YASKAWA

YASKAWA AC Drive GA700
Supplemental Technical Manual

Introduction

Thank you for purchasing YASKAWA AC Drive GA700.

This supplemental technical manual describes the functions added or changed with a GA700 software upgrade, and should be read to ensure proper usage. Read this manual together with the manual (TOEP C710617 xx) included with the product and the GA700 Technical Manual (SIEP C710617 xx) that can be found on our documentation website. Always observe the safety messages and precautions to ensure correct application of the product.

Applicable Model

This manual applies to GA700 for software versions S1040 or later.
The software version is indicated on the nameplate affixed to the side of the product, and also can be viewed by using monitor parameter U1-25.

Modified Contents

This supplemental manual explains about these modifications:

1. Addition of A1-00 [Language Selection]=13 [Korean]
2. Addition of time related monitor
   (U5-30 [Time hours/minutes HHMM], U5-31 [Date year], U5-32 [Date month/day MMDD], U5-33 [Date day of week])
3. Support of emergency operation function at cooling fan fault
4. Improvement of PM Advanced Open Loop Vector (AOLV/PM) (addition of nA-07 to nA-10)
5. Improvement of PM control voltage limit function (addition of n8-68 [Output Voltage Limit Level 1], nA-11 [Output Voltage Limit Level 2])
6. Support for DriveWorksAdvance <1>

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1. Addition of A1-00 [Language Selection]=13 [Korean]

A1-00 [Language Selection] = 13 [Korean] has been added. (Underlined part indicates added language.)

No. (Hex.)	Name	Description	Default Setting (Range)
A1-00 (0100) RUN	Language Selection	V/f CL-V/f OLV CLV AOLV OLV/PM AOLV/PM CLV/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 initialize this parameter. 0: English 1: Japanese 2: German 3: French 4: Italian 5: Spanish 6: Portuguese 7: Chinese 8: Czech 9: Russian 10: Turkish 11: Polish 12: Greek **13: Korean**	0 (0 - **13**)

2. Addition of time related monitor (U5-30 [Time hours/minutes HHMM], U5-31 [Date year], U5-32 [Date month/day MMDD], U5-33 [Date day of week])

A monitor capable of displaying the preset time/date/day of week (U5-30 [Time hours/minutes HHMM], U5-31 [Date year], U5-32 [Date month/day MMDD], U5-33 [Date day of week]) has been added. When setting the date, set whether or not to connect the LCD keypad to make the setting from MEMOBUS Communication.

Note: ・The date cannot be set while the LED keypad is connected.

・If the LCD keypad does not have a clock battery, you must set the date and time each time you energize the drive.

No. (Hex.)	Name	Description	MFAO Signal Level
U5-30 (3000)	Time hours/minutes HHMM	V/f CL-V/f OLV CLV AOLV OLV/PM AOLV/PM CLV/PM EZOLV Time (hours/minutes) is displayed in the format "HH:MM". Set the time display format at o4-22 [Time Format].	No signal output available
U5-31 (3001)	Date year	V/f CL-V/f OLV CLV AOLV OLV/PM AOLV/PM CLV/PM EZOLV Year is displayed in the format "YYYY".	No signal output available
U5-32 (3002)	Data month/day	V/f CL-V/f OLV CLV AOLV OLV/PM AOLV/PM CLV/PM EZOLV Month and day are displayed in the format "MM/DD".	No signal output available
U5-33 (3003)	Date day of week	V/f CL-V/f OLV CLV AOLV OLV/PM AOLV/PM CLV/PM EZOLV Shows the day of the week.	No signal output available

◆ Related MEMOBUS command data

Note: ・The date cannot be set while the LED keypad is connected.

・If the LCD keypad does not have a clock battery, you must set the date and time each time you energize the drive.

Register Number (Hex.)	Description
3004	Time Setting Setting range: 0000 to 2359 (decimal), the default value at energizing: 0000 Set 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 energizing: 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 value at energizing: 101 Sets the month and the date in MMDD format. • MM: 01 to 12 (decimal) • DD: 01 to 31 (decimal)
3007	Set the Date Information Setting range: 0 to 8 (decimal), the default value at energizing: 8 Sets the values specified in 3004H to 3006H as the date and time. • Command Data: 1 • Response Data: 0 (normal), 8 (fault)

3. Support of Emergency Operation Function at Cooling Fan Fault

◆ Section Safety

Damage to Equipment

When using the drive after changing L9-29 [FAn1 Detection Selection] from the default setting (1: Coast to Stop), understand the precautions given in parameter description details.
During a fan failure, the cooling function of the drive decreases considerably. For this reason, the temperature inside the drive becomes higher than normal which can cause damage to the drive or shorten the life of the drive.

◆ Parameter

Drive operation when the drive detects FAn1 [Drive Cooling Fan Fault] can be selected at L9-29 [FAn1 Detection Selection].

No. (Hex.)	Name	Description	Default Setting (Range)
L9-29 (1BF7) Expert	FAn1 Detection Selection	V/f CL-V/f OLV CLV AOLV OLV/PM AOLV/PM CLV/PM EZOLV Sets operation when the drive detects FAn1 [Drive Cooling Fan Fault]. Usually it is not necessary to change this parameter. Note: ・Setting value 5 is outside the scope of the product warranty. Use this value only when short-time emergency operation is required when a fan failure occurs. This function enables only short-time operation that does not activate oH1 [Heatsink Overheat], oL2 [Drive Overloaded] and other protection functions. ・During normal operation, set L9-29 = 1. When a FAn1 fault occurs, set L9-29 = 5 and perform emergency operation after the drive has stopped. ・When setting value 5 is selected, the drive detects a FAn1 alarm at all times and displays "FAn1" on the keypad so that the user is aware that emergency operation is in progress. Be sure to set Alarm (10) to MFDO (H2-xx) so that detection is performed at the host controller. ・During emergency operation, the cooling function of the drive decreases considerably. For this reason, the temperature inside the drive becomes higher than normal which can cause damage to the drive or shorten the life of the drive. To reduce increased temperature inside the drive, it is recommended to forcefully feed in air from the outside. Immediately after emergency operation is completed, stop the drive and replace the cooling fan. 1: Coast to Stop 5: Emergency Operation	1 (1, 5)

◆ Multi-Function Digital Output

The names of the following function have been changed. (The underlined part in the table below is the added item)

Setting Value	Function	Description
60	**During Detection of Drive Cooling Fan Fault**	V/f CL-V/f OLV CLV AOLV OLV/PM AOLV/PM CLV/PM EZOLV The terminal activates when the drive detects a drive cooling fan fault.

◆ MEMOBUS Command Data

The bit assignments of the following register numbers have been changed. (Underlined part in the table below is the added item)

Register number (Hex.)	Description	
00CE	Minor Fault Description 7	
	bit0 - 4	Reserved
	bit5	**FAn1 [Drive Cooling Fan Fault]**
	bit6 - F	Reserved

◆ Related MEMOBUS Command Data

Register number (Hex.)	Description	
00EE	Fault Description 12	
	bit0 - 1	Reserved
	bit2	FAn1 [Drive Cooling Fan Fault]
	bit3	CP1 [Comparator 1 Limit Fault]
	bit4	CP2 [Comparator 2 Limit Fault]
	bit5	bCE [Bluetooth Communication Fault]
	bit6 - F	Reserved

◆ Troubleshooting

The following alarm has been added. (Underlined parts in the table below are added items)

[Alarm]

◆FAn1 [Drive Cooling Fan Fault]

Code	Name	Cause	Possible Solutions
FAn1	Drive Cooling Fan Fault	The cooling fan is damaged.	• Examine cooling fan operation. • Re-energize the drive. • Examine U4-03 [Cooling Fan Ope Time] and U4-04 [Cool Fan Maintenance]. 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 [Cooling Fan Ope Time] and U4-04 [Cool Fan Maintenance]. If the performance life of the circulation fan is expired or if there is damage to the circulation fan, replace the circulation fan.
		The power supply for the fan and inrush current prevention circuit has failed. (Models 2257 to 2415, 4208 to 4H12)	• Re-energize the drive and check to see if the alarm stays. • If the alarm stays, replace the control board or the drive. For information about replacing the control board, contact Yaskawa or your nearest sales representative.
Note: ・If the drive detects this alarm, the terminal set to H2-xx = 10 [MFDO Function Select = Alarm] will activate. ・When 5 [Emergency Operation] is set to L9-29 [FAn1 Detection Selection], the drive detects a FAn1 alarm at all times and displays "FAn1" on the keypad so that the user is aware that emergency operation is in progress.			

4. Improvement of PM Advanced Open Loop Vector (AOLV/PM) (addition of nA-07 to 10)

The performance of the PM advanced open loop vector has been improved. If adjustment is necessary, change and adjust the following parameters. Usually it is not necessary to change this parameter.

No. (Hex.)	Name	Description	Default Setting (Range)
nA-07 (3170) Expert	Drive Method Switch Speed	V/f CL-V/f OLV CLV AOLV OLV/PM **AOLV/PM** CLV/PM EZOLV Sets the speed that the drive method is switched. Usually it is not necessary to change this parameter. Note: This parameter is enabled when nA-07≠0.0%.	0.0% (0.0 – 100.0%)
nA-08 (3171) Expert	Drive Method Switch Hysteresis Band	V/f CL-V/f OLV CLV AOLV OLV/PM **AOLV/PM** CLV/PM EZOLV Sets the hysteresis band that the drive method is switched. The drive method is switched by nA-07 [Drive Method Switch Speed] to nA-07+nA-08. Usually it is not necessary to change this parameter. Note: This parameter is enabled when nA-07≠0.0%.	0.0% (0.0 – 100.0%)
nA-09 (3172) Expert	Stop Condition Selection	V/f CL-V/f OLV CLV AOLV OLV/PM **AOLV/PM** CLV/PM EZOLV Sets the criteria that the drive uses to judge a stop. Usually it is not necessary to change this parameter. 0: Output Frequency 1: SFS Output Frequency Note: ・This parameter is enabled when n8-72 [Speed Estimation Method Select] = 0 [Method 1] and n8-57 [HFI Overlap Selection] = 0 [HFI Overlap Selection = Disabled]. ・If nA-09 = 0 is set, set nA-10 [Minimum Output Frequency Limit] = 1 [Enabled]. If nA-09 = 0 and nA-10 = 0 [Disabled], the drive will detect oPE08 [Parameter Selection Error].	0 (0 - 1)
nA-10 (3173) Expert	Minimum Output Frequency	V/f CL-V/f OLV CLV AOLV OLV/PM **AOLV/PM** CLV/PM EZOLV If nA-10 = 0 [Disabled], a value 5% or less of E1-06 [Base Frequency] can be set to E1-09 [Minimum Output Frequency]. Usually it is not necessary to change this parameter. 0: Disabled 1: Enabled Note: ・This parameter is enabled when n8-57 = 0 [Overlap Selection = Disabled]. ・If nA-09 [Stop Condition Selection] = 0 [Output Frequency], set nA-10 = 1. If nA-09 = 0 and nA-10 = 0 [Disabled], the drive will detect oPE08 [Parameter Selection Error].	1 (0 - 1)

◆ Troubleshooting

The following cause has been added. (Underlined part in the table below is added item)

Code	Name	Cause	Possible Solutions
oPE08	Parameter Selection Error	**When A1-02 = 6 [PM Advanced Open Loop Vector], you used these parameter settings: ・If nA-09 [Stop Condition Selection] = 0 [Output Frequency] ・nA-10 [Minimum Output Frequency] = 0 [Disabled]**	**Correct the parameter settings.**

5. Improvement of PM control voltage limit function (addition of n8-68 [Output Voltage Limit Level 1], nA-11 [Output Voltage Limit Level 2])

A function that allows you to set a limit value to the output voltage has been added to prevent saturation of the output voltage. Usually it is not necessary to change this parameter.

No. (Hex.)	Name	Description	Default Setting (Range)
n8-68 (0237) Expert	Output Voltage Limit Level 1	V/f CL-V/f OLV CLV AOLV OLV/PM **AOLV/PM** **CLV/PM** EZOLV Sets the voltage limit level in output voltage limit control Usually it is not necessary to change this parameter.	0.95 (0.50 - 1.50)
nA-11 (1BF8) Expert	Output Voltage Limit Level 2	V/f CL-V/f OLV CLV AOLV **OLV/PM** **AOLV/PM** **CLV/PM** EZOLV Sets the voltage limit level in output voltage limit control Usually it is not necessary to change this parameter.	1.00 (0.50 - 1.50)

◆ Fine Tuning during Test Runs

nA-11 [Output Voltage Limit Level 2] has been added to parameters that are used in fine tuning during test runs in the Open Loop Vector Control for PM mode, Advanced Open Loop Vector Control Method for PM mode and Closed Loop Vector Control Method for PM Control mode. (Underlined parts in the table below are added items)

◆ A1-02 = 5 [PM Open Loop Vector]/A1-02 = 6 [PM Advanced Open Loop Vector]/A1-02 = 7 [PM Closed Loop Vector]

Issue	Parameter Number	Possible Solutions	Default Setting	Recommended Setting
When the motor base frequency is exceeded, the output voltage exceeds the motor rated voltage.	**nA-11 [Output Voltage Limit Level 2]**	**Increase the setting in 0.10-unit increments.**	**1.00**	**1.10 - 1.30**

6. Support for DriveWorksAdvance <1>

DriveWorksAdvance (DWAD) is a version of DriveWorksEZ with additional customization features such as C language function blocks. As DriveWorksAdvance functions are for specific customers, they are not available for other customers.

◆ Newly added monitor

No. (Hex.)	Name	Description	MFAO Signal Level
U8-14 (195D)	DWAD Version Control Monitor	V/f CL-V/f OLV CLV AOLV OLV/PM AOLV/PM CLV/PM EZOLV Displays the DriveWorksAdvance version. Note: As DriveWorksAdvance functions are for specific customers, they are not available for other customers.	No signal output available
U8-19 (1962)	DWAD Platform Version	V/f CL-V/f OLV CLV AOLV OLV/PM AOLV/PM CLV/PM EZOLV Displays the DriveWorksAdvance platform version. Note: As DriveWorksAdvance functions are for specific customers, they are not available for other customers.	No signal output available
U8-20 (1963)	DWAD status	V/f CL-V/f OLV CLV AOLV OLV/PM AOLV/PM CLV/PM EZOLV Displays the DriveWorksAdvance status as 1 (ON) or 0 (OFF). When the DriveWorksAdvance status is OFF, U8-20 is shown as 00000000. Bit0: DWAD loading (no error) Bit1: Sum check error in ROM area for DWAD Bit2: Type code error Bit3: DWAD platform version error Bit4: Online sum check error in ROM area for DWAD Bit5: Not used (normal value of 0). Bit6: Not used (normal value of 0). Bit7: Not used (normal value of 0). Note: As DriveWorksAdvance functions are for specific customers, they are not available for other customers.	No signal output available

◆ Newly added faults, minor faults

Display (Hex.)	Name	ALM LED	Type
CPF50 (00b3)	Control Circuit Error (DriveWorksAdvance data error)	Illuminated	Fault
dWA4 (00AA)	DriveWorksEZ Alarm 4	Flashing	Minor Fault
dWA5 (00AB)	DriveWorksEZ Alarm 5	Flashing	Minor Fault
dWF4 (047A)	DriveWorksEZ Fault 4	Illuminated	Fault
dWF5(047B)	DriveWorksEZ Fault 5	Illuminated	Fault

Note: As DriveWorksAdvance functions are for specific customers, they are not available for other customers.

◆ Details of newly added faults

Code	Name	Cause	Possible Solutions
CPF50	Control Circuit Error (DriveWorksAdvance data error)	There was a drive hardware problem.	• Re-energize the drive and check to see if the fault stays. • Re-write the DWAD data. • 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.
dWF4	DriveWorksEZ Fault 4	The DriveWorksEZ program output a fault.	Examine the DriveWorksEZ program and remove the cause of the fault. This is not a drive fault.
dWF5	DriveWorksEZ Fault 5	The DriveWorksEZ program output a fault.	Examine the DriveWorksEZ program and remove the cause of the fault. This is not a drive fault.

Note: As DriveWorksAdvance functions are for specific customers, they are not available for other customers.

◆ Details of newly added minor faults

Code	Name	Cause	Possible Solutions
dWA4	DriveWorksEZ Alarm 4	The DriveWorksEZ program output a minor fault.	Examine the DriveWorksEZ program and remove the cause of the fault. This is not a drive fault.
dWA5	DriveWorksEZ Alarm 5	The DriveWorksEZ program output a minor fault.	Examine the DriveWorksEZ program and remove the cause of the fault. This is not a drive fault.

◆ Newly added MEMOBUS/Modbus communications monitor data

Register No. (Hex.)	Description	
00D3H	CPF Contents 4	
	Bit2	CPF50 [Control Circuit Error (DriveWorksAdvance data error)]
00F9H	Fault Description 18	
	Bit9	dWF4 [DriveWorksEZ Fault 4]
	BitA	dWF5 [DriveWorksEZ Fault 5]
00E7H	Minor Fault Description 11	
	Bit9	dWA4 [DriveWorksEZ Alarm 4]
	BitA	dWA5 [DriveWorksEZ Alarm 5]

Note: As DriveWorksAdvance functions are for specific customers, they are not available for other customers.