Chapter 11: Troubleshooting

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Introduction

This chapter provides alarm descriptions and the corrective actions you can use for troubleshooting.

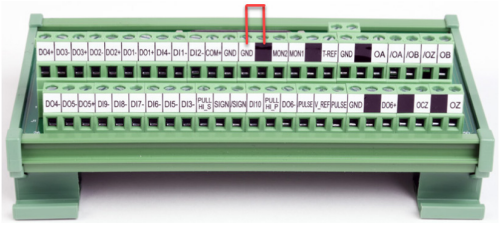
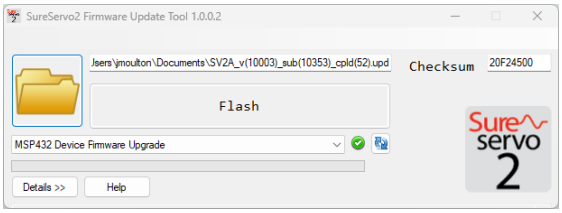
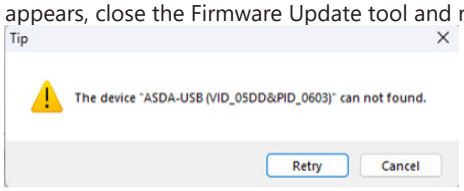
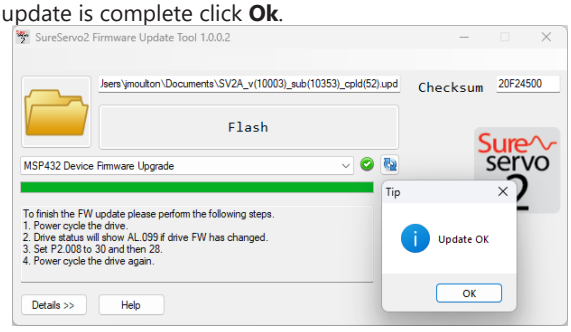
There are four types of alarms: General, STO, Communication, and Motion control.

- *General type: alarms caused by hardware or encoder signal errors.*
- *STO type: alarms caused by STO errors.*
- *Communication type: alarms caused by serial/Ethernet Modbus or Ethernet/IP errors.*
- *Motion control type: alarms caused by motion control command (in PR mode) errors.*

AL.nnn is the alarm format on the 7-segment display.

11.1 - How to Revive a Dead (Bricked) Drive

In the unlikely event that a drive is non-responsive, front panel does not light up and no communications are possible, the below procedure can revive an otherwise dead drive. Removing power from the drive during a firmware update is a common way to brick a drive.

Step	Action
1	Pins 13 and 14 need to be jumpered on CN1. No other wires should be connected. 
2	Use the latest SV2 software from the Automation Direct website. (https://www.automationdirect.com/support/software-downloads?itemcode=SV2-PRO)
3	Apply power to the drive, then open the Firmware update tool in SureServo2 Pro and open the latest FW file. The USB connection will be different than normally shown. Depending on the PCs drivers it could be similar to “MSP 432 Device Firmware Upgrade” or “TMS3200F28x7x USB Boot Loader”.
4	Click ‘Flash’  If the following message appears, close the Firmware Update tool and restart the procedure. 
5	After the firmware update is complete click **Ok**. 
6	Turn off power to the drive, then unplug the jumper and re-apply power to the drive.

11.2 - Alarm List

General Type:

Display	Alarm Name	Error Type		Servo State	
		ALM	WARN	ON	OFF
AL001	Overcurrent	○			○
AL002	Overvoltage	○			○
AL003	Undervoltage		○		○
AL004	Motor combination error	○			○
AL005	Regeneration error	○			○
AL006	Overload	○			○
AL007	Excessive deviation of speed command	○			○
AL008	Abnormal pulse command	○			○
AL009	Excessive deviation of position command	○			○
AL010	Voltage error duration regeneration	○		○	
AL011	Encoder error	○			○
AL012	Adjustment error	○			○
AL013	Motor Override		○		○
AL014	Reverse limit error		○	○	
AL015	Forward limit error		○	○	
AL016	IGBT overheat	○			○
AL017	Abnormal EEPROM	○			○
AL018	Abnormal encoder signal output	○			○
AL019	Serial communication error	○			○
AL020	Serial communication timeout		○	○	
AL022	RST leak phase		○		○
AL023	Early overload warning		○	○	
AL024	Encoder initial magnetic field error	○			○
AL025	Encoder internal error	○			○
AL026	Encoder unreliable internal data	○			○
AL027	Internal motor error	○			○
AL028	Encoder voltage error or encoder internal error	○			○
AL02A	Number of revolutions of the encoder is in error	○			○
AL02B	Motor data error	○			○

General alarms continued on next page

Display	Alarm Name	Error Type		Servo State	
		ALM	WARN	ON	OFF
AL02C	Servo drive overload	○		○	
AL030	Motor crash error	○			○
AL031	Motor power cable incorrect wiring or disconnection	○			○
AL032	Abnormal encoder vibration	○			○
AL034	Encoder internal communication error	○			○
AL035	Encoder temperature exceeds the protective range	○			○
AL036	Encoder alarm status error	○			○
AL040	Excessive deviation of full closed-loop position control	○			○
AL041	CN5 communication is disconnected	○			○
AL042	Analog input voltage is too high	○			○
AL044	Servo function overload warning		○	○	
AL045	E-Gear ratio value error	○			○
AL056	Excessive motor speed	○			○
AL057	Feedback pulse is lost	○			○
AL058	Excessive position deviation after initial magnetic field detection is complete	○			○
AL05C	Motor position feedback error	○			○
AL060	Absolute position lost		○	○	
AL061	Encoder undervoltage		○	○	
AL062	Mult-turn overflow in absolute encoder		○	○	
AL063	Linear scale (CN5) signal error		○	○	
AL064	Encoder vibration warning		○	○	
AL066	Number of turns for the absolute encoder overflows (servo drive)	○		○	
AL067	Encoder temperature warning		○	○	
AL068	Absolute data transmitted by I/O is in error		○	○	
AL06A	Absolute position is lost / Absolute position is not initialized		○	○	

General alarms continued on next page

Display	Alarm Name	Error Type		Servo State	
		ALM	WARN	ON	OFF
AL06B	The error between the servo drive internal coordinates and the encoder coordinates is too large		○	○	
AL06E	Encoder type is unidentifiable	○			○
AL06F	The absolute position is not established		○	○	
AL070	Encoder did not complete the command issued by servo drive		○	○	
AL071	Number of revolutions of the encoder is in error	○			○
AL072	Encoder overspeed	○			○
AL073	Encoder memory error	○			○
AL074	Absolute encoder single turn position error	○			○
AL075	Absolute encoder position error	○			○
AL077	Encoder computing error	○			○
AL079	Encoder parameter error	○			○
AL07A	Encoder Z phase position is lost	○			○
AL07B	Encoder memory busy	○			○
AL07C	Command to clear the absolute position is issued when the motor speed is over 200 rpm		○	○	
AL07D	Servo drive power is cycled before AL07C is cleared	○			○
AL07E	Encoder clearing procedure error	○			○
AL07F	Encoder version error	○			○
AL083	Servo drive outputs excessive current	○			○
AL085	Regeneration error	○			○
AL086	Regenerative Resistor Overload	○			○
AL088	Servo function overload warning	○			○
AL089	Current detection interference		○	○	
AL08A	Auto-tuning function - Command error		○	○	
AL08B	Auto-tuning function - Pause time is too short		○	○	

General alarms continued on next page

Display	Alarm Name	Error Type		Servo State	
		ALM	WARN	ON	OFF
AL08C	Auto-tuning function - Inertia estimation error		○	○	
AL095	Regenerative brake resistor disconnected		○	○	
AL099	DSP firmware update	○			○
AL09C	Parameter reset failed	○			○
AL219	Write Parameters: parameter cannot be written		○	○	
AL221	A non-existing mode is used		○	○	
AL21B	Memory stack is out of range		○	○	
AL22D	Absolute positioning is not allowed when E-Cam is engaged		○	○	
AL223	Some commands are not allowed to be used when the servo is in the ERROR or FAULT state		○	○	
AL239	The argument of the LOOP_CMD command is out of range		○	○	
AL23F	Parameter is written to a memory address that is out of range		○	○	
AL245	PR positioning timeout		○	○	
AL247	The MATT_ACC command called a math function that is out of range		○	○	
AL249	PR path number is out of range		○	○	
AL251	The argument of the MATH_POWR command is out of range		○	○	
AL255	The system object ID is out of range when the object is used		○	○	
AL257	The system object function block ID is out of range when a system object is used		○	○	
AL25B	Object argument format error		○	○	
AL25F	An error occured when the object dictionary was accessed		○	○	
AL35F	Emergency stop during acceleration		○	○	
AL422	Write-in failed caused by power supply cut-off	○			○

NOTE: If the servo drive shows an alarm that is not in this table, please contact Automation Direct.

STO type:

Display	Alarm Name	Error Type		Servo State	
		ALM	WARN	ON	OFF
AL500	STO function is enabled	○			○
AL501	STO_A lost (signal loss or signal error)	○			○
AL502	STO_B lost (signal loss or signal error)	○			○
AL503	STO self-diagnostic error	○			○
AL510	Internal parameter update program of the servo drive is abnormal		○	○	
AL520	Calculation program timeout	○			○
AL521	Vibration elimination parameter error	○			○
ALF21	Command error	○			○

NOTE: If the servo drive shows an alarm that is not in this table, please contact Automation Direct.

Communication type:

Display	Alarm Name	Error Type		Servo State	
		ALM	WARN	ON	OFF
AL131	CRC of EEPROM calculation error occurs when using PDO	○		○	
AL132	Parameter is write-prohibited when using PDO	○		○	
AL180	Detect the connection between PLC and comm. card (timeout detection based on P3.067)	○			○
AL185	HSSP command timeout or data checksum error	○			○
AL186	Comms Bus off	○		○	
AL201	Error occurs when loading data	○			○
AL301	Synchronization failure		○	○	
AL302	Synchronization signal for sent too soon		○	○	
AL303	Synchronization signal timeout		○	○	
AL304	Invalid IP command		○	○	
AL305	SYNC period error		○	○	
AL401	NMT reset command is received while the servo is on	○			○

NOTE: If the servo drive shows an alarm that is not in this table, please contact Automation Direct.

Motion control type:

Display	Alarm Name	Error Type		Servo State	
		ALM	WARN	ON	OFF
AL207	Parameter group of PR Type 8 (Write) is out of range		○	○	
AL209	Parameter number of PR Type 8 (Write) is out of range		○	○	
AL211	Parameter format setting of Type 8 (Write) PR is in error		○	○	
AL213	Parameter setting of PR Type 8 (Write) is in error		○	○	
AL215	Write parameters: read-only		○	○	
AL217	Write parameters: parameter locked		○	○	
AL22D	Absolute positioning is not allowed when E-Cam is engaged	○		○	
AL231	Monitoring item for PR Write command is out of range		○	○	
AL235	Absolute positioning command error		○	○	
AL237	Indexing coordinate is undefined		○	○	
AL283	Software positive limit		○	○	
AL285	Software negative limit		○	○	
AL289	Feedback position counter overflows		○	○	
AL380	Position offset alarm for DO.MC_OK		○	○	
AL3CF	DI.PFQS input for quick stop and fault (Emergency Stop)		○		○
AL3F1	Absolute index coordinate undefined	○			○
AL400	Index coordinate error	○			○
AL404	Value of PR special filter setting is too high	○			○
AL555	System failure	○			○
AL809	PR arithmetic operation parameter error or secondary platform error	○			○

NOTE: If the servo drive shows an alarm that is not in this table, please contact Automation Direct.

11.3 - Causes and Corrective Actions

11.3.1 - General type

AL001 Overcurrent	
Trigger condition and causes	Condition: main circuit current is over 1.5 times of the maximum instantaneous current of the motor. Causes: 1) Motor has a short-circuit or fault to ground (frame). 2) Motor wiring is wrong. 3) IGBT is abnormal. 4) Parameter setting is wrong. 5) Control command setting is wrong.
Checking methods and corrective actions	1) Check the connection between the motor and servo drive and make sure that the wire is not short-circuited. Do not expose the metal part of the wiring. Check if you have followed the wiring sequence of the motor and servo drive as described in this manual. 2) If the temperature of the heat sink is abnormal, please contact AutomationDirect technical support. Check if the setting value is much greater than the default. It is suggested that you reset the servo drive to the factory default settings and then modify the settings one by one. 3) Check if the target Torque/Speed/Position commanded changes greatly. If so, please modify the rate of change in the command or enable the filter.
How to clear the alarm?	DI.ARST

AL002 Overvoltage	
Trigger condition and causes	Condition: main circuit voltage exceeds the rated value. Causes: 1) The input voltage of the main circuit is higher than the rated voltage. 2) Wrong power input (wrong power system). 3) Malfunction of the servo drive hardware. 4) Incorrect selection of the regenerative resistor or no connection to an external regenerative resistor. This will occur if the DC bus voltage is over 410V for over 1 second.
Checking methods and corrective actions	1) Use a voltmeter to check if the input voltage of the main circuit is within the rated range (refer to Appendix A Specifications). Use the right voltage source or connect the regulator in series. Use a voltmeter to check if the power system complies with the specifications. If not, use the right voltage source or connect the transformer in series. 2) Check if the input voltage of the main circuit is within the rated range. If the issue persists, please contact AutomationDirect technical support. 3) Check the connection for the regenerative resistor, re-calculate the value for the regenerative resistor, and correctly set the values of P1.052 and P1.053.
How to clear the alarm?	DI.ARST

AL003 Undervoltage	
Trigger condition and causes	Condition: 1) Main circuit voltage is below the rated value. By default, AL003 is defined as a warning. To define it as an alarm, set P2.066 [Bit 9]. 2) The DC Bus voltage is below P4.024 x √2 Causes: 1) The input voltage of main circuit is lower than the permissible rated value. 2) No power is supplied to the main circuit. 3) Wrong power input (wrong power system).
Checking methods and corrective actions	1) Check that the voltage wiring is correct and the input voltage for the main circuit is normal. 2) Cycle the servo drive power and use a voltmeter to check the main circuit voltage. 3) Use a voltmeter to check if the power system complies with the specifications. Check if using the right voltage source or the transformer is connected in series.
How to clear the alarm?	AL003 is cleared according to the setting of P2.066 [Bit2] 1) If P2.066 [Bit2] is set to 0, use DI.ARST to clear the alarm after the voltage is back in the normal range. 2) If P2.066 [Bit2] is set to 1, the alarm is automatically cleared once the voltage is back in the normal range.

AL004 Motor Combination Error	
Trigger condition and causes	Condition: wrong motor is used with the servo drive. Causes: 1) Motor combination error (the servo drive connects to the wrong motor.) 2) The encoder is loose. 3) The encoder is damaged.
Checking methods and corrective actions	1) Use the right motor. 2) Check and re-install the encoder connector. 3) If the encoder (motor) is not operating properly, please replace the motor.
How to clear the alarm?	Cycle power on the servo drive.

AL005 Regeneration Error	
Trigger condition and causes	Condition: an error occurs during regeneration. Causes: 1) You selected a wrong regeneration resistor or the external regeneration resistor is not connected. 2) P1.053 (regenerative resistor watts) is not set to 0 when the regenerative resistor is not connected 3) Parameter setting error (P1.052, P1.053).
Checking methods and corrective actions	1) Re-calculate the value for the regenerative resistor and reset the value of P1.052 and P1.053. If you cannot clear the alarm, please contact AutomationDirect technical support. 2) Set P1.053 to 0 if not using a regenerative resistor. 3) Correctly set the parameters for the regenerative resistor, (P1.052) and the regenerative resistor watts (P1.053).
How to clear the alarm?	DI.ARST

AL006 Overload	
Trigger condition and causes	Condition: overload of motor and servo drive. Causes: 1) The load is over the rated range and the servo drive is in a persistent overload condition. 2) The control system parameter is wrong. 3) Incorrect wiring of motor and encoder. 4) Encoder malfunction.
Checking methods and corrective actions	1) Set P0.002 to 11 to monitor the servo drive status. Check if the average torque [%] is continuously over 100%. If so, please increase the motor capacity or reduce the load. Refer to Load and operation time in Appendix A for more details. • Check if there is any mechanical vibration. • Acceleration/deceleration constant is set too high. 2) Check if the wiring of UVW and the encoder cables is correct. 3) Contact AutomationDirect technical support.
How to clear the alarm?	DI.ARST

AL007 Excessive Speed Deviation	
Trigger condition and causes	Condition: deviation from the Speed command and the feedback speed exceeds the allowable range (P2.034). Causes: 1) A drastic change in speed. 2) Incorrect setting for P2.034. 3) Incorrect wiring of the UVW and/or encoder cables.
Checking methods and corrective actions	1) Use the signal detector to check if the input analog voltage signal is normal. If not, adjust the signal changing rate or enable the filter function. 2) Check and make sure the value of P2.034 (over-speed warning) is correct. 3) Ensure correct wiring of the UVW and encoder cables.
How to clear the alarm?	DI.ARST

AL008 Abnormal Pulse Command	
Trigger condition and causes	Condition: the input frequency for the pulse command is over the allowable value for the hardware interface. Cause: the pulse command frequency is higher than the rated input frequency.
Checking methods and corrective actions	Use the scope to check if the input frequency is higher than the rated frequency. Correctly set the input pulse frequency.
How to clear the alarm?	DI.ARST

AL009 Excessive Position Command Deviation	
Trigger condition and causes	Condition: Deviation of position command and feedback exceeds the allowable range (P2.035). Causes: 1) The maximum position deviation is set too low. 2) Gain value is set too low. 3) Torque limit is set too low. 4) Excessive external load. 5) Improper setting for the E-gear ratio. 6) The power cables are loose. 7) Speed limit is set too low.
Checking methods and corrective actions	1) Check the value of the maximum deviation (P2.035 excessive position deviation warning condition). 2) Check if the gain value is appropriate for the application. 3) Check if the torque limit setting is appropriate for the application. 4) Check the external load. Reduce the external load or re-evaluate the motor capacity if necessary. 5) Check if the settings for P1.044 and P1.045 are appropriate for the application and set the correct values. 6) Check if the power cables are loose. 7) Check if the set value of P1.055 (Maximum speed limit) is too low.
How to clear the alarm?	DI.ARST

AL010 Voltage error during regeneration	
Trigger condition and causes	1) When the regenerative resistor is incorrectly selected or no external regenerative resistor is connected, the regenerative voltage remains at 400V for a period of time during regeneration. 2) P1.053 (Regenerative resistor watts) is not set to 0 when the regenerative resistor is not connected.
Checking methods and corrective actions	1) Check the connection for the regenerative resistor, re-calculate the value for the regenerative resistor, and correctly set the values of P1.052 and P1.053. If the issue persists, please contact AutomationDirect technical support. 2) Set P1.053 to 0 if not using a regenerative resistor.
How to clear the alarm?	DI.ARST

AL011 Encoder Error	
Trigger condition and causes	Condition: the encoder produces abnormal pulses. Causes: 1) Encoder wiring is wrong. 2) Encoder connector is loose. 3) Poor wiring of the encoder. 4) Connection to the encoder is cut off due to interference. 5) Encoder is damaged.
Checking methods and corrective actions	1) Check if the wiring follows the instructions in the user manual. If not, connect the wiring correctly. 2) Check if the CN2 connector and the encoder connector are loose. If so, reconnect the connectors. 3) Check both of the connections between the encoder and CN2 of the servo drive to see if there is any poor wiring or damaged wires. If so, please replace the connector and cable. 4) Please check the communication error status by setting P0.002 to -80. If the value continuously increases, it means there is interference. Please check the following: • Make sure the servo motor is well grounded. Please connect the ground of UVW connector (Green) to the heat sink of the servo drive. • Check if the connection for the encoder signal cable is normal. Make sure that you separate the encoder signal cable from the main power circuit cable to avoid interference. • Use shielded cable for the encoder. 5) If you took all corrective actions but the issue persists, please replace the motor.
How to clear the alarm?	Re-power on the servo drive.

AL012 Adjustment Error	
Trigger condition and causes	Condition: the calibration value exceeds the allowable value during electric calibration. Causes: 1) The analog input contact is not correctly set to zero. 2) The detection device is damaged.
Checking methods and corrective actions	Check if the voltage at the analog input contact is the same as the ground voltage. Reset the power supply. If the issue persists, please contact Automation Direct.
How to clear the alarm?	Remove the connection cable for CN1 and then execute auto calibration.

AL013 Motor Override	
Trigger condition and causes	The Motor Override input is active.
Checking methods and corrective actions	Check the digital input and make sure it is off.
How to clear the alarm?	DI.OVRD

AL014 Reverse Limit Error	
Trigger condition and causes	Condition: reverse limit switch is triggered. Causes: 1) Reverse limit switch is triggered. 2) Servo system is unstable.
Checking methods and corrective actions	1) Check the reverse limit switch and make sure it is off. 2) Check the parameter setting and the load inertia. If the setting is wrong, please modify the parameter value or re-estimate the motor capacity.
How to clear the alarm?	Reset the alarm or switch the servo drive off.

AL015 Forward Limit Error	
Trigger condition and causes	Condition: forward limit switch is activated. Causes: 1) Forward limit switch is activated. 2) Servo system is unstable.
Checking methods and corrective actions	1) Check the forward limit switch and make sure it is off. 2) Check the parameter setting and the load inertia. If the setting is wrong, please modify the parameter value or re-estimate the motor capacity.
How to clear the alarm?	Reset the alarm or switch the servo drive off.

AL016 IGBT Overheat	
Trigger condition and causes	Condition: temperature of IGBT is too high. Causes: 1) The load is over the rated range and the servo drive is in a persistent overload condition. 2) Motor has a short-circuit or fault to ground (frame).
Checking methods and corrective actions	1) Check if the motor is overloaded or over-current. Then try increasing the motor's capacity or reducing the load. 2) Check if the wiring of servo drive output is correct.
How to clear the alarm?	DI.ARST

AL017 Abnormal EEPROM	
Trigger condition and causes	Condition: error occurs when DSP accesses EEPROM. Causes: 1) Parameter writing error or the value exceeds the permissible range. This error occurs when parameters are restored to the default and servo drive type is incorrect. 2) Data in ROM is damaged or there is no data in ROM. This occurs when the system is in Servo On status. If this alarm occurs, please contact AutomationDirect technical support.
Checking methods and corrective actions	Press the SHIFT key on the panel and "EXGAB" is displayed. X = 1, 2, 3 G = Group No. of the parameter AB = Parameter No. in hexadecimal format If the panel displays E320A, this is parameter P2.010; if E3610 is displayed, this is P6.016. Please check the value for the displayed parameter. 1) Press the SHIFT key to display the parameter code. If this alarm occurs when power is supplied to the drive, it means a parameter value has exceeded the range. You can modify the value and then cycle the power. If the error occurs during normal operation, it means an error occurred when writing the parameter. 2) Press the SHIFT key on the panel and E100X is displayed. If this alarm occurs while parameters are being restored to the default, it means the servo model type setting is incorrect. Please correct it. 3) Press the SHIFT key on the panel and E0001 is displayed. If this alarm occurs while power is being supplied, it is usually because the data in ROM is damaged or there is no data in the ROM. Please contact AutomationDirect technical support.
How to clear the alarm?	If this alarm occurs when the drive is started, please reset the parameters and then cycle the power. If the alarm occurs during operation, please reset the alarm.

AL018 Abnormal Encoder Signal Output	
Trigger condition and causes	Condition: output frequency of the encoder is higher than the rated output frequency of the hardware. Causes: 1) Pulse resolution of the encoder is set too high. 2) There is interference or cable damage causing communication error. 3) Encoder error.
Checking methods and corrective actions	1) The setting of P1.076 and P1.046 should follow these requirements: P1.076 > motor speed and $\frac{\text{Motor speed}}{60} \times P1.046 \times 4 < 19.8 \times 10^6$ 2) Please check the communication error status by setting P0.002 to -80. If the value continuously increases, it means there is interference. Please check the following: • Make sure the servo motor is properly grounded and connect the UVW connector (color green) to the heat sink of the servo drive. • Check if the connection of encoder signal cable is normal. Make sure that you separate the encoder signal cable from the main power circuit cable to avoid interference. • Use shielded cable for the encoder. 3) Check the error log (P4.000—P4.005) and see if an alarm has occurred (AL011, AL024, AL025, and 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 detection function for encoder output error (AL018).
How to clear the alarm?	1) DI.ARST 2) Please contact Automation Direct technical support.

AL019 Serial Communication Error	
Trigger condition and causes	Condition: RS-485 communication error. Causes: 1) Improper setting of the communication parameters. 2) Incorrect communication address. 3) Incorrect communication value.
Checking methods and corrective actions	1) Check the values of the communication parameters. Then correctly set P3.003 and P3.004 or restore the value to default. 2) Check and correctly set the communication address. 3) Check and correctly set the accessing value.
How to clear the alarm?	DI.ARST

AL020 Serial Communication Timeout	
Trigger condition and causes	Condition: RS-485 communication error. Causes: 1) Improper setting of the timeout parameter (P5.003). 2) Servo drive has not received the communication command for a long time and has timed out (please refer to P5.003). 3) Improper setting for P3.004.
Checking methods and corrective actions	1) Check and make sure the value for the communication timeout parameter is correct. 2) Check if the communication cable is loose or broken and is correctly wired.
How to clear the alarm?	DI.ARST

AL022 RST Leak Phase	
Trigger condition and causes	Condition: RST power cable is loose or there is no power. The default setting of AL022 is a warning. To set AL022 as an alarm, you can set P2.066 [Bit 12]. Cause: RST leak phase.
Checking methods and corrective actions	Check if the RST power cable is loose or there is no power. For 3kW (or above) SureServo2 servo drives, the alarm occurs when one single phase is not connected to the power supply. Correctly connect the power to the servo drive. If the issue persists, please contact AutomationDirect technical support.
How to clear the alarm?	DI.ARST

AL023 Early Overload Warning	
Trigger condition and causes	Early overload warning
Checking methods and corrective actions	1) Check if your servo drive is overloaded and refer to the corrective actions for AL006 for troubleshooting. 2) Check if the value of P1.056 is set too low. If yes, please increase the value, which should be over 100 to disable the warning function.
How to clear the alarm?	DI.ARST

AL024 Encoder Initial Magnetic Field Error	
Trigger condition and causes	Condition: the magnetic field of the encoder U, V, W signal is in error. Cause: the initial magnetic field of the encoder is in error (Signal U, V, W of the encoder magnetic field is in error.)
Checking methods and corrective actions	1) Make sure the servo motor is properly grounded and connect the UVW connector (color green) to the heat sink of the servo drive. 2) Make sure the encoder cable is separated from the power supply or any high-current cables to avoid interference. 3) Use shielded cable for the encoder. 4) If using an external encoder, check the wiring noise interference. For the noise filter of the CN5 position feedback signal connector, refer to P1.074. If the issue persists, please contact AutomationDirect technical support.
How to clear the alarm?	Re-power on the servo drive.

AL025 Encoder Internal Error	
Trigger condition and causes	Condition: internal memory and counter of the encoder are in error. Causes: 1) Internal encoder error (internal memory and counter are in error). 2) When applying power, the motor rotates because of inertia of the machinery or other causes.
Checking methods and corrective actions	1) Check grounding and connections: • Make sure the servo motor is properly grounded and connect the UVW connector (color green) to the SureServo2 servo drive heat sink. • Make sure the encoder cable is separated from the power supply or any high-current cables to avoid interference. • Use shielded cable for the encoder. 2) Make sure the motor shaft does not move when power is turned on.
How to clear the alarm?	Cycle the power to the servo drive.

AL026 Encoder Unreliable Internal Data	
Trigger condition and causes	Condition: internal data error occurs three consecutive times. Causes: 1) External interference. 2) Malfunction of encoder hardware.
Checking methods and corrective actions	To correct the interference, check the following descriptions: 1) Make sure the servo motor is properly grounded and connect the UVW connector (color green) to the SureServo2 servo drive heat sink. 2) Make sure the encoder cable is separated from the power supply or any high-current cables to avoid interference. 3) Use shielded cable for the encoder. 4) Set P0.002 to -80 by using the panel to monitor the communication error status. If the value is greater than 0 and the value increases continuously, please check steps 1—3 again. If the value is 0, contact AutomationDirect technical support.
How to clear the alarm?	Re-power on the servo drive.

AL027 Internal Motor Error	
Trigger condition and causes	Condition: encoder reset error. Cause: encoder reset.
Checking methods and corrective actions	1) Check if the encoder cable is firmly connected. 2) Check if the power supply for the encoder is stable and make sure to use shielded cable. 3) Check if the operation temperature is over 95°C. Identify the cause for the high temperature and do not restart operation before the temperature falls back into the allowable range. There is no monitoring variable or parameter to read this temperature. If issue persists, please contact Automation Direct technical support.
How to clear the alarm?	Re-power on the servo drive.

AL028 Encoder Voltage Error or Encoder Internal Error	
Trigger condition and causes	Condition: servo drive charging circuit is not removed so the battery voltage is higher than the specification (>3.8 V) or the encoder signal is in error. Causes: 1) Voltage level of the battery is too high. 2) Internal encoder error.
Checking methods and corrective actions	1) Follow the testing procedure for over-voltage/over-current and troubleshoot. This automatically clears AL028. • Check the servo drive charging circuit. Avoid incorrect wiring; if Pin 1 (5V) of CN2 is connected to BAT+, it means the power (5V) of the servo drive is being charged to the battery. • Check if the battery is correctly installed (voltage > 3.8 V). 2) Check and remove the cause for the alarm. If the issue persists, please contact AutomationDirect technical support. • Make sure the servo motor is properly grounded and connect the UVW connector (color green) to the servo drive heat sink. • Make sure the encoder cable is separated from the power supply or any high-current cables to avoid interference. • Use shielded cable for the encoder. If issue persists, please contact AutomationDirect technical support.
How to clear the alarm?	Cycle power on the servo drive.

AL029 Gray Code Error	
Trigger condition and causes	Absolute position error.
Checking methods and corrective actions	Cycle the power to the servo drive to operate the motor. Then check if the alarm occurs again. If the issue persists, please replace the encoder.
How to clear the alarm?	Re-power on the servo drive.

AL02A Number of Revolutions of the Encoder is in Error	
Trigger condition and causes	Condition: the number of revolutions of the encoder is in error. Cause: the internal signal of the encoder is abnormal causing error in the number of revolutions.
Checking methods and corrective actions	Contact AutomationDirect for a new motor.
How to clear the alarm?	N/A

AL02B Motor Data Error	
Trigger condition and causes	Accessing the internal data of the motor is in error.
Checking methods and corrective actions	Send your servo motor back to AutomationDirect.
How to clear the alarm?	N/A

AL02C Servo drive overload	
Trigger condition and causes	1) The servo drive has exceeded the rated load for a continuous time. 2) The gain parameter of the control system or the motion profile setting is inappropriate. 3) Incorrect wiring of the motor and encoder. 4) Motor encoder is damaged or defective.
Checking methods and corrective actions	1) Check if the monitoring variable "motor current (ampere)" has exceeded the rated output current of the servo drive for a long period of time. a) Check if there is mechanical vibration and adjust the control gain parameter appropriately. b) If the acceleration/deceleration time setting is too short, reduce the acceleration/deceleration speed setting. 2) Check if the wirings of the motor power cable and the encoder are correct. 3) Run Autotune to properly set the system gains.
How to clear the alarm?	DI.ARST

AL030 Motor Collision Error	
Trigger condition and causes	Condition: when the motor hits the device, the torque reaches the value of P1.057 and lasts for the time set by P1.058. Causes: 1) Check if the function of motor crash protection (P1.057) is enabled. If so, please set P1.057 to 0. 2) Check if the value of P1.057 is set too low and the time set by P1.058 is too short. Please set P1.057 according to the actual torque. Incorrect values might inadvertently trigger the signal or lose the protection function.
Checking methods and corrective actions	Cycle power on the servo drive to operate the motor and check if the alarm occurs again. If the issue persists, please replace the encoder.
How to clear the alarm?	DI.ARST

AL031 Motor Power Cable Incorrect Wiring or Disconnection	
Trigger condition and causes	Condition: incorrect wiring or disconnection of the power cable U, V, W, and GND. Causes: Incorrect wiring or disconnection of motor power cable U, V, W. The switch for cut-off detection is set by P2.065 Bit 9, which default is set to disable. The switch for wiring error detection is set by P2.065 Bit 8, which is disabled by default.
Checking methods and corrective actions	Check if the motor power cable (U, V, W, GND) is firmly connected. Please connect wiring and ground properly by following the instructions in this user manual.
How to clear the alarm?	Cycle power on the servo drive.

AL032 Abnormal Encoder Vibration	
Trigger condition and causes	Condition: abnormal vibration occurred in the encoder. Cause: the internal signal or mechanical part of the encoder is abnormal causing the signal returned by the encoder to be in error.
Checking methods and corrective actions	Check if the motor vibration range is within 2.5 G. If the vibration is within the range, send your servo motor back to AutomationDirect.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

AL034 Encoder Internal Communication Error	
Trigger condition and causes	Condition: 1) Internal communication error for the absolute type encoder. 2) Internal error for the other type of encoder. Cause: encoder internal communication error.
Checking methods and corrective actions	1) Check the battery wiring. Then wire it again and cycle power on the system. 2) Check if the battery voltage is within the normal range. 3) Internal communication error for the encoder occurs. Please replace the motor.
How to clear the alarm?	Cycle power on the servo drive.

AL035 Encoder Temperature Exceeds the Protective Range	
Trigger condition and causes	Condition: encoder temperature is over the maximum of 105°C. Cause: encoder temperature is over 105°C. This is an estimated temperature. The encoder may trigger the temperature alarm slightly under or above this temperature.
Checking methods and corrective actions	Set P0.002 to -124 in order to read the temperature and check if it is below 105°C. If the encoder temperature is higher than 100°C, please improve the heat dissipation or reduce the operating load. If the temperature difference between the motor and the displayed temperature value is over 30°C, please send the motor back to the distributor.
How to clear the alarm?	After the temperature detector shows a temperature below 105°C, please cycle power on the servo drive.

AL036 Encoder Alarm Status Error	
Trigger condition and causes	Condition: abnormal state occurred in the encoder. Cause: the encoder sends out an alarm signal, but the alarm status of the encoder read by the servo drive shows no error.
Checking methods and corrective actions	1) Check if the motor is properly grounded. Make sure the power cable (green end) is grounded to the servo drive heat sink. 2) 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. 3) Use shielded cable for the encoder, pull out the shielded mesh, and ground it. 4) Check the motor speed and make sure it is within the rated range. If the issue persists, send your servo motor back to AutomationDirect.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

AL040 Excessive Deviation of Full Closed-Loop Position Control	
Trigger condition and causes	Condition: excessive deviation of full closed-loop position control. Cause: 1) The setting value of P1.073 is too low. 2) The connector may be loose or there is a problem when the connector connects to the mechanical parts. 3) The input value for P1.072 can only be an integer. However, when the motor runs a cycle, if the number of A/B pulses in a full-closed loop is not an integer, the position error between the motor encoder and the auxiliary encoder accumulates. Thus, you need to set P1.085 to avoid triggering AL040.
Checking methods and corrective actions	1) Check the value for P1.073. If the value is too low, please set a higher value. 2) Make sure the connector is firmly connected and there is no problem in connecting the mechanical load. 3) Check if the value of P1.085 is set properly.
How to clear the alarm?	DI.ARST

AL041 CN5 Encoder is Disconnected	
Trigger condition and causes	CN5 communication is cut off.
Checking methods and corrective actions	1) Check the communication circuit of CN5. 2) When CN5 is not in use, ensure P1.074.X is set to 0.
How to clear the alarm?	DI.ARST

AL042 Analog Input Voltage is Too High	
Trigger condition and causes	Analog input voltage for the speed command is higher than the level specified by P1.083.
Checking methods and corrective actions	Check if the voltage source for the speed command is correct. Check the setting value of P1.083 and set it to 0 when this function is not required.
How to clear the alarm?	DI.ARST

AL044 Servo Function Overload Warning	
Trigger condition and causes	Condition: when the motor controlling function of servo drive is overloaded, the motion control function is affected, causing PR or E-Cam operation to be in error. Cause: Servo function overload warning.
Checking methods and corrective actions	1) Check if the filter is enabled and see if enabling the filter is necessary. 2) Set P2.066 Bit4 to 1 to disable this alarm.
How to clear the alarm?	1) Disable the filter if it is not required, such as the low-pass filter (P1.006 – P1.008), moving filter (P1.068), low-frequency vibration suppression (P1.025 – P1.028), vibration elimination (P1.089 – P1.094), or Notch filter (5 sets), percentage of friction compensation (P1.062), and motor hard stop (torque percentage)(P1.057). 2) Set P2.066 Bit4 to 1 and cycle power on the servo drive.

AL045 E-Gear Ratio Value Error	
Trigger condition and causes	Condition: when the value of the E-Gear ratio exceeds the range (1/4–262144), this alarm occurs once power to the servo drive is cycled. Cause: when the servo drive is powered on, E-Gear ratio value is in error.
Checking methods and corrective actions	Check if the value for the E-gear ratio is within the allowable range (1/4–262144). Correct the value in P1.044, P1.045, or P2.00-P2.062 and then cycle power on the servo drive.
How to clear the alarm?	Cycle power on the servo drive after the value is corrected.

AL056 Excessive Motor Speed	
Trigger condition and causes	Condition: when the filtered motor speed exceeds the setting of P1.111, the servo drive immediately switches to the Servo Off state and displays this alarm. Cause: this alarm is to remind the user that the motor speed has reached the upper limit of the current setting (P1.111).
Checking methods and corrective actions	1) Check the reason for the high motor speed, such as the set value of P1.111 is too small, the bandwidth is not set properly, or the motor parameter setting does not match the motor specification. 2) Evaluate the motor speed and the condition of the mechanical parts. If allowable, increase the speed and then the set value of P1.111.
How to clear the alarm?	DI.ARST

AL057 Feedback Pulse is Lost	
Trigger condition and causes	Condition: when P2.081 is set to 1, the servo drive will detect if there is pulse leakage. When the pulse leakage exceeds the set value of P2.082, this alarm is triggered. Cause: 1) Pulse leakage occurs during motor operation. 2) The pulse signal is interfered by noise.
Checking methods and corrective actions	1) Check if pulse leakage has occurred to the motor encoder feedback due to noise interference. 2) 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. 3) If the encoder feedback type is a square-wave digital signal, check if the motor speed is too fast and exceeds the maximum limit of 20 MHz that the hardware can receive (the limit multiplied by 4 times the frequency). 4) In addition to eliminating the noise interference, if the encoder type is a square wave digital signal, you can also filter the noise by setting the applicable filter functions. When the main encoder signal source is CN5, set P1. 074.U. 5) Set the maximum speed limit of the motor with P1.055. 6) Check if P2.083 is set correctly.
How to clear the alarm?	Cycle power on the servo drive.

AL058 Excessive Position Deviation after Initial Magnetic Field Detection is Complete	
Trigger condition and causes	Condition: 1) After the initial magnetic field detection is complete, the servo system then attempts, but fails to reduce the existing position error. 2) If the controller issues commands when the servo system is not fully settled, the position error might thus be greater and cannot be reduced. Cause: the controller issues commands during initial magnetic field detection.
Checking methods and corrective actions	1) Check if the controller has issued a command immediately when it is powered on. Use the software scope and select [Command position] to monitor whether there is a command issued. If so, increase the delay time for the controller to issue the command after it is powered on. 2) If the controller time sequence cannot be modified due to surge interference or other factors when powered on, set P2.088 [Bit 4] to 1 to prohibit the servo from receiving controller commands during the initial magnetic field detection.
How to clear the alarm?	DI.ARST

AL05C Motor Position Feedback Error	
Trigger condition and causes	Condition: sudden jumps occur to the motor position feedback. Cause: 1) Encoder feedback is abnormal or the encoder is damaged. 2) Encoder feedback is interfered.
Checking methods and corrective actions	1) Check if the feedback signal is abnormal. Use the software scope and select Feedback position [PUU] as the input signal for the channel and sample at 16 kHz or 20 kHz, and then operate the motor manually to monitor whether the feedback value has discontinuous sudden jumps. 2) Check if the feedback signal is interfered, causing sudden jumps to the motor position feedback. 3) If the source of the main encoder is CN2, check if the communication error rate is increased due to interference. For example, check the communication error rate by setting P0.017 to -80 and monitor whether the value of P0.009 is not 0 and continuously increases.
How to clear the alarm?	Cycle power on the servo drive.

AL060 Absolute Position is Lost	
Trigger condition and causes	Condition: losing number of revolutions because of low battery voltage or loss of the power. Causes: 1) Voltage level of the battery is too low. 2) The battery is replaced when the main power of the servo drive is off. 3) The battery is not installed when the absolute function is enabled. 4) Poor connection or disconnection of the battery power circuit.
Checking methods and corrective actions	1) Check if the battery voltage is below 2.9V; execute homing after changing the battery. Please refer to Chapter 10 Absolute servo system for more details about initializing the absolute coordinate system. 2) Do not change or remove the battery when the SureServo2 servo drive's main power is off. To execute homing again, please refer to Chapter 10 for absolute coordinate initialization. 3) Please follow the instructions below: • Install the battery. • Check the connection between the battery power source and the servo drive. • Check the encoder wiring. 4) Connect or correct the wiring so that the battery power is supplied to the encoder and then execute homing again. • Check the encoder wiring. • Check the connection between the battery box and servo drive.
How to clear the alarm?	Connect or reconnect the wiring so that the battery power is supplied to the encoder and then re-establish the absolute origin coordinates. Refer to Chapter 10 for more information on the absolute servo system.

AL061 Encoder Undervoltage	
Trigger condition and causes	Condition: voltage level of the absolute encoder battery is lower than the allowable value (3.1V). Cause: voltage level of the battery is too low.
Checking methods and corrective actions	Measure the battery voltage and see if it is less than 3.1V. If the voltage is too low, replace the battery when the main power is on.
How to clear the alarm?	The alarm is cleared automatically.

AL062 Number of Turns for the Absolute Encoder Overflows	
Trigger condition and causes	Condition: the number of turns for the absolute encoder exceeds the range: -32768 to +32767. Cause: motor's rotation cycle exceeds the allowable range.
Checking methods and corrective actions	Check if the motor's number of turns while operating is within the range between -32768 and +32767. If not, please execute homing again.
How to clear the alarm?	Cycle power on the servo drive.

AL063 Linear Scale (CN5) Signal Error	
Trigger condition and causes	An error occurred to the linear scale original signal.
Checking methods and corrective actions	Check if the linear scale and read head are installed correctly, and then set DI.ARST to On or cycle power on the servo drive. If the issue persists and you have ensured the CN5 encoder is correct, send your servo motor back to AutomationDirect.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

AL064 Encoder Vibration Warning	
Trigger condition and causes	Condition: abnormal vibration occurred in the encoder. Cause: the internal signal or mechanical part of the encoder is abnormal, so the encoder returns a warning signal.
Checking methods and corrective actions	Check if the motor vibration range is within 2G. If the vibration is within the range, contact AutomationDirect.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

AL066 Number of Turns for the Absolute Encoder Overflows (Servo Drive)	
Trigger condition and causes	Condition: the number of turns for the encoder absolute position (P0.051) exceeds half the number of turns for the encoder resolution (-32768 to +32767 for a motor). Cause: motor's rotation cycle exceeds the allowable range.
Checking methods and corrective actions	1) Check if the motor's number of turns during operation is within the range specified above. If not, re-establish the absolute origin coordinates. 2) Make sure you have enabled the function for preventing rotary axis position loss when an overflow occurs. If it is disabled, set P2.069.Z to 1 to enable the function.
How to clear the alarm?	Re-establish the absolute origin coordinates.

AL067 Encoder Temperature Warning	
Trigger condition and causes	Condition: the encoder temperature is over 85°C (warning level), but still under 100°C, which is within the protective range. Cause: encoder temperature warning (85°C–100°C).
Checking methods and corrective actions	Set P0.002 to -124 and check if the encoder temperature is identical to the motor temperature. If the encoder temperature is too high, please improve the heat dissipation or reduce the operating load. If the temperature difference between the encoder and motor is over 30°C, please contact AutomationDirect technical support.
How to clear the alarm?	Cycle power on the servo drive.

AL068 Absolute data transmitted by I/O is in error	
Trigger condition and causes	Condition: the time sequence is wrong when the absolute position is read by DI/O. Cause: 1) Time sequence is wrong. 2) Reading timeout.
Checking methods and corrective actions	1) Correct the time sequence for reading the data with DI/O: a) DI.ABSQ switches to off after DO.ABSR is off. b) DI.ABSQ switches to on after DO.ABSR is on. 2) Check the duration from when DO.ABSR switches on to the time when DI.ABSQ switches on and see if this duration is over 200ms. When DO.ABSR switches on and after the bit data of absolute position is ready, it should read DO.ABSD within 200ms, switch DI.ABSQ on, and then inform the servo drive that data reading is complete.
How to clear the alarm?	Cycle power in the servo drive.

AL06A Absolute Position is Lost / Absolute Position is not Initialized	
Trigger condition and causes	There are two conditions that may cause the loss of absolute position. One is the absolute coordinates are not established. When the absolute origin coordinates are established, the origin is lost after power cycling of the servo drive. The other is an error occurred. After the absolute origin coordinates are established, AL06A still occurs after power cycling of the servo drive. **Coordinates are not established.** Condition: 1) The servo drive is used for the first time. 2) The battery is drained and the power supply of the servo drive is cut off. 3) When the servo is used with an absolute motor, the user issues an absolute position command after the first use or modification of the E-Gear ratio. Cause: 1) The servo drive is used for the first time, so the absolute origin coordinates are not established. 2) Retaining the absolute position requires power supply, so when the battery is drained and the power supply of the servo drive is cut off, the absolute position of the servo is lost. 3) After the E-Gear ratio is modified, the communication type coordinate system needs to be re-established. **An error occurred.** Condition: 1) The encoder cable is damaged, including the exterior and internal wiring. 2) There is a momentary power failure in the battery power supply. 3) The absolute motor is in error. 4) The battery box is used, and J1 and J2 are connected in reverse. 5) The voltage level of the battery is lower than 2.9V. Cause: 1) Power supply is unstable due to damage of the encoder cable. 2) The reason for the momentary power failure may be that the battery box connector is loose or excessive machine vibration. 3) The absolute encoder of this motor is in error. 4) If J1 and J2 are connected in reverse, the battery cannot charge the capacitor. The capacitor functions as a buffer to supply power when the power supply of the servo drive power is switched to the battery due to a main power failure.
Checking methods and corrective actions	1) Check if the absolute origin coordinates are established (refer to Section 10.3 for more information). 2) Avoid replacing the battery when the servo drive is powered off. It is suggested to replace the battery when the servo drive is powered on, so the absolute encoder has continuous power supply. 3) Re-establish the absolute origin coordinates. 4) Replace the encoder cable. Use the X-ray to check if the internal wiring is damaged. 5) Check if the wiring is loose. If the wiring is fine, replace the battery box for cross-testing. 6) Replace the servo motor. 7) Ensure J1 is connected to the battery and J2 is connected to the servo drive.
How to clear the alarm?	This alarm is cleared after you complete the initialization of the absolute position.

AL06B The Error Between the Servo Drive Internal Coordinates and the Encoder Coordinates is Too Large	
Trigger condition and causes	Condition: when the absolute motor is powered by the battery, the number of motor rotations exceeds half the number of revolutions of the resolution. Cause: the error between the servo drive internal coordinates and the encoder coordinates is too large.
Checking methods and corrective actions	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.

AL06E Encoder Type is Unidentifiable	
Trigger condition and causes	The servo drive cannot identify the encoder type.
Checking methods and corrective actions	Check all encoder cable wiring and connections.
How to clear the alarm?	If encoder cabling and connectors are OK, replace the motor.

AL06F The Absolute Position is not Established	
Trigger condition and causes	Condition: the establishment of the absolute position has timed out. Cause: the process for establishing the absolute position of the servo drive is in error.
Checking methods and corrective actions	If the issue persists after you cycle power on the servo drive and re-establish the absolute origin coordinates, contact AutomationDirect.
How to clear the alarm?	Cycle power on the servo drive and re-establish the absolute origin coordinates.

AL070 Encoder Does Not Complete the Command Issued by Servo Drive	
Trigger condition and causes	Command is not completed when the barcode is written to the encoder.
Checking methods and corrective actions	Check if the wiring is correct and firmly connected. If not, please correctly connect the wiring again.
How to clear the alarm?	Cycle power on the servo drive.

AL071 Number of Revoluations of the Encoders is in Error	
Trigger condition and causes	Condition: the number of revolutions of the encoder is in error. Cause: the internal signal of the encoder is abnormal causing error in the number of revolutions of the encoder.
Checking methods and corrective actions	If you executed DI.ARST but the issue persists, contact AutomationDirect.
How to clear the alarm?	DI.ARST

AL072 Encoder Overspeed	
Trigger condition and causes	1) When encoder is powered by the servo drive: over 8800 rpm; 2) When encoder is powered by the battery: over 10000 rpm. 3) Voltage level of the battery is too low.
Checking methods and corrective actions	1) Check if the motor is well grounded; make sure the power cable is grounded to the heat sink of the servo drive. 2) Make sure the encoder cable is separated from the power supply or any high-current cable to avoid interference. 3) Use shielded cable for the encoder and pull out the shielded mesh and ground it. 4) Check the motor speed and make sure it is within the rated range. 5) Measure the battery voltage to see if it is below 3.1 V. 6) Check if the battery wiring has poor contact. If issue persists, please contact AutomationDirect technical support.
How to clear the alarm?	Cycle power on the servo drive.

AL073 Encoder Memory Error	
Trigger condition and causes	An error occurs when the encoder is reading data from, or writing data to EEPROM.
Checking methods and corrective actions	1) Check if the motor is well grounded; make sure the power cable is grounded to the servo drive heat sink. 2) Make sure the encoder cable is separated from the power supply or any high-current cables to avoid interference. 3) Use shielded cable for the encoder and pull out the shielded mesh and ground it. 4) Check the motor speed and make sure it is within the rated range. If the issue persists, please contact AutomationDirect technical support.
How to clear the alarm?	Cycle power on the servo drive.

AL074 Absolute Encoder Single Turn Position Error	
Trigger condition and causes	Absolute encoder single turn position error.
Checking methods and corrective actions	1) Check if the motor is well grounded; make sure the power cable is grounded to the servo drive heat sink. 2) Make sure the encoder cable is separated from the power supply or any high-current cables to avoid interference. 3) Use shielded cable for the encoder and pull out the shielded mesh and ground it. 4) Check the motor speed and make sure it is within the rated range. If the issue persists, please contact AutomationDirect technical support.
How to clear the alarm?	Cycle power on the servo drive.

AL075 Absolute Encoder Position Error	
Trigger condition and causes	Absolute encoder position error.
Checking methods and corrective actions	1) Check if the motor is well grounded; make sure the power cable is grounded to the heat sink of the servo drive. 2) Make sure the encoder cable is separated from the power supply or any high-current cables to avoid interference. 3) Use shielded cable for the encoder and pull out the shielded mesh and ground it. 4) Check the motor speed and make sure it is within the rated range. If the issue persists, please contact AutomationDirect technical support.
How to clear the alarm?	Cycle power on the servo drive.

AL077 Encoder Computing Error	
Trigger condition and causes	Encoder internal error (internal computing error).
Checking methods and corrective actions	1) Check if the motor is well grounded; make sure the power cable is grounded to the heat sink of the servo drive. 2) Make sure the encoder cable is separated from the power supply or any high-current cables to avoid interference. 3) Use shielded cable for the encoder and pull out the shielded mesh and ground it. 4) Check the motor speed and make sure it is within the rated range. If the issue persists, please contact AutomationDirect technical support.
How to clear the alarm?	Cycle power on the servo drive.

AL079 Encoder Parameter Error	
Trigger condition and causes	The encoder is not cycled after the parameter is written, so the parameter value is not updated.
Checking methods and corrective actions	Check if the parameter is written to the encoder. If so, please cycle power on the encoder to update the parameter.
How to clear the alarm?	Cycle power on the servo drive.

AL07A Encoder Z Phase Position is Lost	
Trigger condition and causes	Encoder Z phase position is in error.
Checking methods and corrective actions	Send your servo motor back to AutomationDirect.
How to clear the alarm?	N/A

AL07B Encoder Memory Busy	
Trigger condition and causes	Encoder memory is busy.
Checking methods and corrective actions	1) Check if the motor is well grounded; make sure the power cable is grounded to the heat sink of the servo drive. 2) Make sure the encoder cable is separated from the power supply or any high-current cables to avoid interference. 3) Use shielded cable for the encoder and pull out the shielded mesh and ground it. 4) Check the motor speed and make sure it is within the rated range. If the issue persists, please contact AutomationDirect technical support.
How to clear the alarm?	Cycle power on the servo drive.

AL07C Command to Clear The Absolute Position is Issued When the Motor Speed is Over 200 rpm	
Trigger condition and causes	The command to clear the absolute position is issued when the motor speed is over 200 rpm.
Checking methods and corrective actions	Check if a command to clear the absolute position is issued while motor speed is over 200 rpm. If so, follow the procedure for clearing the absolute position to clear this alarm. Do not issue a command to clear the absolute position when the motor speed is over 200 rpm.
How to clear the alarm?	Cycle power on the servo drive.

AL07D Servo Drive Power Is Cycled Before AL07C is Cleared	
Trigger condition and causes	AL07C occurs and is not cleared before the power is cycled on the servo drive, and the motor stops operating.
Checking methods and corrective actions	Use DI.ARST to clear the alarm. Once this alarm is cleared, AL07C occurs. Please follow the checking and troubleshoot methods to clear that alarm.
How to clear the alarm?	Cycle power on the servo drive.

AL07E Encoder Clearing Procedure Error	
Trigger condition and causes	The time to clear the encoder exceeds the limit.
Checking methods and corrective actions	If the issue persists, set P0.002 to -81 to check the communication quality with the encoder. If communication is normal, use DI.ARST to clear this alarm.
How to clear the alarm?	Cycle power on the servo drive.

AL07F Encoder Version Error	
Trigger condition and causes	The encoder version read by the servo drive is wrong.
Checking methods and corrective actions	N/A
How to clear the alarm?	Replace the motor immediately.

AL083 Servo Drive Outputs Excessive Current	
Trigger condition and causes	Condition: during general operation, this alarm occurs when the servo drive outputs current that is over the allowable level specified by the firmware. This alarm protects IGBT from overheating or burning out because of the high current. Causes: 1) UVW cable is short-circuited. 2) Motor wiring is wrong. 3) Interference on the analog signal GND for the servo drive.
Checking methods and corrective actions	1) Check the connection between the motor power cable and its connector. If metal wire is exposed or the wire is torn, the UVW cable can short-circuit. In this case, please replace the UVW cable and prevent the metal conductor from being exposed. 2) Refer to Chapter 3 *Wiring* and check the following: • If you do not use the AutomationDirect standard power cable, make sure the UVW wiring sequence is correct. • Make sure the UVW wiring between the servo drive and the motor is correctly connected. 3) Check if the analog signal GND is mistakenly connected to another ground signal (incorrect connection can cause interference). DO NOT use a common ground for the analog signal and GND. Follow the wiring instructions in Chapter 3.
How to clear the alarm?	DI.ARST

AL085 Regeneration Error	
Trigger condition and causes	Condition: regeneration control error. Cause: regenerative resistor is not operating, but the regenerative voltage remains at 400V for a period of time.
Checking methods and corrective actions	Check the connections for the regenerative resistor, re-calculate the value for the regenerative resistor, and reset the value of P1.052 and P1.053. If this does not clear the alarm, please contact AutomationDirect technical support.
How to clear the alarm?	DI.ARST

AL086 Regenerative Resistor Overload	
Trigger condition and causes	Condition: excessive energy in the capacitor of the servo drive is released to the regenerative resistor causing overload of the resistor. Cause: 1) Incorrect selection of the regenerative resistor or no connection to an external regenerative resistor. 2) Incorrect parameter settings for P1.052 and P1.053. 3) Other energy (such as interference) is input to the servo drive or the input voltage is higher than the allowable rated voltage. 4) Malfunction of the servo drive hardware.
Checking methods and corrective actions	1) Check the connection for the regenerative resistor and correctly set the values of P1.052 and P1.053. 2) Re-assess whether the regenerative energy exceeds the value of P1.053. If the regenerative energy exceeds the set value, replace the regenerative resistor with a regenerative resistor that has a higher capacity. 3) 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. 4) Measure the voltage between P3 and terminals. If it does not match the displayed DC Bus voltage when you enter monitoring code 14 to P0.002, the servo drive may be malfunctioning. Contact AutomationDirect. 5) 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, use the right voltage source, or connect the regulator in series.
How to clear the alarm?	DI.ARST

AL088 Servo Function Overload Warning	
Trigger condition and causes	Condition: too many motor control functions on the servo drive are enabled. Cause: Servo function overload warning.
Checking methods and corrective actions	If using a filter, see if using this filter is necessary.
How to clear the alarm?	Disable the filter if not required, such as low-pass filter (P1.006 — P1.008), moving filter (P1.068), low-frequency vibration suppression (P1.025 — P1.028), vibration elimination (elasticity compensation) (P1.089 — P1.094), or Notch filter (5 sets), percentage of friction compensation (P1.062), and motor hard stop - torque percentage (P1.057).

AL089 Current Detection Interference	
Trigger condition and causes	Condition: current detection interference. Cause: current detection in the servo drive is affected by an external interference source.
Checking methods and corrective actions	Check the environment around the servo drive to see if there is any interference source.
How to clear the alarm?	Remove or reposition the interference source. Set P2.112 [Bit 1] to 0 to disable AL089. If the issue persists, please contact AutomationDirect technical support.

AL08A Auto-tuning Function - Command Error	
Trigger condition and causes	Condition: no command is issued when the servo drive starts the auto-tuning procedure. Causes: 1) When the command source is the controller, neither the controller nor the position register issue the command. 2) When command source is the servo drive, position 1 and 2 specify the same position. 3) The signal cable is not connected or incorrectly connected so that the servo drive cannot receive the command.
Checking methods and corrective actions	1) Make sure a command is being issued. 2) Make sure the wiring between the controller and servo drive is correct.
How to clear the alarm?	DI.ARST

AL08B Auto-tuning Function - Pause Time is too Short	
Trigger condition and causes	Condition: the pause time is too short when the controller is the command source in the auto-tuning procedure. The auto-tuning algorithm requires a certain amount of time to perform the calculation. The tuning result is affected if the pause time is too short. Cause: pause time in the cycle is too short.
Checking methods and corrective actions	1) For a reciprocating motion between two points, pausing is required on the return, which has to be longer than 1 sec. 2) For rotation in a single direction, pause time is required when the motor rotates a certain number of cycles (> 2 cycles).
How to clear the alarm?	DI.ARST

AL08C Auto-tuning Function - Inertia Estimation Error	
Trigger condition and causes	Condition: inertia estimation error occurs when the servo drive starts the auto-tuning procedure. Causes: 1) Acceleration/deceleration time is too long. 2) Rotation speed is too slow. 3) Inertia of the machine is too large. 4) Inertia variation is too drastic.
Checking methods and corrective actions	1) The acceleration/deceleration time for the motor to rotate from 0 rpm to 3000 rpm must be within 1.5 sec. 2) The slowest speed must be no less than 200 rpm; above 500 rpm is suggested. 3) The load inertia must be no more than 50 times the motor inertia. 4) Avoid applications that require drastic variation in the inertia.
How to clear the alarm?	DI.ARST

AL095 Regenerative Braking Resistor Disconnected	
Trigger condition and causes	The value of P1.053 (wattage of regenerative resistor) is not 0 and the external regenerative resistor or the brake is not connected. Only servo drives of 5.5 kW or above that have built-in regenerative resistors show this alarm.
Checking methods and corrective actions	1) If the regenerative brake is required for dynamic braking, please connect the regenerative resistor. Once you connect the resistor, make sure that the value of P1.053 is correct. 2) If not using the regenerative brake, set P1.053 (wattage of regenerative resistor) to 0. If the issue persists, please contact AutomationDirect technical support.
How to clear the alarm?	DI.ARST

AL099 DSP Firmware Update	
Trigger condition and causes	EEPROM is not reset after DSP firmware is updated.
Checking methods and corrective actions	Check if the firmware is updated. Set P2.008 to 30 first and then set it to 28. Next, cycle power on the servo drive.
How to clear the alarm?	Set P2.008 to 30 and then 28. Cycle power on the servo drive.

AL09C Parameter Reset Failed	
Trigger condition and causes	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 methods and corrective actions	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.

AL219 Write Parameters: Parameter Cannot Be Written	
Trigger condition and causes	Condition: this parameter is write-protected. Cause: the parameter write-protected function is enabled.
Checking methods and corrective actions	Check if the parameter and data array protection function (P5.097) is enabled.
How to clear the alarm?	Disable the parameter and data array protection function or reset the parameters.

AL221 A Non-existing Mode is Used	
Trigger condition and causes	Condition: the drive is set for a non-existent Mode or a command was issued that is not valid in the current mode. Cause: incorrect use of firmware command.
Checking methods and corrective actions	Verify there is a proper setting in P1.001 and that any DI or communication commands that are being triggered are relevant to the current operating mode. If P1.001 is correct and this problem persists, record the steps that lead to this issue and contact AutomationDirect.
How to clear the alarm?	DI.ARST

AL223 Some Commands are Not Allowed to be Used When the Servo is in the ERROR or FAULT state	
Trigger condition and causes	Condition: the servo is in the ERROR or FAULT state when a specific command is used. Cause: incorrect use of firmware command.
Checking methods and corrective actions	Record the operation steps and contact AutomationDirect.
How to clear the alarm?	DI.ARST

AL21B Memory Stack is Out of Range	
Trigger condition and causes	Condition: when a tack control command is used, the memory address it out of range. Cause: incorrect use of the command of the firmware.
Checking methods and corrective actions	Record the operatoin steps and contact AutoamtionDirect.
How to clear the alarm?	DI.ARST

AL21D A Divisor in an Expression is Zero in the Program	
Trigger condition and causes	Condition: a divisor in an expression is zero in the program. Cause: programming error of the firmware.
Checking methods and corrective actions	Record the operation steps and contact AutomationDirect.
How to clear the alarm?	DI.ARST

AL239 The Argument of the LOOP_CMD Command is Out of Range	
Trigger condition and causes	Condition: when the LOOP_CMD command is used, the input argument it out of range. Cause: incorrect use of firmware command.
Checking methods and corrective actions	Record the operation steps and contact AutomationDirect.
How to clear the alarm?	DI.ARST

AL23F Parameter is Written to a Memory Address that is Out of Range	
Trigger condition and causes	Condition: when the command for writing the parameter is used, the parameter is written to the memory address that is out of range. Cause: incorrect use of firmware command.
Checking methods and corrective actions	Record the operation steps and contact AutomationDirect.
How to clear the alarm?	DI.ARST

AL245 PR Positioning Timeout	
Trigger condition and causes	Condition: PR positioning function is triggered. Cause: incorrect use of firmware command.
Checking methods and corrective actions	Check if the conditions for completing the PR commands are not set or not triggered, causing the PR command to register as incomplete.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

AL247 The MATT_ACC Command Called a Math Function that is Out of Range	
Trigger condition and causes	Condition: the function ID of the math function called by the MATH_ACC command is out of range. Cause: incorrect use of firmware command.
Checking methods and corrective actions	Record the operation steps and contact AutomationDirect.
How to clear the alarm?	DI.ARST

AL249 PR Path Number is Out of Range	
Trigger condition and causes	Condition: the number of the triggered PR path exceeds the upper limit. Cause: the number of the triggered PR path is higher than 99.
Checking methods and corrective actions	1) Check if the PR command jumps to a path exceeding the range. 2) Check if the PR command format is correct.
How to clear the alarm?	DI.ARST or cycle power on the servo drive.

AL251 The Argument of the MATH_POWER Command is Out of Range	
Trigger condition and causes	Condition: when the MATH_POWER command is used, the argument is not within the range of 0–10. Cause: incorrect use of firmware command.
Checking methods and corrective actions	Record the operation steps and contact AutomationDirect.
How to clear the alarm?	DI.ARST

AL255 The System Object ID is Out of Range when the Object is Used	
Trigger condition and causes	Condition: when the system object is used, the object ID is out of range. Cause: incorrect use of firmware command.
Checking methods and corrective actions	Record the operation steps and contact AutomationDirect.
How to clear the alarm?	DI.ARST

AL257 The System Object Function Block ID is Out of Range when a System Object is Used	
Trigger condition and causes	Condition: when the system object is used, the object function block ID is out of range. Cause: incorrect use of firmware command.
Checking methods and corrective actions	Record the operation steps and contact AutomationDirect.
How to clear the alarm?	DI.ARST

AL25B Object Argument Format Error	
Trigger condition and causes	Condition: when the system object is used, the argument format of the object is in error. Cause: incorrect use of firmware command.
Checking methods and corrective actions	Record the operation steps and contact AutomationDirect.
How to clear the alarm?	DI.ARST

AL25F An Error Occured when the Object Dictionary was Accessed	
Trigger condition and causes	Condition: when an object dictionary command is used, an error occurs because the value is out of range or the object dictionary does not exist. Cause: incorrect use of firmware command.
Checking methods and corrective actions	Record the operation steps and contact AutomationDirect.
How to clear the alarm?	DI.ARST

AL35F Emergency Stop During Acceleration	
Trigger condition and causes	The rising edge of DI(0x47) is triggered, and then the motor decelerates to 0 and triggers AL3CF.
Checking methods and corrective actions	Check if any of the parameters, P2.010–P2.017 and P2.036–P2.040, are set to DI9(0x47) and are triggered.
How to clear the alarm?	Cycle power on the servo drive.

AL422 Write-in Failed Caused by Power Supply Cut-off	
Trigger condition and causes	Condition: if P2.069.Z is set to 1 (prevent indexing coordinate overflow = yes) and the power supply is cut off, the motor fails to store the current position. Cause: 1) The load is over the trated range and the servo drive is in a continous overload condition. 2) After firmware update, 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 cause malfunction of the servo drive.
Checking methods and corrective actions	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.
How to clear the alarm?	Cycle power on the servo drive.

11.3.2 - STO TYPE

AL500 STO Function Is Enabled	
Trigger condition and causes	Safe torque off function (STO) is enabled.
Checking methods and corrective actions	Safe torque off function (STO) is enabled. Please check why it is enabled.
How to clear the alarm?	1) Use DI.ARST or 0x6040.Fault Reset, or set P0.001 to 0. 2) If not using STO, plug the short circuit device into CN10 or wiring to short circuit the block. Follow the instructions in Section 3.11.3 for the STO wiring.

AL501 STO_A Loss (signal loss or signal error)	
Trigger condition and causes	Loss of STO_A signal or STO_A and STO_B signals are not synchronized for more than 1sec.
Checking methods and corrective actions	Make sure the wiring of STO_A is correct.
How to clear the alarm?	Cycle power on the servo drive.

AL502 STO_B Loss (signal loss or signal error)	
Trigger condition and causes	Loss of STO_B signal or STO_A and STO_B signals are not synchronized for more than 1 sec.
Checking methods and corrective actions	Make sure the wiring of STO_B is correct.
How to clear the alarm?	Cycle power on the servo drive.

AL503 STO Self-diagnostic Error	
Trigger condition and causes	An error occurs during STO self-diagnosis.
Checking methods and corrective actions	Make sure the wiring of STO_A and STO_B are correct.
How to clear the alarm?	If the wiring is correct, it might be that the STO circuit is causing the error.

AL510 Internal Parameter Update Program of the Servo Drive is Abnormal	
Trigger condition and causes	Internal parameter update program of the servo drive is abnormal.
Checking methods and corrective actions	If this alarm occurs when the motor parameter identification function is executed, cycle power on the servo drive and re-execute the motor parameter identification function.
How to clear the alarm?	N/A

AL520 Calculation Program Timeout	
Trigger condition and causes	Servo drive calculation program timeout.
Checking methods and corrective actions	1) Cycle power on the servo drive. 2) If the alarm persists, disable the vibration elimination function by setting [Bit 8] and [Bit 9] of P2.094 to 0.
How to clear the alarm?	N/A

AL521 Vibration Elimination Parameter Error	
Trigger condition and causes	Condition: the value for the vibration elimination parameter (elasticity compensation) is not appropriate. Causes: 1) The value of vibration suppression (elasticity compensation) is incorrect. 2) The Bode plot is in error due to other variables while the operation system is analyzing the program.
Checking methods and corrective actions	Perform system analysis again and correctly set the value for the vibration elimination parameter.
How to clear the alarm?	1) Perform system analysis again and correctly set the value for the vibration elimination parameter. 2) If the issue persists, please disable the vibration elimination function P2.094 [Bit 8] & [Bit 9].

ALF21 Command Error	
Trigger condition and causes	Condition: the use of the firmware commands does not comply with the specifications. Cause: servo status mode error. It could occur when servo is in motion status and reconnecting status at the same time.
Checking methods and corrective actions	Record the operation steps and contact AutomationDirect.
How to clear the alarm?	Cycle power on the servo drive.

11.3.3 - Communication Type:

AL131 CRC of EEPROM Calculation Error Occurs when Using PDO	
Trigger condition and causes	The data in ROM is damaged; all objects are automatically restored to default values.
Checking methods and corrective actions	Check if the specified object causes a CRC calculation error in EEPROM when PDO is being received or sent. Usually, this alarm is caused by an error in DSP.
How to clear the alarm?	NMT: reset node or 0x6040 (fault reset) or DI.ARST.

AL132 Parameter is Write-prohibited when Using PDO	
Trigger condition and causes	When using communication object to write data to the parameter, the parameter is currently write-prohibited.
Checking methods and corrective actions	Please refer to the specified parameter description to write data to the parameter.
How to clear the alarm?	NMT: reset node or 0x6040 (fault reset).

AL180 Detect the connection between the PLC and comm. card	
Trigger condition and causes	No data message received in the time duration specified in P3.067 on EtherNet/IP Explicit or Modbus TCP. This can be set as a Warning or an Alarm
Checking methods and corrective actions	1) Check if the communication is normal. 2) Check if the wiring is correctly connected.
How to clear the alarm?	NMT: reset node or 0x6040 (fault reset) or DI.ARST

AL185 HSSP command timeout or data checksum error	
Trigger condition and causes	Condition: internal communication is cut off. Cause: Abnormal communication hardware, (internal communication card packet fails for > 5s, or the received packet contains a CRC error 3x in a row)..
Checking methods and corrective actions	1) Check if the communication cable is intact and firmly connected. 2) Check the communication quality; it is suggested that you use common grounding and shielded cable. 3) For communication type models, check if the value of monitoring variable 120 increases constantly.
How to clear the alarm?	NMT: reset node or 0x6040 (fault reset) or DI.ARST (**NOTE:** This is an internal alarm and is not dependent on P3.065 or P3.067)

AL186 Communication Bus Off	
Trigger condition and causes	Transmission error in comms data.
Checking methods and corrective actions	1) Check if the cable is well connected and whether there is any noise inference. Replace the communication cable or eliminate the noise if necessary. 2) There are an excessive number of the slave stations, and the communication cycle is too short. Please lengthen the communication cycle.
How to clear the alarm?	NMT: reset node or 0x6040 (fault reset).

AL201 Error occurs when loading data	
Trigger condition and causes	Condition: an error has occurred when loading data from EEPROM. Cause: initialization error of comms data.
Checking methods and corrective actions	1) If the alarm is cleared after cycling power on the servo drive, it means the error occurs at the moment when reading the data. 2) If the issue persists after cycling power on the servo drive, it means the data in the EEPROM is damaged and you need to write the correct value again. See the following methods: • To write the default value, set P2.008 to 30 and then 28
How to clear the alarm?	DI.ARST

AL22D Absolute positioning is not allowed when E-Cam is engaged	
Trigger condition and causes	Condition: Absolute positioning is performed when the E-Cam is engaged. Cause: Absolute positioning is performed when the E-Cam is engaged.
Checking methods and corrective actions	Check if the E-Cam is engaged when the servo is performing absolute positioning.
How to clear the alarm?	DI.ARST

AL301 Synchronization failure	
Trigger condition and causes	Condition: the servo drive fails to synchronize with the controller in IP mode. Cause: synchronization failure.
Checking methods and corrective actions	1) Make sure the communication between the servo drive and the controller is good. 2) After eliminating any problems that you find, allow the controller to re-send the SYNC signal and ensure that it is sent successfully. 3) Modify the setting for P3.009 (setting the default value is suggested).
How to clear the alarm?	NMT: reset node or 0x6040 (fault reset).

AL302 Synchronization signal is sent too soon	
Trigger condition and causes	Condition: when using comms, the synchronization signal is received too soon. Cause: the synchronization signal is sent too soon.
Checking methods and corrective actions	1) Make sure the setting of synchronization cycle (0x1006) is identical to that of the controller. 2) Modify the setting of P3.009 (using the default value is suggested). 3) Ensure the correct time sequence of sending packets from the controller. A drift or delay in packet sending time causes synchronization failure.
How to clear the alarm?	NMT: reset node or 0x6040 (fault reset).

AL303 Synchronization signal timeout	
Trigger condition and causes	Condition: in IP mode, the synchronization with the controller failed. Cause: timeout of synchronization signal.
Checking methods and corrective actions	1) Make sure the communication quality is good. 2) Make sure the setting of synchronization cycle (0x1006) is identical to that of the controller. 3) Modify the setting of P3.009 (using default value is suggested). 4) Ensure the correct time sequence for sending packets from the controller. A drift or delay in packet sending time causes synchronization failure.
How to clear the alarm?	NMT: reset node or 0x6040 (fault reset).

AL304 Invalid IP command	
Trigger condition and causes	Condition: command cannot be sent when in IP mode. Cause: invalid IP command.
Checking methods and corrective actions	The computing time in IP mode takes too long. Please disable the USB monitoring function.
How to clear the alarm?	NMT: reset node or 0x6040 (fault reset).

AL305 SYNC period error	
Trigger condition and causes	Condition: Comms 301 Obj 0x1006 Data Error Cause: SYNC period error.
Checking methods and corrective actions	Check the value of 0x1006. If it is smaller than or equal to 0, the alarm occurs.
How to clear the alarm?	NMT: reset node or 0x6040 (fault reset).

AL401 NMT reset command is received while servo is on	
Trigger condition and causes	NMT reset command is received while servo drive is on.
Checking methods and corrective actions	Check if the NMT reset command is received while the servo drive is on. Use NMT.reset or 0x6040 (fault reset).
How to clear the alarm?	DI.ARST

11.3.4 - Motion control type:

AL207 Parameter group of PR Type 8 (Write) is out of range	
Trigger condition and causes	Condition: parameter group for PR Type 8 (Write), P_Group, is out of range. Cause: the group for PR Type 8 (Write) command source exceeds the range.
Checking methods and corrective actions	Writing parameter using PR procedure: the parameter group of command source exceeds the range. Please check the setting.
How to clear the alarm?	DI.ARST or set P0.001 to 0.

AL209 Parameter number of PR Type 8 (Write) is out of range	
Trigger condition and causes	Condition: parameter number for PR Type 8 (Write) is out of range. Cause: parameter number is out of range.
Checking methods and corrective actions	Writing parameter using PR procedure: parameter number of PR Type 8 (Write) is out of range. Please check the setting.
How to clear the alarm?	DI.ARST or set P0.001 to 0.

AL211 Parameter Format Setting of Type 8 (Write) PR is in Error	
Trigger condition and causes	Condition: parameter format setting of Type 8 (Write) PR command is in error. Cause: 1) Incorrect parameter format. 2) The SureServo2 Pro software version and the firmware version do not match.
Checking methods and corrective actions	1) Check if the parameter format is correct. 2) Check if you are using the latest version of the software. If you took the corrective actions but the issue persists, contact AutomationDirect.
How to clear the alarm?	DI.ARST

AL213 Parameter setting of PR Type 8 (Write) is in error	
Trigger condition and causes	Condition: when using PR Type 8 (Write) to write parameters, the parameter value is incorrect. Cause: parameter value of PR Type 8 (Write) is in error.
Checking methods and corrective actions	Make sure the parameter value is within the correct range.
How to clear the alarm?	DI.ARST or set P0.001 to 0.

AL215 Write parameters: read-only	
Trigger condition and causes	Condition: write parameters using PR procedure: the parameter is read-only. Cause: an error occurs when writing parameters with PR Type 8 (Write) command.
Checking methods and corrective actions	The specified parameter is read-only.
How to clear the alarm?	DI.ARST or set P0.001 to 0.

AL217 Write parameters: parameter locked	
Trigger condition and causes	Condition: write parameters using PR procedure: the parameter is write-protected when the servo drive is on or the parameter's value exceeds the range. Condition: an error occurs when writing parameters with PR Type 8 (Write) command.
Checking methods and corrective actions	Please write the parameters when the servo drive is off and make sure the parameter's value is within the range.
How to clear the alarm?	Modify the PR command and the parameter.

AL231 Monitoring item for PR Write command is out of range	
Trigger condition and causes	Condition: the value of the monitoring item for PR Type 8 (Write), Sys_Var, exceeds the range. Cause: the value for the monitoring item is out of range.
Checking methods and corrective actions	Please check the code range when writing the monitoring code and make sure it is within the allowable range.
How to clear the alarm?	Reset the alarm or set P0.001 to 0.

AL235 Absolute positioning command error	
Trigger condition and causes	Condition: execute a position command after the feedback position counter overflows. Cause: feedback position counter overflows.
Checking methods and corrective actions	Incremental system: When the motor keeps operating in one direction, this leads to overflow of the position feedback register (FB_PUU), and the coordinate system cannot display the correct position. Executing a positioning command after overflow results in an error. Please use the scope to check if the feedback position has overflowed and then execute the homing procedure. Absolute system: This error occurs when executing the absolute positioning command in the following situations: 1) Feedback position register (FB_PUU) overflows. 2) Setting for P1.001.Z changes, but homing has not been completed yet. 3) E-Gear ratio (P1.044 and P1.045) changes, but homing has not been completed yet. 4) The function to return to the original point is triggered, but homing has not been completed yet. 5) When AL060 or AL062 occurs, please use the scope to check if the feedback position has overflowed. Check steps 1—4 above and perform the homing procedure.
How to clear the alarm?	Incremental system: Perform homing procedure after using DI.ARST to clear the alarm. Absolute system: Establish the absolute origin position.

AL237 Indexing coordinate is undefined	
Trigger condition and causes	Condition: using the indexing function and execute positioning command before defining the start point of the indexing coordinate. Cause: The servo drive cannot identify this coordinate system.
Checking methods and corrective actions	Check if the indexing coordinate has been defined: 1) Perform the homing procedure before using the indexing function. 2) After alarm occurs, use DI.ARST or set P0.001 to 0 to clear the alarm. 3) This alarm is also cleared when you power on the servo.
How to clear the alarm?	DI.ARST or set P0.001 to 0.

AL283 Software positive limit	
Trigger condition and causes	Condition: the target position specified by the command exceeds the software positive limit. Cause: reaching the software positive limit.
Checking methods and corrective actions	When you enable the software positive limit function, this alarm is determined by the command instead of by the feedback position. The alarm may occur while the actual position is still within the allowable range. The software positive limit is determined by the Position command instead of the actual feedback position because the command is sent before the feedback is received. That is, the actual position may have not reached the limit when the limit protection has been triggered. To fix this, you can set a proper deceleration time to satisfy the application requirement. Please see description for P5.003.
How to clear the alarm?	The alarm is automatically cleared after the motor moves away from the limit.

AL285 Software negative limit	
Trigger condition and causes	Condition: target position specified by the command is less than the software negative limit. Cause: the software negative limit is triggered.
Checking methods and corrective actions	The software negative limit is determined by the Position command instead of the actual feedback position because the command is sent before the feedback is received. That is, the actual position may have not reached the limit when the limit protection has been triggered. To fix this, you can set a proper deceleration time for the application. Please refer to the description for P5.003.
How to clear the alarm?	The alarm is automatically cleared after the motor moves away from the limit.

AL289 Feedback position counter overflows	
Trigger condition and causes	Feedback position counter overflows.
Checking methods and corrective actions	1) Please set the gear ratio according to the total traveling distance of the absolute motor and the actual application requirements to avoid the feedback position counter overflow. 2) If P2.069.Z is set to 1 (prevent index coordinate overflow function), please set P2.070 bit 2 to 1.
How to clear the alarm?	DI.ARST

AL380 Position offset alarm for DO.MC_OK	
Trigger condition and causes	DO.MC_OK is on and then goes off.
Checking methods and corrective actions	Please refer to the description of P1.048. After DO.MC_OK is on, DO.MC_OK goes off because DO.TPOS turns off. There might be an external force causing the position deviation of the motor after positioning is completed. You can disable this alarm by setting P1.048.Y to 0.
How to clear the alarm?	DI.ARST or set P0.001 to 0.

AL3CF DI.PFQS input for quick stop and fault (Emergency Stop)	
Trigger condition and causes	After AL35F is triggered and the motor has decelerated to 0, this alarm occurs.
Checking methods and corrective actions	Check if any of the parameters, P2.010–P2.017 and P2.036–P2.040, are set to DI(0x47) and are triggered.
How to clear the alarm?	Cycle power on the servo drive.

AL3F1 Absolute index coordinate undefined	
Trigger condition and causes	Condition: in communication mode, an absolute positioning command is issued before absolute coordinate system is created. Causes: 1) The absolute coordinate system has not been created. 2) Overflow occurs since the motor keeps rotating in the same direction.
Checking methods and corrective actions	1) Create an absolute coordinate system. 2) Set the coordinate system origin again.
How to clear the alarm?	Set the origin again.

AL400 Index coordinate error	
Trigger condition and causes	Condition: P1.044 x P2.052 x 4 has to be less than 2^31. Cause: value of P2.052 is set too low and causes the index coordinate error.
Checking methods and corrective actions	Check if the value of P2.052 is within the allowable setting range. If the setting value is too low, an index coordinate error occurs. Please adjust the value of P2.052.
How to clear the alarm?	DI.ARST

AL404 Value of PR special filter setting is too high	
Trigger condition and causes	Condition: the value of the PR special filter (P1.022) is set too high so that the following error exceeds the range. Cause: following error of internal position exceeds the allowable range.
Checking methods and corrective actions	Check the setting of P1.022. If the value is too high, the following error exceeds the allowable range faster. Please adjust the value of P1.022.
How to clear the alarm?	DI.ARST

AL555 System failure	
Trigger condition and causes	DSP processing error.
Checking methods and corrective actions	If this alarm occurs, please contact AutomationDirect technical support without making any modification.
How to clear the alarm?	N/A

AL809 PR Arithmetic operation parmeter error or secondary platform error	
Trigger condition and causes	Condition: an error occurs when the servo drive decodes the motion command. Cause: The PR arithmetic operation parameters have to be compiled by the SureServo2 Pro software before being downloaded to the servo drive. Directly editing the PR arithmetic operation parameters through the panel or controller without recompiling the parameters in SureServo2 Pro triggers AL809.
Checking methods and corrective actions	1) Make sure you edit PR arithmetic operation parameters through SureServo2 Pro. Do not directly modify these parameters with the panel or controller. 2) If this alarm occurs when the servo is not in PR mode, please save the parameter file and contact the AutomationDirect technical support. 3) For advanced users: you can save the scope screenshot when the alarm occurs. Set P5.007 and P0.001 for the two channels to monitor the status and save the scope.
How to clear the alarm?	Cycle power on the servo drive.

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