

# Hi300/360 系列

## 交流伺服驱动器使用手册

适用对象：通用调试

本文档适用于 V6.20 及以上软件版本，上电后请确认软件版本。



文档编号：  
软件版本：V6.20  
手册版本：V1.00

## 8. Error Diagnosis and Handling

### 8.1 Introduction of alarm parameter

When the drive runs normally and is failure-free, the parameter value EI.00 to EI.10 is 0. When the error occurs, ERR light blinks, operator displays pertinent error code, and the corresponding error bit in EI.00 to EI.10 will be set to 1. Meanwhile, users can check the current error data through EI.17 to EI.33; and check the accumulation error record through EI.41 to EI.58.

When a failure occurs, firstly, press ENTER key to clear the error display, then, as per the error display, find out the error reason and adjust the parameters or change the wiring. Finally, press STOP key to shut down the ERR light; the STOP light is on when there is no error, which indicate the drive has cleared error state and been in the ready mode.

**Table 8.1 EI group parameters**

Parameters	Parameter descriptions	Para. No.	Unit
EI.00	Error system	801	None
EI.01	Error processor	802	None
EI.02	Error operating system	803	None
EI.03	Error power supply unit	804	None
EI.04	Error power unit system	805	None
EI.05	Error motor	806	None
EI.06	Error peripheral system	807	None
EI.07	Error data record system	808	None
EI.08	Error parameter set	809	None
EI.09	Error CAN synchronous	810	None
EI.10	Error drive board	811	None
EI.11	Error position controller	812	None
EI.17	Error code latest	901	None
EI.18	Error target speed	902	r/min
EI.19	Error speed set value	903	r/min
EI.20	Error speed actual value	904	r/min
EI.21	Error apparent current actual value	905	A
EI.22	Error motor torque actual value	906	%
EI.23	Error motor voltage actual value	907	None
EI.24	Error DC link voltage actual value	908	V
EI.25	Error heatsink temperature actual value	909	°C
EI.26	Error terminal digital input state	910	None
EI.27	Error terminal digital output state	911	None
EI.28	Error analog input 1 actual value	912	%
EI.29	Error analog input 2 actual value	913	%

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EI.30	Error analog input 3 actual value	914	%
EI.31	Error drive status	915	None
EI.32	Error ASR status	916	None
EI.33	Error auxiliary information	917	None
EI.34	Error warning status	918	None
EI.41	Error log 1	867	None
EI.42	Error 1 repeat times	868	None
EI.43	Operation time before error 1	869	s
EI.44	Error log 2	870	None
EI.45	Error 2 repeat times	871	None
EI.46	Operation time before error 2	872	s
EI.47	Error log 3	873	None
EI.48	Error 3 repeat times	874	None
EI.49	Operation time before error 3	875	s
EI.50	Error log 4	876	None
EI.51	Error 4 repeat times	877	None
EI.52	Operation time before error 4	878	s
EI.53	Error log 5	879	None
EI.54	Error 5 repeat times	880	None
EI.55	Operation time before error 5	881	s
EI.56	Error log 6	882	None
EI.57	Error 6 repeat times	883	None
EI.58	Operation time before error 6	884	s

## 8.2 Troubleshooting according error code

Common error alarm and handling methods are as follows in the Table 8.2.

**Table 8.2 Common error list**

<b>Error codes</b>	<b>Contents</b>	<b>Reasons</b>	<b>Handling methods</b>
Er034	Lack of input phase	Lack of phase in the three-phase power input	Check whether the drive is charged or its wiring condition
Er035	Power switch (DC-DC) error of control board	Power switch (DC-DC) error of control board	Seek for the technical support
Er049	Software overvoltage	1. Voltage is too high. 2. The regenerated energy is larger than the energy that the braking resistor consumes. 3. The braking resistor is loosening connection or disconnected.	1.Check the A.C. voltage 2.Reduce the braking resistance value 3.Check the wiring of braking resistor
Er055	Hardware overvoltage	4. Internal braking loop is abnormal.	4.Increase the speed-reducing time RF.02 5.Increase the release torque time CS.22 6. Seek for technical support

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Er050	Software overcurrent	<ol style="list-style-type: none"> <li>1. Current loop value (PI) is too large.</li> <li>2. The short circuit and ground connection occur in the output side of the drive.</li> <li>3. The encoder wire is loose or disconnected.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the parameters of PI, and reduce Kp (CI.00、CI.02)</li> <li>2. Check the motor insulation or line-to-ground insulation</li> <li>3. Check the wiring of encoder</li> <li>4. Check motor parameters</li> </ol>
Er056	Hardware overvoltage	<ol style="list-style-type: none"> <li>4. Motor parameters (Ls) are wrong.</li> </ol>	
Er051	IGBT shortcircuit	<ol style="list-style-type: none"> <li>1. The short circuit and ground connection occur in the output side of the drive.</li> <li>2. IGBT module is damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the motor insulation or line-to-ground insulation</li> <li>2. Check whether the IGBT module is damaged</li> <li>3. Seek for technical support</li> </ol>
Er053	Software undervoltage	<ol style="list-style-type: none"> <li>1. Three-phase A.C device's instant outage occurs.</li> <li>2. The wires of input power are loose.</li> <li>3. Cut off the power and the drive discharges.</li> <li>4. The variation of input voltage is too large or phase loss.</li> <li>5. Capacity code has not been set.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the wiring</li> <li>2. Check whether it's instant power failure</li> <li>3. Check whether the power variation is too large</li> <li>4. Check whether the rectifier bridge and buffer resistance is normal</li> <li>5. Check PU.00 to confirm the setting of model, if PU.00 has no data, please set PU.10 and PU.09</li> <li>6. Seek for technical support</li> </ol>
Er054	Over-heated Heatsink	<ol style="list-style-type: none"> <li>1. Ambient temperature is too high.</li> <li>2. Surrounded heated objects</li> <li>3. The cooling fan stops running.</li> <li>4. Heatsink is blocked.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the ambient temperature is too high</li> <li>2. Air duct blockage or damage of fan</li> <li>3. Check the module temperature and make sure the detection sensor is damaged</li> <li>4. Seek for technical support</li> </ol>
Er057	Self-checking circuit error of sampling Phase-U current	<ol style="list-style-type: none"> <li>1. Strong interference</li> <li>2. Abnormal hall components</li> <li>3. Abnormal drive board</li> </ol>	Seek for technical support
Er061	Self-checking circuit error of sampling Phase-V current	<ol style="list-style-type: none"> <li>1. Strong interference</li> <li>2. Abnormal hall components</li> <li>3. Abnormal drive board</li> </ol>	Seek for technical support
Er062	Self-checking circuit error of sampling Phase-W current	<ol style="list-style-type: none"> <li>1. Strong interference</li> <li>2. Abnormal hall components</li> <li>3. Abnormal drive board</li> </ol>	Seek for technical support
Er058	Overvoltage in	Overvoltage in the input AC	Check the input voltage of

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	the input terminal	three-phase terminal	three-phase terminal
Er059	Power-on and self-testing fails	<ol style="list-style-type: none"> <li>1. The short circuit of interphase</li> <li>2. The short circuit of line-to-ground connection</li> <li>3. The motor lines disconnect.</li> <li>4. The internal wirings disconnect.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the wiring</li> <li>2. Seek for technical support</li> </ol>
Er060	The setting of PU.02 or PU.03 is wrong.	When DR.00=0, PU.02 (P.U. per unit current setting) is wrong. When DR.00=3, PU.02 or PU.03 exceeds the limit value.	When DR.00=0, Reset PU.02: $0 < PU.02 \leq \min\{PU.12, DR.19\}$ When DR.00=3, Adjust PU.02 or PU.03.
Er063	Heatsink's temperature is too low.	<ol style="list-style-type: none"> <li>1. Ambient temperature is too low.</li> <li>2. Temperature wirings are disconnected.</li> </ol>	Check the temperature wirings
Er066	Motor is over-heated	<ol style="list-style-type: none"> <li>1. The temperature sensor wiring is short-circuited and loosening connection.</li> <li>2. The internal motor is over heated.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the temperature wirings</li> <li>2. Check whether the internal motor is over heated or temperature sensor wiring is short-circuited</li> </ol>
Er067	Motor is over-loaded	<ol style="list-style-type: none"> <li>1. The load is too large.</li> <li>2. The setting of nominal voltage is incorrect.</li> <li>3. Motor is blocked.</li> <li>4. Notch position (Dr. 12) is wrong.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce the load</li> <li>2. Check whether the nominal current setting is correct</li> <li>3. Check whether the motor or oil pump is jammed</li> <li>4. Check the encoder (Dr.12) and do notch position self-searching again</li> </ol>
Er068	Autotuning notch position fails	<ol style="list-style-type: none"> <li>1. Incorrect encoder setting (EC.01 or EC.02 or DR.06)</li> <li>2. The motor wiring sequence hasn't followed by the connection sequence of red wire, blue wire and yellow wire.</li> <li>3. Heavy load or motor stuck</li> </ol>	<ol style="list-style-type: none"> <li>1. Modify the setting of the encoder mode (EC.01 or EC.02 or DR.06)</li> <li>2. Adjust the motor wirings</li> <li>3. Check whether the motor is stuck</li> </ol>
Er069	Reverse overspeed of Motor	<ol style="list-style-type: none"> <li>1. Torque release is too fast, CS.22 is too small.</li> <li>2. The parameters of speed loop are too large.</li> <li>3. Other errors happen.</li> </ol>	<ol style="list-style-type: none"> <li>1. Increase torque release time (CS.22)</li> <li>2. Modify the setting of speed loop, decrease Kp(CS.00) or increase Ti (CS.01)</li> <li>3. Check recent error records, the cause of Er069</li> </ol>
Er070	Zero sequence current exceeds the threshold	<ol style="list-style-type: none"> <li>1. Single-phase of the motor is earthing.</li> <li>2. Electromagnetic interference is</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the wiring of motor and line-to-ground insulation</li> <li>2. Seek for technical support</li> </ol>

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	value	too large.	
Er071	Pressure sensor disconnection	Pressure sensor line is loose or not connected.	Check the wiring
Er081	Key operation error	When the drive is enabled by terminal, pressing RUN key or STOP key will trigger the error.	Clear error message , run the drive again
Er083	Encoder error	1.Encoder loosens connection or disconnect 2.Internal wiring fault	1. Check the encoder wiring connection 2. Seek for technical support
Er084	Non-finished autotuning verify position sensor angle	Former autotuning verify position sensor angle hasn't finished.	Clean the error, autotuning verify position sensor angle once again
Er087	Encoder emulation error	Given pulse and actual pulse of encoder's simulation is excessive deviation.	1. Given pulse frequency exceeds 2MHz. 2. Check out EC.04,EU.05
Er088	Encoder 2 error	Mechanical angle exceeds the reference angle in the encoder 2.	1. Check wiring of encoder and GND condition of motor'dynamic wires
Er089 <sup>6.20</sup>	Encoder card SPI error	SPI protocol of encoder card has no response.	1. Encoder card hasn't inserted. 2. Encoder card hasn't been programmed.
Er090 <sup>6.20</sup>	Encoder card timeout	The incomplete reading of encoder card when using its data.	Seek for technical support
Er091 <sup>6.20</sup>	STO error	1. Check IN.16. When bit0 or bit1 is valid, 2-way STO input is detected and the up and down power is not synchronized, with the interval of more than 1 second. 2. Check IN16. When bit2 is valid, if overvoltage of 5V1 or 5V2 is detected inside STO, it is judged to be a bad STO circuit.	1. Check whether the 2-way STO input wire is connected properly, and whether the STO switch is synchronously on or off, and then try to connect to the STO to clear the error.If external causes have been excluded, then one of the STO circuits inside the control board is broken. 2. Seek for technical support
ER109	I <sup>2</sup> C time out	Disconnection of EEPROM in the driving board	Check the wiring and the weld condition of the components
ER110	Parameters of EEPROM in the driving board changes	Parameter inconsistency between control board and the hardware parameters of driving board	Update the hardware parameter of control board (EE.24=1)
ER111	Parameter of EEPROM in the driving board provokes error.	Verification error or incomplete EEPROM data of driving board	Parameter bootload of EEPROM in the driving board
Er122	Error setting of motor model DR.01	The setting of motor model DR.01 hasn't been done.	Before writing UD.03 to 11, please set the DR.01
Er128	Timeout of CAN	1. The communication line is not	1. Check the wiring

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	bus communication	connected 2. Communication lines are loose. 3. The internal circuit is abnormal.	2. Seek for technical support
Er129	CAN bus communication is wrong.	1. The baud rate is set incorrectly. 2. Electromagnetic interference is too large.	1. Check the baud rate setting 2. Check the earthing, eliminate the interference
Er130	CAN slave drive is abnormal.	CAN slave drive is abnormal.	As per the error code of the slave drive, detect the error reasons and enable drive run normally.
Er133	Timeout of CAN bus's heartbeat message	1. The communication line is not connected. 2. Communication lines are loose. 3. The master station's communication is abnormal. 4. Electromagnetic interference is too large.	1. Check the wiring 2. Check the earthing 2. Seek for technical support
Er134 <sup>6.20</sup>	Receiving externally simultaneous signal error out of controller	1. No signal 2. The Periodic signal doesn't match with the setting 3. The signal vibration is too large.	1. Check out the setting of FB.73 and FB.74 2. Seek for technical support
Er135	PWM synchronous error	PWM and EtherCAT lost the synchronism	1. Restart the drive 2. Contact with technician
Er136	Synchronous resolver error	Encoder and EtherCAT lost the synchronism.	1. Restart the drive 2. Contact with technician
Er138 <sup>6.20</sup>	CANopen PDO over length	The data of CAN's PDO exceeds 8 bits	1. Check the configuration parameters of PDO
Er139 <sup>6.20</sup>	Slave pump number beyond	Amount of slave pump exceeds 4.	1. In the oil pump mode, the amount of slave pump $\leq 4$
Er144	Over-loaded IGBT	IGBT's temperature or Ixt value exceeds the threshold value.	1. Check the cooling condition 2. Reduce the load
Er145	Switch frequency setting error	5K frequency setting is forbidden in the version 5.35	Adjust the switch frequency, if the drive triggers the alarm
Er146	The temperature value of JC in the IGBT is overheated.	The temperature value of JC exceeds the valve value PN.20. (The upper limit value of JC in the IGBT)	1. Reduce the load 2. Check out the power unit switching frequency (PU.16), whether its value is 4kHz. In addition, make sure whether the frequency reduction function (PN.19) has turned on.
Er147	The temperature value of JC in	The temperature value of JC exceeds the valve value PN.20. (The upper limit value of JC in the	1. Reduce the load 2. Check out the power unit switching frequency (PU.16),

	the IGBT is overheated.	IGBT)	whether its value is 4kHz. In addition, make sure whether the frequency reduction function (PN.19) has turned on.
Er160	Position data error in the CAN bus communication	The number of CAN bus's given position exceeds PFB.05 times.	1. Check out the wiring of Can bus 2. Modify parameters of FB.85 under the upper limit times of packet loss.

**Note:** When CAN meets error, the parameter (PN.23) selection of drive's operation pause is speedy parking or automatic parking. If the execution is speedy parking, the screen will show the instruction of Er133. If the execution is automatic parking, the screen will show the instruction of Er128 or Er129.

### 8.3 Troubleshooting according fault phenomenon

Common error and handling methods have shown in the Table 8.3.

**Table 8.3 Inspection of common errors**

Phenomenons	Handling methods
The operator displays "ErCon" and flashes.	Plug in and off the communication cable or exchange the communication cable, and check whether there is a connection problem between operator and motherboard.
After power on, the operator does not light up.	<ol style="list-style-type: none"> <li>1. Check input power supply, and confirm whether the voltage of electric grid is too low.</li> <li>2. Check the voltage of master wire. If the voltage of master wire is normal, it may occur error in the switching power supply.</li> <li>3. Check the communication wire between control board and operator.</li> <li>4. Check the connection condition of flat cable between control board and driving board</li> </ol>
Drive doesn't enter into running state even though the operation command has been given.	<ol style="list-style-type: none"> <li>1. Check out the command source OP.00, if the display is 0, users need to create the enable signal generated by interface connection. Then users press the RUN key simultaneously with generated enable signal.</li> <li>2. Check out the soft enable OP.02, if the display is 0, the drive can't enter into running state.</li> <li>3. If the above situation is normal, please check out RU.15 and RU.16 for IO input signals.</li> <li>4. Check out configuration input parameter of DI, whether the relevant I/O signal value can meet with configuration demand for enable signal.</li> </ol>
Autotuning motor notch position fails.	<ol style="list-style-type: none"> <li>1. As for ER084, autotuning motor notch position hasn't completed. Cable vibration in connection or midterm disconnection in wiring, users need to insert signal code DR.12=1212 and find out verify position sensor angle.</li> <li>2. As for ER068, autotuning motor notch position fails. <ul style="list-style-type: none"> <li>➤ Check out correction of encoder's parameters, EC.00 (encoder type),</li> </ul> </li> </ol>

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	<p>EC.01 (encoder mode)、EC.02 (Encoder's pulse number per revolution)</p> <ul style="list-style-type: none"> <li>➤ Whether the number of the motor's pole-pairs is correct.</li> <li>➤ Whether maxium drive current PU.02 is too low.</li> <li>➤ Whether the load is too large.</li> <li>➤ Whether the torque of motor is limited. Users is suggested to set CS.18 (Torque positive limit source) to 0.</li> <li>➤ Abnormal encoder signal</li> </ul>
<p>The target speed has given to the drive, but the motor doesn't reach to the given speed.</p>	<ol style="list-style-type: none"> <li>1. Check out the drive is running (Whether the RUN Key is blinking normally and RU.21 value is 4.) And Check whether RU.01 and RU.02 have a given speed.</li> <li>2. Check whether the speed source OP.01 is set correctly and whether the speed instruction received by the driver is correct.</li> <li>3. Possible reasons <ul style="list-style-type: none"> <li>➤ Whether the current is limited. <ol style="list-style-type: none"> <li>① if the operator shows n-019, indicating that module protection mode is triggered. (Huge current in the low rotaing speed maybe appear.) The current is limited to the rated current of the drive</li> <li>② Check CS.18(Torque positive limit source) , whether the drive's signal value limites torque value.</li> <li>③ Whether PU.02 (max drive current) is too low.</li> <li>④ Whether the load is too large to cause the motor to stop running.</li> </ol> </li> <li>➤ Whether the acceleration and deceleration time RF.01 and RF.02 are too large, and the motor speed cannot keep up.</li> <li>➤ The limited motor operation ability (Opposing electromotive force and weak magnete factor)</li> <li>➤ Whether OP.02(the operation mode) is -3 (speed control).</li> <li>➤ Check the digital input signals, whether there is signal of jog, linkage or reverse rotating.</li> <li>➤ Check CS.04, and see whether the rotating direction of motor is setting reversely.</li> <li>➤ Check the wiring in the I/O interface, whether the wire connection between interfaces has been mistaken. (Possibly: brass wire has been connected into another I/O interface.)</li> </ul> </li> </ol>
<p>The output torque of the motor is not up to the requirement.</p>	<ol style="list-style-type: none"> <li>1. The driver's output power is too small, or PU.02 (max drive current) is too low. Motor is affected by the current limitation in high-speed area, which leads to insufficient output torque.</li> <li>2. Torque output in the weak magnetic area is less than that in the low speed. Even though the current in two area is same, the output torque is different. Therefore, users need to check torque value before usage.</li> </ol>

## 8.4 Warning alarm and troubleshooting

When the drive releases the hum of warning, the operator will display the corresponding warning code. Warning information only indicates the current state. When the warning condition is cleared, the drive will clear warning code automatically, it does not need human intervention. Warning messages will not be saved.

**Table 8.4 Warning explanation**

Warning code	Contents	Reasons	Handling methods
n-017	Heatsink overtemperature	Temperature of heatsink exceeds warning threshold (PN.12)	1.Reduce the load
n-018	Lacking voltage in the drive's input	When the drive is not running, the input voltage is lower than the threshold value.	1.Check the wiring 2.Check the power
n-019	Over-loaded IGBT	IGBT's temperature or Ixt value exceeds the threshold value.	1.Check the cooling condition 2. Reduce the load
n-020	Heatsink's temperature is too low.	The surrounding's temperature is too low. The NTC's lines are broken.	Check whether the NTC's lines are broken.
n-033	Motor's over-loaded warning	Motor's I <sup>2</sup> t value exceeds the threshold value of DR.15.	1.Reduce the load
n-049	STO terminal is not connected.	STO terminal is not connected.	Check the wiring