Goodrive390L Series Lift-dedicated VFD

Quick Start Guide

This guide describes the instructions of operating Goodrive390L series lift-dedicated variable frequency drive (VFD), including information about the safety precautions, external wiring, terminal functions, quick startup, keypad, common function parameters, and common faults. Please scan the e-manual platform QR code provided in part 8 or marked on the VFD housing for more information.
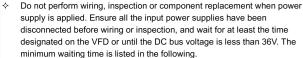
1 Safety precautions

1.1 Warning

Sign	Name	Description	Abbreviation
Danger	Danger	Severe personal injury or even death can result if related requirements are not followed.	
Warning	Warning	Personal injury or equipment damage can result if related requirements are not followed.	
Forbid	Electrostatic sensitive	The PCBA may be damaged if related requirements are not followed.	
Hot	Hot sides	Do not touch. The VFD base may become hot.	
Electric shock risk 5 min	Electric shock risk	As high voltage still presents in the bus capacitor after power off, wait for at least five minutes (or 15 min / 25 min, depending on the warning symbols on the machine) after power off to prevent electric shock.	5 min
Read manual	Read manual	Read the operation manual before operating the equipment.	
Note	Note	Actions taken to ensure proper running.	Note

1.2 Safety guidelines

- Only trained and qualified professionals are allowed to carry out related operations.
- Do not perform wiring, inspection or component replacement when power supply is applied. Ensure all the input power supplies have been disconnected before wiring or inspection, and wait for at least the time designated on the VFD or until the DC bus voltage is less than 36V. The minimum waiting time is listed in the following.

VFD model		Minimum waiting time
1PH 220V	2.2kW	5 minutes
3PH 220V	2.2kW–18.5kW	5 minutes
3PH 380V	4kW–37kW	5 minutes

- Do not refit the VFD unless authorized; otherwise fire, electric shock or other injury may result.
- The base may become hot when the machine is running. Do not touch. Otherwise, you may get burnt.
- The electrical parts and components inside the VFD are electrostatic sensitive. Take measurements to prevent electrostatic discharge when performing related operations.
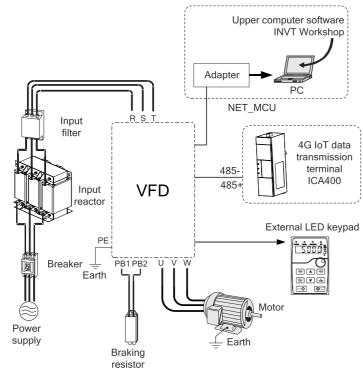
1.3 Environment condition

Environment	Condition
Ambient temperature	❖ -10–+50°C ❖ When the ambient temperature exceeds 40°C, derate 1% for every increase of 1°C. ❖ Do not use the VFD when the ambient temperature exceeds 50°C. ❖ In order to improve reliability, do not use the VFD in the places where the temperature changes rapidly. ❖ When the VFD is used in a closed space, such as control cabinet, use a cooling fan or air conditioner for cooling, preventing the internal temperature from exceeding the temperature required. ❖ When the temperature is too low, if you want to use the VFD that has been idled for a long time, install an external heating device before the use to eliminate the freeze inside the VFD. Otherwise, the VFD may be damaged.
Relative humidity (RH)	❖ RH: less than 90% ❖ Condensation is not allowed. ❖ The max. RH cannot exceed 60% in the environment where there are corrosive gases.
Running environment	Install the VFD in a place: ❖ Away from electromagnetic radiation sources ❖ Without oil mist, corrosive gas, flammable gas, radioactive gas, contaminative air, or contaminative liquid. ❖ Without the chance for foreign objects such as metal powder, dust, oil and water to fall into the VFD (do not install the VFD onto combustible objects such as wood) ❖ With low salt content ❖ Without direct sunlight

Environment	Condition
Altitude	❖ Lower than 1000 meters ❖ When the altitude exceeds 1000m, derate by 1% for every additional 100m. ❖ When the installation site altitude exceeds 3000m, consult the local INVT dealer or office.
Vibration	The max. amplitude of vibration cannot exceed 5.8m/s² (0.6g).
Installation direction	Install the VFD vertically to ensure good heat dissipation performance.

2 Peripheral wiring

Figure 2-1 Peripheral equipment connection

3 Terminal function

3.1 Main circuit terminal diagram

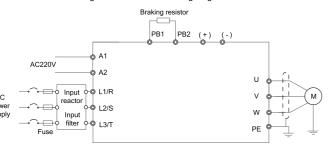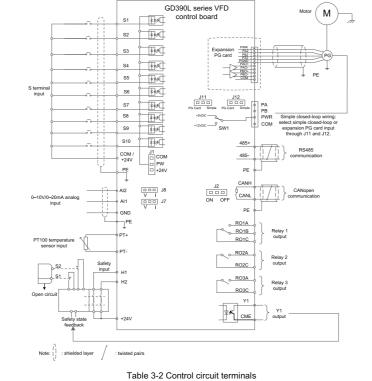Figure 3-1 Main circuit wiring diagram

Table 3-1 Main circuit terminal description

Terminal symbol	Terminal name	Function
L1, L2, L3 (or R, S, T)	Main circuit power input	Connect R, S, T terminals when the input is 3PH AC 380V. Connect L1, L2, L3 terminals when the input is 3PH AC 220V. Connect any two of L1, L2, L3 terminals when the input is single phase AC 220V.
PB1, PB2	Reserved terminal to connect to the external braking resistor	To connect the external braking resistor
(+), (-)	DC bus terminal	To connect the DC 48V emergency power supply
A1, A2	Auxiliary power input port	When the DC 48V emergency power supply is used, connecting the UPS AC 220V power supply can enable the normal operation of the internal auxiliary power supply of the VFD.
U, V, W	VFD output	3PH AC output terminals, connected to the motor.
(Grounding)	Grounding terminal	Grounding terminal

3.2 Control circuit wiring diagram

Figure 3-2 Wiring diagram of basic control circuit

Note: ─── : shielded layer ∼ : twisted pairs

Table 3-2 Control circuit terminals

Terminal symbol	Description
+24V	Used to externally provide 24V±10% power supply. Max. output current: 200mA
COM	Reference ground of +24V
S1–S10	Regular digital input terminals 1. Internal impedance: 3.3kΩ 2. 12–30V voltage input is acceptable. 3. Bi-direction input terminal, supporting both NPN and PNP (Selected through the jumper J1) 4. Max. input frequency: 1kHz 5. All of them are programmable digital input terminals. Users can set the terminal function by function code.
Y1, CME	Open collector outputs 1. Switch capacity: 50mA/30V 2. Output frequency range: 0–1kHz
RO1 RO2 RO3	Three programmable relay outputs One group of NC and NO output: RO1A: NO; RO1B: NC; RO1C: common Two groups of NO output: RO2A, RO2C; RO3A, RO3C Contact capacity: 3A/AC250V, 1A/DC30V
AI1, AI2	1. Input range: 0–10V or 0–20mA, set through the jumpers J7 and J8. 2. Input impedance: 20kΩ for voltage input or 500Ω for current input 3. Resolution: 5mV when 10V corresponds to 50Hz. 4. Error: ±1% at 25°C
PT+, PT-	PT100 interfaces 1. Resolution: 1°C 2. Range: -20°C–150°C 3. Detection precision: ±3°C
PA, PB	Simple closed-loop encoder signal interfaces 1. Applicable to 5V/12V push-pull, OC encoders 2. Response frequency: 100kHz
PWR	Encoder power interface. The common terminal is COM which can be set to 5V or 12V through SW1.
CANH, CANL	CANopen communication interfaces. The terminal matching resistor can be connected through the jumper J2.
485+, 485-	RS485 communication interfaces
H1, H2	STO function input terminals 1. Connected to external NC contacts. When the contacts open, STO acts and VFD output stops. 2. H1 and H2 are redundant inputs. They are short connected to +24V by default. Remove the jumper before using STO function. 3. Use the shielded cable with a length shorter than 25m.

4 Quick startup

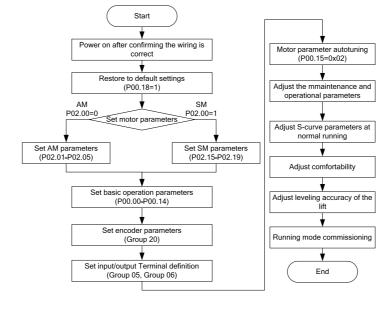### 4.1 Check before power-on

- Ensure that all terminals have been securely connected.
- Ensure that the motor power matches the VFD power.

4.2 First power-on

After confirming the wiring and power are correct, close the air switch of the AC power supply at the VFD input side to power on the VFD. The keypad displays as the following figure, indicating that the VFD is ready for run.

The quick startup diagram is as follows:

5 Keypad

Table 5-1 LCD keypad

No.	Name	Description	
1	Status indicator	RUN/TUNE	Off: The VFD is stopped. On: The VFD is running.
		FWD/REV	Forward or reverse running indicator Off: The VFD is running forward. On: The VFD is running reversely.
		LOCAL/REMOT	Indicates whether the VFD is controlled through the keypad, terminals, or communication. Off: The VFD is controlled through the keypad. Blinking: The VFD is controlled through terminals. On: The VFD is controlled through remote communication.
		TRIP	Fault indicator LED on: The VFD is in fault state. LED off: The VFD is in normal state.
2	Keys	PRG ESC Programming key	Press it to enter or exit level-1 menus.
		DATA ENT Confirmation key	Press it to enter menus in cascading mode or confirm the setting of a parameter.
		▲ UP key	Press it to increase data or move upward.
		▼ Down key	Press it to decrease data or move downward.
		SHIFT Right-shifting key	Press it to select display parameters rightward in the interface for the VFD in stopped or running state or to select digits to change during parameter setting.
		Run key	Press it to run the VFD when using the keypad for control.
		Stop/Reset key	Press it to stop the VFD that is running. The function of this key is restricted by P07.04. In fault alarm state, this key can be used for reset in any control modes.
		QUICK JOG Multifunction shortcut key	The function is determined by P07.02.

Note: The standard keypad type (LCD/LED) depends on the VFD models.

6 Common function parameter setup

The following table briefly describes some common function parameters and typical values.
"○" indicates that the value of the parameter can be modified when the VFD is in stopped or running state.
"◉" indicates that the value of the parameter cannot be modified when the VFD is in running state.
"●" indicates that the value of the parameter is detected and recorded, and cannot be modified.
(The VFD automatically checks and constrains the modification of parameters, which helps prevent incorrect modifications.)

Function code	Name	Description	Default	Modify
P00.00	Speed control mode	0–3 0: Sensorless vector control (SVC) mode 1: Reserved 2: VF control 3: Closed-loop vector control	2	◉
P00.01	Channel of running commands	0–2 0: Keypad 1: Terminal 2: Communication	0	◉
P00.02	Communication mode of running commands	0–1 0: Modbus/Modbus TCP communication 1: CANopen	0	◉
P00.03	Max. output frequency	Max(P00.04, 10.00)–200.00Hz	50.00Hz	◉
P00.04	Upper limit of running frequency	P00.05–P00.03	50.00 Hz	◉
P00.05	Lower limit of running frequency	0.00 Hz–P00.04	0.00 Hz	◉
P00.06	Rated speed of the elevator	0.100–4.000m/s	1.000m/s	◉
P00.07	Speed command channel selection	0–9 0: Keypad 1: AI1 (follow) 2: AI2 (follow) 3: AI1 4: AI2 5: Reserved 6: Multi-step speed running 7–8: Reserved 9: CANopen communication	0	◉
P00.10	Speed set through keypad	0.000 m/s–P00.06	1.000m/s	○
P00.13	Running direction	0–2 0: Run in default direction 1: Run in reverse direction 2: Disable reverse running	0	◉
P00.14	Carrier frequency setting	Specifies the carrier frequency. A high carrier frequency will have an ideal current waveform, few current harmonics, and small motor noise, but it will increase the switch loss, increase VFD temperature, and impact the output capacity. At the same time, the VFD current leakage and electrical magnetic interference will increase. On the contrary, an extremely-low a carrier frequency may cause unstable operation at low frequency, decrease the torque, or even lead to oscillation. The carrier frequency has been properly set in the factory before the VFD is delivered. In general, you do not need to modify it. Setting range: 1.0–15.0 kHz Note: When the frequency used exceeds the default carrier frequency, the VFD needs to derate by 10% for each increased of 1kHz.	Model depended (8.0kHz)	◉
P00.15	Motor parameter autotuning	0x00–0x34 Ones place: Motor basic parameter autotuning 0: No operation 1: Reserved 2: Complete parameter static autotuning 3: Reserved 4: Deadzone compensation autotuning Tens place: Initial pole angle autotuning 0: No operation 1: Reserved 2: Static autotuning 3: Rotary autotuning 2	0x00	◉
P00.18	Function parameter restoration	0–2 0: No operation 1: Restore to default values (excluding motor parameters) 2: Clear fault records	0	◉
P01.00	Start mode	0–1 0: Direct start 1: Start after DC braking	0	◉
P01.06	ACC/DEC mode	0–1 0: Linear 1: S curve	1	◉
P01.09	Starting frequency of DC braking for stop	Starting frequency of DC braking for stop: During the deceleration to stop, the VFD starts DC braking for stop when running frequency reaches the starting frequency determined by P01.09.	0.00Hz	◉
P01.11	DC braking current for stop	0.0%	◉

Function code	Name	Description	Default	Modify
P01.12	DC braking time for stop	DC braking current for stop: It indicates the applied DC braking energy. Stronger current indicates greater DC braking effect. DC braking time for stop: It indicates the hold time of DC braking. If the time is 0, DC braking is invalid, and the VFD decelerates to stop within the specified time. Setting range of P01.09: 0.00–P00.03(Hz) Setting range of P01.11: 0.0–100.0% (of the VFD rated output current) P01.12 setting range: 0.00–50.00s	0.00s	◉
P01.15	Stop inflection speed	0.000m/s–P00.06	0.000m/s	◉
P02.00	Motor type	0–1 0: Asynchronous motor (AM) 1: Synchronous motor (SM)	0	◉
P02.01	Rated power of AM	0.1–3000.0kW	Model depended (0.4kW)	◉
P02.02	Rated frequency of AM	0.01Hz–P00.03(Hz)	50.00Hz	◉
P02.03	Rated speed of AM	1–60000rpm	Model depended (1400rpm)	◉
P02.04	Rated voltage of AM	0–1200V	Model depended (380V)	◉
P02.05	Rated current of AM	0.8–6000.0A	Model depended (1.0A)	◉
P02.06	Stator resistance of AM	0.001–65.535Ω	Model depended (0.001Ω)	○
P02.07	Rotor resistance of AM	0.001–65.535Ω	Model depended (0.001Ω)	○
P02.08	Leakage inductance of AM	0.1–6553.5mH	Model depended (0.1mH)	○
P02.09	Mutual inductance of AM	0.1–6553.5mH	Model depended (0.1mH)	○
P02.10	No-load current of AM	0.1–6553.5A	Model depended (0.1A)	○
P02.15	Rated power of SM	0.1–3000.0kW	Model depended (0.4kW)	◉
P02.16	Rated frequency of SM	0.01–P00.03(Hz)	50.00Hz	◉
P02.17	Number of pole pairs of SM	1–128	2	◉
P02.18	Rated voltage of SM	0–1200V	Model depended (380V)	◉
P02.19	Rated current of SM	0.0–6000.0A	Model depended (1.0A)	◉
P02.20	Stator resistance of SM	0.001–65.535Ω	Model depended (0.001Ω)	○
P02.21	Direct-axis inductance of SM	0.01–655.35mH	Model depended (0.1mH)	○
P02.22	Quadrature-axis inductance of SM	0.01–655.35mH	Model depended (0.1mH)	○
P02.23	Counter-emf of SM	0–10000V	300V	○
P02.33	Pulley diameter	100–2000mm	500mm	○
P02.34	DEC ratio	0.50–50.00	1.00	○
P02.35	Speed ratio	0–65535	1000	○
P03.00	Speed-loop proportional gain 1	0.0–200.0	20.0	○
P03.01	Speed-loop integral time 1	0.000–10.000s	0.600s	○
P03.02	Low-point frequency for switching	0.00–P03.05(Hz)	5.0Hz	○
P03.03	Speed-loop proportional gain 2	0.0–200.0	20.0	○
P03.04	Speed-loop integral time 2	0.000–10.000s	0.600s	○
P03.05	High-point frequency for switching	P03.02–P00.03(Hz)	10.00Hz	○
P03.06	Speed-loop output filter	0–8	0	○
P03.09	Current loop bandwidth	0–2000Hz	400Hz	○

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Function code	Name	Description	Default	Modify
P05.01	Function of S1	0–40	0	◎
P05.02	Function of S2	0: No function	1	◎
P05.03	Function of S3	1: Up running (FWD)	2	◎
P05.04	Function of S4	2: Down running (REV)	8	◎
P05.05	Function of S5	3: Running in inspection (EXM)	9	◎
P05.06	Function of S6	4: Emergency running (EMER)	10	◎
P05.07	Function of S7	5: Coast to stop (FSTP)	0	◎
P05.08	Function of S8	6: Fault reset (RET)	0	◎
P05.09	Function of S9	7: External fault (EF)	0	◎
P05.10	Function of S10	8: Multi-speed terminal 1 (MS1) 9: Multi-speed terminal 2 (MS2) 10: Multi-step speed terminal 3 (MS3) 11: Up forced DEC 1 (UFS1) 12: Up forced DEC 2 (UFS2) 13: Up forced DEC 3 (UFS3) 14: Down forced DEC 1 (DFS1) 15: Down forced DEC 2 (DFS2) 16: Down forced DEC 3 (DFS3) 17: Contactor feedback signal (TB) 18: Brake feedback signal (FB) 19: VFD enabling (ENA) 20: Forced decelerate to stop 21: Emergency mode 22: Motor overheating 23: Main power supply input disconnected (for India) 24: UPS input disconnected by main control (for India) 25: Base lockout 26: Brake feedback signal 2 27: Brake travel feedback 1 28: Brake travel feedback 2 29: Brake travel feedback 3 30: Brake travel feedback 4 31: Reserved 32: Upper door zone 33: Middle door zone 34: Lower door zone 35: High-speed trigger point 36: Medium-speed trigger point 37–40: Reserved	0	◎
P05.13	Input terminal polarity	0x000–0x3FF bit0: S1 bit1: S2 bit2: S3 bit3: S4 bit4: S5 bit5: S6 bit6: S7 bit7: S8 bit8: S9 bit9: S10	0x000	○
P05.14	Digital input filter time	0.000–1.000s The function code is used to specify the filter time of S1–S10 terminal sampling. In strong interference cases, increase the value to avoid maloperation.	0.010s	○
P06.01	Y1 output	0: No output	1	○
P06.03	Relay output RO1	1: Lift in operation	0	○
P06.04	Relay output RO2	2: Up operation	7	○
P06.05	Relay output RO3	3: Down running 4: Fault output 5: Running at zero speed 6: Ready for running 7: Brake control 8: Contactor control 9: Any frequency reached 10: Frequency level detection FDT1 output 11: Frequency level detection FDT2 output 12: Brake 2 control 13: Light-load direction detection completed 14: Down as the light-load direction detection result 15: Up as the light-load direction detection result 16: Running 1 (excluding current withdrawal) 17: STO action 18: SPI fault output 19: UPS control signal output (India) 20: Star-shorted output 21: Waiting after autonomous rescue leveling 22–30: Reserved	8	○
P06.06	Output terminal polarity selection	0x00–0x0F bit0: Y1 bit1: RO1 bit2: RO2 bit3: RO3	0x00	○
P07.01	Parameter copy	0–4 0: No operation 1: Upload parameters to the keypad 2: Download parameters (including motor parameters) 3: Download non-motor parameters	0	◎
P08.52	STO-SAFE status reset selection	0–3 0: Manual reset, with triggering fault oupout	3	◎

1: Automatic reset, with triggering fault oupout
2: Manual reset, without triggering fault output
3: Automatic reset, without triggering fault output triggered

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Function code	Name	Description	Default	Modify
P10.00	Multi-step speed 0	0.000m/s–P00.06	0.000m/s	○
P10.01	Multi-step speed 1	0.000m/s–P00.06	0.000m/s	○
P10.02	Multi-step speed 2	0.000m/s–P00.06	0.000m/s	○
P10.03	Multi-step speed 3	0.000m/s–P00.06	0.000m/s	○
P10.04	Multi-step speed 4	0.000m/s–P00.06	0.000m/s	○
P10.05	Multi-step speed 5	0.000m/s–P00.06	0.000m/s	○
P10.06	Multi-step speed 6	0.000m/s–P00.06	0.000m/s	○
P10.07	Multi-step speed 7	0.000m/s–P00.06	0.000m/s	○
P10.38	S-curve ACC start segment duration	0.1–360.0s	2.0s	◎
P10.39	S-curve ACC end segment duration	0.1–360.0s	2.0s	◎
P10.40	ACC time	0.1–360.0s	2.0s	◎
P10.41	S-curve DEC start segment duration	0.1–360.0s	2.0s	◎
P10.42	S-curve DEC end segment duration	0.1–360.0s	2.0s	◎
P10.43	DEC time	0.1–360.0s	2.0s	◎
P10.44	S-curve start duration during stop	0.1–360.0s	2.0s	◎
P10.45	S-curve end segment duration during stop	0.1–360.0s	2.0s	◎
P10.46	Running speed at maintenance	0.000m/s–P00.06	0.200m/s	○
P10.47	ACC/DEC time at maintenance	0.1–360.0s	4.0s	◎
P10.48	Forced DEC time	0.1–360.0s	2.0s	◎
P10.49	Emergency running speed	0.001–P00.06(m/s)	0.100m/s	○
P10.50	Emergency ACC/DEC time	0.1–360.0s	20.0s	○
P10.53	DEC time for creeping to stop	0.1–360.0s During deceleration to stop, when the speed reached the value set in P01.15, the speed is switched to the DEC time set in P10.53, the curve of deceleration to stop switches to those set in P10.44, P10.45, and P10.53.	2.0s	○
P10.54	Frequency threshold for light-load detection in open-loop control	5.00–20.00Hz	5.00Hz	◎
P11.00	Protection against phase loss	0x000–0x111 Ones place: 0: Disable software input phase loss protection. 1: Enable software input phase loss protection. Tens place: 0: Output phase loss protection disabled 1: Protection against output phase loss enabled Hundreds place: 0: Output phase loss not enabled before startup 1: Output phase loss enabled before startup	0x010	◎
P14.00	Local serial communication address	1–247	1	○
P14.01	Communication baud rate	0–7 0: 1200 bps 1: 2400 bps 2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps 6: 57600 bps 7: 115200 bps	4	○
P14.02	Data bit check	0–5 0: No check (N, 8, 1) for RTU 1: Even check (E, 8, 1) for RTU 2: Odd check (O, 8, 1) for RTU 3: No check (N, 8, 2) for RTU 4: Even check (E, 8, 2) for RTU 5: Odd check (O, 8, 2) for RTU	1	○
P14.03	Communication response delay	0–200ms	5ms	○
P14.04	485 communication timeout period	0.0–60.0s	0.0s	○
P14.10	Enabling 485 upgrade program	0–2 0: Disable 1: Enable OTA upgrade of MCU 2: Enable USB upgrade of MCU Note: The OTA upgrade of DSP does not require software upgrade, and hardware enablement can be achieved by burning the adapter cable, DSP currently does not support USB upgrade.	0	◎

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Function code	Name	Description	Default	Modify
P14.15	Upgrade program information	0–5 0: Not upgraded 1–2 Reserved 3: Successfully upgraded 4–5: Reserved Note: When upgrading, set P14.15 to 0 before setting P14.10. After successful upgrade, P14.15 is automatically set to 3.	0	◎
P15.01	CANopen communication address	0–127	2	◎
P15.26	CANopen communication timeout period	0.0–60.0s	5.0s	○
P15.27	CANopen communication baud rate	0–7 0: 1000kbps 1: 800kbps 2: 500kbps 3: 250kbps 4: 125kbps 5: 100kbps 6: 50kbps 7: 20kbps	3	◎
P20.00	Encoder type selection	0–6 0: Incremental encoder 1: Reserved 2: Sin/Cos encoder without CD signal 3: Endat absolute encoder 4: SSI absolute encoder 5: Sin/Cos encoder with CD signal 6: Reserved	0	◎
P20.01	Encoder pulse number	0–16000	1024	○
P20.02	Encoder direction	0x000–0x111 Ones place: AB signal direction 0: Forward 1: Reverse Tens place: Reserved Hundreds place: CD/absolute position pole signal direction 0: Forward 1: Reverse	0x000	◎
P20.06	Speed ratio between encoder mounting shaft and motor	You need to set the function parameter when the encoder is not installed on the motor shaft and the drive ratio is not 1. Setting range: 0.001–65.535	1.000	○
P20.09	Initial angle of Z pulse	Relative electric angle between the encoder Z pulse and the motor pole position. Setting range: 0.00–359.99°	0.00°	○
P20.10	Pole initial angle	Relative electric angle between the encoder position and the motor pole position. Setting range: 0.00–359.99°	0.00°	○

7 Common faults and solutions

The following lists common VFD faults, of which the possible causes and solutions are described briefly.

Fault code	Fault type	Possible cause	Solution
E1	Inverter unit U-phase protection	ACC is too fast. IGBT module is damaged. Misoperation caused by interference. Drive wires are poorly connected. To-ground short circuit occurs.	Increase ACC time. Replace the power unit. Check the drive wires. Check whether there is strong interference surrounding the peripheral device.
E2	Inverter unit V-phase protection		
E3	Inverter unit W-phase protection		
E4	Overcurrent during acceleration	ACC/DEC is too fast. The voltage of the grid is too low. VFD power is too small. Load transient or exception occurred. To-ground short circuit or output phase loss occurred. Strong external interference sources. The overvoltage stall protection is not enabled. Phase loss on output side.	Increase ACC/DEC time. Check the input power. Select a VFD with larger power. Check whether the load is short circuited (to-ground short circuit or line-to-line short circuit) or the rotation is not smooth. Check the output wiring. Check whether there is strong interference. Check the related function code settings. Check whether phase loss occurred on output side.
E5	Overcurrent during deceleration		
E6	Overcurrent during constant speed running		
E7	Overvoltage during acceleration	Exception occurred in input voltage. Large energy feedback. Lack of braking units.	Check the input power. Check whether load DEC time is too short or the motor starts during rotating.
E8	Overvoltage during deceleration		
E9	Overvoltage during constant speed running		
E10	Bus undervoltage fault	The voltage of the grid is too low. The overvoltage stall protection is not enabled.	Check the grid input power supply. Check the setting of related function codes.
E11	Motor overload	Grid voltage is too low. The motor rated current is set incorrectly. The motor stall occurs or the load transient is too large.	Check the grid voltage. Reset the rated current of the motor. Check the load and adjust the torque boost quantity.

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Fault code	Fault type	Possible cause	Solution
E12	VFD overload	ACC is too fast. The motor in rotating is restarted. Grid voltage is too low. Load is too large. The motor power is too large.	Increase ACC time. Avoid restart after stop. Check the grid voltage. Select the VFD with larger power. Select a proper motor.
E13	Phase loss on input side	Phase loss or violent fluctuation occurred on input R, S, T.	Check the input power. Check the installation wiring.
E14	Phase loss on output side	Phase loss output occurs to U, V, W (or the three phases of the load are seriously asymmetrical).	Check the output wiring. Check the motor and cables.
E15	Rectifier module overheating	Air duct is blocked or fan is damaged. Ambient temperature is too high. Long-time overload running.	Ventilate the air duct or replace the fan. Lower the ambient temperature.
E16	Inverter module overheat		
E17	External fault	SI external faulty input terminal action.	Check external device input.
E18	RS485 communication fault	Improper baud rate. Communication line fault. Incorrect communication address. Communication suffers from strong interference.	Set proper baud rate. Check the wiring of communication interfaces. Set the communication address correctly. Change or replace the wire or improve the anti-interference capability.
E19	Current detection fault	Poor contact of the connector of control board. Hall component is damaged. Exception occurred to amplification circuit.	Check the connector and re-plug. Replace the main control board. Replace the main control board.
E20	Motor autotuning fault	The motor capacity does not match the VFD capacity. Motor parameter is set improperly. Autotuned parameter settings deviate sharply from the standard ones. Autotuning timeout.	Change the VFD model. Set proper motor type and nameplate parameters. Empty the motor load and carry out autotuning again. Check the motor wiring and parameter setup. Check whether the upper limit frequency is larger than 2/3 of the rated frequency.
E21	EEPROM operation fault	Error in reading or writing control parameters. EEPROM damaged.	Press STOP/RST to reset. Replace the main control board.
E22	PID feedback offline fault	PID feedback offline. PID feedback source disappears.	Check PID feedback signal. Check the wiring. Check PID feedback source.
E23	Braking unit fault	Fault occurred to the braking circuit or the braking pipe is damaged. Resistance of the external braking resistor is small.	Check the braking unit, and replace with new braking pipe. Increase the brake resistance.
E24	Running time reached	The actual running time of the VFD is longer than the internal set running time.	Ask for the supplier and adjust the set running time.
E25	Electronic overload fault	The VFD reports overload pre-alarm according to the setting.	Check the load and the overload pre-alarm points.
E26	Keypad communication fault	Keypad cable connected improperly or disconnected. Keypad cable too long, causing strong interference. Keypad or mainboard communication circuit error.	Check the keypad cable to determine whether a fault occurs. Check for and remove the external interference source. Replace the hardware and seek maintenance services.
E27	Parameter upload error	Keypad cable connected improperly or disconnected. Keypad cable too long, causing strong interference. Keypad or mainboard communication circuit error.	Check for and remove the external interference source. Replace the hardware and seek maintenance services.
E28	Parameter download error	Keypad cable connected improperly or disconnected. Keypad cable too long, causing strong interference. Data storage error occurred to the keypad.	Check for and remove the external interference source. Replace the hardware and seek maintenance services. Re-back up the data on the keypad.
E29	PROFIBUS communication fault	Communication address is not correct. The matching resistance is not set well. The master GSD file is not set up. The peripheral interference is too large.	Check the related settings. Check the surrounding environment, and eliminate interference effects.
E30	Ethernet communication fault	The address of Ethernet is set improperly. The communication mode is set improperly. The peripheral interference is too large.	Check the related settings. Check the communication mode selection. Check the surrounding environment, and eliminate interference effects.
E31	CANopen communication fault	Line contact is poor. The matching resistor is not switched on. Communication baud rates do not match. The peripheral interference is too large.	Check the line: switch on the matching resistor. Set the same baud rate. Check the surrounding environment, and eliminate interference effects.

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Fault code	Fault type	Possible cause	Solution
E32	To-ground short-circuit fault 1	VFD output is short connected to the ground. There is a fault in the current detection circuit.	Check whether the motor wiring is normal. Replace the hall component. Replace the main control board.
E33	To-ground short-circuit fault 2	VFD output is short connected to the ground. There is a fault in the current detection circuit.	Check whether the motor wiring is normal. Replace the hall component. Replace the main control board.
E34	Speed deviation fault	The feedback from brake 2 is inconsistent with the control signal for brake 2. The load is too heavy or stalled. Phase loss occurs in SM output.	Check whether the brake 2 is in good condition. Check feedback terminal signal.
E35	Mal-adjustment fault	SM control parameters are set incorrectly. Autotuned parameters are not accurate. The VFD is not connected to the motor.	Check the load and ensure the load is normal. Check whether the control parameters are set correctly. Increase the mal-adjustment detection time.
E36	Electronic underload fault	The VFD reports underload pre-alarm according to the setting.	Check the load and the underload pre-alarm points.
E37	Encoder offline fault	Incorrect encoder wiring, causes the failure to get the encoder signal. Incorrect encoder parameter settings.	Check encoder wiring. Check encoder parameter settings.
E38	Encoder reversal fault	Incorrect encoder signal direction.	Set the function code to change the floor detection or reverse the AB signal wires.
E39	Encoder Z pulse offline fault	The Z-pulse signal cable is not connected.	Check the Z-pulse signal cable.
E41	STO card circuit 1 exception	Circuit 1 of the STO card does not work.	Check whether the STO card is normal. Check circuit 1 of the STO card.
E42	STO card circuit 2 exception	Circuit 2 of the STO card does not work.	Check whether the STO card is normal. Check circuit 2 of the STO card.
E43	STO internal circuit exception	The internal circuits of the STO card do not work.	Check whether the internal circuits of the VFD control board are in good condition.
E44	Safety code CRC check	Exceptions occur in the verification of the safety circuit code.	Check whether the control board is in good condition.
E56	Encoder UVW disconnection	There are no U, V, or W signals or there is interference.	Check the U, V, and W signal wires.
E59	Motor over-temperature fault	Motor overtemperature input terminal is valid. The temperature detection resistance is abnormal. Long-time overload running or exception occurred.	Check the wiring of the motor overtemperature input terminal. Check whether the temperature sensor is proper. Check the motor, and perform maintenance on the motor.
E82	PT100 overtemperature	The PT100 sensor obtains inaccurate temperature or it is calibrated inaccurately. Device or ambient temperature is too high.	Calibrate the sensor through parameter settings. Lower the device or ambient temperature.
E92	AI1 disconnection	Input voltage of AI1 is too low. AI1 wiring is disconnected.	Connect a 5V or 10mA power source to check if the input is normal. Check the wiring or replace the cables.
E93	AI2 disconnection	Input voltage of AI2 is too low. AI2 wiring is disconnected.	Connect a 5V or 10mA power source to check if the input is normal. Check the wiring or replace the cables.
E96	No upgrade bootloader	Upgrade bootloader missing.	Contact the manufacturer.
E580	Brake fault	Brake signal and control signal are inconsistent. Feedback terminal signal is interfered.	Check whether the brake is in good condition. Check feedback terminal signal.
E581	Contactor fault	Brake signal and control signal are inconsistent. Feedback terminal signal is interfered.	Check whether the contactor is in good condition. Check feedback terminal signal.
E582	No enabling signal	Enabling signal is missing during operation.	Check the enabling signal timing and connection.
E583	Braking pipe overcurrent fault	Braking pipe resistance is unmatched.	Check the resistance of braking pipe.
E584	AM output without current	The AM is not connected to the motor cable or phase loss occurs.	Check the motor wiring.
E585	No absolute position signal	The absolute-value encoder position signal is lost. The encoder is interfered.	Check whether the encoder is in good condition. Check whether the VFD and encoder are grounded.
E586	Electronic star shorting fault	Electronic star shorting feedback fault. Overspeed or over current during star shorting.	Check whether there is a hardware fault with the star shorting. Check whether the current and speed are normal during star shorting.
E587	Dual-CPU communication fault 1	DSP communication is disconnected in dual CPU structure.	Check the DSP communication wiring.

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Fault code	Fault type	Possible cause	Solution
E588	Dual-CPU communication fault 2	MCU communication is disconnected in dual CPU structure.	Check the MCU communication wiring.
E589	Dual-CPU communication fault 3	Communication disconnected in dual CPU structure.	Check the communication wiring of dual CPU structure.
E590	Sin/Cos encoder CD disconnection	The CD signal of Sin/Cos encoder is lost.	Check the wiring of Sin/Cos encoder.
E591	Brake 2 fault	The feedback from brake 2 is inconsistent with the control signal for brake 2. Feedback terminal signal is interfered.	Check whether the brake 2 is in good condition. Check feedback terminal signal.
E592	Brake travel 1 fault	The feedback from travel 1 is inconsistent with the brake control signal.	Check whether the switch for travel 1 is functioning properly.
E593	Brake travel 2 fault	The feedback from travel 2 is inconsistent with the brake control signal.	Check whether the switch for travel 2 is functioning properly.
E594	Brake travel 3 fault	The feedback from travel 3 is inconsistent with the brake control signal.	Check whether the switch for travel 3 is functioning properly.
E595	Brake travel 4 fault	The feedback from travel 4 is inconsistent with the brake control signal.	Check whether the switch for travel 4 is functioning properly.
E596	No multi-step speed signal	During multi-step speed mode operation, no speed is set.	Check the multi-step speed settings. Check the multi-step speed terminal signals.
E597	Shaft auto-tuning fault	During the shaft auto-tuning process, the floor detection exceeds the set total number of floors.	Check the total floor settings. Check door zone signals and forced deceleration signals.
E598	False activation of forced deceleration	The forced deceleration signal is interfered with. The running floor information is incorrect.	Check the forced deceleration signal. Perform maintenance reset check to the bottom floor.
E599	Reverse running height fault	The motor running direction is opposite to the detected height direction.	Check the running direction and height change.
E600	PT100 disconnection	PT100 sensor wiring is disconnected.	Check if the wiring of PT100 sensor is normal.

8 More information

Please contact us for any information about the product. It is necessary to provide the product model and serial number during consultation. To obtain more information, you can:

- Contact INVT local office.
- Visit www.invt.com or scan the following QR code of INVT official website.

- Scan the e-manual QR code to view the full version of the e-manual.

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