **Note:** Depending on control method, maximum current is *E2-01 [Motor Rated Current], E5-03 [PM Motor Rated Current]*, or *E9-06 [Motor Rated Current]* .	70% (0 - 100%)
Y4-53 (3D2E)	HFO Delay On-Time	V/f OLV/PM EZOLV Sets a delay for the activation of HFO.	5.0 s (0.0 - 6000.0 s)
Y4-54 (3D2F)	HFO Delay Off-Time	V/f OLV/PM EZOLV Sets a delay for the deactivation of HFO.	0.0 s (0.0 - 6000.0 s)

◆ Y5: Hand/Off/Auto Operation

No. (Hex.)	Name	Description	Default (Range)
Y5-01 (3D40)	HAND Frequency Reference Source	V/f OLV/PM EZOLV Sets the frequency reference source when HAND Mode is active. 0 : HAND Analog Input 1 : HAND Reference 1 (Y5-02)	1 (0, 1)
Y5-02 (3D41) RUN	HAND Frequency Reference	V/f OLV/PM EZOLV Sets the frequency reference when HAND Mode is active and *Y5-01 = 1 [HAND Frequency Reference Source = HAND Reference 1 (Y5-02)]*. **Note:** • When *A1-02 = 8 [Control Method Selection = EZOLV]*, the upper limit is the Hz equivalent of *E9-02 [Maximum Speed]*. • When *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]* for Motor 2, the upper limit is the larger value between *E1-04 [Maximum Output Frequency]* and *E3-04 [Motor 2 Maximum Output Frequency]*.	40.00 Hz (0.00 - E1-04 Hz)
Y5-03 (3D42)	HAND/AUTO Switchover During Run	V/f OLV/PM EZOLV Sets the function to enable or disable switching between HAND and AUTO Mode during run. Switching from AUTO to HAND is not permitted when the drive is running in MEMOBUS Multiplex mode with auxiliary drives enabled. 0 : Disabled 1 : Enabled	0 (0, 1)
Y5-04 (3D43)	Operation HAND Key	V/f OLV/PM EZOLV Sets the HAND key on the HOA keypad to let you switch between HAND Mode and AUTO Mode. 0 : Disabled 1 : Enabled	1 (0, 1)
Y5-05 (3D44) RUN	HAND Frequency Reference 2	V/f OLV/PM EZOLV Sets the frequency reference when HAND Mode 2 is active. **Note:** • When *A1-02 = 8 [Control Method Selection = EZOLV]*, the upper limit is the Hz equivalent of *E9-02 [Maximum Speed]*. • When *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]* for Motor 2, the upper limit is the larger value between *E1-04 [Maximum Output Frequency]* and *E3-04 [Motor 2 Maximum Output Frequency]*.	0.00 Hz (0.00 - E1-04 Hz)
Y5-06 (3D45) RUN	HAND Reference Prime Loss Level	V/f OLV/PM EZOLV Detects loss of prime in the pump during HAND mode. If the measured quantity (determined by *Y1-18*) is less than this level for the time specified in *Y1-20* and the output frequency is at or more than the *Y5-02* level, a “Loss Of Prime” condition occurs. The drive will respond to the “Loss Of Prime” condition depending the setting of *Y1-22*.	0.0 (0.0 - 1000.0)

No. (Hex.)	Name	Description	Default (Range)
Y5-07 (3D46) RUN	HAND Reference Prime Loss Level 2	V/f OLV/PM EZOLV Detects loss of prime in the pump during HAND mode 2. If the measured quantity in *Y1-18* is less than this level for the time specified in *Y1-20* and the output frequency is at or more than the *Y5-05* level, the drive will detect a *Loss Of Prime* condition. The drive will respond to the "Loss Of Prime" condition depending the setting of *Y1-22*. **Note:** Parameter *Y1-18 [Prime Loss Detection Method]* set the units.	0.0 (0.0 - 1000.0)
Y5-09 (3D48)	HAND MOP Selection	V/f OLV/PM EZOLV Sets whether you can use MOP to change HAND references from the Home screen. 0 : ENTER Key Required 1 : Immediate/MOP-style	0 (0, 1)

◆ Y6: Flow Meter Setup

No. (Hex.)	Name	Description	Default (Range)
Y6-01 (3D5E)	Flow Meter Scaling	V/f OLV/PM EZOLV This parameter enables the flow meter functions when set ≠ 0.0. It sets the display scaling when "Flow Rate" is used as the PID feedback and sets the scaling for the "Flow Rate" analog output. When you use a pulse input is for the flow rate, this parameter will also set the scaling for the "Flow Rate" analog input. **Note:** Decimal place position is set by *Y6-22 [Flow Meter Decimal Place Pos.]*.	0.0 GPM (0.0 - 6000.0 GPM)
Y6-02 (3D5F)	Turbine Input Scaling Coarse	V/f OLV/PM EZOLV Sets the scaling for the turbine in units of pulses/gallon. Pulses/Gallon = *Y6-02* + *Y6-03 [Turbine Input Scaling Fine]*. **Note:** Scaling is internally limited to 0.0001 ppG.	1 ppG (0 - 6000 ppG)
Y6-03 (3D60)	Turbine Input Scaling Fine	V/f OLV/PM EZOLV Sets the scaling for the turbine in units of pulses/gallon. Pulses/Gallon = *Y6-02 [Turbine Input Scaling Coarse]* + *Y6-03*. **Note:** Scaling is internally limited to 0.0001 ppG.	0.0000 ppG (0.0000 - 0.9999 ppG)
Y6-04 (3D61)	Water Flow Units	V/f OLV/PM EZOLV Sets the display units for flow meter related parameters and monitors 0 : U.S. Gallons / min (GPM) 1 : U.S. Gallons / hour (GPH) 2 : Cubic Feet / min (CFM) 3 : Cubic Meters / hour (CMH) 4 : Acre-Feet / year (AFY) **Note:** This parameter affects these parameters and monitors: *Y2-02 [Sleep Level]*, *Y6-06 [Low Flow Level]*, *Y6-17 [High Flow Level]*, *Y6-27 [Flow Rate Limit Level]*, *Y9-41 [Add Flow Level]*, *Y9-42 [Remove Flow Level]*, and *UA-83 [Flow Rate]*.	0 (0 - 4)
Y6-05 (3D62) RUN	Flow Accumulation Set Reset	V/f OLV/PM EZOLV Resets the accumulated flow and sets monitors *UA-84* to *UA-89* to *0*. 0 : No Reset 7770 : Reset Accumulation 8880 : Set Accumulation (Y6-31 - Y6-34) **Note:** After you modify this parameter, it will automatically return to 0.	0 (0 - 65535)
Y6-06 (3D63) RUN	Low Flow Level	V/f OLV/PM EZOLV Sets the level below which the flow must be for longer than the time set in *Y6-07 [Low Flow Detection Time]* to trigger a Low Flow condition. **Note:** • Setting this parameter to 0.0 will disable the function. • Unit text is set by *Y6-04 [Water Flow Units]*. • Decimal place position is set by *Y6-22 [Flow Meter Decimal Place Pos.]*.	0.0 (0.0 - 6000.0)
Y6-07 (3D64) RUN	Low Flow Detection Time	V/f OLV/PM EZOLV Sets the length of time that the flow rate must be below the level set in *Y6-06 [Low Flow Level]* to detect a Low Flow condition.	10 s (0 - 6000 s)

No. (Hex.)	Name	Description	Default (Range)
Y6-08 (3D65) RUN	Low Flow Detection Wait Time	V/f OLV/PM EZOLV Sets the length of time that the drive will wait after coming out of a zero speed condition before activating Low Flow detection. **Note:** This feature is canceled when the Flow Rate is above the Low Flow Level for the time set in *Y6-21 [Low Flow Det Wait Time Cancel]*.	0.0 min (0.0 - 3600.0 min)
Y6-09 (3D66)	Low Flow Behavior	V/f OLV/PM EZOLV Sets how the drive will respond when it detects a *LowFl Low Flow* condition. 0 : Digital Output Only 1 : Alarm (and Digital Output) 2 : Fault (and Digital Output) 3 : Auto-Restart (time set by Y6-10)	1 (0 - 3)
Y6-10 (3D67)	Low Flow Auto-Restart Time	V/f OLV/PM EZOLV Sets the length of time that the drive will wait before it tries to auto-restart after a *LowFl Low Flow* fault. **Note:** This parameter is effective only when *Y6-09 = 3 [Low Flow Behavior = Auto-Restart (time set by Y6-10)]*.	3.0 min (0.1 - 6000.0 min)
Y6-11 (3D68) RUN	Accumulation Level - Millions	V/f OLV/PM EZOLV Sets the accumulated volume that will trigger the *Accumulated Flow Level* alarm, *Accumulated Flow Level* fault, or the Accumulated Flow Level digital output. **Note:** • Accumulated Flow Level is calculated using this formula: Level = (*Y6-11* × 1,000,000) + (*Y6-12* × 1000) + *Y6-13* + *Y6-14* • Unit text is set by *Y6-16 [Flow Meter Accumulator Units]*.	0 (0 - 65535)
Y6-12 (3D69) RUN	Accumulation Level - Thousands	V/f OLV/PM EZOLV Sets the accumulated volume that will trigger the *Accumulated Flow Level* alarm, *Accumulated Flow Level* fault, or the Accumulated Flow Level digital output. **Note:** • Accumulated Flow Level is calculated using this formula: Level = (*Y6-11* × 1,000,000) + (*Y6-12* × 1000) + *Y6-13* + *Y6-14* • Unit text is set by *Y6-16 [Flow Meter Accumulator Units]*.	0 (0 - 999)
Y6-13 (3D6A) RUN	Accumulation Level - Ones	V/f OLV/PM EZOLV Sets the accumulated volume that will trigger the *Accumulated Flow Level* alarm, *Accumulated Flow Level* fault, or the Accumulated Flow Level digital output. **Note:** • Accumulated Flow Level is calculated using this formula: Level = (*Y6-11* × 1,000,000) + (*Y6-12* × 1000) + *Y6-13* + *Y6-14* • Unit text is set by *Y6-16 [Flow Meter Accumulator Units]*.	0 (0 - 999)
Y6-14 (3D6B) RUN	Accumulation Level - Decimal	V/f OLV/PM EZOLV Sets the accumulated volume that will trigger the *Accumulated Flow Level* alarm, *Accumulated Flow Level* fault, or the Accumulated Flow Level digital output. **Note:** • Accumulated Flow Level is calculated using this formula: Level = (*Y6-11* × 1,000,000) + (*Y6-12* × 1000) + *Y6-13* + *Y6-14* • Unit text is set by *Y6-16 [Flow Meter Accumulator Units]*.	0.0000 (0.0000 - 0.9999)
Y6-15 (3D6C) RUN	Accumulated Volume Behavior	V/f OLV/PM EZOLV Sets how the drive will respond when the accumulated volume reaches the level set by Accumulation Level parameters *Y6-11* to *Y6-14*. When you use settings 2 to 5, *Y6-20 [Accumulator Stopping Method]* sets the stopping method when the accumulated volume reaches the target value. 0 : Digital Output Only 1 : Alarm (and Digital Output) 2 : Fault (and Digital Output) 3 : Fault + MFDO + Accum Reset 4 : Stop + Alarm + MFDO 5 : Stop + Alarm + MFDO + AccumReset	1 (0 - 5)
Y6-16 (3D6D)	Flow Meter Accumulator Units	V/f OLV/PM EZOLV Sets the units that the drive uses to accumulate flow. 1 : Gallons (gal) 2 : Acre-Feet (A-F) **Note:** Changing this parameter will reset the accumulated flow displayed in monitors *UA-84* to *UA-87* to *0*.	1 (1, 2)

No. (Hex.)	Name	Description	Default (Range)
Y6-17 (3D6E) RUN	High Flow Level	V/f OLV/PM EZOLV Sets the level above which the flow must be for longer than the time set in *Y6-18 [High Flow Detection Time]* to trigger a High Flow condition. **Note:** • Setting this parameter to 0.0 will disable the function. • Unit text is set by *Y6-04 [Water Flow Units]*. • Decimal place position is set by *Y6-22 [Flow Meter Decimal Place Pos.]*.	0.0 (0.0 - 6000.0)
Y6-18 (3D6F) RUN	High Flow Detection Time	V/f OLV/PM EZOLV Sets the length of time that the flow rate must be above the level set in *Y6-17 [High Flow Level]* to detect a High Flow condition.	10 s (0 - 6000 s)
Y6-19 (3D70)	High Flow Behavior	V/f OLV/PM EZOLV Sets how the drive will respond it detects a *HiFlo High Flow* condition. 0 : Digital Output Only 1 : Alarm (and Digital Output) 2 : Fault (and Digital Output) 3 : Auto-Restart (time set by Y6-42)	1 (0 - 3)
Y6-20 (3D71)	Accumulator Stopping Method	V/f OLV/PM EZOLV Sets how the drive will stop when the accumulated volume reaches the level set by Accumulation Level parameters *Y6-11* to *Y6-14*. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) **Note:** This parameter is effective only when *Y6-15 = 2 - 5 [Fault and Stop selections]*.	1 (0 - 2)
Y6-21 (3D72) RUN	Low Flow Det Wait Time Cancel	V/f OLV/PM EZOLV Sets the length of time that the flow rate must be above the level set in *Y6-06 [Low Flow Level]* to cancel the delay wait time set in *Y6-08 [Low Flow Detection Wait Time]* and start Low Flow Detection.	5 s (0 - 6000 s)
Y6-22 (3D73)	Flow Meter Decimal Place Pos	V/f OLV/PM EZOLV Sets the number of decimal places for the Flow Meter parameters and monitors. 0 : No Decimal Places (XXXXX) 1 : One Decimal Place (XXXX.X) 2 : Two Decimal Places (XXX.XX)	1 (0 - 2)
Y6-26 (3D77)	Flow Rate Limit Selection	V/f OLV/PM EZOLV Enables and disables the Flow Rate Limiter. 0 : Disabled 1 : Enabled 2 : Enabled - Low Limit	0 (0 - 2)
Y6-27 (3D78) RUN	Flow Rate Limit Level	V/f OLV/PM EZOLV Sets the Flow Rate Limit according to the *Y6-26 [Flow Rate Limit Selection]* setting. When *Y6-26 = 1 [Enabled]*, the drive decreases speed when the Flow rate increases rapidly or is more than this level (PI control). When *Y6-26 = 2 [Enabled - Low Limit]*, the drive decreases speed when the Flow rate decreases rapidly or is less than this level (PI control). **Note:** • Unit text is set by *Y6-04 [Water Flow Units]*. • Decimal place position is set by *Y6-22 [Flow Meter Decimal Place Pos.]*.	0.0 (0.0 - 6000.0)
Y6-28 (3D79) RUN	Flow Rate Limit Regulator P Gain	V/f OLV/PM EZOLV Sets the responsiveness of the Flow Rate limit regulator. Increasing the setting increases the responsiveness.	1.00 (0.00 - 25.00)
Y6-29 (3D7A) RUN	Flow Rate Limit Regulator I Time	V/f OLV/PM EZOLV Sets the responsiveness of the Flow Rate limit regulator. Reducing the setting increases the responsiveness.	1.00 s (0.00 - 10.00 s)
Y6-30 (3D7B) RUN	Flow Limit Regulator Delay	V/f OLV/PM EZOLV Sets the length of time before the Flow Rate Limiter activates after the drive has started to run.	10 s (0 - 6000 s)
Y6-31 (3D7C) RUN	Set Accumulation Level Millions	V/f OLV/PM EZOLV Sets the stored accumulated volume. **Note:** • Level = (*Y6-31* × 1,000,000) + (*Y6-32* × 1000) + *Y6-33* + *Y6-34* • Value is written to the drive when *Y6-05 = 8880 [Flow Accumulation Set Reset = Set Accumulation (Y6-31 - Y6-34)]*, after which the values in *Y6-31* to *Y6-34* reset to *0*. • Unit text is set by *Y6-16 [Flow Meter Accumulator Units]*.	0 (0 - 655535)

No. (Hex.)	Name	Description	Default (Range)
Y6-32 (3D7D) RUN	Set Accumulation Level Thousands	V/f OLV/PM EZOLV Sets the stored accumulated volume. **Note:** • Level = (*Y6-31* × 1,000,000) + (*Y6-32* × 1000) + *Y6-33* + *Y6-34* • Value is written to the drive when *Y6-05 = 8880 [Flow Accumulation Set Reset = Set Accumulation (Y6-31 - Y6-34)]*, after which the values in *Y6-31* to *Y6-34* reset to *0*. • Unit text is set by *Y6-16 [Flow Meter Accumulator Units]*.	0 (0 - 999)
Y6-33 (3D7E) RUN	Set Accumulation Level Ones	V/f OLV/PM EZOLV Sets the stored accumulated volume. **Note:** • Level = (*Y6-31* × 1,000,000) + (*Y6-32* × 1000) + *Y6-33* + *Y6-34* • Value is written to the drive when *Y6-05 = 8880 [Flow Accumulation Set Reset = Set Accumulation (Y6-31 - Y6-34)]*, after which the values in *Y6-31* to *Y6-34* reset to *0*. • Unit text is set by *Y6-16 [Flow Meter Accumulator Units]*.	0 (0 - 999)
Y6-34 (3D7F) RUN	Set Accumulation Level Decimal	V/f OLV/PM EZOLV Sets the stored accumulated volume. **Note:** • Level = (*Y6-31* × 1,000,000) + (*Y6-32* × 1000) + *Y6-33* + *Y6-34* • Value is written to the drive when *Y6-05 = 8880 [Flow Accumulation Set Reset = Set Accumulation (Y6-31 - Y6-34)]*, after which the values in *Y6-31* to *Y6-34* reset to *0*. • Unit text is set by *Y6-16 [Flow Meter Accumulator Units]*.	0.0000 (0.0000 - 0.9999)
Y6-35 (3D80) RUN	Accumulator Delta Save Selection	V/f OLV/PM EZOLV Sets and resets the starting value used to calculate monitor *UA-89 [Delta Volume Accum]*. 0 : - - 1 : Set 2 : Reset	0 (0 - 2)
Y6-36 (3D81) RUN	Delta Accumulator Level Millions	V/f OLV/PM EZOLV Sets the starting value used for monitor *UA-89 [Delta Volume Accum]*. **Note:** • Level = (*Y6-36* × 1,000,000) + (*Y6-37* × 1000) + *Y6-38* + *Y6-39* • Setting *Y6-35 = 1 [Accumulator Delta Save Selection = Set]* will overwrite the values by the current accumulation values as displayed by *UA-84 to UA-87 (or UA-88)*. • Setting *Y6-35 = 2 [Reset]* will reset the *Y6-36* to *Y6-39* values to *0*. • Unit text is set by *Y6-16 [Flow Meter Accumulator Units]*.	0 (0 - 65535)
Y6-37 (3D82) RUN	Delta Accumulator Lvl Thousands	V/f OLV/PM EZOLV Sets the starting value used for monitor *UA-89 [Delta Volume Accum]*. **Note:** • Level = (*Y6-36* × 1,000,000) + (*Y6-37* × 1000) + *Y6-38* + *Y6-39* • Setting *Y6-35 = 1 [Accumulator Delta Save Selection = Set]* will overwrite the values by the current accumulation values as displayed by *UA-84 to UA-87 (or UA-88)*. • Setting *Y6-35 = 2 [Reset]* will reset the *Y6-36* to *Y6-39* values to *0*. • Unit text is set by *Y6-16 [Flow Meter Accumulator Units]*.	0 (0 - 999)
Y6-38 (3D83) RUN	Delta Accumulator Level Ones	V/f OLV/PM EZOLV Sets the starting value used for monitor *UA-89 [Delta Volume Accum]*. **Note:** • Level = (*Y6-36* × 1,000,000) + (*Y6-37* × 1000) + *Y6-38* + *Y6-39* • Setting *Y6-35 = 1 [Accumulator Delta Save Selection = Set]* will overwrite the values by the current accumulation values as displayed by *UA-84 to UA-87 (or UA-88)*. • Setting *Y6-35 = 2 [Reset]* will reset the *Y6-36* to *Y6-39* values to *0*. • Unit text is set by *Y6-16 [Flow Meter Accumulator Units]*.	0 (0 - 999)
Y6-39 (3D84) RUN	Delta Accumulator Level Decimal	V/f OLV/PM EZOLV Sets the starting value used for monitor *UA-89 [Delta Volume Accum]*. **Note:** • Level = (*Y6-36* × 1,000,000) + (*Y6-37* × 1000) + *Y6-38* + *Y6-39* • Setting *Y6-35 = 1 [Accumulator Delta Save Selection = Set]* will overwrite the values by the current accumulation values as displayed by *UA-84 to UA-87 (or UA-88)*. • Setting *Y6-35 = 2 [Reset]* will reset the *Y6-36* to *Y6-39* values to *0*. • Unit text is set by *Y6-16 [Flow Meter Accumulator Units]*.	0.0000 (0.0000 - 0.9999)
Y6-40 (3D85)	Low Flow Fault Retry Attempts	V/f OLV/PM EZOLV Sets the number of times that the drive will try to restart when a *LowFl Low Flow* condition is detected.	3 (0 - 10)
Y6-41 (3D86)	High Flow Fault Retry Attempts	V/f OLV/PM EZOLV Sets the number of times that the drive will try to restart when a *HiFlo High Flow* condition is detected.	3 (0 - 10)
Y6-42 (3D87)	High Flow Fault Restart Time	V/f OLV/PM EZOLV Sets the time interval between each *HiFlo High Flow* auto-restart attempt.	20.0 s (0.5 - 3600.0 s)

◆ Y7: Anti-Jam

No. (Hex.)	Name	Description	Default (Range)
Y7-01 (3D90)	Anti-Jam Selection	V/f OLV/PM EZOLV Enables and disables the Anti-Jam function. 0 : Disabled 1 : Enabled	0 (0, 1)
Y7-02 (3D91) RUN	Anti-Jam Cycle Count	V/f OLV/PM EZOLV Sets the maximum number of cycles that the drive will try before triggering an Anti-Jam fault.	1 (1 - 100)
Y7-03 (3D92) RUN	AJ Detection Current Lvl @ Start	V/f OLV/PM EZOLV Sets the current level (at start) that will trigger the Anti-Jam function. Set as a percentage of motor rated current.	120% (50 - 200%)
Y7-04 (3D93) RUN	AJ Detection Current Lvl @ Start	V/f OLV/PM EZOLV Sets the length of time the current must be more than the *Y7-03 [AJ Detection Current Lvl @ Start]* level to trigger the Anti-Jam function.	0.3 s (0.1 - 2.0 s)
Y7-05 (3D94) RUN	AJ Detection Current Level @ Run	V/f OLV/PM EZOLV Sets the current level (during run) that will trigger the Anti-Jam function. Set as a percentage of motor rated current. A setting of 0% disables Anti-Jam during run.	0% (0 - 200%)
Y7-06 (3D95) RUN	Anti-Jam Detection Time @ Run	V/f OLV/PM EZOLV Sets the length of time that the current must be more than the *Y7-05 [AJ Detection Current Level @ Run]* level to trigger the Anti-Jam function (during run).	0.3 s (0.1 - 2.0 s)
Y7-07 (3D96) RUN	Anti-Jam Frequency Reference	V/f OLV/PM EZOLV Sets the maximum speed when the Anti-Jam feature is operating.	25.00 Hz (1.50 - 400.00 Hz)
Y7-08 (3D97) RUN	Anti-Jam Release Time	V/f OLV/PM EZOLV Sets the length of time that the current must be less than the level set in *Y7-03 [AJ Detection Current Lvl @ Start]* to resume normal operation.	2.0 s (0.5 - 10.0 s)
Y7-09 (3D98) RUN	Anti-Jam Display Text Selection	V/f OLV/PM EZOLV Selects the text shown when the Anti-Jam function is active. This selection also changes the fault and alarm text that will display if the drive was unable to clear the debris from the impeller in the number of tries set in *Y7-02 [Anti-Jam Cycle Count]*. 0 : Anti-Jam 1 : De-Rag	0 (0, 1)

◆ Y8: De-Scale/De-Rag

No. (Hex.)	Name	Description	Default (Range)
Y8-01 (3DE0)	De-Scale Operation Selection	V/f OLV/PM EZOLV Sets the drive De-Scale functionality. 0 : Disabled 1 : De-Scale Enabled 2 : Force De-Scale	0 (0 - 2)
Y8-02 (3DE1) RUN	De-Scale Cycle Count	V/f OLV/PM EZOLV Sets the number of forward/reverse cycles for the De-Scale function.	1 (1 - 100)
Y8-03 (3DE2) RUN	De-Scale Forward Speed	V/f OLV/PM EZOLV Sets the speed during the forward portion of the De-Scale operation. **Note:** When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the upper limit is the Hz equivalent of *E9-02 [Maximum Speed]*. While you set *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]*, the upper limit is the greater of the *E1-04 [Maximum Output Frequency]* value and the *E3-04 [Motor 2 Maximum Output Frequency]* value.	25.00 Hz (0.00 - E1-04 Hz)
Y8-04 (3DE3) RUN	De-Scale Forward Run Time	V/f OLV/PM EZOLV Set the amount of time the drive will run in the forward portion of the De-Scale cycle.	10 s (1 - 6000 s)
Y8-05 (3DE4) RUN	De-Scale Reverse Run Time	V/f OLV/PM EZOLV Set the amount of time the drive will run in the reverse portion of the De-Scale cycle.	10 s (1 - 6000 s)

No. (Hex.)	Name	Description	Default (Range)
Y8-06 (3DE5) RUN	De-Scale Acceleration Time	V/f OLV/PM EZOLV Sets the amount of time it will take the drive to accelerate from zero to the De-Scale frequency reference *Y8-03 [De-Scale Forward Speed]* or *Y8-09 [De-Scale Reverse Speed]*. **Note:** Internally limited to the equivalent range of 0.1 s to 6000.0 s acceleration from 0 Hz to Maximum Frequency.	2.0 s (0.1 - 600.0 s)
Y8-07 (3DE6) RUN	De-Scale Deceleration Time	V/f OLV/PM EZOLV Sets the amount of time it will take the drive to decelerate from the De-Scale frequency reference *Y8-03 [De-Scale Forward Speed]* or *Y8-09 [De-Scale Reverse Speed]* to zero. **Note:** Internally limited to the equivalent range of 0.1 s to 6000.0 s acceleration from 0 Hz to Maximum Frequency.	2.0 s (0.1 - 600.0 s)
Y8-08 (3DE7) RUN	Run Time before De-Scale	V/f OLV/PM EZOLV Sets the number of pump operating hours (*U1-16 ≠ 0 [SFS Output Freq ≠ 0]*) before a De-Scale routine will run.	168.0 h (0.1 - 2000.0 h)
Y8-09 (3DE8) RUN	De-Scale Reverse Speed	V/f OLV/PM EZOLV Sets the speed during the reverse portion of the De-Scale operation. **Note:** When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the upper limit is the Hz equivalent of *E9-02 [Maximum Speed]*. While you set *H1-xx = 16 [MFDI Function Selection = Motor 2 Selection]*, the upper limit is the greater of the *E1-04 [Maximum Output Frequency]* value and the *E3-04 [Motor 2 Maximum Output Frequency]* value.	25.00 Hz (0.00 - E1-04 Hz)

◆ Y9: Network Multiplex Options

No. (Hex.)	Name	Description	Default (Range)
Y9-01 (3DF4)	Lead Drive Selection	V/f OLV/PM EZOLV Specifies how the next Lead Drive is selected. This parameter is always used when there is a network request to stage. 0 : Next Available 1 : Lowest Runtime 2 : Stop History	1 (0 - 2)
Y9-02 (3DF5)	System Feedback Source	V/f OLV/PM EZOLV Defines which signal to use for PID Feedback when *Y1-01 = 3 [Multiplex Mode = Network Multiplex]*. 0 : Analog Only 1 : Ana→Net, No Alarm 2 : Ana→Net, Alarm 3 : Network Only **Note:** Setting has no effect when *Y1-01 ≠ 3*.	0 (0 - 3)
Y9-03 (3DF6) RUN	Alternation Time	V/f OLV/PM EZOLV Specifies the time for a drive to request alternation, influenced by *Y9-04 [Alternation Mode]*. The alternation feature is disabled when this parameter is set to 0. **Note:** Unit text is set by *Y9-19 [Alternation Time Unit]*.	24 (0 - 1000)
Y9-04 (3DF7)	Alternation Mode	V/f OLV/PM EZOLV Sets the method of alternation. The new lead drive is selected using *Y9-01 [Lead Drive Selection]*. 0 : FIFO Auto 1 : FIFO Forced 2 : LIFO 3 : FIFO @Sleep	0 (0 - 3)
Y9-05 (3DF8)	Lag Drive Mode	V/f OLV/PM EZOLV Sets how lag drives function and defines the running fixed speed, turning off, and following the output speed of the Lead drive. 0 : Fixed Speed 2 : Turn Off 3 : Follow Lead Speed	0 (0 - 3)
Y9-06 (3DF9) RUN	Lag Fixed Speed	V/f OLV/PM EZOLV Sets the speed at which the drive will run when the drive changes from a lead to a lag and *Y9-05 = 0 [Lag Drive Mode = Fixed Speed]* after the time set in *Y9-07 [Lag Fixed Speed Delay]* expires. **Note:** When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the range is 0.0 - 120.0 Hz.	55.0 Hz (0.0 - 400.0 Hz)

No. (Hex.)	Name	Description	Default (Range)
Y9-07 (3DFA) RUN	Lag Fixed Speed Delay	V/f OLV/PM EZOLV Sets the length of time that the speed is latched when the drive changes from a lead to a lag before the drive responds based on the *Y9-05* setting.	5 s (0 - 1000 s)
Y9-08 (3DFB)	Staging Mode	V/f OLV/PM EZOLV Sets the detection method for staging a new drive. 0 : Output Frequency 1 : Feedback 2 : Feedback + Output Frequency 3 : Flow Meter	0 (0 - 3)
Y9-09 (3DFC) RUN	Staging Frequency Level	V/f OLV/PM EZOLV When *Y9-08 = 0 [Staging Mode = Output Frequency]*, sets the level above which the output frequency must be for the time set in *Y9-11 [Staging Delay Time]* for the lead drive to request a new lead drive through the iQpump MEMOBUS network. When *Y9-08 = 2 [Feedback + Output Frequency]*, sets the level above which the output frequency must be when the delta feedback (setpoint – feedback for direct acting PID, feedback – setpoint for reverse acting PID) is more than the level set in *Y9-10 [Staging Delta Feedback Level]* for the time set in *Y9-11*, for the lead drive to request a new lead drive through the iQpump MEMOBUS network. **Note:** When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the range is 0.0 - 120.0 Hz.	59.5 Hz (0.0 - 400.0 Hz)
Y9-10 (3DFD) RUN	Staging Delta Feedback Level	V/f OLV/PM EZOLV When *Y9-08 = 1 [Staging Mode = Feedback]*, sets the level above which the delta feedback must be for the time set in *Y9-11 [Staging Delay Time]* for the lead drive to request a new lead drive through the iQpump MEMOBUS network. When *Y9-08 = 2 [Feedback + Output Frequency]*, sets the level above which the delta feedback (setpoint – feedback for direct acting PID, feedback – setpoint for reverse acting PID) must be when the output frequency is more than *Y9-09 [Staging Frequency Level]* for the time set in *Y9-11* for the lead drive to request a new lead drive through the iQpump MEMOBUS network. **Note:** Unit set by *Y1-02 [System Units]*, resolution set by *b5-39 [PID User Unit Display Digits]*.	4.0 PSI (0.0 - 6000.0 PSI)
Y9-11 (3DFE) RUN	Staging Delay Time	V/f OLV/PM EZOLV Sets the delay time before a new lead drive is added to the system.	10 s (0 - 3600 s)
Y9-12 (3DFF)	De-staging Mode	V/f OLV/PM EZOLV Sets the detection method for de-staging to the previous lead drive. 0 : Output Frequency 1 : Feedback 2 : Feedback + Output Frequency 3 : Flow Meter	0 (0 - 3)
Y9-13 (3E00) RUN	De-staging Frequency Level	V/f OLV/PM EZOLV When *Y9-12 = 0 [De-staging Mode = Output Frequency]*, sets the level below which the output frequency must be for the time set in *Y9-15 [De-staging Delay Time]* for the lead drive to request to be removed through the iQpump MEMOBUS network. When *Y9-12 = 2 [Feedback + Output Frequency]*, sets the level below which the output frequency must be when the delta feedback (setpoint – feedback for direct acting PID, feedback – setpoint for reverse acting PID) is more than the level set in *Y9-14 [De-staging Delta Feedback Level]* for the time set in *Y9-15*, for the lead drive to request to be removed through the iQpump MEMOBUS network. **Note:** • The de-staging frequency level is the maximum value of *d2-02 [Frequency Reference Lower Limit]*, *Y1-06 [Minimum Speed]*, and *Y4-12 [Thrust Frequency]* if any value is greater than the value set in *Y9-13*. • When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the range is 0.0 - 120.0 Hz.	40.0 Hz (0.0 - 400.0 Hz)
Y9-14 (3E01) RUN	De-staging Delta Feedback Level	V/f OLV/PM EZOLV When *Y9-12 = 1 [De-staging Mode = Feedback]*, sets the level above which the delta feedback (setpoint – feedback for direct acting PID, feedback – setpoint for reverse acting PID) must be for the time set in *Y9-15 [De-staging Delay Time]* for the lead drive to request to be removed through the iQpump MEMOBUS network. When *Y9-12 = 2 [Feedback + Output Frequency]*, sets the level above which the delta feedback must be when the output frequency is less than *Y9-13 [De-staging Frequency Level]* for the time set in *Y9-15* for the lead drive to request to be removed through the iQpump MEMOBUS network. **Note:** Unit set by *Y1-02 [System Units]*, resolution set by *b5-39 [PID User Unit Display Digits]*.	0.0 PSI (0.0 - 6000.0 PSI)
Y9-15 (3E02) RUN	De-staging Delay Time	V/f OLV/PM EZOLV Sets the delay time before the lead drive is removed from the system.	10 s (0 - 3600 s)
Y9-16 (3E03) RUN	Stabilization Time	V/f OLV/PM EZOLV Sets the time used to stabilize the system when a drive is staged or de-staged. Lead-lag control and pump protection is suspended during this time. The lead drive will resume lead-lag control and pump protection behavior when the this timer expires.	3 s (0 - 3600 s)

No. (Hex.)	Name	Description	Default (Range)
Y9-17 (3E04) RUN	Setpoint Modifier	V/f OLV/PM EZOLV Sets the value to increment the System Setpoint depending on the number of drives running. **Note:** Example: Drive 1: Setpoint Drive X: Setpoint + ((X-1) (*Y9-17*)) • Example: Drive 1: Setpoint Drive X: Setpoint + ((X-1) (*Y9-17*)) • Unit set by *Y1-02 [System Units]*, resolution set by *b5-39 [PID User Unit Display Digits]*.	0.0 PSI (-999.9 - 999.9 PSI)
Y9-18 (3E05) RUN	High Feedback De-stage Level	V/f OLV/PM EZOLV Sets the feedback level as a percentage of *Y1-11 [High Feedback Level]* that will trigger a quick de-stage. The quick de-stage ignores *Y9-12* to *Y9-15* and uses an internal 2-second delay. **Note:** • This function is intended to be used when *b5-09 = 0 [PID Output Level Selection = Normal Output (Direct Acting)]* only, and may cause drives to de-stage incorrectly when *b5-09 = 1 [Reverse Output (Reverse Acting)]*. • A setting of 0.0% disables the High Feedback De-stage feature.	97.0% (0.0 - 100.0%)
Y9-19 (3E06) RUN	Alternation Time Unit	V/f OLV/PM EZOLV Sets the units for *Y9-03 [Alternation Time]*. 0 : Hours (H) 1 : Minutes (min)	0 (0, 1)
Y9-20 (3E07)	Allow Network Run	V/f OLV/PM EZOLV Sets when a network Run command is allowed. 0 : Always 1 : First/Alternation 2 : First Only 3 : Alternation Only	0 (0 - 3)
Y9-21 (3E08) RUN	Run Priority	V/f OLV/PM EZOLV Sets the Lead Drive selection priority overriding the *Y9-01 [Lead Drive Selection]* value. The drive with the lowest *Y9-21* value has the highest priority and will become the Lead Drive first. If more than one drive has the lowest *Y9-21* value, *Y9-01* determines which drive becomes the Lead.	8 (1 - 16)
Y9-22 (3E09) RUN	System Fault Retry Attempts	V/f OLV/PM EZOLV Sets the number of times that the iQpump MEMOBUS network will allow automatic restarts of system faults. The drive uses *L5-04 [Interval Method Restart Time*] to decide when to attempt a system fault restart. Set this parameter to the same value for all networked drives for correct operation.	5 (0 - 10)
Y9-23 (3E0A)	Max Drives Allowed to Run	V/f OLV/PM EZOLV Sets a limit on the maximum number of drives that can run on the system.	8 (1 - 8)
Y9-24 (3E0B) RUN	Lead Swap at Sleep Delay Time	V/f OLV/PM EZOLV When the Lead Drive has been in Sleep Mode for the length of time set in this parameter and there is another drive available with a lower *Y9-21 [Run Priority]* value, the available drive will request for a swap. **Note:** Set this parameter to 0 to disable the function.	0 s (0 - 7200 s)
Y9-25 (3E0C)	Highest Node Address	V/f OLV/PM EZOLV Sets the highest possible node address in the MEMOBUS network. For optimal network performance, it is recommended to set the serial communication address *H5-01* starting from 1h then consecutively up to the last drive and then setting this parameter to that *H5-01* address.	8 (2 - 8)
Y9-26 (3E0D)	Master Time-out	V/f OLV/PM EZOLV Sets the minimum length of time that the slave drives will wait for a message from the master before doing the action set in *Y9-27 [Network Recovery]*.	4.0 s (1.0 - 10.0 s)
Y9-27 (3E0E)	Network Recovery	V/f OLV/PM EZOLV Sets the response for slave drives when no messages are received from the master for the time set in *Y9-26 [Master Time-out]*. 0 : Automatic 1 : Slave/Resume 2 : Slave/Stop 3 : Fault MSL	0 (0 - 3)
Y9-28 (3E0F)	NETSCAN Alarm Time	V/f OLV/PM EZOLV Sets the length of time that the slave drives will wait for a message from the master before displaying a *NETSCAN* alarm	2.0 s (1.0 - 10.0 s)
Y9-29 (3E10) RUN	Network AUTO Start Delay	V/f OLV/PM EZOLV Sets the length of time that the network will wait before it selects and stars the Lead Drive after the first drive on the network is put on AUTO Mode.	2.0 s (0.0 - 60.0 s)

No. (Hex.)	Name	Description	Default (Range)
Y9-30 (3E11) RUN	Lag Speed Follower Gain	V/f OLV/PM EZOLV When *Y9-05 = 3 [Lag Drive Mode = Follow Lead Speed]*, the drive will follow the speed of the current lead drive applying this gain and *Y9-31 [Lag Speed Follower Bias]*.	100.0% (0.0 - 300.0%)
Y9-31 (3E12) RUN	Lag Speed Follower Bias	V/f OLV/PM EZOLV When *Y9-05 = 3 [Lag Drive Mode = Follow Lead Speed]*, the drive will follow the speed of the current lead drive applying this bias and *Y9-30 [Lag Speed Follower Gain]*.	0.00 Hz (-60.00 - 60.00 Hz)
Y9-32 (3E13) RUN	Lag Follower Deceleration Rate	V/f OLV/PM EZOLV Sets the deceleration time when *Y9-05 = 3 [Lag Drive Mode = Follow Lead Speed]* and the *Y9-33 [Lag Follower Decel Active Time]* timer is running.	60.0 s (0.0 - 1000.0 s)
Y9-33 (3E14) RUN	Lag Follower Decel Active Time	V/f OLV/PM EZOLV Sets the window during which the *Y9-32 [Lag Follower Deceleration Rate]* deceleration time is effective. The drive will use the standard deceleration rates when it expires. **Note:** A setting of 0.0 s will disable the Lag Follower deceleration time switching.	0.0 s (0.0 - 3600.0 s)
Y9-34 (3E15) RUN	Low Feedback De-stage	V/f OLV/PM EZOLV Sets the low feedback level that will trigger a quick de-stage. The quick de-stage ignores *Y9-12* to *Y9-15* and uses an internal 2 s delay. **Note:** • This function is intended to be used when *b5-09 = 1 [PID Output Level Selection = Reverse Output (Reverse Acting)]* only, and may cause drives to de-stage incorrectly when *b5-09 = 1 [Normal Output (Direct Acting)]*. • Unit set by *Y1-02 [System Units]*, resolution set by *b5-39 [PID User Unit Display Digits]*. • A setting of 0.0 disables the Low Feedback De-stage feature.	0.0 PSI (0.0 - 6000.0 PSI)
Y9-35 (3E16) RUN	Alternation Stabilize Time	V/f OLV/PM EZOLV Sets the maximum length of time that the drive will stay running when it was called to alternate-out. The drive is put into the Alternation Stabilization Mode during this period. **Note:** Set this parameter to 0 to disable the function.	10 s (0 - 1000 s)
Y9-36 (3E17) RUN	Alternation Stabilize Bias	V/f OLV/PM EZOLV Sets the minimum amount of PID error applied to the drive during Alternation Stabilization Mode. A lower value can cause it to stay running longer, while a higher value will make the transition faster at the cost of a more significant pressure change. Set in % of System Unit Scaling *[Y1-03]*.	0.50% (0.00 - 10.00%)
Y9-40 (3E1B) RUN	Flow Rate Source	V/f OLV/PM EZOLV Defines the Flow Meter input source when *Y1-01 = 3 [Multiplex Mode = Memobus Network]*. 0 : Analog 3 : Network	0 (0, 3)
Y9-41 (3E1C) RUN	Add Flow Level	V/f OLV/PM EZOLV When *Y9-08 = 3 [Staging Mode = Flow Meter]* and the Flow Rate is more than the level set in this parameter times the number of pumps running for the length of time set in *Y9-11 [Staging Delay Time]*, the lead drive will request for a new lead drive through the iQpump MEMOBUS network. **Note:** Unit set by *Y6-04 [Water Flow Units]*, resolution set by *Y6-22 [Flow Meter Decimal Place Pos]*.	0.0 (0.0 - 6000.0)
Y9-42 (3E1D) RUN	Remove Flow Level	V/f OLV/PM EZOLV When *Y9-12 = 3 [De-staging Mode = Flow Meter]* and the Flow Rate is less than the level set in this parameter times the number of pumps running for the length of time set in *Y9-15 [De-staging Delay Time]*, the lead drive will request to be removed from the system through the iQpump MEMOBUS network. **Note:** Unit set by *Y6-04 [Water Flow Units]*, resolution set by *Y6-22 [Flow Meter Decimal Place Pos]*.	0.0 (0.0 - 6000.0)
Y9-50 (3E25)	WaterLvl/SuctPres/PI Aux Source	V/f OLV/PM EZOLV Sets the signal to use for Water Level Control *[Yd-xx]*, Suction Pressure Control *[YE-xx]*, or PI Aux Control *[YF-xx]* when *Y1-01 = 3 [Multiplex Mode = Network Multiplex]*. 0 : Analog Only 1 : Ana→Net, No Alrm 2 : Ana→Net, Alarm 3 : Network Only	0 (0 - 3)
Y9-51 (3E26)	WaterLvl/SuctPres/PI Aux TurnOff	V/f OLV/PM EZOLV Sets the MEMOBUS Multiplex response to Water Level, Suction Pressure, or PI Aux Control. 0 : Disabled 1 : Enabled	0 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
Y9-55 (3E2A)	VFD Run Time Offset	V/f OLV/PM EZOLV Sets an offset to the drive run time used for lead drive selection. Impacts lead drive selection only when *Y9-01 = 1 [Lead Drive Selection = Lowest Runtime]*. **Note:** When you use *A1-03 [Initialize Parameters]* to initialize the drive, the drive will not reset this parameter.	0 H (0 - 65535 H)
Y9-98 (3E55)	Network Parameter Push	V/f OLV/PM EZOLV Sets how System-wide Parameters are pushed into the MEMOBUS Multiplex network. 0 : Disabled 1 : Enabled/Prompt **Note:** Parameter push functionality is limited when the drive is in a mixed (iQpump1000 and iQpump605) network.	1 (0, 1)

◆ YA: Preset Setpoint

No. (Hex.)	Name	Description	Default (Range)
YA-01 (3E58) RUN	Setpoint 1	V/f OLV/PM EZOLV Sets the PID Setpoint when *b1-01 = 0 [Frequency Reference Selection 1 = Keypad or Multi-Speed Selection]*. **Note:** • Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution. • Upper limit determined by *Y6-04 [Water Flow Units]* when *Y1-02 = 25 (System Units = Flow (Use Y6-04)]* and *Y6-01 [Flow Meter Scaling] > 0.0*. The upper limit when *Y6-04 = 2 [Cubic Feet/min (CFM)]* is 800.0 CFM and the upper limit when *Y6-04 = 3 [Cubic Meters/hour (CMH)]* is 1360.0 CMH.	0.0 (0.0 - 6000.0)
YA-02 (3E59) RUN	Setpoint 2	V/f OLV/PM EZOLV Sets the PID Setpoint as specified by the Multi-Setpoint digital inputs. **Note:** • Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution. • Upper limit determined by *Y6-04 [Water Flow Units]* when *Y1-02 = 25 (System Units = Flow (Use Y6-04)]* and *Y6-01 [Flow Meter Scaling] > 0.0*. The upper limit when *Y6-04 = 2 [Cubic Feet/min (CFM)]* is 800.0 CFM and the upper limit when *Y6-04 = 3 [Cubic Meters/hour (CMH)]* is 1360.0 CMH.	0.0 (0.0 - 6000.0)
YA-03 (3E5A) RUN	Setpoint 3	V/f OLV/PM EZOLV Sets the PID Setpoint as specified by the Multi-Setpoint digital inputs. **Note:** • Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution. • Upper limit determined by *Y6-04 [Water Flow Units]* when *Y1-02 = 25 (System Units = Flow (Use Y6-04)]* and *Y6-01 [Flow Meter Scaling] > 0.0*. The upper limit when *Y6-04 = 2 [Cubic Feet/min (CFM)]* is 800.0 CFM and the upper limit when *Y6-04 = 3 [Cubic Meters/hour (CMH)]* is 1360.0 CMH.	0.0 (0.0 - 6000.0)
YA-04 (3E5B) RUN	Setpoint 4	V/f OLV/PM EZOLV Sets the PID Setpoint as specified by the Multi-Setpoint digital inputs. **Note:** • Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution. • Upper limit determined by *Y6-04 [Water Flow Units]* when *Y1-02 = 25 (System Units = Flow (Use Y6-04)]* and *Y6-01 [Flow Meter Scaling] > 0.0*. The upper limit when *Y6-04 = 2 [Cubic Feet/min (CFM)]* is 800.0 CFM and the upper limit when *Y6-04 = 3 [Cubic Meters/hour (CMH)]* is 1360.0 CMH.	0.0 (0.0 - 6000.0)
YA-05 (3E5C) RUN	Setpoint 5	V/f OLV/PM EZOLV Sets the PID Setpoint as specified by the Multi-Setpoint digital inputs. **Note:** Parameters *Y1-02 [System Units]*, *Y1-03 [Feedback Device Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution.	0.0 (0.0 - 6000.0)
YA-06 (3E5D) RUN	Setpoint 6	V/f OLV/PM EZOLV Sets the PID Setpoint as specified by the Multi-Setpoint digital inputs. **Note:** Parameters *Y1-02 [System Units]*, *Y1-03 [Feedback Device Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution.	0.0 (0.0 - 6000.0)

No. (Hex.)	Name	Description	Default (Range)
YA-07 (3E5E) RUN	Setpoint 7	V/f OLV/PM EZOLV Sets the PID Setpoint as specified by the Multi-Setpoint digital inputs. **Note:** Parameters *Y1-02 [System Units]*, *Y1-03 [Feedback Device Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution.	0.0 (0.0 - 6000.0)
YA-08 (3E5F) RUN	Setpoint 8	V/f OLV/PM EZOLV Sets the PID Setpoint as specified by the Multi-Setpoint digital inputs. **Note:** Parameters *Y1-02 [System Units]*, *Y1-03 [Feedback Device Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution.	0.0 (0.0 - 6000.0)
YA-09 (3E60)	AUTO PID Setpoint MOP Selection	V/f OLV/PM EZOLV Sets whether you can use MOP to change AUTO PID Setpoint from the Home screen. 0 : ENTER Key Required 1 : Immediate/MOP-style	0 (0, 1)

◆ YC: Foldback Features

No. (Hex.)	Name	Description	Default (Range)
YC-01 (3EBC)	Output Current Limit Select	V/f OLV/PM EZOLV Sets the function to enable or disable the output current regulator. 0 : Disabled 1 : Enabled	0 (0, 1)
YC-02 (3EBD) RUN	Current Limit	V/f OLV/PM EZOLV Sets the current limit. **Note:** Value is internally limited to 300% of the drive rated current set in *n9-01 [Inverter Rated Current]*.	0.0 A (0.0 - 1000.0 A)
YC-03 (3EBE) RUN Expert	Current Limit Regulator Gain	V/f OLV/PM EZOLV Sets the responsiveness of the current limit regulator. A higher value is more responsive.	1.00 (0.00 - 25.00)
YC-04 (3EBF) RUN Expert	Current Limit Reg. Integral Time	V/f OLV/PM EZOLV Sets the responsiveness of the current limit regulator. A lower value is more responsive.	1.00 s (0.00 - 10.00 s)
YC-06 (3EC1)	Current Limit Start Delay	V/f OLV/PM EZOLV Sets the delay time before Current Limit is operational.	0 s (0 - 600 s)
YC-10 (3EC5)	Single Phase Foldback Sel	V/f OLV/PM EZOLV Sets the function to enable or disable the single phase ripple regulator. 0 : Disabled 1 : Enabled	1 (0, 1)
YC-11 (3EC6)	Ripple Regulator Setpoint	V/f OLV/PM EZOLV Sets the ripple regulator setpoint as a percentage of the maximum amount of ripple permitted before the drive detects a *PF [Input Phase Loss]* fault.	95.0% (0.0 - 200.0%)
YC-12 (3EC7)	Current Limit Reg. Integral Time	V/f OLV/PM EZOLV Enables and disables the ripple voltage feedback ramp and how often the feedback ramp is updated. 0 : Ramp Disabled 1 - 100 : Ramp Enabled	1 (0 - 100)
YC-14 (3EC9)	Behavior when SPC is Not Ready	V/f OLV/PM EZOLV Sets the drive behavior when the Single Phase Converter faults or is not ready. 0 : Coast to Stop - Fault 1 : Coast to Stop - Alarm	1 (0, 1)

◆ Yd: Water Level Control

No. (Hex.)	Name	Description	Default (Range)
Yd-01 (3EEE)	Water Level Selection	V/f OLV/PM EZOLV Enables and disables Water Level Control. 0 : Disabled 1 : Enabled	0 (0, 1)
Yd-02 (3EEF) RUN	Water Level Transducer Scaling	V/f OLV/PM EZOLV Sets the full scale (20 mA) output of the pressure transducer connected to analog input terminal *H3-0x = 3B [Water Level / Suct Pres Feedback]*. **Note:** • 1 PSI = 2.308966 ft of water. • Decimal place position is dependent on *Yd-22 [Water Lvl Decimal Place Pos]*.	100.0 PSI (5.0 - 500.0 PSI)
Yd-03 (3EF0) RUN	Water Level Setpoint	V/f OLV/PM EZOLV Sets the amount of water above the sensor to which the drive will attempt to regulate. **Note:** Decimal place position is dependent on *Yd-22 [Water Lvl Decimal Place Pos]*.	20.0 ft (0.0 - 1200.0 ft)
Yd-04 (3EF1) RUN	Minimum Water Level	V/f OLV/PM EZOLV When the amount of water above the sensor is less than this level for longer than the length of time set in *Yd-05 [Water Level Sleep Delay Time]*, the drive will go to sleep. **Note:** • You must set *Y1-04 [Sleep Wake-up Level] ≠ 0* to enter water level sleep. • Decimal place position is dependent on *Yd-22 [Water Lvl Decimal Place Pos]*.	10.0 ft (0.0 - 1200.0 ft)
Yd-05 (3EF2) RUN	Water Level Sleep Delay Time	V/f OLV/PM EZOLV Sets the length of time that the drive will delay before going to sleep after the water level is less than the level set in *Yd-04 [Minimum Water Level]*.	5 s (0 - 3600 s)
Yd-06 (3EF3) RUN	Water Level Sleep Wake-up Level	V/f OLV/PM EZOLV Sets the level above which the water must be for longer than the time set in *Yd-07 [Water Level Sleep Wake-up Time]* to wake up the drive after being forced to sleep based on *Yd-04 [Minimum Water Level]*. **Note:** Decimal place position is dependent on *Yd-22 [Water Lvl Decimal Place Pos]*.	30.0 ft (0.0 - 1200.0 ft)
Yd-07 (3EF4)	Water Level Sleep Wake-up Time	V/f OLV/PM EZOLV Sets the length of time that the water must be above the level set in *Yd-06 [Water Level Sleep Wake-Up Level]* to wake up the drive after being forced to sleep based on *Yd-04 [Minimum Water Level]*.	1 s (0 - 3600 s)
Yd-08 (3EF5) RUN	Water Level Sleep Wake-up Time	V/f OLV/PM EZOLV Sets the minimum speed at which the drive will be allowed to run when the drive is controlling the water level. When the drive is controlling pressure or when this parameter is set to a value less than *Y1-06 [Minimum Speed]* or *Y4-12 [Thrust Frequency]*, the drive will use the *Y1-06* or *Y4-12* value as the minimum speed . **Note:** For EZ Vector Control Method *[A1-02 = 8]*, the range is 0.00 - 120.00 Hz.	0.00 Hz (0.00 - 400.00 Hz)
Yd-09 (3EF6) RUN	Low Water Level Detection Level	V/f OLV/PM EZOLV When the amount of water above the sensor is lower than this level for longer than the time set in *Yd-10 [Low Water Level Detection Time]*, the drive will respond based on the *Yd-11 [Low Water Level Behavior]* setting. **Note:** • *Yd-10* detection time only applies when *Yd-11 = 2 or 3 [Fault (and Digital Output) or Auto-Restart (time set by Yd-12)]*. • Decimal place position is dependent on *Yd-22 [Water Lvl Decimal Place Pos]*. • Setting this parameter to 0.0 disables this detection.	0.0 ft (0.0 - 1200.0 ft)
Yd-10 (3EF7) RUN	Low Water Level Detection Time	V/f OLV/PM EZOLV Sets the length of time delay that the water level must be less than the level set in *Yd-09 [Low Water Level Detection Level]* before the drive will react. This detection time only applies when *Yd-11 = 2 or 3 [Fault (and Digital Output) or Auto-Restart (time set by Yd-12)]*. **Note:** Unit is dependent on *Yd-15 [Low Water Level Detect Time Unit]*.	0.1 (0.0 - 300.0)
Yd-11 (3EF8)	Low Water Level Behavior	V/f OLV/PM EZOLV Sets the drive response when the water level in the well is less than the level set in *Yd-09 [Low Water Level Detection Level]* for longer than the time set in *Yd-10 [Low Water Level Detection Time]*. 0 : Digital Output Only 1 : Alarm (and Digital Output) 2 : Fault (and Digital Output) 3 : Auto-Restart (time set by Yd-12) **Note:** Detection time set in *Yd-10 [Low Water Level Detection Time]* only applies to settings 2 and 3.	0 (0 - 3)

No. (Hex.)	Name	Description	Default (Range)
Yd-12 (3EF9)	Water Lvl Ctrl Auto-Restart Time	V/f OLV/PM EZOLV Sets the length of time that the drive will wait before it tries to auto-restart after a *LowWL Low Water Level* fault. This is effective only when *Yd-11 = 3 [Low Water Level Behavior = Auto-Restart (time set by Yd-12)]* and *Yd-39 ≠ 0 [LowWaterLevel Flt Retry Attempts]*.	5.0 min (0.1 - 6000.0 min)
Yd-13 (3EFA) RUN	Water Level Control P Gain	V/f OLV/PM EZOLV Sets the proportional gain when the drive is operating in Water Level Control.	2.00 (0.00 - 25.00)
Yd-14 (3EFB) RUN	Water Level Control I Time	V/f OLV/PM EZOLV Sets the integral time when the drive is operating in Water Level Control. Setting this parameter to 0.0 disables the water level control integrator.	5.0 s (0.0 - 360.0 s)
Yd-15 (3EFC)	Low Water Level Detect Time Unit	V/f OLV/PM EZOLV Sets the time units for *Yd-10 [Low Water Level Detection Time]*. 0 : Minutes (min) 1 : Seconds (sec)	0 (0, 1)
Yd-16 (3EFD)	Water Level Feedback Wire Break	V/f OLV/PM EZOLV Sets behavior when the analog input selected for water level feedback is programmed to receive a 4 to 20 mA signal and the signal is lost. 0 : No Display 1 : Alarm Only 2 : Fault (no retry, coast to stop) 3 : Auto-Restart (time set by Yd-38)	2 (0 - 3)
Yd-20 (3F02)	Water Level Speed Control	V/f OLV/PM EZOLV Enables and disables the effect of the Water Level Controller on output speed 0 : Disabled 1 : Enabled	1 (0, 1)
Yd-22 (3F04)	Water Level Decimal Place Pos	V/f OLV/PM EZOLV Sets the number of decimal places for the Water Level parameters and monitor. 0 : No Decimal Places (XXXXX) 1 : One Decimal Place (XXXX.X) 2 : Two Decimal Places (XXX.XX) 3 : Three Decimal Places (XX.XXX)	1 (0 - 3)
Yd-25 (3F07) RUN	Water Lvl Ctrl Activation Level	V/f OLV/PM EZOLV Sets the level at which the amount of water above the sensor must be less than for longer than the time set in *Yd-26 [Water Lvl Ctrl Activation Delay]* to activate Water Level Control and affect the output frequency. Also sets the level at which the amount of water below the sensor must be above for longer than the *Yd-26* time to deactivate Water Level Control and have no effect on the output frequency. Water Level Control is always active (if enabled) when set to 0.0. **Note:** Decimal place position is dependent on *Yd-22 [Water Lvl Decimal Place Pos]*.	0.0 ft (0.0 - 1200.0 ft)
Yd-26 (3F08) RUN	Water Lvl Ctrl Activation Delay	V/f OLV/PM EZOLV Sets the time for which the amount of water above the sensor must be less than the level set in *Yd-25 [Water Lvl Ctrl Activation Level*] to activate Water Level Control and affect the output frequency. Also sets the time for which the amount of water below the sensor must be above the *Yd-25* level to deactivate Water Level Control and have no effect on the output frequency.	2 s (0 - 3600 s)
Yd-35 (3F11) RUN	Water Level Min Transducer Scale	V/f OLV/PM EZOLV Sets the minimum scale output of the water level transducer connected to the *H3-xx = 3B [Water Level / Suction Pressure]* analog input terminal. **Note:** You must set this parameter < *Yd-02 [Water Level Transducer Scaling]* to be effective. If this parameter is set > *Yd-02*, Water Level Feedback will be disabled (set to 0).	0.0 PSI (-999.9 - 999.9 PSI)
Yd-36 (3F12) RUN	Water Lvl Lo Lvl Det Hysteresis	V/f OLV/PM EZOLV Sets the hysteresis level used for *LowWL Low Water* detection. **Note:** • When *Yd-11 = 3 [Low Water Level Behavior = Auto-Restart (time set by Yd-12)]*, the water level must be above the value of *Yd-09 + Yd-36* before *Yd-12 [Water Lvl Ctrl Auto-Restart Time]* starts. • Decimal place position is dependent on *Yd-22 [Water Lvl Decimal Place Pos]*.	0.0 ft (0.0 - 100.0 ft)
Yd-37 (3F13)	WaterLvlLoss Flt Retry Attempts	V/f OLV/PM EZOLV Sets the number of times that the drive will try to restart when a *WLL Water Level Feedback Loss* condition is detected.	3 (0 - 10)
Yd-38 (3F14)	WaterLvlLoss Fault Restart Time	V/f OLV/PM EZOLV Sets the time interval between each *WLL Water Level Feedback Loss* auto-restart attempt.	20.0 s (0.5 - 3600.0 s)
Yd-39 (3F15)	LowWaterLevel Flt Retry Attempts	V/f OLV/PM EZOLV Sets the number of times that the drive will try to restart when a *LowWL Low Water Level* condition is detected.	3 (0 - 10)

◆ YE: Suction Pressure Control

No. (Hex.)	Name	Description	Default (Range)
YE-01 (3F20)	Suction Pressure Control Select	V/f OLV/PM EZOLV Enables and disables Suction Pressure Control and Vacuum Control. 0 : Disabled 1 : Suction Pressure (PSI) 2 : Vacuum ("Hg)	0 (0 - 2)
YE-02 (3F21) RUN	Suction Pres Transducer Scaling	V/f OLV/PM EZOLV Sets the full scale (20 mA) output of the pressure transducer connected to the analog input terminal programmed for *Water Level / Suct Pres Feedback [H3-xx = 3B]*. **Note:** Unit is dependent on *YE-01 [Suction Pressure Control Select]*. Setting *1 = PSI*, setting *2 = "Hg*, and decimal place position is dependent on *YE-22 [Suction Pressure Dec Place Pos]*.	100.0 (5.0 - 1200.0)
YE-03 (3F22) RUN	Suction Pressure Setpoint	V/f OLV/PM EZOLV Sets the amount of suction pressure to which the drive will attempt to regulate. **Note:** Unit is dependent on *YE-01 [Suction Pressure Control Select]*. Setting *1 = PSI*, setting *2 = "Hg*, and decimal place position is dependent on *YE-22 [Suction Pressure Dec Place Pos]*.	20.0 (0.0 - 1200.0)
YE-04 (3F23) RUN	Minimum Suction Pressure	V/f OLV/PM EZOLV Sets the level below which the suction pressure must be for the length of time set in *YE-05 [Suction Pres Sleep Delay Time]* to put the drive to sleep. **Note:** Unit is dependent on *YE-01 [Suction Pressure Control Select]*. Setting *1 = PSI*, setting *2 = "Hg*, and decimal place position is dependent on *YE-22 [Suction Pressure Dec Place Pos]*.	10.0 (0.0 - 1200.0)
YE-05 (3F24) RUN	Suction Pres Sleep Delay Time	V/f OLV/PM EZOLV Sets the length of time that the drive will delay before going to sleep after the suction pressure is below the level set in *YE-04 [Minimum Suction Pressure]*.	5 s (0 - 3600 s)
YE-06 (3F25) RUN	Suction Pres Sleep Wake-up Level	V/f OLV/PM EZOLV Sets the level above which the suction pressure must be for longer than the time set in *YE-07 [Suction Pres Sleep Wake-up Time]* to wake the drive up after it has been forced to sleep based on *YE-04 [Minimum Suction Pressure]*. **Note:** Unit is dependent on *YE-01 [Suction Pressure Control Select]*. Setting *1 = PSI*, setting *2 = "Hg*, and decimal place position is dependent on *YE-22 [Suction Pressure Dec Place Pos]*.	30.0 (0.0 - 1200.0)
YE-07 (3F26)	Suction Pres Sleep Wake-up Time	V/f OLV/PM EZOLV Sets the length of time that the suction pressure must be more than the level set in *YE-06 [Suction Pres Sleep Wake-up Level]* for the drive to wake up if it has been forced to sleep based on *YE-04 [Minimum Suction Pressure]*.	1 s (0 - 3600 s)
YE-08 (3F27) RUN	Suction Pres Ctrl Minimum Speed	V/f OLV/PM EZOLV Sets the minimum speed at which the drive will be allowed to run when the drive is controlling suction pressure. When the drive is controlling outlet pressure or this parameter is set less than *Y1-06 [Minimum Speed]* or *Y4-12 [Thrust Frequency]*, *Y1-06* or *Y4-12* will be used as the minimum speed. **Note:** For EZ Vector Control Method *[A1-02 = 8]*, the range is 0.0 - 120.0 Hz	0.00 Hz (0.00 - 400.00 Hz)
YE-09 (3F28) RUN	Low Suction Pressure Det Level	V/f OLV/PM EZOLV Sets the level below which the suction pressure must be for longer than the time set in *YE-10 [Low Suction Pressure Det Time]* to trigger the drive response set in *YE-11 [Low Suction Pressure Behavior]*. **Note:** • The detection time set in *YE-10* only applies when *YE-11 = 2 or 3 [Fault (and Digital Output) or Auto-Restart (time set by YE-15)]* while *YE-01 = 1 [Suction Pressure Control Select = Suction Pressure (PSI)]*. When *YE-01 = 2 [Vacuum ("Hg)]*, YE-10 detection time delay applies when *YE-11 = 1, 2, or 3 [Fault (and Digital Output), Auto-Restart (time set by YE-15), or Auto-Restart (time set by YE-15)]*. • A setting of 0.0 disables this detection • Unit is dependent on *YE-01 [Suction Pressure Control Select]*. Setting *1 = PSI*, setting *2 = "Hg*, and decimal place position is dependent on *YE-22 [Suction Pressure Dec Place Pos]*.	0.0 (0.0 - 1200.0)
YE-10 (3F29) RUN	Low Suction Pressure Det Time	V/f OLV/PM EZOLV Sets the length of time that the water level must be below *YE-09 [Low Suction Pressure Det Level]* before the drive will react. **Note:** • The detection time set in this parameter only applies when *YE-11 = 2 or 3 [Fault (and Digital Output) or Auto-Restart (time set by YE-15)]* while *YE-01 = 1 [Suction Pressure Control Select = Suction Pressure (PSI)]*. When *YE-01 = 2 [Vacuum ("Hg)]*, *YE-10* detection time delay applies when *YE-11 = 1, 2, or 3 [Fault (and Digital Output), Auto-Restart (time set by YE-15), or Auto-Restart (time set by YE-15)]*. • Unit is dependent on *YE-18 [Suction Pressure Det Time Unit]*.	0.1 (0.0 - 300.0)

No. (Hex.)	Name	Description	Default (Range)
YE-11 (3F2A)	Low Suction Pressure Behavior	V/f OLV/PM EZOLV Sets how the drive will respond to a *LoSuc Low Suction Pressure* condition when the water level in the well is less than the level set in *YE-09 [Low Suction Pressure Det Level]* for longer than the time set in *YE-10 [Low Suction Pressure Det Time]*. 0 : Digital Output Only 1 : Alarm (and Digital Output) 2 : Fault (and Digital Output) 3 : Auto-Restart (time set by YE-15) **Note:** The detection time set in *YE-10* only applies when *YE-11 = 2 or 3 [Fault (and Digital Output) or Auto-Restart (time set by YE-15)]* while *YE-01 = 1 [Suction Pressure Control Select = Suction Pressure (PSI)]*. When *YE-01 = 2 [Vacuum ("Hg)]*, YE-10 detection time delay applies when *YE-11 = 1, 2, or 3 [Fault (and Digital Output), Auto-Restart (time set by YE-15), or Auto-Restart (time set by YE-15)]*.	1 (0 - 3)
YE-12 (3F2B) RUN	High Suction Pressure Det Level	V/f OLV/PM EZOLV Sets the level above which the suction pressure must be for longer than the time set in *YE-13 [High Suction Pressure Det Time]*, to trigger the drive response set in *YE-14 [High Suction Pressure Behavior]*. **Note:** • A setting of 0.0 disables this detection. • The detection time set in YE-13 only applies when *YE-14 = 2 or 3 [Fault (and Digital Output) or Auto-Restart (time set by YE-15)]*. • Unit is dependent on *YE-01 [Suction Pressure Control Select]*. Setting *1 = PSI*, setting *2 = "Hg*, and decimal place position is dependent on *YE-22 [Suction Pressure Dec Place Pos]*.	0.0 (0.0 -1200.0)
YE-13 (3F2C) RUN	High Suction Pressure Det Time	V/f OLV/PM EZOLV Sets the length of time that the water level must be more than *YE-12 [High Suction Pressure Det Level]* before the drive will react. This is effective only when *YE-14 = 2 or 3 [High Suction Pressure Behavior = Fault (and Digital Output) or Auto-Restart (time set by YE-15)]*. **Note:** Unit is dependent on *YE-18 [Suction Pressure Det Time Unit]*.	0.1 (0.0 - 300.0)
YE-14 (3F2D)	High Suction Pressure Behavior	V/f OLV/PM EZOLV Sets how the drive will respond to a *HiSuc High Suction Pressure* condition when the water level in the well is more than the level set in *YE-12 [High Suction Pressure Det Level]* for longer than the time set in *YE-13 [High Suction Pressure Det Time]*. 0 : Digital Output Only 1 : Alarm (and Digital Output) 2 : Fault (and Digital Output) 3 : Auto-Restart (time set by YE-15) **Note:** The detection time set in *YE-13* only applies when *YE-14 = 2 or 3 [Fault (and Digital Output) or Auto-Restart (time set by YE-15)]*.	1 (0 - 3)
YE-15 (3F2E)	Suction Pres Auto-Restart Time	V/f OLV/PM EZOLV Sets the length of time that the drive will wait before it tries an auto-restart of a *LoSuc Low Suction Pressure* or *HiSuc High Suction Pressure* fault. **Note:** Effective only when *YE-11 = 3 [Low Suction Pressure Behavior = Auto-Restart (time set by YE-15)]* or *YE-14 = 3 [High Suction Pressure Behavior = Auto-Restart (time set by YE-15)]* and *YE-39 ≠ 0 [Low Suction Fault Retry Attempts ≠ 0]* for *Low Suction Pressure* faults, or *YE-40 ≠ 0 [High Suction Flt Retry Attempts ≠ 0]* for *High Suction Pressure* faults.	5.0 min (0.1 - 6000.0 min)
YE-16 (3F2F) RUN	Suction Pressure Control P Gain	V/f OLV/PM EZOLV Sets the proportional gain for when the drive is operating in Suction Pressure Control.	2.00 (0.00 - 25.00)
YE-17 (3F30) RUN	Suction Pressure Control I Time	V/f OLV/PM EZOLV Sets the integral time for when the drive is operating in Suction Pressure Control. **Note:** A setting of 0.0 disables the water level control integrator.	5.0 s (0.0 - 360.0 s)
YE-18 (3F31)	Suction Pressure Det Time Unit	V/f OLV/PM EZOLV Sets the time units for *YE-10 [Low Suction Pressure Det Time]* and *YE-13 [High Suction Pressure Det Time]*. 0 : Minutes (min) 1 : Seconds (sec)	0 (0, 1)
YE-19 (3F32)	Suction Pressure Fdbk Wire Break	V/f OLV/PM EZOLV Sets behavior when the analog input selected for water level feedback is programmed to receive a 4 to 20 mA signal and the signal is lost. 0 : No Display 1 : Alarm Only 2 : Fault (no retry, coast to stop) 3 : Auto-Restart (time set by YE-38)	2 (0 - 3)

No. (Hex.)	Name	Description	Default (Range)
YE-20 (3F36)	Suction Pressure Speed Control	V/f OLV/PM EZOLV Enables and disables Suction Pressure Controller effect on output speed 0 : Disabled 1 : Enabled	1 (0, 1)
YE-22 (3F38)	Suction Pressure Dec Place Pos	V/f OLV/PM EZOLV Sets the number of decimal places for the Suction Pressure parameters and monitors. 0 : No Decimal Places (XXXXX) 1 : One Decimal Place (XXXX.X) 2 : Two Decimal Places (XXX.XX) 3 : Three Decimal Places (XX.XXX)	1 (0 - 3)
YE-25 (3F3B) RUN	Suc Pres Ctrl Activation Level	V/f OLV/PM EZOLV Sets the level below which the pressure be for the time set in *YE-26 [Suc Pres Ctrl Activation Delay]* to activate Suction Pressure Control and let it affect the output frequency. When the suction pressure is more than this level for longer than the time set in *YE-26*, Suction Pressure Control is deactivated and it will not have an effect on the output frequency. **Note:** • Unit is dependent on *YE-01 [Suction Pressure Control Select]*. Setting *1 = PSI*, setting *2 = "Hg*, and decimal place position is dependent on *YE-22 [Suction Pressure Dec Place Pos]*. • Suction Pressure Control is always active (if enabled) when set to 0.0.	0.0 (0.0 - 1200.0)
YE-26 (3F3C) RUN	Suc Pres Ctrl Activation Delay	V/f OLV/PM EZOLV Sets the length of time for which the suction pressure must be less than the level set in *YE-25 [Suc Pres Ctrl Activation Level]* to activate Suction Pressure Control and let it affect the output frequency. When the suction pressure is more than the *YE-25* level for longer than this time, Suction Pressure Control is deactivated and it will not have an effect on the output frequency.	2 s (0 - 3600 s)
YE-35 (3F45) RUN	Suc Pres Min Transducer Scale	V/f OLV/PM EZOLV Sets the minimum scale output of the suction pressure transducer connected to the *H3-xx = 3B [Water Level / Suct Pres Feedback]* analog input terminal. **Note:** • Unit is dependent on *YE-01 [Suction Pressure Control Select]*. Setting *1 = PSI*, setting *2 = "Hg*, and decimal place position is dependent on *YE-22 [Suction Pressure Dec Place Pos]*. • This parameter is only effective when set < *YE-02 [Suction Pres Transducer Scaling]*. If this parameter setting is > *YE-02*, Suction Pressure Feedback will be disabled (set to 0).	0.0 (-999.9 - 999.9)
YE-36 (3F46) RUN	SucPres LoHi Lvl Det Hysteresis	V/f OLV/PM EZOLV Sets the Hysteresis Level used for low and high level detection. **Note:** • Unit is dependent on *YE-01 [Suction Pressure Control Select]*. Setting *1 = PSI*, setting *2 = "Hg*, and decimal place position is dependent on *YE-22 [Suction Pressure Dec Place Pos]*. • When *YE-11 = 3 [Low Suction Pressure Behavior = Auto-Restart (time set by YE-15)]*, the suction pressure must be more than the value of *YE-09 [Low Suction Pressure Det Level] + YE-36* before *YE-15 [Suction Pres Auto-Restart Time]* will start. • When *YE-14 = 3 [High Suction Pressure Behavior = Auto-Restart (time set by YE-15)]*, the suction pressure must be less than the value of *YE-12 [High Suction Pressure Det Level] – YE-36* before *YE-15* will start.	0.0 (0.0 - 100.0)
YE-37 (3F47)	SuctPresLoss Flt Retry Attempts	V/f OLV/PM EZOLV Sets the number of times that the drive will try to restart after it detects a *SPL Suction Pressure Feedback Loss* condition.	3 (0 - 10)
YE-38 (3F48)	SuctPresLoss Fault Restart Time	V/f OLV/PM EZOLV Sets the time interval between each *SPL Suction Pressure Feedback Loss* auto-restart attempt.	20.0 s (0.5 - 3600.0 s)
YE-39 (3F49)	Low Suction Fault Retry Attempts	V/f OLV/PM EZOLV Sets the number of times that the drive will try to restart after it detects a *LoSuc Low Suction Pressure* condition.	3 (0 - 10)
YE-40 (3F4A)	High Suction Flt Retry Attempts	V/f OLV/PM EZOLV Sets the number of times that the drive will try to restart after it detects a *HISuc High Suction Pressure* condition.	3 (0 - 10)

◆ YF: PI Auxiliary Control

No. (Hex.)	Name	Description	Default (Range)
YF-01 (3F50)	PI Aux Control Selection	V/f OLV/PM EZOLV Sets the PI Auxiliary Control function. 0 : Disabled 1 : Enabled	0 (0, 1)
YF-02 (3F51) RUN	PI Aux Control Transducer Scale	V/f OLV/PM EZOLV Sets the full scale (10 V or 20 mA) output of the pressure transducer connected to the analog input terminal programmed for *H3-xx = 27 [PI Aux Control Feedback Level]*. **Note:** Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	145.0 (1.0 - 6000.0)
YF-03 (3F52) RUN	PI Aux Control Setpoint	V/f OLV/PM EZOLV Sets the level to which the drive will try to regulate. **Note:** Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	20.0 PSI (0.0 - 6000.0)
YF-04 (3F53) RUN	PI Aux Control Minimum Level	V/f OLV/PM EZOLV Sets the level below which the drive must be for longer than *YF-05 [PI Aux Control Sleep Delay Time]* before the drive goes to sleep and turns off all lag pumps. **Note:** • Set this parameter to 0.0 to disable the function. • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	10.0 PSI (0.0 - 6000.0)
YF-05 (3F54) RUN	PI Aux Control Sleep Delay Time	V/f OLV/PM EZOLV Sets the length of time that the drive will delay before it goes to sleep after the level is less than *YF-04 [PI Aux Control Minimum Level]* (when *YF-23 = 1 [PI Aux Ctrl Output Level Select = Inverse Acting]*) or more than *YF-24 [PI Auxiliary Ctrl Maximum Level]* (when *YF-23 = 0 [Direct Acting]*).	5 s (0 - 3600 s)
YF-06 (3F55) RUN	PI Aux Control Wake-up Level	V/f OLV/PM EZOLV Sets the level to wake up the drive when the drive after *YF-04 [PI Aux Control Minimum Level]* or *YF-24 [PI Auxiliary Ctrl Maximum Level]* put the drive to sleep. **Note:** • Parameter *YF-23 [PI Aux Ctrl Output Level Select]* sets the condition to wake up the drive. – *YF-23 = 0 [Direct Acting]*: The PI Aux Feedback must be less than the level set in this parameter for longer than the time set in *YF-07* to wake up. – *YF-23 = 1 [Inverse Acting]*: The PI Aux Feedback must be more than the level set in this parameter for longer than the time set in *YF-07 [PI Aux Control Wake-up Time]* to wake up. • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution. • Range is 0.0 to 999.9 with sign-bit "-" or "+" indicating Delta to Setpoint.	30.0 PSI (0.0 - 999.9 PSI)
YF-07 (3F56)	PI Aux Control Wake-up Time	V/f OLV/PM EZOLV Sets the time to wake up the drive when the drive after *YF-04 [PI Aux Control Minimum Level]* or *YF-24 [PI Auxiliary Ctrl Maximum Level]* put the drive to sleep. **Note:** Parameter *YF-23 [PI Aux Ctrl Output Level Select]* sets the condition to wake up the drive. • *YF-23 = 0 [Direct Acting]*: The PI Aux Feedback must be less than the level set in *YF-06* for longer than the time set in *YF-07* to wake up. • *YF-23 = 1 [Inverse Acting]*: The PI Aux Feedback must be more than the level set in *YF-06 [PI Aux Control Wake-up Level]* for longer than the time set in *YF-07* to wake up.	1.0 s (0.0 - 3600.0 s)
YF-08 (3F57) RUN	PI Aux Control Minimum Speed	V/f OLV/PM EZOLV Sets the minimum speed at which the drive can run when the PI Auxiliary Control has an effect on the output speed. **Note:** The drive will use *Y1-06 [Minimum Speed]* and *Y4-12 [Thrust Frequency]* as the minimum speed when PI Aux Control does not have an effect on the output speed or when you set *YF-08 < Y1-06 and Y4-12*.	0.00 Hz (0.00 - 400.00 Hz)
YF-09 (3F58) RUN	PI Aux Control Low Level Detect	V/f OLV/PM EZOLV Sets the level below which the drive must be for longer than *YF-10 [PI Aux Control Low Lvl Det Time]* to respond as specified by *YF-11 [PI Aux Control Low Level Det Sel]*. **Note:** • Set this parameter to 0.0 to disable the function. • Parameter *YF-10* only applies to when *YF-11 = 2 and 3 [Fault and Auto-Restart (time set by YF-15)]*. • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution. • Range is 0.0 to 999.9 with sign-bit "-" or "+" indicating Delta to Setpoint.	0.0 PSI (0.0 - 999.9 PSI)

No. (Hex.)	Name	Description	Default (Range)
YF-10 (3F59) RUN	PI Aux Low Level Detection Time	V/f OLV/PM EZOLV Sets the length of time that the PI Aux Feedback must be less than *YF-09 [PI Aux Control Low Lvl Detection]* to trigger a drive response when *YF-11 = 2 and 3 [PI Aux Control Low Level Det Sel = Fault and Auto-Restart (time set by YF-15)]*.	0.1 min (0.0 - 300.0 min)
YF-11 (3F5A)	PI Aux Control Low Level Det Sel	V/f OLV/PM EZOLV Sets drive response when the PI Aux Feedback decreases to less than *YF-09 [PI Aux Control Low Lvl Detection]* for longer than *YF-10 [PI Aux Control Low Lvl Det Time]*. 0 : Digital Output Only 1 : Alarm (and Digital Output) 2 : Fault (and Digital Output) 3 : Auto-Restart (time set by YF-15) **Note:** • Set *YF-01 = 1 [PI Aux Control Selection = Enabled]* and *YF-09 [PI Aux Control Low Level Detect]* > 0 to enable PI Aux Low Level Detection. • Parameter *YF-10* only applies when *YF-11 = 2 or 3*.	1 (0 - 3)
YF-12 (3F5B) RUN	PI Aux Control High Level Detect	V/f OLV/PM EZOLV Sets the value above which the level must be for longer than *YF-13 [PI Aux High Level Detection Time]* to respond as specified by *YF-14 [PI Aux Hi Level Detection Select]*. **Note:** • Set this parameter to 0.0 to disable the function. • Parameter *YF-13* only applies to when *YF-14 = 2 and 3 [Fault and Auto-Restart (time set by YF-15)]*. • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution. • Range is 0.0 to 999.9 with sign-bit "-" or "+" indicating Delta to Setpoint.	0.0 PSI (0.0 - 999.9 PSI)
YF-13 (3F5C) RUN	PI Aux High Level Detection Time	V/f OLV/PM EZOLV Sets the length of time that the level must be more than *YF-12 [PI Aux Control High Level Detect]* before the drive will respond when *YF-14 = 2, 3 [PI Aux Hi Level Detection Select]*.	0.1 min (0.0 - 300.0 min)
YF-14 (3F5D)	PI Aux Control Hi Level Det Sel	V/f OLV/PM EZOLV Sets the drive response when the PI Aux Feedback increases to more than the *YF-12 [PI Aux Control High Level Detect]* level for longer than the time set in *YF-13 [PI Aux High Level Detection Time]*. 0 : Digital Output Only 1 : Alarm (and Digital Output) 2 : Fault (and Digital Output) 3 : Auto-Restart (time set by YF-15) **Note:** • Set *YF-01 = 1 [PI Aux Control Selection = Enabled]* and *YF-12 [PI Aux Control High Level Detect]* > 0 to enable PI Aux High Level Detection. • Parameter *YF-13* only applies when *YF-14 = 2 or 3*	1 (0 - 3)
YF-15 (3F5E)	PI Aux Level Detect Restart Time	V/f OLV/PM EZOLV Sets the length of time the drive will wait before it tries an Auto-Restart of *LoAux [Low PI Aux Feedback Level]* or *HiAux [High PI Aux Feedback Level]* fault. **Note:** Effective only when *YF-11 = 3* or *YF-14 = 3*, and *YF-39 > 0 [Low PI Aux Fault Retry Attempts]* for Low PI Aux Feedback Level fault or *YF-40 > 0 [High PI Aux Fault Retry]* for High PI Aux Feedback Level fault.	5.0 min (0.1 - 6000.0 min)
YF-16 (3F5F) RUN	PI Auxiliary Control P Gain	V/f OLV/PM EZOLV Sets the proportional gain for the suction pressure control.	2.00 (0.00 - 25.00)
YF-17 (3F60) RUN	PI Auxiliary Control I Time	V/f OLV/PM EZOLV Sets the integral time for the suction pressure control. **Note:** Set this parameter to 0.0 to disable the integrator.	5.0 s (0.0 - 360.0 s)
YF-18 (3F61)	PI Aux Control Detect Time Unit	V/f OLV/PM EZOLV Sets the time unit for *YF-10 [PI Aux Control Low Lvl Det Time]* and *YF-13 [PI Aux High Level Detection Time]*. 0 : Minutes (min) 1 : Seconds (sec)	0 (0, 1)
YF-19 (3F62)	PI Aux Ctrl Feedback Wire Break	V/f OLV/PM EZOLV Sets how the analog input selected for PI Aux Feedback will respond when it is programmed to receive a 4 mA to 20 mA signal and the signal is lost. 0 : No Display 1 : Alarm Only 2 : Fault (no retry, coast to stop) 3 : Auto-Restart (time set by YF-38)	2 (0 - 3)

No. (Hex.)	Name	Description	Default (Range)
YF-20 (3F63)	PI Aux Main PI Speed Control	V/f OLV/PM EZOLV Sets if the PI Auxiliary Controller has an effect on output speed. 0 : Disabled 1 : Enabled	1 (0, 1)
YF-21 (3F64)	PI Aux Ctrl Level Unit Selection	V/f OLV/PM EZOLV Set the units shown for the PI Aux Level parameters and monitors. 0 : “WC: inches of water column 1 : PSI: pounds per square inch 2 : GPM: gallons/min 3 : °F: Fahrenheit 4 : ft^3/min: cubic feet/min 5 : m^3/h: cubic meters/hour 6 : L/h: liters/hour 7 : L/s: liters/sec 8 : bar: bar 9 : Pa: Pascal 10 : °C: Celsius 11 : m: meters 12 : ft: feet 13 : L/min: liters/min 14 : m^3/min: cubic meters/min 15 : “Hg: Inch Mercury 16 : kPa: kilopascal 48 : %: Percent 49 : Custom (YF-32 ~ 34) 50 : None	1 (0 - 50)
YF-22 (3F65)	PI Aux Level Decimal Place Pos	V/f OLV/PM EZOLV Sets the number of decimal places for the PI Aux Level parameters and monitors. 0 : No Decimal Places (XXXXX) 1 : One Decimal Place (XXXX.X) 2 : Two Decimal Places (XXX.XX) 3 : Three Decimal Places (XX.XXX)	1 (0 - 3)
YF-23 (3F66)	PI Aux Ctrl Output Level Select	V/f OLV/PM EZOLV Sets the PI Auxiliary Controller to be Direct-acting or Inverse-acting. 0 : Direct Acting 1 : Inverse Acting	1 (0, 1)
YF-24 (3F67) RUN	PI Auxiliary Ctrl Maximum Level	V/f OLV/PM EZOLV Sets the maximum level for PI Auxiliary Control. When the level is more than this setting for longer than *YF-05 [PI Aux Control Sleep Delay Time]*, the drive will go to sleep and turn off all lag drives. **Note:** • Set this parameter to 0.0 to disable the function. • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	0.0 PSI (0.0 - 6000.0 PSI)
YF-25 (3F68) RUN	PI Aux Control Activation Level	V/f OLV/PM EZOLV Sets the level to activate the PI Auxiliary Control. **Note:** • The drive response changes when the *YF-23 [PI Aux Ctrl Output Level Select]* setting changes. – *YF-23 = 0 [Direct Acting]*: When the PI Aux Feedback level is more than this setting for longer than *YF-26 [PI Aux Control Activation Delay]*, the drive will activate the PI Auxiliary Control to control the output frequency. – *YF-23 = 1 [Inverse Acting]*: When the PI Aux Feedback level is less than this setting for longer than *YF-26*, the drive will activate PI Auxiliary Control to control the output frequency. • When you set this parameter to 0.0 PSI, PI Auxiliary Control is always enabled. • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	0.0 PSI (0.0 - 6000.0 PSI)

No. (Hex.)	Name	Description	Default (Range)
YF-26 (3F69) RUN	PI Aux Control Activation Delay	V/f OLV/PM EZOLV Sets the delay time to activate the PI Auxiliary Control. **Note:** • The drive response changes when the *YF-23 [PI Aux Ctrl Output Level Select]* setting changes. – *YF-23 = 0 [Direct Acting]*: When the PI Aux Feedback level is more than *YF-25 [PI Aux Control Activation Level]* for longer than this time, the drive will activate the PI Auxiliary Control to control the output frequency. – *YF-23 = 1 [Inverse Acting]*: When the PI Aux Feedback level is less than *YF-25* for longer than this time, the drive will activate PI Auxiliary Control to control the output frequency. • When you set this parameter to 0.0 PSI, PI Auxiliary Control is always enabled.	2 s (0 - 3600 s)
YF-32 (3F6F)	PI Aux Custom Unit Character 1	V/f OLV/PM EZOLV Sets the first character of the PI Aux custom unit display when *YF-21 = 49 [PI Aux Ctrl Level Unit Selection = Custom (YF-32 ~ 34)]*.	41 (20 - 7A)
YF-33 (3F70)	PI Aux Custom Unit Character 2	V/f OLV/PM EZOLV Sets the second character of the PI Aux custom unit display when *YF-21 = 49 [PI Aux Ctrl Level Unit Selection = Custom (YF-32 ~ 34)]*.	41 (20 - 7A)
YF-34 (3F71)	PI Aux Custom Unit Character 3	V/f OLV/PM EZOLV Sets the third character of the PI Aux custom unit display when *YF-21 = 49 [PI Aux Ctrl Level Unit Selection = Custom (YF-32 ~ 34)]*.	41 (20 - 7A)
YF-35 (3F72) RUN	PI Aux Minimum Transducer Scale	V/f OLV/PM EZOLV Sets the minimum scale output of the pressure transducer that is connected to the terminal set for *H3-xx = 27 [MFAI Function Selection = PI Auxiliary Control Feedback]*. **Note:** • To enable this parameter, set it to less than *YF-02 [PI Aux Control Transducer Scale]*. If you set it to more than *YF-02*, it will disable the PI Auxiliary Feedback (set to 0). • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	0.0 PSI (-999.9 - +999.9 PSI)
YF-36 (3F73) RUN	PI Aux Lo Hi Lvl Det Hysteresis	V/f OLV/PM EZOLV Sets the Hysteresis Level used for low and high level detection. **Note:** • When *YF-11 = 3 [PI Aux Control Low Level Det Sel = Auto-Restart (time set by YF-15)]*, the PI Aux Feedback level must increase more than the value of *YF-09 [PI Aux Control Low Level Detect] + YF-36* before *YF-15 [PI Aux Level Detect Restart Time]* starts. • When *YF-14 = 3 [PI Aux Control Hi Level Det Sel = Auto-Restart (time set by YF-15)]*, the PI Aux Feedback Level must decrease less than the value of *YF-12 [PI Aux Control High Level Detect] – YF- 36* before *YF-15* starts. • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	0.0 PSI (0.0 - 100.0 PSI)
YF-37 (3F74)	PI Aux Fdbk Fault Retry Attempts	V/f OLV/PM EZOLV Sets the number restart attempts when the drive detects a *AuxFB PI Aux Feedback Level Loss* condition.	3 (0 - 10)
YF-38 (3F75)	PI Aux Fdbk Fault Restart Time	V/f OLV/PM EZOLV Sets the time interval between each *AuxFB PI Aux Feedback Level Loss* auto-restart attempt.	20.0 s (0.5 - 3600.0 s)
YF-39 (3F76)	Low PI Aux Fault Retry Attempts	V/f OLV/PM EZOLV Sets the number restart attempts when the drive detects a *LoAux Low PI Auxiliary Feedback Level* condition.	3 (0 - 10)
YF-40 (3F77)	High PI Aux Fault Retry Attempts	V/f OLV/PM EZOLV Sets the number restart attempts when the drive detects a *HiAux High PI Auxiliary Feedback Level* condition.	3 (0 - 10)

5.17 U: Monitors

◆ U1: Operation Status Monitors

No. (Hex.)	Name	Description	MFAO Signal Level
U1-01 (0040)	Frequency Reference	V/f OLV/PM EZOLV Shows the frequency reference value. Parameter *o1-03 [Keypad Display Unit Selection]* sets the display units. Unit: 0.01 Hz	10 V = Maximum frequency (0 V to +10 V)
U1-02 (0041)	Output frequency	V/f OLV/PM EZOLV Shows the output frequency. Parameter *o1-03 [Keypad Display Unit Selection]* sets the display units. Unit: 0.01 Hz	10 V = Maximum frequency (0 V to +10 V)
U1-03 (0042)	Output Current	V/f OLV/PM EZOLV Shows the output current. The keypad shows the value of *U1-03* in amperes (A). When you use serial communications to show the monitor, the current is "8192 = drive rated current (A)". Use the formula: "Numerals being displayed / 8192 × drive rated current (A)" to use the serial communication current value shown in the monitor. Unit: Determined by the drive model. • 0.01 A: 2011 to 2046, 4005 to 4014 • 0.1 A: 2059 to 2396, 4021 to 4720	10 V = Drive rated current
U1-04 (0043)	Control Method	V/f OLV/PM EZOLV Shows the drive control method. 0 : V/f Control 5 : PM Open Loop Vector 8 : EZ Vector Control	No signal output available
U1-05 (0044)	Motor Speed	V/f OLV/PM EZOLV Shows the detected motor speed. Parameter *o1-03 [Keypad Display Unit Selection]* sets the display units. Unit: 0.01 Hz	10 V = Maximum frequency (0 V to +10 V)
U1-06 (0045)	Output Voltage	V/f OLV/PM EZOLV Shows the output voltage reference. Unit: 0.1 V	208 V class: 10 V = 200 Vrms 480 V class: 10 V = 400 Vrms
U1-07 (0046)	DC Bus Voltage	V/f OLV/PM EZOLV Shows the DC bus voltage. Unit: 1 V	208 V class: 10 V = 400 V 480 V class: 10 V = 800 V
U1-08 (0047)	Output Power	V/f OLV/PM EZOLV Shows the internally-calculated output power. When you change *A1-02 [Control Method Selection]*, it will also change the signal level of the analog output. • A1-02 = 0: Drive capacity (kW) • A1-02 = 5: *PM Motor Rated Power [E5-02]* (kW) • A1-02 = 8: *Motor Rated Power [E9-07]* (kW) Unit: Determined by the drive model. • 0.01 kW: 2011 to 2046, 4005 to 4014 • 0.1 kW: 2059 to 2396, 4021 to 4720	10 V: Drive capacity (motor rated power) kW (-10 V to +10 V)
U1-09 (0048)	Torque Reference	V/f OLV/PM EZOLV Shows the internal torque reference value. Unit: 0.1%	10 V = Motor rated torque (0 V to +10 V)
U1-10 (0049)	Input Terminal Status	V/f OLV/PM EZOLV Shows the status of the MFDI terminal where 1 = ON, 0 = OFF. For example, *U1-10* shows "00000011" when terminals S1 and S2 are ON. bit0 : Terminal S1 (MFDI 1) bit1 : Terminal S2 (MFDI 2) bit2 : Terminal S3 (MFDI 3) bit3 : Terminal S4 (MFDI 4) bit4 : Terminal S5 (MFDI 5) bit5 : Terminal S6 (MFDI 6) bit6 : Terminal S7 (MFDI 7) bit7 : Terminal S8 (MFDI 8)	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U1-11 (004A)	Output Terminal Status	V/f OLV/PM EZOLV Shows the status of the MFDO terminal where 1 = (ON) and 0 = (OFF). For example, *U1-11* shows "00000011" when terminals M1 and M3 are ON. **Note:** When *H2-xx = 100 to 1C4 [Inverse Output of Function]*, the monitor will show the value before inversion. bit 0 : Terminals M1-M2 bit 1 : Terminals M3-M4 bit 2 : Terminals MD-ME-MF bit 3 : Not used (normal value of 0). bit 4 : Not used (normal value of 0). bit 5 : Not used (normal value of 0). bit 6 : Not used (normal value of 0). bit 7 : Fault relay MA/MB-MC	No signal output available
U1-12 (004B)	Drive Status	V/f OLV/PM EZOLV Shows drive status where 1 = ON and 0 = OFF. For example, *U1-12* shows "00000101" during run with the Reverse Run command. bit0 : During Run bit1 : During zero-speed bit2 : During reverse bit3 : During fault reset signal input bit4 : During speed agreement bit5 : Drive ready bit6 : During minor fault detection bit7 : During fault detection	No signal output available
U1-13 (004E)	Terminal A1 Level	V/f OLV/PM EZOLV Shows the signal level of terminal A1. Unit: 0.1% • Determined by *H3-61*. • "mA" or "VDC" is shown depending on whether the MFAI is set to 0-10 V, 0 to 20 mA, or 4 to 20 mA.	10 V = 100% (0 V to +10 V)
U1-14 (004F)	Terminal A2 Level	V/f OLV/PM EZOLV Shows the signal level of terminal A2. Unit: 0.1% • Determined by *H3-62*. • "mA" or "VDC" is shown depending on whether the MFAI is set to 0-10 V, 0 to 20 mA, or 4 to 20 mA.	10 V = 100% (0 V to +10 V)
U1-15 (0050)	Terminal A3 Level	V/f OLV/PM EZOLV Shows the signal level of terminal A3. Unit: 0.1% • Determined by *H3-63*. • "mA" or "VDC" is shown depending on whether the MFAI is set to 0-10 V, 0 to 20 mA, or 4 to 20 mA.	10 V = 100% (0 V to +10 V)
U1-16 (0053)	SFS Output Freq	V/f OLV/PM EZOLV Shows the output frequency after soft start. Shows the frequency with acceleration and deceleration times and S-curves. Parameter *o1-03 [Keypad Display Unit Selection]* sets the display units. Unit: 0.01 Hz	10 V = Maximum frequency (0 V to +10 V)
U1-17 (0058)	DI-A3 Input Status	V/f OLV/PM EZOLV Shows the reference value input from DI-A3 option. Shows the input signal for DI-A3 in hexadecimal as set in *F3-01 [Digital Input Function Selection]*. 3FFFF: Set (1 bit) + Sign (1 bit) + 16 bit	No signal output available
U1-18 (0061)	oPE Fault Parameter	V/f OLV/PM EZOLV Shows the parameter number that caused the *oPE02 [Parameter Range Setting Error]* or *oPE08 [Parameter Selection Error]*.	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U1-19 (0066)	MEMOBUS/Modbus Error Code	V/f OLV/PM EZOLV Shows the contents of the MEMOBUS/Modbus communication error where 1 = "error" and 0 = "no error". For example, *U1-19* shows "00000001" when there is a CRC error. bit0 : CRC Error bit1 : Data Length Error bit2 : Not used (normal value of 0). bit3 : Parity Error bit4 : Overrun Error bit5 : Framing Error bit6 : Timed Out bit7 : Not used (normal value of 0).	No signal output available
U1-21 (0077)	AI-A3 Term V1Level	V/f OLV/PM EZOLV Shows the analog reference of terminal V1 on analog input option card AI-A3. Unit: 0.1% • Determined by *F2-16*. • "mA" or "VDC" is shown depending on whether the MFAI is set to 0-10 V, 0 to 20 mA, or 4 to 20 mA.	10 V = 100% (-10 V to +10 V)
U1-22 (072A)	AI-A3 Term V2Level	V/f OLV/PM EZOLV Shows the analog reference of terminal V2 on analog input option card AI-A3. Unit: 0.1% • Determined by *F2-17*. • "mA" or "VDC" is shown depending on whether the MFAI is set to 0-10 V, 0 to 20 mA, or 4 to 20 mA.	10 V = 100% (-10 V to +10 V)
U1-23 (072B)	AI-A3 Term V3Level	V/f OLV/PM EZOLV Shows the analog reference of terminal V3 on analog input option card AI-A3. Unit: 0.1% • Determined by *F2-18*. • "mA" or "VDC" is shown depending on whether the MFAI is set to 0-10 V, 0 to 20 mA, or 4 to 20 mA.	10 V = 100% (-10 V to +10 V)
U1-24 (007D)	Input Pulse Montr	V/f OLV/PM EZOLV Shows the frequency to pulse train input terminal RP. Unit: 1 Hz	Determined by H6-02
U1-25 (004D)	SoftwareNumber Flash	V/f OLV/PM EZOLV Shows the FLASH ID.	No signal output available
U1-26 (005B)	SoftwareNumber ROM	V/f OLV/PM EZOLV Shows the ROM ID.	No signal output available
U1-50 (1199) Expert	Virtual Analog In	V/f OLV/PM EZOLV Shows the virtual analog input value.	Determined by H7-40

◆ U2: Fault Trace

No. (Hex.)	Name	Description	MFAO Signal Level
U2-01 (0080)	Current Fault	V/f OLV/PM EZOLV Shows the fault that the drive has when viewing the monitor.	No signal output available
U2-02 (0081)	Previous Fault	V/f OLV/PM EZOLV Shows the fault that occurred most recently.	No signal output available
U2-03 (0082)	Freq Reference@Fault	V/f OLV/PM EZOLV Shows the frequency reference at the fault that occurred most recently. Use *U1-01 [Frequency Reference]* to monitor the frequency reference value. Unit: 0.01 Hz	No signal output available
U2-04 (0083)	Output Freq @ Fault	V/f OLV/PM EZOLV Shows the output frequency at the fault that occurred most recently. Use *U1-02 [Output Frequency]* to monitor the actual output frequency. Unit: 0.01 Hz	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U2-05 (0084)	Output Current@Fault	V/f OLV/PM EZOLV Shows the output current at the fault that occurred most recently. Use *U1-03 [Output Current]* to monitor the output current. The keypad shows the value of *U1-03* in amperes (A). When you use serial communications to show the monitor, the current is "8192 = drive rated current (A)". Use the formula: "Numerals being displayed / 8192 × drive rated current (A)" to use the serial communication current value shown in the monitor. Unit: Determined by the drive model. • 0.01 A: 2011 to 2046, 4005 to 4014 • 0.1 A: 2059 to 2396, 4021 to 4720	No signal output available
U2-06 (0085)	Motor Speed @ Fault	V/f OLV/PM EZOLV Shows the motor speed at the fault that occurred most recently. Use *U1-05 [Motor Speed]* to monitor the motor speed. Unit: 0.01 Hz	No signal output available
U2-07 (0086)	Output Voltage@Fault	V/f OLV/PM EZOLV Shows the output voltage reference at the fault that occurred most recently. Use *U1-06 [Output Voltage]* to monitor the output voltage reference. Unit: 0.1 V	No signal output available
U2-08 (0087)	DC Bus Voltage@Fault	V/f OLV/PM EZOLV Shows the DC bus voltage at the fault that occurred most recently. Use *U1-07 [DC Bus Voltage]* to monitor the DC bus voltage. Unit: 1 V	No signal output available
U2-09 (0088)	Output Power @ Fault	V/f OLV/PM EZOLV Shows the output power at the fault that occurred most recently. Use *U1-08 [Output Power]* to monitor the output power. Unit: 0.1 kW	No signal output available
U2-10 (0089)	Torque Ref @ Fault	V/f OLV/PM EZOLV Shows the torque reference at the fault that occurred most recently as a percentage of the motor rated torque. Use *U1-09 [Torque Reference]* to monitor the torque reference. Unit: 0.1%	No signal output available
U2-11 (008A)	Input Terminal Status @ Fault	V/f OLV/PM EZOLV Shows the status of the MFDI terminals at the most recent fault where 1 = (ON) and 0 = (OFF). For example, *U2-11* shows "00000011" when terminals S1 and S2 are ON. Use *U1-10 [Input Terminal Status]* to monitor the MFDI terminal status. bit0 : Terminal S1 bit1 : Terminal S2 bit2 : Terminal S3 bit3 : Terminal S4 bit4 : Terminal S5 bit5 : Terminal S6 bit6 : Terminal S7 bit7 : Terminal S8	No signal output available
U2-12 (008B)	Output Terminal Status @ Fault	V/f OLV/PM EZOLV Shows the status of the MFDO terminals at the most recent fault where 1 = (ON) and 0 = (OFF). For example, *U2-12* shows "00000011" when terminals M1 and M3 are ON. Use *U1-11 [Output Terminal Status]* to monitor the MFDO terminal status. bit 0 : Terminals M1-M2 bit 1 : Terminals M3-M4 bit 2 : Terminals MD-ME-MF bit 3 : Not used (normal value of 0). bit 4 : Not used (normal value of 0). bit 5 : Not used (normal value of 0). bit 6 : Not used (normal value of 0). bit 7 : Fault relay MA/MB-MC	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U2-13 (008C)	Operation Status @ Fault	V/f OLV/PM EZOLV Shows the status of the MFDO terminals at the most recent fault where 1 = (ON) and 0 = (OFF). For example, *U2-13* shows "00000001" during run. Use *U1-12 [Drive Status]* to monitor the MFDO terminal status. bit0 : During Run bit1 : During zero-speed bit2 : During reverse bit3 : During fault reset signal input bit4 : During speed agreement bit5 : Drive ready bit6 : During minor fault detection bit7 : During fault detection	No signal output available
U2-14 (008D)	Elapsed Time @ Fault	V/f OLV/PM EZOLV Shows the cumulative operation time of the drive at the fault that occurred most recently. Use *U4-01 [Total VFD Run Time]* to monitor the cumulative operation time. Unit: 1 h	No signal output available
U2-15 (07E0)	SFS Output @ Fault	V/f OLV/PM EZOLV Shows the output frequency after soft start at the fault that occurred most recently. Use *U1-16 [SFS Output Freq]* to monitor the output frequency after soft start. Unit: 0.01 Hz	No signal output available
U2-16 (07E1)	q-Axis Current@Fault	V/f OLV/PM EZOLV Shows the q-Axis current of the motor at the fault that occurred most recently. Use *U6-01 [Iq SEC Current]* to monitor the q-Axis current of the motor. Unit: 0.1 %	No signal output available
U2-17 (07E2)	d-Axis Current@Fault	V/f OLV/PM EZOLV Shows the d-Axis current of the motor at the fault that occurred most recently. Use *U6-02 [Id EXC Current]* to monitor the d-Axis current of the motor. Unit: 0.1%	No signal output available
U2-20 (008E)	Heatsink Temp @Fault	V/f OLV/PM EZOLV Shows the heatsink temperature at the fault that occurred most recently. Use *U4-08 [Heatsink Temperature]* to monitor the temperature of the heatsink. Unit: 1 °C	No signal output available
U2-21 (1166) Expert	STPo Detect @ Fault	V/f OLV/PM EZOLV Monitors conditions to detect *STPo [Motor Step-Out Detected]* faults. The bit for each condition is shown as ON or OFF. bit0 : Excessive current bit1 : Induced voltage deviation bit2 : d-axis current deviation bit3 : Motor lock at startup bit4 : Acceleration stall continue bit5 : Acceleration stall repeat bit6 : Not used (normal value of 0). bit7 : Not used (normal value of 0).	No signal output available
U2-30 (3008)	Fault 1 YYYY	V/f OLV/PM EZOLV Shows the year when the most recent fault occurred.	No signal output available
U2-31 (3009)	Fault 1 MMDD	V/f OLV/PM EZOLV Shows the month and day when the most recent fault occurred.	No signal output available
U2-32 (300A)	Fault 1 HHMM	V/f OLV/PM EZOLV Shows the time when the most recent fault occurred.	No signal output available
U2-90 (3FC0)	Pump Setpoint @Fault	V/f OLV/PM EZOLV Displays the *Pump Setpoint UA-90* at the time of fault. Monitor limited to 200% of *Y1-03*. Unit: 0.1 PSI	No signal output available
U2-91 (3FC1)	Pump Feedback @Fault	V/f OLV/PM EZOLV Displays the *Pump Feedback UA-91* at the time of fault. Monitor limited to 200% of *Y1-03*. Unit: 0.1 PSI	No signal output available
U2-94 (3FC4)	Motor Speed @ Fault	V/f OLV/PM EZOLV Displays *Motor Speed UA-94*, which is the absolute value of *U1-02 [Output Frequency]* converted to RPM at the time of fault. Unit: 1 RPM	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U2-97 (3FC7)	Water Level @ Fault	V/f OLV/PM EZOLV Displays the amount of water above the water level sensor *UA-97* at the time of fault. **Note:** This monitor is cleared when *Yd-01 = 0 [Water Level Selection = Disabled]*. Unit: 0.1 ft	No signal output available
U2-98 (3FC8)	Suction Press @Fault	V/f OLV/PM EZOLV Displays the amount of suction pressure *UA-98* at the time of fault. Unit: 0.1 PSI **Note:** • This monitor is cleared when *YE-01 = 0 [Suction Pressure Control Select = Disabled]*. • Unit is dependent on *YE-01 [Suction Pressure Control Select]* where setting 1 is PSI and setting 2 is "Hg, and decimal place position is dependent on *YE-22 [Suction Pressure Dec Place Pos]*.	No signal output available

◆ U3: Fault History

No. (Hex.)	Name	Description	MFAO Signal Level
U3-01 (0090)	1st MostRecent Fault	V/f OLV/PM EZOLV Shows the fault history of the most recent fault. **Note:** The drive saves this fault history to two types of registers at the same time for the MEMOBUS/Modbus communications.	No signal output available
U3-02 (0091)	2nd MostRecent Fault	V/f OLV/PM EZOLV Shows the fault history of the second most recent fault. **Note:** The drive saves this fault history to two types of registers at the same time for the MEMOBUS/Modbus communications.	No signal output available
U3-03 (0092)	3rd MostRecent Fault	V/f OLV/PM EZOLV Shows the fault history of the third most recent fault. **Note:** The drive saves this fault history to two types of registers at the same time for the MEMOBUS/Modbus communications.	No signal output available
U3-04 (0093)	4th MostRecent Fault	V/f OLV/PM EZOLV Shows the fault history of the fourth most recent fault. **Note:** The drive saves this fault history to two types of registers at the same time for the MEMOBUS/Modbus communications.	No signal output available
U3-05 (0804)	5th MostRecent Fault	V/f OLV/PM EZOLV Shows the fault history of the fifth most recent fault.	No signal output available
U3-06 (0805)	6th MostRecent Fault	V/f OLV/PM EZOLV Shows the fault history of the sixth most recent fault.	No signal output available
U3-07 (0806)	7th MostRecent Fault	V/f OLV/PM EZOLV Shows the fault history of the seventh most recent fault.	No signal output available
U3-08 (0807)	8th MostRecent Fault	V/f OLV/PM EZOLV Shows the fault history of the eighth most recent fault.	No signal output available
U3-09 (0808)	9th MostRecent Fault	V/f OLV/PM EZOLV Shows the fault history of the ninth most recent fault.	No signal output available
U3-10 (0809)	10th MostRecentFault	V/f OLV/PM EZOLV Shows the fault history of the tenth most recent fault.	No signal output available
U3-11 (0094)	ElapsedTime@1stFault	V/f OLV/PM EZOLV Shows the cumulative operation time when the most recent fault occurred. **Note:** The drive saves this cumulative operation time to two types of registers at the same time for the MEMOBUS/Modbus communications. Unit: 1 h	No signal output available
U3-12 (0095)	ElapsedTime@2ndFault	V/f OLV/PM EZOLV Shows the cumulative operation time when the second most recent fault occurred. **Note:** The drive saves this cumulative operation time to two types of registers at the same time for the MEMOBUS/Modbus communications. Unit: 1 h	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U3-13 (0096)	ElapsedTime@3rdFault	V/f OLV/PM EZOLV Shows the cumulative operation time when the third most recent fault occurred. **Note:** The drive saves this cumulative operation time to two types of registers at the same time for the MEMOBUS/Modbus communications. Unit: 1 h	No signal output available
U3-14 (0097)	ElapsedTime@4thFault	V/f OLV/PM EZOLV Shows the cumulative operation time when the fourth most recent fault occurred. **Note:** The drive saves this cumulative operation time to two types of registers at the same time for the MEMOBUS/Modbus communications. Unit: 1 h	No signal output available
U3-15 (080E)	ElapsedTime@5thFault	V/f OLV/PM EZOLV Shows the cumulative operation time when the fifth most recent fault occurred. Unit: 1 h	No signal output available
U3-16 (080F)	ElapsedTime@6thFault	V/f OLV/PM EZOLV Shows the cumulative operation time when the sixth most recent fault occurred. Unit: 1 h	No signal output available
U3-17 (0810)	ElapsedTime@7thFault	V/f OLV/PM EZOLV Shows the cumulative operation time when the seventh most recent fault occurred. Unit: 1 h	No signal output available
U3-18 (0811)	ElapsedTime@8thFault	V/f OLV/PM EZOLV Shows the cumulative operation time when the eighth most recent fault occurred. Unit: 1 h	No signal output available
U3-19 (0812)	ElapsedTime@9thFault	V/f OLV/PM EZOLV Shows the cumulative operation time when the ninth most recent fault occurred. Unit: 1 h	No signal output available
U3-20 (0813)	ElapsedTime@10 Fault	V/f OLV/PM EZOLV Shows the cumulative operation time when the tenth most recent fault occurred. Unit: 1 h	No signal output available
U3-21 (300B)	Fault 1 YYYY	V/f OLV/PM EZOLV Shows the year when the most recent fault occurred.	No signal output available
U3-22 (300C)	Fault 1 MMDD	V/f OLV/PM EZOLV Shows the month and day when the most recent fault occurred.	No signal output available
U3-23 (300D)	Fault 1 HHMM	V/f OLV/PM EZOLV Shows the time when the most recent fault occurred.	No signal output available
U3-24 (300E)	Fault 2 YYYY	V/f OLV/PM EZOLV Shows the year when the second most recent fault occurred.	No signal output available
U3-25 (300F)	Fault 2 MMDD	V/f OLV/PM EZOLV Shows the month and day when the second most recent fault occurred.	No signal output available
U3-26 (3010)	Fault 2 HHMM	V/f OLV/PM EZOLV Shows the time when the second most recent fault occurred.	No signal output available
U3-27 (3011)	Fault 3 YYYY	V/f OLV/PM EZOLV Shows the year when the third most recent fault occurred.	No signal output available
U3-28 (3012)	Fault 3 MMDD	V/f OLV/PM EZOLV Shows the month and day when the third most recent fault occurred.	No signal output available
U3-29 (3013)	Fault 3 HHMM	V/f OLV/PM EZOLV Shows the time when the third most recent fault occurred.	No signal output available
U3-30 (3014)	Fault 4 YYYY	V/f OLV/PM EZOLV Shows the year when the fourth most recent fault occurred.	No signal output available
U3-31 (3015)	Fault 4 MMDD	V/f OLV/PM EZOLV Shows the month and day when the fourth most recent fault occurred.	No signal output available
U3-32 (3016)	Fault 4 HHMM	V/f OLV/PM EZOLV Shows the time when the fourth most recent fault occurred.	No signal output available
U3-33 (3017)	Fault 5 YYYY	V/f OLV/PM EZOLV Shows the year when the fifth most recent fault occurred.	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U3-34 (3018)	Fault 5 MMDD	V/f OLV/PM EZOLV Shows the month and day when the fifth most recent fault occurred.	No signal output available
U3-35 (3019)	Fault 5 HHMM	V/f OLV/PM EZOLV Shows the time when the fifth most recent fault occurred.	No signal output available
U3-36 (301A)	Fault 6 YYYY	V/f OLV/PM EZOLV Shows the year when the sixth most recent fault occurred.	No signal output available
U3-37 (301B)	Fault 6 MMDD	V/f OLV/PM EZOLV Shows the month and day when the sixth most recent fault occurred.	No signal output available
U3-38 (301C)	Fault 6 HHMM	V/f OLV/PM EZOLV Shows the time when the sixth most recent fault occurred.	No signal output available
U3-39 (301D)	Fault 7 YYYY	V/f OLV/PM EZOLV Shows the year when the seventh most recent fault occurred.	No signal output available
U3-40 (301E)	Fault 7 MMDD	V/f OLV/PM EZOLV Shows the month and day when the seventh most recent fault occurred.	No signal output available
U3-41 (301F)	Fault 7 HHMM	V/f OLV/PM EZOLV Shows the time when the seventh most recent fault occurred.	No signal output available
U3-42 (3020)	Fault 8 YYYY	V/f OLV/PM EZOLV Shows the year when the eighth most recent fault occurred.	No signal output available
U3-43 (3021)	Fault 8 MMDD	V/f OLV/PM EZOLV Shows the month and day when the eighth most recent fault occurred.	No signal output available
U3-44 (3022)	Fault 8 HHMM	V/f OLV/PM EZOLV Shows the time when the eighth most recent fault occurred.	No signal output available
U3-45 (3023)	Fault 9 YYYY	V/f OLV/PM EZOLV Shows the year when the ninth most recent fault occurred.	No signal output available
U3-46 (3024)	Fault 9 MMDD	V/f OLV/PM EZOLV Shows the month and day when the ninth most recent fault occurred.	No signal output available
U3-47 (3025)	Fault 9 HHMM	V/f OLV/PM EZOLV Shows the time when the ninth most recent fault occurred.	No signal output available
U3-48 (3026)	Fault 10 YYYY	V/f OLV/PM EZOLV Shows the year when the tenth most recent fault occurred.	No signal output available
U3-49 (3027)	Fault 10 MMDD	V/f OLV/PM EZOLV Shows the month and day when the tenth most recent fault occurred.	No signal output available
U3-50 (3028)	Fault 10 HHMM	V/f OLV/PM EZOLV Shows the time when the tenth most recent fault occurred.	No signal output available

◆ U4: Maintenance Monitors

No. (Hex.)	Name	Description	MFAO Signal Level
U4-01 (004C)	Total VFD Run Time	V/f OLV/PM EZOLV Shows the cumulative operation time of the drive. Use parameter *o4-01 [Elapsed Operating Time Setting]* to reset this monitor. Use parameter *o4-02 [Elapsed Operating Time Selection]* to select the cumulative operation times from: • The time from when the drive is energized until it is de-energized. • The time at which the Run command is turned ON. The maximum value that the monitor will show is *99999*. After this value is more than *99999*, the drive automatically resets it and starts to count from *0* again. Unit: 1 h **Note:** The MEMOBUS/Modbus communication data is shown in 10 h units. Use register 0099H for data in 1 h units.	10 V: 99999 h
U4-02 (0075)	Total Run Commands	V/f OLV/PM EZOLV Shows how many times that the drive has received a Run command. Use parameter *o4-13 [RUN Command Counter @ Initialize]* to reset this monitor. The maximum value that the monitor will show is *65535*. After this value is more than *65535*, the drive automatically resets it and starts to count from *0* again. Unit: 1	10 V: 65535 times

No. (Hex.)	Name	Description	MFAO Signal Level
U4-03 (0067)	Fan Elapsed Time	V/f OLV/PM EZOLV Shows the cumulative operation time of the cooling fans. Use parameter *o4-03 [Fan Operation Time Setting]* to reset this monitor. The maximum value that the monitor will show is *99999*. After this value is more than *99999*, the drive automatically resets it and starts to count from *0* again. Unit: 1 h **Note:** The MEMOBUS/Modbus communication data is shown in 10 h units. Use register 009BH for data in 1 h units.	10 V: 99999 h
U4-04 (007E)	Fan Life Mon	V/f OLV/PM EZOLV Shows the cumulative operation time of the cooling fans as a percentage of the estimated performance life of the cooling fans. The default value is 0. The value counts up from 0. Use *o4-03 [Fan Operation Time Setting]* to reset this monitor. Unit: 1% **Note:** Replace the cooling fans when this monitor is at 90%.	10 V: 100%
U4-05 (007C)	Capacitor Life Mon	V/f OLV/PM EZOLV Shows the operation time of the electrolytic capacitors for the main circuit and control circuit as a percentage of the estimated performance life of the electrolytic capacitors. The default value is 0. The value counts up from 0. Use *o4-05 [Capacitor Maintenance Setting]* to reset this monitor. Unit: 1% **Note:** Replace the electrolytic capacitor when this monitor is at 90%.	10 V: 100%
U4-06 (07D6)	PreChargeRelayMon	V/f OLV/PM EZOLV Shows the operation time of the soft charge bypass relay as a percentage of the estimated performance life of the soft charge bypass relay. The default value is 0. The value counts up from 0. Use *o4-07 [Softcharge Relay Maintenance Set]* to reset this monitor. Unit: 1% **Note:** Replace the drive when this monitor is at 90%.	10 V: 100%
U4-07 (07D7)	IGBT Maintenance	V/f OLV/PM EZOLV Shows the operation time of the IGBTs as a percentage of the estimated performance life of the IGBTs. The default value is 0. The value counts up from 0. Use *o4-09 [IGBT Maintenance Setting]* to reset this monitor. Unit: 1% **Note:** Replace the drive when this monitor is at 90%.	10 V: 100%
U4-08 (0068)	Heatsink Temp	V/f OLV/PM EZOLV Shows the heatsink temperature of the drive. Unit: 1 °C	10 V: 100 °C
U4-09 (005E)	LED Check	V/f OLV/PM EZOLV Turns on the LED Status Ring and all of the keypad LEDs to make sure that the LEDs operate correctly. 1. Set *o2-24 = 0 [LED Light Function Selection = Enable Status Ring & Keypad LED]*. 2. Push (↵) when *U4-09* is the top monitor shown on the keypad. All LEDs on the keypad and LED Status Ring will turn on. **Note:** When Safety input 2 CH is open (STo), READY will flash.	No signal output available
U4-10 (005C)	kWh, Lower 4 Digits	V/f OLV/PM EZOLV Shows the lower 4 digits of the watt hour value for the drive. Unit: 1 kWh **Note:** The watt hour is displayed in 9 digits. Monitor *U4-11 [kWh, Upper 5 Digits]* shows the upper 5 digits and *U4-10* shows the lower 4 digits. Example for 12345678.9 kWh: *U4-10*: 678.9 kWh *U4-11*: 12345 MWh	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U4-11 (005D)	kWh, Upper 5 Digits	V/f OLV/PM EZOLV Shows the upper 5 digits of the watt hour value for the drive. Unit: 1 MWh **Note:** Monitor *U4-11* shows the upper 5 digits and *U4-10 [kWh, Lower 4 Digits]* shows the lower 4 digits. Example for 12345678.9 kWh: *U4-10*: 678.9 kWh *U4-11*: 12345 MWh	No signal output available
U4-13 (07CF)	Peak Hold Current	V/f OLV/PM EZOLV Shows the hold value of the peak value (rms) for the drive output current. Use *U4-14 [PeakHold Output Freq]* to show the drive output frequency at the time that the drive holds the output current. The drive will hold the peak hold current at the next start up and restart of the power supply. The drive keeps the held value during baseblock (during stop). The keypad shows the value of *U4-13* in amperes (A). When you use serial communications to show the monitor, the current is "8192 = drive rated current (A)." Use the formula: "Numerals being displayed / 8192 × drive rated current (A)" to use the serial communication current value shown in the monitor. Unit: Determined by the drive model. • 0.01 A: 2011 to 2046, 4005 to 4014 • 0.1 A: 2059 to 2396, 4021 to 4720	No signal output available
U4-14 (07D0)	PeakHold Output Freq	V/f OLV/PM EZOLV Shows the output frequency at which the peak value (rms) of the drive output current is held. The peak hold current can be monitored by *U4-13 [Peak Hold Current]*. The peak hold output frequency will be cleared at the next startup and restart of the power supply. The drive keeps the value that was under hold during baseblock (during stop). Unit: 0.01 Hz	No signal output available
U4-16 (07D8)	Motor oL1 Level	V/f OLV/PM EZOLV Shows the integrated value of *oL1 [Motor Overload]* as a percentage of *oL1* detection level. Unit: 0.1%	10 V: 100%
U4-18 (07DA)	Reference Source	V/f OLV/PM EZOLV Shows the selected frequency reference source. The keypad shows the frequency reference source as "XY-nn" as specified by these rules: X: *External Reference 1/2 Selection [H1-xx = 2]* selection status • 1: *b1-01 [Frequency Reference Selection 1]* • 2: *b1-15 [Frequency Reference Selection 2]* Y-nn: Frequency reference source • 0-01: Keypad (*d1-01 [Reference 1]*) • 1-00: Analog input (unassigned) • 1-01: MFAI terminal A1 • 1-02: MFAI terminal A2 • 1-03: MFAI terminal A3 • 2-02 to 2-17: Multi-step speed reference (*d1-02 to d1-17 [Reference 2 to 16, Jog Reference]*) • 3-01: MEMOBUS/Modbus communications • 4-01: Communication option card • 5-01: Pulse train input • 7-01: DriveWorksEZ • 9-01: Up/Down command • B-00: Hand Reference 1 (Analog) • B-01: Hand Reference 1 (Y5-02) • C-01: Hand Reference 2 (Y5-05) **Note:** Display is Zero filled.	No signal output available
U4-19 (07DB)	Modbus FreqRef	V/f OLV/PM EZOLV Shows the frequency reference sent to the drive from the MEMOBUS/Modbus communications as a decimal. Unit: 0.01%	10 V: Maximum frequency (0 V to +10 V)
U4-20 (07DC)	Option Freq Ref	V/f OLV/PM EZOLV Shows the frequency reference sent to the drive from the communication option as a decimal. Unit: 0.01 %	10 V: Maximum frequency (0 V to +10 V)

No. (Hex.)	Name	Description	MFAO Signal Level
U4-21 (07DD)	Run Cmd Source	V/f OLV/PM EZOLV Shows the selected Run command source. The keypad shows the Run command source as “XY-nn" as specified by these rules: X: Run command • 0: OFF • 1: AUTO • 2: HAND • 3: JOG, Emergency Override Y: Run command source • 1: HOA Keypad, External terminals • 3: Memobus/Modbus communications • 4: Communication option card • 7: DriveWorksEZ nn: Run command limit status data • 00: No limit status. • 01: The Run command stayed ON when the drive stopped in Programming Mode. • 02: The Run command stayed ON when switching from HAND Mode to AUTO mode, or the Run command was entered during *oPE* at power-up while *b1-17 = 1 [Run Command at Power Up = Accept Existing RUN Command]*. • 03: The Run command is in standby after the drive was energized until the soft charge bypass contactor turns ON. **Note:** The drive will detect *Uv1 [DC Bus Undervoltage]* or *Uv [Undervoltage]* if the soft charge bypass contactor does not turn ON after 10 s. • 04: Will not restart after run stop. • 05: An MFDI terminal cased a Fast stop or you pushed OFF on the keypad to ramp the motor to stop. • 06: *b1-17 = 0 [Run Command at Power Up = Disregard Existing RUN Command]*. • 07: During baseblock while coast to stop with timer. • 08: Frequency reference is less than *E1-09 [Minimum Output Frequency]* during baseblock. • 09: Waiting for the Enter command from PLC. **Note:** Display is Zero filled.	No signal output available
U4-22 (07DE)	Modbus CmdData (hex)	V/f OLV/PM EZOLV Shows the operation signal (register 0001H) sent to the drive from MEMOBUS/Modbus communications as a 4-digit hexadecimal number (zero suppress). The keypad shows the operation signal as specified by these rules: bit0 : Forward run/Stop bit1 : Reverse run/Stop bit2 : External fault bit3 : Fault Reset bit4 : Multi-function input 1 bit5 : Multi-function input 2 bit6 : Multi-function input 3 bit7 : Multi-function input 4 bit8 : Multi-function input 5 bit9 : Multi-function input 6 bitA : Multi-function input 7 bitB : Multi-function input 8 bitC : Not used (normal value of 0). bitD : Not used (normal value of 0). bitE : Not used (normal value of 0). bitF : Not used (normal value of 0).	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U4-23 (07DF)	Option CmdData (hex)	V/f OLV/PM EZOLV Shows the operation signal (register 0001H) sent to the drive from MEMOBUS/Modbus communications as a 4-digit hexadecimal number. The keypad shows the operation signal as specified by these rules: bit 0 : Forward run/Stop bit 1 : Reverse run/Stop bit 2 : External fault bit 3 : Fault Reset bit 4 : Multi-function input 1 bit 5 : Multi-function input 2 bit 6 : Multi-function input 3 bit 7 : Multi-function input 4 bit 8 : Multi-function input 5 bit 9 : Multi-function input 6 bit A : Multi-function input 7 bit B : Multi-function input 8 bit C : Not used (normal value of 0). bit D : Not used (normal value of 0). bit E : Not used (normal value of 0). bit F : Not used (normal value of 0).	No signal output available
U4-24 (07E6)	Num of Runs (Low)	V/f OLV/PM EZOLV Shows the lower 4 digits of the drive run count. **Note:** The drive run count is an 8-digit number. Monitor *U4-25 [Number of Runs(High)]* shows the upper 4 digits and *U4-24* shows the lower 4 digits.	10 V: 9999
U4-25 (07E7)	Num of Runs(High)	V/f OLV/PM EZOLV Shows the upper 4 digits of the drive run count. **Note:** The drive run count is an 8-digit number. Monitor *U4-25* shows the upper 4 digits and *U4-24 [Number of Runs (Low)]* shows the lower 4 digits.	10 V: 65535
U4-52 (1592)	Network Torque Ref	V/f OLV/PM EZOLV Shows the torque reference that the drive received from a serial communication option card or from MEMOBUS/Modbus communications as a decimal number. Unit: 0.1%	10 V: 100% (0 V to +10 V)
U4-61 (3096) Expert	Total EMOVR Run Time	V/f OLV/PM EZOLV Shows the length of time that the drive operated in Emergency Override Mode. Unit: 1 min **Note:** • The maximum value is 60,000 min. • This monitor does not accumulate operation time when *S6-07 = 1 [EMOVR Fault Suppression Mode = Test Mode]*.	No signal output available
U4-63 (3098) Expert	Ripple Reg. Feedback	V/f OLV/PM EZOLV Shows the amount of DC Bus Voltage Ripple (raw value, before the ripple ramp is applied) 230 V Drives: 100% = 283 VDC 460 V Drives: 100% = 566 VDC 575 V Drives: 100% = 813 VDC Unit: 0.1%	10 V: 100.0%
U4-75 (1BC4)	Comm Option Type	V/f OLV/PM EZOLV Displays the protocol of the communication option currently connected to the drive. 1 : Modbus TCP/IP (SI-EM3) 2 : EtherNet/IP (SI-EN3) or PROFINET (SI-EP3) 9 : DeviceNet (SI-N3) 10 : BACNet (SI-B3) A : PROFIBUS-DP (SI-P3) B : CANopen (SI-S3) 11 : LONWORKS (SI-W3) 13 : Metasys N2/Apogee FLN P1 70 : Protocol not set (JOHB-SMP3) 71 : Modbus TCP/IP (JOHB-SMP3) 72 : EtherNet/IP (JOHB-SMP3) 74 : EtheCAT(JOHB-SMP3) 75 : BACnet/IP(JOHB-SMP3) 78 : PROFINET (JOHB-SMP3) FF : Communication Option not Connected	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U4-76 (1BC5)	MAC Address1 1, 2	V/f OLV/PM EZOLV Displays the first and second octets of MAC address 1. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-77 (1BC6)	MAC Address1 3, 4	V/f OLV/PM EZOLV Displays the third and fourth octets of MAC address 1. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-78 (1BC7)	MAC Address1 5, 6	V/f OLV/PM EZOLV Displays the fifth and sixth octets of MAC address 1. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-79 (1BC8) Expert	MAC Address2 1, 2	V/f OLV/PM EZOLV Displays the first and second octets of MAC address 2. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-80 (1BC9) Expert	MAC Address2 3, 4	V/f OLV/PM EZOLV Displays the third and fourth octets of MAC address 2. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-81 (1BCA) Expert	MAC Address2 5, 6	V/f OLV/PM EZOLV Displays the fifth and sixth octets of MAC address 2. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-82 (1BCB) Expert	MAC Address3 1, 2	V/f OLV/PM EZOLV Displays the first and second octets of MAC address 3. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-83 (1BCC) Expert	MAC Address3 3, 4	V/f OLV/PM EZOLV Displays the third and fourth octets of MAC address 3. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-84 (1BCD) Expert	MAC Address3 5, 6	V/f OLV/PM EZOLV Displays the fifth and sixth octets of MAC address 3. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available

◆ U5: PID Monitors

No. (Hex.)	Name	Description	MFAO Signal Level
U5-01 (0057)	PID Feedback	V/f OLV/PM EZOLV Shows the PID control feedback value. Unit: 0.01% **Note:** • Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution. • You must use an analog monitor option card AO-A3 to output negative values.	10 V = Maximum frequency (-10 V to +10 V)
U5-02 (0063)	PID Input	V/f OLV/PM EZOLV Shows the change between the PID setpoint and PID feedback (the quantity of PID input) as a percentage of the maximum output frequency. Unit: 0.01%	10 V: Maximum frequency (0 V to +10 V)
U5-03 (0064)	PID Output	V/f OLV/PM EZOLV Shows the PID control output as a percentage of the maximum output frequency. Unit: 0.01%	10 V: Maximum frequency (0 V to +10 V)

No. (Hex.)	Name	Description	MFAO Signal Level
U5-04 (0065)	PID Setpoint	V/f OLV/PM EZOLV Shows the PID setpoint. Unit: 0.01% **Note:** • Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution. • You must use an analog monitor option card AO-A3 to output negative values.	10 V = Maximum frequency (-10 V to +10 V)
U5-05 (07D2)	PID Diff Fdbk	V/f OLV/PM EZOLV Shows the PID differential feedback value as a percentage of the maximum output frequency. This monitor is available after you set *H3-02, H3-10, or H3-06 = 16 [MFAI Function Selection = Differential PID Feedback]*. Unit: 0.01%	10 V = Maximum frequency (-10 V to +10 V)
U5-06 (07D3)	PID Fdbk-Diff Fdbk	V/f OLV/PM EZOLV Shows the difference from calculating *U5-05 - U5-01 [PID Diff Fdbk] - [PID Feedback]*. Unit: 0.01% **Note:** *U5-01 [PID Feedback] = U5-06* when *H3-02, H3-10, or H3-06 ≠ 16 [MFAI Function Selection ≠ Differential PID Feedback]*.	10 V = Maximum frequency (-10 V to +10 V)
U5-14 (086B)	PID Out2 Upper 4	V/f OLV/PM EZOLV Shows the custom PI output. Monitor *U5-14* shows the upper four digits and *U5-15 [PID Out2 Lower 4]* shows the lower four digits. The drive uses *b5-43 [PID Out2 Monitor MAX Upper4 Dig]* and *b5-44 [PID Out2 Monitor MAX Lower4 Dig]* to scale the monitors. Unit: 1 **Note:** Parameter *b5-41 [PID Output 2 Unit]* sets the display unit.	10 V = b5-43 × 10000
U5-15 (086C)	PID Out2 Lower 4	V/f OLV/PM EZOLV Shows the custom PI output. Monitor *U5-15* shows the lower four digits and *U5-14 [PID Out2 Upper 4]* shows the upper four digits. The drive uses *b5-43 [PID Out2 Monitor MAX Upper4 Dig]* and *b5-44 [PID Out2 Monitor MAX Lower4 Dig]* to scale the monitors. Unit: 0.01 **Note:** Parameter *b5-41 [PID Output 2 Unit]* sets the display unit.	b5-43 > 0: 10 V = 10000 b5-43 = 0: 10 V = b5-44
U5-17 (086E)	PI2 Setpoint	V/f OLV/PM EZOLV Shows the PI2 Control setpoint. **Note:** Parameters *S3-04 [PI2 Control Unit Selection]* and *S3-03 [PI2 Control Decimal Place Pos]* set the unit and resolution.	10 V = S3-02
U5-18 (086F)	PI2 Feedback	V/f OLV/PM EZOLV Shows the PI2 Control Feedback Level from the terminal set for *H3-xx = 26 [PI2 Control Feedback]*. **Note:** Parameters *S3-04 [PI2 Control Unit Selection]* and *S3-03 [PI2 Control Decimal Place Pos]* set the unit and resolution.	10 V = S3-02
U5-19 (0870)	PI2 Control Input	V/f OLV/PM EZOLV Shows the PI2 Control input (deviation between PI target and feedback). **Note:** Parameters *S3-04 [PI2 Control Unit Selection]* and *S3-03 [PI2 Control Decimal Place Pos]* set the unit and resolution.	10 V = S3-02
U5-20 (0871)	PI2 Control Output	V/f OLV/PM EZOLV Shows the PI2 Control output. **Note:** • Parameters *S3-04 [PI2 Control Unit Selection]* and *S3-03 [PI2 Control Decimal Place Pos]* set the unit and resolution. • The drive operation while *H1-xx = A8 or 1A8 [PI2 Control Disable]* changes when the *S3-12 [PI2 Control Disable Mode Sel]* setting changes.	10 V = S3-02
U5-30 (3000)	Time Hr Min HHMM	V/f OLV/PM EZOLV Shows the current time (Hours and Minutes).	No signal output available
U5-31 (3001)	Date Year	V/f OLV/PM EZOLV Shows the current year.	No signal output available
U5-32 (3002)	Date Mo Day MMDD	V/f OLV/PM EZOLV Shows the current date (Month and Date).	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U5-33 (3003)	Date Week	V/f OLV/PM EZOLV Shows the current date of the week. bit 0 : Sunday bit 1 : Monday bit 2 : Tuesday bit 3 : Wednesday bit 4 : Thursday bit 5 : Friday bit 6 : Saturday bit 7 : Not used (normal value of 0).	No signal output available
U5-99 (1599)	Setpoint	V/f OLV/PM EZOLV Shows the PID setpoint command. Unit: 0.01% **Note:** • Parameters *Y1-02 [PID Unit Display Selection]*, *Y1-03 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, scaling, and resolution. • You must use an analog monitor option card AO-A3 to output negative values.	10 V = Maximum frequency (-10 V to +10 V)

◆ U6: Operation Status Monitors

No. (Hex.)	Name	Description	MFAO Signal Level
U6-01 (0051)	Iq SEC Current	V/f OLV/PM EZOLV Shows the value calculated for the motor secondary current (q-Axis) as a percentage of the motor rated secondary current. Unit: 0.1%	10 V: Motor secondary rated current (0 V to +10 V)
U6-02 (0052)	Id EXC Current	V/f OLV/PM EZOLV Shows the value calculated for the motor excitation current (d-Axis) as a percentage of the motor rated secondary current. Unit: 0.1%	10 V: Motor secondary rated current (0 V to +10 V)
U6-03 (0054)	ASR Input	V/f OLV/PM EZOLV Shows the ASR input value as a percentage of the maximum frequency. Unit: 0.01%	10 V: Maximum frequency (0 V to +10 V)
U6-04 (0055)	ASR Output	V/f OLV/PM EZOLV Shows the ASR output value as a percentage of the motor rated secondary current. Unit: 0.01%	10 V: Motor secondary rated current (0 V to +10 V)
U6-05 (0059)	Voltage Ref (Vq)	V/f OLV/PM EZOLV Shows the drive internal voltage reference for motor secondary current control (q-Axis). Unit: 0.1 V **Note:** You must use an analog monitor option card AO-A3 to output negative values.	208 V class: 10 V = 200 Vrms 480 V class: 10 V = 400 Vrms (-10 V to +10 V)
U6-06 (005A)	Voltage Ref (Vd)	V/f OLV/PM EZOLV Shows the drive internal voltage reference for motor excitation current control (d-Axis). Unit: 0.1 V **Note:** You must use an analog monitor option card AO-A3 to output negative values.	208 V class: 10 V = 200 Vrms 480 V class: 10 V = 400 Vrms (-10 V to +10 V)
U6-10 (07C1) Expert	ContAxisDeviation	V/f OLV/PM EZOLV Shows the deviation between the γδ-Axis that the drive uses for motor control and the dq-Axis. Unit: 0.1 ° **Note:** You must use an analog monitor option card AO-A3 to output negative values.	5 V: 180 ° (-10 V to +10 V)
U6-14 (07CB) Expert	MagPolePosn(Obs)	V/f OLV/PM EZOLV Shows the value of the flux position estimation. Unit: 0.1 ° **Note:** You must use an analog monitor option card AO-A3 to output negative values.	10 V: 180 ° (-10 V to +10 V)
U6-17 (07D1) Expert	Energy Save Coeff	V/f OLV/PM EZOLV Shows the total time of direction of motor rotation detections for Speed Estimation Speed Searches. This value adjusts *b3-26 [Direction Determination Level]*. **Note:** Upper limit is +32767 and lower limit is -32767.	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U6-20 (07D4)	UP/DOWN 2 Bias Value	V/f OLV/PM EZOLV Shows the bias value used to adjust the frequency reference. Unit: 0.1%	10 V: Maximum Frequency
U6-31 (007B)	TorqueDetect Monitor	V/f OLV/PM EZOLV Monitors the torque reference or the output current after applying the filter. Unit: 0.1%	10 V:100%
U6-36 (0720) Expert	Comm Errors-Host	V/f OLV/PM EZOLV Shows the number of inter-CPU communication errors. When you de-energize the drive, this value resets to 0.	No signal output available
U6-37 (0721) Expert	Comm Errors-Sensor	V/f OLV/PM EZOLV Shows the number of inter-CPU communication errors. When you de-energize the drive, this value resets to 0.	No signal output available
U6-57 (07C4)	PolePolarityDeterVal	V/f OLV/PM EZOLV Shows the change from the integrated current when the drive finds the polarity. Unit: 1 **Note:** If the change from the integrated current is less than 819, increase *n8-84 [Polarity Detection Current]*. *U6-57 = 8192* is equivalent to the motor rated current.	No signal output available
U6-80 (07B0)	Option IP Address 1	V/f OLV/PM EZOLV Shows the currently available local IP Address (1st octet).	No signal output available
U6-81 (07B1)	Option IP Address 2	V/f OLV/PM EZOLV Shows the currently available local IP Address (2nd octet).	No signal output available
U6-82 (07B2)	Option IP Address 3	V/f OLV/PM EZOLV Shows the currently available local IP Address (3rd octet).	No signal output available
U6-83 (07B3)	Option IP Address 4	V/f OLV/PM EZOLV Shows the currently available local IP Address (4th octet).	No signal output available
U6-84 (07B4)	Online Subnet 1	V/f OLV/PM EZOLV Shows the currently available subnet mask (1st octet).	No signal output available
U6-85 (07B5)	Online Subnet 2	V/f OLV/PM EZOLV Shows the currently available subnet mask (2nd octet).	No signal output available
U6-86 (07B6)	Online Subnet 3	V/f OLV/PM EZOLV Shows the currently available subnet mask (3rd octet).	No signal output available
U6-87 (07B7)	Online Subnet 4	V/f OLV/PM EZOLV Shows the currently available subnet mask (4th octet).	No signal output available
U6-88 (07B8)	Online Gateway 1	V/f OLV/PM EZOLV Shows the currently available Gateway address (1st octet).	No signal output available
U6-89 (07B9)	Online Gateway 2	V/f OLV/PM EZOLV Shows the currently available Gateway address (2nd octet).	No signal output available
U6-90 (07F0)	Online Gateway 3	V/f OLV/PM EZOLV Shows the currently available Gateway address (3rd octet).	No signal output available
U6-91 (07F1)	Online Gateway 4	V/f OLV/PM EZOLV Shows the currently available Gateway address (4th octet).	No signal output available
U6-92 (07F2)	Online Speed	V/f OLV/PM EZOLV Shows the currently available communications speed. 10: 10 Mbps 100: 100 Mbps	No signal output available
U6-93 (07F3)	Online Duplex	V/f OLV/PM EZOLV Shows the currently available Duplex setting.	No signal output available
U6-97 (07F7)	OPT SPARE 4	V/f OLV/PM EZOLV Shows the option software version when you use the JOHB-SMP3 option. **Note:** When you use other options, refer to the Instruction Manual for the option.	No signal output available
U6-98 (07F8)	First Fault	V/f OLV/PM EZOLV Shows the contents of the most recent communication options fault (Modbus TCP/IP, EtherNet/IP).	No signal output available
U6-99 (07F9)	Current Fault	V/f OLV/PM EZOLV Shows the contents of current fault from communication options (Modbus TCP/IP, EtherNet/IP).	No signal output available

◆ U8: DriveWorksEZ Monitors

No. (Hex.)	Name	Description	MFAO Signal Level
U8-01 (1950)	DWEZ Monitor 1	V/f OLV/PM EZOLV Shows DWEZ Monitor 1. (Display range: 0.00% to 999.99%) Unit: 0.01%	10 V = 100%
U8-02 (1951)	DWEZ Monitor 2	V/f OLV/PM EZOLV Shows DWEZ Monitor 2. (Display range: 0.00% to 999.99%) Unit: 0.01%	10 V = 100%
U8-03 (1952)	DWEZ Monitor 3	V/f OLV/PM EZOLV Shows DWEZ Monitor 3. (Display range: 0.00% to 999.99%) Unit: 0.01%	10 V = 100%
U8-04 (1953)	DWEZ Monitor 4	V/f OLV/PM EZOLV Shows DWEZ Monitor 4. (Display range: 0.00% to 999.99%) Unit: 0.01%	10 V = 100%
U8-05 (1954)	DWEZ Monitor 5	V/f OLV/PM EZOLV Shows DWEZ Monitor 5. (Display range: 0.00% to 999.99%) Unit: 0.01%	10 V = 100%
U8-06 (1955)	DWEZ Monitor 6	V/f OLV/PM EZOLV Shows DWEZ Monitor 6. (Display range: 0.00% to 999.99%) Unit: 0.01%	10 V = 100%
U8-07 (1956)	DWEZ Monitor 7	V/f OLV/PM EZOLV Shows DWEZ Monitor 7. (Display range: -999.9% to +999.99%) Unit: 0.01%	10 V = 100%
U8-08 (1957)	DWEZ Monitor 8	V/f OLV/PM EZOLV Shows DWEZ Monitor 8. (Display range: -999.9% to +999.99%) Unit: 0.01%	10 V = 100%
U8-09 (1958)	DWEZ Monitor 9	V/f OLV/PM EZOLV Shows DWEZ Monitor 9. (Display range: -999.9% to +999.99%) Unit: 0.01%	10 V = 100%
U8-10 (1959)	DWEZ Monitor 10	V/f OLV/PM EZOLV Shows DWEZ Monitor 10.	No signal output available
U8-11 (195A)	DWEZ Version 1	V/f OLV/PM EZOLV Shows the Upper three digits of the user ID. When you click the setting button on the title bar of the PC tool to open the setting screen, you can confirm the user ID with the primary user ID display.	No signal output available
U8-12 (195B)	DWEZ Version 2	V/f OLV/PM EZOLV Shows the lower five digits of the user ID. When you click the setting button on the title bar of the PC tool to open the setting screen, you can confirm the user ID with the primary user ID display.	No signal output available
U8-13 (195C)	DWEZ Version 3	V/f OLV/PM EZOLV Shows the software ID.	No signal output available
U8-18 (1961)	DWEZ Platform Ver	V/f OLV/PM EZOLV Shows the DriveWorksEZ platform version.	No signal output available
U8-21 (1964)	DWEZ Monitor 21	V/f OLV/PM EZOLV Shows DWEZ Monitor 21. (Display range: -999.9% to +999.99%) Unit: 0.01%	10 V = 100%
U8-22 (1965)	DWEZ Monitor 22	V/f OLV/PM EZOLV Shows DWEZ Monitor 22. Unit: The number of decimal points shown is set with Q2-21.	10 V = 100%
U8-23 (1966)	DWEZ Monitor 23	V/f OLV/PM EZOLV Shows DWEZ Monitor 23. Unit: The number of decimal points shown is set with Q2-22.	10 V = 100%
U8-24 (1967)	DWEZ Monitor 24	V/f OLV/PM EZOLV Shows DWEZ Monitor 24. Unit: The number of decimal points shown is set with Q2-23.	10 V = 100%
U8-25 (1968)	DWEZ Monitor 25	V/f OLV/PM EZOLV Shows DWEZ Monitor 25. Unit: The number of decimal points shown is set with Q2-24.	10 V = 100%

No. (Hex.)	Name	Description	MFAO Signal Level
U8-31 (196E)	DWEZ Monitor 31	V/f OLV/PM EZOLV Shows DWEZ Monitor 31. (Display range: 0.00% to 999.99%) Unit: 0.01%	10 V = 100%
U8-32 (196F)	DWEZ Monitor 32	V/f OLV/PM EZOLV Shows DWEZ Monitor 32. (Display range: 0.00% to 999.99%) Unit: 0.01%	10 V = 100%
U8-33 (1970)	DWEZ Monitor 33	V/f OLV/PM EZOLV Shows DWEZ Monitor 33. (Display range: 0.00% to 999.99%) Unit: 0.01%	10 V = 100%
U8-34 (1971)	DWEZ Monitor 34	V/f OLV/PM EZOLV Shows DWEZ Monitor 34. (Display range: 0.00% to 999.99%) Unit: 0.01%	10 V = 100%
U8-35 (1972)	DWEZ Monitor 35	V/f OLV/PM EZOLV Shows DWEZ Monitor 35. (Display range: 0.00% to 999.99%) Unit: 0.01%	10 V = 100%
U8-36 (1973)	DWEZ Monitor 36	V/f OLV/PM EZOLV Shows DWEZ Monitor 36. (Display range: 0.00% to 999.99%) Unit: 0.01%	10 V = 100%
U8-37 (1974)	DWEZ Monitor 37	V/f OLV/PM EZOLV Shows DWEZ Monitor 37. (Display range: -999.9% to +999.99%) Unit: 0.01%	10 V = 100%
U8-38 (1975)	DWEZ Monitor 38	V/f OLV/PM EZOLV Shows DWEZ Monitor 38. (Display range: -999.9% to +999.99%) Unit: 0.01%	10 V = 100%
U8-39 (1976)	DWEZ Monitor 39	V/f OLV/PM EZOLV Shows DWEZ Monitor 39. (Display range: -999.9% to +999.99%) Unit: 0.01%	10 V = 100%
U8-40 (1977)	DWEZ Monitor 40	V/f OLV/PM EZOLV Shows DWEZ Monitor 40.	No signal output available
U8-51 (1982)	DWEZ Monitor 51	V/f OLV/PM EZOLV Shows DWEZ Monitor 51. (Display range: -999.9% to +999.99%) Unit: 0.01%	10 V = 100%
U8-52 (1983)	DWEZ Monitor 52	V/f OLV/PM EZOLV Shows DWEZ Monitor 52. Unit: The number of decimal points shown is set with Q2-41.	10 V = 100%
U8-53 (1984)	DWEZ Monitor 53	V/f OLV/PM EZOLV Shows DWEZ Monitor 53. Unit: The number of decimal points shown is set with Q2-42.	10 V = 100%
U8-54 (1985)	DWEZ Monitor 54	V/f OLV/PM EZOLV Shows DWEZ Monitor 54. Unit: The number of decimal points shown is set with Q2-43.	10 V = 100%
U8-55 (1986)	DWEZ Monitor 55	V/f OLV/PM EZOLV Shows DWEZ Monitor 55. Unit: The number of decimal points shown is set with Q2-44.	10 V = 100%
U8-60 (198B)	RemoteIO Status	V/f OLV/PM EZOLV Shows the operation status of Remote IO as 1 (ON) and 0 (OFF). If the DriveWorksEZ MEMOBUS master active signal is ON, for example, the monitor shows *U8-60 = 00000001*. bit 0 : Bit 0: DriveWorksEZ MEMOBUS Master Active bit 1 : Not used (normal value of 0) bit 2 : Not used (normal value of 0) bit 3 : Not used (normal value of 0) bit 4 : Not used (normal value of 0) bit 5 : Not used (normal value of 0) bit 6 : Not used (normal value of 0) bit 7 : Not used (normal value of 0)	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U8-61 (198C)	RemoteDI Monitor 0-7bit	V/f OLV/PM EZOLV Shows the operation status of Remote DI1 to DI8 as 1 (ON) and 0 (OFF). If Remote DI1 and DI2 are ON, for example, the monitor shows *U8-61 = 00000011*. bit 0 : Remote DI1 bit 1 : Remote DI2 bit 2 : Remote DI3 bit 3 : Remote DI4 bit 4 : Remote DI5 bit 5 : Remote DI6 bit 6 : Remote DI7 bit 7 : Remote DI8	No signal output available
U8-62 (198D)	RemoteDI Monitor 8-Fbit	V/f OLV/PM EZOLV Shows the operation status of Remote DI9 to DI16 as 1 (ON) and 0 (OFF). If Remote DI9 and DI10 are ON, for example, the monitor shows *U8-62 = 00000011*. bit 0 : Remote DI9 bit 1 : Remote DI10 bit 2 : Remote DI11 bit 3 : Remote DI12 bit 4 : Remote DI13 bit 5 : Remote DI14 bit 6 : Remote DI15 bit 7 : Remote DI16	No signal output available
U8-63 (198E)	RemoteDO Monitor 0-7bit	V/f OLV/PM EZOLV Shows the operation status of Remote DO1 to DO8 as 1 (ON) and 0 (OFF). If Remote DO1 and DO2 are ON, for example, the monitor shows *U8-63 = 00000011*. bit 0 : Remote DO1 bit 1 : Remote DO2 bit 2 : Remote DO3 bit 3 : Remote DO4 bit 4 : Remote DO5 bit 5 : Remote DO6 bit 6 : Remote DO7 bit 7 : Remote DO8	No signal output available
U8-64 (198F)	RemoteDO Monitor 8-Fbit	V/f OLV/PM EZOLV Shows the operation status of Remote DO9 to DO16 as 1 (ON) and 0 (OFF). If Remote DO9 and DO10 are ON, for example, the monitor shows *U8-64 = 00000011*. bit 0 : Remote DO9 bit 1 : Remote DO10 bit 2 : Remote DO11 bit 3 : Remote DO12 bit 4 : Remote DO13 bit 5 : Remote DO14 bit 6 : Remote DO15 bit 7 : Remote DO16	No signal output available

◆ UA: Network Multiplexing

No. (Hex.)	Name	Description	MFAO Signal Level
UA-01 (1EC1)	Network PID Feedback	V/f OLV/PM EZOLV Network PID Feedback recognized by the iQpump Memobus Network. Unit: 0.1 PSI	No signal output available
UA-02 (1EC2)	Network Activity	V/f OLV/PM EZOLV Shows network traffic. A fluctuating number from 0.0% to 100.0% identifies activity, while a relatively constant 0.0% identifies no activity. The unit is followed by an identifier that changes based on network status: <->: Drive cannot communicate to other drives <+>: Drive is a Node on a network <M>: Drive is the Master on an iQpump Network Unit: 0.1%	No signal output available
UA-03 (1EC3)	Time to Alternation	V/f OLV/PM EZOLV Time remaining before a drive requests alternation, which is dependent on *Y9-04 [Alternation Mode]*. Unit: 1 min	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
UA-04 (1EC4)	Running Queue No	V/f OLV/PM EZOLV Position in the iQpump MEMOBUS Multiplex Running Queue.	No signal output available
UA-05 (1EC5)	iQ Drives Running	V/f OLV/PM EZOLV Drives that are running on the MEMOBUS Network. Bit positions correspond to the node address: bit 0 -> address 01h… bit 7 -> address 08h.	No signal output available
UA-06 (1EC6)	iQ Drives Available	V/f OLV/PM EZOLV Drives that can be controlled on the MEMOBUS Network. Bit positions correspond to the node address: bit 0 -> address 01h, bit 1 -> address 02h … bit 7 -> address 08h.	No signal output available
UA-07 (1EC7)	VFD Run Time+Offset	V/f OLV/PM EZOLV Shows the cumulative run time of the drive added to the run time offset set in *Y9-55 [VFD Run Time Offset]*. The maximum value that this monitor can display is 65535. Network multiplex refers to this monitor value for run time selection when *Y9-01 = 1 [Lead Drive Selection: Lowest Runtime]*. Check *U4-01 [Total VFD Run Time]* for only the cumulative run time of the drive and for values higher than 65535. Unit: 1 H	No signal output available
UA-79 (37AF)	PID Feedback Backup	V/f OLV/PM EZOLV Shows the PID Feedback Backup *[H3-xx = 24]* signal that the drive uses when it loses PID Feedback *[H3-xx = B]*. Unit: 0.1 PSI	No signal output available
UA-81 (3BB0)	Diff Level Source	V/f OLV/PM EZOLV Shows the Differential Feedback signal from the terminal set for *H3-xx = 2D [Differential Level Source]*. Unit: 0.1 PSI	No signal output available
UA-83 (3B9E)	Flow Rate	V/f OLV/PM EZOLV Shows the flow rate based on the pulse input frequency or the analog voltage (flow rate input) and *Y6-01 [Flow Meter Scaling]* and *Y6-04 [Water Flow Units]*. **Note:** • A 2-second first order filter is applied to this monitor. • Unit text is set by *Y6-04* and decimal place position is set by *Y6-22 [Flow Meter Decimal Place Pos]*. Unit: 0.1	Full Scale: Y6-01
UA-84 (3B9F)	AccumLvl - Millions	V/f OLV/PM EZOLV Monitors *UA-84* to *UA-87* display the volume recorded from the flow meter (Pulse Input or Analog). Total Volume = (*UA-84* × 1000000) + (*UA-85* × 1000) + *UA-86* + *UA-87* **Note:** Unit text depends on *Y6-16 [Flow Meter Accumulation Units]*. Unit: 1 - 0.0001	No signal output available
UA-85 (3BA0)	AccumLvl - Thousands	V/f OLV/PM EZOLV Monitors *UA-84* to *UA-87* display the volume recorded from the flow meter (Pulse Input or Analog). Total Volume = (*UA-84* × 1000000) + (*UA-85* × 1000) + *UA-86* + *UA-87* **Note:** Unit text depends on *Y6-16 [Flow Meter Accumulation Units]*. Unit: 1 - 0.0001	No signal output available
UA-86 (3BA1)	AccumLvl - Ones	V/f OLV/PM EZOLV Monitors *UA-84* to *UA-87* display the volume recorded from the flow meter (Pulse Input or Analog). Total Volume = (*UA-84* × 1000000) + (*UA-85* × 1000) + *UA-86* + *UA-87* **Note:** Unit text depends on *Y6-16 [Flow Meter Accumulation Units]*. Unit: 1 - 0.0001	No signal output available
UA-87 (3BA2)	AccumLvl - Decimals	V/f OLV/PM EZOLV Monitors *UA-84* to *UA-87* display the volume recorded from the flow meter (Pulse Input or Analog). Total Volume = (*UA-84* × 1000000) + (*UA-85* × 1000) + *UA-86* + *UA-87* **Note:** Unit text depends on *Y6-16 [Flow Meter Accumulation Units]*. Unit: 1 - 0.0001	No signal output available
UA-88 (3BA3)	Total Volume Accum	V/f OLV/PM EZOLV Displays the total accumulated volume. **Note:** • This monitor will always return 0 when read over MEMOBUS. • Unit text and decimal place depend on *Y6-16 [Flow Meter Accumulation Units]*. No decimal places are displayed for gallons. Four decimal places are displayed for Acre-Feet. Unit: 0.0001	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
UA-89 (3BA4)	Delta Volume Accum	V/f OLV/PM EZOLV Displays the delta of the total accumulated volume. Delta Volume Accumulated = Total Volume - Starting Delta Volume [(*UA-84* to *UA-87* or *UA-88*) - (*Y6-36* to *Y6-39*)] **Note:** • This monitor will always return 0 when read over MEMOBUS. • Unit text and decimal place depend on *Y6-16 [Flow Meter Accumulation Units]*. No decimal places are displayed for gallons. Four decimal places are displayed for Acre-Feet. Unit: 0.0001	No signal output available
UA-90 (3BA5)	Pump Setpoint	V/f OLV/PM EZOLV Shows the PID Setpoint. Unit: 0.01 **Note:** Units set by *Y1-02 [System Units]*, internal scaling by *Y1-03 [Feedback Device Scaling]*, and resolution by *b5-39 [PID User Unit Display Digits]*.	No signal output available
UA-91 (3BA6)	Pump Feedback	V/f OLV/PM EZOLV Shows the PID Feedback. Unit: 0.01 **Note:** Units set by *Y1-02 [System Units]*, internal scaling by *Y1-03 [Feedback Device Scaling]*, and resolution by *b5-39 [PID User Unit Display Digits]*.	10 V = *Y1-03*
UA-92 (3BA7)	Pump Status	V/f OLV/PM EZOLV Shows pump running status where 0 = (OFF) and 1 = (Running). For example, *UA-92* shows "00111111" when the drive and Pump 2 to Pump 6 are running. bit 0 : Drive bit 1 : Pump 2 bit 2 : Pump 3 bit 3 : Pump 4 bit 4 : Pump 5 bit 5 : Pump 6 bit 6 : Not used (normal value of 0). bit 7 : Not used (normal value of 0).	No signal output available
UA-93 (3BA8)	Total Setpoint Comp.	V/f OLV/PM EZOLV Shows the total setpoint compensation in absolute value. Unit: 0.01 **Note:** Units set by *Y1-02 [System Units]*, internal scaling by *Y1-03 [Feedback Device Scaling]*, and resolution by *b5-39 [PID User Unit Display Digits]*.	No signal output available
UA-94 (3BA9)	Motor Speed	V/f OLV/PM EZOLV Shows the absolute value of *U1-02 [Output Frequency]* converted to RPM. Unit: 1 RPM	No signal output available
UA-96 (3BAB)	PI Aux Ctrl Feedback	V/f OLV/PM EZOLV Shows the PI Auxiliary Control Feedback level from the terminal set for *H3-xx = 27 [PI Auxiliary Control Feedback]*. Unit: 1 PSI **Note:** Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	No signal output available
UA-97 (3BAC)	Water Level	V/f OLV/PM EZOLV Displays the amount of water above the water level sensor. [LPF] Unit: 0.1 ft	10 V = Yd-02
UA-98 (3BAD)	Suction Pressure	V/f OLV/PM EZOLV Shows the amount of suction pressure. Unit: 0.1 **Note:** Unit is dependent on *YE-01 [Suction Pressure Control Select]* where setting 1 is PSI and setting 2 is "Hg, and decimal place position is dependent on *YE-22 [Suction Pressure Dec Place Pos]*.	10 V = YE-02
UA-99 (3BB1)	Anti-No-Flow Timer	V/f OLV/PM EZOLV Shows the value of the anti-no-flow timer. When this value is at the *Y2-24 [Anti-No-Flow Detection Time]* setting, the anti-no-flow feature starts to decrease the output frequency. Unit: 0.1 s	No signal output available

5.18 Parameters that Change from the Default Settings with A1-02 [Control Method Selection]

The values for parameter *A1-02* changes the default settings for the parameters in these tables:

◆ A1-02 = 0 [V/f]

No.	Name	Range	Unit	Control Method (A1-02 Setting)
				V/f (0)
b2-04	DC Inject Braking Time at Stop	0.00 - 10.00	0.01 s	0.50
b2-13	Short Circuit Brake Time @ Stop	0.00 - 25.50	0.01 s	-
b3-08	Speed Estimation ACR P Gain	0.00 - 6.00	0.01	0.50 *1
b3-09	Speed Estimation ACR I Time	0.0 - 1000.0	0.1 ms	2.0
b3-10	Speed Estimation Detection Gain	1.00 - 1.20 *2	0.01	1.05
b3-14	Bi-directional Speed Search	0 - 1	1	0 *3
b3-24	Speed Search Method Selection	1 - 2	1	2
b8-19	E-Save Search Injection Freq	10 - 300	1 Hz	-
C2-01	S-Curve Time @ Start of Accel	0.00 - 10.00	0.01 s	0.20
C3-02	Slip Compensation Delay Time	0 - 10000	1 ms	2000
C4-01	Torque Compensation Gain	0.00 - 2.50	0.01	1.00
C4-02	Torque Compensation Delay Time	0 - 60000	1 ms	200
C5-01	ASR Proportional Gain 1	0.00 - 300.00	0.01	-
C5-02	ASR Integral Time 1	0.000 - 60.000	0.001 s	-
C5-03	ASR Proportional Gain 2	0.00 - 300.00	0.01	-
C5-04	ASR Integral Time 2	0.000 - 60.000	0.001 s	-
C5-06	ASR Delay Time	0.000 - 0.500	0.001 s	-
C6-02	Carrier Frequency Selection	1 - F	7	7 *1
E1-04	Maximum Output Frequency	40.0 - 400.0 *4	0.1 Hz	60.0 *5
E1-05	Maximum Output Voltage	0.0 - 255.0 *6	0.1 V	230.0 *5
E1-06	Base Frequency	0.0 - 400.0 *4	0.1 Hz	60.0 *5
E1-09	Minimum Output Frequency	0.0 - 400.0 *4	0.1 Hz	1.5 *5
L1-01	Motor Overload (oL1) Protection	0 - 6	1	2
L2-31	KEB Start Voltage Offset Level	0 - 100 *6	1 V	0
L3-05	Stall Prevention during RUN	0 - 3	1	2
L3-20	DC Bus Voltage Adjustment Gain	0.00 - 5.00	0.01	1.00
n8-51	Pull-in Current @ Acceleration	0 - 200	1%	-
o1-03	Frequency Display Unit Selection	0 - 3	1	0
o1-28	Custom Monitor 5	0, 101 - 1099	1	116

*1 The default setting changes when the setting for *o2-04 [Drive Model Selection]* changes.
*2 The setting range changes when the *A1-02 [Control Method Selection]* setting changes.
*3 When *b3-24 = 1*, the default value is 1.
*4 The setting range varies depending on the setting of *E5-01 [PM Motor Code Selection]* when *A1-02 = 5 [Control Method Selection = PM Open Loop Vector]*.
*5 The default setting changes when the drive model and *E1-03 [V/f Pattern Selection]* change.
*6 This is the value for 208 V class drives. Double the value for 480 V class drives.

◆ A1-02 = 5 and 8 [OLV/PM and EZOLV]

No.	Name	Range	Unit	Control Method (A1-02 Setting)	
				OLV/PM (5)	EZOLV (8)
b2-04	DC Inject Braking Time at Stop	0.00 - 10.00	0.01 s	0.00	0.00
b2-13	Short Circuit Brake Time @ Stop	0.00 - 25.50	0.01 s	0.50	0.00 *1
b3-08	Speed Estimation ACR P Gain	0.00 - 6.00	0.01	0.30	0.60 *2
b3-09	Speed Estimation ACR I Time	0.0 - 1000.0	0.1 ms	2.0	10.0
b3-10	Speed Estimation Detection Gain	1.00 - 1.20 *3	0.01	-	1.00
b3-14	Bi-directional Speed Search	0 - 1	1	-	0
b3-24	Speed Search Method Selection	1 - 2	1	-	1 *4
C2-01	S-Curve Time @ Start of Accel	0.00 - 10.00	0.01 s	1.00	1.00
C3-02	Slip Compensation Delay Time	0 - 10000	1 ms	-	200
C4-01	Torque Compensation Gain	0.00 - 2.50	0.01	0.00	0.00
C4-02	Torque Compensation Delay Time	0 - 60000	1 ms	100	200
C6-02	Carrier Frequency Selection	1 - F	1	2 *2	2 *2
E1-04	Maximum Output Frequency	40.0 - 400.0	0.1 Hz	Determined by E5-01	-
E1-05	Maximum Output Voltage	0.0 - 255.0 *5	0.1 V	Determined by E5-01	-
E1-06	Base Frequency	0.0 - 400.0	0.1 Hz	Determined by E5-01	-
E1-09	Minimum Output Frequency	0.0 - 400.0	0.1 Hz	Determined by E5-01	-
L1-01	Motor Overload (oL1) Protection	0 - 6	1	4	1 *6
L2-31	KEB Start Voltage Offset Level	0 - 100 *5	1 V	50	50
L3-05	Stall Prevention during RUN	0 - 3	1	2	3
L3-20	DC Bus Voltage Adjustment Gain	0.00 - 5.00	0.01	0.65	0.65
n8-51	Pull-in Current @ Acceleration	0 - 200	1%	50	80
o1-03	Frequency Display Unit Selection	0 - 3	1	2	0 *7
o1-28	Custom Monitor 5	0, 101 - 1099	1	116	105

*1 Enabled only when *E9-01 = 1 [Motor Type Selection = Permanent Magnet (PM)]*

*2 The default setting is different for different models.

- 2011 - 2114, 4005 - 4052: 0.6
- 2143 - 2396, 4065 - 4720: 0.3

*3 The setting range changes when the *A1-02 [Control Method Selection]* setting changes.

*4 The default settings are different for different motor types.

- *E9-01 = 0 [Motor Type Selection = Induction (IM)]*: 2
- *E9-01 = 1, 2 [Permanent Magnet (PM), Synchronous Reluctance (SynRM)]*: 1

*5 This is the value for 208 V class drives. Double the value for 480 V class drives.

*6 The default settings are different for different motor types.

- *E9-01 = 0 [Motor Type Selection = Induction (IM)]*: 1
- *E9-01 = 1, 2 [Permanent Magnet (PM), Synchronous Reluctance (SynRM)]*: 4

*7 The default settings are different for different motor types.

- *E9-01 = 0 [Motor Type Selection = Induction (IM)]*: 0
- *E9-01 = 1, 2 [Permanent Magnet (PM), Synchronous Reluctance (SynRM)]*: 1

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Specifications are subject to change without notice for ongoing product modifications and improvements.

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