Technical Announcement

Delta Electronics, Inc. IABG

Product	ASDA-A3	Applicable Model	A3-M A3-F A3-E A3-L	Security Classification	☑ General ☐ Confidential ☐ Highly Confidential
				ECN No.	126A-18B010 126A-19C012
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Recipient	Sales Representative (Taiwan), Product Manager (Taiwan), DGC, DEU, DPR, DES, DEK, DEJ, and DIN				

Subject:

Firmware update release for the ASDA-A3 series products.

- Latest firmware for the A3-M models: v10601 sub65
- Latest firmware for the A3-F models: v10671 sub65
- Latest firmware for the A3-E models: v10661 sub65
- Latest firmware for the A3-L models: v10635 sub55

Important:

1. Firmware release time

Model	Year and week of production in Wujiang plant
A3-M	W2011
A3-F	W2009
A3-E	W2012
A3-L	W2019

Description:

1. Correction: if you set OD 6040.bit7 fault reset when the servo is off and then trigger the position limit, AL014 and AL015 are cleared when the servo is on.
2. Correction: in Profile Position (PP) Mode, the OD 6040.bit8 halt function fails for the second time.
3. Correction: in Profile Position (PP) Mode, using the Quick Stop function triggers ALF21.
4. Correction: in communication mode, using the Quick Stop function during the homing process triggers ALF21 or AL223.
5. Correction: in CANopen mode, when P3.012.Z is set to 0, the absolute function is enabled, but the home offset is valid after the power is on.
6. Correction: PLC cannot recognize the A3-M models.
7. Correction: error of PR torque homing in reverse direction to look for Z pulse.
8. Correction: in Speed mode, if the speed is a negative value, the motor speed is in error when it decelerates to zero speed.
9. Added Heartbeat function in CANopen mode.
10. Added PFQS function in communication mode.
11. Optimized the index coordinates function when overflow occurs.

12. Correction: if the servo drive is connected to a 50MC controller, after the controller re-downloads the program, it immediately enters Cyclic Synchronous Position (CSP) Mode and switches to Servo On, but the servo drive displays AL3E3.
13. Correction: when using the incremental function, the homing complete flag is on by default after powering on. The correction is made so the flag is on after the homing procedure is complete.
14. For EtherCAT applications, the maximum torque limit is changed to 350%.
15. Correction: in Profile Position (PP) Mode, OD 6040 is unable to operate when its setting is switched from 0x10F to 0x1F.
16. Supports CN2 communication format (Tamagawa, Biss C, Endat2.2, Mitutoyo, and Fagor) and its absolute functions.
17. Supports the CN2 position signal converter box function.
18. Supports sine wave signals (use with position signal converter box and receive signals with CN2), pulse signals, and third-party communication type rotary motors and linear motors.
19. Supports ECMA-C8 motors.
20. Added DI [0x0B] Switch between full- and semi-closed loop modes.

Value: 0x0B			
DI name	Description	Triggering method	Control mode
FHS	Switch between full- and semi-closed loop modes.	Level triggered	PT, PR*

Note: PR full-closed loop function is not yet supported.

21. Added P1.060 Motor hard stop 1 - level offset.

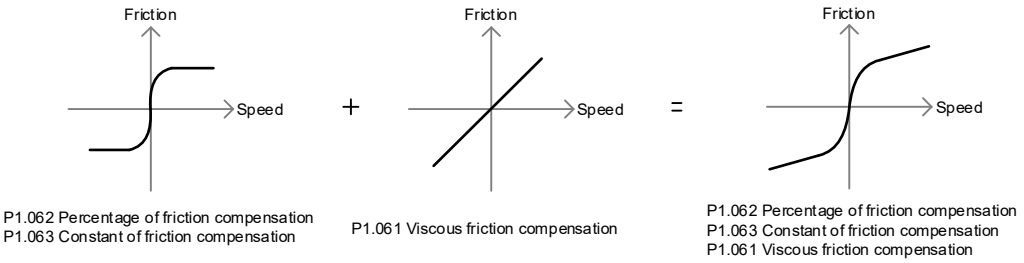
P1.060	**Motor hard stop 1 - level offset**		**Address: 0178H 0179H**
Default:	0	Control mode:	All
Unit:	%	Setting range:	-300 to +300
Format:	DEC	Data size:	16-bit

Settings:
When using P1.057 (Motor hard stop 1 - torque percentage) and the average torque level deviates due to an external force, such as Z-axis gravity, you can use this parameter to set the corresponding compensation.
Suggested setting value = (Average torque at constant speed in positive direction + Average torque at constant speed in negative direction) / 2
Note: refer to P0.002 = 54 (torque feedback) for the average torque at constant speed.

22. Added P1.061 Viscous friction compensation.

P1.061	**Viscous friction compensation**		**Address: 017AH 017BH**
Default:	0	Control mode:	PT / PR / S / Sz
Unit:	0.1%/1000 rpm (rotary) 0.1%/1000 mm/s (linear)	Setting range:	0 - 1000
Format:	DEC	Data size:	16-bit

Settings:
Because kinetic friction corresponds with the speed, you can use this parameter to compensate the motor torque according to the speed to improve the position error during acceleration and deceleration. When P1.062 = 0, this parameter is invalid.



P1.062 Percentage of friction compensation
P1.063 Constant of friction compensation

P1.061 Viscous friction compensation

P1.062 Percentage of friction compensation
P1.063 Constant of friction compensation
P1.061 Viscous friction compensation

23. Added P1.078 Gain switching delay time.

P1.078	Gain switching delay time		Address: 019CH 019DH
Default:	0	Control mode:	P / S
Unit:	ms	Setting range:	0 - 32767
Format:	DEC	Data size:	16-bit

Settings:
When using the gain switching function (P2.027 = 3 or 7), you can use this parameter to set the delay time after the switching condition is met. Refer to the description of P2.027 for more details.

24. Added P1.079 Gain rate of change during gain switching delay.

P1.079	Gain rate of change during gain switching delay		Address: 019EH 019FH
Default:	100	Control mode:	P / S
Unit:	%	Setting range:	0 - 500
Format:	DEC	Data size:	16-bit

Settings:
Sets the gain rate of change during gain switching delay.
If P1.078 is 0, this function is disabled.
Within the delay time set by P1.078, the settings of P2.000 (Position control gain) and P2.004 (Speed control gain) will be affected by the setting of P1.079 (Gain rate of change during gain switching delay). Refer to the description of P2.027 for more details.

25. Added P1.080 Rate of change for speed detection filter and jitter suppression.

P1.080	Rate of change for speed detection filter and jitter suppression		Address: 01A0H 01A1H
Default:	100	Control mode:	P / S
Unit:	%	Setting range:	0 - 100
Format:	DEC	Data size:	16-bit

Settings:
Adjusts the rate of change for speed detection filter and jitter suppression (P2.049) according to the gain switching condition. (This parameter is inversely proportional to the value of P2.049. The smaller the setting value, the stronger the filtering effect.)

26. Added P1.084 Error clearing function when switching between full- and semi-closed loops.

P1.084	Error clearing function when switching between full- and semi-closed loops		Address: 01A8H 01A9H
Default:	0x0000	Control mode:	PT / PR*
Unit:	-	Setting range:	0x0000 - 0x0001
Format:	HEX	Data size:	16-bit

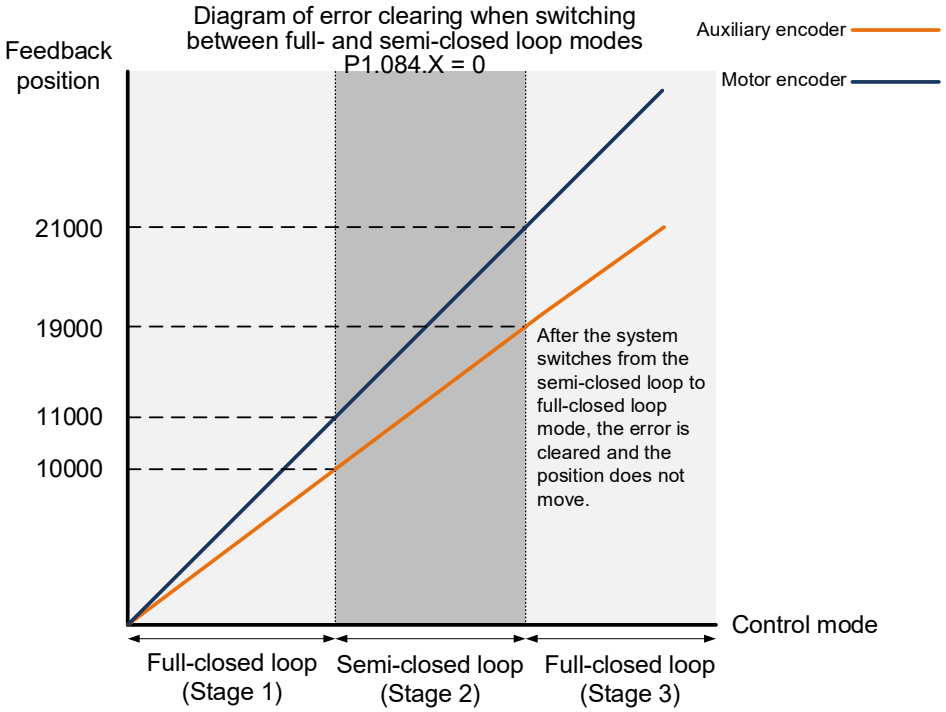
Settings:

X	Error clearing function when the system switches from semi-closed loop to full-closed loop	Z	Reserved
Y	Reserved	U	Reserved

■ X: error clearing function when switching from semi-closed loop to full-closed loop
0: clear the error when switching.
When the system is in semi-closed loop control, the command refers to the motor encoder, and the position does not move after the system switches to full-closed loop.
1: no clearing of the error when switching.
When the system is in semi-closed loop control, the command refers to the motor encoder. After the system switches to full-closed loop, the command issued in semi-closed loop becomes the full-closed loop command, thus the position moves.

Note:
1. PR full-closed loop function is not yet supported.
2. Use DI [0x0B] to switch between full- and semi-closed loop modes.

Example:
■ Error clearing enabled (P1.084.X = 0)



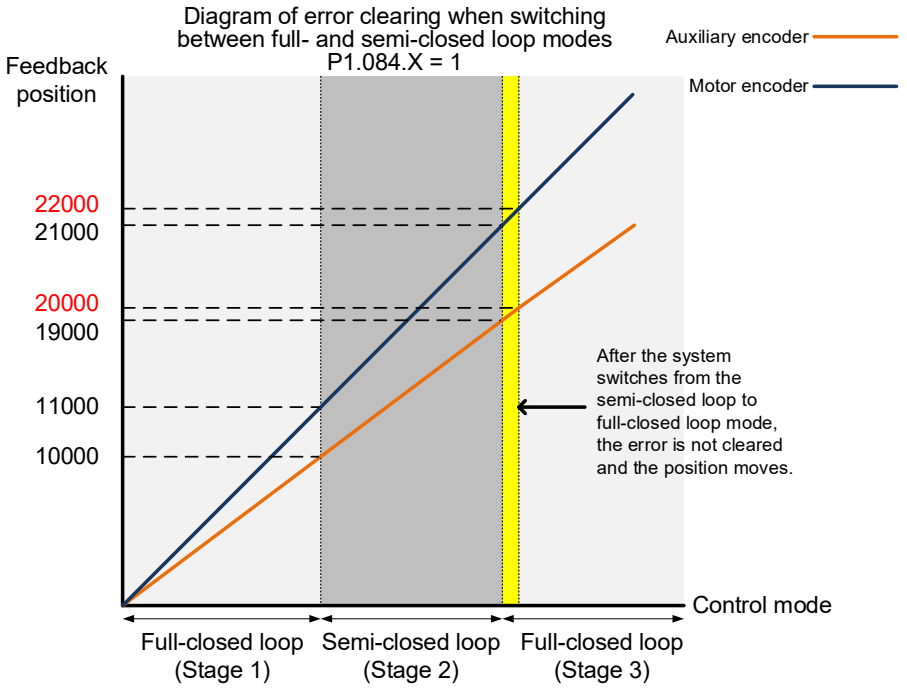
Stage 1: full-closed loop control (feedback position of the auxiliary encoder)
If the servo drive issued a position command of 10,000 PUU and the feedback position of the auxiliary encoder is 10,000 PUU, the final feedback position of the motor encoder is 11,000 PUU due to the backlash and sliding of the mechanism.

Stage 2: semi-closed loop control (feedback position of the motor encoder)
Use DI [0x0B] to switch the control mode from full-closed loop to semi-closed loop, then issue the position command of 10,000 PUU again. In semi-closed loop control, since the command refers to

the position of the motor encoder, the final feedback position of the motor encoder is 21,000 PUU, but the feedback position of the auxiliary encoder is 19,000 PUU. In this mode, there is an error of 1,000 PUU between the auxiliary encoder (19,000 PUU) and the position command (20,000 PUU).

Stage 3: full-closed loop control (feedback position of the auxiliary encoder)
When you set P1.084 to 0, the error will be cleared. Thus, after using DI [0x0B] to switch the control mode from semi-closed loop to full-closed loop, the feedback position of the auxiliary encoder is not corrected.

- Error clearing disabled (P1.084.X = 1)



Stage 1: full-closed loop control
If the servo drive issued a position command of 10,000 PUU and the feedback position of the auxiliary encoder is 10,000 PUU, the final feedback position of the motor encoder is 11,000 PUU due to the backlash and sliding of the mechanism.

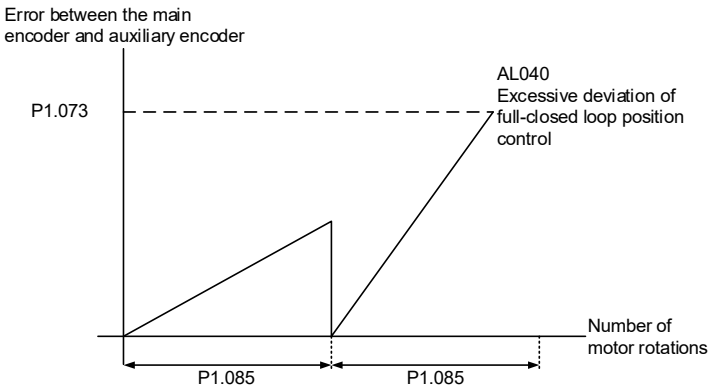
Stage 2: semi-closed loop control
Use DI [0x0B] to switch the control mode from full-closed loop to semi-closed loop, then issue the position command of 10,000 PUU again. In semi-closed loop control, since the command refers to the position of the motor encoder, the feedback position of the motor encoder is 21,000 PUU, but the feedback position of the auxiliary encoder is 19,000 PUU. In this mode, there is an error of 1,000 PUU between the auxiliary encoder (19,000 PUU) and the position command (20,000 PUU).

Stage 3: full-closed loop control
When you set P1.084 to 1, the error will not be cleared. Thus, after using DI [0x0B] to switch the control mode from semi-closed loop to full-closed loop, the feedback position of the auxiliary encoder is corrected and the motor moves to the corresponding position (yellow area as shown in the above figure). The previous semi-closed loop command becomes the full-closed loop command and refers to the auxiliary encoder to move the mechanism to the position corresponding to the actual command. The final feedback position of the auxiliary encoder is 20,000 PUU.

27. Added P1.085 Auto clearing of the feedback position error between the main encoder and auxiliary encoder.

P1.085	Auto clearing of the feedback position error between the main encoder and auxiliary encoder		Address: 01AAH 01ABH
Default:	0	Control mode:	PT (full-closed loop)
Unit:	rev	Setting range:	0 - 32768 (0: disable this function)
Format:	DEC	Data size:	16-bit

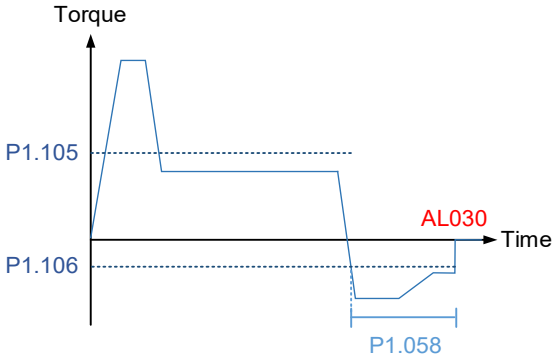
Settings:
This parameter sets the upper limit of the feedback position error between the main encoder and auxiliary encoder. When the number of motor rotations is greater than or equal to this parameter value, the system automatically clears the error.



28. Added P1.105 Motor hard stop 2 - torque upper limit.

P1.105	Motor hard stop 2 - torque upper limit		Address: 01D2H 01D3H
Default:	0	Control mode:	All
Unit:	%	Setting range:	-300 to +300
Format:	DEC	Data size:	16-bit

Settings:
When Motor hard stop 2 is enabled (P2.112.bit 8 = 1), the settings of torque percentage (P1.057) and level offset (P1.060) for Motor hard stop are invalid. During motor operation, if the motor current is higher than this protection setting value and continues in this state exceeding the protection time (P1.058), AL030 will be triggered.



29. Added P1.106 Motor hard stop 2 - torque lower limit.

P1.106	Motor hard stop 2 - torque lower limit		Address: 01D4H 01D5H
Default:	0	Control mode:	All
Unit:	%	Setting range:	-300 to +300
Format:	DEC	Data size:	16-bit

Settings:
When Motor hard stop 2 is enabled (P2.112.bit 8 = 1), the settings of torque percentage (P1.057) and level offset (P1.060) for Motor hard stop are invalid. During motor operation, if the motor current is lower than this protection setting value and continues in this state exceeding the protection time (P1.058), AL030 will be triggered.

30. Added P1.112 Single-direction torque limit.

P1.112	Single-direction torque limit		Address: 01E0H 01E1H
Default:	500	Control mode:	All
Unit:	%	Setting range:	-500 to +500
Format:	DEC	Data size:	16-bit

Settings:
Refer to the description of P4.044 for more details.

31. Added Code 18 to P2.008 Special parameter write-in function. Set P2.008 to 18 to reset the PM parameter group, then cycle the power for the setting to take effect.

32. Correction: parameters of P2.027.Y that change before and after integrator switching.

P2.027	Gain switching condition and method selection		Address: 0236H 0237H
Default:	0x0000	Control mode:	Shown as follows
Unit:	-	Setting range:	0x0000 - 0x0018
Format:	HEX	Data size:	16-bit

Settings:

■ X: gain switching condition

X	Function	Control mode
0	Disable gain switching function.	-
1	Signal of gain switching (DI.GAINUP) is on.	All
2	In position control mode, position error is larger than P2.029.	P
3	Frequency of Position command is larger than P2.029.	P
4	Rotation speed of servo motor is faster than P2.029.	All
5	Signal of gain switching (DI.GAINUP) is off.	All
6	In position control mode, position error is smaller than P2.029.	P
7	Frequency of Position command is smaller than P2.029.	P
8	Rotation speed of servo motor is slower than P2.029.	All

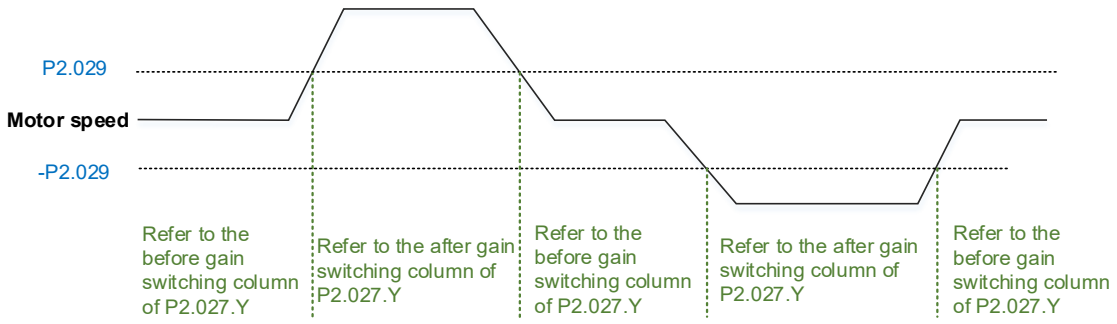
■ Y: gain switching method
0: gain rate switching
1: integrator switching (switch from P controller to PI controller)

Setting value	Control mode P	Control mode S	Gain switching
0	P2.000 x 100%	-	Before switching
	P2.004 x 100%	P2.004 x 100%	
	P2.006 x 100%	P2.006 x 100%	
	P2.025 x 100%	P2.025 x 100%	
	P2.026 x 100%	P2.026 x 100%	
	P2.049 x 100%	P2.049 x 100%	
	P2.000 x P2.001	-	After switching
	P2.004 x P2.005	P2.004 x P2.005	
	P2.006 x 100%	P2.006 x 100%	
	P2.025 x P2.107	P2.025 x P2.107	
	P2.026 x 100%	P2.026 x 100%	
	P2.049 x P1.080	P2.049 x P1.080	
1	P2.000 x 100%	-	Before switching
	P2.004 x 100%	P2.004 x 100%	
	P2.006 x 0%	P2.006 x 0%	
	P2.025 x 100%	P2.025 x 100%	
	P2.026 x 0%	P2.026 x 0%	
	P2.049 x100%	P2.049 x100%	
	P2.000 x P2.001	-	After switching
	P2.004 x 100%	P2.004 x 100%	
	P2.006 x 100%	P2.006 x 100%	
	P2.025 x P2.107	P2.025 x P2.107	
	P2.026 x 100%	P2.026 x 100%	
	P2.049 x P1.080	P2.049 x P1.080	

Note: the parameters marked with different colors in the above table are the differences between Y = 0 and 1.

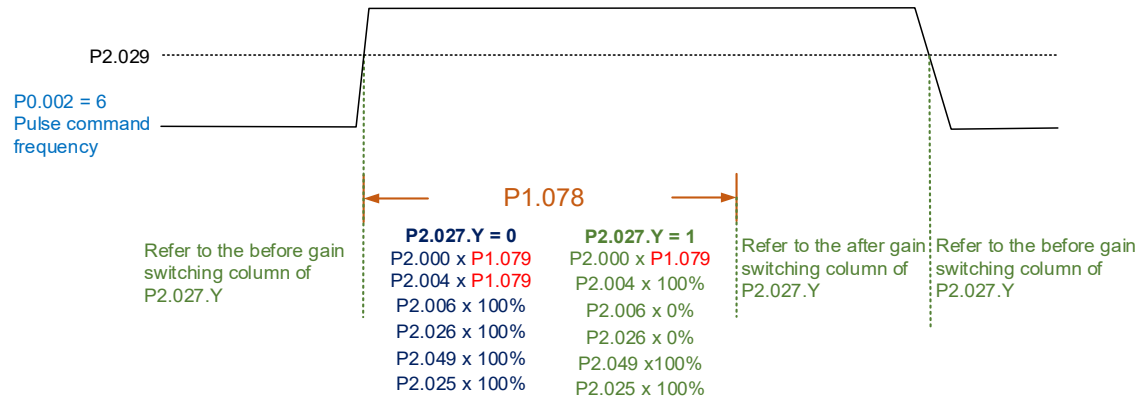
When P2.027.X is set to 1, 2, 4, 5, 6, or 8, P1.078 Gain switching delay time is not supported.

P2.027.X = 4

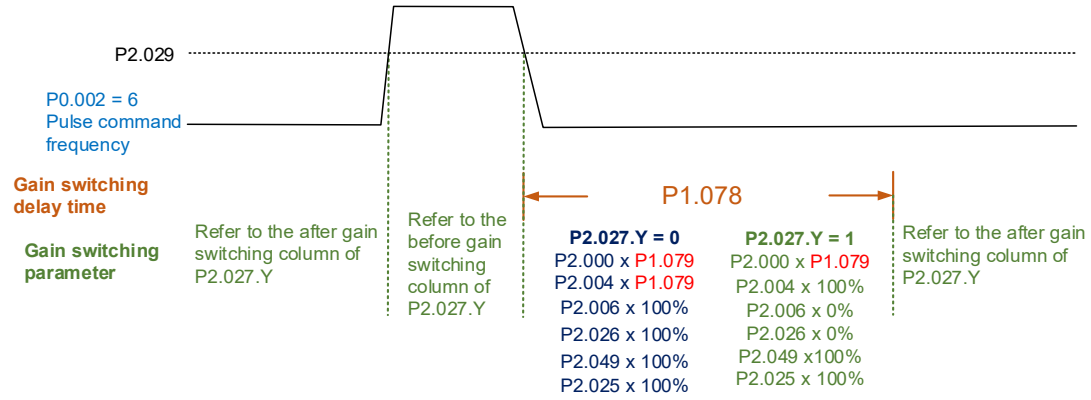


When P2.027.X is set to 3 or 7 and P1.078 Gain switching delay time is set, the servo drive ignores the setting value of P2.027.Y. The gain parameter during the delay time is adjusted according to P1.079. Refer to the following figure.

P2.027.X = 3



P2.027.X = 7



33. Added P2.066 [Bit 12] RST leak phase (AL022) error type selection.

P2.066	**Special bit register 2**		**Address: 0284H 0285H**
Default:	0x0020	Control mode:	PT / PR / S / Sz
Unit:	-	Setting range:	0x0000 - 0x187F
Format:	HEX	Data size:	16-bit

Bit	Function	Description
Bit 12	RST leak phase (AL022) error type selection	0: set AL002 as WARN. 1: set AL002 as ALM.

34. Added P2.068.U CANopen PV mode unit selection.

P2.068	**Following error compensation switch**		**Address: 0288H 0289H**
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 - 0x2101
Format:	HEX	Data size:	16-bit

Settings:

- U: CANopen PV mode unit selection
  0: 0.1 rpm
  1: 0.01 rpm
  Note: when you change the setting of P2.068.U, the units of OD 606B, OD 606C, OD 60FF, and P5.003 Deceleration time for auto-protection in bus communication mode will change as well. Make sure the setting values are correct.

35. Supports P2.069.Z Index coordinates function setting when overflow occurs.

P2.069	Absolute encoder		Address: 028AH 028BH
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 - 0x0111
Format:	HEX	Data size:	16-bit

Settings:

- Z: index coordinates function setting when overflow occurs
  0: index coordinates are lost when overflow occurs.
  1: index coordinates are not affected by overflow, but absolute coordinates are not retained (AL289 and AL062 do not function).

36. Added P2.081 Pulse leakage detection function.

P2.081	Pulse leakage detection function		Address: 02A2H 02A3H
Default:	1	Control mode:	All
Unit:	-	Setting range:	0 - 1
Format:	DEC	Data size:	16-bit

Settings:
Set this parameter to 0 to disable the pulse leakage detection function; set this parameter to 1 to enable this function.
This parameter is only applicable to pulse motors and when PM.003.U is set to 1 (CN5 is the main encoder).

37. Added P2.082 Pulse leakage warning level.

P2.082	Pulse leakage warning level		Address: 02A4H 02A5H
Default:	400	Control mode:	All
Unit:	pulse	Setting range:	0 - 32767
Format:	DEC	Data size:	16-bit

Settings:
When P2.081 is set to 1 and the number of pulse leakage exceeds this set value, AL057 is triggered.
This parameter is only applicable to pulse motors and when PM.003.U is set to 1 (CN5 is the main encoder).

38. Added P2.083 Exceed Z signal detection.

P2.083	Exceed Z signal detection		Address: 02A6H 02A7H
Default:	2000	Control mode:	All
Unit:	pulse	Setting range:	0 to 2^{31}-1
Format:	DEC	Data size:	32-bit

Settings:
This parameter detects if the motor encounters a new Z signal when operating. It is suggested to set the number of pulses at half the distance between two Z signals.
This parameter is only applicable to pulse linear motors and when PM.003.U is set to 1 (CN5 is the main encoder). You can disregard this parameter if there is only one Z signal.

39. Added P2.084 Special function for low resolution motor.

P2.084	Special function for low resolution motor		Address: 02A8H 02A9H
Default:	0x0000	Control mode:	PT / PR / S / Sz
Unit:	-	Setting range:	0x0000 - 0x311F
Format:	HEX	Data size:	16-bit

Settings:

Bit	7	6	5	4	3	2	1	0
Bit	15	14	13	12	11	10	9	8

Bit	Function	Description
Bit 0 - Bit 7	Reserved	-
Bit 8	Speed smoothing function 1	When the resolution of the motor is low, enable this function to smooth the uneven speed. This function is only applicable to pulse motors and when PM.003.U is set to 1 (CN5 is the main encoder). 0: disable 1: enable
Bit 9 - Bit 11	Reserved	-
Bit 12	Speed smoothing function 2	When the resolution of the motor is low, enable this function to smooth the speed with a filtering effect. Before enabling this function, it is suggested to gradually lower the set value for P2.025 to avoid sacrificing the phase due to excessive filtering and thus resulting in resonance of the machine. 0: disable 1: enable Note: when this function is enabled, P2.049 becomes invalid.
Bit 13 - Bit 15	Reserved	-

40. Added P2.088 [Bit 3] Maintain the strength of the gain switch integrator.

P2.088	Motor special bit register		Address: 02B0H 02B1H
Default:	0x0000	Control mode:	PT / PR / S / Sz
Unit:	-	Setting range:	0x0000 - 0xFFFF
Format:	HEX	Data size:	16-bit

Settings:

Bit	Function	Description
Bit 3	Maintain the strength of the gain switch integrator	0: do not adjust the strength of the speed loop integrator. (Integrator strength = P2.004 x P2.005 x P2.006) 1: when the gain switching function (P2.027) is enabled, it can avoid reducing the integrator strength when the speed control gain (P2.004) is switched. (Integrator strength = P2.004 x P2.006)

41. Added P2.090 Two-degrees-of-freedom - anti-interference gain.

P2.090	Two-degrees-of-freedom - anti-interference gain		Address: 02B4H 02B5H
Default:	850	Control mode:	PT / PR
Unit:	0.001	Setting range:	500 - 1999
Format:	DEC	Data size:	16-bit

Settings:
This parameter improves the command response and fine tunes the overshoot when the command is settling. Set this parameter to a smaller value to reduce the occurrence of command overshoot. This parameter is only valid when the two-degrees-of-freedom control function is enabled (P2.094 [Bit12] = 1) and its function is similar to that of P2.026.

42. Added P2.091 Two-degrees-of-freedom - position feed forward gain.

P2.091	Two-degrees-of-freedom - position feed forward gain		Address: 02B6H 02B7H
Default:	1000	Control mode:	PT / PR
Unit:	0.1%	Setting range:	0 - 3000
Format:	DEC	Data size:	16-bit

Settings:
This parameter reduces the following error of the motor. If the value is set too high, it may cause overshoot during positioning. It is suggested to set this parameter to the default value or only make small adjustments. This parameter is only valid when the two-degrees-of-freedom control function is enabled (P2.094 [Bit12] = 1) and its function is similar to that of P2.002.

43. Added P2.092 Two-degrees-of-freedom - speed feed forward gain.

P2.092	Two-degrees-of-freedom - speed feed forward gain		Address: 02B8H 02B9H
Default:	1000	Control mode:	PT / PR
Unit:	0.1%	Setting range:	0 - 3000
Format:	DEC	Data size:	16-bit

Settings:
This parameter reduces the following error when the motor starts and stops. Use this parameter to roughly adjust the overshoot during positioning. Set this parameter to a larger value to reduce overshoot. This parameter is only valid when the two-degrees-of-freedom control function is enabled (P2.094 [Bit 12] = 1) and its function is similar to that of P2.007.

44. Added P2.094 [Bit 6] AL007 detection in Position mode and [Bit 7] Switch for AL086.

P2.094▲	Special bit register 3		Address: 02BCH 02BDH
Default:	0x1090 0x0090 (A3-F models)	Control mode:	PT / PR / S / Sz
Unit:	-	Setting range:	0x0000 - 0xF3F6
Format:	HEX	Data size:	16-bit

Bit	Function	Description
Bit 6	AL007 detection in Position mode	Switch for AL007 detection in Position mode (PT and PR) 0: disable AL007 detection (default) 1: enable AL007 detection
Bit 7	Switch for brake resistor temperature protection after AL086 is triggered	Switch for the brake resistor temperature protection when the input voltage is too high 0: disable 1: enable

45. Changed the default value of P2.104 from 200 to 800.

P2.104	P/PI torque switching command condition		Address: 02D0H 02D1H
Default:	800	Control mode:	PT / PR / S / Sz
Unit:	%	Setting range:	1 - 800
Format:	DEC	Data size:	16-bit

46. Added P2.112 [Bit 8] Motor hard stop function selection and [Bit 10] Switch for AL040.

P2.112▲	Special bit register 4		Address: 02E0H 02E1H
Default:	0x0018	Control mode:	PT / PR / S / Sz
Unit:	-	Setting range:	0x0000 - 0x153F
Format:	HEX	Data size:	16-bit

Bit	Function	Description
Bit 8	Motor hard stop function selection	Motor hard stop 2 currently supports motors with Hall sensors (PM.003.Y = 1) or absolute motors. 0: Motor hard stop 1 (Refer to the settings of P1.057, P1.058, and P1.060.) 1: Motor hard stop 2 (Refer to the settings of P1.105, P1.106, and P1.058.)
Bit 10	Switch for AL040 (Excessive deviation of full-closed loop position control)	Only Speed mode supports this function. When the full-closed loop control is enabled (P1.074 = 1), the system will force enable the detection for AL040, so this function is invalid. 0: disable AL040 1: enable AL040

47. Added P3.005 Modbus communication.

P3.005	Modbus communication		Address: 030AH 030BH
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 - 0x0112
Format:	HEX	Data size:	16-bit

Settings:

- Y: sets the servo drive as the master or slave of Modbus.
  0: slave of Modbus
  1: master of Modbus
- Z: during Modbus communication, when the function code is 03H or 10H (read or write multiple words), the system gives priority to read or write high-bit data. Use this function for controllers with different priority for transmitting high-bits and low bits of the packets.
  0: transmit low bits first
  1: transmit high bits first

48. Changed the default value of P3.007 from 0 to 1 to be closer to the delay time recognized by RTU (duration of 3.5 characters).

P3.007	Modbus communication response delay time		Address: 030EH 030FH
Default:	1	Control mode:	All
Unit:	0.5 ms	Setting range:	0 - 1000
Format:	DEC	Data size:	16-bit

49. Added P3.012.U Error clearing when the limit alarm occurs.

P3.012	Communication support setting		Address: 0318H 0319H
Default:	0x1000	Control mode:	CANopen / DMCNET / EtherCAT
Unit:	-	Setting range:	0x0000 - 0x1111
Format:	HEX	Data size:	16-bit

Settings:

■ U: error clearing when the limit alarm occurs

0: when the limit alarm occurs, it needs to be cleared before reversing the operating direction to move away from the limit.

1: when the limit alarm occurs, it does not need to be cleared before reversing the operating direction to move away from the limit.

Note: use 0x6041 Statusword and 0x60FD Digital inputs to determine whether the motor has reached the limit.
Positive limit: OD 0x6041 [Bit 14] On & 0x60FD [Bit 1] On
Negative limit: OD 0x6041 [Bit 15] On & 0x60FD [Bit 0] On
The bit status of 0x6041 (Fault / Warning / Quick stop) remains unchanged when the servo reaches the limit.

50. Added P3.017 CANopen B mode disconnection delay time.

P3.017	CANopen B mode disconnection delay time		Address: 0322H 0323H
Default:	1000	Control mode:	CANopen
Unit:	ms	Setting range:	1 - 1000
Format:	DEC	Data size:	16-bit

Settings:

If the communication disconnection time exceeds this set value when using the PV (Profile Velocity), PT (Profile Torque), or HM (Homing Mode) mode in CANopen B mode, the system issues AL303.

51. Added P3.018 EtherCAT special function switch.

P3.018	EtherCAT special function switch		Address: 0324H 0325H
Default:	0x00002000	Control mode:	EtherCAT
Unit:	-	Setting range:	0x00000000 - 0x01112211
Format:	HEX	Data size:	32-bit

Settings:

- X: unit selection for Target velocity (OD 60FF) and Velocity actual value (OD 606C) when in the PV (Profile Velocity) mode or CSV (Cyclic Synchronous Velocity) mode.
  0: 0.1 rpm
  1: pulse/sec
- Z: AL185 communication disconnection detection setting
  0: disconnection detection starts after EtherCAT communication enters OP state.
  1: disconnection detection starts after EtherCAT communication enters INIT state.
  2: disable disconnection detection.

Note: when using the ring topology connection, set P3.018.Z to 2 to disable the disconnection detection.

- C: unit selection for the maximum speed of OD 607F and OD 6080
  0: 0.1 rpm for OD 607F and rpm for OD 6080.
  1: pulse/sec for OD 607F and OD 6080.

52. Added P3.019 Statusword display content.

P3.019	Statusword display content		Address: 0326H 0327H
Default:	0x0021	Control mode:	CANopen / EtherCAT
Unit:	-	Setting range:	0x0000 - 0x1100
Format:	HEX	Data size:	16-bit

Settings:

- Z: display content of OD 6041h [Bit 14]
  0: display the positive limit status.
  1: display the current synchronization status between the servo drive and controller. When the status displays On, it indicates that the synchronization is complete (SYN_OK).

53. Added P3.022 EtherCAT PDO timeout setting.

P3.022	EtherCAT PDO timeout setting		Address: 032CH 032DH
Default:	0xFF04	Control mode:	EtherCAT
Unit:	-	Setting range:	0x0002 - 0xFF14
Format:	HEX	Data size:	16-bit

Settings:

When using the PDO to transmit data periodically, use this parameter to set the timeout setting. The following two sets of digits set the alarm conditions for AL180 and AL3E3 respectively to ensure that the servo drive receives the PDO. When one of the alarm occurs, it means the allowable duration for packet loss exceeds the set range.

U Z Y X

Digit	UZ	YX
Function	AL180 alarm condition	AL3E3 alarm condition
Range	00x00 (disabled) - 0xFF (default)	02 - 14

- YX: AL3E3 alarm condition (allowable cycle for elapsed time); applicable to IP / CSP / CSV / CST modes. AL3E3 occurs when the servo drive does not receive the PDO within the set cycle.
  When the communication cycle is 4 ms and you set this parameter to 02 (allow two cycles), it means if the servo drive does not receive any PDO within 8 ms, AL3E3 occurs.
- UZ: AL180 alarm condition (allowable duration for elapsed time); applicable to all motion modes. AL180 occurs when the servo drive does not receive the PDO within the set duration (unit: ms). Set 0x01 for 1 ms, 0x02 for 2 ms, and 0xFF for 255 ms.

54. Added P4.044.X Single-direction torque limit setting.

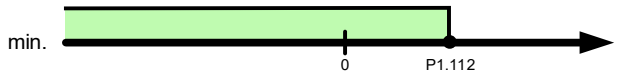
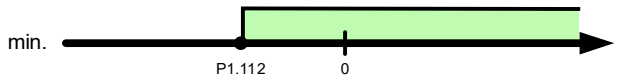
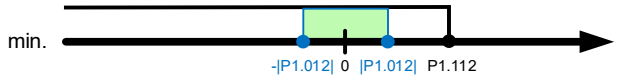
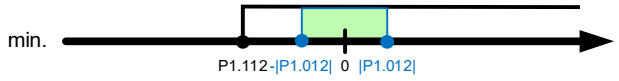
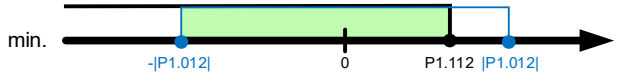
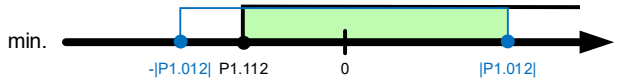
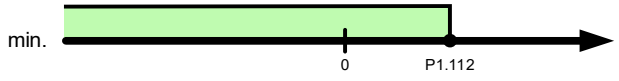
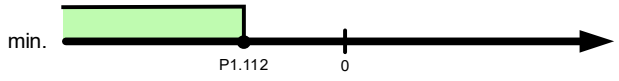
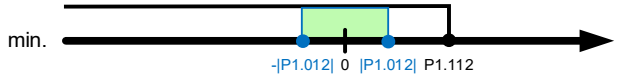
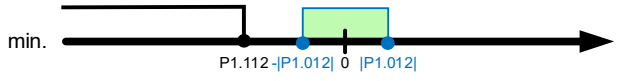
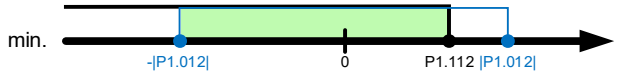
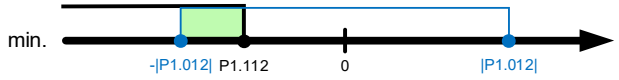
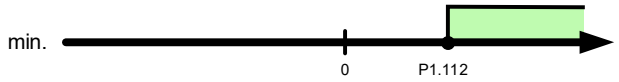
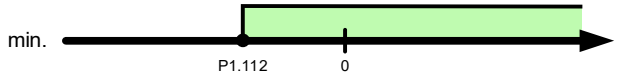
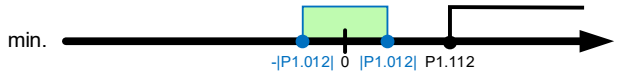
P4.044	Special bit register 5		Address: 0458H 0459H
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 - 0x0003
Format:	HEX	Data size:	16-bit

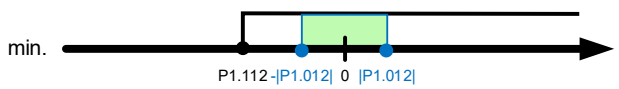
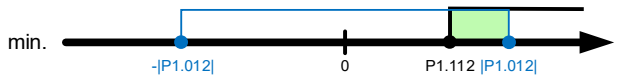
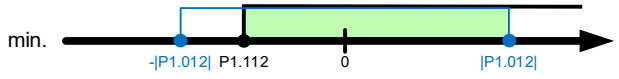
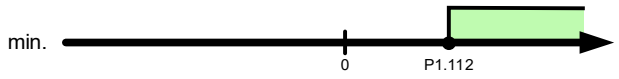
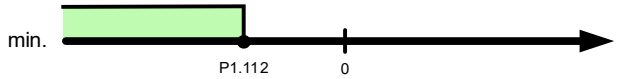
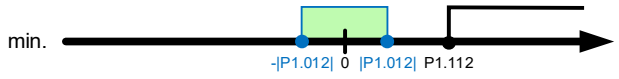
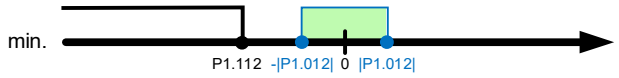
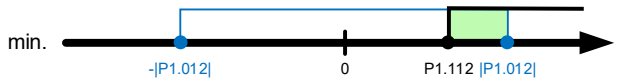
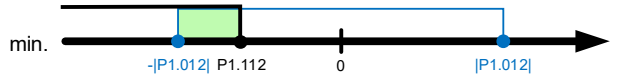
Settings:

U Z Y X

X	Single-direction torque limit setting	Z	Reserved
Y	Reserved	U	Reserved

This parameter limits the torque of the motor. The area with the background color is the torque limit area.
The following figures use P1.012 to explain the settings, but the functions of the External analog torque command and Internal torque limits(P1.012~P1.014) are the same, so you can set these parameters according to the requirements.

P4.044.X	P1.012	P1.112	Operating range
0	turn off P1.012 function (P1.002.Y=0)	≥ 0	
		< 0	
	≤ |P1.112|	≥ 0	
		< 0	
	≥ |P1.112|	≥ 0	
		< 0	
1	turn off P1.012 function (P1.002.Y=0)	≥ 0	
		< 0	
	< |P1.112|	≥ 0	
		< 0	
	> |P1.112|	≥ 0	
		< 0	
2	turn off P1.012 function (P1.002.Y=0)	≥ 0	
		< 0	
	< |P1.112|	≥ 0	

P4.044.X	P1.012	P1.112	Operating range
		< 0	
	> |P1.112|	≥ 0	
		< 0	
3	turn off P1.012 function (P1.002.Y=0)	≥ 0	
		< 0	
	< |P1.112|	≥ 0	
		< 0	
	> |P1.112|	≥ 0	
		< 0	

55. Added PM.000 Motor type.

PM.000▲●	**Motor type**		**Address: FD00H FD01H**
Default:	0	Control mode:	All
Unit:	-	Setting range:	0 - 3
Format:	DEC	Data size:	16-bit

Settings:

Set this parameter according to the type of motor used.

Setting value	Motor type
0	Permanent-magnet synchronous rotary motor (SPM)
1	Reserved
2	Permanent-magnet synchronous linear motor (LM)
3	Reserved

56. Added PM.001 Motor parameter automatic identification function.

PM.001▲■	Motor parameter automatic identification function		Address: FD02H FD03H
Default:	0	Applicable motor:	All
Unit:	-	Setting range:	0 - 1
Format:	DEC	Data size:	16-bit

Settings:
Enables or disables the motor parameter automatic identification function.
0: disable
1: enable
Note:
1. This parameter is invalid if you are using a Delta communication type rotary motor.
2. Rotary motor means a permanent-magnet synchronous rotary motor; linear motor means a permanent-magnet synchronous linear motor.

57. Added PM.002 Motor parameter identification status.

PM.002▲●	Motor parameter identification status		Address: FD04H FD05H
Default:	0	Applicable motor:	All
Unit:	-	Setting range:	0 - 1
Format:	DEC	Data size:	16-bit

Settings:
After executing motor parameter identification, the servo drive automatically detects whether the identification is complete. Use this parameter to obtain the motor parameter identification status.
If the motor parameter identification process has not been completed (PM.002 = 0) and you switch the servo to the Servo On state, AL053 occurs to warn the user that the motor parameter identification is not yet complete. This parameter is automatically set to 1 when the motor parameter automatic identification is complete. If you do not execute the motor parameter identification process, complete the related parameter settings for third-party motors, and then set this parameter to 1.
0: motor parameter identification is not complete yet
1: motor parameter identification is complete
Note:
1. This parameter value is always 1 and unchangeable if you are using a Delta rotary motor.
2. Rotary motor means a permanent-magnet synchronous rotary motor; linear motor means a permanent-magnet synchronous linear motor.

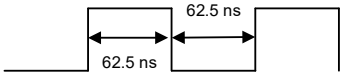
58. Added PM.003 Encoder type.

PM.003▲●	Encoder type		Address: FD06H FD07H
Default:	0x0010	Applicable motor:	All
Unit:	-	Setting range:	0x0000 - 0x1312
Format:	HEX	Data size:	16-bit

Settings:

Sets the encoder type related settings.

- X: CN2 signal type[*2]
  0: pulse digital signal
  1: sine wave analog signal
  2: pulse digital signal - for Delta motor with magnetic encoder (ECMA-C8)
- Y: Hall sensor
  0: no Hall sensor
  1: with Hall sensor
  Note: if you select “no Hall sensor”, the motor moves slightly to detect the magnetic pole when the servo is on for the first time. It is suggested to execute the Z-axis magnetic field detection after installing the Hall sensor.
- Z: converter box ABZ pulse filter[*2]
  0: bypass
  1: 16 MHz
  2: 8 MHz
  3: 3 MHz
  Example: pulse width 16 MHz (62.5 ns)



- U: main encoder signal source
  0: CN2
  1: CN5

Note:

1. This parameter is invalid if you are using a Delta communication type rotary motor.
2. To receive pulses or sine wave signals with CN2, use the Delta position signal converter box (ASD-IF-EN0A20).
3. Rotary motor means a permanent-magnet synchronous rotary motor; linear motor means a permanent-magnet synchronous linear motor.
4. When connecting the Delta motor with magnetic encoder (ECMA-C8) to the CN5 connector, set this parameter to 0x1002 and cycle the power without the need for motor parameter identification.

59. Added PM.004 Main encoder resolution.

PM.004▲●	Main encoder resolution		Address: FD08H FD09H
Default:	-	Applicable motor:	All
Unit:	Rotary motor: Pulse signal: pulse/rev Sine wave signal: period/rev Communication type*: bit/rev Linear motor: Pulse signal: $10^{-3}\ \mu m / pulse$ Sine wave signal: $10^{-3}\ \mu m / period$ Communication type: $10^{-3}\ \mu m / pulse$	Setting range:	Rotary motor: Pulse signal: 128 to 2^{28} Sine wave signal: 64 to $2^{30\text{-PM.005}}$ Communication type*: 7 - 30 Linear motor: Pulse signal: 1 - 30000 Sine wave signal: $2^{\text{PM.005-1}}$ to 200000 Communication type*: 1 - 30000
Format:	DEC	Data size:	32-bit

Settings:
Set the resolution according to the encoder specifications.
When PM.003.U = 0, input the resolution of the encoder connected to CN2; when PM.003.U = 1, input the resolution of the encoder connected to CN5.
Rotary motor:

1. Pulse encoder: input the number of single-phase pulses per revolution; the resolution of the motor is (PM.004 x 4) pulse/rev.
2. Sine wave encoder: input the number of single-phase sine waves per revolution; the resolution of the motor is (PM.004 x $2^{\text{PM.005}}$) pulse/rev.
3. Communication type encoder: input the resolution according to the Motor Parameter Identification Wizard process.

Linear motor:

1. Pulse encoder: input the corresponding distance of the motor pulse after quadruple frequency; the resolution of the motor is (PM.004 x 0.001) um/pulse.
2. Sine wave encoder: input the corresponding distance of the motor single-phase sine wave; the resolution of the motor is (PM.004 x 0.001 / $2^{\text{PM.005}}$) um/pulse.
3. Communication type encoder: input the resolution according to the Motor Parameter Identification Wizard process.

Note:

1. Rotary motor means a permanent-magnet synchronous rotary motor; linear motor means a permanent-magnet synchronous linear motor.
2. Communication type indicates communication formats of encoders of other brands that are supported by ASDA-A3, such as BissC, Mitutotyo, Endat2.2, Fagor, and Tamagawa.

60. Added PM.005 Position signal converter box interpolation magnification.

PM.005	Position signal converter box interpolation magnification		Address: FD0AH FD0BH
Default:	11	Applicable motor:	Linear motor, third-party rotary motor
Unit:	-	Setting range:	2 - 11
Format:	DEC	Data size:	16-bit

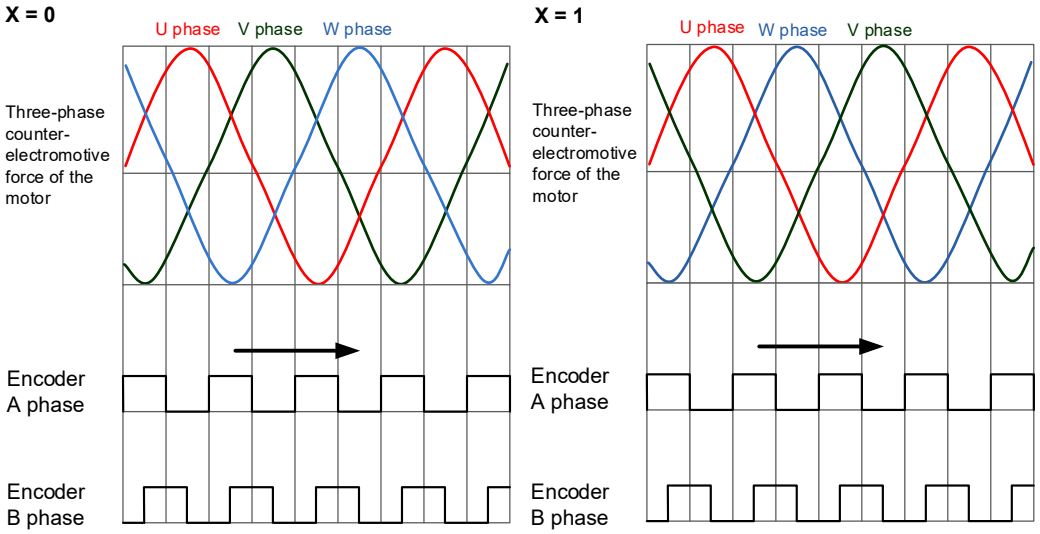
Settings:
This parameter improves the motor resolution with interpolation magnification. It is applicable to sine wave encoders and not applicable to pulse encoders.
The resolution of the sine wave encoder after interpolation is PM.004 x 2^N; N = PM.005.

61. Added PM.006 Motor UVW and Hall sensor phase sequences.

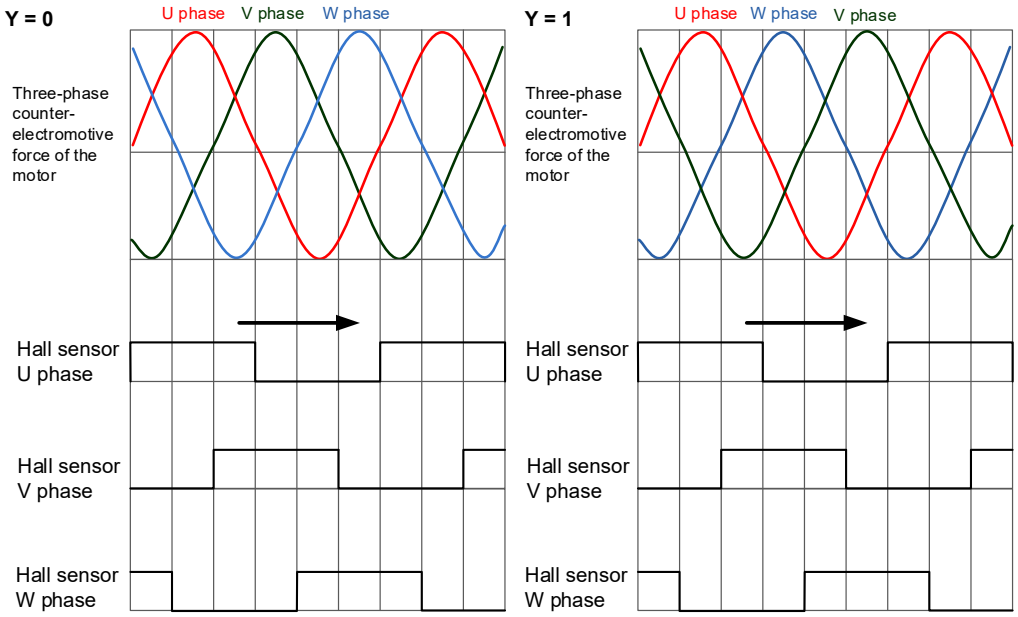
PM.006▲●	Motor UVW and Hall sensor phase sequences		Address: FD0CH FD0DH
Default:	0x0000	Applicable motor:	Linear motor, third-party rotary motor
Unit:	-	Setting range:	0x0000 - 0x0011
Format:	HEX	Data size:	16-bit

Settings:
During the motor parameter identification process, the servo drive automatically detects the phase sequences of the motor UVW and Hall sensor. You can use this parameter to obtain this information.

- X: motor UVW phase sequence and encoder incremental direction
  0: when A phase is ahead of B phase, the motor phase sequence is U, V, and W.
  1: when A phase is ahead of B phase, the motor phase sequence is U, W, and V.



- Y: motor UVW phase sequence and Hall sensor UVW direction
  0: when the Hall sensor phase sequence is U, V, and W, the motor phase sequence is U, V, and W.
  1: when the Hall sensor phase sequence is U, V, and W, the motor phase sequence is U, W, and V.



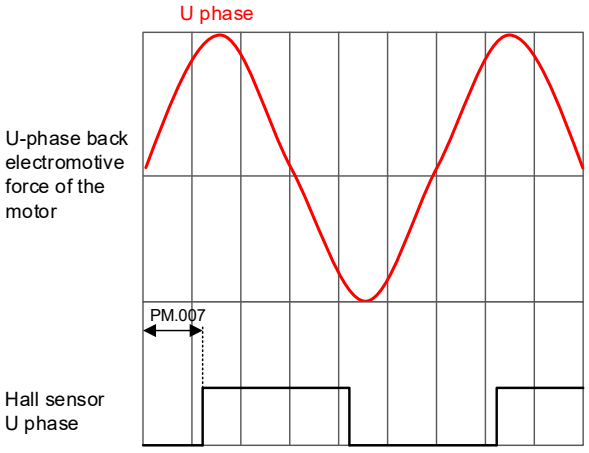
62. Added PM.007 Hall sensor offset angle.

PM.007▲●	Hall sensor offset angle		Address: FD0EH FD0FH
Default:	0.0	Applicable motor:	All
Unit:	degree	Setting range:	0 - 360.0
Format:	DEC	Data size:	16-bit

Settings:

During the motor parameter identification process, the servo drive automatically detects the offset angle of the Hall sensor. You can use this parameter to obtain this information.

When the Hall sensor causes hysteresis due to different motion directions of the motor, the U-phase zero point of the Hall sensor is based on the central angle of the hysteresis. For the description of hysteresis, refer to the diagram of PM.008.

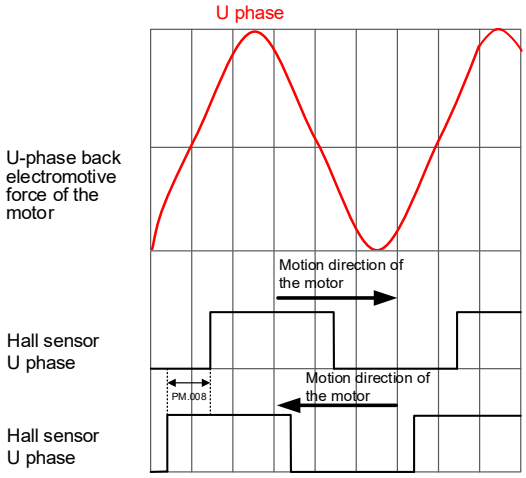


63. Added PM.008 Hall sensor hysteresis width.

PM.008▲●	Hall sensor hysteresis width		Address: FD10H FD11H
Default:	0.0	Applicable motor:	All
Unit:	degree	Setting range:	0 - 360.0
Format:	DEC	Data size:	16-bit

Settings:

During the motor parameter identification process, the servo drive automatically detects the hysteresis width of the Hall sensor. You can use this parameter to obtain this information.



64. Added PM.009 Electrical angle settings.

PM.009▲	Electrical angle settings		Address: FD12H FD13H
Default:	0x0000	Applicable motor:	Linear motor, third-party rotary motor
Unit:	-	Setting range:	0x0000 - 0xFFFF
Format:	HEX	Data size:	16-bit

Settings:

Bit	7	6	5	4	3	2	1	0
Bit	15	14	13	12	11	10	9	8

Bit	Function	Description
Bit 0	Reserved	-
Bit 1	Magnetic field detection after powering on	Magnetic field detection after the absolute encoder is powered on (cycle the power for this setting to take effect) 0: after the absolute encoder is powered on, the initial magnetic field angle is determined by PM.010. 1: after the absolute encoder is powered on, the initial magnetic field angle is determined by the initial magnetic field detection function.
Bit 2	Detect the number of magnetic poles	Set the automatic detection of the number of magnetic poles when executing the motor parameter identification process for the third-party rotary motor. 0: automatic detection of the number of magnetic poles 1: no detection of the number of magnetic poles. Manually input the number of magnetic poles to PM.028 Permanent-magnet rotary motor pole number.

Bit	Function	Description
Bit 3	Reserved	-
Bit 4	Use the Hall sensor to determine whether the motor magnetic field is deviated	Use the Hall sensor to determine whether the motor magnetic field is deviated 0: disable 1: enable If the deviation between the magnetic field detected by the Hall sensor and the actual magnetic field of the motor is too large, AL055 Motor magnetic field error occurs.
Bit 5 - Bit 15	Reserved	-

65. Added PM.010 Offset between absolute encoder zero point and motor magnetic field zero point.

PM.010▲●	**Offset between absolute encoder zero point and motor magnetic field zero point**		**Address: FD14H FD15H**
Default:	180.0	Applicable motor:	Absolute motor
Unit:	degree	Setting range:	0 - 360.0
Format:	DEC	Data size:	16-bit

Settings:

The accumulated angle starting from the motor magnetic field zero point to the positive phase sequence of the magnetic field, and then to the absolute encoder zero point. This parameter value will be automatically detected and input during the motor parameter identification process.

66. Added PM.011 Initial magnetic field current detection.

PM.011▲●	**Initial magnetic field current detection**		**Address: FD16H FD17H**
Default:	100	Applicable motor:	Linear motor, third-party rotary motor
Unit:	%	Setting range:	0 - 250
Format:	DEC	Data size:	16-bit

Settings:

If the motor is not installed with a Hall sensor, the servo drive will automatically detect the motor magnetic field when the servo is switched to On for the first time. Use this parameter to set the current value during the motor magnetic field detection. If you are using a Hall sensor (PM.003 = 1), you do not need to set this parameter.

The current affects the motion range of the motor during magnetic field detection, and the servo obtains the magnetic field data through the motion.

Note the following when setting this parameter:

1. When the friction between the motor and the mechanical parts is too large, magnetic field detection error may occur which triggers AL052. Increase the set value of this parameter can reduce the occurrence of AL052.
2. When the motor moves too much, lower the set value of this parameter to reduce the motion during magnetic field detection.

Note:

1. It is not suggested to use the initial magnetic field current detection for Z axis. Install a Hall sensor to Z axis for magnetic field detection.
2. The gantry application requires a Hall sensor for magnetic field detection. Thus, this function is not suggested.

67. Added PM.012 Initial magnetic field detection.

PM.012▲	Initial magnetic field detection		Address: FD18H FD19H
Default:	0x0044	Applicable motor:	Linear motor, third-party rotary motor
Unit:	-	Setting range:	0x0011- 0x2FFF
Format:	HEX	Data size:	16-bit

Settings:

The motor magnetic field detection process can only complete when the X and Y conditions are met at the same time. If the two conditions are not met at the same time, the servo re-starts the detection process. If the detection fails four consecutive times, AL052 is triggered.

■ X: initial magnetic field detection condition 1

During the detection process, when the motion of the motor magnetic field exceeds this electrical angle, one of the detection conditions is met.

Setting value	1	2	3	4	5	6	7	8
Degree	0.25	0.5	0.75	1	1.25	1.5	1.75	2
Setting value	9	A	B	C	D	E	F	-
Degree	2.25	2.5	2.75	3	3.25	3.5	3.75	-

■ Y: initial magnetic field detection condition 2

During the detection process, when the control command for the magnetic field exceeds this electrical angle, one of the detection conditions is met.

Setting value	1	2	3	4	5	6	7	8
Degree	10	20	30	40	50	60	70	80
Setting value	9	A	B	C	D	E	F	-
Degree	90	100	110	120	130	140	150	-

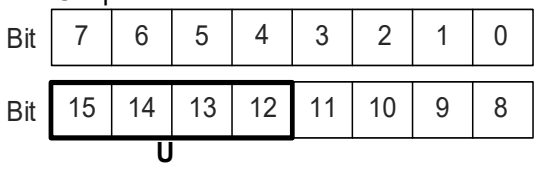
■ Z: initial magnetic field detection delay time

When the servo is switched to Servo On for the first time, the initial magnetic field detection starts after this set delay time.

Setting value	0	1	2	3	4	5	6	7
Time (ms)	0	50	100	150	200	250	300	350
Setting value	8	9	A	B	C	D	E	F
Time (ms)	400	450	550	650	750	850	950	1050

Note: if the Z axis is using a motor with a brake, do not set the initial magnetic field detection delay time.

■ U: special function



Bit	Function	Description
Bit 12 - Bit 13	Mechanical limit initial magnetic field detection	If using a Z-axis linear motor or the mechanical limit is set, the initial magnetic field detection will have a more stable detection result. Bit 13 = 0, Bit 12 = 0: disable this function. Bit 13 = 0, Bit 12 = 1: when the value of the motor feedback position [PUU] increases towards a positive value, the motor reaches the mechanical limit. Bit 13 = 1, Bit 12 = 0: when the value of the motor feedback position [PUU] decreases towards a negative value, the motor reaches the mechanical limit.
Bit 14 - Bit 15	Reserved	-

68. Added PM.013 Third-party motor flag.

PM.013▲●	**Third-party motor flag**		**Address: FD1AH FD1BH**
Default:	0	Applicable motor:	All
Unit:	-	Setting range:	0 - 1
Format:	DEC	Data size:	16-bit

Settings:
When using a third-party motor, the servo drive automatically detects and inputs this parameter after executing the motor parameter identification process. If you do not execute the motor parameter identification process, set this parameter to 1.

1. This parameter is automatically set to 0 when the Delta communication type motor is connected to CN2 and the communication is successful.
2. When you are not using a Delta communication type motor, set this parameter to 1. This parameter is automatically set to 1 when you execute the Motor Parameter Identification Wizard.

69. Added PM.015 Current loop proportional gain (kp).

PM.015	**Current loop proportional gain (kp)**			**Address: FD1EH FD1FH**
Operation interface:	Panel / software	Communication	Applicable motor:	All
Default:	0.000	0	Data size:	32-bit
Unit:	rad/s	0.001 rad/s		
Setting range:	Rotary motor: 0.000 - 1023.000 Linear motor: 0.000 - 16383.000	Rotary motor: 0 - 1023000 Linear motor: 0 - 16383000		
Format:	Three decimals	DEC		
Example:	1.5 = 1.5 rad/s	1500 = 1.5 rad/s		

Settings:
You do not need to set this parameter when using a Delta communication type motor.
Increasing the current control gain can enhance the current response and reduce the current control errors. If you set the value too high, it may cause vibration and noise. It is suggested that general users do not adjust this parameter.

Note: rotary motor means a permanent-magnet synchronous rotary motor; linear motor means a permanent-magnet synchronous linear motor.

70. Added PM.016 Current loop integral gain (ki).

PM.016	Current loop integral gain (ki)		Address: FD20H FD21H
Default:	0	Applicable motor:	All
Unit:	%	Setting range:	0 - 32767
Format:	DEC	Data size:	16-bit

Settings:

You do not need to set this parameter when using a Delta communication type motor. Increasing the current control integral can enhance the current response and reduce the current control errors. If you set the value too high, it may cause vibration and noise. It is suggested that general users do not adjust this parameter.

71. Added PM.019 Load increase gain.

PM.019▲	Load increase gain		Address: FD26H FD27H
Default:	100	Applicable motor:	All
Unit:	%	Setting range:	0 - 600
Format:	DEC	Data size:	16-bit

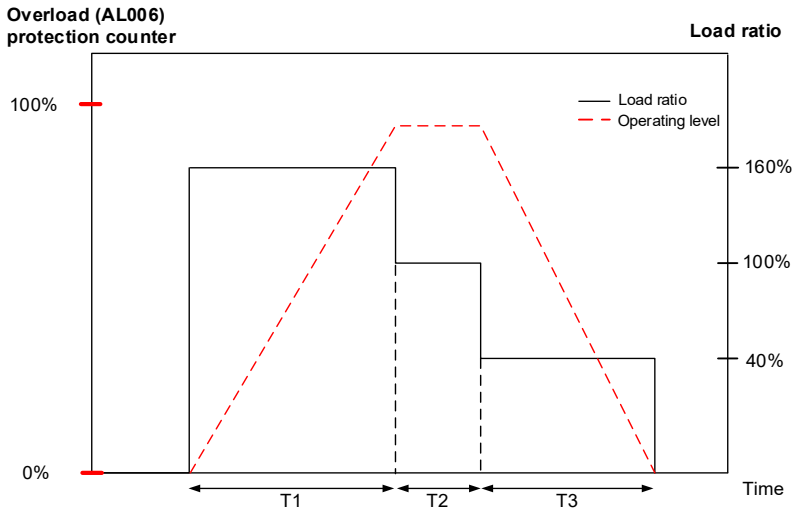
Settings:

Use this parameter to adjust the motor overload protection time. For the setting details, refer to the following table and figures.

Load ratio	Operating time	Load ratio	Operating time
0	12 sec × PM.020	260%	3.9 sec × PM.019
20%	12.3 sec × PM.020	280%	3.3 sec × PM.019
40%	13.6 sec × PM.020	300%	2.8 sec × PM.019
60%	16.3 sec × PM.020	320%	2.5 sec × PM.019
80%	22.6 sec × PM.020	340%	2.2 sec × PM.019
100%	N/A	360%	2.0 sec × PM.019
120%	26.38 sec × PM.019	380%	1.8 sec × PM.019
140%	35.2 sec × PM.019	400%	1.6 sec × PM.019
160%	17.6 sec × PM.019	420%	1.4 sec × PM.019
180%	11.2 sec × PM.019	440%	1.3 sec × PM.019
200%	8 sec × PM.019	460%	1.2 sec × PM.019
220%	6.1 sec × PM.019	480%	1.1 sec × PM.019
240%	4.8 sec × PM.019	500%	1 sec × PM.019

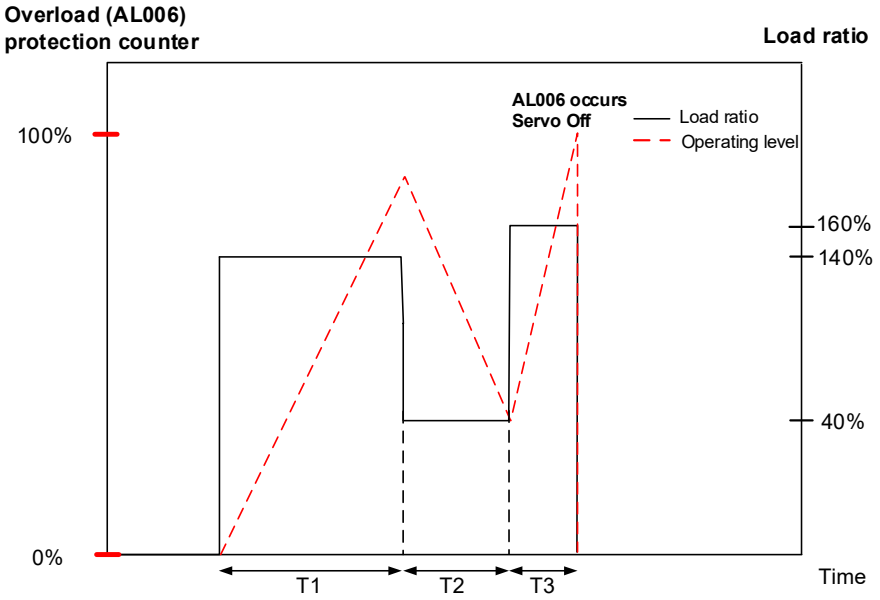
The time required for the motor protection level at the normal level to reach the overload level is called the operating time. When the protection level reaches the overload level, AL006 is triggered. The load ratio is based on 100%. When the ratio is above 100%, it is load increase gain (PM.019); when the ratio is less than 100%, it is load decrease gain (PM.020).

Example 1:



1. When the load ratio is 160%, the overload (AL006) protection counter continues to increase.
2. When the load ratio is 100%, the operating level is leveled off.
3. When the load ratio is 40%, the overload (AL006) protection counter continues to decrease.

Example 2:



As shown in the figure above, the load ratio affects whether the load is accumulated. When the load accumulates over 100%, the operating time must be taken into consideration, or else AL006 occurs.

72. Added PM.020 Load decrease gain.

PM.020▲	Load decrease gain		Address: FD28H FD29H
Default:	100	Applicable motor:	All
Unit:	%	Setting range:	15 - 600
Format:	DEC	Data size:	16-bit

Settings:
This parameter setting affects the operating time of the load decrease and the overall motion planning. Refer to the description of PM.019.

73. Added PM.022 Motor temperature sensor.

PM.022▲●	Motor temperature sensor		Address: FD2CH FD2DH
Default:	0	Applicable motor:	Linear motor, third-party rotary motor
Unit:	-	Setting range:	0 - 3
Format:	DEC	Data size:	16-bit

Settings:

Sets the type of motor temperature sensor connected to the servo drive CN5 Pin 13 and Pin 14 (see Section 3.7).
0: not connected to a motor temperature sensor
1: Delta linear motor NTC thermistor
2: NTC level thermistor
3: PTC level thermistor

74. Added PM.024 Motor temperature sensor resistance.

PM.024▲	Motor temperature sensor resistance		Address: FD30H FD31H
Default:	50000	Applicable motor:	Linear motor, third-party rotary motor
Unit:	ohm	Setting range:	0 - 50000
Format:	DEC	Data size:	32-bit

Settings:
This parameter is only valid when PM.022 is set to 2 or 3. Input the resistance value corresponding to the protective temperature according to the resistance value of the connected temperature sensor. Refer to the NTC or PTC temperature and resistance value corresponding table for the resistance value.

75. Added PM.028 Permanent-magnet rotary motor pole number.

PM.028▲●	Permanent-magnet rotary motor pole number		Address: FD38H FD39H
Default:	10	Applicable motor:	Permanent-magnet rotary motor
Unit:	pole	Setting range:	2 - 100
Format:	DEC	Data size:	16-bit

Settings:
Input the correct value according to the specifications of the third-party permanent-magnet rotary motor.
Note: pole number = pole pair x 2

76. Added PM.029 Permanent-magnet rotary motor rated current.

PM.029▲●	Permanent-magnet rotary motor rated current			Address: FD3AH FD3BH
Operation interface:	Panel / software	Communication	Applicable motor:	Permanent-magnet rotary motor
Default:	-	-	Data size:	16-bit
Unit:	Arms	0.01 Arms		
Setting range:	0.00 to servo drive rated current	0 to servo drive rated current x 100		
Format:	Two decimals	DEC		
Example:	1.5 = 1.5 Arms	150 = 1.5 Arms		

Settings:
Input the correct value according to the specifications of the third-party permanent-magnet rotary motor.
Unit conversion between Ampere peak and Ampere RMS:

$$\text{Ampere peak (Apk)} = \text{Ampere RMS (Arms)} \times \sqrt{2}$$

77. Added PM.030 Permanent-magnet rotary motor maximum current.

PM.030▲●	Permanent-magnet rotary motor maximum current			Address: FD3CH FD3DH
Operation interface:	Panel / software	Communication	Applicable motor:	Permanent-magnet rotary motor
Default:	-	-	Data size:	16-bit
Unit:	Arms	0.01 Arms		
Setting range:	0.00 to servo drive maximum current	0 to servo drive maximum current x 100		
Format:	Two decimals	DEC		
Example:	1.5 = 1.5 Arms	150 = 1.5 Arms		

Settings:
Input the correct value according to the specifications of the third-party permanent-magnet rotary motor.
Unit conversion between Ampere peak and Ampere RMS:

$$\text{Ampere peak (Apk)} = \text{Ampere RMS (Arms)} \times \sqrt{2}$$

78. Added PM.031 Permanent-magnet rotary motor rated speed.

PM.031▲	Permanent-magnet rotary motor rated speed		Address: FD3EH FD3FH
Default:	-	Applicable motor:	Permanent-magnet rotary motor
Unit:	rpm	Setting range:	0 - 3000
Format:	DEC	Data size:	16-bit

Settings:
Input the correct value according to the specifications of the third-party permanent-magnet rotary motor.

79. Added PM.032 Permanent-magnet rotary motor maximum speed.

PM.032▲	Permanent-magnet rotary motor maximum speed		Address: FD40H FD41H
Default:	-	Applicable motor:	Permanent-magnet rotary motor
Unit:	rpm	Setting range:	0 - 6000
Format:	DEC	Data size:	16-bit

Settings:
Input the correct value according to the specifications of the third-party permanent-magnet rotary motor.

80. Added PM.033 Permanent-magnet rotary motor torque constant.

PM.033▲	Permanent-magnet rotary motor torque constant			Address: FD42H FD43H
Operation interface:	Panel / software	Communication	Applicable motor:	Permanent-magnet rotary motor
Default:	-	-	Data size:	32-bit
Unit:	Nm/Arms	0.001 Nm/Arms		
Setting range:	0.000 - 65.535	0 - 65535		
Format:	Three decimals	DEC		
Example:	1.5 = 1.5 Nm/Arms	1500 = 1.5 Nm/Arms		

Settings:
Input the correct value according to the specifications of the third-party permanent-magnet rotary motor.

81. Added PM.034 Permanent-magnet rotary motor rotor inertia.

PM.034▲	Permanent-magnet rotary motor rotor inertia			Address: FD44H FD45H
Operation interface:	Panel / software	Communication	Applicable motor:	Permanent-magnet rotary motor
Default:	-	-	Data size:	32-bit
Unit:	$10^{-4}\mathrm{kg}\cdot m^2$	0.001*$10^{-4}\mathrm{kg}\cdot m^2$		
Setting range:	0.000 - 2147483.647	0 - 2147483647		
Format:	Three decimals	DEC		
Example:	1.5 = 1.5x10^{-4} $\mathrm{kg}\cdot m^2$	1500 = 1.5x10^{-4} $\mathrm{kg}\cdot m^2$		

Settings:
Input the correct value according to the specifications of the third-party permanent-magnet rotary motor.

82. Added PM.035 Permanent-magnet rotary motor phase resistance.

PM.035▲	Permanent-magnet rotary motor phase resistance			Address: FD46H FD47H
Operation interface:	Panel / software	Communication	Applicable motor:	Permanent-magnet rotary motor
Default:	-	-	Data size:	32-bit
Unit:	ohm	0.001 ohm		
Setting range:	0.000 - 65.535	0 - 65535		
Format:	Three decimals	DEC		
Example:	1.5 = 1.5 ohm	1500 = 1.5 ohm		

Settings:
Input the correct value according to the specifications of the third-party permanent-magnet rotary motor.

83. Added PM.036 Permanent-magnet rotary motor phase inductance.

PM.036▲	Permanent-magnet rotary motor phase inductance			Address: FD48H FD49H
Operation interface:	Panel / software	Communication	Applicable motor:	Permanent-magnet rotary motor
Default:	-	-	Data size:	32-bit
Unit:	mH	0.01 mH		
Setting range:	0.00 - 655.35	0 - 65535		
Format:	Two decimals	DEC		
Example:	1.5 = 1.5 mH	150 = 1.5 mH		

Settings:
Input the correct value according to the specifications of the third-party permanent-magnet rotary motor.

84. Added PM.038 Permanent-magnet rotary motor back electromotive force constant.

PM.038▲	Permanent-magnet rotary motor back electromotive force constant			Address: FD4CH FD4DH
Operation interface:	Panel / software	Communication	Applicable motor:	Permanent-magnet rotary motor
Default:	-	-	Data size:	16-bit
Unit:	Vrms/rpm	0.0001 Vrms/rpm		
Setting range:	0.0000 - 2.2876	0 - 22876		
Format:	Four decimals	DEC		
Example:	1.5 = 1.5 Vrms/rpm	15000 = 1.5 Vrms/rpm		

Settings:
Input the correct value according to the specifications of the third-party permanent-magnet rotary motor.

85. Added PM.045 Linear motor pole pitch.

PM.045▲●	Linear motor pole pitch			Address: FD5AH FD5BH
Operation interface:	Panel / software	Communication	Applicable motor:	Linear motor
Default:	-	-	Data size:	32-bit
Unit:	mm/360°	0.001 mm/360°		
Setting range:	1.000 - 500.000	1000 - 500000		
Format:	Three decimals	DEC		
Example:	1.5 = 1.5 mm/360°	1500 = 1.5 mm/360°		

Settings:
Input the correct value according to the specifications of the linear motor.

86. Added PM.046 Linear motor rated current.

PM.046▲●	Linear motor rated current			Address: FD5CH FD5DH
Operation interface:	Panel / software	Communication	Applicable motor:	Linear motor
Default:	-	-	Data size:	16-bit
Unit:	Arms	0.01 Arms		
Setting range:	0.00 to servo drive rated current	0 to servo drive rated current x 100		
Format:	Two decimals	DEC		
Example:	1.5 = 1.5 Arms	150 = 1.5 Arms		

Settings:
Input the correct value according to the specifications of the linear motor.
Unit conversion between Ampere peak and Ampere RMS:

$$\text{Ampere peak (Apk)} = \text{Ampere RMS (Arms)} \times \sqrt{2}$$

87. Added PM.047 Linear motor maximum current.

PM.047▲●	Linear motor maximum current			Address: FD5EH FD5FH
Operation interface:	Panel / software	Communication	Applicable motor:	Linear motor
Default:	-	-	Data size:	16-bit
Unit:	Arms	0.01 Arms		
Setting range:	0.00 to servo drive maximum current	0 to servo drive maximum current x 100		
Format:	Two decimals	DEC		
Example:	1.5 = 1.5 Arms	150 = 1.5 Arms		

Settings:
Input the correct value according to the specifications of the linear motor.
Unit conversion between Ampere peak and Ampere RMS:

$$\text{Ampere peak (Apk)} = \text{Ampere RMS (Arms)} \times \sqrt{2}$$

88. Added PM.048 Linear motor maximum speed.

PM.048▲	Linear motor maximum speed		Address: FD60H FD61H
Default:	-	Applicable motor:	Linear motor
Unit:	mm/s	Setting range:	0 - 15999
Format:	DEC	Data size:	16-bit

Settings:
Input the correct value according to the specifications of the linear motor.

89. Added PM.049 Linear motor force constant.

PM.049▲	Linear motor force constant			Address: FD62H FD63H
Operation interface:	Panel / software	Communication	Applicable motor:	Linear motor
Default:	-	-	Data size:	32-bit
Unit:	N/Arms	0.01 N/Arms		
Setting range:	0.00 - 1773.62	0 - 177362		
Format:	Two decimals	DEC		
Example:	1.5 = 1.5 N/Arms	150 = 1.5 N/Arms		

Settings:
Input the correct value according to the specifications of the linear motor.

90. Added PM.050 Linear motor phase resistance.

PM.050▲	Linear motor phase resistance			Address: FD64H FD65H
Operation interface:	Panel / software	Communication	Applicable motor:	Linear motor
Default:	-	-	Data size:	32-bit
Unit:	ohm	0.001 ohm		
Setting range:	0.000 - 65.535	0 - 65535		
Format:	Three decimals	DEC		
Example:	1.5 = 1.5 ohm	1500 = 1.5 ohm		

Settings:
Input the correct value according to the specifications of the linear motor.

91. Added PM.051 Linear motor phase inductance.

PM.051▲	Linear motor phase inductance			Address: FD66H FD67H
Operation interface:	Panel / software	Communication	Applicable motor:	Linear motor
Default:	-	-	Data size:	32-bit
Unit:	mH	0.01 mH		
Setting range:	0.00 - 655.35	0 - 65535		
Format:	Two decimals	DEC		
Example:	1.5 = 1.5 mH	150 = 1.5 mH		

Settings:
Input the correct value according to the specifications of the linear motor.

92. Added PM.053 Linear motor back electromotive force constant.

PM.053▲	Linear motor back electromotive force constant		Address: FD6AH FD6BH	
Operation interface:	Panel / software	Communication	Applicable motor:	Linear motor
Default:	-	-	Data size:	16-bit
Unit:	Vrms/(m/s)	0.1 Vrms/(m/s)		
Setting range:	0.0 - 591.2	0 - 5912		
Format:	One decimal	DEC		
Example:	1.5 = 1.5 Vrms/(m/s)	15 = 1.5 Vrms/(m/s)		

Settings:
Input the correct value according to the specifications of the linear motor.

93. Added AL048 Abnormal encoder signal output.

AL048 Abnormal encoder signal output	
Trigger condition and cause	Condition: the output pulse frequency of the encoder is higher than the maximum output frequency of the hardware. Cause: 1. The pulse resolution of the encoder is set too high. 2. There is interference or cable damage causing communication error. 3. Encoder error.
Checking method and corrective action	1. The settings of P1.076 and P1.046 should follow these requirements: P1.076 > motor speed and $\frac{\text{Motor speed}}{60} \times \text{P1.046} \times 4 < 19.8 \times 10^6$ 2. Check the communication error rate by setting P0.002 to -80. If this value continues to accumulate, it means there is interference. Check the following items: (a) Check if the motor is properly grounded. Make sure the power cable (green end) is grounded to the servo drive heat sink. (b) Check if the connection for the encoder signal cable is normal. Make sure the encoder signal cable is separated from the power supply or any high-current cables to avoid interference. (c) Use shielded cable for the encoder. 3. Check the error log (P4.000 - P4.004) and see if an alarm has occurred (AL011, AL024, AL025, or AL026). Use the checking methods and corrective actions to clear the alarm if any of them occurs. 4. If you do not need to use the OA/OB pulse, set P2.065 [Bit 13] to 1 to disable the encoder output error detection function.
How to clear the alarm?	1. DI.ARST 2. Contact the distributor.

94. Added AL05D Detection error for offset between absolute encoder zero point and motor magnetic field zero point (PM.010).

AL05D Detection error for offset between absolute encoder zero point and motor magnetic field zero point (PM.010)	
Trigger condition and cause	Condition: when executing the Motor Parameter Identification Wizard for the third-party absolute motor, an error occurred when the Wizard detected the offset between the absolute encoder zero point and motor magnetic field zero point (PM.010). Cause: the difference between the actual magnetic field angle of the motor and the set value is too big.
Checking method and corrective action	1. Check if PM.003, PM.004, PM.028, and PM.045 are set correctly according to the specifications. 2. Make sure you can manually operate the motor. 3. Check if the friction between the motor and mechanical part is too large. 4. Check if the feedback signal is abnormal. Use the software scope and select Feedback position [PUU] as the channel type to monitor whether the feedback value is correct. 5. If there is interference, check the following items: (a) Check if the motor is properly grounded. Make sure the power cable (green end) is grounded to the servo drive heat sink. (b) Use shielded cable for the feedback signal cable. Make sure the signal cable is separated from the power supply or any high-current cables to avoid interference.
How to clear the alarm?	DI.ARST

95. Added AL05E Position signal converter box communication failure.

AL05E Position signal converter box communication failure	
Trigger condition and cause	Condition: communication error occurred when connecting the Delta position signal converter box to the CN2 connector. Cause: 1. A communication error occurred to the position signal converter box. 2. A communication error occurred during the Motor Parameter Identification Wizard setting process.
Checking method and corrective action	1. Check the wiring of the position signal converter box. 2. Check if the encoder connector is connected to the motor and CN2 of the servo drive. If there is any poor wiring or damaged wires, replace the connector and cable. 3. Check the communication error rate by setting P0.002 to -80. If this value continues to accumulate, it means there is interference. Check the following items: ■ Check if the motor is properly grounded. Make sure the power cable (green end) is grounded to the servo drive heat sink. ■ Check if the connection for the encoder signal cable is normal. Make sure the encoder signal cable is separated from the power supply or any high-current cables to avoid interference. ■ Use shielded cable for the encoder. If you took all corrective actions but the issue persists, replace the motor.
How to clear the alarm?	Cycle power on the servo drive.

96. Added AL086 Input voltage is too high.

AL086 Input voltage is too high	
Trigger condition and cause	Condition: when the servo drive detects no regenerative energy, but other energy (such as interference) is input to the servo drive, or the input voltage is higher than the allowable rated voltage. Cause: 1. Other energy (such as interference) is input to the servo drive or the input voltage is higher than the allowable rated voltage. 2. Malfunction of the servo drive hardware.
Checking method and corrective action	1. Use a voltmeter to measure if the input voltage from the power supply is within the allowable rated voltage (refer to Appendix A Specifications). If the input voltage exceeds the rated range, remove the interference source. 2. Measure the voltage of P3 and ⊖ terminals. If it does not match the displayed DC bus voltage when you input monitoring code 14 to P0.002, then the servo drive may be malfunctioning. 3. If you took the above actions and the issue persists, use a scope with a differential carbon rod to measure whether the input voltage has high-frequency signal interference. If there is interference, remove the interference source.
How to clear the alarm?	1. Use the correct voltage source or connect the voltage regulator in series. 2. Send your servo drive back to the distributor or contact Delta.

97. Added AL09C Parameter reset failed.

AL09C Parameter reset failed	
Trigger condition and cause	Condition: the parameter reset process is not complete. Cause: an error occurred during the parameter reset process, so the reset procedure could not be completed.
Checking method and corrective action	Check if the power is cut off during the reset process. Check the power wiring and switch.
How to clear the alarm?	Set P2.008 to 30 and then 28. Cycle power on the servo drive.

98. Added AL422 Write-in failed caused by power supply cut off.

AL422 Write-in failed caused by power supply cut off	
Trigger condition and cause	Condition: if P2.069.Z is set to 1 (function of preventing indexing coordinate from overflow) and the power supply is cut off, the motor fails to store the current position. Cause: 1. The load is over the rated range and the servo drive is in a continuous overload condition. 2. After updating the firmware, the internal variables vary depending on the version. 3. The servo drive hardware EEPROM is abnormal. 4. The hardware of the servo drive is short-circuited. 5. AL520 occurred and causes malfunction of the servo drive.
Checking method and corrective action	1. Set P0.002 to 12 for monitoring if the average load rate [%] is continuously over 100%. If so, increase the motor capacity or reduce the load. Refer to Appendix A for Graph of load and operating time. 2. If this alarm persists, send your servo drive back to the distributor or contact Delta.
How to clear the alarm?	Cycle power on the servo drive.

99. Added ALD00 MITUTOYO encoder - overspeed.

ALD00 MITUTOYO encoder - overspeed	
Trigger condition and cause	Condition: an error occurred to the MITUTOYO encoder. Cause: 1. The motor speed exceeds 3 m/s. 2. The installation or wiring of the encoder is incorrect. 3. The installation and operating environment do not meet the specifications, causing encoder error. 4. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

100. Added ALD01 MITUTOYO encoder - initialization error.

ALD01 MITUTOYO encoder - initialization error	
Trigger condition and cause	Condition: an error occurred to the MITUTOYO encoder. Cause: 1. Initialization status error. 2. The installation or wiring of the encoder is incorrect. 3. The installation and operating environment do not meet the specifications, causing encoder error. 4. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

101. Added ALD02 MITUTOYO encoder - hardware error.

ALD02 MITUTOYO encoder - hardware error	
Trigger condition and cause	Condition: an error occurred to the MITUTOYO encoder. Cause: 1. The encoder hardware signal is in error. 2. The installation or wiring of the encoder is incorrect. 3. The installation and operating environment do not meet the specifications, causing encoder error. 4. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

102. Added ALD03 MITUTOYO encoder - absolute position detection error.

ALD03 MITUTOYO encoder - absolute position detection error	
Trigger condition and cause	Condition: an error occurred to the MITUTOYO encoder. Cause: 1. The absolute position is in error. 2. The installation or wiring of the encoder is incorrect. 3. The installation and operating environment do not meet the specifications, causing encoder error. 4. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

103. Added ALD04 MITUTOYO encoder - sensor or read head error.

ALD04 MITUTOYO encoder - sensor or read head error	
Trigger condition and cause	Condition: an error occurred to the MITUTOYO encoder. Cause: 1. The sensor signal is in error. 2. The installation or wiring of the encoder is incorrect. 3. The installation and operating environment do not meet the specifications, causing encoder error. 4. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

104. Added ALD05 MITUTOYO encoder - sensor signal strength error.

ALD05 MITUTOYO encoder - sensor signal strength error	
Trigger condition and cause	Condition: an error occurred to the MITUTOYO encoder. Cause: 1. The signal strength of the sensor is in error and the position data may contain errors. 2. The installation or wiring of the encoder is incorrect. 3. The installation and operating environment do not meet the specifications, causing encoder error. 4. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

105. Added ALD06 MITUTOYO encoder - sensor signal strength warning.

ALD06 MITUTOYO encoder - sensor signal strength warning	
Trigger condition and cause	Condition: an error occurred to the MITUTOYO encoder. Cause: 1. The signal strength of the sensor is in error, but the position data does not contain errors. 2. The installation or wiring of the encoder is incorrect. 3. The installation and operating environment do not meet the specifications, causing encoder error. 4. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

106. Added ALD07 MITUTOYO encoder - temperature warning.

ALD07 MITUTOYO encoder - temperature warning	
Trigger condition and cause	Condition: an error occurred to the MITUTOYO encoder. Cause: 1. The internal temperature of the encoder is over 65°C (149°F). 2. The installation or wiring of the encoder is incorrect. 3. The installation and operating environment do not meet the specifications, causing encoder error. 4. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

107. Added ALD08 BISS C encoder - sensor installation error.

ALD08 BISS C encoder - sensor installation error	
Trigger condition and cause	Condition: an error occurred to the BISS C encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

108. Added ALD09 BISS C encoder - sensor installation warning.

ALD09 BISS C encoder - sensor installation warning	
Trigger condition and cause	Condition: an error occurred to the BISS C encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

109. Added ALD16 EnDat 2.2 encoder - sensor installation error.

ALD16 EnDat 2.2 encoder - sensor installation error	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

110. Added ALD17 EnDat 2.2 encoder - sensor signal strength error.

ALD17 EnDat 2.2 encoder - sensor signal strength error	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

111. Added ALD18 EnDat 2.2 encoder - position error.

ALD18 EnDat 2.2 encoder - position error	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

112. Added ALD19 EnDat 2.2 encoder - overvoltage.

ALD19 EnDat 2.2 encoder - overvoltage	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

113. Added ALD20 EnDat 2.2 encoder - undervoltage.

ALD20 EnDat 2.2 encoder - undervoltage	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

114. Added ALD21 EnDat 2.2 encoder - overcurrent.

ALD21 EnDat 2.2 encoder - overcurrent	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

115. Added ALD22 EnDat 2.2 encoder - low battery voltage.

ALD22 EnDat 2.2 encoder - low battery voltage	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

116. Added ALD23 EnDat 2.2 encoder - frequency collision warning.

ALD23 EnDat 2.2 encoder - frequency collision warning	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

117. Added ALD24 EnDat 2.2 encoder - temperature warning.

ALD24 EnDat 2.2 encoder - temperature warning	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

118. Added ALD25 EnDat 2.2 encoder - sensor signal strength warning.

ALD25 EnDat 2.2 encoder - sensor signal strength warning	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

119. Added ALD26 EnDat 2.2 encoder - low battery voltage warning.

ALD26 EnDat 2.2 encoder - low battery voltage warning	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

120. Added ALD27 EnDat 2.2 encoder - reference point error warning.

ALD27 EnDat 2.2 encoder - reference point error warning	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

121. Added ALD28 EnDat 2.2 encoder - cyclic mode warning.

ALD28 EnDat 2.2 encoder - cyclic mode warning	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

122. Added ALD29 EnDat 2.2 encoder - position limit warning.

ALD29 EnDat 2.2 encoder - position limit warning	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST

123. Added ALD30 EnDat 2.2 encoder - readiness warning.

ALD30 EnDat 2.2 encoder - readiness warning	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST

124. Added ALD31 EnDat 2.2 encoder - diagnostic warning.

ALD31 EnDat 2.2 encoder - diagnostic warning	
Trigger condition and cause	Condition: an error occurred to the EnDat 2.2 encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST

125. Added ALE00 Fagor encoder - CPU error.

ALE00 Fagor encoder - CPU error	
Trigger condition and cause	Condition: an error occurred to the Fagor encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST

126. Added ALE01 Fagor encoder - parameter error.

ALE01 Fagor encoder - parameter error	
Trigger condition and cause	Condition: an error occurred to the Fagor encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST

127. Added ALE02 Fagor encoder - CCD error.

ALE02 Fagor encoder - CCD error	
Trigger condition and cause	Condition: an error occurred to the Fagor encoder. Cause: 1. The installation or wiring of the encoder is incorrect. 2. The installation and operating environment do not meet the specifications, causing encoder error. 3. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST

128. Added ALE03 Fagor encoder - position error.

ALE03 Fagor encoder - position error	
Trigger condition and cause	Condition: an error occurred to the Fagor encoder. Cause: 1. Analog signal of the sensor < 0.2 Vpp. 2. The installation or wiring of the encoder is incorrect. 3. The installation and operating environment do not meet the specifications, causing encoder error. 4. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST

129. Added ALE04 Fagor encoder - sensor signal strength warning.

ALE04 Fagor encoder - sensor signal strength warning	
Trigger condition and cause	Condition: an error occurred to the Fagor encoder. Cause: 1. Analog signal of the sensor < 0.4 Vpp. 2. The installation or wiring of the encoder is incorrect. 3. The installation and operating environment do not meet the specifications, causing encoder error. 4. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST

130. Added ALE05 Fagor encoder - voltage warning.

ALE05 Fagor encoder - voltage warning	
Trigger condition and cause	Condition: an error occurred to the Fagor encoder. Cause: 1. The encoder voltage is abnormal. 2. The installation or wiring of the encoder is incorrect. 3. The installation and operating environment do not meet the specifications, causing encoder error. 4. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST

131. Added ALE06 Fagor encoder - overspeed warning.

ALE06 Fagor encoder - overspeed warning	
Trigger condition and cause	Condition: an error occurred to the Fagor encoder. Cause: 1. The motor speed is too fast and has exceeded the maximum value of the encoder. 2. The installation or wiring of the encoder is incorrect. 3. The installation and operating environment do not meet the specifications, causing encoder error. 4. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST

132. Added ALE07 Fagor encoder - temperature warning.

ALE07 Fagor encoder - temperature warning	
Trigger condition and cause	Condition: an error occurred to the Fagor encoder. Cause: 1. The encoder temperature has exceeded the maximum value. 2. The installation or wiring of the encoder is incorrect. 3. The installation and operating environment do not meet the specifications, causing encoder error. 4. The encoder is damaged.
Checking method and corrective action	1. Make sure the encoder or read head is correctly installed and wired according to the manufacturer's instruction manual. 2. If the issue persists, contact the distributor of the encoder.
How to clear the alarm?	DI.ARST

133. Added ALF21 Secondary platform command error.

ALF21 Secondary platform command error		
Trigger condition and cause	Condition: the usage of the secondary platform commands does not comply with the specifications. Cause: refer to the error codes.	
Checking method and corrective action	Check the error codes with the following methods. 1. View the ERR register with the EzASD software. 2. Press the SHIFT key when the panel displays ALF21.	
	Error code	Description
	0x0207	The parameter group (grp) value of the LACC_PR or SACC_PR command is out of range.
	0x0209	The parameter index (idx) value of the LACC_PR or SACC_PR command is out of range.
	0x0213	The written value for the SACC_PR command exceeds the range of this parameter.
	0x0215	This parameter is read-only, so the SACC_PR command cannot be written.
	0x0217	In the Servo On state, the SACC_PR command cannot be written.
	0x0219	This parameter is locked, so the SACC_PR command cannot be written. Check if the parameter and data array protection function (P5.097) is enabled.

	0x021B	The stack space is insufficient. Calling multiple levels of functions may use up the stack space. Try reducing the number of levels first.
	0x021D	Used the DIV division command (DIVF, DIVL, DIVW), but the divisor is 0.
	0x0221	The mode specified by the argument of the MODE command is undefined.
	0x0223	When the servo drive is in the Servo Off or Quick Stop state, some motion command operations are invalid.
	0x022D	When the E-Cam is engaged, the PABS command is unavailable.
	0x0231	The index value (monitoring variable number) of the LACCL_SV or SACCL_SV command is out of range.
	0x0235	The absolute position overflow causes the PABS command to be unavailable. Execute the homing procedure.
	0x0239	The loop mode specified by the argument of the LOOP_CMD command is undefined.
	0x023F	The register storage command accesses the wrong memory space with the pointer.
	0x0245	The wait command exceeded the time limit. Use the TIMEOUT command to adjust the maximum waiting time.
	0x0261	P3.005.Y is not set to 1, so the servo drive cannot read / write the Modbus object.
	0x0262	When using the Modbus object, the read / write packet length exceeds the limit.
How to clear the alarm?	Cycle power on the servo drive.	

134. Added ALF22 Password does not match.

ALF22 Password does not match	
Trigger condition and cause	Condition: the secondary platform project password does not match the servo drive password. Cause: the secondary platform project password does not match the servo drive password.
Checking method and corrective action	Check if the secondary platform project password and the servo drive password are input correctly.
How to clear the alarm?	1. You can change the secondary platform project password with the EzASD software, but you cannot reset the password. 2. You can change the servo drive password with the EzASD software. You can also set P2.008 to 10 to reset the servo drive password. Note: when you set P2.008 to 10, in addition to resetting all parameters, the secondary platform projects that are stored in the servo drive will also be cleared.