

YASKAWA AC Drive Z1000

AC Drive Bypass for HVAC Fans and Pumps

Manual Supplement

Bypass controller firmware version: VST800298

Bypass controller monitor UB-18 displays the software version of the Z1000 Bypass.

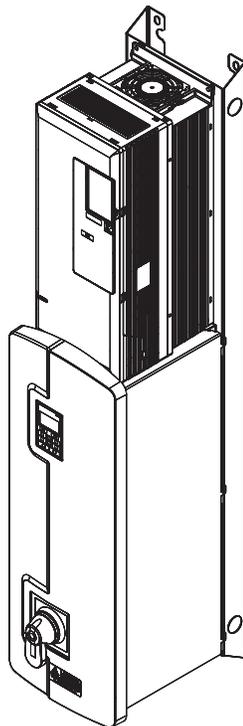
Type: Z1B1

Models: 208 V: 1/2 to 100 HP

480 V: 3/4 to 250 HP

This supplement is for use with Z1000 Bypass Technical Manual No. SIEPYAIZ1B01C <2>.

To properly use the product, read this supplement thoroughly and retain for easy reference, inspection, and maintenance. Ensure the end user receives this supplement.



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Z1000 Bypass Manual Supplement

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i.1 Applicable Document Sections

The contents of this supplement replace or add to the contents of the Yaskawa AC Drive Z1000 Bypass Technical Manual SIEP YAIZ1B 01 sections listed in [Table i.1](#).

Table i.1 Affected Document Sections

Chapter	Section	New Content	Modified Content
Chapter 5 – Programming	H: Terminal Functions	<i>5</i>	<i>16</i> <i>19</i>
	L: Protection Functions	<i>12</i>	<i>16</i>
	o: Operator-Related Settings	<i>13</i>	–
	Z: Bypass Parameters	<i>13</i>	<i>17</i>
	U: Monitor Parameters	<i>15</i>	–
Chapter 6 – Diagnostics & Troubleshooting	Fault Detection	<i>20</i>	<i>20</i>
	Alarm Detection	<i>20</i>	–
Appendix C – BACnet Communications	BACnet Objects Supported	<i>21</i>	–
Appendix E – Apogee FLN Network Protocol	APOGEE FLN Point List Summary	–	<i>22</i>
	Fault Codes	<i>23</i>	–

i.2 New Parameters and New Monitor

◆ H2: Multi-Function Digital Outputs

Note: H2-□□ parameters are available in bypass controller software versions VST800298 and later.

■ H2-01 to H2-03: Terminal M1-M2, M3-M4, and M5-M6 Function Selection

The bypass has three multi-function output terminals. [Table i.2](#) lists the functions available for these terminals using H2-01, H2-02, and H2-03.

No. Addr. Hex	Parameter Name	Setting Range	Default
H2-01 (040B)	Terminal M1-M2 Function Selection (relay)	0 to 160	0: During Run 1
H2-02 (040C)	Terminal M3-M4 Function Selection (relay)	0 to 160	1: Zero Speed
H2-03 (040D)	Terminal M5-M6 Function Selection (relay)	0 to 160	2: Speed Agree 1

Table i.2 Multi-Function Digital Output Terminal Settings

Setting	Function	Page	Setting	Function	Page
0	During Run 1	5	14	User-Set Speed Agree 2	9
1	Zero Speed	6	15	Frequency Detection 3	10
2	Speed Agree 1	6	16	Frequency Detection 4	10
3	User-Set Speed Agree 1	6	17	Torque Detection 1 (N.C.)	8
4	Frequency Detection 1	7	1A	During Reverse	11
5	Frequency Detection 2	7	1B	During Baseblock 2 (N.C.)	11
6	Drive Ready	8	1E	Restart Enabled	11
7	DC Bus Undervoltage	8	20	Drive Overheat Pre-Alarm (oH)	11
8	During Baseblock 1 (N.O.)	8	2F	Maintenance Period	11
B	Torque Detection 1 (N.O.)	8	37	During Run 2	11
C	Frequency Reference Loss	8	39	Watt Hour Pulse Output	12
E	Fault	8	3D	During Speed Search	12
F	Through Mode	9	4C	During Fast Stop	12
10	Minor Fault	9	4D	oH Pre-Alarm Time Limit	12
11	Fault Reset Command Active	9	60	Internal Cooling Fan Alarm	12
13	Speed Agree 2	9	100 to 160	Functions 0 to 60 with Inverse Output	12

Setting 0: During Run

The output closes when the drive is outputting a voltage.

Status	Description
Open	Drive is stopped.
Closed	A Run command is input or the drive is in deceleration or DC injection.

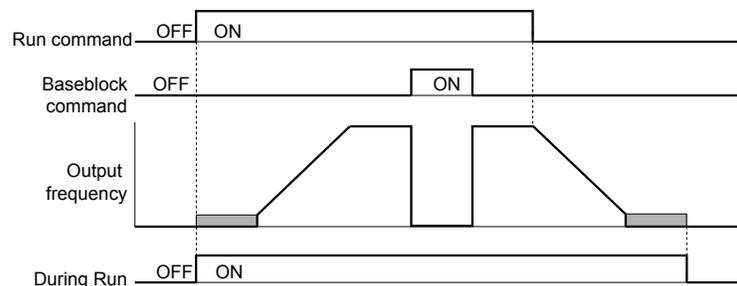


Figure i.1 During Run Time Chart

i.2 New Parameters and New Monitor

Setting 1: Zero Speed

The output closes when the output frequency or motor speed falls below the minimum output frequency set to E1-09 or b2-01.

Status	Description
Open	Output frequency is above the minimum output frequency set to E1-09 or b2-01
Closed	Output frequency is less than the minimum output frequency set to E1-09 or b2-01

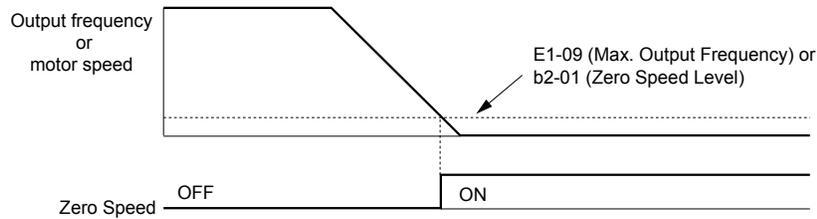


Figure i.2 Zero-Speed Time Chart

Setting 2: Speed Agree 1 (f_{ref}/f_{out} Agree 1)

The output closes when the actual output frequency or motor speed is within the Speed Agree Width (L4-02) of the current frequency reference regardless of the direction.

Status	Description
Open	Output frequency or motor speed does not match the frequency reference while the drive is running.
Closed	Output frequency or motor speed is within the range of frequency reference $\pm L4-02$.

Note: Detection works in forward and reverse.

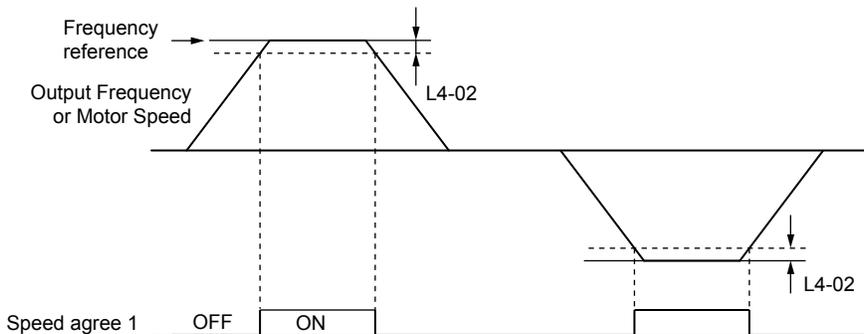


Figure i.3 Speed Agree 1 Time Chart

Setting 3: User-Set Speed Agree 1 (f_{ref}/f_{set} Agree 1)

The output closes when the actual output frequency or motor speed and the frequency reference are within the speed agree width (L4-02) of the programmed speed agree level (L4-01).

Status	Description
Open	Output frequency or motor speed and frequency reference are not both within the range of $L4-01 \pm L4-02$.
Closed	Output frequency or motor speed and the frequency reference are both within the range of $L4-01 \pm L4-02$.

Note: Frequency detection works in forward and reverse. The value of L4-01 is used as the detection level for both directions.

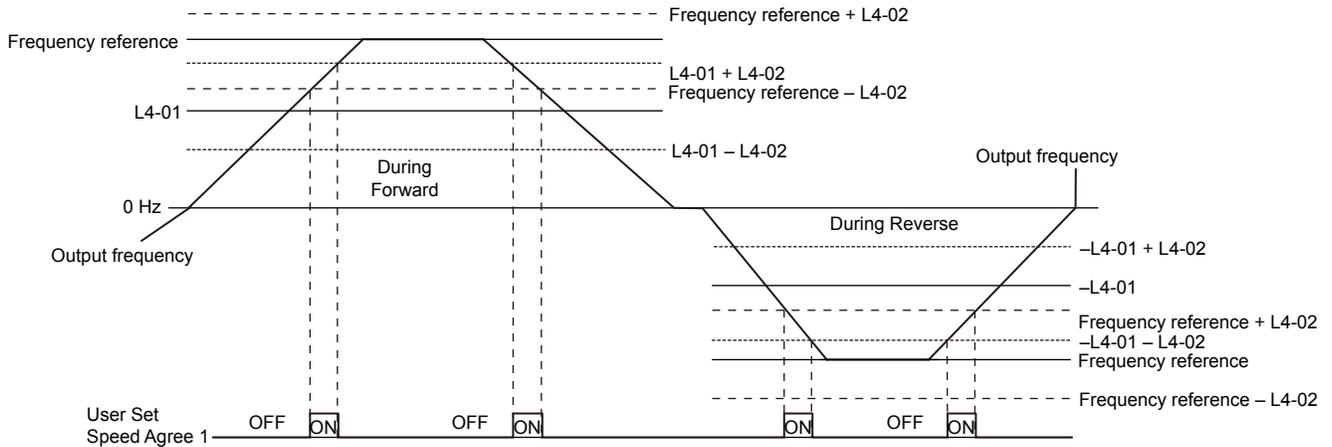


Figure i.4 User Set Speed Agree 1 Time Chart

Setting 4: Frequency Detection 1

The output opens when the output frequency or motor speed rises above the detection level set in L4-01 plus the detection width set in L4-02. The terminal remains open until the output frequency or motor speed fall below the level set in L4-01.

Status	Description
Open	Output frequency or motor speed exceeded $L4-01 + L4-02$.
Closed	Output frequency or motor speed is below $L4-01$ or has not exceeded $L4-01 + L4-02$.

Note: Frequency detection works in forward and reverse. The value of L4-01 is used as the detection level for both directions.

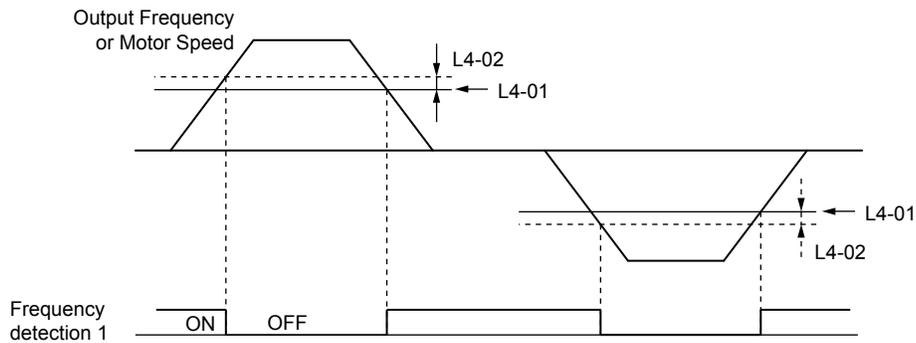


Figure i.5 Frequency Detection 1 Time Chart

Setting 5: Frequency Detection 2

The output closes when the output frequency or motor speed is above the detection level set in L4-01. The terminal remains closed until the output frequency or motor speed fall below $L4-01$ minus the setting of L4-02.

Status	Description
Open	Output frequency or motor speed is below $L4-01$ minus $L4-02$ or has not exceeded $L4-01$.
Closed	Output frequency or motor speed exceeded $L4-01$.

Note: Frequency detection works in forward and reverse. The value of L4-01 is used as the detection level for both directions.

i.2 New Parameters and New Monitor

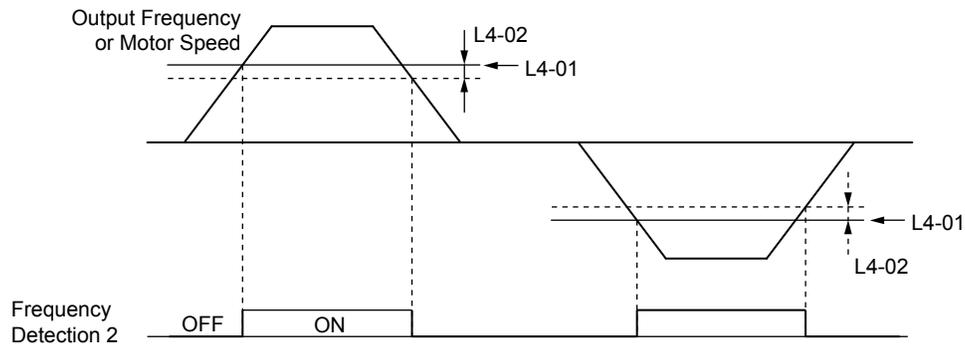


Figure i.6 Frequency Detection 2 Time Chart

Setting 6: Drive Ready

The output closes when the drive is ready to operate the motor. The terminal will not close under the conditions listed below, and any Run commands will be disregarded.

- When the power is shut off
- During a fault
- When the internal power supply of the drive has malfunctioned
- When a parameter setting error makes it impossible to run
- Although stopped, an overvoltage or undervoltage situation occurs
- While editing a parameter in the Programming Mode (when b1-08 = 0)

Setting 7: DC Bus Undervoltage

The output closes when the DC bus voltage or control circuit power supply drops below the trip level set in L2-05. A fault in the DC bus circuit will also cause the terminal set for “DC bus undervoltage” to close.

Status	Description
Open	DC bus voltage is above the level set to L2-05.
Closed	DC bus voltage has fallen below the trip level set to L2-05.

Setting 8: During Baseblock 1 (N.O.)

The output closes to indicate that the drive is in a baseblock state. While in baseblock, output transistors do not switch and no main circuit voltage is output.

Status	Description
Open	Drive is not in a baseblock state.
Closed	Baseblock is being executed.

Settings B and 17: Torque Detection 1 (N.O., N.C.)

These digital output functions signal an overtorque or undertorque situation to an external device.

Set up the torque detection levels and select the output function from the table below.

Setting	Status	Description
B	Closed	Torque detection 1 (N.O.): Output current/torque exceeds (overtorque detection) or is below (undertorque detection) the torque value set in parameter L6-02 for longer than the time specified in parameter L6-03.
17	Open	Torque detection 1 (N.C.): Output current/torque exceeds (overtorque detection) or is below (undertorque detection) the torque value set in parameter L6-02 for longer than the time specified in parameter L6-03.

Setting C: Frequency Reference Loss

The output closes when frequency reference loss is detected.

Setting E: Fault

The output closes when the drive faults (excluding CPF00 and CPF01 faults).

Setting F: Through Mode

Select this setting when using the terminal in a pass-through mode. When set to F, an output does not trigger any function in the drive. Setting F, however, still allows the output status to be read by a PLC via a communication option or MEMOBUS/Modbus communications.

Setting 10: Minor Fault

The output closes when a minor fault condition is present.

Setting 11: Fault Reset Command Active

The output closes when there is an attempt to reset a fault situation from the control circuit terminals, via serial communications, or using a communications option card.

Setting 13: Speed Agree 2 (f_{ref}/f_{out} Agree 2)

The output closes when the actual output frequency or motor speed is within the speed agree width (L4-04) of the current frequency reference, regardless of the direction.

Status	Description
Open	Output frequency or motor speed does not match the frequency reference while the drive is running.
Closed	Output frequency or motor speed is within the range of frequency reference $\pm L4-04$.

Note: Detection works in forward and reverse.

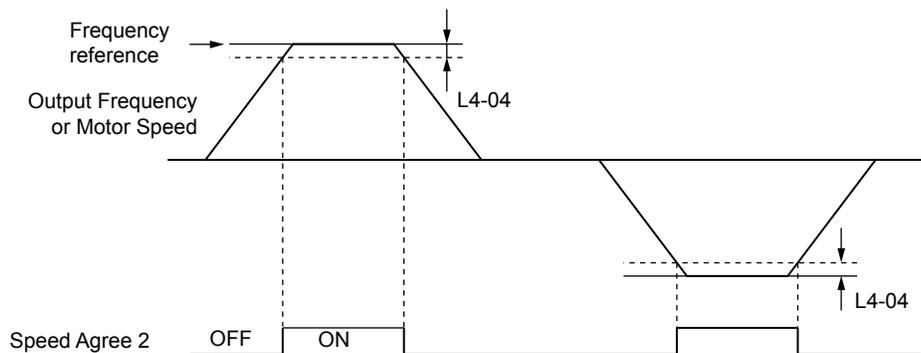


Figure i.7 Speed Agree 2 Time Chart

Setting 14: User-Set Speed Agree 2 (f_{ref}/f_{set} Agree 2)

The output closes when the actual output frequency or motor speed and the frequency reference are within the speed agree width (L4-04) of the programmed speed agree level (L4-03).

Status	Description
Open	Output frequency or motor speed and frequency reference are both outside the range of $L4-03 \pm L4-04$.
Closed	Output frequency or motor speed and the frequency reference are both within the range of $L4-03 \pm L4-04$.

Note: The detection level L4-03 is a signed value; detection works in the specified direction only.

i.2 New Parameters and New Monitor

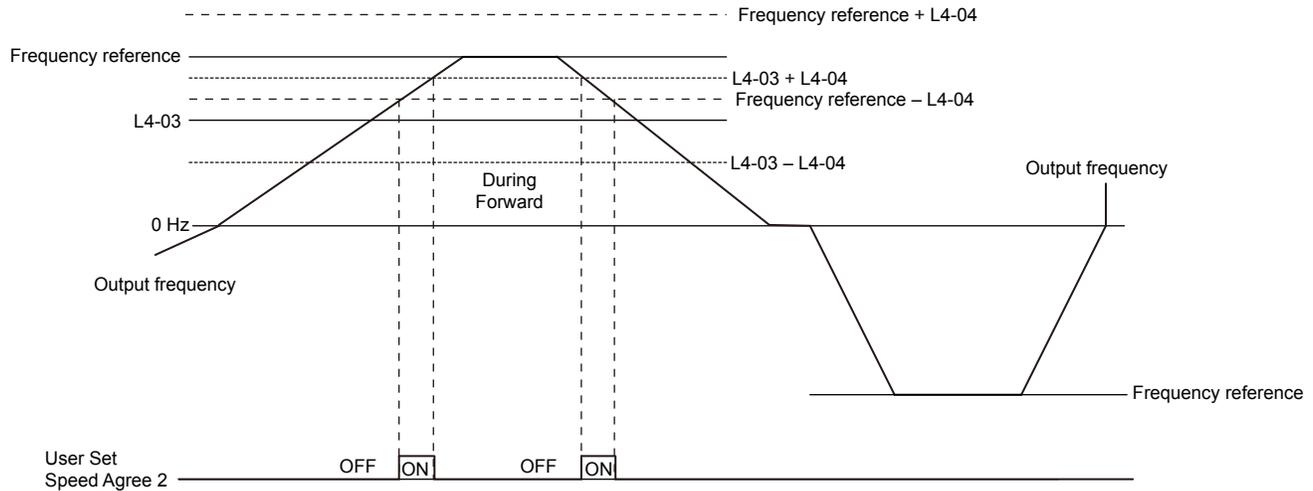


Figure i.8 User-Set Speed Agree 2 Example with a Positive L3-04 Value

Setting 15: Frequency Detection 3

The output opens when the output frequency or motor speed rises above the detection level set in L4-03 plus the detection with set in L4-04. The terminal remains open until the output frequency or motor speed falls below the level set in L4-03. The detection level L4-03 is a signed value; detection works in the specified direction only.

Status	Description
Open	Output frequency or motor speed exceeded L4-03 plus L4-04.
Closed	Output frequency or motor speed is below L4-03 or has not exceeded L4-03 plus L4-04.

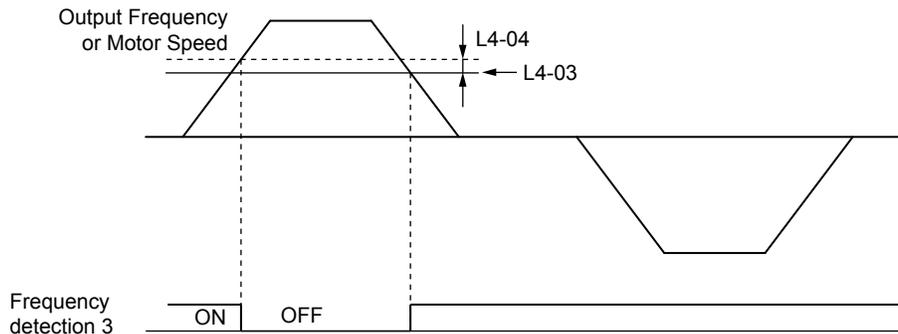


Figure i.9 Frequency Detection 3 Example with a Positive L3-04 Value

Setting 16: Frequency Detection 4

The output closes when the output frequency or motor speed is above the detection level set in L4-03. The terminal remains closed until the output frequency or motor speed falls below L4-03 minus the setting of L4-04.

Status	Description
Open	Output frequency or motor speed is below L4-03 minus L4-04 or has not exceeded L4-03.
Closed	Output frequency or motor speed exceeded L4-03.

Note: The detection level L4-03 is a signed value; detection works in the specified direction only.

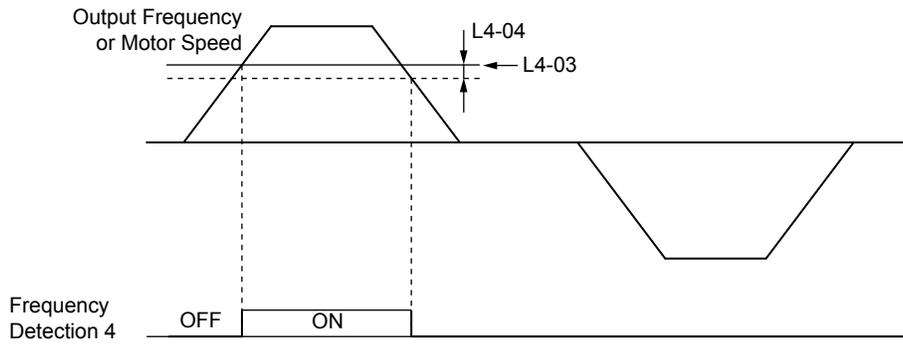


Figure i.10 Frequency Detection 4 Example with Positive L3-04 Value

Setting 1A: During Reverse

The output closes when the drive is running the motor in the reverse direction.

Status	Description
Open	Motor is being driven in the forward direction or stopped.
Closed	Motor is being driven in reverse.

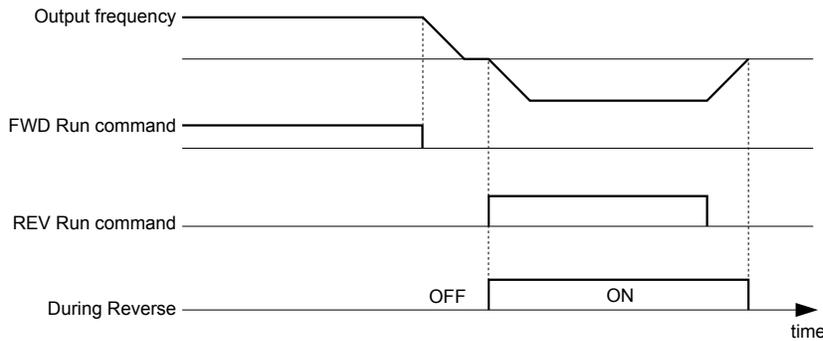


Figure i.11 Reverse Direction Output Example Time Chart

Setting 1B: During Baseblock 2 (N.C.)

The output opens to indicate that the drive is in a baseblock state. While baseblock is executed, output transistors do not switch and no main circuit voltage is output.

Status	Description
Open	Baseblock is being executed.
Closed	Drive is not in a baseblock state.

Setting 1E: Restart Enabled

The output closes when the drive attempts to restart after a fault has occurred.

The fault restart function allows the drive to automatically clear a fault. The terminal set to 1E will close after the fault is cleared and the drive has attempted to restart. If the drive cannot successfully restart within the number of attempts permitted by L5-01, a fault will be triggered and the terminal set to 1E will open.

Setting 20: Drive Overheat Pre-Alarm (oH)

The output closes when the drive heatsink temperature reaches the level specified by parameter L8-02.

Setting 2F: Maintenance Period

The output closes when the cooling fan, DC bus capacitors, or DC bus pre-charge relay may require maintenance as determined by the estimated performance life span of those components. Components performance life is displayed as a percentage on the HOA keypad screen.

Setting 37: During Run 2

The output closes when the drive is outputting a frequency.

i.2 New Parameters and New Monitor

Status	Description
Open	Drive is stopped or one of the following functions is being performed: baseblock, DC Injection Braking, Short Circuit Braking.
Closed	Drive is outputting frequency.

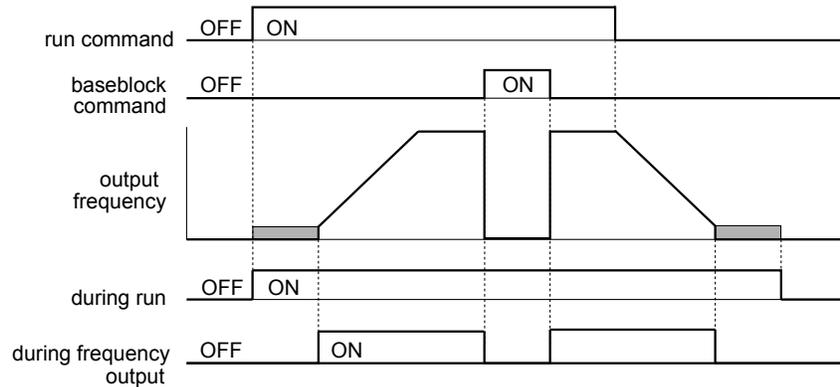


Figure i.12 During Frequency Output Time Chart

Setting 39: Watt Hour Pulse Output

Outputs a pulse to indicate the watt hours.

Setting 3D: During Speed Search

The output terminal closes while Speed Search is being performed.

Setting 4C: During Fast Stop

The output terminal closes when a Fast Stop is being executed. .

Setting 4D: oH Pre-Alarm Time Limit

The output terminal closes when the drive is reducing the speed due to a drive overheat alarm (L8-03 = 4) and the overheat alarm has not disappeared after 10 frequency reduction operation cycles.

Setting 60: Internal Cooling Fan Alarm

The output closes when the drive internal cooling fan has failed.

Setting 100 to 160: Functions 0 to 60 with Inverse Output

These settings have the same function as settings 0 to 60, but with inverse output. Set as 1□□, where the “1” indicates inverse output and the last two digits specify the setting number of the function.

Examples:

- Set 108 for inverse output of “8: During Baseblock 1 (N.O.)”.
- Set 14D for inverse output of “4D: oH Pre-Alarm Time Limit”.

◆ L6: Torque Detection

■ L6-01: Torque Detection Selection 1

The torque detection function is triggered when the current or torque exceed the levels set to L6-02 for longer than the time set to L6-03. L6-01 selects the conditions for detection and the operation that follows.

Note: Parameter is available in bypass controller software versions VST800298 and later.

No. Addr. Hex	Name	Setting Range	Default
L6-01 (04A1)	Torque Detection Selection 1	0 to 8	0

Setting 0: Disabled

Setting 1: oL3 at Speed Agree (Alarm)

Overtorque detection is active only when the output speed is equal to the frequency reference (i.e., no detection during acceleration and deceleration). The operation continues after detecting overtorque and triggering an oL3 alarm.

Setting 2: oL3 at Run (Alarm)

Overtorque detection works as long as the Run command is active. The operation continues after detecting overtorque and triggering an oL3 alarm.

Setting 3: oL3 at Speed Agree (Fault)

Overtorque detection is active only when the output speed is equal to the frequency reference (i.e., no detection during acceleration and deceleration). The operation stops and triggers an oL3 fault.

Setting 4: oL3 at Run (Fault)

Overtorque detection works as long as a Run command is active. The operation stops and triggers an oL3 fault.

Setting 5: UL3 at Speed Agree (Alarm)

Undertorque detection is active only when the output speed is equal to the frequency reference (i.e., no detection during acceleration and deceleration). The operation continues after detecting overtorque and triggering a UL3 alarm.

Setting 6: UL3 at Run (Alarm)

Undertorque detection works as long as the Run command is active. The operation continues after detecting overtorque and triggering a UL3 alarm.

Setting 7: UL3 at Speed Agree (Fault)

Undertorque detection is active only when the output speed is equal to the frequency reference (i.e., no detection during acceleration and deceleration). The operation stops and triggers a UL3 fault.

Setting 8: UL3 at Run (Fault)

Undertorque detection works as long as a Run command is active. The operation stops and triggers a UL3 fault.

◆ o4: Maintenance Monitor Settings**■ o4-11: U2-□□, U3-□□, and UB-09 to UB-16 Initialization**

Resets the drive and bypass fault trace and fault history monitors.

- Note:**
1. Parameter is available in bypass controller software versions VST800298 and later.
 2. Initializing the drive using A1-03 does not reset these monitors.

No. Addr. Hex	Name	Setting Range	Default
o4-11 (0510)	U2, U3, and UB-09 to UB-16 Initialization	0, 1	0

Setting 0: No Action

The drive and bypass keep the previously saved record concerning fault trace and fault history.

Setting 1: Reset Fault Data

Resets the data for the U2-□□, U3-□□, and UB-09 to UB-16 monitors. Setting o4-11 to 1 and pressing the ENTER key erases fault data in the bypass and drive and returns the display to 0.

◆ Z1: Bypass Control System**■ Z1-41: HAND Speed Reference Selection**

Selects the frequency reference source when in HAND Mode.

- Note:** Parameter available in bypass controller software versions VST800298 and later.

No. Addr. Hex	Name	Setting Range	Default
Z1-41 (85EE)	HAND Speed Reference Selection	0, 1	0

Setting 0: Parameter Z1-09

Parameter Z1-09 sets the frequency reference for the drive when in HAND Mode.

Setting 1: Analog

An analog input sets the frequency reference when in HAND Mode.

- Note:**
1. Set H3-02 to "1F - HAND Mode" when using Terminal A1 for HAND Mode frequency reference.

i.2 New Parameters and New Monitor

- Set H3-10 to “1F - HAND Mode” when using Terminal A2 for HAND Mode frequency reference.

■ Z1-50: Bypass Unbalanced Current Detection Level

Sets the current unbalance level between phases as a percentage of parameter E2-01 when operating in Bypass Mode. This function is used in conjunction with parameter Z1-51 to detect input or output phase loss during bypass operation.

The unbalance level is determined by measuring the RMS current in each of the output phases. The amount of current unbalance between the phases is calculated using the following formula:

$$\text{Unbalance Level} = (I_{(\max)} - I_{(\min)}) / I_{(\max)} \times 100\%$$

When the unbalance level exceeds the Z1-50 setting for longer than the time set to Z1-51, an “FB15 – Input Phase Loss” fault is triggered and the drive will coast to stop.

This parameter rarely needs to be changed.

Note: Parameter available in bypass controller software versions VST800298 and later.

No. Addr. Hex	Name	Setting Range	Default
Z1-50 (85F7)	Bypass Unbalanced Current Detection Level	5.0 to 50.0%	25.0%

■ Z1-51: Bypass Unbalance Trip Time Detection Level

Sets the trip time for an unbalance condition when operating in Bypass Mode. This function is used in conjunction with parameter Z1-50 to detect input or output phase loss during bypass operation.

- Note:**
- Parameter available in bypass controller software versions VST800298 and later.
 - Setting this parameter to 0.0 will disable unbalance (bypass phase loss) protection.

No. Addr. Hex	Name	Setting Range	Default
Z1-51 (85F8)	Bypass Unbalance Trip Time Detection Level	0.0 to 30.0 s	5.0 s

■ Z1-52: Bypass Phase Rotation

Input phase rotation is ignored when operating in Drive Mode. Input phase rotation determines motor direction when operating in Bypass Mode.

If input phase rotation is reversed and this parameter is set to 1, an “AL16 – Inp Phase Rotation” alarm will be displayed when operation starts in Bypass Mode and operation continues.

If input phase rotation is reversed and this parameter is set to 2, an “FB16 – Inp Phase Rotation” fault will be displayed when operation starts in Bypass Mode and the drive will coast to stop.

Controls the behavior of the bypass phase rotation detection when operating in Bypass Mode.

Note: Parameter available in bypass controller software versions VST800298 and later.

No. Addr. Hex	Name	Setting Range	Default
Z1-52 (85F9)	Bypass Phase Rotation	0 to 2	1

Setting 0: Disabled

Setting 1: Alarm

Setting 2: Fault

◆ Z2: Bypass Control Input/Output

■ Z2-31: Safety Open Message Selection

Sets the fault message displayed when an FB01 fault is triggered. This parameter also determines the text that is displayed on the top line of the HOA keypad.

Note: Parameter available in bypass controller software versions VST800298 and later.

No. Addr. Hex	Name	Setting Range	Default
Z2-31 (8581)	Safety Open Message Selection	0 to 6	0

Setting 0: Safety Open

Setting 1: Fire Stat

Setting 2: Freeze Stat

Setting 3: Smoke Alarm

Setting 4: Over Pressure

Setting 5: Low Suction

Setting 6: Vibration Switch

◆ Z3: Bypass Control Communication

■ Z3-12: Network Digital Input Select

Determines whether the serial communication digital input simulation is active.

Note: Parameter available in bypass controller software versions VST800298 and later.

No. Addr. Hex	Name	Setting Range	Default
Z3-12 (850B)	Network Digital Input Select	0, 1	0

Setting 0: Disable

Serial communications physical digital inputs are ignored.

For BACnet (Z3-01 = 3): BV72, BV73, BV74, BV75, BV76, BV77, BV78, and BV79 are disabled.

For MEMOBUS/Modbus (Z3-01 = 0): Command Register 8402H is disabled.

For P1 Apogee (Z3-01 = 2): Points LDO44, LDO45, LDO46, LDO47, and LDO48 are disabled.

For Metasys N2 (Z3-01 = 0): Binary Outputs B05, B06, B07, B08, and B09 are disabled.

Setting 1: Enable

Physical digital inputs S1 to S8 are logically OR'd with the serial communications digital inputs.

WARNING! Sudden Movement Hazard. Setting this parameter to 1 may cause the system to run unexpectedly or not stop when required even if the physical digital input is de-energized, resulting in death or serious injury. Clear all personnel from the drive, motor and machine area before applying power. Set this parameter to 0 to prevent serial communications from triggering undesired and unexpected system operation.

◆ UB: Bypass Monitors

■ UB-96: Bypass Unbalance Level

Note: Monitor available in bypass controller software versions VST800298 and later.

No. (Addr. Hex)	Name	Description	Values
UB-96 (87DF)	Bypass Unbalance Level	Displays the percent of current unbalance when operating in Bypass Mode.	Range: 0.0 to 100.0%

i.3 Modified Parameters

◆ H1: Multi-Function Digital Inputs

■ H1-03 to H1-07: Functions for Terminals S3 to S7

These parameters assign functions to the multi-function digital inputs.

Note: Setting F is added and Setting 13 is removed for parameters H1-03 to H1-07 in bypass controller software versions VST800298 and later.

No. Addr. Hex	Parameter Name	Setting Range	Default
H1-03 (0400)	Multi-Function Digital Input Terminal S3 Function Selection	3 to 60	24: External Fault
H1-04 (0401)	Multi-Function Digital Input Terminal S4 Function Selection	3 to 60	14: Fault Reset
H1-05 (0402)	Multi-Function Digital Input Terminal S5 Function Selection	3 to 60	3: Multi-Step Speed Reference 1
H1-06 (0403)	Multi-Function Digital Input Terminal S6 Function Selection	3 to 60	4: Multi-Step Speed Reference 2
H1-07 (0404)	Multi-Function Digital Input Terminal S7 Function Selection	3 to 60	6: Jog Reference Selection

Table i.3 Added Multi-Function Digital Input Terminal Setting

Setting	Function
F	Not Used (Through Mode)

Setting F: Not Used (Through Mode)

Select this setting when using the terminal in a pass-through mode. When set to F, an input does not trigger any function in the drive. Setting F, however, still allows the input status to be read out by a PLC via a communication option or MEMOBUS/Modbus communications.

Table i.4 Removed Multi-Function Digital Input Terminal Setting

Setting	Function
13	Jog Reverse

◆ H3: Multi-Function Analog Inputs

These parameters assign functions to multi-function analog input terminals: A1 and A2.

■ H3-□□ Multi-Function Analog Input Terminal Settings

Note: Setting 1F is “HAND Reference” in bypass controller software versions VST800298 and later. Setting 1F is “Not Used (Through Mode)” in bypass controller software versions VST800297 and earlier.

Table i.5 Modified Multi-Function Analog Input Terminal Setting

Setting	Function
1F	HAND Reference

Setting 1F: HAND Reference

Sets the frequency reference when in HAND Mode and parameter Z1-41, HAND Speed Reference Selection, is set to 1 (Analog).

◆ L2: Momentary Power Loss Ride-Thru

■ L2-01: Momentary Power Loss Operation Selection

When a momentary power loss occurs (DC bus voltage falls below the level set in L2-05), the drive can automatically return to the operation it was performing prior to the power loss based on certain conditions.

Note: Default is 2 in bypass controller software versions VST800298 and later. Default is 0 in bypass controller software versions VST800297 and earlier.

No. Addr. Hex	Name	Setting Range	Default
L2-01 (0485)	Momentary Power Loss Operation Selection	0 to 2	2

Setting 0: Disabled

If power is not restored within 15 ms, a Uv1 fault will result and the motor coasts to stop.

Setting 1: Recover within L2-02

When a momentary power loss occurs, the drive output will be shut off. If the power returns within the time set to parameter L2-02, the drive will perform Speed Search and attempt to resume operation. If the power does not return within this time, it will trigger a Uv1 fault.

Note: L2-02 value is dependent on drive model selection and is not accessible.

Setting 2: Recover as long as CPU Has Power

When a momentary power loss occurs, the drive output will be shut off. If the power returns and the drive control circuit has power, the drive will attempt to perform Speed Search and resume the operation. This will not trigger a Uv1 fault.

Notes on Settings 1 and 2

“Uv” will flash on the operator while the drive is attempting to recover from a momentary power loss. A fault signal is not output at this time.

■ **Z1-07: Speed Reference Select**

Selects the frequency reference source 1.

- Note:**
1. Default is 1 in bypass controller software versions VST800298 and later. Default is 0 in bypass controller software versions VST800297 and earlier.
 2. If a Run command is input to the drive, but the frequency reference entered is 0 or below the minimum frequency, the AUTO or HAND indicator LED on the HOA keypad will light and the OFF indicator will flash.

No. Addr. Hex	Name	Setting Range	Default
Z1-07 (85CC)	Speed Reference Select	0 to 3	1

Setting 0: HOA Keypad

Using this setting, the frequency reference can be input by:

- switching between the multi-speed references from d1-01 to d1-04.
- entering the frequency reference on the operator keypad.

Setting 1: Analog Input Terminals

Using this setting, an analog frequency reference can be entered as a voltage or current signal from terminals A1 or A2.

Voltage Input

Voltage input can be used at any of the two analog input terminals.

When using input terminals A1 and A2, make sure Jumper S1 is set for voltage input.

Setting 2: BACnet, MEMOBUS/Modbus, P1, or N2 Communications

This setting requires entering the frequency reference via the RS-485 serial communications port (control terminals TXRX+ and TXRX-).

Setting 3: Option Card

This setting requires entering the frequency reference via an option board plugged into connector CN5 on the bypass control board. Consult the option card manual for instructions on integrating the drive with the communication system.

■ **Z1-37: Set Time**

Changes the LCD display to time setting to set the Real Time Clock.

- Note:** Setting 2 is added in bypass controller software version VST800298. Setting 2 is not available in bypass controller software versions VST800297 and earlier.

i.3 Modified Parameters

No. Addr. Hex	Name	Setting Range	Default
Z1-37 (853A)	Set Time	0 to 2	0

Setting 0: Normal Display

Setting 1: Displays Time and Date Setting Mode

Setting 2: Reset Time

◆ Z2: Bypass Control Input/Output

■ Z2-01 to Z2-08: Digital Input 1 to 8 Function Select

Note: Setting 22 for parameters Z2-01 to Z2-08 is modified in bypass controller software version VST800298.

No. Addr. Hex	Name	Setting Range	Default
Z2-01 (8563)	Digital Input 1 Function Select	0 to 36	21
Z2-02 (8564)	Digital Input 2 Function Select	0 to 36	22
Z2-03 (8565)	Digital Input 3 Function Select	0 to 36	23
Z2-04 (8566)	Digital Input 4 Function Select	0 to 36	24
Z2-05 (8567)	Digital Input 5 Function Select	0 to 36	25
Z2-06 (8568)	Digital Input 6 Function Select	0 to 36	0
Z2-07 (8569)	Digital Input 7 Function Select	0 to 36	0
Z2-08 (856A)	Digital Input 8 Function Select	0 to 36	29

Table i.6 Modified Bypass Digital Input Terminal Setting

Setting	Function
22	Run Enable (Safety) Note: In bypass controller software versions VST800298 and later, multiple digital input terminals can be programmed for “Run Enable (Safety)” (Z2-0□ = 22). The drive will run only when all digital inputs programmed for “22” are active.

■ Z2-23 to Z2-26: Digital Output 7 to 10 Function Select

Note: Setting 23 for parameters Z2-23 to Z2-26 is added in bypass controller software version VST800298. Setting 23 is not available in bypass controller software versions VST800297 and earlier.

No. Addr. Hex	Name	Setting Range	Default
Z2-23 (8579)	Digital Output 7 Function Select	0 to 23; 99	7
Z2-24 (857A)	Digital Output 8 Function Select	0 to 23; 99	10
Z2-25 (857B)	Digital Output 9 Function Select	0 to 23; 99	12
Z2-26 (857C)	Digital Output 10 Function Select	0 to 23; 99	15

Table i.7 Added Bypass Digital Output Terminal Setting

Setting	Function
23	Run Verify The digital output closes when the drive or bypass output current exceeds 10% of the value set in E2-01. The digital output opens when the drive or bypass output current falls below 5% of the value set in E2-01.

i.4 Removed Parameter

■ H5-04: Stopping Method after Communication Error

Note: Parameter H5-04 is removed in bypass controller software version VST800298.

No.	Name	Setting Range	Default
H5-04	Stopping Method after CE	0 to 4	3

Note: The function associated with this parameter is used internally and is not related to customer serial communications.

i.5 New and Modified Faults and Alarms

◆ New Faults and Alarms

Note: Faults and alarms in this section are added in bypass controller software version VST800298.

HOA Keypad Display	Minor Fault Name
AL16	Input Phase Rotation
Cause	Possible Solution
Incorrect phase rotation while Z1-52 is set to 1 in Bypass Mode.	Check the sequence (phase rotation) of the input wiring to the bypass package.

HOA Keypad Display	Fault Name
FB15	Input Phase Loss
Cause	Possible Solutions
Bypass Mode current unbalance condition exceeded the unbalance level limit set by Z1-50 for the amount of time specified in Z1-51.	<ul style="list-style-type: none"> • Check input wiring including fuses, breakers, connections, upstream from the bypass. • Check the motor wiring and connections.

HOA Keypad Display	Fault Name
FB16	Input Phase Rotation
Cause	Possible Solution
Incorrect phase rotation while Z1-52 is set to 2 in Bypass Mode.	Check the sequence (phase rotation) of the input wiring to the bypass package.

◆ Modified Fault

HOA Keypad Display	Fault Name
CE	MEMOBUS/ Modbus Communication Error
Cause	Possible Solution
Communications between the bypass controller and the drive have stopped for longer than 2 seconds.	Check the communication cable, terminal CN6 on the bypass board, and terminals R+, R-, S+, and S- on the drive terminal strip.
Note: Added in bypass controller software version VST800298.	Note: This fault may also occur when the bypass is initialized by setting Z1-01 to 1, 2, or 3. Cycle power on the bypass to clear.

i.6 New BACnet Analog Value Object

AV33 is derived from drive monitors U4-10 and U4-11. These monitors are read when the drive powers up and are updated every minute thereafter.

Note: Object AV33 is added in bypass controller software version VST800298.

Table i.8 New Analog Value Object

Object ID	Object Name	Modbus Address	Precision	Range	Units	PV Access
AV33	Drive kWh	0x005C and 0x005D	XXXXXXXX.X	0.0 to 32767999.9	kWh	R

i.7 Modified Apogee FLN Point List Summary

Drive size determines number of decimal places used.

Note: The “Slope (SI Units)” settings are modified in bypass controller software version VST800298.

Table i.9 Modified APOGEE FLN Application 2721 Point Number Summary

Point No.	Point Type	Point Name	Factory Default (SI Units)	Engr. Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text	Z1000 Parameter
{06}	LAI	CURRENT	0	AMPS (A)	0.01/0.1 <1>	0	–	–	UB-01
{08}	LAI	POWER	0	KW	0.01/0.1 <1>	0	–	–	U1-08
15	LAI	PAR N9.01	0	AMPS (A)	0.01/0.1 <1>	0	–	–	n9-01
30	LAO	CURRENT LMT	0	AMPS (A)	0.01/0.1 <1>	0	–	–	E2-01

<1> In bypass controller software versions VST800298 and later, the number of decimal places in the value depends on the bypass model. This value has two decimal places in models Z1B1D002 to Z1B1D031 and Z1B1B001 to Z1B1B014; this value has one decimal place in models Z1B1D046 to Z1B1D273 and Z1B1B021 to Z1B1B302.

i.8 New Apogee FLN Fault Codes

Note: Apogee FLN fault codes in [Table i.10](#) are added in bypass controller software version VST800298.

Table i.10 New Z1000 Bypass Faults–Apogee FLN Configuration

Fault Code	Fault Name	Fault Code	Fault Name
2711H	Safety Open	2718H	PL Brownout
2712H	BAS Interlock Open	2719H	PL Blackout
2713H	External Fault (EFB)	271AH	No Bypass to Drive Communications
2715H	Motor Overload	271CH	Option Board Communication Fault
2716H	Ext Motor 1 Overload	271DH	Loss of Load
2717H	Ext Motor 2 Overload	2720H	Input Phase Rotation

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The revision dates and the numbers of the revised manuals appear on the bottom of the back cover.

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