



SV660F Series Servo Drive Troubleshooting Guide



Industrial
Automation



Intelligent
Elevator



New Energy
Vehicle



Industrial
Robot



Rail
Transit



Data code 19012104A02

Introduction

The SV660F series high performance AC servo drive provides a power range from 0.05 kW to 7.5 kW. It supports Profinet communication protocol and carries Ethernet communication interfaces to work with the host controller for a networked operation of multiple servo drives.

The SV660N series servo drive supports stiffness level setting, inertia auto-tuning and vibration suppression to simplify the operation process. It allows a quiet and stable operation through cooperating with the MS1 series medium-to-small inertia high-response servo motors configured with a 23-bit multi-turn absolute encoder.

It is suitable for lithium battery PACK, printing and packaging, logistics, automobile manufacturing, tobacco and other industries to achieve fast and accurate collaborative control.

This guide Introduces faults and fault levels, the troubleshooting process, warning codes and fault codes.

More documents

Name	Data Code	Description
SV660F Series Servo Drive Selection Guide	19011667	Provides instructions on product selection, including the list of supporting components, technical data on the drive and motor, and the selection guide of cables.
SV660F Series Servo Drive Hardware Guide	19011666	Presents electrical design guidance of the equipment, description of terminals, required certificates and standards and solutions to common EMC problems.
SV660F Series Servo Drive Commissioning Guide	19011668	Presents servo commissioning, parameter descriptions, including the operating panel, commissioning software, commissioning procedure and a parameter list.
SV660F Series Servo Drive Communication Guide	19011670	Presents functions and parameters of the servo drive, including Profinet communication configuration, parameter description, and communication application cases.
SV660F Series Servo Drive Function Guide	19011669	Presents functions and parameters, including function overview, basic servo functions, adjustment and parameter list.
SV660F Series Servo Drive installation Guide	19012103	Presents installation of the servo drive, including installation steps, mechanical installation, and electrical installation.

Name	Data Code	Description
SV660F Series Servo Drive Troubleshooting Guide	19012104	Introduces faults and fault levels, the troubleshooting process, warning codes and fault codes.
SV660F Series Servo Drive Maintenance Guide	19012105	Provides instructions on maintenance and repair of the equipment.
SV660F Series Servo Drive Safety Guide	19012110	Presents the safety function and related certifications and standards, wiring, commissioning process, troubleshooting, and functions.
SV660F Series Servo Drive Manual Package	PS00005951	Provides information on selection, installation, commissioning, function, troubleshooting and parameters of the equipment.

Revision History

Date	Version	Description
2023-10	A02	- Added information on how to obtain documents from the app in the preface. - Added requirements on mechanical protection for operators in Safety Precautions. - Deleted the description for frequency division output, analog, and fully closed loop. - Added error E551.4. - Optimized the content on E601.2, E210.0, and EB00.0.
2022-12	A01	- Added warranty information in the preface. - Added error E625.0. - Deleted information on E631. - Updated the manual according to the fault table.
2022-07	A00	First release

Access to the Guide

This guide is not delivered with the product. You can obtain the PDF version in the following way:

- Do keyword search at <http://www.inovance.com>.
- Scan the QR code on the equipment to acquire more.
- Scan the QR code below to install the app, where you can search for and download manuals.



Warranty

Inovance provides warranty service within the warranty period (as specified in your order) for any fault or damage that is not caused by improper operation of the user. You will be charged for any repair work after the warranty period expires.

Within the warranty period, maintenance fee will be charged for the following damage:

- Damage caused by operations not following the instructions in the user guide
- Damage caused by fire, flood, or abnormal voltage
- Damage caused by unintended use of the product
- Damage caused by use beyond the specified scope of application of the product
- Damage or secondary damage caused by force majeure (natural disaster, earthquake, and lightning strike)

The maintenance fee is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail.

For details, see the Product Warranty Card.

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Fundamental Safety Instructions

Safety Precautions

- This chapter presents essential safety instructions for a proper use of the equipment. Before operating the equipment, read through the guide and comprehend all the safety instructions. Failure to comply with the safety precautions may result in death, serious injury, or equipment damage.
- "CAUTION", "WARNING", and "DANGER" items in the guide only indicate some of the precautions that need to be followed; they just supplement the safety precautions.
- Use this equipment according to the designated environment requirements. Damage caused by improper use is not covered by warranty.
- Inovance shall take no responsibility for any personal injuries or property damage caused by improper usage.

Safety Levels and Definitions



Indicates that failure to comply with the notice will result in death or severe personal injuries.



Indicates that failure to comply with the notice may result in death or severe personal injuries.



Indicates that failure to comply with the notice may result in minor or moderate personal injuries or equipment damage.

Fundamental Safety Instructions

- Drawings in the guide are sometimes shown without covers or protective guards. Remember to install the covers or protective guards as specified first, and then perform operations in accordance with the instructions.
- The drawings in the guide are shown for illustration only and may be different from the product you purchased.
- Users must take mechanical precautions to protect personal safety and wear protective equipment, such as anti-smashing shoes, safety clothing, safety glasses, protective gloves, and protective sleeves.

Unpacking



WARNING

- Do not install the equipment if you find damage, rust, or signs of use on the equipment or accessories upon unpacking.
- Do not install the equipment if you find water seepage or missing or damaged components upon unpacking.
- Do not install the equipment if you find the packing list does not conform to the equipment you received.



CAUTION

- Check whether the packing is intact and whether there is damage, water seepage, dampness, and deformation before unpacking.
- Unpack the package by following the unpacking sequence. Do not strike the package violently.
- Check whether there is damage, rust, or injuries on the surface of the equipment and equipment accessories before unpacking.
- Check whether the package contents are consistent with the packing list before unpacking.

Storage and Transportation



WARNING

- Large-scale or heavy equipment must be transported by qualified professionals using specialized hoisting equipment. Failure to comply may result in personal injuries or equipment damage.
- Before hoisting the equipment, ensure the equipment components such as the front cover and terminal blocks are secured firmly with screws. Loosely-connected components may fall off and result in personal injuries or equipment damage.
- Never stand or stay below the equipment when the equipment is being hoisted by the hoisting equipment.
- When hoisting the equipment with a steel rope, ensure the equipment is hoisted at a constant speed without suffering from vibration or shock. Do not turn the equipment over or let the equipment stay hanging in the air. Failure to comply may result in personal injuries or equipment damage.

 CAUTION

- Handle the equipment with care during transportation and mind your steps to prevent personal injuries or equipment damage.
- When carrying the equipment with bare hands, hold the equipment casing firmly with care to prevent parts from falling. Failure to comply may result in personal injuries.
- Store and transport the equipment based on the storage and transportation requirements. Failure to comply will result in equipment damage.
- Avoid storing or transporting the equipment in environments with water splash, rain, direct sunlight, strong electric field, strong magnetic field, and strong vibration.
- Avoid storing the equipment for more than three months. Long-term storage requires stricter protection and necessary inspections.
- Pack the equipment strictly before transportation. Use a sealed box for long-distance transportation.
- Never transport the equipment with other equipment or materials that may harm or have negative impacts on this equipment.

Installation

 DANGER

- The equipment must be operated only by professionals with electrical knowledge. Non-professionals are not allowed.

 WARNING

- Read through the guide and safety instructions before installation.
- Do not install this equipment in places with strong electric or magnetic fields.
- Before installation, check that the mechanical strength of the installation site can bear the weight of the equipment. Failure to comply will result in mechanical hazards.
- Do not wear loose clothes or accessories during installation. Failure to comply may result in an electric shock.
- When installing the equipment in a closed environment (such as a cabinet or casing), use a cooling device (such as a fan or air conditioner) to cool the environment down to the required temperature. Failure to comply may result in equipment over-temperature or a fire.
- Do not retrofit the equipment.
- Do not fiddle with the bolts used to fix equipment components or the bolts marked in red.
- When the equipment is installed in a cabinet or final assembly, a fireproof enclosure providing both electrical and mechanical protections must be provided. The IP rating must meet IEC standards and local laws and regulations.
- Before installing equipments with strong electromagnetic interference, such as a transformer, install a shielding equipment for the equipment to prevent malfunction.
- Install the equipment onto an incombustible object such as a metal. Keep the equipment away from combustible objects. Failure to comply will result in a fire.

 CAUTION

- Cover the top of the equipment with a piece of cloth or paper during installation. This is to prevent unwanted objects such as metal chippings, oil, and water from falling into the equipment and causing faults. After installation, remove the cloth or paper on the top of the equipment to prevent over-temperature caused by poor ventilation due to blocked ventilation holes.
- Resonance may occur when the equipment operating at a constant speed executes variable speed operations. In this case, install the vibration-proof rubber under the motor frame or use the vibration suppression function to reduce resonance.

Wiring

 DANGER

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals.
- Before wiring, cut off all the power supplies of the equipment. and wait for at least the time designated on the equipment warning label before further operations because residual voltage still exists after power-off. After waiting for the designated time, measure the DC voltage in the main circuit to ensure the DC voltage is within the safe voltage range. Failure to comply will result in an electric shock.
- Do not perform wiring, remove the equipment cover, or touch the circuit board with power ON. Failure to comply will result in an electric shock.
- Check that the equipment is grounded properly. Failure to comply can result in electric shock.

 WARNING

- Do not connect the input power supply to the output end of the equipment. Failure to comply can result in equipment damage or even a fire.
- When connecting a drive to the motor, check that the phase sequences of the drive and motor terminals are consistent to prevent reverse motor rotation.
- Cables used for wiring must meet cross sectional area and shielding requirements. The shield of the cable must be reliably grounded at one end.
- Fix the terminal screws with the tightening torque specified in the user guide. Improper tightening torque may overheat or damage the connecting part, resulting in a fire.
- After wiring is done, check that all cables are connected properly and no screws, washers or exposed cables are left inside the equipment. Failure to comply may result in an electric shock or equipment damage.

 CAUTION

- Follow the proper electrostatic discharge (ESD) procedure and wear an anti-static wrist strap to perform wiring. Failure to comply may result in damage to the equipment or to the internal circuit of the product.
- Use shielded twisted pairs for the control circuit. Connect the shield to the grounding terminal of the equipment for grounding purpose. Failure to comply will result in equipment malfunction.

Power-on

**DANGER**

- Before power-on, check that the equipment is installed properly with reliable wiring and the motor can be restarted.
- Check that the power supply meets equipment requirements before power-on to prevent equipment damage or a fire.
- After power-on, do not open the cabinet door or protective cover of the equipment, touch any terminal, or disassemble any unit or component of the equipment. Failure to comply will result in an electric shock.

**WARNING**

- Perform a trial run after wiring and parameter setting to ensure the equipment operates safely. Failure to comply may result in personal injuries or equipment damage.
- Before power-on, check that the rated voltage of the equipment is consistent with that of the power supply. Failure to comply may result in a fire.
- Before power-on, check that no one is near the equipment, motor, or machine. Failure to comply may result in death or personal injuries.

Operation**DANGER**

- The equipment must be operated only by professionals. Failure to comply will result in death or personal injuries.
- Do not touch any connecting terminals or disassemble any unit or component of the equipment during operation. Failure to comply will result in an electric shock.

**WARNING**

- Do not touch the equipment casing, fan, or resistor with bare hands to feel the temperature. Failure to comply may result in personal injuries.
- Prevent metal or other objects from falling into the equipment during operation. Failure to comply may result in a fire or equipment damage.

Maintenance**DANGER**

- Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals.
- Do not maintain the equipment with power ON. Failure to comply will result in an electric shock.
- Before maintenance, cut off all the power supplies of the equipment and wait for at least the time designated on the equipment warning label.
- In case of a permanent magnet motor, do not touch the motor terminals immediately after power-off because the motor terminals will generate induced voltage during rotation even after the equipment power supply is off. Failure to comply will result in an electric shock.

 WARNING • Perform routine and periodic inspection and maintenance on the equipment according to maintenance requirements and keep a maintenance record.
Repair
 DANGER • Equipment installation, wiring, maintenance, inspection, or parts replacement must be performed only by professionals. • Do not repair the equipment with power ON. Failure to comply will result in an electric shock. • Before inspection and repair, cut off all the power supplies of the equipment and wait for at least the time designated on the equipment warning label.
 WARNING • Submit the repair request according to the warranty agreement. • When the fuse is blown or the circuit breaker or earth leakage current breaker (ELCB) trips, wait for at least the time designated on the equipment warning label before power-on or further operations. Failure to comply may result in death, personal injuries or equipment damage. • When the equipment is faulty or damaged, the troubleshooting and repair work must be performed by professionals that follow the repair instructions, with repair records kept properly. • Replace quick-wear parts of the equipment according to the replacement instructions. • Do not use damaged equipment. Failure to comply may result in death, personal injuries, or severe equipment damage. • After the equipment is replaced, check the wiring and set parameters again.
Disposal
 WARNING • Dispose of retired equipment in accordance with local regulations and standards. Failure to comply may result in property damage, personal injuries, or even death. • Recycle retired equipment by observing industry waste disposal standards to avoid environmental pollution.

Additional Precautions

Cautions for the dynamic brake

- Dynamic braking can only be used for emergency stop in case of failure and sudden power failure. Do not trigger failure or power failure frequently.
- Ensure that the dynamic braking function has an operation interval of more than 5 minutes at high speed, otherwise the internal dynamic braking circuit may be damaged.

- Dynamic braking is common in rotating mechanical structures. For example, when a motor has stopped running, it keeps rotating due to the inertia of its load. In this case, this motor is in the regenerative state and short-circuit current passes through the dynamic brake. If this situation continues, the drive, and even the motor, may be burned.

Safety label

For safe equipment operation and maintenance, comply with the safety labels on the equipment. Do not damage or remove the safety labels. The following table describes the meaning of the safety labels.

Safety label	Description
	• Never fail to connect the protective earth (PE) terminal. Read through the guide and follow the safety instructions before use. • Never fail to connect Protective Earth (PE) terminal. Read the manual and follow the safety instructions before use. • Do not touch terminals within 15 minutes after disconnecting the power supply to prevent the risk of electric shock. • Do not touch terminals with 15 minutes after Disconnect the power. Risk of electrical shock. • Do not touch the heatsink with power ON to prevent the risk of burn. • Do not touch heatsink when power is ON. Risk of burn.

1 Fault Level and Display

Faults and warnings of the servo drive are divided into three levels based on severity: No. 1 > No. 2 > No. 3, as shown below.

- No. 1 non-resettable fault
- No. 1 resettable fault
- No. 2 resettable fault
- No. 3 resettable warning

Note

"Resettable" means the keypad stops displaying the fault/warning once a "Reset signal" is input.

Fault and warning log

The servo drive can record the latest 20 faults and warnings and values of status parameters upon fault/warning. Among the latest 5 faults/warnings, if a fault/warning occurs repetitively, the servo drive records the fault/warning code and the drive status only once.

A fault/warning will still be saved in the fault log after reset. To remove the fault/warning from the fault log, set H02.31 to 1.

Read the value of H0b.34 to get the fault/warning code. See examples in the following table.

H0b.34 (Hexadecimal)	Description
0101	0: Fault subcode 101: Fault code

2 Fault Reset

Faults and warnings of the servo drive are divided into three levels based on severity: No. 1 > No. 2 > No. 3, as shown below.

- No. 1 non-resettable fault
- No. 1 resettable fault
- No. 2 resettable fault
- No. 3 resettable warning

Note

"Resettable" means the keypad stops displaying the fault/warning once a "Reset signal" is input.

Operating procedure:

- To stop the keypad from displaying the fault/warning, set H0d.01 (Fault reset) to 1 or activate the DI terminal assigned with DI function 2 (FunIN.2: ALM- RST, fault and warning reset).
- To reset No. 1 and No. 2 faults, switch off the S-ON signal, and then set H0d.01 to 1 or activate the DI terminal allocated with DI function 2.
- To reset No. 3 warnings, set H0d.01 to 1 or activate the DI terminal allocated with DI function 2.

Note

- Some faults and warnings can be reset only after the fault causes are rectified by modifying the settings. However, a reset operation does not necessarily activate the modifications to settings.
- For modifications activated at next power-on (R, S, T/L1C, L2C powered on again), perform a power cycle.
- For modifications activated after stop, switch off the S-ON signal. The servo drive can operate normally only after modifications are activated.

☆Related function No.

Start Process	Fault Symptom	Cause	Check method
FunIN.2	ALM-RST	Fault/Warning reset signal	The servo drive may, depending on the warning types, continue running after warning reset. When FunIN.2 is assigned to a low-speed DI, the effective level change of this DI must be kept for more than 3 ms. Otherwise, fault reset will be inactive. Do not assign FunIN.2 to a high-speed DI. Otherwise, fault/warning reset will be inactive. • Inactive: Not resetting the fault/warning • Active: Resetting the fault/warning

3 Description of Warning Codes

- E108.0: Parameter write error

Description:

Parameter values cannot be written to EEPROM.

Cause	Troubleshooting	Solution
An error occurs during parameter-writing.	Modify a certain parameter, power off and on the servo drive again and check whether the modification is saved.	If the modification is not saved and the fault persists after the servo drive is powered off and on repeatedly, replace the servo drive.

- E108.1: Parameter read error

Description:

Parameter values cannot be read from EEPROM.

Cause	Troubleshooting	Solution
The parameter-read operation is abnormal, and the system indicates an EEPROM read failure.	Modify a certain parameter, power off and on the servo drive again and check whether the modification is saved.	If the modification is not saved and the fault persists after the servo drive is powered off and on repeatedly, replace the servo drive.

- E108.2: EEPROM write check error

Description:

The check on the data written in EEPROM failed.

Cause	Troubleshooting	Solution
An error occurs during parameter-writing.	Modify a certain parameter, power off and on the servo drive again and check whether the modification is saved.	If the modification is not saved and the fault persists after the servo drive is powered off and on repeatedly, replace the servo drive.

- E108.3: EEPROM read check error

Description:

The check on the data read in EEPROM failed.

Cause	Troubleshooting	Solution
An error occurs during parameter-reading.	Modify a certain parameter, power off and on the servo drive again and check whether the modification is saved.	If the modification is not saved and the fault persists after the servo drive is powered off and on repeatedly, replace the servo drive.

- E121.0: Duplicate S-ON command

Description:

A redundant S-ON signal is sent when some auxiliary functions are used.

Cause	Troubleshooting	Solution
The external S-ON signal is active when servo drive is enabled internally.	Check whether the following auxiliary functions are used: Check whether DI functions (H0d.02, H0d.03, and H0d.12) are used and whether FunIN.1 (S-ON signal) is active.	Deactivate the DI assigned with FunIN.1 (both hardware DI and virtual DI).

- E122.0: Multi-turn absolute encoder setting error

Description:

The motor does not match the absolute position mode or the motor code is set improperly.

Cause	Troubleshooting	Solution
The motor does not match the absolute position mode or the motor code is set incorrectly.	1. Check the motor nameplate to see whether the motor is configured with a multi-turn absolute encoder. 2. Check whether H00.00 (motor code) is set properly.	Reset H00.00 (motor code) according to the motor nameplate or use a suitable motor.

- E550.2: External switchover wait warning

Description:

Incorrect task block switching.

Cause	Troubleshooting	Solution
If the external warning must be kept to allow current block to continue operating, the keypad displays the warning when current block is done operating.	Check bit4–7 of the task mode (H28.16–H28.31) of current operation block.	The warning will be cleared automatically when the next block is triggered by the external signal.

- E600.0: Inertia auto-tuning failure

Description:

Vibration cannot be suppressed. You can set notch parameters (H09.12...H09.23) manually to suppress vibration.

The auto-tuned values fluctuate dramatically. Increase the maximum operating speed, reduce the acceleration/deceleration time, and shorten the stroke of the lead screw during ETune operation.

Mechanical couplings of the load are loose or eccentric. Rectify the mechanical faults.

A warning occurs during auto-tuning and causes interruption. Rectify the fault causes and perform inertia auto-tuning again.

The vibration cannot be suppressed if the load carries large inertia. In this case, increase the acceleration/deceleration time to ensure the motor current is unsaturated.

Cause	Troubleshooting	Solution
1. Continuous vibration occurs during auto-tuning. 2. The auto-tuned values fluctuate dramatically. 3. Mechanical couplings of the load are loose or eccentric. 4. A warning occurs during auto-tuning and causes interruption. 5. The vibration cannot be suppressed if the load carries a large inertia. In this case, increase the acceleration/deceleration time first to ensure the motor current is unsaturated.	Perform internal inspection to check whether the torque jitters upon stop (not FFT). Check whether Three times more than the last auto-tuned value for variation less than 5 times; 0.5 times more than last auto-tuned value for variation above 5 times.	1. Rectify the fault and perform inertia auto-tuning again. 2. For vibration that cannot be suppressed, enable vibration suppression. 3. Ensure mechanical couplings are connected securely. 4. Increase the maximum operating speed, reduce the acceleration/deceleration time, and shorten the stroke of the lead screw during ETune operation.

- E601.0: Homing warning

Description:

Homing time exceeds the setpoint.

Cause	Troubleshooting	Solution
1. The home switch is faulty.	- There is only high-speed searching but no low-speed searching during homing. - After high-speed searching, low-speed searching in the reverse direction applies.	If a hardware DI is used, check whether the corresponding DI function is allocated to a certain DI in group H03 and check the wiring of this DI. Change the DI logic manually and observe the value of H0b.03 (monitored DI status) to monitor whether the servo drive receives corresponding DI level changes. If the home signal is Z signal but it cannot be found, check the condition of the Z signal.
2. The homing time limit is too short.	Check whether the value of H05.35h (time limit for homing) is too small	Increase the value of H05.35.
3. The speed in high-speed searching for the home switch signal is too low.	Check the distance between the start position of homing and the home switch. Then check whether the setpoint of 6099.01h is too low, resulting in a long homing process.	Increase the value of 6099.01h.
4. The setting of the home switch is improper.	- Check whether the limit signals at both sides are activated. - Check whether a limit signal is activated simultaneously with the home signal.	Set the position of the physical switch properly.

- E601.1: Homing switch error

Description:

The homing switch is set improperly.

Cause	Troubleshooting	Solution
The home switch is set improperly.	Check whether the limit signals at both sides are activated. Check whether the limit signal and the deceleration point signal/home signal are both activated. Check whether the positive and negative position limits are activated successively.	Set the position of the physical switch properly.

- E601.2: Homing method setting error

Description:

The homing method value is too large.

Cause	Troubleshooting	Solution
The homing method value is too large.	Check the value.	Change the value of H25.22 within the limits.

- E730.0: Encoder battery warning

Description:

The voltage of the absolute encoder battery is lower than 3.0 V.

Cause	Troubleshooting	Solution
The voltage of the absolute encoder battery is lower than 3.0 V.	Measure the battery voltage.	Use a new battery with the matching voltage.

Note

E731.0 and E733.0 can trigger E730.0. See E731.0 and E733.0 for other solutions.

- E900.0: DI emergency braking

Description:

The logic of the DI terminal (including the hardware DI and virtual DI) allocated with DI function 34 (FunIN.34) is effective.

Cause	Troubleshooting	Solution
The DI function 34 (EmergencyStop) is triggered.	Check whether the logic of the DI allocated with DI function 34 (FunIN.34: Emergency stop) is valid.	Check the operation mode and clear the active DI braking signal without affecting the safety performance.

- E902.0: DI setting invalid

Description:

DI function parameters are set to invalid values.

Cause	Troubleshooting	Solution
DI (DI1...DI5) function parameters are set to invalid values.	Check whether H03.02, H03.04, H03.06, H03.08, and H03.10 are set to invalid values.	Set DI function parameters to valid values.

- E902.1: DO setting invalid

Description:

DO function parameters are set to invalid values.

Cause	Troubleshooting	Solution
DO (DO1...DO3) function parameters are set to invalid values.	Check whether H04.00, H04.02, and H04.04 are set to invalid values.	Set DO function parameters to valid values.

- E902.2: Invalid setting for torque reach

Description:

The DO parameters set for torque reach in the torque control mode are invalid.

Cause	Troubleshooting	Solution
The DO parameters set for torque reach in the torque control mode are invalid.	Check whether the value of H07.22 is lower than or equal to the value of H07.23 (unit: 0.1%).	Set H07.22 to a value higher than that of H07.23.

- E908.0: Model identification failure

Description:

Model identification check code error.

Cause	Troubleshooting	Solution
1. The model identification check word store in EEPROM is incorrect.	1. Check whether the warning persists after restart.	Set H01-72 to 1 to disable model identification temporarily.
2. The model parameters are not written in the drive before delivery.	2. Check whether parameters can be saved to EEPROM.	

- E909.0: Motor overload warning

Description:

The accumulative heat of the motor reaches the fault threshold.

Cause	Troubleshooting	Solution
1. The motor cables and encoder cable are connected improperly or in poor contact.	Check the wiring among the servo drive, servo motor and the encoder according to the correct wiring diagram.	• Connect the cables according to the wiring diagram. • It is recommended to use the cables provided by Inovance. • When customized cables are used, prepare and connect the customized cables according to the wiring instructions.
2. The load is so heavy that the effective torque outputted by the motor keeps exceeding the rated torque.	1. Confirm the overload characteristics of the servo drive or motor. 2. Check if the drive average load rate H0b.12 (200B-0Dh) is greater than 100.0% for a long time.	1. Replace with a servo drive of higher capacity and a matching servo motor. 2. Reduce the load and increase the acceleration/deceleration time.
3. Acceleration/Deceleration is too frequent or the load inertia is too large.	1. Check the mechanical inertia ratio or perform inertia auto-tuning, and check the value of H08.15 (2008-10h) (load inertia ratio). 2. Confirm the individual operation cycle when the servo motor operates cyclically.	Increase the acceleration/deceleration time.
4. Gains are improper or the stiffness level is too high.	Check whether the motor vibrates and generates unusual noise during operation.	Readjust the gain.
5. The model of the servo drive or motor is set improperly.	Check the serial encoder motor model H00.05 (2000-06h) and the servo drive model H01.10 (2001-0Bh).	View the servo drive nameplate by referring to . Set the servo drive model H01.10 (2001-0Bh) and the motor model correctly to make them match with each other.

Cause	Troubleshooting	Solution
6. The motor is stalled due to mechanical factors, resulting in overload during operation.	Check the running reference and motor speed H0b.00 (200b-01h) through Inovance servo commissioning software or keypad: References in the position control mode: H0b.13 (200b-0Eh input reference counter) References in the speed control mode: H0b.01 (200b-02h speed reference) References in the torque control mode: H0b.02 (200b-03h internal torque reference) Check whether the reference value is not 0 or is very large but the motor speed is 0 RPM in the corresponding mode.	Rectify the mechanical-related problem.
7. The servo drive is faulty.	Power off and on the servo drive.	Replace the servo drive.

- E920.0: Regenerative resistor overload

Description:

The accumulative heat of the regenerative resistor exceeds the set value.

Cause	Troubleshooting	Solution
1. The external regenerative resistor is connected improperly or disconnected.	Remove the external regenerative resistor and measure whether its resistance is " ∞ " (infinite). Measure whether the resistance between terminals P $\oplus$ and C is " ∞ " (infinite).	Replace with a new external regenerative resistor. After confirming the resistance measured is the same as the nominal value, connect it between terminals P $\oplus$ and C.
		Connect the external regenerative resistor between terminals P $\oplus$ and C with a proper cable.
2. The jumper between terminals P $\oplus$ and D is shorted or disconnected when the built-in regenerative resistor is used.	Measure whether the resistance between terminals P $\oplus$ and D is " ∞ " (infinite).	Ensure terminals P $\oplus$ and D are jumpered.

Cause	Troubleshooting	Solution
3. H02.25 (Regenerative resistor type) is set improperly when an external regenerative resistor is used.	• Check the setpoint of H02.25. • Measure the resistance of the external regenerative resistor connected between P⊕ and C. Check whether the resistance measured is too large by comparing it with the value listed in Table "Specifications of the regenerative resistor". • Check whether the value of H02.27 is larger than the resistance of the external regenerative resistor connected between terminals P⊕ and C.	Set H02.25 according to section Wiring and Setting of Braking Resistor in the Hardware Guide. H02.25 = 1 (external, naturally ventilated) H02.25 = 2 (external, forced-air cooling)
4. The resistance of the external regenerative resistor is too large.		Select a proper regenerative resistor according to section "Specifications of the Regenerative Resistor" in SV660F Series Servo Drive Commissioning Guide.
5. The setpoint of H02.27 (Resistance of external regenerative resistor) is higher than the resistance of the external regenerative resistor used.		Set H02.27 according to the resistance of the external regenerative resistor used.
6. The input voltage of the main circuit is beyond the specified range.	Check whether the input voltage of the main circuit cable on the drive side is within the following range: • 220 V servo drive: Value range: 220 V to 240 V Allowable deviation: – 10% to +10% (198 V to 264 V) • 380 V servo drive: Value range: 380 V–440 V Allowable deviation: – 10% to +10% (342 V to 484 V)	Replace or adjust the power supply according to the specified range.

Cause	Troubleshooting	Solution
7. The load moment of inertia ratio is too large.	Perform moment of inertia auto-tuning according to section "Inertia auto-tuning" in SV660F Series Servo Drive Function Guide or calculate the total mechanical inertia based on mechanical parameters. Check whether the actual load inertia ratio exceeds 30.	• Select an external regenerative resistor with large capacity and set H02.26 to a value consistent with the actual power. • Select a larger servo drive. • Reduce the load if allowed. • Increase the acceleration/ deceleration time if allowed. • Increase the motor operation cycle if allowed.
8. The motor speed is excessively high and deceleration is not done within the set time. The motor is in the continuous deceleration status during cyclic operation.	View the motor speed curve in cycle running and check whether the motor is in deceleration status for a long period.	
9. The capacity of the servo drive or the regenerative resistor is insufficient.	View the motor's single cycle speed curve and calculate whether maximum braking energy can be absorbed completely.	
10. The servo drive is faulty.	-	Replace the servo drive.

- E922.0: Resistance of the external regenerative resistor too small

Description:

The value of H02.27 (resistance of external regenerative resistor) is lower than the value of H02.21 (permissible min. resistance of external regenerative resistor).

Cause	Troubleshooting	Solution
When an external regenerative resistor is used (H02.25 = 1 or 2), the resistance of this resistor is lower than the minimum resistance allowed by the servo drive.	Measure whether the resistance of the external regenerative resistor between terminals P⊕ and C is lower than the value of H02.21 (Permissible minimum resistance of regenerative resistor).	• If yes, replace with an external regenerative resistor that matches the servo drive, then set H02.27 according to the resistance of the resistor used. Finally, connect the new resistor between P⊕ and C. • If not, set H02.27 to a value consistent with the resistance of the external regenerative resistor used.

- E924.0: Regenerative transistor overtemperature

Description:

The estimated temperature of the regenerative transistor is higher than H0A.18 (IGBT overtemperature threshold).

Cause	Troubleshooting	Solution
1. The junction temperature of the regenerative transistor is too high. 2. The regenerative transistor will be turned off automatically after overload occurs.	The regenerative transistor temperature exceeds the threshold defined by H0A.49.	Control the working conditions and usage of the regenerative transistor.

- E941.0: Parameter modifications activated at next power-on

Description:

The parameters modified are those whose "Effective time" is "Next power-on".

Cause	Troubleshooting	Solution
The parameters modified are those whose "Effective time" is "Next power-on".	Check whether parameters you modified are those whose "Effective Time" is "Next power-on".	Power off and on the servo drive again.

- E942.0: Parameter saved frequently

Description:

The number of parameters modified at a time exceeds 200.

Cause	Troubleshooting	Solution
Too many parameters are modified and saved to EEPROM (H0C.13 = 1) at a brief interval.	Check whether parameters are modified through the host controller at a brief interval.	Check the operation mode. For parameters that need not be saved to EEPROM, set H0C.13 to 0.

- E950.0: Forward overtravel warning

Description:

The logic of the DI terminal allocated with DI function 14 (FunIN.14: P-OT, positive limit switch) is effective.

Cause	Troubleshooting	Solution
1. The logic of the DI assigned with FunIN.14 (P-OT function 14, positive limit switch) is effective.	• Check whether a certain DI in group H03 is assigned with FunIN.14. • Check whether the logic of DI corresponding to the bit of H0b.03 (Monitored DI status) is effective.	Check the running mode. On the prerequisite of safety, send a reverse command or rotate the motor to deactivate the logic of the DI terminal allocated with DI function 14.
2. The servo position feedback reaches the positive software position limit.	Check whether the position feedback (H0b.17) is close to the value of H0A.41. Check whether the software position limit is set in H0A.40.	Ensure the servo drive references are proper, allowing the load travel range to be within the software position limit.

- E952.0: Reverse overtravel warning

Description:

The logic of the DI terminal allocated with DI function 15 (FunIN.15: N-OT, negative limit switch) is effective.

Cause	Troubleshooting	Solution
1. The logic of the DI assigned with FunIN.15 is effective.	• Check whether a certain DI in group H03 is assigned with FunIN.15. • Check whether the logic of DI corresponding to the bit of H0b.03 (Monitored DI status) is effective.	Check the operation mode. On the prerequisite of ensuring safety, send a forward run command or rotate the motor to deactivate the logic of DI assigned with FunIN.15.
2. The servo position feedback reaches the negative software position limit.	Check whether the position feedback (H0b.17) is close to the value of H0A.43. Check whether the software position limit is set in H0A.40.	Ensure the servo drive references are proper, allowing the load travel range to be within the software position limit.

4 Description of Fault Codes

4.1 Solutions to Faults

- E101.0: parameter error in H02 and above

Description:

The total number of parameters changes, which generally occurs after software update.

Values of parameters in groups H02 and above exceed the limit, which generally occurs after software update.

Cause	Troubleshooting	Solution
1. The voltage of the control circuit power supply drops instantaneously.	1. Check whether the control circuit (L1C, L2C) is in the process of power-off or instantaneous power failure occurs.	1. Restore default settings (H02.31 = 1), and write parameters again. 2. Enlarge the power capacity or replace with a power supply of higher capacity, restore default settings (H02.31 = 1) and write parameters again.
	2. Measure whether the input voltage of the control circuit cable on the non-drive side is within the following range: 220 V servo drive: Value range: 220 V to 240 V Allowable deviation: -10% to +10% (198 V to 264 V) 380 V servo drive: Value range: 380 V–440 V Allowable deviation: -10% to +10% (342 V to 484 V)	Increase the power supply capacity or replace with a power supply of higher capacity. Restore system parameters to default settings (H02.31 = 1), and write parameters again.
2. Instantaneous power failure occurs when saving parameters.	Check whether instantaneous power failure occurs when saving parameters.	Power on the system again, restore system parameters to default settings (H02.31 = 1), and write parameters again.
3. The number of write operations within a certain period of time exceeds the limit.	1. Check whether instantaneous power failure occurs during parameter storage. 2. Check whether parameters are updated frequently through the host controller.	1. If the servo drive is faulty, replace the servo drive. 2. Change the parameter writing method and write parameters again.

Cause	Troubleshooting	Solution
4. The software is updated.	Check whether parameter values in group H02 and above exceed the upper/lower limit due to software update.	Reset the servo drive model and servo motor model, and restore system parameters to default settings (H02.31 = 1).
5. The servo drive is faulty.	If the fault persists though parameters are restored to default settings and the servo drive is powered off and on repeatedly, the servo drive is faulty.	Replace the servo drive.

- E101.1: parameter error in group H00/H01

Description:

The total number of parameters changes, which generally occurs after software update.

Values of parameters in groups H00 or H01 exceed the limit, which generally occurs after software update.

Cause	Troubleshooting	Solution
The servo drive detects whether parameter values in groups H00 and H01 exceed the upper/lower limit during initialization upon power-on. If yes, the keypad displays E101.1. Motor parameters in group H00 are read from the encoder. Servo drive parameters in group H01 are mapped based on the servo drive model defined by H01-10.	Check groups H00 and H01 to find the parameter whose value exceeds the limit. Confirm whether this parameter range is abnormal.	Replace the motor or servo drive.

- E101.2: Address error in read/write operation after the number of parameters changes

Description:

Address error in read/write operation after the number of parameters changes.

Cause	Troubleshooting	Solution
The total number of parameters changes after software update, leading to address error in read/write operation.	Read H0b.90 and H0b.91 and obtain the abnormal parameter group number.	Rectify the wrong values. Restore default settings.

- E102.0: FPGA communication establishment error

Description:

The communication between MCU and FPGA cannot be established.

Cause	Troubleshooting	Solution
The communication between MCU and FPGA cannot be established.	The fault persists after the servo drive is powered off and on repeatedly.	Replace the servo drive.

- E102.8: FPGA and MCU version mismatch

Description:

FPGA and MCU version mismatch.

Cause	Troubleshooting	Solution
The software versions of MCU and FPGA are inconsistent.	1. Check whether the MCU version (H01.00) is 9xx.x (the fourth digit displayed on the keypad is 9); 2. Check whether the FPGA version (H01.01) is 9xx.x (the fourth digit displayed on the keypad is 9).	Contact Inovance for technical support. Update the FPGA or MCU software.

- E104.1: MCU running timeout (MCU break down)

Description:

The access to MCU times out.

Cause	Troubleshooting	Solution
1. FPGA failure	The fault persists after the servo drive is powered off and on repeatedly.	Replace the servo drive.
2. FPGA and HOST communication handshaking error		
3. Access timeout occurs between HOST and the coprocessor		

- E104.2: Current loop operation timeout (FPGA break down)

Description:

The MCU torque interrupt scheduling time is abnormal. This fault is reported only during commissioning.

Cause	Troubleshooting	Solution
1.FPGA failure	The fault persists after the servo drive is powered off and on repeatedly.	Replace the servo drive.
2. FPGA and MCU communication handshaking error		

- E104.4: MCU command update timeout

Description:

Take the moment when interrupt starts as the starting time, if the time when commands are written to MCU is larger than the time when position and speed regulators are started by FPGA, a warning will be reported.

Cause	Troubleshooting	Solution
The system reports that the encoder communication time is set improperly or the command calculation time is too long.	The fault persists after the servo drive is powered off and on repeatedly.	1. Hide unnecessary functions. 2. Replace the servo drive.

- E120.0: Unknown encoder model

Description:

The servo drive detects the encoder model during initialization upon power-on. If the encoder model does not comply with the requirement, E120.0 occurs.

Cause	Troubleshooting	Solution
1. The product (motor or servo drive) code does not exist.	Read the nameplates of the servo drive and motor to check whether SV660F series servo drive and 23-bit servo motor are used. Meanwhile, check whether H00.00 (motor code) is set to 14101.	If the motor code is unknown, set H00.00 to 14101 when the SV660F series servo drive and 23-bit servo motor are used.
	Check the servo drive code (H01.02) to see whether this servo drive code exists.	If the drive code is absent, set the servo drive model correctly according to the nameplate.
2. The power rating of the motor does not match that of the servo drive.	Check whether the servo drive code (H01.02) matches the serial-type motor code (H00.05).	Replace the unmatched products.

- E120.1: Unknown motor model

Description:

The servo drive detects the motor model defined by H00.00 during initialization upon power-on. If the motor model does not exist, E120.1 occurs.

Cause	Troubleshooting	Solution
The motor model defined by H00.00 is abnormal	Check whether the value of H00.00 matches the used motor.	Rectify the value of H00.00.

- E120.2: Unknown drive model

Description:

The servo drive detects the servo drive model defined by H01.10 during initialization upon power-on. If the servo drive model does not exist, E120.2 occurs.

Cause	Troubleshooting	Solution
H01.10 is incorrect	Check the value of H01.10.	Disable servo drive model auto detection and set H01-10 to a proper value manually.

- E120.5: Motor and drive current mismatch

Description:

The rated output of the servo drive is far higher than the rated current of the motor. You must use a servo drive of lower rated output or a motor with higher rated current.

Cause	Troubleshooting	Solution
The internal scale value is abnormal.	Check whether the servo drive model is correct. If the set current sampling coefficient is too large, calculation overflow will occur.	Replace the servo drive.

- E120.6: FPGA and motor model mismatch

Description:

- The motor model is set improperly, causing mismatch and malfunction of the servo drive.
- The motor model is set properly, but the motor encoder is not supported by the servo drive.

Cause	Troubleshooting	Solution
FPGA software version and H00.00 mismatch	Check whether the FPGA software version (H01.01) supports the motor model set by H00.00.	Update the FPGA software to support the motor model or replace the motor.

- E120.7: Model check error

Description:

The servo drive model parameter cannot be identified.

Cause	Troubleshooting	Solution
Model parameter CRC check failed	Check that the model parameter is present.	Write the model parameter again.

- E120.8: Junction temperature parameter check error

Description:

The junction temperature parameter is identified incorrectly.

Cause	Troubleshooting	Solution
Junction temperature parameter CRC check failed	Check that the junction temperature parameter is present.	Rewrite the junction temperature parameter.

- E122.1: Different DIs assigned with the same function

Description:

The same function is assigned to different DIs.

The DI function No. exceeds the maximum number allowed for DI functions.

Cause	Troubleshooting	Solution
1. Multiple DIs are assigned with the same function.	Check whether parameters in groups H03 (H03.02, H03.04...H03.20) and H17 (H17.00, H17.02...H17.30) are assigned with the same non-zero DI function No.	Assign different DI function numbers to parameters in groups H03 or H17, and then restart the control circuit to activate the assignment, or switch off the S-ON signal and send a "RESET" signal to activate the assignment.
2. The DI function No. exceeds the maximum number allowed for DI functions	Check whether the MCU program is updated.	Restore system parameters to default values (H02.31 = 1) and restart the servo drive.

- E122.3: Upper limit in the rotation mode invalid

Description:

The upper limit (reference range) of the mechanical single-turn position exceeds 2^{31} in the absolute position rotation mode.

Cause	Troubleshooting	Solution
The upper limit of the mechanical single-turn position exceeds 2^{31} in the absolute position rotation mode.	Check the setting of the mechanical gear ratio, the upper limit of mechanical single-turn position and the electronic gear ratio when the servo drive runs in the absolute rotation mode (H02.01 = 2).	Reset the mechanical gear ratio, the upper limit of mechanical single-turn position and the electronic gear ratio to ensure the upper limit of the mechanical single-turn position (reference range) does not exceed 2^{31} .

- E122.4: Different VDIs assigned with the same function

Description:

The same function is assigned to different VDIs. The VDI function No. exceeds the maximum number allowed for VDI functions.

Cause	Troubleshooting	Solution
1. The same function is assigned to different VDIs	Check whether parameters in groups H03 (H03.02, H03.04...H03.20) and H17 (H17.00, H17.02...H17.30) are assigned with the same non-zero DI function No.	Assign different DI function numbers to parameters in groups H03 or H17, and then restart the control circuit to activate the assignment, or switch off the S-ON signal and send a "RESET" signal to activate the assignment.
2. The VDI function No. exceeds the maximum number allowed for VDI functions.	Check whether the MCU program is updated.	Restore system parameters to default values (H02.31 = 1) and restart the servo drive.

- E122.5: DI and VDI assigned with the same function

Description:

The same function is assigned to different VDIs. The VDI function No. exceeds the maximum number allowed for VDI functions.

Cause	Troubleshooting	Solution
Two or more DIs and VDIs are assigned with the same function No.	Check whether DI function numbers set in groups H03 and H17 are repetitive.	Change any repetitive number.

- E122.8: small lower limit of the rotation mode

Description:

The lower limit of the mechanical single-turn position is less than 1.

Cause	Troubleshooting	Solution
The lower limit of the mechanical single-turn position (modal axis modulus) is less than 1.	Check the setting of the mechanical gear ratio, the upper limit of mechanical single-turn position and the electronic gear ratio when the servo drive runs in the absolute rotation mode (H0201 = 2 or 5).	Reset the mechanical gear ratio, the upper limit of mechanical single-turn position, and the electronic gear ratio to ensure the lower limit of the mechanical single-turn position (modulo axis modulus) is not below 1.

- E136.0: Encoder ROM motor parameter check error

Description:

When reading parameters in the encoder ROM, the servo drive detects that no parameters are saved there or parameter values are inconsistent with the setpoints.

Cause	Troubleshooting	Solution
1. The servo drive model does not match the motor model.	View the servo drive and servo motor nameplates to check whether the SV660F series servo drive and servo motor are used.	Replace the servo drive and motor.
2. A parameter check error occurs or no parameter is saved in the ROM of the serial incremental encoder.	1. Check whether the encoder cable provided by Inovance is used. For cable specifications, see "Matching Cables". The cable must be connected securely without scratching, breaking or poor contact. 2. Measure signals PS+, PS-, +5V and GND on both ends of the encoder cable and observe whether signals at both ends are consistent. For signal assignment, see Chapter "Wiring" in SV680P Series Servo Drive Hardware Guide.	1. Use the encoder cable provided by Inovance. Ensure motor terminals are connected securely and servo drive screws are tightened properly. Use a new encoder cable if necessary. 2. Route encoder cables and power cables (R/S/T, U/V/W) through different routes.
3. The servo drive is faulty.	The fault persists after the servo drive is restarted.	Replace the servo drive.

- E136.1: Encoder ROM motor parameter read error

Description:

- The encoder cable is not connected properly.
- A communication error occurs on the encoder due to interference.

Cause	Troubleshooting	Solution
1. The encoder cable connections are incorrect or loosened.	Check the encoder cable connection. Check whether ambient vibration is too large, which loosens the encoder cable and even damages the encoder.	1. Connect the encoder cables according to the correct wiring diagram. 2. Re-connect encoder cables and ensure encoder terminals are connected securely.
2. The servo drive is faulty.	The fault persists after the servo drive is restarted.	Replace the servo drive.

- E150.0: STO safety state applied

Description:

The STO input protection applies (safety state).

Cause	Troubleshooting	Solution
Two 24 V inputs are disconnected simultaneously, triggering the STO function.	1. Check whether the STO function is activated.	There is no need to take any corrective actions. After the STO terminal is back to normal, clear the fault using the fault reset function.
	2. Check whether the STO power supply is normal.	Check whether the 24 V power supply for the STO is stable. Tighten the cables that are loose or disconnected.
	3. The fault persists after preceding causes are rectified.	Replace the servo drive.

- E150.1: STO input state abnormal

Description:

The single-channel input of STO is ineffective.

Cause	Troubleshooting	Solution
1. STO input power supply is abnormal.	Check whether the STO power supply is normal.	Check whether the 24 V power supply for the STO is stable. Tighten the cables that are loose or disconnected.
2. STO input resistor is abnormal.	After STO is triggered, only one STO signal is sent to MCU after the 24 V power supply is cut off due to input resistor drift.	Replace the servo drive.
3. STO is ineffective	The fault persists after preceding causes are rectified.	Replace the servo drive.

- E150.2: Buffer 5 V voltage detection error

Description:

The MCU monitors the 5 V power supply of the PWM Buffer to detect whether overvoltage or undervoltage occurs. If the voltage is abnormal, E150.2 occurs.

Cause	Troubleshooting	Solution
The 5 V voltage supplied to the STO Buffer is abnormal due to undervoltage or overvoltage.	Check whether the fault can be removed by a restart. If not, the 5V voltage supplied to the Buffer is abnormal.	Replace the servo drive.

- E150.3: STO input circuit hardware diagnosis failure

Description:

Short circuit occurs on the optocoupler of the upstream hardware circuit of STO.

Cause	Troubleshooting	Solution
Short circuit occurs on the upstream optocoupler of STO1 or STO2.	The fault persists and the keypad displays E150.3 after restart.	Replace the servo drive.

- E150.4: PWM buffer hardware detection failure

Description:

An error occurs on the PWM Buffer integrated circuit during initialization detection upon power-on (the PWM signal cannot be blocked).

Cause	Troubleshooting	Solution
STO Buffer power-on test error	The fault persists and the keypad displays E150.4 after restart.	Replace the servo drive.

- E201.0: Phase-P overcurrent

Description:

An excessively high current flows through the positive pole of the DC-AC circuit.

Cause	Troubleshooting	Solution
1. Gains are set improperly, leading to motor oscillation.	Check whether vibration or sharp noise occurs during start and operation of the motor, or view "Current feedback" in the software tool.	1. Motor parameters are set improperly, modify motor parameter values. 2. Current loop parameters are set improperly, modify current loop parameter values. 3. Speed loop parameters are set improperly, leading to motor oscillation. 4. Servo drive operates improperly. Replace it.
2. The encoder cable is aged or corroded, or connected incorrectly or loosely.	Check whether the encoder cable provided by Inovance is used. Check whether the cable is aging, corroded, or connected loosely. Switch off the S-ON signal and rotate the motor shaft manually. Check whether the value of H0b.17h (Electrical angle) changes as motor shaft rotates.	Re-solder, tighten or replace the encoder cable.

Cause	Troubleshooting	Solution
3. The servo drive is faulty.	1. Switch off the S-ON signal and rotate the motor shaft manually. Check whether the value of H0b.17 (Electrical angle) changes as motor shaft rotates. 2. Disconnect the motor cable and power on the servo drive again, but the fault persists. 3. Check whether resistance of the external regenerative resistor is too small or the regenerative resistor is short-circuited (between terminals P⊕ and C).	1. Replace with a regenerative resistor with matching resistance and perform wiring again. 2. Replace the servo drive.
4. Overcurrent occurs on the regenerative resistor.	Check whether resistance of the external regenerative resistor is too small or the regenerative resistor is short-circuited (between terminals P, C).	Use a regenerative resistor of matching resistance. Perform wiring again.

- E201.1: Phase-U overcurrent
Description:

A current higher than the threshold is collected in the phase-U current.

Cause	Troubleshooting	Solution
1. Motor cables are in poor contact. 2. Motor cables are grounded. 3. U/V/W cables of the motor are short-circuited.	1. Check whether the servo drive power cables and motor cables on the U, V, and W sides of the servo drive are loose. 2. After confirming the servo drive power cables and motor cables are connected properly, measure whether the insulation resistance between the servo drive U/V/W side and the PE cable is at MΩ level.	1. Tighten the cables that are loose or disconnected. 2. Replace the motor in case of poor insulation.
4. The motor is damaged.	1. Disconnect the motor cables and check whether short circuit occurs among U, V, and W phases and whether burrs exist in the wiring. 2. Disconnect the motor cables and measure whether the resistance among U, V, and W phases of motor cables is balanced.	1. Connect the motor cables correctly. 2. Replace the motor if the resistance is unbalanced.

- E201.2: Phase-V overcurrent

Description:

A current higher than the threshold is collected in the phase-V current.

Cause	Troubleshooting	Solution
1. Motor cables are in poor contact. 2. Motor cables are grounded. 3. U/V/W cables of the motor are short-circuited.	1. Check whether the servo drive power cables and motor cables on the U, V, and W sides of the servo drive are loose. 2. After confirming the servo drive power cables and motor cables are connected properly, measure whether the insulation resistance between the servo drive U/V/W side and the PE cable is at MΩ level.	1. Tighten the cables that are loose or disconnected. 2. Replace the motor in case of poor insulation.
4. The motor is damaged.	1. Disconnect the motor cables and check whether short circuit occurs among U, V, and W phases and whether burrs exist in the wiring. 2. Disconnect the motor cables and measure whether the resistance among U, V, and W phases of motor cables is balanced.	1. Connect the motor cables correctly. 2. Replace the motor if the resistance is unbalanced.

- E201.4: Phase-N overcurrent

Description:

An excessively high current flows through the negative pole of the DC-AC circuit.

Cause	Troubleshooting	Solution
1. Gains are set improperly, leading to motor oscillation.	Check whether vibration or sharp noise occurs during start and operation of the motor, or view "Current feedback" in the software tool.	Adjust the gains.
2. The encoder cable is aged or corroded, or connected incorrectly or loosely.	Check whether the encoder cable provided by Inovance is used and whether the cable is aging, corroded, or connected loosely.	Re-solder, tighten or replace the encoder cable.

Cause	Troubleshooting	Solution
3. Overcurrent occurs on the regenerative resistor.	Check whether resistance of the external regenerative resistor is too small or the regenerative resistor is short-circuited (between terminals P⊕ and C).	Replace with a regenerative resistor of matching resistance. Perform wiring again.
4. Overcurrent is caused by the superposition of the braking current and phase current.	Check if the drive accelerates abruptly during braking. Check if the voltage feedback exceeds the release threshold through the Inovance drive commissioning platform, and if the torque command increases abruptly.	Increase the acceleration/ deceleration time.
5. The servo drive is faulty.	Switch off the S-ON signal and rotate the motor shaft manually. Check whether the value of H0b.17 (Electrical angle) changes as motor shaft rotates. Disconnect the motor cable but the fault persists after the servo drive is powered off and on again.	Replace the servo drive.

- E201.4: Phase-N overcurrent

Description:

An excessively high current flows through the negative pole of the DC-AC circuit.

Cause	Troubleshooting	Solution
1. Gains are set improperly, leading to motor oscillation.	Check whether vibration or sharp noise occurs during start and operation of the motor, or view "Current feedback" in the software tool.	Adjust the gains.
2. The encoder cable is aged or corroded, or connected incorrectly or loosely.	Check whether the encoder cable provided by Inovance is used and whether the cable is aging, corroded, or connected loosely.	Re-solder, tighten or replace the encoder cable.

Cause	Troubleshooting	Solution
3. Overcurrent occurs on the regenerative resistor.	Check whether resistance of the external regenerative resistor is too small or the regenerative resistor is short-circuited (between terminals P⊕ and C).	Replace with a regenerative resistor of matching resistance. Perform wiring again.
4. The servo drive is faulty.	Switch off the S-ON signal and rotate the motor shaft manually. Check whether the value of H0b.17 (Electrical angle) changes as motor shaft rotates. Disconnect the motor cable but the fault persists after the servo drive is powered off and on again.	Replace the servo drive.

- E208.2: Encoder communication timeout

Description:

The FPGA detected a communication timeout with the encoder.

Cause	Troubleshooting	Solution
The servo drive fails to receive the data fed back by the encoder in three consecutive cycles.	● Check bit12 of H0b.30. ● The encoder cable is connected improperly. ● The encoder cable is connected loosely. ● The encoder cable is too long. ● The encoder communication is interfered with. ● The encoder is faulty.	1. Check whether the motor model is correct. 2. Check the condition of the encoder cable. 3. Check whether the encoder version (H00.04) is set properly. 4. The servo drive operates improperly. Replace it.

- E208.4: FPGA current loop operation timeout

Description:

The operating time of the current loop exceeds the interval threshold.

Cause	Troubleshooting	Solution
FPGA operation timeout	Internal fault code H0b.45 = 4208: Current loop operation timeout	Disable some unnecessary functions to reduce the operating load of the current loop.

- E210.0: Output short-circuited to ground

Description:

An abnormal motor phase current or bus voltage is detected during power-on self-testing.

- The DC bus voltage exceeds the discharge threshold.
- The phase U current of size C/D/E models is greater than 1/4 of H01.16.
- Overcurrent occurs on phase-P and phase-N of servo drives in SIZE A and B.

Cause	Troubleshooting	Solution
1. The servo drive power cables (U/V/W) are short-circuited to ground.	Disconnect the motor cables and measure whether the servo drive power cables (U/V/W) are short-circuited to ground (PE).	Connect the cables again or replace the servo drive power cables.
2. The motor is short-circuited to ground.	After confirming the servo drive power cables and motor cables are connected properly, measure whether the insulation resistance between the servo drive U/V/W side and the PE cable is at MΩ level.	Replace the motor.
3. The servo drive is faulty.	Disconnect the power cables from the servo drive, but the fault persists after the servo drive is powered off and on repeatedly.	Replace the servo drive.
4. The motor speed is too high during phase-to-ground detection.	Check whether the motor is in the generating status during power-on.	Reduce the motor speed.

● E234.0: Runaway

Description:

- The torque reference direction is in reverse to the speed feedback direction in the torque control mode.
- The speed feedback direction is in reverse to the speed reference direction in the position or speed control mode.

Cause	Troubleshooting	Solution
1. The phase sequence of the U, V, and W cables is incorrect.	Check whether the servo drive power cables are connected in the correct sequence at both ends.	Connect the U, V, and W cables according to correct phase sequence.
The interference signal causes an error in the initial phase detection of the motor rotor upon power-on.	The U/V/W phase sequence is correct, but E234.0 occurs when the servo drive is enabled.	Power off and on the servo drive again.

Cause	Troubleshooting	Solution
3. The encoder model is wrong or the encoder is wired improperly.	View the servo drive and servo motor nameplates to check whether the devices used are Inovance SV660F series servo drive and 23-bit servo motor.	Replace with a mutually-matching servo drive and servo motor. For use of SV660F series servo drive and 23-bit servo motor, set H00.00 to 14101. Check the motor model, encoder type, and encoder cable connection again.
4. The encoder cable is aged or corroded, or connected incorrectly or loosely.	1. Check whether the encoder cable provided by Inovance is used and whether the cable is aging, corroded, or connected loosely. 2. Switch off the S-ON signal and rotate the motor shaft manually. Check whether the value of H0b.10 (Electrical angle) changes as motor shaft rotates.	Re-solder, tighten or replace the encoder cable.
5. The gravity load in vertical axis applications is too large.	Check whether the load of the vertical shaft is too large. Adjust brake parameters H02.09...H02.12 and check whether the fault is cleared.	Reduce the load of the vertical axis, increase the stiffness level, or hide this fault without affecting the safety performance and normal use.
6. Improper parameter settings lead to excessive vibration.	The stiffness level is set to an excessively high value, leading to excessive vibration.	Set a proper stiffness level to avoid excessive vibration.

- E320.0: Regenerative resistor overload

Description:

The regenerative resistor is overloaded.

Cause	Troubleshooting	Solution
The accumulative heat of the regenerative resistor exceeds the maximum thermal capacity of the regenerative resistor.	Check whether the value of H0b.67 exceeds 100%.	1. Check if large discharge current is present due to high bus voltage. 2. Ensure that the motor cannot be driven reversely. 3. Replace the servo drive.



Caution

In applications where the motor drives a vertical axis or is driven by the load, set H0A.12 to 0 to hide the runaway fault.

- E400.0: Main circuit overvoltage

Description:

The DC bus voltage between P $\oplus$ and N $\ominus$ exceeds the overvoltage threshold.

220 V servo drive: Normal value: 310 V Overvoltage threshold: 420 V

380 V servo drive: Normal value: 540 V Undervoltage threshold: 760 V

Cause	Troubleshooting	Solution
1. The voltage input to the main circuit is too high.	Check the power input specifications of the servo drive and measure whether the voltage input to main circuit cables (R/S/T) on the drive side is within the following range: 220 V servo drive: Effective value: 220 V to 240 V Allowable deviation: -10% to +10% (198 V to 264 V) 380 V servo drive: Value range: 380 V to 440 V Allowable deviation: -10% to +10% (342 V to 484 V)	Replace or adjust the power supply according to the specified range.
The power supply is unstable or affected by lightning.	Check whether the power supply is unstable, affected by lightning, or complies with the preceding range.	Connect a surge protection device (SPD) and switch on the power supplies of the control circuit and the main circuit. If the fault persists, replace the servo drive.

Cause	Troubleshooting	Solution
3. The regenerative resistor fails.	If the built-in regenerative resistor is used (H02.25 = 0), check whether terminals P ⊕ and D are jumpered. If yes, measure the resistance between terminals C and D. If an external regenerative resistor is used (H02.25 = 1 or 2), measure the resistance of the external regenerative resistor connected between terminals P ⊕ and C. For details, See table "Specifications of the regenerative resistor" in SV660F Series Servo Drive Commissioning Guide.	1. If the resistance is "∞" (infinite), the regenerative resistor is disconnected internally. 2. If a built-in regenerative resistor is used, change to use an external regenerative resistor (H02.25 = 1 or 2) and remove the jumper between terminals P ⊕ and D. Select an external regenerative resistor of the same resistance and equal or higher power than the built-in one. 3. If an external regenerative resistor is used, replace with a new one and connect it between P ⊕ and C. 4. Set H02.26 (Power of external regenerative resistor) and H02.27 (Resistance of external regenerative resistor) to values consistent with the specifications of the external regenerative resistor used.

Cause	Troubleshooting	Solution
4. The resistance of the external regenerative resistor is too large, resulting in insufficient energy absorption during braking.	Measure the resistance of the external regenerative resistor connected between terminals P $\oplus$ and C, and compare the measured value with the recommended value.	1. Replace with a new external regenerative resistor that carries the recommended resistance, and connect it between P$\oplus$ and C. 2. Set H02.26 (Power of external regenerative resistor) and H02.27 (Resistance of external regenerative resistor) to values consistent with the specifications of the external regenerative resistor used.
5. The motor is in abrupt acceleration/deceleration status and the maximum braking energy exceeds the energy absorption value.	Confirm the acceleration/deceleration time during operation and measure whether the DC bus voltage between P $\oplus$ and N $\ominus$ exceeds the overvoltage threshold during deceleration.	After confirming the input voltage of the main circuit is within the specified range, increase the acceleration/deceleration time if the operating conditions allow.
6. The bus voltage sampling value deviates greatly from the measured value.	Check whether H0b.26 (Bus voltage) is within the following range: 220 V servo drive: H0b.26 > 420 V 380 V servo drive: H0b.26 > 760 V Measure whether the DC bus voltage detected between terminals P$\oplus$ and N$\ominus$ is lower than the value of H0b.26.	Contact Inovance for technical support.
7. The servo drive is faulty.	The fault persists after the main circuit is powered off and on repeatedly.	Replace the servo drive.

- E410.0: Main circuit undervoltage

Description:

The DC bus voltage between P $\oplus$ and N $\ominus$ is lower than the undervoltage threshold.

220 V servo drive: Normal value: 310 V Undervoltage threshold: 200 V (180 V for S5R5 models)

380 V servo drive: Normal value: 540 V Undervoltage threshold: 380 V.

Cause	Troubleshooting	Solution
The power supply of the main circuit is unstable or power failure occurs.	Check the power input specifications of the servo drive and measure whether the input voltage at the power supply side of the main circuit cables and R/S/T on the drive side is within the following range: 220 V servo drive: Value range: 220 V to 240 V Allowable deviation: -10% to +10% (198 V to 264 V) Measure the voltages of all the three phases.	Increase the capacity of the power supply.
Instantaneous power failure occurs.		
The power voltage drops during running.	Monitor the power supply voltage and check whether the main circuit power supply is applied to other devices, resulting in insufficient power capacity and voltage drop.	
4. A three-phase servo drive is connected to a single-phase power supply, leading to phase loss.	Check whether the main circuit is wired correctly and whether phase loss detection (H0A.00) is hidden.	Replace the cables and wire the power cables correctly Three-phase: R, S, T
5. The servo drive is faulty.	Check whether H0b.26 (Bus voltage) is within the following range: 220 V servo drive: H0b.26 < 200 V 380 V servo drive: H0b.26 < 380 V The fault persists after the main circuit is powered off and on repeatedly.	Replace the servo drive.

- E410.0: Main circuit undervoltage

Description:

The DC bus voltage between P $\oplus$ and N $\ominus$ is lower than the undervoltage threshold.

220 V servo drive: Normal value: 310 V Undervoltage threshold: 200 V (180 V for S5R5 models)

380 V servo drive: Normal value: 540 V Undervoltage threshold: 380 V.

Cause	Troubleshooting	Solution
The power supply of the main circuit is unstable or power failure occurs.	Check the power input specifications of the servo drive and measure whether the input voltage at the power supply side of the main circuit cables and R/S/T on the drive side is within the following range: 220 V servo drive: Value range: 220 V to 240 V Allowable deviation: -10% to +10% (198 V to 264 V) Measure the voltages of all the three phases.	Increase the capacity of the power supply.
Instantaneous power failure occurs.		
The power voltage drops during running.		
4. A three-phase servo drive is connected to a single-phase power supply, leading to phase loss.	Check whether the main circuit is wired correctly and whether phase loss detection (H0A.00) is hidden.	Replace the cables and wire the power cables correctly Three-phase: R, S, T
5. The servo drive is faulty.	Check whether H0b.26 (Bus voltage) is within the following range: 220 V servo drive: H0b.26 < 200 V 380 V servo drive: H0b.26 < 380 V The fault persists after the main circuit is powered off and on repeatedly.	Replace the servo drive.

- E410.1: Main circuit de-energized

Description:

Phase loss occurs on the three-phase servo drive.

Cause	Troubleshooting	Solution
The power supply is disconnected during operation.	Check the power input specifications of the servo drive and measure whether the input voltage at the power supply side of the main circuit cables and R/S/T on the drive side is within the following range: 220 V servo drive: Value range: 220 V to 240 V Allowable deviation: -10% to +10% 380 V servo drive: Effective value: 380 to 440 V Allowable deviation: -10% to +10% Measure the voltages of all the three phases.	Increase the capacity of the power supply.
	Monitor the power supply voltage and check whether the main circuit power supply is applied to other devices, resulting in insufficient power capacity and voltage drop.	
	Check whether 200B.1Bh (Bus voltage) is within the following range: 220 V servo drive: $H0b.27h < 200$ V. 380 V servo drive: $H0b.27h < 380$ V. The fault persists after the main circuit is powered off and on repeatedly.	Replace the servo drive.
	Check the wiring of the main circuit.	Replace the cables and wire the power cables correctly Three-phase: R, S, T/L1, L2, L3

- E420.0: Main circuit phase loss
Description:
Drive three-phase input phase abnormal.

Cause	Troubleshooting	Solution
1. The three-phase input cables are connected improperly.	Check whether RST cables on the drive side and non-drive side are in good condition and connected properly.	Replace the cables and connect the main circuit cables properly.
2. A single-phase power supply is used for a three-phase servo drive.	Check the specifications of the power supply and measure whether the voltage input to the main circuit is within the following range: 220 V servo drive: Value range: 220 V to 240 V Allowable deviation: -10% to +10% (198 V to 264 V) 380 V servo drive: Effective value: 380 to 440 V Allowable deviation: -10% to +10% (342 V to 484 V) Measure the voltages of all the three phases.	Servo drives of 0.75 kW (H01.10 = 5) can be supplied by single-phase power supplies. If the input voltage complies with the specifications, set H0A.00 (Power input phase loss protection) to 2 (Inhibit phase loss faults and warnings). If input voltage is outside the specified range, replace or adjust the power supply.
3. The three-phase power supply is unbalanced or the voltages of the three phases are too low.		

- E430.0: Control circuit power supply undervoltage

Description:

The drive control power voltage is below the undervoltage threshold.

Cause	Troubleshooting	Solution
1. The control power supply of servo drives in size C/D/E are unstable or fails.	Check the specifications of the power supply and measure whether the voltage input to the main circuit is within the following range: 220 V servo drive: Value range: 220 V to 240 V Allowable deviation: -10% to +10% (198 V to 264 V) 380 V servo drive: Effective value: 380 to 440 V Allowable deviation: -10% to +10% (342 V to 484 V) Measure the voltages of all the three phases.	Increase the capacity of the power supply.
2. The control power supply of servo drives in size C/D/E are in poor contact.	Check whether control circuit cables are connected properly and whether the voltage of control circuit cables (L1C, L2C) is within the specified range.	Re-connect or replace the cables.

- E500.0: motor overspeed

Description:

The actual speed of the motor exceeds the overspeed threshold.

Cause	Troubleshooting	Solution
1. The phase sequence of motor cables is wrong.	Check whether the servo drive power cables are connected in the correct sequence at both ends.	Connect the U, V, and W cables according to correct phase sequence.
2. H0A.08 is set improperly.	Check whether the overspeed threshold is lower than the maximum speed. Overspeed threshold = $1.2 \times$ Maximum motor speed (H0A.08 = 0). Overspeed threshold = H0A.08 (when H0A.08 $\neq$ 0, and H0A.08 $< 1.2 \times$ maximum motor speed).	Re-set the overspeed threshold according to the mechanical requirements.

Cause	Troubleshooting	Solution
The input reference exceeds the overspeed threshold.	Check whether the motor speed corresponding to the input reference exceeds the overspeed threshold. - Position control mode: In CSP mode, check the gear ratio 6091.01h/6091.02h to determine the position reference increment for an individual synchronization period and convert it to the speed information. In PP mode, check the gear ratio 6091.01h/6091.02h and determine the 6081h (Profile velocity). In HM mode, check the gear ratio 6091.01h/6091.02h, and determine 6099.01h and 6099.02h. - Speed control mode: Check the gear ratio (6091h), target velocity (60FFh), speed limits (H06.06 to H06.09), and the maximum profile velocity (607Fh). - Torque control mode: View the speed limit defined by H07.17 and check the corresponding speed limit.	- Position control mode: CSP: Decrease the position reference increment per synchronization period. The host controller should cover the position ramp when generating references. PP: Decrease the value 6081h or increase the acceleration/ deceleration ramp (6083h, 6084h). HM: Decrease 6099.01h and 6099.02h or increase the acceleration/ deceleration ramp (609Ah). Decrease the gear ratio according to actual conditions. - Speed mode: Decrease the target velocity, speed limit, and gear ratio. In PV mode, increase the speed ramp (6083h and 6084h). In CSV mode, the host controller should cover the speed ramp. - Torque control mode: Set the speed limit to a value lower than the overspeed threshold.
The motor speed overshoots.	Check whether the speed feedback exceeds the overspeed threshold by using Inovance servo commissioning software.	Adjust the gain or mechanical running conditions.
5. The servo drive is faulty.	The fault persists after the servo drive is powered off and on again.	Replace the servo drive.

- E500.1: Speed feedback overflow

Description:

The FPGA speed measurement overflows.

Cause	Troubleshooting	Solution
1. FPGA internal speed overflows.	Check whether the servo drive power cables are connected in the correct sequence at both ends.	Connect the U, V, and W cables according to correct phase sequence.
2. The motor speed overshoots.	Check in the software tool whether the speed feedback exceeds the overspeed threshold.	Adjust the gain or mechanical running conditions.

- E500.2: FPGA position feedback pulse overspeed

Description:

The MCU has detected that the position feedback increment from the FPGA is too large.

Cause	Troubleshooting	Solution
Communication error occurred between boards of the drive.	The alarm persists in spite of repeated power off and on.	Replace the servo drive.

- E550.0: initial operation block number not exist

Description:

The initial operation block number does not exist.

Cause	Troubleshooting	Solution
The block number designated by PLC through POS_STW1.0-5 is outside the range of 0 to 15 or is within this range but the attribute is set to "Invisible".	Check the block number selected and the attribute of this block number.	Rectify the operation block number of the initial segment or change the attribute to "Visible".

- E550.1: relative/absolute attribute of positioning or fixed stopper commands set improperly

Description:

Relative/Absolute attribute of positioning or fixed stopper commands are set improperly.

Cause	Troubleshooting	Solution
The relative/absolute attribute of the positioning or fixed stopper commands are set improperly.	Check whether bit8–bit11 of the task mode (H28.16–H28.31) of current operation block is 0 or 1.	Set bit4–bit7 of the corresponding task mode of the positioning or fixed stopper to 0 to 1 (absolute or relative).

- E550.3: Task switch condition is set improperly.

Description:

Task switch condition is set improperly.

Cause	Troubleshooting	Solution
Task switch condition is set improperly.	Check whether bit4–bit7 of the task mode (H28.16–H28.31) of current operation block is 0–5.	Set task mode bit8-11 properly.

- E550.8: fixed stopper point not found

Description:

The fixed stopper is not found within the range of the displacement reference.

Cause	Troubleshooting	Solution
The fixed stopper is not found within the range of the displacement reference.	Check whether the stopper is within the range of the operation reference.	Set the displacement reference (H27.17–H27.47) properly.

- E550.9: fixed stopper beyond the window

Description:

The position feedback fluctuation exceeds the monitoring window after the fixed stopper is found.

Cause	Troubleshooting	Solution
The position feedback fluctuation exceeds the monitoring window (H28.64) after the fixed stopper is found.	Check whether H28.64 is set properly.	Set a proper monitoring window value.

- E551.1: program block stop exception

Description:

The switchover condition for the last block is not "stop".

Cause	Troubleshooting	Solution
The switchover condition for the last block is not "stop".	Check whether bit4–7 of the task mode (H28.16–28.31) of the last block in operation is 0.	Setting switchover condition for the last block to "stop".

- E551.3: jump block not exist

Description:

The block number designated by the jump task does not exist.

Cause	Troubleshooting	Solution
The block number designated by the jump task does not exist.	Check whether the setting range of corresponding task parameters (H28.32–H28.62) of the jump block is 0–15.	Set task parameters for the jump block properly.

- E551.4: Continuous position reference not supported in relative positioning
Description:

Continuous position reference not supported in relative positioning

Cause	Troubleshooting	Solution
Continuous position reference enabled in relative positioning of telegram 111.	Check whether ConfigEPos_x8 (bit 12 of POS_STW1) = 1.	Set bit12 of POS_STW1 to 0.

- E602.0: Angle auto-tuning failure
Description:

Unusual jitter occurs on the encoder feedback during angle auto-tuning.

Cause	Troubleshooting	Solution
The data fed back by the encoder is abnormal.	Check if the encoder communication is being disturbed.	Check the wiring of the encoder.

- E602.2: U/V/W phase sequence reversed
Description:

A wrong U/V/W phase sequence is detected during angle auto-tuning.

Cause	Troubleshooting	Solution
Incorrect UVW wiring is detected during angle auto-tuning.	Check whether U/V/W phases are wired correctly.	Exchange cables of any two phases among U/V/W and perform auto-tuning again.

- E605.0: Motor speed too high upon S-ON
Description:

The motor speed exceeds the rated speed when the servo drive in size A/B is switched on.

Cause	Troubleshooting	Solution
The motor speed exceeds the rated speed when the servo drive is switched on.	Check if the drive is enabled when the motor has been driven.	Switch on the drive when the motor is standstill.

- E620.0: Motor overload
Description:

The accumulative heat of the motor reaches the fault threshold.

Cause	Troubleshooting	Solution
1. The motor and encoder cables are connected incorrectly or in poor contact.	Check the wiring between the servo drive, servo motor and the encoder according to the correct "wiring diagram".	Connect the cables according to the wiring diagram. It is recommended to use the cables provided by Inovance. When customized cables are used, prepare and connect the customized cables according to the wiring instructions.
2. The load is so heavy that the effective torque outputted by the motor keeps exceeding the rated torque.	Check the overload characteristics of the servo drive or servo motor. Check whether the average load rate (H0b.12) of the servo drive keeps exceeding 100.0%.	Use a servo drive of higher capacity and a matching servo motor, or reduce the load and increase the acceleration/deceleration time.
3. Acceleration/deceleration is too frequent or the load inertia is too large.	Calculate the mechanical inertia ratio or perform inertia auto-tuning. Check the value of H08.00 (Load inertia ratio). Confirm the individual operation cycle when the servo motor operates cyclically.	Increase the acceleration/deceleration time during single-cycle running.
4. The gain adjustment is improper or the stiffness is too high.	Check whether the motor vibrates and generates unusual noise during operation.	Readjust the gain.
5. The servo drive model or motor model is set improperly.	Check the motor model (H00.00) and drive model (H01.10) stored in the bus encoder.	Check the servo drive nameplate and set the servo drive model (H01.10) and motor model properly according to section "Servo Drive Model and Nameplate" in SV660F Series Servo Drive Hardware Guide.

Cause	Troubleshooting	Solution
6. The motor is stalled due to mechanical factors, resulting in overload during operation.	Check the reference and motor speed (H0b.00) through the software tool or keypad. - References in the position control mode: H0b.13 (Input position reference counter) - References in the speed control mode: H0b.01 (Speed reference) - References in the torque control mode: H0b.02 (Internal torque reference) Check whether the reference value is not 0 but the motor speed is 0 rpm in the corresponding mode.	Rectify the mechanical-related problem.
7. The servo drive is faulty.	The fault persists after the servo drive is powered off and on again.	Replace the servo drive.

Note

When E620.0 occurs, stop the servo drive for at least 30s before further operations.

- E625.0: Brake abnormality enabled

Description:

Brake abnormality is enabled.

Cause	Troubleshooting	Solution
The brake fails when it is released.	Check if the motor shaft end is held by the brake when the brake release signal is active.	1. Check the brake wiring. 2. Replace the Brake motor.

- E626.0: brake abnormality disabled

Description:

Brake abnormality is disabled.

Cause	Troubleshooting	Solution
The brake fails when it closes.	Check if the motor shaft end is not held tightly by the brake when the braking signal is active.	1. Check the brake wiring. 2. Replace the Brake motor.

- E630.0: motor rotor locked over-temperature

Description:

The actual motor speed is lower than 10rpm but the torque reference reaches the limit, and such status lasts for the time defined by H0A.32.

Cause	Troubleshooting	Solution
1. U/V/W output phase loss, wire breakage or incorrect phase sequence occurs on the servo drive.	Perform motor trial run without load and check cable connections and the phase sequence.	Re-connect the cables according to the wiring diagram or replace the cables.
2. The motor parameters (especially the number of pole pairs) are set improperly and motor angle auto-tuning is not performed.	View parameters in group H00 to check whether the number of pole pairs are set properly. Perform angle auto-tuning on the motor several times and check whether the value of H00.28 is consistent during angle auto-tuning.	Modify the motor parameter values.
3. The communication commands are being disturbed.	Check whether jitter occurs on the commands sent from the host controller and whether EtherCAT communication is being disturbed.	Check whether the communication line between the host controller and the servo drive is being disturbed.
4. The motor is stalled due to mechanical factors.	Check the reference and motor speed (H0b.00) through the software tool or keypad. ● References in the position control mode: H0b.13 (Input position reference counter) ● References in the speed control mode: H0b.01 (Speed reference) ● References in the torque control mode: H0b.02 (Internal torque reference) Check whether the reference value is not 0 but the motor speed is 0 rpm in the corresponding mode. Check the current feedback (torque reference) waveform.	Check whether any mechanical part gets stuck or eccentric.

Note

When E620.0 occurs, stop the servo drive for at least 30s before further operations.

- E640.0: IGBT over-temperature

Description:

The IGBT temperature reaches the fault threshold defined by H0A.18.

Cause	Troubleshooting	Solution
1. The ambient temperature is too high. 2. The servo drive is restarted repeatedly to reset the overload fault.	Measure the ambient temperature and view the fault records (set H0b.33 and view H0b.34) to check whether an overload fault/warning is reported (E620.0, E630.0, E650.0, E909.0, E920.0, E922.0).	● Improve the cooling conditions of the servo drive to lower down the ambient temperature. ● Change the fault reset method. After overload occurs, wait for 30s before reset. Increase the capacities of the servo drive and servo motor. Increase the acceleration/ deceleration time and reduce the load.
3. The fan is damaged.	Check whether the fan works properly during operation.	Replace the servo drive.
4. The servo drive is installed in a wrong direction and the clearance between servo drives is improper.	Check whether the servo drive is installed properly.	Install the servo drive according to the installation requirements.
5. The servo drive is faulty.	The fault persists even though the servo drive is restarted five minutes after power-off.	Replace the servo drive.

Note

When E620.0 occurs, stop the servo drive for at least 30s before further operations.

- E640.1: Flywheel diode overtemperature

Description:

The temperature of the flywheel diode reaches the fault threshold defined by H0A.18.

Cause	Troubleshooting	Solution
1. The ambient temperature is too high. 2. The servo drive is restarted repeatedly to reset the overload fault.	Measure the ambient temperature and view the fault records (set H0b.33 and view H0b.34) to check whether an overload fault/warning is reported (E620.0, E630.0, E650.0, E909.0, E920.0, E922.0).	• Improve the cooling conditions of the servo drive to lower down the ambient temperature. • Change the fault reset method. After overload occurs, wait for 30s before reset. Increase the capacities of the servo drive and servo motor. Increase the acceleration/deceleration time and reduce the load.
3. The fan is damaged.	Check whether the fan works properly during operation.	Replace the servo drive.
4. The servo drive is installed in a wrong direction and the clearance between servo drives is improper.	Check whether the servo drive is installed properly.	Install the servo drive according to the installation requirements.
5. The servo drive is faulty.	The fault persists even though the servo drive is restarted five minutes after power-off.	Replace the servo drive.

Note

When E620.0 occurs, stop the servo drive for at least 30s before further operations.

- E650.0: Heatsink overtemperature

Description:

The temperature of the servo drive power module is higher than the overtemperature threshold.

Cause	Troubleshooting	Solution
1. The ambient temperature is too high.	Measure the ambient temperature.	Improve the cooling conditions of the servo drive to lower down the ambient temperature.
2. The servo drive is restarted repeatedly to reset the overload fault.	View the fault log (set H0b.33 and view H0b.34). Check whether an overload fault or warning (E620.0, E630.0, E650.5, E909.0, E920.0, E922.0) occurs.	Change the fault reset method. After overload occurs, wait for 30s before reset. Increase the capacities of the servo drive and servo motor. Increase the acceleration/ deceleration time and reduce the load.
3. The fan is damaged.	Check whether the fan works properly during operation.	Replace the servo drive.
4. The servo drive is installed in a wrong direction and the clearance between servo drives is improper.	Check whether the servo drive is installed properly.	Install the servo drive according to the installation requirements.
5. The servo drive is faulty.	The fault persists even though the servo drive is restarted five minutes after power-off.	Replace the servo drive.

Note

When E620.0 occurs, stop the servo drive for at least 30s before further operations.

- E660.0: Motor overtemperature

Description:

The temperature of the air-cooled motor is too high.

Cause	Troubleshooting	Solution
The temperature of the air-cooled motor is too high.	Measure whether the temperature of the air-cooled motor is too high.	Cool the motor down.

- E661.0: STune failure

Description:

During STune operation, the gain drops to the lower limit.

- Position loop gain < 5.
- Speed loop gain < 5.
- Model loop gain < 10.

Cause	Troubleshooting	Solution
During STune operation, the gain drops to the lower limit. Position loop gain < 5 Speed loop gain < 5 Model loop gain < 10	Check if vibration resonance is properly suppressed in the system. The torque vibration amplitude exceeds the setpoint of H09.11.	1. Set the notch manually. 2. Modify the electronic gear ratio to improve the command resolution, increase the command filter time constant in the parameter configuration interface. 3. Check whether the machine suffers from periodic fluctuation. 4. Set H09.58 to 1 to clear resonance suppression parameters, and perform STune again.

- E662.0: ETune failure

Description:

Check whether resonance that occurred during ETune operation cannot be suppressed.

Cause	Troubleshooting	Solution
Check whether resonance that occurred during ETune operation cannot be suppressed.	Check whether there is abnormal noise or torque fluctuation during operation.	1. Set the notch manually when vibration cannot be suppressed automatically. 2. Modify the electronic gear ratio to improve the command resolution, increase the command filter time constant or in the parameter configuration interface. 3. Increase the value of H09.11 as appropriate. 4. Check whether the machine suffers from periodic fluctuation. 5. Check whether the positioning threshold is too low. Increase the reference acceleration/ deceleration time.

- E663.0: ITune failure

Description:

Check whether resonance that occurred during ITune operation cannot be suppressed.

Cause	Troubleshooting	Solution
Check whether resonance that occurred during ITune operation cannot be suppressed.	Check whether there is abnormal noise or torque fluctuation during operation.	1. Set the notch manually when vibration cannot be suppressed automatically. 2. Modify the electronic gear ratio to improve the command resolution, increase the command filter time constant in the parameter configuration interface. 3. Check whether the machine suffers from periodic fluctuation. 4. Increase the value of H09.11 as appropriate.

- E664.0: Resonance too strong

Description:

Resonance occurs on the servo system and the torque fluctuation amplitude is higher than the value of H09.54.

Cause	Troubleshooting	Solution
Resonance occurs on the servo system and the torque fluctuation amplitude is higher than the value of H09.54.	Check whether there is abnormal noise or torque fluctuation during operation.	1. Check whether the inertia ratio or loop gain parameters are set properly. 2. Check whether resonance parameters are set properly. 3. Increase the value of H09.54 or set H09.54 to 0 to disable this function.

- E731.0: Encoder battery failure

Description:

The voltage of the absolute encoder battery is lower than 2.9 V.

Cause	Troubleshooting	Solution
1. The battery is not connected during power-off.	Check whether the battery is connected during power-off.	Set H0d.20 to 1 to clear the fault.
2. The encoder battery voltage is too low.	Measure the battery voltage.	Use a new battery with the matching voltage.

- E733.0: Encoder multi-turn counting error

Description:

An encoder multi-turn counting error occurs.

Cause	Troubleshooting	Solution
The encoder is faulty.	Set H0d.20 to 2 to clear the fault, but E733.0 persists after restart.	Replace the motor.

- E735.0: Encoder multi-turn counting overflow

Description:

A multi-turn counting overflow occurs on the absolute encoder.

Cause	Troubleshooting	Solution
The number of forward revolutions exceeds 32767 or the number of reverse revolutions exceeds 32768.	Check whether the value of H0b.70 (Number of absolute encoder revolutions) reach 32767 or 32768 when the servo drive works in the absolute linear mode (H02.01 = 1).	Set H0d.20 to 2 to power on again. Perform homing if necessary.

- E740.0: Absolute encoder communication timeout

Description:

Communication timeout occurs on the absolute encoder.

Cause	Troubleshooting	Solution
The communication between the servo drive and the encoder times out.	Check the wiring of the encoder and power on the servo drive again.	1. Check whether the encoder version (H00.04) is set properly. 2. Check whether the servo drive software version (H01.00). 3. Check the encoder cable connections. 4. Replace the servo motor.

- E740.2: Absolute encoder error

Description:

A communication error occurs on the RX side of the encoder.

Cause	Troubleshooting	Solution
An error occurs on the communication between the servo drive and the encoder.	Check whether the value of H0b.28 is not 0.	1. Check whether H00.00 (Motor code) is set properly. 2. Check whether the encoder cable is connected properly. 3. Check whether the servo drive and motor are grounded properly. You can wind a magnetic ring on the encoder cable to reduce interference.

- E740.3: Absolute encoder single-turn calculation error

Description:

The encoder is faulty.

Cause	Troubleshooting	Solution
An internal fault occurs on the encoder.	Check whether bit7 of H0b.28 is set to 1.	1. Check whether the encoder version (H00.04) is proper. 2. Check whether the encoder cable is proper. 3. Replace the motor.

- E740.6: Encoder data write error

Description:

The attempt to write the encoder data fails.

Cause	Troubleshooting	Solution
An error occurs when writing the position offset after angle auto-tuning.	Replace with a new encoder cable. If the fault no longer occurs after cable replacement, it indicates the original encoder cable is damaged. Keep the motor in a certain position, power on the system several times and observe the change of H0b.17 (Electrical angle). The electrical angle deviation should be within $\pm 30^\circ$ when the motor position does not change.	Use a new encoder cable. If the fault persists after the encoder cable is replaced, the encoder may be faulty. In this case, replace the servo motor.

- E760.0: Encoder overtemperature

Description:

The temperature of the absolute encoder is too high.

Cause	Troubleshooting	Solution
The temperature of the absolute encoder is too high.	Measure the encoder or motor temperature.	Switch off the S-ON signal to wait for the encoder to cool down.

- E939.0: Motor power cable disconnected

Description:

At least one phase of the motor is disconnected.

Cause	Troubleshooting	Solution
Motor power cables disconnected	Check whether the motor UVW cables are connected properly.	1. Check if the power cable are disconnected or in poor contact. Re-connect the power cable. 2. Replace the servo motor.

- E939.1: Phase-U power cable disconnected

Description:

Phase-U power cable disconnected

Cause	Troubleshooting	Solution
Motor U phase power cable breakage	Check the wiring of the phase-U power cable.	1. Check if the power cable are disconnected or in poor contact. Re-connect the power cable. 2. Replace the servo motor.

- E939.2: Phase-V power cable disconnected

Description:

Phase-V power cable disconnected

Cause	Troubleshooting	Solution
Motor V phase power cable breakage	Check the wiring of the phase-V power cable.	1. Check if the power cable are disconnected or in poor contact. Re-connect the power cable. 2. Replace the servo motor.

- E939.3: Phase-W power cable disconnected

Description:

Phase-W power cable disconnected

Cause	Troubleshooting	Solution
Motor W phase power cable breakage	Check the wiring of the phase-W power cable.	1. Check if the power cable are disconnected or in poor contact. Re-connect the power cable. 2. Replace the servo motor.

- EA33.0: Encoder read/write check error

Description:

Internal parameters of the encoder are abnormal.

Cause	Troubleshooting	Solution
1. The serial incremental encoder cable is disconnected or loose.	Check the wiring.	Check whether the encoder cables are connected incorrectly, disconnected, or in poor contact. If the motor cables and encoder cables are bundled together, separate them.
2. An error occurs when reading/writing the serial incremental encoder parameters.	If the fault persists after the servo drive is powered off and on repeatedly, the encoder is faulty.	Replace the servo motor.

- EB00.0: Position deviation too large

Description:

The position deviation in the position control mode is larger than the setpoint of H0A.10 (Threshold of excessive position deviation).

Cause	Troubleshooting	Solution
1. U/V/W output phase loss or incorrect phase sequence occurs on the servo drive.	Perform a no-load trial run on the motor and check the wiring.	Re-connect the cables according to the wiring diagram or replace the cables.
2. The servo drive U/V/W cables or the encoder cable is disconnected.	Check the wiring.	Reconnect one end of the power cables to the U, V, and W terminals of the servo drive and the other end to those of the servo motor, respectively. If necessary, replace all cables and ensure a reliable connection.

Cause	Troubleshooting	Solution
3. The motor is stalled due to mechanical factors.	Check the reference and motor speed (H0b.00) through the software tool or keypad. - References in the position control mode: H0b.13 (Input position reference counter) - References in the speed control mode: H0b.01 (Speed reference) - References in the torque control mode: H0b.02 (Internal torque reference) Check whether the reference value is not 0 but the motor speed is 0 rpm in the corresponding mode.	Rectify the mechanical-related problem.
The servo drive gain is too low.	Check the position loop gain and speed loop gain of the servo drive. 1st gain set: H08.00...H08.02 2nd gain set: H08.03...H08.05	Adjust the gain values manually or perform gain auto-tuning.
5. The value of H0A.10 is insufficient for the operating conditions.	Check the value of H0A.10.	Increase the setpoint of H0A.10.
6. The servo drive/motor is faulty.	Monitor the operating waveform using the oscilloscope function of Inovance commissioning software and check whether the operating waveform includes the following information: position reference, position feedback, speed reference, torque reference	If the position reference is not 0 but the position feedback is always 0, replace the servo drive or motor.

- EB00.1: Position deviation overflow

Description:

The position deviation is too large.

Cause	Troubleshooting	Solution
1. U/V/W output phase loss or incorrect phase sequence occurs on the servo drive.	Perform a no-load trial run on the motor and check the wiring.	Re-connect the cables according to the wiring diagram or replace the cables.
2. The servo drive U/V/W cables or the encoder cable is disconnected.	Check the wiring.	Reconnect one end of the power cables to the U, V, and W terminals of the servo drive and the other end to those of the servo motor, respectively. If necessary, replace all cables and ensure a reliable connection.
3. The motor is stalled due to mechanical factors.	Check the reference and motor speed (H0b.00) through the software tool or keypad. - References in the position control mode: H0b.13 (Input position reference counter) - References in the speed control mode: H0b.01 (Speed reference) - References in the torque control mode: H0b.02 (Internal torque reference) Check whether the reference value is not 0 but the motor speed is 0 rpm in the corresponding mode.	Rectify the mechanical-related problem.
The servo drive gain is too low.	Check the position loop gain and speed loop gain of the servo drive. 1st gain set: H08.00... H08.02 2nd gain set: H08.03... H08.05	Adjust the gain values manually or perform gain auto-tuning.
5. The value of H0A.10 is insufficient for the operating conditions.	Check the value of H0A.10.	Increase the setpoint of H0A.10.
6. The servo drive/motor is faulty.	Monitor the operation waveform through the oscilloscope function in the software tool: position references, position feedback, speed references, and torque references.	If the position reference is not 0 but the position feedback is always 0, replace the servo drive or motor.

- EB01.0: Position reference increment too large

Description:

The pulse reference increment exceeds the excessive reference threshold three times consecutively.

Cause	Troubleshooting	Solution
The pulse reference increment exceeds the excessive reference threshold three times consecutively.	Check whether the baud rate of pulse reference input exceeds H0A.09.	1. Increase the value of H0A.09. 2. Reduce the baud rate of pulse input.

- EB01.1: Individual position reference increment too large

Description:

The target position increment is too large.

Cause	Troubleshooting	Solution
The target position increment is too large.	Check the variation between two adjacent target positions using the software tool.	1. Check whether the maximum speed of the motor fulfills the application requirement. If yes, reduce the target position reference increment, which is to lower the profile reference speed. If not, replace the servo motor. 2. Before switching the mode or enabling the servo drive, check whether the target position is aligned with current position feedback. 3. The communication sequence of the host controller is abnormal, leading to slave data error. Check the communication sequence of the host controller.

- EB01.2: Position reference increment too large continuously

Description:

The target position increment is too large.

Cause	Troubleshooting	Solution
The target position increment is too large.	Check the variation between two adjacent target positions using the software tool.	1. Check whether the maximum speed of the motor fulfills the application requirement. If yes, reduce the target position reference increment, which is to lower the profile reference speed. If not, replace the servo motor. 2. Before switching the mode or enabling the servo drive, check whether the target position is aligned with current position feedback. 3. The communication sequence of the host controller is abnormal, leading to slave data error. Check the communication sequence of the host controller.

- EB01.3: Command overflow
Description:

The target position is still in the process of transmission when the servo limit or software position limit signal is activated and the 32-bit upper/lower limit is reached.

Cause	Troubleshooting	Solution
The target position is still in the process of transmission when the servo limit or software position limit signal is activated and the 32-bit upper/lower limit is reached.	Check whether the host controller continues sending commands after overtravel warning is reported by the servo drive.	1. Detect the servo limit signal (bit0 and bit1 of 60FD is recommended) through the host controller. 2. Stop sending limit direction commands when an active servo limit signal is detected by the host controller.

- EB01.4: Target position beyond upper/lower limit

Description:

The target position exceeds the upper/lower limit of the unit position in the single-turn absolute mode.

Cause	Troubleshooting	Solution
The target position exceeds the upper/lower limit of the unit position in the single-turn absolute mode.	Check whether the set target position is within the single-turn upper/lower limit.	Set the target position to a value within the upper/lower limit.

- EB03.0: Electronic gear ratio beyond the limit - H05.02

Description:

The electronic gear ratio exceeds the limit: $(0.001\text{--}4000 \times \text{Encoder resolution} / 10000)$.

Cause	Troubleshooting	Solution
The electronic gear ratio converted by converted exceeds the maximum gear ratio or is less than the minimum gear ratio.	Check if the electronic gear ratio is within the range of $0.001\text{--}4000 \times \text{Encoder resolution} / 10000$.	Change the value of H05.02.

- EB03.1: Electronic gear ratio beyond the limit - Electronic gear ratio 1

Description:

The electronic gear ratio exceeds the limit: $(0.001\text{--}4000 \times \text{Encoder resolution} / 10000)$.

Cause	Troubleshooting	Solution
The group 1 electronic gear ratio exceeds the maximum gear ratio or is less than the minimum gear ratio.	Check if the group 1 electronic gear ratio is within the range of $0.001\text{--}4000 \times \text{Encoder resolution} / 10000$.	Change the group 1 electronic gear ratio.

- EB03.2: Electronic gear ratio beyond the limit - Electronic gear ratio 2

Description:

The group 2 electronic gear ratio exceeds the limit: $(0.001-4000 \times \text{Encoder resolution}/10000)$.

Cause	Troubleshooting	Solution
The group 2 electronic gear ratio exceeds the maximum gear ratio or is less than the minimum gear ratio.	Check if the group 2 electronic gear ratio is within the range of $0.001-4000 \times \text{Encoder resolution}/10000$.	Change the group 1 electronic gear ratio.

- EE03.0: communication timeout

Description:

Communication timeout occurred after switching to the running state.

Cause	Troubleshooting	Solution
Communication frame is present between the host controller and the drive, but the drive is in the waiting state for communication.	● Check whether the PLC is in the normal operation state. ● Check whether the STP is used as the communication cable. ● Check whether the servo drive is well grounded. ● Check whether the communication cable is connected. ● If you use IRT mode, verify that the topology of the host controller is consistent with the actual connection. ● The PLC has too many axes, causing watchdog timeout.	● Switch the PLC to normal operation state. ● Use the STP cable. ● Connect the cable according to the wiring instructions. ● Verify that the topology of the host controller is consistent with the actual connection. ● Increase the watchdog time.

- EE03.1: communication abnormal

Description:

The communication chip is not functioning properly, and the check times out.

Cause	Troubleshooting	Solution
The communication chip is faulty.	• Check whether the PLC is in the normal operation state. • Check whether the STP is used as the communication cable. • Check whether the servo drive is well grounded. • Check whether the communication cable is connected. • Check whether the fault persists after repeated restart.	• Switch the PLC to normal operation state. • Use the STP cable. • Connect the cable according to the wiring instructions. • Replace the servo drive. •

- EE08.0: PLC synchronization lost

Description:

The SYNC signal is turned off when the PROFINET network is in the OP state.

Cause	Troubleshooting	Solution
Bit10 of the PLC control word changes after the servo drive is enabled in host controller control mode.	Check whether STW1.bit10 (Encoder feedback mode) is set to 0 (Internal/External encoder feedback switchover at electronic gear ratio switchover).	If STW1.bit10 is 0, set bit10 to 1.

- EE08.1: PLC stopped

Description:

The PLC stopped.

Cause	Troubleshooting	Solution
The PLC stops during synchronous communication.	• Check whether the PLC is in the normal operation state. • Check whether the STP is used as the communication cable. • Check whether the servo drive is well grounded. • Check the Ethernet port of the servo drive is damaged.	• Switch the PLC to normal operation state. • Use the STP. • Connect the cable according to the wiring instructions.

- EE08.7: Abnormal heartbeat

Description:

The heartbeat is abnormal during synchronous communication.

Cause	Troubleshooting	Solution
The heartbeat is abnormal during synchronous communication.	• Check whether the STP is used as the communication cable. • Check whether the servo drive is well grounded. • Check the value of H29.01.	• Use the STP. • Connect the cable according to the wiring instructions.

- EE08.8: No network connection during synchronous communication
Description:

The network is not connected during synchronous communication.

Cause	Troubleshooting	Solution
No network connection during synchronous communication	• Check whether the STP is used as the communication cable. • Check whether the servo drive is well grounded. • Check whether the communication cable is connected.	• Use the STP. • Connect the cable according to the wiring instructions.

- EE08.9: LAN cable disconnected
Description:

The LAN cable is disconnected during synchronous communication.

Cause	Troubleshooting	Solution
The LAN cable is disconnected during synchronous communication.	• Check whether the STP is used as the communication cable. • Check whether the servo drive is well grounded. • Check whether the communication cable is connected.	• Use the STP. • Connect the cable according to the wiring instructions.

- EE09.0: Software position limit setting error
Description:

The lower limit of the software limit is equal to or larger than the upper limit.

Cause	Troubleshooting	Solution
The lower limit of the software position limit is equal to or larger than the upper limit.	Check the values of H0A.41 and H0A.43.	Reset the values and ensure H0A.43 is smaller than H0A.41.

- EE09.1: Home setting error
Description:

The home offset exceeds the upper/lower limit.

Cause	Troubleshooting	Solution
1. The home offset is outside the software position limit.	The home offset is outside the software position limit when the encoder works in the incremental mode, absolute linear mode, and single-turn absolute mode.	Set the home offset to a value within the software position limit.
2. The home offset is beyond the upper/lower limit in the rotation mode.	The home offset is outside the mechanical single-turn upper/lower limit when the encoder works in the rotation mode.	Set the home offset to a value within the mechanical single-turn upper/lower limit.

- EE09.2: Gear ratio beyond the limit

Description:

The electronic gear ratio exceeds the limit: $(0.001, 4000 \times \text{Encoder resolution} / 10000)$.

Cause	Troubleshooting	Solution
The set electronic gear ratio exceeds the preceding range.	The gear ratio 6091.01h/ 6091.02h exceeds the preceding range.	Set the gear ratio within the required range.

- EE11.1: EEPROM read failure

Description:

Communication with the external EEPROM failed.

Cause	Troubleshooting	Solution
Reading of PROFINET data in EEPROM failed.	This fault persists after the servo drive is powered off and on several times.	Replace the servo drive.

- EE11.2: EEPROM update failure

Description:

The communication is normal but the message in the EEPROM is wrong or lost.

Cause	Troubleshooting	Solution
Failed to update PROFINET data in EEPROM.	This fault persists after the servo drive is powered off and on several times.	Replace the servo drive.

- EE12.0: Parallel port detection error

Description:

The internal chip is faulty.

Cause	Troubleshooting	Solution
The internal chip is faulty.	The fault persists after the servo drive is powered off and on repeatedly.	Replace the servo drive.

- EE15.0: Synchronization cycle error too large

Description:

The synchronization cycle error exceeds the threshold.

Cause	Troubleshooting	Solution
The synchronization cycle error of the controller is too large.	● Measure the synchronization cycle of the controller. ● Through a digital oscilloscope. ● Measure the synchronization cycle of the controller by using the oscilloscope function in the software tool.	Increase the value of H0E.32.

- EE16.0: MCU and ESC communication error

Description:

MCU and ESC communication times out.

Cause	Troubleshooting	Solution
MCU and ESC communication timeout	The fault persists after the servo drive is powered off and on repeatedly.	Replace the servo drive.

- EE18.0: PN device name missing

Description:

The device name is missing.

Cause	Troubleshooting	Solution
The communication is faulty, leading to device name loss.	Check whether the device name is present through the software tool network.	Re-assign a device name.

- EE20.0: Continuous position reference not supported in relative positioning of telegram 111

Description:

Continuous position reference is set for telegram 111 relative positioning.

Cause	Troubleshooting	Solution
Continuous position reference enabled in relative positioning of telegram 111.	Check whether bit12 of POS_STW1 is 1.	Set bit12 of POS-STW1 to 0.

4.2 Internal Faults

When any one of the following fault occurs, contact Inovance for technical support.

- E602.0: Angle auto-tuning failure
- E220.0: Phase sequence incorrect
- EA40.0: Parameter auto-tuning failure
- E111.0: Internal parameter error

5 List of Warning Codes

Table 5–1 Resettable warning list

Fault Code	Fault subcode	Name	Fault level	Resettable
E108	E108.0	Storage parameter write error	No. 3	Yes
	E108.1	Storage parameter read error	No. 3	Yes
	E108.2	Invalid check on data written in EEPROM	No. 3	Yes
	E108.3	Invalid check on data read in EEPROM	No. 3	Yes
E121	E121.0	Duplicate S-ON command	No. 3	Yes
E122	E122.0	Multi-turn absolute encoder setting error	No. 3	Yes
E550	E550.2	External switchover wait warning	No. 3	Yes
E600	E600.0	Inertia auto-tuning failure	No. 3	Yes
E601	E601.0	Homing warning	No. 3	Yes
	E601.1	Homing switch error	No. 3	Yes
	E601.2	Homing mode setting error	No. 3	Yes
E730	E730.0	Encoder battery warning	No. 3	Yes
E900	E900.0	DI emergency braking	No. 3	Yes
E902	E902.0	DI setting invalid	No. 3	Yes
	E902.1	DO setting invalid	No. 3	Yes
	E902.2	Torque reach setting invalid	No. 3	Yes
E908	E908.0	Model identification check code error	No. 3	Yes
E909	E909.0	Motor overload	No. 3	Yes
E920	E920.0	Braking resistor overload	No. 3	Yes
E922	E922.0	Resistance of the external regenerative resistor too small	No. 3	Yes
E924	E924.0	Regenerative transistor over-temperature	No. 3	Yes
E941	E941.0	Modified parameters activated at next power-on	No. 3	Yes
E942	E942.0	Parameter storage too frequent	No. 3	Yes
E950	E950.0	Positive limit switch warning	No. 3	Yes
E952	E952.0	Negative limit switch warning	No. 3	Yes

6 List of Fault Codes

No. 1 non-resettable faults:

Table 6–1 List of No. 1 non-resettable faults

Fault Code	Fault subcode	Fault Name	Fault level	Resettable
E101	E101.0	Abnormal parameters in groups H02 and above	No. 1	No
	E101.1	Parameter error in group H00/H01	No. 1	No
	E101.2	Address error in read/write operation after the number of parameters changes	No. 1	No
E102	E102.0	FPGA communication establishment error	No. 1	No
	E102.8	FPGA and MCU version mismatch	No. 1	No
E104	E104.1	MCU running timeout (MCU break down)	No. 1	No
	E104.2	FPGA running timeout (FPGA break down)	No. 1	No
	E104.4	MCU command update timeout	No. 1	No
E120	E120.0	Unknown encoder model	No. 1	No
	E120.1	Unknown motor model	No. 1	No
	E120.2	Unknown drive model	No. 1	No
	E120.5	Motor and drive current mismatch	No. 1	No
	E120.6	FPGA and motor model mismatch	No. 1	No
	E120.7	Model check error	No. 1	No
	E120.8	Junction temperature parameter check error	No. 1	No
E136	E136.0	Encoder ROM motor parameter check error	No. 1	No
	E136.1	Encoder ROM motor parameter read error	No. 1	No
E201	E201.0	Phase-P overcurrent	No. 1	No
	E201.1	Phase-U overcurrent	No. 1	No
	E201.2	Phase-V overcurrent	No. 1	No
	E201.4	Phase-N overcurrent	No. 1	No
E210	E210.0	Output short-circuited to ground	No. 1	No
E234	E234.0	Runaway	No. 1	No
E740	E740.0	Absolute encoder communication timeout	No. 1	No
	E740.2	Absolute encoder error	No. 1	No
	E740.3	Absolute encoder single-turn calculation error	No. 1	No
	E740.6	Encoder write error	No. 1	No
EA33	EA33.0	Encoder read/write check error	No. 1	No

Fault Code	Fault subcode	Fault Name	Fault level	Resettable
EE12	EE12.0	Parallel port detection error	No. 1	No
EE16	EE16.0	MCU and ESC communication error	No. 1	No

No. 1 resettable faults

Table 6-2 List of No. 1 resettable faults

Fault Code	Fault subcode	Fault Name	Fault level	Resettable
E150	E150.0	STO safety state applied	No. 1	Yes
	E150.1	STO input state abnormal	No. 1	Yes
	E150.2	Buffer 5 V voltage detection error	No. 1	Yes
	E150.3	STO input circuit hardware diagnosis failure	No. 1	Yes
	E150.4	PWM Buffer hardware diagnosis failure	No. 1	Yes
E208	E208.2	Encoder communication timeout	No. 1	Yes
	E208.4	FPGA current loop operation timeout	No. 1	Yes
E320	E320.0	Braking resistor overload	No. 1	Yes
E400	E400.0	Main circuit overvoltage	No. 1	Yes
E410	E410.0	Main circuit undervoltage	No. 1	Yes
	E410.1	Main circuit de-energized	No. 1	Yes
E500	E500.0	Motor overspeed	No. 1	Yes
	E500.1	Speed feedback overflow	No. 1	Yes
	E500.2	FPGA position feedback pulse overspeed	No. 1	Yes
E602	E602.0	Angle auto-tuning failure	No. 1	Yes
	E602.2	U/V/W phase sequence reversed	No. 1	Yes
E605	E605.0	Speed too fast upon S-ON	No. 1	Yes
E620	E620.0	Motor overload	No. 1	Yes
E625	E625.0	Brake abnormality enabled	No. 1	Yes
E626	E626.0	Brake abnormality disabled	No. 1	Yes
E630	E630.0	Motor stall over-temperature protection	No. 1	Yes
E640	E640.0	High IGBT junction overtemperature	No. 1	Yes
	E640.1	Flywheel diode overtemperature	No. 1	Yes
E650	E650.0	Heatsink overtemperature	No. 1	Yes
E660	E660.0	Motor overtemperature	No. 1	Yes
E939	E939.0	Motor power cables disconnected	No. 1	Yes
	E939.1	Phase-U power cable disconnected	No. 1	Yes
	E939.2	Phase-V power cable disconnected	No. 1	Yes
	E939.3	Phase-W power cable disconnected	No. 1	Yes

No. 2 resettable faults

Table 6-3 List of No. 2 resettable faults

Fault Code	Fault subcode	Fault Name	Fault level	Resettable
E122	E122.1	DI function allocation error	No. 2	Yes
	E122.3	Upper limit in the rotation mode too high	No. 2	Yes
	E122.4	VDI function allocation error	No. 2	Yes
	E122.5	DI and VDI assigned with the same function	No. 2	Yes
	E122.8	Small lower limit of the rotation mode	No. 2	Yes
E420	E420.0	Main circuit phase loss	No. 2	Yes
E430	E430.0	Control power supply undervoltage	No. 2	Yes
E550	E550.0	Initial operation block number not exist	No. 2	Yes
	E550.1	Relative/absolute attribute of positioning or fixed stopper commands set improperly	No. 2	Yes
	E550.3	Task switch condition is set improperly.	No. 2	Yes
	E550.8	Fixed stopper point not found	No. 2	Yes
	E550.9	Fixed stopper beyond the window	No. 2	Yes
E551	E551.1	Program block stop exception	No. 2	Yes
	E551.3	Jump block not exist	No. 2	Yes
	E551.4	Continuous position reference not supported in relative positioning	No. 2	Yes
E661	E661.0	STune error	No. 2	Yes
E662	E662.0	ETune error	No. 2	Yes
E663	E663.0	ITune error	No. 2	Yes
E664	E664.0	Resonance too strong	No. 2	Yes
E731	E731.0	Encoder battery failure	No. 2	Yes
E733	E733.0	Encoder multi-turn counting error	No. 2	Yes
E735	E735.0	Encoder multi-turn counting overflow	No. 2	Yes
E760	E760.0	Encoder over-temperature	No. 2	Yes
EB00	EB00.0	Excessive position deviation	No. 2	Yes
	EB00.1	Position deviation overflow	No. 2	Yes
EB01	EB01.0	The position reference increment is too large.	No. 2	Yes
	EB01.1	Individual position reference increment too large	No. 2	Yes
	EB01.2	Position reference increment too large continuously	No. 2	Yes
	EB01.3	Reference overflow	No. 2	Yes
	EB01.4	Single-turn position limit violated in singlet-turn absolute mode	No. 2	Yes

Fault Code	Fault subcode	Fault Name	Fault level	Resettable
EB03	EB03.0	Electronic gear ratio beyond the limit - H05.02	No. 2	Yes
	EB03.1	Electronic gear ratio beyond the limit - Electronic gear ratio 1	No. 2	Yes
	EB03.2	Electronic gear ratio beyond the limit - Electronic gear ratio 2	No. 2	Yes
EE03	EE03.0	Communication timeout	No. 2	Yes
	EE03.1	Communication abnormal	No. 2	Yes
EE08	EE08.0	PLC sync loss	No. 2	Yes
	EE08.1	PLC stopped	No. 2	Yes
	EE08.7	Heartbeat error	No. 2	Yes
	EE08.8	No network connection during synchronous communication	No. 2	Yes
	EE08.9	LAN cable disconnected	No. 2	Yes
EE09	EE09.0	Software position limit setting error	No. 2	Yes
	EE09.1	Home setting error	No. 2	Yes
	EE09.2	Gear ratio beyond the limit	No. 2	Yes
EE11	EE11.1	EEPROM bus read failure	No. 2	Yes
	EE11.2	EEPROM update failure	No. 2	Yes
EE15	EE15.0	Synchronization cycle error too large	No. 2	Yes
EE18	EE18.0	PN device name missing	No. 2	Yes
EE20	EE20.0	Continuous position reference not supported in relative positioning of telegram 111	No. 2	Yes



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