Goodrive380L series lift-dedicated VFD

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

If the end user is a military unit or the product is used for weapon manufacturing, please comply with relevant export control regulations in the Foreign Trade Law of the People's Republic of China, and complete necessary formalities.

1 Safety precautions

1.1 Warning signs

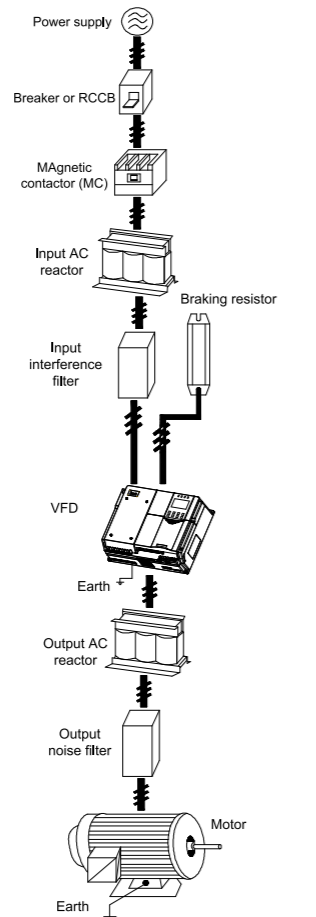| Sign	Name	Description	Abbreviation
Danger	Danger	Severe personal injury or even death can result if related requirements are not followed.	
Warning	Warning	Personal injury or equipment damage can result if related requirements are not followed.	
Forbid	Electrostatic sensitive	The PCBA may be damaged if related requirements are not followed.	
Hot	Attention Hot sides	Do not touch. The VFD base may become hot.	
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 the operation manual before operating the equipment.	
Attention	Attention	Actions taken to ensure proper running.	Attention

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–4kW	5 minutes
3PH 380V 4kW–7.5kW	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.
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
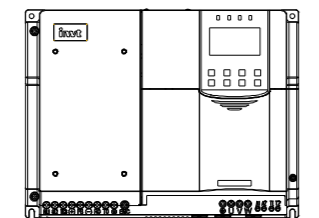
Figure 3-1 Terminal diagram of the main circuit

Table 3-1 Main circuit terminals

Terminal symbol	Terminal name	Function
R/L1, S/L2, T/L3	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.
(+), PB	Reserved terminals to connect to the external braking resistor	Reserved terminals to connect to the external braking resistor
(-)	DC negative bus output terminal	DC negative bus output terminal
R0, T0	Emergency rescue main power input port	When using the emergency rescue function, DC48V or AC220V power can be input.
A1, A2	Emergency power auxiliary power input port	When using the emergency rescue function normally, UPS AC220V power can be connected.
T1, T2	Inspection input port	For equipment maintenance and debugging in the case of main power failure. AC220V power supply can be connected.
U, V, W	VFD outputs	3PH AC output terminals, which connect to the motor in most cases
	Grounding terminal	Grounding terminal

3.2 Control circuit wiring diagram
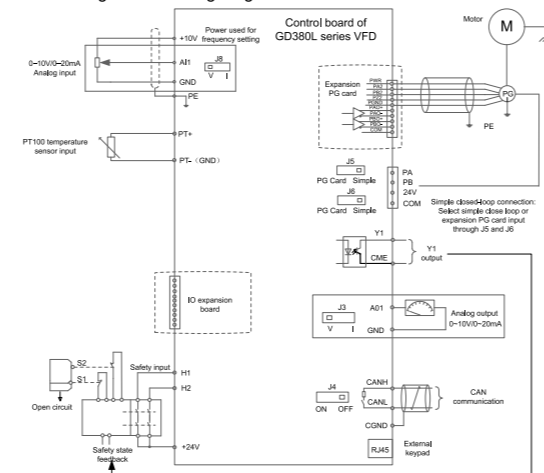
Figure 3-2 Wiring diagram of basic control circuit

Table 3-2 Control circuit terminals

Terminal name	Description
+24V	Used to provide input digital working power from the internal to the external Capacity: 200mA
COM	+24V common terminal
Y1	1. Switch capacity: 50mA/30V 2. Output frequency range: 0–1kHz
CME	Common terminal of open collector output
PA[1]	Encoder interface 1. Applicable to 24V push-pull, OC encoders 2. Response frequency: 100kHz
PB[1]	
PT+	PT100 interface 1. Resolution: 1°C 2. Range: -20°C–150°C 3. Detection precision: ±3°C
PT-	
+10V	Used to externally provide 10V reference power supply. Max. output current: 50mA. Generally used as the regulation power supply of the external potentiometer whose impedance is greater than 5kΩ.
GND	Reference zero potential
AI1	1. Input range: For AI, 0~10V/0~20mA. AI1 is switched by jumper 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
GND	Reference zero potential of +10V
AO1	1. Output range: 0~10V or 0~20mA 2. Whether voltage or current is used for output is set through the jumper J3. 3. Resolution: 10mV when 10V corresponds to 50Hz.
CANH	CANopen communication interface
CANL	
+24V	
H1	STO function input terminal
+24V	
H2	

3.3 Terminal block circuit wiring diagram

Figure 3-3 Terminal block circuit wiring diagram
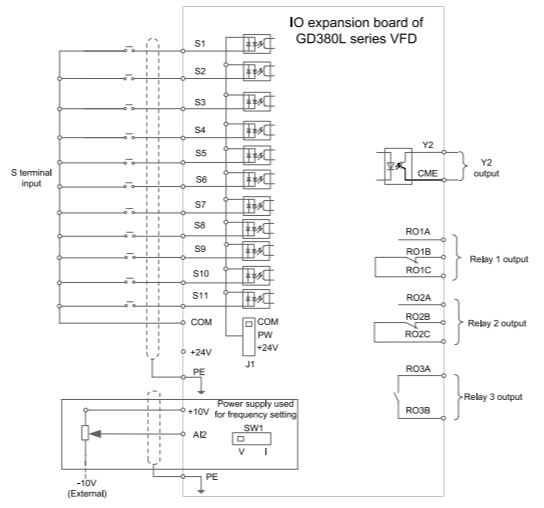

Table 3-3 Terminal block circuit terminals

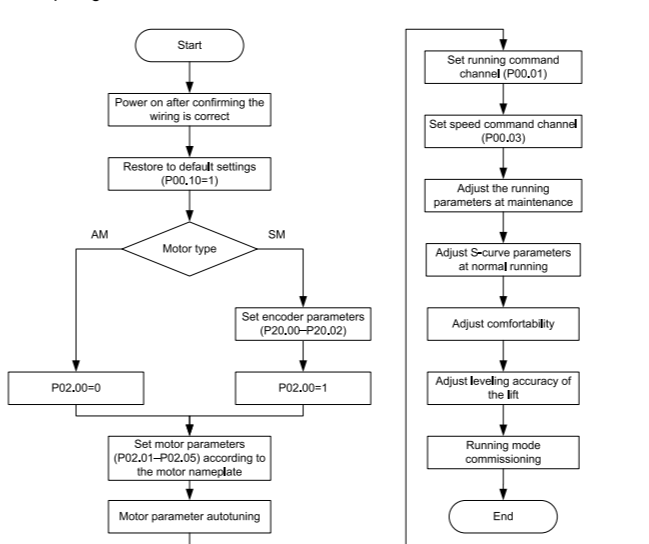| Terminal name	Description
S1–S11	Regular digital input terminal 1. Internal impedance: 3.3kΩ 2. 12–30V voltage input is acceptable. 3. Bi-direction input terminal, supporting both NPN and PNP 4. Max. input frequency: 1kHz 5. All of them are programmable digital input terminals. Users can set the terminal function by function code.
COM	+24V common terminal
AI2	1. Input range: For AI2, 0~10V/0~20mA. AI2 is switched by DIP switch SW1. 2. Input impedance: 20kΩ for voltage input or 500Ω for current input 3. Resolution: 10mV when 5mV corresponds to 50Hz. 4. Error: ±1% at 25°C
GND	Reference zero potential of +10V
Y2	1. Switch capacity: 50mA/30V 2. Output frequency range: 0~1kHz
CME	Common terminal of open collector output
RO1A	RO1 output; RO1A: NO; RO1B: NC; RO1C: common
RO1B	Contact capacity: 3A/AC250V, 1A/DC30V
RO1C	
RO2A	RO2 output; RO2A: NO; RO2B: NC; RO2C: common
RO2B	Contact capacity: 3A/AC250V, 1A/DC30V
RO2C	
RO3A	RO3 output. RO3A: NO; RO3C: NC
RO3C	Contact capacity: 3A/AC250V, 1A/DC30V

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:

Note:
1. When jumper cap J5/J6 is shorted to Simple, a simple closed-loop control can be achieved.
2. RJ45 is an external keypad interface. It is recommended to use standard RJ45 connectors with short body.

5 Keypad

Table 5-1 LCD keypad

No.	Item		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.

No.	Item		Description
	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 On: The VFD is in fault state. 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 P07.05. 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 P07.04.

6 Common function parameters

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: Sensorless vector control (SVC) 0 1: SVC 1 2: Reserved 3: Closed-loop vector control	0	◎
P00.01	Channel of running commands	0: LED keypad (the indicator is off) 1: Terminal (the indicator blinks) 2: LCD keypad (the indicator is off) 3: CAN (the indicator is on) 4: CANopen (the indicator is on)	1	◎
P00.02	Rated speed of the elevator	0.100–4.000m/s	1.000m/s	◎
P00.03	Speed command selection	0: Keypad 1: AI1 2: AI2 3: Multi-step speed running 4: Remote communication 5: AI1 tracking running 6: CAN communication-based setting 7: CAN communication-based reference 8: CANopen communication-based setting 9: CANopen communication-based reference	3	◎
P00.04	Max. output frequency	1.00–600.00Hz	50.00Hz	◎
P00.05	Speed set through keypad	0.00Hz–P00.02 (Rated speed of the elevator)	0.00Hz	○
P00.06	Running direction	0: Run at the default direction. 1: Run at the opposite direction. 2: Disable reverse running	0	○
P00.07	Carrier frequency	0: Fixed carrier frequency. The VFD runs at the carrier frequency set in P00.08. 1: Automatic regulation	0	○
P00.08	Carrier frequency setting	(carrier frequency / noise / leakage current / heat dissipation table) The relationship between models and carrier frequencies is as follows: | Model		Default carrier frequency
380V	1.5–11kW	8.0kHz
	15–30kW	4.0kHz		8.0kHZ	○

Function code	Name	Description	Default	Modify
		Advantage of high carrier frequency: ideal current waveform, little current harmonic wave and motor noise. Disadvantage of high carrier frequency: increasing the switch loss, increasing VFD temperature and the impact to the output capacity. The VFD needs to derate on high carrier frequency. At the same time, the leakage and electrical magnetic interference will increase. On the contrary, an extremely-low 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. When the frequency used exceeds the default carrier frequency, the VFD needs to derate by 20% for each increase of 1k carrier frequency. Setting range: 1.0–16.0kHz		
P00.09	Motor parameter autotuning	0: No operation 1: Rotating parameter autotuning on empty-load asynchronous motor 2: Static parameter autotuning on asynchronous motor 3: Rotating parameter autotuning on empty-load synchronous motor 4: Static parameter autotuning on synchronous motor 5: Rotating parameter autotuning on synchronous motor with load	0	◎
P00.10	Function parameter restore	0: No operation 1: Restore default values 2: Clear fault records 3. Restore function parameters, reading function parameters that are saved when the LSB of P07.01 is set to 1.	0	◎
P01.00	Start mode	0: Start-up directly: start from the starting frequency P01.01 1: Start-up after DC braking: start the motor from the starting frequency after DC braking (setting P01.04 and P01.05) It is suitable in the cases where reverse rotation may occur to the low inertia load during starting.	0	◎
P01.07	Stop mode	0: Decelerate to stop. After the stop command becomes valid, the VFD decelerates to decrease the output frequency during the set time. When the frequency decreases to the stop speed, the VFD stops. 1: Coast to stop: after the stop command becomes valid, the VFD ceases the output immediately. And the load coasts to stop at the mechanical inertia. And the load coasts to stop according to mechanical inertia.	0	◎
P01.08	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	◎
P01.09	Demagnetization time	Wait time before DC braking: The VFD blocks output before starting DC braking.	0.00s	◎
P01.10	DC braking current for stop	After this wait time, DC braking is started so as to prevent overcurrent caused by DC braking at high speed. DC braking current for stop: It indicates the applied DC braking energy. Stronger current indicates greater DC braking effect.	0.0%	◎
P01.11	DC braking time for stop	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 P01.08: 0.00Hz–P00.04 (Max. output frequency) Setting range of P01.09: 0.00–30.00s Setting range of P01.10: 0.0–100.0% (of the VFD rated output current) Setting range of P01.11: 0.0–50.0s	0.08	○
P02.00	Motor type	0: Asynchronous motor (AM) 1: Synchronous motor (SM)	0	◎
P02.01	Motor rated power	0.1–3000.0kW	Model depended	◎
P02.02	Motor rated frequency	0.01Hz–P00.04 (Max. frequency)	50.00Hz	◎
P02.03	Motor rated speed	1–36000rpm	Model depended	◎

Page -7-

Function code	Name	Description	Default	Modify
P02.04	Motor rated voltage	0~1200V	Model depended	◎
P02.05	Motor rated current	0.8~6000.0A	Model depended	◎
P02.06	Stator resistance of AM	0.001~65.535Ω	Model depended	◎
P02.07	Rotor resistance of AM	0.001~65.535Ω	Model depended	◎
P02.08	Leakage inductance of AM	0.1~6553.5mH	Model depended	◎
P02.09	Mutual inductance of AM	0.1~6553.5mH	Model depended	◎
P02.10	No-load current of AM	0.1~6553.5A	Model depended	◎
P02.11	Direct-axis inductance of SM	0.01~655.35mH	Model depended	◎
P02.12	Quadrature-axis inductance of SM	0.01~655.35mH	Model depended	◎
P02.13	Counter-emf of SM	0~10000V	320V	◎
P02.14	Pulley diameter	100~2000m	500mm	◎
P02.15	DEC ratio	0.50~50.00	1.00	◎
P02.16	Speed ratio	0~65535	1000	○
P05.01	Function of S1 terminal	0: No function 1: Up running (FWD) 2: Down running (REV) 3: Rushing in reverse direction (EXM) 4: Emergency operation (EMER) 5: Coast to stop (FSTP) 6: Fault reset (RET) 7: External fault (EF) 8: Multi-step speed terminal 1 (MS1) 9: Multi-step 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: Leveling signal 27~40: Reserved	0	◎
P05.02	Function of S2 terminal		1	◎
P05.03	Function of S3 terminal		2	◎
P05.04	Function of S4 terminal		8	◎
P05.05	Function of S5 terminal		9	◎
P05.06	Function of S6 terminal		10	◎
P05.07	Function of S7 terminal		0	◎
P05.08	Function of S8 terminal		4	◎
P05.09	Function of S9 terminal		0	◎
P05.10	Function of S10 terminal		0	◎
P05.11	Function of S11 terminal		0	◎
P05.12	Reserved		0	◎
P05.13	Input terminal polarity	The function code is used to set the polarity of input terminals. When a bit is 0, the input terminal is positive; when a bit is 1, the input terminal is negative. BIT10 BIT9 BIT8 BIT7 BIT6 / S11 S10 S9 S8 S7 / BIT5 BIT4 BIT3 BIT2 BIT1 BIT0 / S6 S5 S4 S3 S2 S1. Setting range: 0x000~0x7FF	0x000	○
P05.14	Digital input filter time	The function code is used to specify the filter time of S1~S11 terminal sampling. In strong interference cases, increase the value to avoid maloperation. 0.000~1.000s	0.002s	○
P05.16	Enable power-on terminal detection	0: Disable 1: Enable (terminal command power-on response and terminal command response to UV fault rectification)	1	○
P06.01	Y1 output	0: No output 1: Lift in operation 2: Up operation 3: Down running 4: Fault output 5: Running at zero speed 6: Ready for running 7: Brake control 8: Contactor control 9: Frequency reached 10: Frequency level detection FDT output 11: Reserved 12: Reserved 13: Light-load direction detection completed 14: Down as the light-load direction detection	1	○
P06.02	Y2 output selection		0	○
P06.03	Relay output RO1		0	○
P06.04	Relay output RO2		7	○
P06.05	Relay output RO3		8	○

Page -8-

Function code	Name	Description	Default	Modify
		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: Sealed-star output 21: Waiting after autonomous rescue leveling		
P06.07	Output terminal polarity selection	The function code is used to set the polarity of output terminals. When the current bit is set to 0, the output terminal is positive. When the current bit is set to 1, the output terminal is negative. BIT4 BIT3 BIT2 BIT1 BIT0 / RO3 RO2 RO1 Y2 Y1. Setting range: 0x00~0x1F	0x00	○
P06.08	AO1 output	0: Running speed 1: Set speed 2: Rotational speed 3: Output Current 4: Output voltage 5: Output power 6: Ouptut torque 7: AI1 input 8: AI2 input	0	○
P07.01	Parameter copy	Ones place: 0: No operation 1: Upload parameters from the local address to the keypad 2: Download parameters (including motor parameters) from the keypad to the local address 3: Download parameters (excluding group P02) from the keypad to the local address 4: Download parameters (including only motor parameters of P02) from the keypad to the machine. 5: Save parameters (including motor parameters) of the machine Note: After any operation among 1~5 is complete, the parameter restores to 0. Tens place: Reserved Thousands place: 0: Low speed 1: Medium speed 2: High speed	0x100	◎
P09.00	Multi-step speed 0	0.000m/s~P00.02	0.080m/s	◎
P09.01	Multi-step speed 1	0.000m/s~P00.02	0.700m/s	◎
P09.02	Multi-step speed 2	0.000m/s~P00.02	0.180m/s	◎
P09.03	Multi-step speed 3	0.000m/s~P00.02	0.300m/s	◎
P09.04	Multi-step speed 4	0.000m/s~P00.02	0.000m/s	◎
P09.05	Multi-step speed 5	0.000m/s~P00.02	0.000m/s	◎
P09.06	Multi-step speed 6	0.000m/s~P00.02	0.000m/s	◎
P09.07	Multi-step speed 7	0.000m/s~P00.02	0.000m/s	◎
P09.08	Multi-step speed priority	0: CHINESE TYPE 1: ISTANBUL TYPE 2: KONYA TYPE 3: ADANA TYPE	0	◎
P09.09	ACC time	0.1~360.0s	2.0s	◎
P09.10	DEC time	0.1~360.0s	2.0s	◎
P09.11	S-curve ACC start segment duration	0.1~360.0s	2.0s	◎
P09.12	S-curve ACC end segment duration	0.1~360.0s	2.0s	◎
P09.13	S-curve DEC start segment duration	0.1~360.0s	2.0s	◎
P09.14	S-curve DEC end segment duration	0.1~360.0s	2.0s	◎
P09.15	S-curve start segment duration during stop	0.1~360.0s	2.0s	◎
P09.16	S-curve end segment duration during stop	0.1~360.0s	2.0s	◎

Page -9-

Function code	Name	Description	Default	Modify
P09.17	Running speed at maintenance	0.001m/s~P00.02	0.200m/s	◎
P09.18	ACC/DEC time at maintenance	0.1~360.0s	4.0s	◎
P09.19	Forced DEC time	0.0~360.0s	0.0s	◎
P09.20	Emergency running speed	0.001m/s~P00.02	0.100m/s	◎
P09.21	Emergency ACC/DEC time	0.1~360.0s	20.0s	◎
P09.22	Leveling segment	0~7	0	◎
P09.23	Leveling speed	0.001m/s~P00.02	0.010m/s	◎
P09.24	DEC time for creeping to stop	0.1~360.0s. During deceleration to stop, when the speed reached the value set in P01.12, the curve of deceleration to stop switches to those set in P09.15, P09.16, and P09.24.	2.0s	◎
P09.25	Speed 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: Protection against input phrase loss disabled 1: Protection against input phrase loss enabled Tens place: 0: Protection against output phrase loss disabled 1: Protection against output phrase loss enabled LED hundreds place: 0: Hardware input phrase loss protection disabled 1: Hardware input phrase loss protection enabled	0x110	○
P11.01	Frequency drop at transient power-off	0: Disable 1: Enable	0	○
P11.02	Frequency drop rate at transient power-off	Setting range: 0.00Hz/s~P00.04 (max. output frequency) After the power loss of the grid, the bus voltage drops to the sudden frequency-decreasing point, the VFD begin to decrease the running frequency at P11.02, to make the VFD generate power again. The returning power can maintain the bus voltage to ensure a rated running of the VFD until the recovery of power. Voltage class 380V / 660V; Frequency decrease at sudden power failure 460V / 800V. Note: 1. Adjusting the parameter properly can prevent the stop caused by the VFD protection during shifting the grid. 2. The function can be enabled only after the input phase loss protection is disabled.	10.00 Hz/s	○
P11.03	Overvoltage stalling protection	0: Disable 1: Enable	0	○
P11.04	Overvoltage stalling protection voltage	120~145% (standard bus voltage) (380V) = 136%; 120~145% (standard bus voltage) (220V) = 120%		○
P11.05	Current limit action	During accelerated running, as the load is too large, the actual acceleration rate of motor is lower than that of output frequency, if no measures are taken, the VFD may trip due to overcurrent during acceleration. Ones place: Current limit action 0: Invalid 1: Always valid	0	○
P11.06	Automatic current limit threshold	Current-limit protection function detects output current during running, and compares it with the current-level defined by P11.06, if it exceeds the current-limit level, the VFD will run at stable frequency during accelerated running, or run in decreased frequency during constant-speed running; if it exceeds the current-limit level continuously, the VFD output frequency will drop continuously until reaching lower limit frequency. When the output current is detected to be lower than the current-limit level again, it will continue accelerated running.	160.0%	○
P11.07	Frequency drop rate during current limit	Setting range of P11.06: 50.0~200.0% (of the VFD rated output current) Setting range of P11.07: 0.00~50.00Hz/s	10.00 Hz/s	○

Page -10-

Function code	Name	Description	Default	Modify
P11.20	STO function selection	Ones place: 0: STO function disabled 1: STO function enabled Tens place: 0: Alarm locked (the SAFE fault can be reset manually) 1: Alarm not locked (the SAFE fault can be reset automatically)	0x01	◎
P15.27	CAN/CANopen communication baud rate	0: 1000kbps 1: 800kbps 2: 500kbps 3: 250kbps 4: 125kbps 5: 100kbps 6: 50kbps 7: 20kbps	3	◎
P15.28	CAN/CANopen communication address	0~127	1	◎
P20.00	Encoder type selection	0: Incremental encoder (AB) 1: ABZUVW encoder 2: Resolver-type encoder 3: Sin/Cos encoder without CD signals 4: Sin/Cos encoder with CD signals 5: EnDat absolute encoder	0	◎
P20.01	Encoder pulse count	Number of pulses generated when the encoder revolves for one circle. Setting range: 0~60000	1024	◎
P20.02	Encoder direction	Ones place: AB direction 0: Forward 1: Reverse Tens place: Reserved Hundreds place: CD/UVW 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

This chapter briefly describes some common faults and the solutions.

Fault code	Fault type	Possible cause	Solution
OUt1	[1] 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 drive wires; Check whether there is strong interference surrounding the peripheral device.
OUt2	[2] Inverter unit V-phase protection		
OUt3	[3] Inverter unit W-phase protection		
OV1	[7] Overvoltage during ACC	Exception occurred to input voltage. Large energy feedback; Lack of braking units; Energy-consumption braking is not enabled.	Check the input power. Check whether load DEC time is too short or the motor starts during rotating; Install dynamic brake components. Check the setting of related function codes.
OV2	[8] Overvoltage during DEC		
OV3	[9] Overvoltage during constant speed running		
OC1	[4] Overcurrent during ACC	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. Select the 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 if there is strong interference; Check the related function code settings. Check whether phase loss occurred on output side.
OC2	[5] Overcurrent during DEC		
OC3	[6] Overcurrent during constant speed running		
UV	[10] Bus undervoltage	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.
OL1	[11] Motor overload	The voltage of the grid 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 motor rated current. Check the load and adjust the torque boost quantity.
OL2	[12] VFD overload	ACC is too fast. The motor in rotating is restarted. The voltage of the grid is too low. Load 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.

Page -11-

Fault code	Fault type	Possible cause	Solution
SPI	[13] Phase loss on input side	Phase loss or violent fluctuation occurred on input R, S, T.	Check the input power. Check the installation wiring.
SPO	[14] 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 cable.
OH1	[15] 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.
OH2	[16] Inverter module overheat		
EF	[17] External fault	SI external faulty input terminal action.	Check external device input.
CE	[18] RS485 communication fault	Incorrect 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 proper communication address.
ItE	[19] 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 hall component. Replace the main control board.
tE	[20] Motor autotuning fault	The motor capacity does not match the VFD capacity. Motor parameter is set improperly. The parameters gained from autotuning deviate sharply from the standard parameters; 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.
EEP	[21] EEPROM operation fault	Error in reading or writing control parameters. EEPROM is damaged.	Press STOP/RST to reset. Replace the main control board.
PIDE	[22] PID feedback offline fault	PID feedback offline. PID feedback source disappears.	Check PID feedback signal wires. Check PID feedback source.
bCE	[23] Braking unit fault	Fault occurred to the brake 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.
END	[24] 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.
OL3	[25] Electronic overload fault	The VFD reports overload pre-alarm according to the setting.	Check the load and the overload pre-alarm points.
PCE	[26] 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.
UPE	[27] 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 and seek maintenance services. Replace the hardware and seek maintenance services.
DNE	[28] 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.
E-DP	[29] 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 its surrounding environment, and eliminate interference effects.
E-NET	[30] 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.
E-CAN	[31] 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 at the same baud rate; Check the surrounding environment, and eliminate interference effects.
ETH1	[32] 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.
ETH2	[33] To-ground short-circuit fault 2	VFD output is short connected to the ground.	Check whether the motor wiring is normal.

Page -12-

Fault code	Fault type	Possible cause	Solution
		There is a fault in the current detection circuit.	Replace the hall component; Replace the main control board.
dEu	[34] Speed deviation fault	The load is too heavy or stalled.	Check the load to ensure it is proper, and increase the detection time; Check whether the control parameters are set properly.
STo	[35] Mal-adjustment fault	Control parameters of the synchronous motor is set improperly. Autotuned parameters are not accurate; The VFD is not connected to the motor.	Check the load and ensure the load is normal. Check whether control parameters are set correctly. Increase the mal-adjustment detection time.
LL	[36] Electronic underload fault	The VFD reports underload pre-alarm according to the setting.	Check the load and the underload pre-alarm points.
ENC1O	[37] Encoder disconnection fault	Incorrect encoder wiring, causes the failure to get the encoder signal. Incorrect encoder parameter settings.	Check the wiring. Check encoder parameter settings.
ENC1D	[38] Encoder reserve-rotation fault	Incorrect encoder signal direction.	Set the function code to reverse the direction or reverse the AB signal wires.
ENC1Z	[39] Encoder Z-pulse disconnection fault	The Z-pulse signal cable is not connected.	Check the Z-pulse signal cable.
ENC1U	[40] U disconnection	There are no U, V, or W signals or there is interference.	Check the U, V, and W signal wiring.
OT	[43] Motor overtemperature fault	Motor overtemperature signal.	
BAE	[45] 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.
CONE	[46] 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.
nPoS	[47] CD signal unavailable	The sine-cosine or absolute-value encoder position signal is lost.	Check whether the encoder is in good condition. Check whether the VFD and encoder are grounded.
SAFE	[49] STO card fault	The STO card safety circuit does not work. The expansion card type is incorrect.	Check whether the STO card is in good condition. Check whether the expansion card type is in good condition.
STL1	[50] STO card circuit 1 exception	Circuit 1 of the STO card does not work.	Check whether the STO card is in good condition. Check circuit 1 of the STO card.
STL2	[51] STO card circuit 2 exception	Circuit 2 of the STO card does not work.	Check whether the STO card is in good condition. Check circuit 2 of the STO card.
STL3	[52] STO internal circuit exception	The internal circuits of the STO card do not work.	Check whether the circuits of the VFD control board is in good condition.
CrCE	[53] Safety code CRC exception	Exceptions occur in the verification of the safety circuit code.	Check whether the control board is in good condition.
bOC	[54] Braking pipe overcurrent fault	Braking pipe resistance is unmatched.	Check the resistance of braking pipe.
bOL	[55] Braking pipe overload	Braking pipe resistance is unmatched. The device is in the energy feedback state for long period.	Check the resistance of braking pipe. Check the operating conditions.
C2-Er	[64] Expansion card communication fault	Expansion card is connected improperly. Expansion card is damaged.	Check the expansion card connection. Check whether the expansion card is in good condition.

8 More information

Please contact us for any information about the products. 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 QR code of INVT.

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