

Escalator integrated controller quick debugging process instructions

Ver: V1.1

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Chapter 1 Debugging Process

1.1 Connect the power cord, motor cord and brake cord and brake resistor cord according to the supplied drawing.

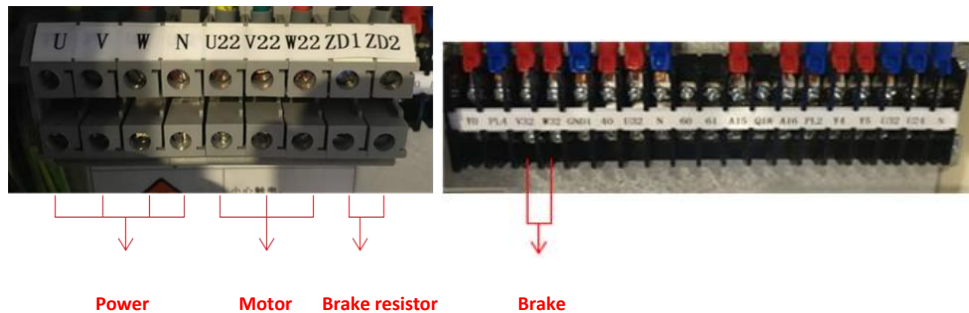


Figure 1

1.2 Safety circuit sealing

In order to ensure that the switch can be inspected and operated during the early installation, it is allowed to seal the safety circuit (contactor KJT-A2 or TB2-A18 and circuit breaker F4-2 are sealed). Be sure to remove the seal after debugging is completed.

1.3 Set parameters

Set the parameters according to the host nameplate, mainly including the following parameters: power F5-03, rated speed F5-04, rated current F5-08, no-load current F5-09 (set according to 1/3 of the rated current). After setting the above parameters, if ER00 (safety circuit detection point abnormality) appears, you need to adjust the input type F3-00, observe the input lights of the mainboard x9 ~ x25, set the lights on to ON, and the lights off to OFF. Save the parameters after setting.

1.4 Inspection and operation, installation of switches and sensors

It mainly includes the following types: **photoelectric beam switch**; **key box switch**; **step missing sensor**; **handrail speed sensor**; **gear speed sensor**.

- Photoelectric beam switch installation: Install a set of beam switches at the upper and lower entrances;
- Key box switch: install one on the top and one on the bottom;
- Step missing sensor: one is installed on the top and one on the bottom, sensing the edge of the step, with an installation distance of 2~4mm, as shown in Figure 2.

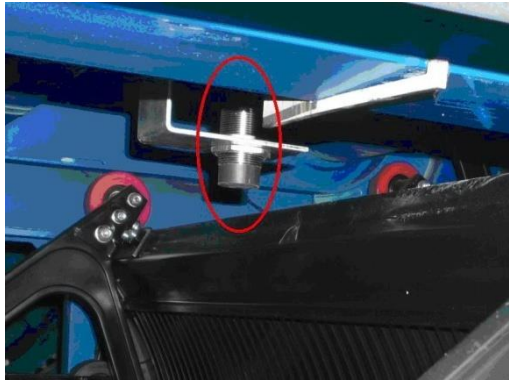


Figure 2

- Handrail speed sensor: One is installed on each handrail roller, and one pulse is generated for each rotation. If the roller is made of non-metallic material, a metal object needs to be fixed on the surface. If it is made of metal, part of the metal can be hollowed out. The cross-section should be similar to the cross-section of the sensor head, and the hole depth should be at least 3mm. The sensor installation distance is 1~3mm, as shown in Figure 3.

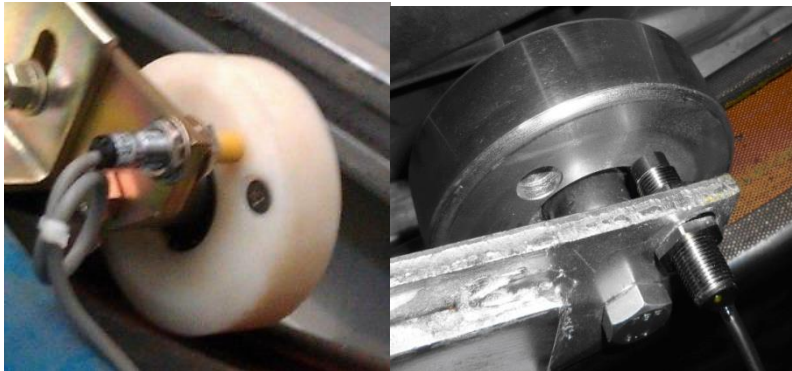


Figure 3

- Main gear speed measurement: Two proximity switches are installed on two different gear teeth with a phase difference of 90°. When installing, one is aligned with the tooth peak and the other is aligned with 1/4 of the tooth peak spacing. Multiple tooth peaks are allowed between the switches, but they should be pointed to the axis of the gear as much as possible. The installation spacing should not exceed 5mm. As shown in Figure 4.

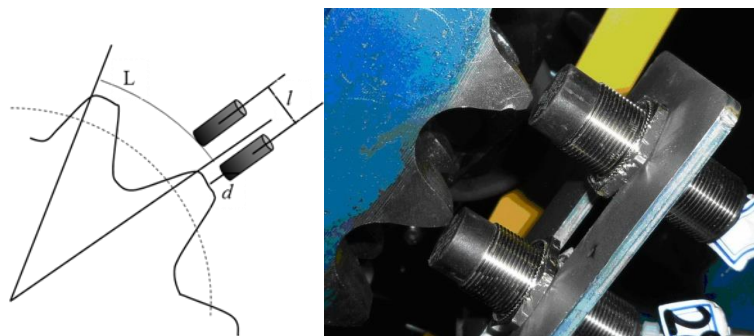


Figure 4

- After the installation is completed, in order to verify the installation quality, you can check it through the hand operator: run the elevator in the maintenance state, check the AB phase difference in the operator in the monitoring menu, and gradually adjust the size of I so that the AB two-phase phase difference displayed in the operator is in the range of 10%~40% (25% is best) for the upward movement and 60%~90% (75% is best) for the downward movement. After the sensor position is adjusted, it will display OK for both upward and downward movement, otherwise it will display ERR, as shown in Figure 5.

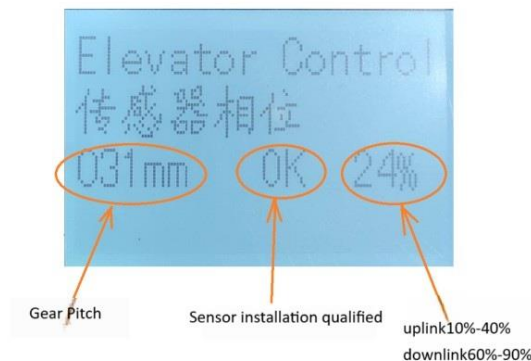


Figure 5

1.5 If the given direction is inconsistent with the actual direction during maintenance operation

Adjust the F6-03 parameter. If the arrow directions of both key boxes are incorrect, adjust the F1-06 parameter. If only one is incorrect, remove the internal setting jumper.

Install the limit switch, remove the sealing wire after completion. If the safety circuit is not conductive, find the cause according to the random drawing until the safety contactor is energized and the mainboard X9~X25 and X29 are lit. Then restore the X9-X25 input type to ON, and finally verify whether each safety switch can cut off the safety circuit.

1.6 Debug the safety circuit board

- If there is no brake arm feedback, short-circuit J12-5 and J12-6 on the safety circuit board.
- Set the main gear diameter and main gear teeth number according to actual conditions.
- Set the handrail wheel diameter, the actual setting value = handrail wheel diameter / handrail wheel detection point.
- If E-02 is reported during express operation, reverse the test switch.
- Report E-03, E-04 handrail belt abnormality, observe whether X13, X14 flash during operation. If it flashes normally, check the handrail wheel diameter setting parameters.
- Report E-05, E-06 step missing fault, observe whether X15, X16 flash during operation, if flashing normally, adjust the step width according to the actual situation.
- After the above parameters are modified, they need to be saved manually.

1.7 Express operation

- Test whether the photoelectric switch at the entrance can accelerate in the forward direction after it is effective. If the forward direction does not accelerate and the reverse entrance accelerates effectively, swap the inputs of X5 and X6 on the main board.
- Adjust the energy saving time according to the actual situation, parameter F2-07, the default energy saving time is 60 seconds.
- Test the start and stop of the upper and lower parts.

1.8 Simulate failure

- Over speed fault: The maximum speed of the escalator is generally 0.5m/s. In order to realize the over speed fault, the protection value can only be reduced, that is, the given speed is reduced from 0.5m/s to 0.3m/s. If the safety board detects that the actual escalator speed is greater than 0.3m/s, it is an over speed fault, and the safety board displays the E-01 fault code.
- Reverse fault: Replace the signals of the two gear speed sensors and the two plug-ins GU4 and GU5 to achieve the problem. After the elevator starts, a reverse fault is simulated and the safety board displays the E-02 fault code.
- Missing step fault: remove a step or cut off the step sensor signal during operation. Missing upper steps show E-05, and missing lower steps show E-06.
- Abnormal handrail speed failure: The handrail sensor signal is cut off during operation, the safety board reports a fault, and the digital block displays E-03 left handrail failure or E-04 right handrail failure.

Chapter 2 Integrated machine logic side fault code description and processing method

Chart 1 Logic side fault code

Fault Code	Instructions	Treatment
01	Safety circuit grounding protection fault	Check the power input line.
02	Drive chain disconnection fault	Check the input circuit and drive chain. If the drive chain is broken, replace it.
03	Left and right step chain failure	Check the input circuit and step chain components, and replace any damaged ones.
04	Left and right lower comb teeth failure	Check the input circuit and lower comb parts, and replace any damaged ones.
05	Left and right lower entrance and exit failure	Check the input line and lower inlet and outlet components and replace any damaged ones.
06	Left and right lower apron plate failure	Check the input circuit and lower apron parts and replace any damaged ones.
07	Lower stop /lower control box emergency stop	Check the input circuit and lower stop or emergency stop components and replace any damaged ones.
08	Lower front panel /lower inspection socket	Check the input circuit and lower front panel or repair the socket components, and replace them if damaged.
09	Lower step sinking	Check the input circuit and lower step components and replace any damaged ones.
10	Upper steps sink	Check the input circuit and upper step components and replace any damaged ones.
11	Upper front panel /upper control box inspection socket	Check the input circuit and the upper front panel or upper control box to inspect the socket components, and replace any damaged ones.
12	Upper stop /Upper control box emergency stop	Check the input circuit and upper stop or emergency stop parts of upper control box, and replace any damaged ones.
13	Left and right upper apron plate failure	Check the input circuit and upper apron parts and replace any damaged ones.
14	Left and right upper entrance and exit failure	Check the input circuit and upper inlet and outlet components and replace any damaged ones.
15	Left and right upper comb teeth failure	Check the input circuit and upper comb parts, and replace them if damaged.
16	Host crank switch / thermal fault	Check the input circuit and cranking switch or thermal switch components, and replace any damaged ones.
18	PES security protection fails	Check for faults on the safety circuit board.

Chart 1 Logic side fault code (Cont'd)

Fault Code	Instructions	Treatment
30	The safety circuit contactor coil and feedback contact are inconsistent.	Check the input type, input wiring and safety contactor. If the contactor is damaged, replace it.
32	The brake and its contact actions are inconsistent	Check the input type (X7), brake monitoring switch and wiring. If there is no such switch, set the brake feedback detection enable (Break, Feedback) to OFF.
33	Inverter operation failure	Check the inverter direction, enable signal and operation signal output circuit, and check the inverter related parameter settings. (Note that the escalator is open-loop control).
34	Operation is inconsistent with its contact action	Check the input type (X3), input circuit and transport contactor. If the transport contactor is damaged, replace it.
35	Multiple faults in a given direction	Find up and down input circuits.
37	Inverter fault	Find the inverter fault code and determine the cause. When an inverter fault occurs, the inverter is powered off and reset twice. If the fault still exists, the inverter main contactor is powered off.
40	Leisure mode has no leisure time set	Please set your leisure time.
98	Driver side program lock	The device is not unlocked after the program upgrade. Please return it to the factory or contact after-sales service.
99	Logical side program lock	The device is not unlocked after the program upgrade. Please return it to the factory or contact after-sales service.

Note: If an escalator malfunctions during operation, stop the escalator immediately.

Chapter 3 Integrated machine drive side fault code description and processing method

Chart 2 Driver fault list

Fault code	Display	Name and content	cause of issue	Solution
DF1	UV	Undervoltage The DC bus voltage of the main circuit is lower than the undervoltage protection setting value (400V level, bus undervoltage protection value is about DC380V; 200V level, bus undervoltage protection value is about DC220V).	The input power supply is missing a phase, causing an instantaneous power outage; The voltage fluctuation of the input power supply is too large; The wiring terminals of the input power supply are loose; The surge resistor is not disconnected; The low-voltage backup power supply is in emergency operation, and the X18 signal is invalid.	1.UV fault is reported after power-on: Check the input power supply voltage; Check the input power supply terminal; Check the wiring parts of the mainboard and the power board. 2.No-load uplink is normal, downlink reports fault: Check the surge resistor status. 3.Fault is reported in emergency: Check whether the motherboard X18 signal line is normal. 4.UV fault is reported after the system loses power: UV fault is recorded every time the power is lost, which is normal.
DF2	OV	Overvoltage The DC bus voltage of the main circuit is higher than the overvoltage protection setting value (400V level, bus overvoltage protection value is about DC760V; 200V level, bus overvoltage protection value is about DC410V).	The input power voltage is too high; The braking is abnormal or there is no external braking resistor or the braking resistor value is mismatched; The deceleration curve is too steep.	Check the input power supply; Check the wiring of the brake resistor; Check the resistance value of the brake resistor; Slow down the deceleration curve.
DF3	OH	Heat sink or driver module overheating When the module temperature is higher than the preset value and lasts for a period of time, a fault is reported; When the module temperature is lower than zero degrees and lasts for a period of time, a fault is reported.	The ambient temperature is too high; There are heating elements around; The cooling fan is faulty; The current temperature is below zero degrees; The connection between the main board and the power board is poor.	Lower the ambient temperature; Move away surrounding heat sources; Check the cooling fan wiring and air duct; Turn off FX-21 (negative temperature alarm enable); Check the connectors of the mainboard and power supply.

Figure 2 Driver fault list (Cont'd)

Fault code	Display	Name and content	cause of issue	Solution
DF4	IF	IPM Fault A serious short-circuit fault is detected in the driver module, and the system automatically triggers the hardware overcurrent protection. You need to check the peripheral short-circuit fault first, and you cannot retry directly.	IPM overcurrent or short circuit; IPM over-temperature; IPM control power supply abnormality (undervoltage); Motor wire adhesion or short circuit to ground; Star-sealing contactor contact abnormal action.	Check if the output is short-circuited; Check if the motor is short-circuited; If not, please contact the manufacturer; Check if the contactor action status of the star-sealing contactor is normal.
DF5	OC	Overcurrent The instantaneous value of the controller phase current exceeds the overcurrent detection value and the duration exceeds the specified time limit.	Output short circuit (line short circuit, motor short circuit); Load is too large; Curve is too sharp; Encoder signal connection is poor; Motor parameters and encoder parameters are incorrectly set: 1. The synchronous host origin value is incorrect; 2. The asynchronous host slip frequency is too large; 3. The host pole number is incorrectly set; 4. The encoder line number is incorrectly set; 5. The PI regulator parameters are incorrectly set.	Check if the output and motor are short-circuited; Check if the load matches the power of the integrated machine; Check if the curve is too fast, and change it to slow; Check if the encoder signal is connected normally; Check if the motor parameters or encoder parameter settings are correct: 1. Check if the synchronous host encoder origin value is correct; 2. Check if the asynchronous motor slip frequency is correct; 3. Check if the number of motor poles is correct; 4. Check if the encoder line number is correct; 5. Check if the PI regulator parameters are incorrect.
DF6	CF	CPU failure Controller is not working properly.	Excessive electromagnetic interference.	Please contact the manufacturer.
DF7	OS	Overspeed: The motor speed feedback exceeds the maximum speed limit and lasts for longer than the specified time.	The maximum speed limit value and its duration value are improperly set; The speed overshoot is too large; The encoder feedback is poor; The motor and encoder parameters are incorrectly set.	Check the maximum speed limit value and its duration parameter settings; Check the speed loop P and I parameters; Check the encoder; Check the motor and encoder setting parameters.

Figure 2 Driver fault list (Cont'd)

Fault code	Display	Name and content	cause of issue	Solution
DF8	OE	<p>Speed is out of tolerance The speed deviation is too large, and the speed exceeds the deviation set value [F9-03] and the duration exceeds the specified time.</p>	<p>Defective encoder; Abnormal motor brake action; Incorrect motor and encoder parameter settings; Motor line sequence and encoder line sequence do not correspond; Excessive load; Too sharp curve; Inappropriate setting of deviation value and its specified time.</p>	<p>Check the encoder; Check the motor brake opening and closing status; Check the motor and encoder parameters; Change the motor line sequence or change the encoder A+, A- or B+, B- signal lines; Check the mechanical system and reduce the load; Slow down the curve; Adjust its parameter settings.</p>
DF10	FF	<p>Flash error When saving parameters, the data is incorrect.</p>	<p>The onboard data memory is not functioning properly.</p>	<p>Please contact the manufacturer.</p>
DF11	BF	<p>Base blockade error When the system detects that the base blocking is effective, it receives the motor operation command but does not meet the operation conditions.</p>	<p>External base lock wiring error; Base lock level type setting error.</p>	<p>Check base blocking terminal wiring; Change base blocking level type setting.</p>
DF12	OL	<p>Overload Motor overload: The motor current exceeds the motor rating by 150% and lasts for 60 seconds or exceeds 200% and lasts for 10 seconds. Controller overload: The motor current exceeds the drive rating by 150% and lasts for 60 seconds or exceeds 200% and lasts for 10 seconds.</p>	<p>The load is too large; The controller capacity is too small; The motor capacity is insufficient.</p>	<p>Reduce the load; Replace a controller with suitable capacity; Replace a host with suitable power or appropriately increase the value of F5-08 [rated current] to improve the motor overload function.</p>

Figure 2 Driver fault list (Cont'd)

Fault code	Display	Name and content	cause of issue	Solution
DF13	MC	<p>The controller main circuit MC (contactor) is malfunctioning.</p> <p>The pull-in command is given, but it does not pull in the specified time.</p>	<p>The wiring of the main circuit MC is poor or damaged;</p> <p>FX-23 [surge feedback type] is set incorrectly;</p> <p>The driving power supply of the bottom shell power board is abnormal.</p>	<p>Try disconnecting and then connecting the controller power supply;</p> <p>If this protection occurs continuously, contact the manufacturer or replace the controller;</p> <p>Modify the FX-23 [surge feedback type] status;</p> <p>Power off the system, power it on again, and check whether the fault repeats.</p>
DF14	BR	<p>Brake failure</p> <p>When the system detects that the bus voltage reaches the braking range, the brake pipe is continuously opened for more than the preset timeout period.</p>	<p>The brake IGBT is damaged or the brake resistor is missing;</p> <p>The main board and power board are poorly connected.</p>	<p>Check the brake resistor and its wiring or replace the controller;</p> <p>Check the main board and power board connectors.</p>
DF15	OF	<p>Output phase loss</p> <p>Motor control conditions are not met after the system detects an output open circuit or phase loss.</p>	<p>Output wire is broken, output terminal is loose;</p> <p>motor winding is broken;</p> <p>System detection is too sensitive, resulting in false detection.</p>	<p>Check the output wires and their terminals, and check if the motor windings are broken;</p> <p>Cancel the output phase loss detection by setting FD-21.BIT2 to 1.</p>
DF16	SCF	<p>Output current is not blocked when parking</p> <p>After the system executes the stop command, it detects that the output current is not zero and lasts for a preset time.</p>	<p>The elevator control cabinet is not working properly; the drive controller is damaged.</p>	<p>Check the elevator control cabinet wiring;</p> <p>Replace the drive controller.</p>
DF17	SRF	<p>Slip failure when parking</p> <p>After the system executes the stop command, it detects that the encoder feedback speed is not zero.</p>	<p>The brake force is insufficient or the encoder is loose or disturbed.</p>	<p>Adjust the brake, tighten the encoder, and eliminate or block interference.</p>

Figure 2 Driver fault list (Cont'd)

Fault code	Display	Name and content	cause of issue	Solution
DF21	DF	Parameter setting error The system detects that the rated current, motor no-load current, motor slip frequency, motor pole pair number, or encoder line number setting is abnormal.	Parameter setting error, focus on checking the motor rated current, motor no-load current, motor pole pair number, motor slip frequency, encoder line number, etc.	Check the relevant setting parameters.
DF22	SDF	Internal self-test error The system has detected a fault type that cannot be assigned to a general fault number.	Internal manufacturer error.	Please contact the manufacturer.
DF23	150	The current acquisition sensor is abnormal. When the elevator starts, the system detects that the instantaneous value of the current in the current sensor is not near zero.	The connection between the mainboard and the driver power supply is poor; The current sensor hardware is faulty.	Detect the connection between the motherboard and the driver power board; Please contact the manufacturer.
DF24	151	Zero speed state timeout The system detects that the elevator controller has been giving a zero speed state and has exceeded the zero speed timeout period.	The elevator controller speed setting is abnormal.	Check whether the maintenance speed or rated ladder speed setting is reasonable.
DF25	152	Base block failure in the motherboard The drive controller detects that the system has a base blocking signal and cannot perform a fault reset.	The connection between the control components in the main control board is abnormal; The connection between the main control board and the power board is abnormal.	Check the main control board connection or replace the main control board; Check whether the main board and power board cables are connected properly.

Figure 2 Driver fault list (Cont'd)

Fault code	Display	Name and content	cause of issue	Solution
DF26	153	Load compensation timing abnormality When compensation with weighing device is started, the system detects the motor rotation.	The motor holding force is insufficient or the advance opening time is too short.	Check whether the motor brake is normal or whether the system advance brake opening time is set too short.
DF27	154	Angle self-learning failed The system detected that the load angle self-learning failed to complete normally.	Self-learning with load angle stopped in the middle of the process due to a fault, and self-learning was not performed correctly.	Eliminate the faults encountered in angle self-learning and perform angle self-learning again. Note: Do not force the elevator to start if the load angle self-learning fails, as there is a risk of the elevator running away.
DF28	155	Internal bus communication abnormality The system detected an abnormality in the internal communication of the main control board.	The connection between the controllers inside the main control board is abnormal; The elevator controller command is abnormal; The main control board related components are working abnormally.	Replace the mainboard, or contact the manufacturer if there is strong electromagnetic interference; Check or replace the mainboard to eliminate the fault.
DF29	156	Abnormal motor operation mode The speed source selection F9-01 does not match the current execution control logic.	F9-01 [Speed source selection] setting error.	When the elevator is running normally, it is necessary to confirm that F9-01=2.
DF30	157	Bottom shell power identification abnormality The main control computer board cannot correctly identify the bottom case configuration information.	The connection between the mainboard and the power driver board is poor; The mainboard related components are working abnormally; The power board related components are working poorly.	Check whether the connection between the main control board and the drive power board is normal; Replace the main board and troubleshoot; Replace the power board and troubleshoot.

Figure 2 Driver fault list (Cont'd)

Fault code	Display	Name and content	cause of issue	Solution
DF31	158	The underlying driver communication is abnormal. A communication anomaly with the underlying driver chip on the board was detected.	The connection between the main control board components is abnormal.	Check whether there is strong electromagnetic interference or contact the manufacturer; Replace the mainboard and troubleshoot.
DF33	160	Before starting, the feedback speed is abnormal Before the elevator starts, it detects that the encoder feedback speed is out of limit.	The encoder signal is abnormal; The motor brake force is insufficient or the brake is open.	Check whether the encoder A and B signals are normal; Check the motor brake.
DF34	161	When the system is detecting the brake force, it detects that the encoder feedback displacement value is too large.	The brake force is insufficient or the brake is open; The encoder feedback signal is abnormal.	Check whether the brake is normal; Check whether the encoder signal is normal.
DF35	162	During safety protection, the motor creep displacement is too large When the system is in safety protection state, it is detected that the encoder feedback displacement value is too large.	The brake force is seriously insufficient or the brake is open; The encoder feedback signal is abnormal; The control parameter settings are unreasonable.	Check whether the brake is normal; Check whether the encoder signal is normal; The relevant parameters of safety protection are set unreasonably.
DF36	163	Three-phase power line input phase loss During system operation, input phase loss was detected; During system operation, the chassis drive power supply was detected to be abnormal.	The three-phase power line is missing a phase or the three-phase voltage amplitude is too low; Check the fault record to see if there is an IF fault, and handle it according to the IF fault; The connection line between the main board and the power board is bad.	Check whether the three-phase power line is missing a phase; Check whether the three-phase output line is short-circuited; Check whether the connection between the main board and the driver power board is firm; When using a single-phase power supply, set FD-21.BIT0=1 to shield the input phase loss protection.

Figure 2 Driver fault list (Cont'd)

Fault code	Display	Name and content	cause of issue	Solution
DF37	164	<p>Three-phase output line short circuit</p> <p>There is a short circuit fault between the three-phase output lines of the integrated machine or between the ground and the N line.</p>	<p>The three-phase output line is short-circuited between phases;</p> <p>The three-phase output line is short-circuited relative to ground;</p> <p>The three-phase output line is short-circuited relative to N;</p> <p>The power matching between the motor and the controller is unbalanced.</p>	<p>Detect interphase short circuit of the three-phase output line of the integrated machine;</p> <p>Detect short circuit of the three-phase output line of the integrated machine to ground;</p> <p>Detect short circuit of the three-phase output line of the integrated machine to N;</p> <p>Detect whether the power matching of the motor and the controller is normal. This fault can be shielded by FD-21.BIT3=1.</p> <p>Note: It is not recommended to disable this protection function, as there is a risk of burning the driver module.</p>
DF38	165	<p>Three-phase output current unbalance</p> <p>The system detects that the three-phase output current is not near the current zero zone and exceeds the preset time.</p>	<p>One of the three-phase output lines is short-circuited to ground or to N;</p> <p>There is an abnormality in the three-phase current feedback channel.</p>	<p>Detect the short circuit fault of the three-phase output of the integrated machine to N or to the ground;</p> <p>Detect the current sensor feedback channel of the current.</p>
DF39	166	<p>Output voltage saturation</p> <p>During system operation, it was detected that the integrated output voltage was saturated.</p>	<p>The three-phase power supply voltage is too low;</p> <p>The rated speed of the motor does not match the actual speed;</p> <p>The slip frequency of the asynchronous motor is set too low;</p> <p>The load of the asynchronous motor is too large.</p>	<p>Check the bus voltage and power supply;</p> <p>Check whether the rated speed of the motor is consistent with the nameplate;</p> <p>Fine-tune the slip frequency of the asynchronous motor;</p> <p>Check the balance coefficient of the elevator.</p>