YASKAWA

YASKAWA AC Drive GA800
Supplemental Technical Manual

Introduction

Thank you for purchasing YASKAWA AC Drive GA800. This supplemental technical manual describes the functions added or changed with a GA800 software upgrade, and should be read to ensure proper usage. Read this manual together with the GA800 Technical Reference (SIEPC710617xx) that can be found on our documentation website. Observe the safety messages and precautions to ensure correct application of the product.

Applicable Model

This manual applies to GA800 for software versions PRG:9026 or later.
The software version is indicated on the nameplate affixed to the side of the product, and it can also be viewed by using monitor parameter *U1-25*.

Supplemental Information

This supplemental manual explains about these modifications:

1. **Addition of Carrier Frequency Reduction Function for IGBT Temperature**
2. **Addition of Protection Function for High Current**
3. **Modification of Access Level for Parameters**
4. **Addition of Monitors for Peak Hold Current**
5. **Addition of Sine Wave Filter Selection**

1. Addition of Carrier Frequency Reduction Function for IGBT Temperature

To prevent IGBT failure due to heat stress, a carrier frequency reduction function for the IGBT temperature has been added.

◆ **Added Parameter**

No. (Hex.)	Name	Description	Default Setting (Range)
L9-30 (0D40) Expert	IGBT Temperature Protection Selection	**V/f** **CL-V/f** **OLV** **CLV** **AOLV** **OLV/PM** **AOLV/PM** **CLV/PM** **EZOLV** Enables and disables IGBT temperature protection. Do not disable this function normally. Note: If the drive is run with a high IGBT temperature, heat will stress the IGBT in the drive and cause a failure or decreased service life. 0: Disabled Do not perform temperature protection. 1: Enabled Automatically reduce the carrier frequency when the IGBT temperature is high.	Determined by A1-02 (0, 1)

◆ **Parameter that Changes from the Default Setting with A1-02 [Control Method Selection]**

No.	Name	Control Method (A1-02 Setting)								
		V/f (0)	CL-V/f (1)	OLV (2)	CLV (3)	AOLV (4)	OLV/PM (5)	AOLV/PM (6)	CLV/PM (7)	EZOLV (8)
L9-30	IGBT Temperature Protection Selection	0	0	0	0	-	0	-	0	0

◆ Added Monitor

No. (Hex.)	Name	Description	MFAO Signal Level
U1-94 (1BC3) Expert	Drive Status 2	V/f CL-V/f OLV CLV AOLV OLV/PM AOLV/PM CLV/PM EZOLV Displays the drive status with 1 = ON and 0 = OFF. For example, when the carrier frequency is automatically reduced, U1-94 displays "00000010". bit 0: During torque limit bit 1: During carrier frequency reduction bit 2: During current limit bit 3: During stall prevention operation bit 4 - 7: Not used (always 0).	No signal output available

◆ Related Parameter

A note was added to the following parameter. (Underlined parts in the table below are added items)

No. (Hex.)	Name	Description	Default Setting (Range)
L8-38 (04EF)	Carrier Frequency Reduction	V/f CL-V/f OLV CLV AOLV OLV/PM AOLV/PM CLV/PM EZOLV Selects the operation of the carrier frequency reduction function. The carrier frequency is reduced when the output current exceeds a specific level. **Note: Regardless of the setting of *L8-38*, the carrier frequency reduction function by *L9-30 [IGBT Temperature Protection Selection]* is given priority when the IGBT temperature is high.** 0: Disabled 1: Enabled below 6 Hz 2: Enabled for the EntireSpeedRange	Determined by A1-02, C6-01, and o2-04 (0 - 2)

◆ Troubleshooting

Causes and possible solutions were added for the following problem.

7.10 Troubleshooting Without Fault Display

◆ The Motor Is Making an Audible Noise

Cause	Possible Solutions
The carrier frequency reduction function by *L9-30 [IGBT Temperature Protection Selection]* activated.	If the motor excitation sound is audible, replace the drive with a larger capacity model.

2. Addition of Protection Function for High Current

To enhance protection for high current in the drive, a function was added to detect the current output current and determine if there is fault, minor fault, or alarm. Adjust the parameters when fault, minor fault, or alarm is detected.

◆ Additions to List of Fault, Minor Fault, Alarm Codes

Display (Hex.)	Name	ALM LED	Type
HC1 (00C3)	High Current Detection 1	Flashing	Alarm
HC1 (00C3)	High Current Detection 1	Flashing	Minor fault
HC2 (00C4)	High Current Detection 2	Flashing	Alarm
HC2 (00C4)	High Current Detection 2	Flashing	Minor fault
HC3 (0438)	High Current Detection 3	Illuminated	Fault

Note: When the drive detects a fault, minor fault, or alarm, it will cause these conditions:
- Fault: HC3 is displayed on the operator and the fault relay is output. The drive shuts OFF output.
- Minor fault: HC1 or HC2 is displayed on the operator and a minor fault is detected. The terminal set to multi-function digital output *H2-xx = 10* (Minor Fault) is switched ON.
- Alarm: The alarm for HC1 or HC2 is displayed on the operator, but the minor fault signal above is not output.

◆ Reference values

The reference values for HC1, HC2, and HC3 [High Current Detection 1 to 3] have the following order:

HC3 > HC2 > HC1.

◆ Added Minor Faults/Alarms

Code	Name	Cause	Possible Solutions
HC1 (00C3)	High Current Detection 1	Tuning was not performed (start-up procedures in the manual).	- Perform the start-up procedures in the manual (including auto-tuning). - Check the relationship between V/f pattern frequency and voltage. Lower the voltage if too high for the frequency.
		The setting value for the carrier frequency is large.	Decrease the setting value for the carrier frequency. (We recommend using the drive with the default settings.)
		The drive's output current is large.	- Decrease the load. - Increase the acceleration/deceleration time. - Adjust the brake release time.
		The drive is operating with its protection functions disabled.	Enable the following protection functions for the drive. - L8-15 = 1 [Enabled] - L8-38 = 1 [Enabled below 6 Hz] or 2 [Enabled for the EntireSpeedRange] - L9-30 = 1 [Enabled]
	Notes: • This alarm/minor fault will be detected when a reference value is exceeded at which drive output current may stress parts. • When this minor fault is detected, the terminal set to multi-function digital output *H2-xx = 10* (Minor Fault) will switch ON. • For HC1 detection, set to disable, continue operation (output minor fault), or continue operation (output alarm) in *L9-37 [High Current Detection 1 Operation Selection]*.		
HC2 (00C4)	High Current Detection 2	Tuning was not performed (start-up procedures in the manual).	- Perform the start-up procedures in the manual (including auto-tuning). - Check the relationship between V/f pattern frequency and voltage. Lower the voltage if too high for the frequency.
		The setting value for the carrier frequency is large.	Decrease the setting value for the carrier frequency. (We recommend using the drive with the

Code	Name	Cause	Possible Solutions
			default settings.)
		The drive's output current is large.	- Decrease the load. - Increase the acceleration/deceleration time. - Adjust the brake release time. - Replace the drive with a larger capacity model.
		The drive is operating with its protection functions disabled.	Enable the following protection functions for the drive. - L8-15 = 1 [Enabled] - L8-38 = 1 [Enabled below 6 Hz] or 2 [Enabled for the EntireSpeedRange] - L9-30 = 1 [Enabled]
	Notes: • This alarm/minor fault will be detected when a reference value is exceeded at which drive output current may affect the service life of parts. • When this minor fault is detected, the terminal set to multi-function digital output *H2-xx = 10* (Minor Fault) will switch ON. • For HC2 detection, set to disable, continue operation (output minor fault), or continue operation (output alarm) in *L9-38 [High Current Detection 2 Operation Selection]*.		

◆ Added Fault

Code	Name	Cause	Possible Solutions
HC3 (0438)	High Current Detection 3	Tuning was not performed (start-up procedures in the manual).	- Perform the start-up procedures in the manual (including auto-tuning). - Check the relationship between V/f pattern frequency and voltage. Lower the voltage if too high for the frequency.
		The setting value for the carrier frequency is large.	Decrease the setting value for the carrier frequency. (We recommend using the drive with the default settings.)
		The drive's output current is large.	- Decrease the load. - Increase the acceleration/deceleration time. - Adjust the brake release time. - Replace the drive with a larger capacity model.
		The drive is operating with its protection functions disabled.	Enable the following protection functions for the drive. - L8-15 = 1 [Enabled] - L8-38 = 1 [Enabled below 6 Hz] or 2 [Enabled for the EntireSpeedRange] - L9-30 = 1 [Enabled]
	Note: Perform Fault Reset to clear the fault.		

◆ Added Parameters

No. (Hex.)	Name	Description	Default Setting (Range)
L9-37 (0D49) Expert	High Current Detection 1 (HC1) Operation Selection	**V/f** **CL-V/f** **OLV** **CLV** **AOLV** **OLV/PM** **AOLV/PM** **CLV/PM** **EZOLV** Select the operation when High Current Detection 1 (HC1) is detected. 0: Disabled 1: Continue operation (detect minor fault) HC1 is detected as a minor fault when a reference value is exceeded at which drive output current may stress parts. The terminal set to multi-function digital output *H2-xx = 10* (Minor Fault) is switched ON.	2 (0 - 2)

		2: Continue operation (detect alarm)
		    HC1 is detected as an alarm and displayed on the operator
		    when a reference value is exceeded at which drive output
		    current may stress parts. The minor fault signal is not output.	

L9-38
(0D4A)
Expert
	High Current
	Detection 2
	(HC2) Operation
	Selection
		`V/f` `CL-V/f` `OLV` `CLV` `AOLV` `OLV/PM` `AOLV/PM` `CLV/PM` `EZOLV`
		Select the operation when High Current Detection 2 (HC2) is detected.
		0: Disabled
		1: Continue operation (detect minor fault)
		    HC2 is detected as a minor fault when a reference value is
		    exceeded at which drive output current may affect the service
		    life of parts. The terminal set to multi-function digital output
		    H2-xx = 10 (Minor Fault) is switched ON.
		2: Continue operation (detect alarm)
		    HC2 is detected as an alarm and displayed on the operator
		    when a reference value is exceeded at which drive output
		    current may affect the service life of parts. The minor fault
		    signal is not output.
			1
			(0 - 2)

◆ **MEMOBUS Command Data**

The bit assignments for the following register numbers were changed. (Underlined parts in the table below are added items)

Register No. (Hex.)	Description	
00E9	Minor Fault Description 13	
	bit 0 - 1	Reserved
	bit 2	**HC1 [High Current Detection 1]**
	bit 3	**HC2 [High Current Detection 2]**
	bit 4 - F	Reserved
00F5	Fault Description 14	
	bit 0 - 5	Reserved
	bit 6	PSE [JOHB-SMP3 Protocol Set Error]
	bit 7	**HC3 [High Current Detection 3]**
	bit 8 - F	Reserved

3. Modification of Access Level for Parameters

The access level for the following parameters was changed to expert.

Table: Parameters with Changed Access Level

No.	Name
L8-09	Output Ground Fault Detection
L8-15	oL2 Characteristics Sel atLowSpd
L8-18	Software Current Limit Selection
L8-38	Carrier Frequency Reduction

4. Addition of Monitors for Peak Hold Current

◆ **Added Monitors**

No. (Hex.)	Name	Description	MFAO Signal Level
U4-87 (306D)	PeakHold Current 2	V/f CL-V/f OLV CLV AOLV OLV/PM AOLV/PM CLV/PM EZOLV Displays the hold value of the peak value (rms) for the drive output current. The drive output frequency and cumulative operation time at the time the output current was held can be checked with *U4-88 [PeakHold Output Freq 2]* and *U4-89 [PeakHold Cumulative Ope Time]*. The peak hold current value is held during baseblock (when stopped) and when the power supply is restarted. *U4-87 [PeakHold Current 2]*, *U4-88 [PeakHold Output Freq 2]*, and *U4-89 [PeakHold Cumulative Ope Time]* can be reset with *o4-26 [Peak Hold Initialization Selection]*. The value of *U4-87* appears in amperes (A) on the keypad. When viewing via MEMOBUS/Modbus communications, the current is "8192 = drive rated current (A)." Current can be calculated from the monitor value present at MEMOBUS/Modbus communications using "Numerals being displayed / 8192 × drive rated current (A)." Unit: Determined by the drive model. • Models 2004 to 2042 and 4002 to 4023: 0.01 A • Models 2056 to 2415 and 4031 to 4675: 0.1 A • Models 4810 to 4H12: 1 A	No signal output available
U4-88 (306E)	PeakHold Output Freq 2	V/f CL-V/f OLV CLV AOLV OLV/PM AOLV/PM CLV/PM EZOLV Displays the output frequency at which the peak value (rms) of the drive output current is held. The peak hold current can be monitored by *U4-87 [PeakHold Current 2]*. The peak hold output frequency is held during baseblock (when stopped) and when the power supply is restarted. *U4-87 [PeakHold Current 2]*, *U4-88 [PeakHold Output Freq 2]*, and *U4-89 [PeakHold Cumulative Ope Time]* can be reset with *o4-26 [Peak Hold Initialization Selection]*. Unit: 0.01 Hz	No signal output available

U4-89 (306F)	PeakHold Cumulative Ope Time	V/f CL-V/f OLV CLV AOLV OLV/PM AOLV/PM CLV/PM EZOLV
		
		Displays the cumulative operation time when the output current was held.
		The cumulative operation time when the peak is held during baseblock (when stopped) and when the power supply is restarted.
		U4-87 [PeakHold Current 2], *U4-88 [PeakHold Output Freq 2]*, and *U4-89 [PeakHold Cumulative Ope Time]* can be reset with *o4-26 [Peak Hold Initialization Selection]*.
		The maximum number displayed is 99999. This value will be automatically reset to 0 and start counting again after reaching 99999.
		Unit: 1 h
		   Note:
		   The MEMOBUS/Modbus communication data is shown in 10 h units.
			No signal output available

◆ **Added Parameter**

No. (Hex.)	Name	Description	Default Setting (Range)
o4-26 (316F)	Peak Hold Initialization Selection	`V/f` `CL-V/f` `OLV` `CLV` `AOLV` `OLV/PM` `AOLV/PM` `CLV/PM` `EZOLV` Initializes (resets) the monitor values of *U4-87 [PeakHold Current 2]*, *U4-88 [PeakHold Output Freq 2]*, and *U4-89 [PeakHold Cumulative Ope Time]*. 0: Hold the monitor values of *U4-87 [PeakHold Current 2]*, *U4-88 [PeakHold Output Freq 2]*, and *U4-89 [PeakHold Cumulative Ope Time]*. 1: Reset the monitor values of *U4-87 [PeakHold Current 2]*, *U4-88 [PeakHold Output Freq 2]*, and *U4-89 [PeakHold Cumulative Ope Time]*. After the values are reset, the setting value of *o4-26* automatically reverts to 0.	0 (0, 1)

5. Addition of Sine Wave Filter Selection

A parameter has been added to the drive to operate correctly when a sine wave filter is installed.

◆ **Added Parameter**

No. (Hex.)	Name	Description	Default Setting (Range)
C4-26 (317F) Expert	Sine Wave Filter Selection	`V/f` `CL-V/f` `OLV` `CLV` `AOLV` `OLV/PM` `AOLV/PM` `CLV/PM` `EZOLV` Sets the drive to operate correctly when a sine wave filter is installed. Enable this parameter only when a sine wave filter is installed on the output terminals. Usually it is not necessary to change this setting. 0: Disabled(No Sine Wave Filter) 1: Enabled(With Sine Wave Filter)	0 (0, 1)