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-204057
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Subject:

Firmware update release for the ASDA-A3 series products.
- ➢ Latest firmware for the A3-M models: v10809 sub81
- ➢ Latest firmware for the A3-F models: v10879 sub81
- ➢ Latest firmware for the A3-E models: v10869 sub81
- ➢ Latest firmware for the A3-L models: v10839 sub81

Important:

Firmware release time:

Model	Week of production in Wujiang plant
A3-M	W2033
A3-F	W2032
A3-E	W2032
A3-L	W2032

Modified and optimized functions:
1. Modification: the range of OD 6071 is -3500 to +3500.
2. Modification: in the communication mode, when OD 6060 is set to 6, executing the homing procedure again is required.
3. Optimization: the time synchronization between EtherCAT and DMCNET.

Corrected functions:
1. Correction: if P1.044 = 1 and P1.045 = 1, when the PR absolute position command is lower than 20,000 PUU, the positioning will be abnormal.
2. Correction: if P1.001.Z = 1, the position error captured by the Capture function is calculated incorrectly.
3. Correction: the default settings of read-only parameters P1.113 - P1.118 are 0.
4. Correction: in the DMCNET communication mode, when undervoltage (AL003) and RST leak phase (AL022) occur, the communication enters the OP state before the input voltage is stable. Meaning after the correction, the communication now enters the OP state only after the input voltage is stable.

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5. Correction: in the EtherCAT communication mode, the parameter range of OD 607F and OD 6080 is limited to the set value of PM.032.
6. Correction: in the communication mode, AL289 is triggered by mistake when homing.
7. Correction: the PR point-to-point overlap command is abnormal.
8. Correction: in the EtherCAT communication mode, the update timing of OD 60B8 and OD 60B9 is corrected.
9. Correction: the position command is abnormal when the absolute function is enabled and the DI for homing is triggered.
10. Correction: in the EtherCAT interpolation mode, when the motor reaches the limit, the motor vibrates if the position command executes re-positioning.
11. Correction: when executing the Motor Parameter Identification Wizard for the absolute motor, there is a chance that the calculation of the PM.010 value is incorrect.
12. Correction: when the servo drive is powered on and the motor position is at the Z signal, this leads to the permanent loss of the servo drive OZ signal.
13. Correction: when the servo drive outputs the OZ signal for the first time, the signal is abnormal.
14. Correction: the OZ logic level of A3-E is reversed.
15. Correction: inaccurate positioning during low-speed incremental positioning with a longer deceleration time.
16. Correction: the DO.HOME signal is abnormal when the position is lost.

Added functions:
1. Added: in the communication mode, set OD 6060 to 0 to stop the motor.
2. Added: in the communication mode, all alarms are automatically cleared when the communication is initializing.
3. Added: in the EtherCAT communication mode, use the communication to access hidden parameters.
4. The EtherCAT communication diagnostic system is supported.
5. The minimum distance between Z and Z (multi-Z) supported by the pulse leakage detection function (P2.081) is 512 µm.
6. Added monitoring variables of -169 regenerative resistance overload (AL086) protection counter, -201 number of pulse leakage, -202 degree of motor electrical angle, and -207 regenerative resistor power consumption.

Code	Variable name / property	Description
-169	Regenerative resistance overload (AL086) protection counter	This variable monitors the average power consumed by the regenerative resistor (unit: %) when the capacitor energy of the servo drive is released to the regenerative resistor. When the value reaches 100%, AL086 is triggered.
-201	Number of pulse leakage	When the pulse leakage detection function is enabled (P2.081 = 1), this variable monitors the accumulated number of pulse leakage.
-202	Degree of motor electrical angle	The current electrical angle degree x 4.
-207	Regenerative resistor power consumption	This variable monitors the power consumed by the regenerative resistor (unit: %) at the moment when the capacitor energy of the servo drive is released to the regenerative resistor.

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7. Modified the setting range and parameter function description for P1.012 - P1.014. The following provides the details of P1.012 as an example.

P1.012	Internal Torque command 1 / internal torque limit 1		Address: 0118H 0119H
Default:	100	Control mode:	T / Tz: internal Torque command 1 PT / PR / S / Sz: internal torque limit 1
Unit:	%	Setting range:	-5000 to +5000
Format:	DEC	Data size:	16-bit

Settings:

1. When P2.112 [Bit 14] = 0
   Internal Torque command: 35 = 35%
   Internal torque limit: positive and negative values are identical. Refer to the following descriptions.

Torque limit value of P1.012	Valid torque range	Torque limit in forward direction	Torque limit in reverse direction
35	-35% to +35%	35%	-35%
-35			

2. When P2.112 [Bit 14] = 1
   Internal Torque command: 35 = 3.5%
   Internal torque limit: positive and negative values are identical. Refer to the following descriptions.

Torque limit value of P1.012	Valid torque range	Torque limit in forward direction	Torque limit in reverse direction
35	-3.5% to +3.5%	3.5%	-3.5%
-35			

8. Added gain adjustment modes 5 and 6 to P2.032.

P2.032	Gain adjustment mode		Address: 0240H 0241H
Default:	0x0001 (A3-L, A3-M, A3-E) 0x0000 (A3-F)	Control mode:	All
Unit:	-	Setting range:	0x0000 - 0x0006
Format:	HEX	Data size:	16-bit

Settings:

Value	Adjustment mode	Inertia estimation	Parameter	
			Manual	Auto
5	Gain adjustment mode 5 (Same as P2-32 = 1 of the A2 series)	Real-time estimation, the value is updated to P1.037 every 30 minutes	P2.126	P1.037, P2.000, P2.004, P2.006, P2.023, P2.024, P2.025, P2.043, P2.044, P2.045, P2.046, P2.049, P2.089, P2.094, P2.098, P2.099, P2.101, P2.102
6	Gain adjustment mode 6 (Same as P2-32 = 2 of the A2 series)	Fixed set value of P1.037	P1.037 P2.126	P2.000, P2.004, P2.006, P2.023, P2.024, P2.025, P2.043, P2.044, P2.045, P2.046, P2.049, P2.089, P2.094, P2.098, P2.099, P2.101, P2.102

9. Added the P2.069.U single-turn absolute function and modified the maximum setting range of P2.069 from 0x0111 to 0x1111.

P2.069●	Absolute encoder		Address: 028AH 028BH
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 - 0x1111
Format:	HEX	Data size:	16-bit

Settings:

U Z Y X

U: single-turn absolute function
0: disable
1: enable (This automatically enables the absolute type operation mode (X = 1) and index coordinates are not affected by overflow, but absolute coordinates are not retained (Z = 1)).

10. Added P2.112 [Bit 13] regenerative braking mode setting and [Bit 14] unit selection for internal Torque command / internal torque limit (P1.012 - P1.014), as well as modified the default and setting range of this parameter.

P2.112	Special bit register 4		Address: 02E0H 02E1H
Default:	0x2018	Control mode:	PT / PR / S / Sz
Unit:	-	Setting range:	0x0000 - 0x753F
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 13	Regenerative braking mode setting	Regenerative braking mode 2 accelerates the release of capacitor voltage and reduces capacitor load voltage. 0: regenerative braking mode 1 1: regenerative braking mode 2
Bit 14	Unit selection for internal Torque command / internal torque limit (P1.012 - P1.014)	0: 1 % 1: 0.1 %

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11. Added P2.121 Special bit register 6.

P2.121	Special bit register 6	Address: 02FCH 02FDH
Default:	0x00000000	Control mode: All
Unit:	-	Setting range: 0x00000000 - 0x0000000F
Format:	HEX	Data size: 32-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	In the communication mode, the behavior setting after homing	0: absolute positioning to the home offset (OD 607C) after homing. 1: decelerate to a stop after homing.
Bit 2	In the communication mode, the definition of the setting value for origin definition (P6.001) and home offset (OD 607C)	0: origin definition (P6.001) = multiply the OD 607C setting value by a negative sign. 1: origin definition (P6.001) = OD 607C
Bit 3	The unit for the homing speed in the CANopen mode	0: 0.1 rpm 1: 1 rpm
Bit 4 - Bit 31	Reserved	-

12. Added P2.125 Special bit register 7.

P2.125	Special bit register 7	Address: 02FAH 02FBH
Default:	0x0000	Control mode: All
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	Filter frequency for the motor speed of the monitoring variable (P0.002 = 7)	0: 15 Hz 1: 1 Hz
Bit 1 - Bit 15	Reserved	-

13. Added P2.126 Speed loop response bandwidth

P2.126	Speed loop response bandwidth	Address: 02FCH 02FDH	
Default:	40	Control mode:	PT / PR / S / Sz
Unit:	Hz	Setting range:	1 - 1000
Format:	DEC	Data size:	16-bit

Settings:

This parameter only takes effect when P2.032 is set to 5 or 6.

Bandwidth	Stiffness and response	Applicable mechanical part
1 - 100 Hz	Low stiffness and low response	Belt, gear and rack, reducer, cam
101 - 250 Hz	Medium stiffness and medium response	Screw
251 Hz and above	High stiffness and high response	Direct drive mechanism

Note: the servo drive automatically sets the response of the position loop according to this parameter.
The function of this parameter is the same as P2-31 of the A2 series.

14. Modified the default value of P3.012 from 0x1000 to 0x0000.

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

15. Added AL066 Number of turns for the absolute encoder overflows (servo drive)

AL066 Number of turns for the absolute encoder overflows (servo drive)	
Trigger condition and cause	Condition: the number of turns for the encoder absolute position (P0.051) exceeds half the number of turns for the encoder resolution. 1. The number of turns for a Delta motor is -32768 to +32767. 2. For third-party motors, calculate the number of turns based on the motor specifications. Cause: motor's rotation cycle exceeds the allowable range.
Checking method and corrective action	Check if the motor's number of turns during operation is within the range specified above. If not, re-establish the absolute origin coordinates.
How to clear the alarm?	Re-establish the absolute origin coordinates.

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16. Added AL06B The error between the servo drive internal coordinates and the encoder coordinates is too large.

AL06B The error between the servo drive internal coordinates and the encoder coordinates is too large	
Trigger condition and cause	Condition: when the absolute motor is powered by the battery, the number of motor rotations exceeds 1/4 the number of turns for the resolution. Cause: the deviation between the servo drive internal coordinates and the encoder coordinates is too large.
Checking method and corrective action	The mechanical parts are not properly fastened when the machine is being transported causing rotation of the motor.
How to clear the alarm?	Re-establish the absolute origin coordinates.

17. Added AL06F The absolute position is not established.

AL06F The absolute position is not established	
Trigger condition and cause	Condition: the establishment of the absolute position has timed out. Cause: the servo drives process of establishing the absolute position is in error.
Checking method and corrective action	Cycle power on the servo drive and re-establish the absolute origin coordinates. If the issue persists, contact your local distributor or technician.
How to clear the alarm?	Cycle power on the servo drive and re-establish the absolute origin coordinates.

18. Added AL0A6 Absolute position coordinates of the servo drive and motor do not match.

AL0A6 Absolute position coordinates of the servo drive and motor do not match	
Trigger condition and cause	Condition: suppose there are servo drive A, servo motor A, servo drive B, and servo motor B. Servo drive A and servo drive B have established the absolute origin coordinates with servo motor A and servo motor B, respectively. In this case, if you operate servo drive A with servo motor B, AL0A6 will be triggered. Cause: replace the servo drive or servo motor.
Checking method and corrective action	Re-establish the absolute origin coordinates.
How to clear the alarm?	Re-establish the absolute origin coordinates.