




6 Troubleshooting and Solutions

6.1 Safety Information



Safety Information	
 Danger	<ul style="list-style-type: none"> ◆ Do not disconnect the AC drive while power is on, and keep all breakers in OFF state. Failure to comply may result in electric shock.
 Warning	<ul style="list-style-type: none"> ◆ Make sure to ground the AC drive according to local laws and regulations. Failure to comply may result in electric shock or a fire. ◆ Do not remove the front cover or touch internal circuit while the power is on. Failure to comply may result in electric shock. ◆ Do not allow unqualified personnel to perform any maintenance, inspection or part replacement work. Failure to comply may result in electric shock or a fire. ◆ When installing the drive inside an enclosed cabinet, use cooling fan or air conditioner to keep temperature below 50°C. Failure to comply may result in overheating or even a fire. ◆ Tighten all screws based on the specified tightening torque. Failure to comply may result in a fire or electric shock. ◆ Always confirm input voltage is within nameplate rating. Failure to comply may result in electric shock or a fire. ◆ Keep flammable and combustible materials away from the drive.
 Caution	<ul style="list-style-type: none"> ◆ Cover the top of the drive with a temporary cloth or paper during installation so as to prevent foreign matter such as metal shavings, oil and water from falling into the drive. If any foreign matter falls into the drive, the drive may have a fault. ◆ After the installation is completed, remove the temporary cloth or paper. If leaving the cloth or paper on the drive, the drive may have abnormal heating due to poor ventilation. ◆ Follow proper electrostatic discharge (ESD) procedures when operating the AC drive. Failure to comply will damage internal circuit of the drive.

6.2 Troubleshooting During Trial Run

It is applicable to application without an encoder for speed feedback. You need to set rated motor voltage and rated motor frequency correctly.

Problem	Solutions
Motor oscillation during running	<ul style="list-style-type: none"> • Increase the setting of F3-11 (V/F oscillation suppression gain) by 10 gradually. The permissible maximum setting here is 100.
Overcurrent during start	<ul style="list-style-type: none"> • Decrease the setting of F3-01 (torque boost) by 0.5% gradually.
Very large current during running	<ul style="list-style-type: none"> • Set rated motor voltage (F1-02) and rated motor frequency (F1-04) correctly. • Decrease the setting of F3-01 (torque boost) by 0.5% gradually.
Too loud motor noise	<ul style="list-style-type: none"> • Increase the setting of F0-15 (carrier frequency) by 1.0kHz gradually. Note that increase in carrier frequency will result in an increase in the leakage current of the motor.
Overvoltage detected when heavy load is suddenly removed or during deceleration	<ul style="list-style-type: none"> • Ensure that F3-23 (overvoltage stall enable) is enabled. Increase the setting of F3-24/ F3-25 (overvoltage stall gain, default is 30) by 10 gradually. The permissible maximum setting here is 100. • Decrease the setting of F3-22 (voltage limit) by 10 V gradually. The permissible minimum setting here is 700 V. The default value of F3-20 is 770 V.
Overcurrent detected when heavy load is suddenly added or during acceleration	<ul style="list-style-type: none"> • Increase the setting of F3-20 (overcurrent stall gain, default is 20) by 10 gradually. The permissible maximum setting here is 100. • Decrease the setting of F3-18 (current limit level) by 10% gradually. The permissible minimum setting here is 50%. The default value of F3-18 is 150%.

6.3 Fault Display

When a fault occurs during running, the AC drive stops output immediately, the fault indicator  flashes, and the contact of the fault relay acts. The operation panel displays the fault code such as , as shown in the following figure. Solutions in the table are for reference only. Do not repair or transform the drive by your self. If the fault persists, contact Inovance or our agent for technical support.

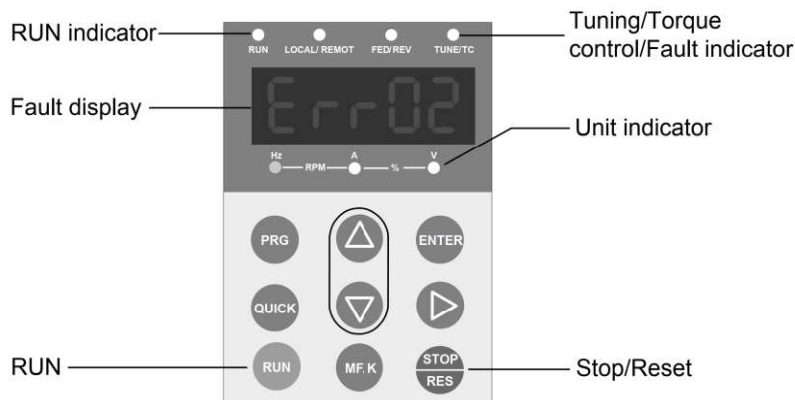

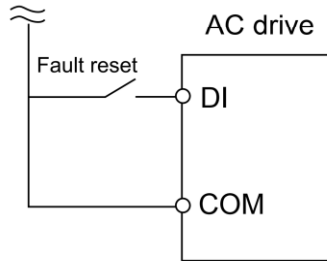

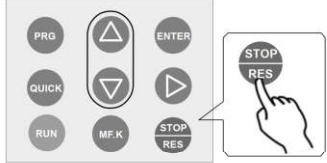
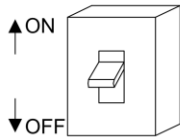
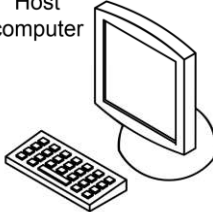


Figure 6-1 Interface

6.4 Resetting Fault

Stage	Solution	Remark
After the fault occurs	Check the operating panel for detailed information of recent three faults, such as fault type and frequency, current, bus voltage, DI/DO state, accumulative power-on time and accumulative running time at occurrence of the faults.	View these information via F9-14 to F9-44. 
Before the fault is reset	Find and remove cause of the fault according to the fault type displayed on the operating panel. Then reset the fault.	Troubleshoot the fault according to section 6.5 "Faults and Diagnostics".
Fault resetting method	(1) Allocate a DI terminal with function 9 "Fault reset (RESET)" by setting any of F4-00 to F4-09 to 9.	
	(2) Confirm that F7-02 = 1 (default value). Then press the  key on operating panel.	Fault resetting via operating panel 
	(3) Disconnect the power supply. Until the fault code disappears, connect the power supply again.	
	(4) Fault resetting via host computer Confirm that F0-02 = 2 and write "7" (fault reset) to communication address 2000H. <small><Note></small>	Host computer 
Note <ul style="list-style-type: none"> For details, refer to "Appendix B Definition of Communication Data Address and Modbus Communication Protocol". 		

6.5 Faults and Diagnostics



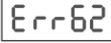
Troubleshoot the faults occurring during operating the drive as follows:

Fault Name	Operating Panel Display	Cause	Possible Solution
Overcurrent during acceleration	Err02	Ground fault or short circuit exists in the output circuit.	<ul style="list-style-type: none"> Check whether short-circuit occurs on the motor, motor cable or contactor.
		Acceleration time is too short.	<ul style="list-style-type: none"> Increase acceleration time.
		The overcurrent stall prevention parameters are set improperly.	<ul style="list-style-type: none"> Ensure that current limit is enabled (F3-19 = 1). The setting of current limit level (F3-18) is too large. Adjust it between 120% and 150%. The setting of current limit gain (F3-20) is too small. Adjust it between 20 and 40.
		Customized torque boost or V/F curve is not appropriate.	<ul style="list-style-type: none"> Adjust the customized torque boost or V/F curve.
		The spinning motor is started.	<ul style="list-style-type: none"> Enable the catching a spinning motor function or start the motor after it stops.
		The AC drive suffers external interference.	<ul style="list-style-type: none"> View historical fault records. If the current value is far from the overcurrent level, find interference source. If external interference does not exist, it is the drive board or hall device problem.
Overcurrent during deceleration	Err03	Ground fault or short circuit exists in the output circuit.	<ul style="list-style-type: none"> Check whether short-circuit occurs on the motor, motor cable or contactor.
		Deceleration time is too short.	<ul style="list-style-type: none"> Increase deceleration time.
		The overcurrent stall prevention parameters are set improperly.	<ul style="list-style-type: none"> Ensure that current limit is enabled (F3-19 = 1). The setting of current limit level (F3-18) is too large. Adjust it between 120% and 150%. The setting of current limit gain (F3-20) is too small. Adjust it between 20 and 40.
		Braking unit and braking resistor are not installed.	<ul style="list-style-type: none"> Install braking unit and braking resistor.
		The AC drive suffers external interference.	<ul style="list-style-type: none"> View historical fault records. If the current value is far from the overcurrent level, find interference source. If external interference does not exist, it is the drive board or hall device problem.
Overcurrent at constant speed	Err04	Ground fault or short circuit exists in the output circuit.	<ul style="list-style-type: none"> Check whether short-circuit occurs on the motor, motor cable or contactor.
		The overcurrent stall prevention parameters are set improperly.	<ul style="list-style-type: none"> Ensure that current limit is enabled (F3-19 = 1). The setting of current limit level (F3-18) is too large. Adjust it between 120% and 150%. The setting of current limit gain (F3-20) is too small. Adjust it between 20 and 40.
		The AC drive power class is small.	<ul style="list-style-type: none"> If output current exceeds rated motor current or rated output current of the AC drive during stable running, replace a drive of larger power class.
		The AC drive suffers external interference.	<ul style="list-style-type: none"> View historical fault records. If the current value is far from the overcurrent level, find interference source. If external interference does not exist, it is the drive board or hall device problem.





Fault Name	Operating Panel Display	Cause	Possible Solution
Overvoltage during acceleration	Err05	Input voltage is too high.	<ul style="list-style-type: none"> Adjust input voltage to normal range.
		An external force drives motor during acceleration.	<ul style="list-style-type: none"> Cancel the external force or install a braking resistor.
		The overvoltage stall prevention parameters are set improperly.	<ul style="list-style-type: none"> Ensure that the voltage limit function is enabled (F3-23 = 1). The setting of voltage limit (F3-22) is too large. Adjust it between 770V and 700 V. The setting of frequency gain for voltage limit (F3-24) is too small. Adjust it between 30 and 50.
		Braking unit and braking resistor are not installed.	<ul style="list-style-type: none"> Install braking unit and braking resistor.
		Acceleration time is too short.	<ul style="list-style-type: none"> Increase acceleration time.
Overvoltage during deceleration	Err06	The overvoltage stall prevention parameters are set improperly.	<ul style="list-style-type: none"> Ensure that the voltage limit function is enabled (F3-23 = 1). The setting of voltage limit (F3-22) is too large. Adjust it between 770V and 700 V. The setting of frequency gain for voltage limit (F3-24) is too small. Adjust it between 30 and 50.
		An external force drives motor during deceleration.	<ul style="list-style-type: none"> Cancel the external force or install a braking resistor.
		Deceleration time is too short.	<ul style="list-style-type: none"> Increase deceleration time.
		Braking unit and braking resistor are not installed.	<ul style="list-style-type: none"> Install braking unit and braking resistor.
Overvoltage at constant speed	Err07	The overvoltage stall prevention parameters are set improperly.	<ul style="list-style-type: none"> Ensure that the voltage limit function is enabled (F3-23 = 1). The setting of voltage limit (F3-22) is too large. Adjust it between 770V and 700 V. The setting of frequency gain for voltage limit (F3-24) is too small. Adjust it between 30 and 50. The setting of frequency rise threshold during voltage limit (F3-26) is too small. Adjust it between 5 Hz and 20 Hz.
		An external force drives motor during running.	<ul style="list-style-type: none"> Cancel the external force or install a braking resistor.
Control power fault	Err08	The input voltage exceeds the setting range.	<ul style="list-style-type: none"> Adjust the input voltage to be within the setting range.
Undervoltage	Err09	Instantaneous power failure occurs	<ul style="list-style-type: none"> Enable the power dip ride through function (F9-59 ≠ 0).
		The AC drive's input voltage is not within the permissible range.	<ul style="list-style-type: none"> Adjust the voltage to normal range.
		The bus voltage is abnormal.	<ul style="list-style-type: none"> Contact the agent or Inovance.
		The rectifier bridge, the buffer resistor, the drive board or the control board are abnormal.	<ul style="list-style-type: none"> Contact the agent or Inovance.



Fault Name	Operating Panel Display	Cause	Possible Solution
AC drive overload	Err 10	Load is too heavy or locked-rotor occurs on motor.	<ul style="list-style-type: none"> Reduce load or check motor and mechanical conditions.
		The AC drive power class is small.	<ul style="list-style-type: none"> Replace a drive of larger power class.
Motor overload	Err 11	F9-01 (Motor overload protection gain) is set improperly.	<ul style="list-style-type: none"> Set F9-01 correctly.
		Load is too heavy or locked-rotor occurs on motor.	<ul style="list-style-type: none"> Reduce load or check motor and mechanical conditions.
Input phase loss	Err 12	Input phase loss occurs.	<ul style="list-style-type: none"> Eliminate faults in external circuitry.
		Drive board, lightning protection board, control board, or rectifier bridge is abnormal.	<ul style="list-style-type: none"> Contact the agent or Inovance.
Output phase loss	Err 13	Motor winding is damaged.	<ul style="list-style-type: none"> Check resistance between motor wires.
		The cable connecting the AC drive and the motor is abnormal.	<ul style="list-style-type: none"> Check for wiring errors and ensure the output cable is connected properly.
		The AC drive's three-phase outputs are unbalanced when the motor is running.	<ul style="list-style-type: none"> Check whether the motor three-phase winding is normal.
		The drive board or the IGBT is abnormal.	<ul style="list-style-type: none"> Contact the agent or Inovance.
IGBT overheat	Err 14	The ambient temperature is too high.	<ul style="list-style-type: none"> Lower the ambient temperature.
		The ventilation is clogged.	<ul style="list-style-type: none"> Clean the ventilation.
		The fan is damaged.	<ul style="list-style-type: none"> Replace the cooling fan.
		Thermally sensitive resistor of IGBT is damaged.	<ul style="list-style-type: none"> Replace the damaged thermally sensitive resistor.
		The AC Drive IGBT is damaged.	<ul style="list-style-type: none"> Replace the AC Drive IGBT.
External fault	Err 15	External fault signal is input via DI.	<ul style="list-style-type: none"> Confirm that the mechanical condition allows restart (F8-18) and reset the operation.
		External fault signal is input via virtual I/O.	<ul style="list-style-type: none"> Confirm that the virtual I/O parameters in group A1 are set correctly and reset the operation.
Communication fault	Err 16	Host computer is in abnormal state.	<ul style="list-style-type: none"> Check the cable of host computer.
		Communication cable is abnormal.	<ul style="list-style-type: none"> Check the communication cables.
		The serial port communication protocol (F0-28) of extension communication card is set improperly.	<ul style="list-style-type: none"> Set F0-28 of extension communication card correctly.
		Communication parameters in group Fd are set improperly.	<ul style="list-style-type: none"> Set communication parameters in group Fd properly.
		After all the preceding checkings are done but the fault still exists, restore the default settings.	

Fault Name	Operating Panel Display	Cause	Possible Solution
Contactor fault	Err17	Drive board and power supply are abnormal.	• Replace drive board or power supply board.
		Contactor is abnormal.	• Replace contactor.
		The lightning protection board is abnormal.	• Replace the lightning protection board.
Current detection fault	Err18	The hall is abnormal.	• Replace the hall element.
		The drive board is abnormal.	• Replace the drive board.
Motor auto-tuning fault	Err19	Motor parameters are not set according to nameplate.	• Set motor parameters correctly according to nameplate.
		Motor auto-tuning times out.	• Check the cable connecting AC drive and motor.
EEPROM read-write fault	Err21	The EEPROM chip is damaged.	• Replace the main control board.
Short circuit to ground	Err23	Motor is short circuited to the ground.	• Replace cable or motor.
Accumulative running time reached	Err26	Accumulative running time reaches the setting value.	• Clear the record through parameter initialization.
User-defined Fault 1	Err27	User-defined fault 1 is input via DI.	• Reset the operation.
		User-defined fault 1 is input via virtual I/O.	• Reset the operation.
User-defined Fault 2	Err28	User-defined fault 2 is input via DI.	• Reset the operation.
		User-defined fault 2 is input via virtual I/O.	• Reset the operation.
Accumulative power-on time reached	Err29	Accumulative power-on time reaches the setting value.	• Clear the record through parameter initialization.
Load loss	Err30	The output current of AC drive is smaller than F9-64 (load loss detection level).	• Check whether load is disconnected or the setting of F9-64 and F9-65 (load lost detection time) satisfies actual running condition.
PID feedback lost during running Feedback loss	Err31	PID feedback is smaller than the setting value of FA-26 (detection level of PID feedback loss).	• Check PID feedback or set FA-26 properly.
Pulse-by-pulse current limit fault	Err40	Load is too heavy or locked-rotor occurs on motor.	• Reduce load or check motor and mechanical conditions.
		The AC drive power class is small.	• Replace a drive of larger power class.
Motor switchover fault during running Motor winding is damaged.	Err41	Motor switchover via terminal during drive running of the AC drive.	• Perform motor switchover after the AC drive stops.
Motor overtemperature	Err45	Cable connection of temperature sensor becomes loose	• Check cable connection of temperature sensor.
		The motor temperature is too high.	• Decrease carrier frequency or take other measures to cool the motor.

Fault Name	Operating Panel Display	Cause	Possible Solution
Slave error in master-slave control		Check the slave motor.	<ul style="list-style-type: none"> Troubleshoot the problem according to the slave fault code.
Braking unit overload		Resistance of braking resistor is too small.	<ul style="list-style-type: none"> Replace a braking resistor of larger resistance.
Short-circuit of braking circuit		Braking module is abnormal.	<ul style="list-style-type: none"> Contact the agent or Inovance.

6.6 Symptoms and Diagnostics

SN	Fault Description	Cause	Possible Solution
1	There is no display while power-on. 	The mains voltage is not input or too low.	<ul style="list-style-type: none"> Check the power supply.
		The switching power supply on drive board of the AC drive is faulty.	<ul style="list-style-type: none"> Check bus voltage.
		Wires between control board and drive board and between control board and operating panel break.	<ul style="list-style-type: none"> Re-connect the 8-pin wire and 40-pin wire.
		Pre-charge resistor of the AC drive is damaged.	<ul style="list-style-type: none"> Contact the agent or Inovance.
		Control board or operating panel is faulty.	
		Rectifier bridge is damaged.	
2	"HC" is displayed while power-on. 	Wire between drive board and control board is in poor contact.	<ul style="list-style-type: none"> Re-connect the 8-pin wire and 28-pin wire.
		Related components on control board are damaged	<ul style="list-style-type: none"> Contact the agent or Inovance.
		The motor or motor cable is short circuited to ground.	
		The hall is damaged.	
		The mains voltage is too low.	
3	"Err23" is displayed at power-on. 	Motor or motor output cable is short circuited to ground.	<ul style="list-style-type: none"> Use a megger to measure insulation resistance of motor and motor cable.
		The AC drive is damaged.	<ul style="list-style-type: none"> Contact the agent or Inovance.
4	The display is normal while power-on. But after running, "HC" is displayed and the drive stops immediately. 	The cooling fan is damaged or locked-rotor occurs.	<ul style="list-style-type: none"> Replace the cooling fan.
		Short circuit exists in wiring of control terminals.	<ul style="list-style-type: none"> Eliminate short circuit fault in control circuit wiring.

SN	Fault Description	Cause	Possible Solution
5	Err14 (IGBT overheat) is detected frequently. 	The setting of carrier frequency is too high.	<ul style="list-style-type: none"> • Reduce carrier frequency (F0-15). • Replace the fan or clean the ventilation
		The cooling fan is damaged, or ventilation is clogged.	<ul style="list-style-type: none"> • Replace the fan or clean the ventilation.
		Components inside the AC drive are damaged (thermistor or others).	<ul style="list-style-type: none"> • Contact the agent or Inovance.
6	The motor does not rotate after the AC drive runs.	It is motor or motor cable problem.	<ul style="list-style-type: none"> • Check that wiring between AC drive and motor is normal.
		Related AC drive and motor parameters are set improperly.	<ul style="list-style-type: none"> • Restore the factory parameters and re-set the following parameters properly: • Motor 1 control mode (F0-01) and command source selection (F0-02) • F3-01 (torque boost) in V/F control under heavy-load start.
		Cable connection between drive board and control board is in poor contact.	<ul style="list-style-type: none"> • Re-connect wirings and ensure secure connection.
		The drive board is faulty.	<ul style="list-style-type: none"> • Contact the agent or Inovance.
7	DI terminals are disabled.	Related parameters are set incorrectly.	<ul style="list-style-type: none"> • Check and set parameters in group F4 again.
		External signals are incorrect.	<ul style="list-style-type: none"> • Re-connect external signal cables.
		Jumper across OP and +24 V becomes loose.	<ul style="list-style-type: none"> • Re-confirm the jumper bar across OP and +24 V.
		The control board is faulty.	<ul style="list-style-type: none"> • Contact the agent or Inovance.
8	The AC drive detects overcurrent and overvoltage frequently.	Motor parameters are set improperly.	<ul style="list-style-type: none"> • Set motor parameters or perform motor auto-tuning again.
		Acceleration/deceleration time is improper.	<ul style="list-style-type: none"> • Set proper acceleration/deceleration time.
		Load fluctuates.	<ul style="list-style-type: none"> • Contact the agent or Inovance.
9	Err17 is detected upon power-on or running. 	The pre-charge relay or contactor is not closed.	<ul style="list-style-type: none"> • Check whether the relay or contactor cable is loose. • Check whether the relay or contactor is faulty. • Check whether 24 V power supply of the contactor is faulty. • Contact the agent or Inovance.
10	The motor coasts to stop or cannot be braked during deceleration or deceleration to stop.	The overvoltage stall protection takes effect.	<ul style="list-style-type: none"> • If braking resistor is set, set Overvoltage Stall Enabled to Disabled (F3-23 = 0).