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Quick Start Guide

Frequency Inverter ST600 and ST600SP

Introduction

This abridged manual briefly describes the external wiring, the terminals, the keypad, the quick start steps, as well as the most common function parameter settings, errors and solutions and the most commonly used communication and PG cards for Sourcetronic ST600 and ST600SP series frequency inverters.

Visit www.sourcetronic.com for more information or refer to the detailed full version of the manual.

Warning!	
	This guide only contains the most basic information on installation and commissioning. Failure to observe the safety instructions and the installation and commissioning instructions in the corresponding documentation can lead to accidents, including damage to the appliance, injuries or even death. Only trained and qualified specialists may carry out the relevant work!
Danger!	
	Never carry out work such as wiring, inspection or replacement of components while the power supply is switched on. Before carrying out this work, ensure that all input power supplies have been disconnected and wait at least the time specified on the VFD (see below) or until the DC bus voltage is less than 36 V.

VFD Model	Minimum Waiting Time
1R5G3–110G3	5 min
132G3-315G3	15 min
355G3 and above	25 min

1 External Wiring

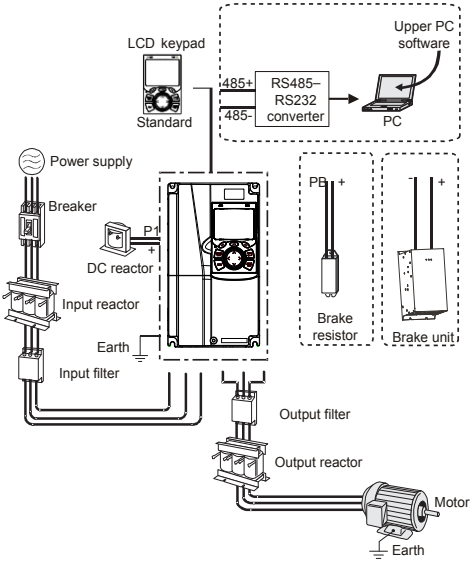


Figure 1-1 ST600 System Configuration

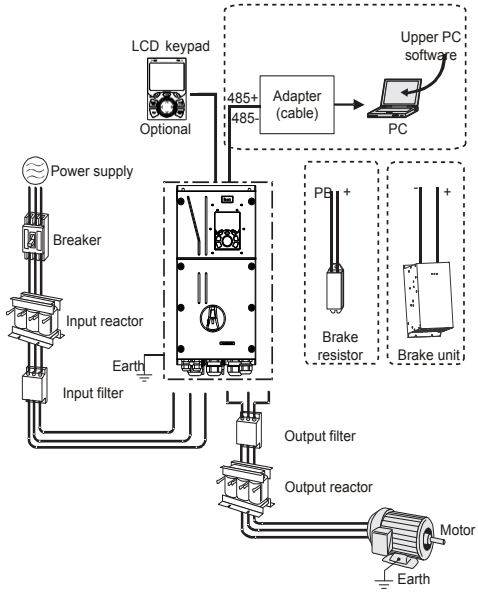


Figure 1-2 ST600SP System Configuration

2 Terminals

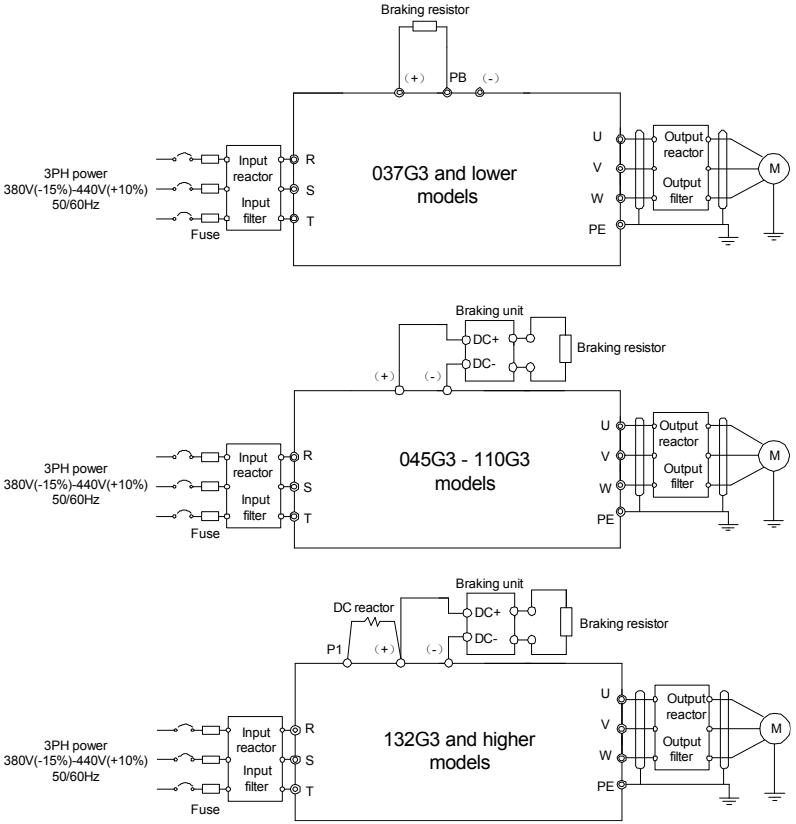


Figure 2-1 Main Circuit Wiring for Standard Models

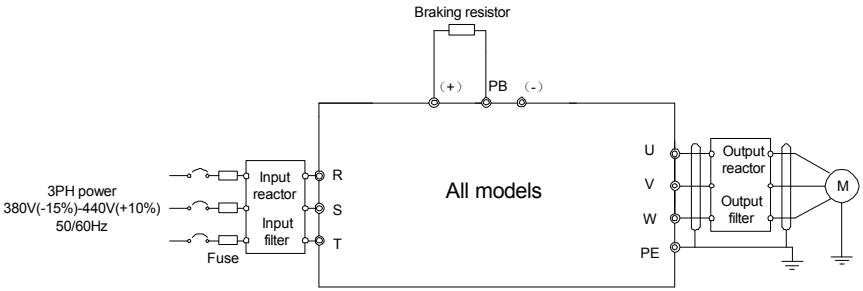


Figure 2-2 Main Circuit Wiring for SP Models

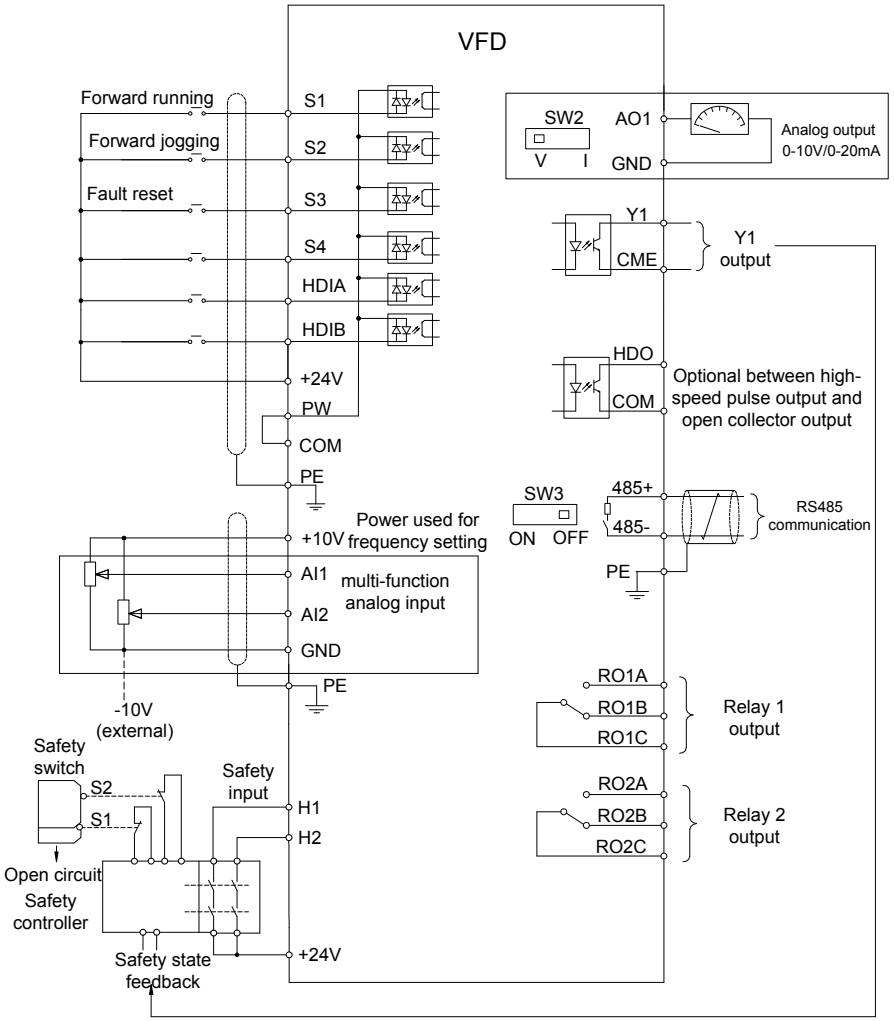


Figure 2-3 Control Circuit Wiring

Table 2-1 VFD Terminal Description

Terminal	Description
Main Circuit Terminals	
R, S, T	3PH AC input terminals, connected to the grid
U, V, W	3PH AC output terminals, usually connected to the motor
P1	• P1 and (+) connect to external DC reactor terminals. • (+) and (-) connect to external braking unit terminals or shared DC bus terminals. • PB and (+) connect to external braking resistor terminals.
(+)	
(-)	
PB	
⏚	PE terminal. The PE terminals of each machine must be grounded reliably.
Control Circuit Terminals	
+10V	Locally provided +10.5V power supply
AI1	Analog input. Range: 0–10V/0–20mA. Function code P05.50 specifies whether to use voltage or current input.
AI2	Analog input. Range: -10V – +10V
GND	Reference ground of +10.5V
AO1	Analog output. Range: 0–10V/0–20mA. SW2 is used to select voltage or current output.
RO1A	Relay output. RO1A: NO; RO1B: NC; RO1C: common Contact capacity: 3A/AC 250V, 1A/DC 30V
RO1B	
RO1C	
RO2A	Relay output. RO2A: NO; RO2B: NC; RO2C: common Contact capacity: 3A/AC 250V, 1A/DC 30V
RO2B	
RO2C	
HDO	Switch capacity: 50mA/30V. Output frequency range: 0–50kHz. Duty ratio: 50%
COM	Reference ground of +24V
CME	Common terminal of open collector output; short connected to COM by default
Y1	Switch capacity: 50mA/30V; Output frequency range: 0–1kHz
485+	RS485 differential signal communication port. The standard communication interface should use a shielded twisted pair cable. Specify whether the 120 Ω matching resistor of the RS485 communication should be connected via the DIP switch or the jumper.
485-	
PE	Grounding terminal
PW	External power input terminal for digital input circuits. In NPN mode, short-circuit PW and +24V. In PNP mode, short-circuit PW and COM.
+24V	User the power supply provided by the VFD. Max. output current: 200mA

<table>
<tr><td>S1–S4</td><td>Digital Input:
Internal impedance: 3.3kΩ
12–30V voltage input is acceptable
Bidirectional input terminals, supporting both NPN and PNP connection methods
Max. input frequency: 1kHz
Programmable digital input terminals, the exact functions of which can be set via related parameters</td></tr>
<tr><td>HDIA</td><td rowspan="2">Channels for Both High Frequency Pulse Input and Digital Input:
Max. input frequency: 50kHz
Duty ratio: 30%–70%
Supports quadrature encoder input when both HDIA and HDIB are available, with the speed measurement function</td></tr>
<tr><td>HDIB</td></tr>
<tr><td>+24V–H1</td><td rowspan="2">Safe Torque Off (STO) Inputs:
Redundant STO input, connected to the external NC contact. When the contact opens, STO is activated and the VFD stops the output.
Shielded cables with a maximum length of 25m are used for the safety input signal cables.
Terminals H1 and H2 are short-circuited to +24 V by default. Remove the jumper from the terminals before using the STO function.</td></tr>
<tr><td>+24V–H2</td></tr>
</table>

3 Keypad

The specifics of the keypad may vary between product models.

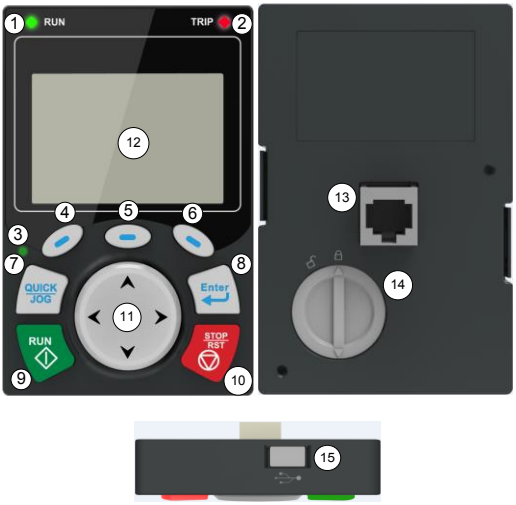


Figure 3-1 Standard Model Keypad

Figure 3-2 SP Model Keypad

No.	Name	Description
1	State Indicators	Operation Indicator: LED off – the VFD is stopped; LED on – the VFD is running LED blinking – the VFD is in parameter autotuning
2		Error Indicator: LED on – the VFD is in error state LED off – the VFD is in normal state LED blinking – the VFD is in pre-alarm state
3		Short-cut key indicator, which displays different state under different functions, see definition of QUICK/JOG key for details
4	Function Keys	The function of the function key depends on the respective menu. The function of the function key is displayed in the footer.
5		
6		
7	Shortcut Key	Custom. By default, the button is defined as the JOG function. The function of the shortcut button can be set via P07.02, as shown below. 0: No function; 1: Jogging (linkage indicator (3); logic: NO); 2: Reserved; 3: Switch between FWD and REV (linkage indicator (3); logic: NC); 4: Clear UP/DOWN settings (linkage indicator (3) logic: NC); 5: Coast to stop (linkage indicator (3); logic: NC); 6: Switch the operating command reference value mode in sequence (linkage indicator (3); logic: NC); 7: Reserved; **Note:** If default values are restored, the set function of the shortcut key returns to 1 (jogging).
8	Confirmation Key	The function of the confirmation button varies depending on the menu, e.g. confirmation of parameter setting, confirmation of parameter selection, calling up the next menu, etc.
9	Running Key	In keypad operation mode, this button is used to start VFD operation or to initiate autotuning.
10	Stop/Reset Key	During operation, you can stop the VFD or stop the autotuning by pressing the Stop/Reset button; this button is limited by the setting of P07.04. While in error state, all control modes can be reset with this button.

11	Direction Keys	**UP**: The function of the UP key varies depending on the interface, e.g. moving the displayed element upwards, moving the selected element upwards, changing digits, etc; **DOWN**: The function of the DOWN key varies depending on the interface, e.g. moving the displayed element downwards, moving the selected element downwards, changing digits, etc; **LEFT**: The function of the LEFT key varies depending on the interface, e.g. switching the monitoring interface, e.g. moving the cursor to the left, exiting the current menu and returning to the previous menu, etc; **RIGHT**: The function of the RIGHT key varies depending on the interface, e.g. switching the monitoring interface, moving the cursor to the right, calling up the next menu, etc.
12	Screen Display	240×160 dot-matrix LCD; able to display three monitoring parameters or six sub-menu items simultaneously
13	RJ45 Interface	You can use the RJ45 interface to connect to the VFD.
14	Clock Battery Holder	You can use the battery holder for replacing or installing a battery for the clock.
15	USB Terminal	Mini USB terminal

4 Quick Start

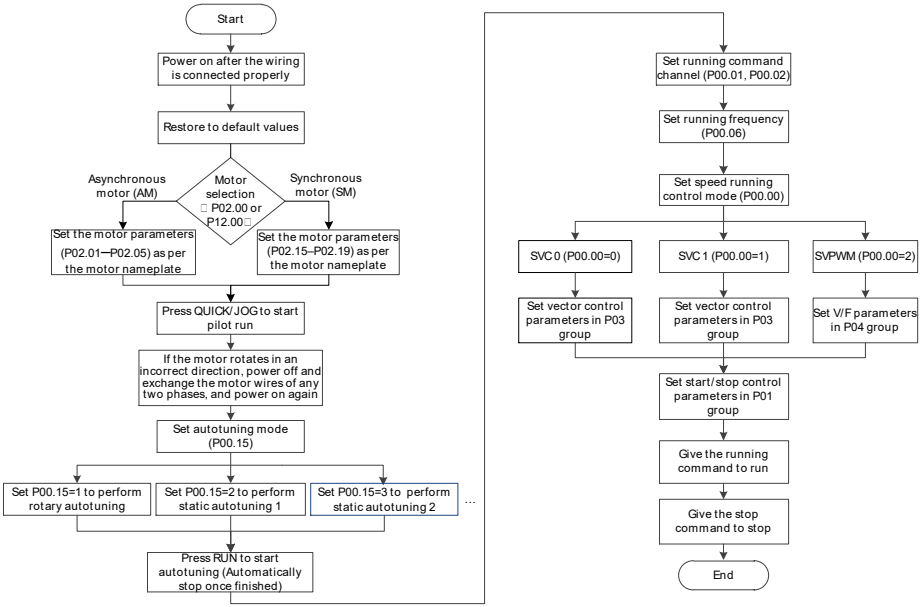
4.1 Check Before Power-On

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

4.2 First Operation

Make sure the wiring and power supply are correct and close the AC power supply air switch on the VFD input side to turn on the device. The LCD user interface will launch the setup wizard to guide you through the setup.

The quick start flowchart is as follows:



5 Important Function Parameter Settings

Only a few common function parameters and typical values are briefly described below.

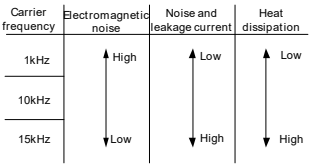
"○" indicates that the value of the parameter can be changed when the VFD is in stop or operating mode.

"◎" indicates that the value of the parameter cannot be changed while the VFD is in operation.

"●" indicates that the value of the parameter is recognized and saved, but cannot be changed.

(The VFD automatically checks parameter changes and restricts them to prevent invalid settings.)

Function Code	Name	Description	Default	Modifiable?
P00.00	Speed Control Mode	0: Sensorless vector control (SVC) mode 0 1: Sensorless vector control (SVC) mode 1 2: Space voltage vector control mode 3: Closed-loop vector control mode	2	◎
P00.01	Channel Of Running Commands	0: Keypad 1: Terminal 2: Communication	0	○
P00.02	Communication Mode Of Running Commands	0: Modbus/Modbus TCP 1: PROFIBUS/CANopen/DeviceNet 2: Ethernet 3: EtherCAT/PROFINET/ Ethernet IP 4: Programmable expansion card 5: Wireless communication card 6: Reserved **Note:** The options 0 (for Modbus TCP), 1, 2, 3, 4 and 5 are add-on functions, valid only when configured with related expansion cards.	0	○
P00.03	Max. Output Frequency	Max (P00.04; 10)–630.00Hz	50.00Hz	◎
P00.04	Upper Limit Of Running Frequency	P00.05–P00.03 (Max. output frequency)	50.00Hz	◎
P00.05	Lower Limit Of Running Frequency	0.00Hz–P00.04 (Upper limit of running frequency)	0.00Hz	◎
P00.06	Channel to Set Frequency Reference Value A	0: Keypad 1: AI1 2: AI2 3: AI3	0	○

P00.07	Channel to Set Frequency Reference Value B	4: High-speed pulse HDIA 5: Simple PLC program 6: Multi-step speed running 7: PID control 8: Modbus/Modbus TCP communication	15	○
P00.10	Frequency Set Through Keypad	0.00 Hz–P00.03 (Max. output frequency)	50.00Hz	○
P00.11	ACC Time 1	0.0–3600.0s	Model-dependent	○
P00.12	DEC Time 1		Model-dependent	○
P00.13	Running Direction	0: Run forward 1: Run backward (reverse) 2: Disable reverse running mode	0	○
P00.14	Carrier Frequency		Model-dependent	○
P00.15	Motor Parameter Autotuning	0: Disable 1: Rotary autotuning 1 2: Static autotuning 1 (full) 3: Static autotuning 2 (partial)	0	◎
P00.18	Restore Function Parameters	0: Disable 1: Restore defaults (excluding motor parameters) 2: Clear error records 5: Restore defaults (factory test mode) 6: Restore defaults (including motor parameters)	0	◎
P01.00	Start Mode	0: Direct start 1: Start after DC braking 2: Start after speed tracking	0	◎
P01.08	Stop Mode	0: Decelerate to stop 1: Coast to stop	0	○
P01.09	Starting Frequency Of DC Braking For Stop	0.00Hz–P00.03 (Max. output frequency)	0.00Hz	○
P01.11	DC Braking Current	0.0–100.0%	0.0%	○
P01.12	DC Braking Time Until Standstill	0.00–50.00s	0.00s	○

P01.18	Terminal-Based Operating Command Protection At Power-On	0: Terminal-based operating commands are inactive at power-on 1: Terminal-based operating commands are active at power-on	0	◎
P02.00	Type Of Motor 1	0: Asynchronous motor (AM) 1: Synchronous motor (SM)	0	◎
P02.01	Rated Power Of AM 1	0.1–3000.0kW	Model-dependent	◎
P02.02	Rated Frequency Of AM 1	0.01Hz–P00.03 (Max. output frequency)	50.00Hz	◎
P02.03	Rated Speed Of AM 1	1–60000rpm	Model-dependent	◎
P02.04	Rated Voltage Of AM 1	0–1200V	Model-dependent	◎
P02.05	Rated Current Of AM 1	0.8–6000.0A	Model-dependent	◎
P02.15	Rated Power Of SM 1	0.1–3000.0kW	Model-dependent	◎
P02.16	Rated Frequency Of SM 1	0.01Hz–P00.03 (Max. output frequency)	50.00Hz	◎
P02.17	Number Of Pole Pairs Of SM 1	1–128	2	◎
P02.18	Rated Voltage Of SM 1	0–1200V	Model-dependent	◎
P02.19	Rated Current Of SM 1	0.8–6000.0A	Model-dependent	◎
P02.23	Counter-Emf Of SM 1	0–10000	300	○
P03.00	Speed-Loop Proportional Gain 1	0.0–200.0	20.0	○
P03.01	Speed-Loop Integral Time 1	0.000–10.000s	0.200s	○
P03.03	Speed-Loop Proportional Gain 2	0.0–200.0	20.0	○
P03.04	Speed-Loop Integral Time 2	0.000–10.000s	0.200s	○

P03.09	Current-Loop Proportional Coefficient P	0–65535	1000	○
P03.11	Torque Setting Method	0–1: Keypad (P03.12) 2: AI1 3: AI2 4: AI3 5: Pulse frequency HDI 6: Multi-step torque 7: Modbus communication	0	○
P04.01	Torque Boost Of Motor 1	0.0%: (Automatic torque boost), 0.1%–10.0%	0	○
P04.09	V/F Slip Compensation Gain Of Motor 1	0.0–200.0%	100.0%	○
P04.10	Low-Frequency Oscillation Control Factor Of Motor 1	0–100	10	○
P04.11	High-Frequency Oscillation Control Factor Of Motor 1	0–100	10	○
P05.01	Function Of S1	0: No function 1: Run forward 2: Run backward 3: Three-wire operating control (SIN) 4: Jog forward 5: Jog backward 6: Coast to stop 7: Reset errors 9: External error input 10: Increase frequency setting (UP) 11: Decrease frequency setting (DOWN)	1	◎
P05.02	Function Of S2		4	◎
P05.03	Function Of S3		7	◎
P05.04	Function Of S4		0	◎
P05.29	AI2 Lower Limit	-10.00V–P05.31	-10.00V	○
P05.35	AI2 Upper Limit	P05.33–10.00V	10.00V	○
P06.01	Y1 Output	0: Inactive 1: Running 2: Running forward 3: Running backward 4: Jogging 5: VFD in error 6: Frequency level detection FDT1 8: Frequency reached	0	○
P06.03	RO1 Output		1	○
P06.04	RO2 Output		5	○

P06.14	AO1 Output	0: Operating frequency 1: Set frequency 3: Rotation speed (Relative to the speed corresponding to max. output frequency) 4: Output current (Relative to twice the VFD rated current)	0	○
P06.16	HDO High-Speed Pulse Output	5: Output current (Relative to twice the motor rated current) 6: Output voltage (Relative to 1.5 times the VFD rated voltage) 7: Output power (Relative to twice the motor rated power)	0	○
P06.17–P06.21	AO1 Output Upper/Lower Limit Settings	For details, see the full version of the e-manual.		○
P07.00	User Password	0–65535	0	○
P07.27–P07.32	Present Error Type – 5th-Last Error Type	0–76 (0: No error) For details, see the full version of the e-manual.	0	○
P08.28	Auto Error Reset Count	0–10	0	○
P08.29	Auto Error Reset Interval	0.1–3600.0s	1.0s	○
P14.00	Local Communication Address	1–247 **Note:** The communication address of a slave cannot be set to 0.	1	○
P14.01	Communication Baud Rate	0: 1200BPS 1: 2400BPS 2: 4800BPS 3: 9600BPS 4: 19200BPS 5: 38400BPS	4	○
P14.02	Data Bit Check	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	○
P15.01	Module Address	0–127	2	○
P15.02–P15.12	Received Pzd2–Received Pzd12	0–31 1: Set frequency (0–F_{max}, unit: 0.01Hz)	0	○

and P16.32–P16.42		2: PID reference (-1000–1000, in which 1000 corresponds to 100.0%) 3: PID feedback (-1000–1000, in which 1000 corresponds to 100.0%) 4: Torque setting (-3000–+3000, in which 1000 corresponds to 100.0% of the motor rated current) 5: Upper limit of the FWD operating frequency (0–F_{max}, unit: 0.01 Hz) 6: Upper limit of the REV operating frequency (0–F_{max}, unit: 0.01 Hz) 7: Upper limit of the electromotive torque (0–3000, in which 1000 corresponds to 100.0% of the motor rated current) 8: Upper limit of the braking torque (0–3000, in which 1000 corresponds to 100% of the motor rated current)		
P15.13–P15.23 and P16.43–P16.53	Sent Pzd2–Sent Pzd12	0–31 1: Operating frequency (x100, Hz) 4: Output voltage (x1, V) 5: Output current (x10, A) 6: Actual output torque (x10, %) 7: Actual output power (x10, %) 8: Rotation speed (x1, RPM)	0	○
P20.00	Encoder Type Display	0: Incremental encoder 1: Resolver-type encoder 2: Sin/Cos encoder 3: Endat absolute encoder	0	●
P20.01	Encoder Pulse Number	0–16000	1024	◎
P20.02	Encoder Direction	0x000–0x111 *Ones digit: AB direction* 0: Forward 1: Reverse *Tens digit: Z pulse direction (reserved)* 0: Forward 1: Reverse *Hundreds digit: CD/UVW pole signal direction* 0: Forward 1: Reverse	0x000	◎
P20.03	Detection Time Of Encoder Offline Error	0.0–10.0s	2.0s	○

6 Possible Errors and Solutions

Note: Our error code scheme is being upgraded. Some products use the old scheme and the others use the new one, which are listed in "Error code display".

Error Code	Error Type	Possible Cause	Corrective Measures
OUt1	[1] Inverter Unit U Phase Protection	• Acceleration is too fast; • IGBT module is damaged; • Malfunction due to interference; wires are poorly connected; • To-ground short-circuit occurred	• Increase acceleration time; • Replace the power unit; • Check the wires; • Check for sources of strong interference in the vicinity of the peripheral device
OUt2	[2] Inverter Unit V Phase Protection		
OUt3	[3] Inverter Unit W Phase Protection		
OC1	[4] Overcurrent During Acceleration	• Acceleration is too fast; • Grid voltage is too low; • VFD power is too small; • Load transient or exception occurred; • To-ground short-circuit or output phase loss occured; • Strong external interference; • Overvoltage stalling protection is not enabled	• Increase the ACC/DEC time; • Check the input power; • Select a VFD with larger power; • Check if 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 for sources of strong interference; • Check the setup of related function codes.
OC2	[5] Overcurrent During Deceleration		
OC3	[6] Overcurrent During Constant Speed Running		
OV1	[7] Overvoltage During Acceleration	• Deceleration is too short; • Exception occurred at the input voltage; • Large energy feedback; • Lack of braking units; • Dynamic braking is not enabled, and the deceleration time is too short.	• Check the input power; • Check if the load deceleration time is too short; or if the motor starts up during rotation; • Install dynamic braking units; • Check the settings of related function codes
OV2	[8] Overvoltage During Deceleration		
OV3	[9] Overvoltage During Constant Speed		
UV	[10] Bus Undervoltage Error	• Grid voltage is too low; • Overvoltage stalling protection is not enabled	• Check the grid input power; • Check the setup of related function codes
OL1	[11] Motor Overload	• Grid voltage is too low; • Rated motor current is set incorrectly; • The motor stalls, or the load jumps violently	• Check the grid voltage; • Reset the rated motor current; • Check the load and adjust the torque boost
OL2	[12] VFD Overload	• Acceleration is too fast;	• Increase acceleration time;

		• The motor restarts during rotation; • Grid voltage is too low; • Load is too large; • Power is too low;	• Avoid restart after stop; • Check the grid voltage; • Select a VFD with larger power; • Select a suitable motor
SPI	[13] Phase Loss On Input Side	Phase loss or intense fluctuation occurred to R, S and T input	• Check the input power; • Check installation wiring
SPO	[14] Phase Loss On Output Side	Phase loss occurred to U, V, W output (or the three phases of the motor are 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-term overload	• Ventilate the air duct or replace the fan; • Lower the ambient temperature
OH2	[16] Inverter Module Overheating		
CE	[18] Modbus/Modbus TCP Communication Error	• Baud rate is set incorrectly; • Communication line error; • Communication address error; • Communication suffers from strong interference	• Set a suitable baud rate; • Check the wiring of communication interfaces; • Set a suitable communication address; • Replace or change the wiring to improve anti-interference capacity
tE	[20] Motor Autotuning Error	• Motor capacity does not match with the VFD capacity, this error may occur easily if the difference between them is exceeds five power classes; • Motor parameters are set incorrectly; • The parameter settings obtained via autotuning deviate sharply from the standard standards; • Autotuning timeout	• Select a different VFD model, or enable V/F control mode; • Set the correct motor type and nameplate parameters; • Empty the motor load and restart autotuning; • Check the motor wiring and parameter setup; • Check whether the frequency upper limit is larger than 2/3 of the rated frequency
dEu	[34] Speed Deviation Error	Load is too heavy, or stalling occurred	• Check the load to ensure it is suitable, increase the detection time; • Ensure that the control parameters are set correctly
STo	[35] Maladjustment Error	• Control parameters of synchronous motor is set improperly; • The parameter settings obtained via autotuning are inaccurate;	• Check the load to ensure it is suitable, • Ensure that the control parameters are set correctly;

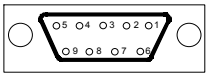
		• The VFD is not connected to the motor	• Increase the maladjustment detection time

7 Common Communication Cards And PG Cards

7.1 Common Communication Cards

7.1.1 PROFIBUS-DP Communication Card (STX503)

This card uses a 9-pin type D connector, as shown in the following figure:



Connector Pin		Description
1, 2, 7, 9	-	Unused
3	B-Line	Data+ (twisted pair 1)
4	RTS	Request sending
5	GND_BUS	Isolation ground
6	+5V BUS	Isolated power supply of 5 V DC
8	A-Line	Data- (twisted pair 2)
Housing	SHLD	PROFIBUS cable shielding line

7.1.2 CAN Multi-Protocol Communication Card (STX505C)

It uses European-style screw terminals.

Terminal Symbol	Name	Description
PGND	Isolation Ground	–
PE	Shielded Cable	CAN bus shield
CANH	CAN Positive Input	CAN bus high-level signal
CANL	CAN Negative Input	CAN bus low-level signal
CAN	CAN Terminal Resistor Switch	OFF: No terminal resistor is connected between CAN_H and CAN_L.
		ON: A terminal resistor is connected between CAN_H and CAN_L.

Note: Before powering on this card, set the DIP switch according to the protocol selection relationship so that it corresponds to the protocol actually used.

DIP Switch SW2		
1	**2**	**Protocol**
OFF	OFF	CANopen
ON	OFF	CAN master/slave

7.1.3 PROFINET Communication Card (STX509), Ethernet/IP Communication Card (STX510) And Modbus TCP Communication Card (STX515)

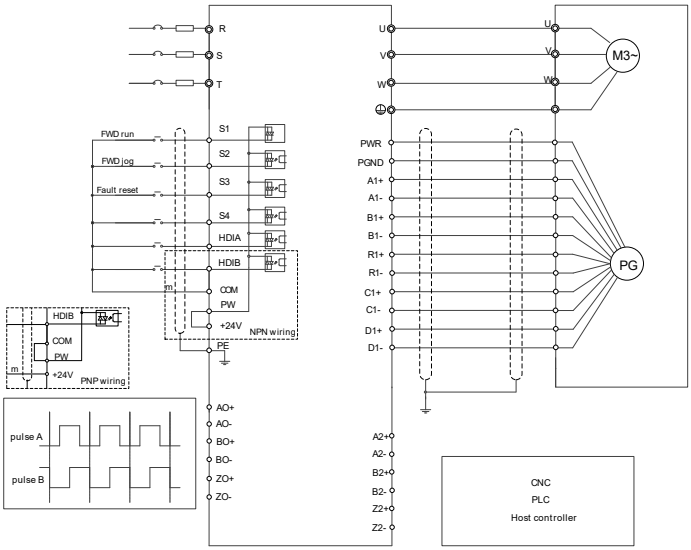
The communication cards use a standard RJ45 interface, the terminal signals of which are described as follows:

Pin	Name	Description
1	TX+	Transmit Data+
2	TX-	Transmit Data-
3	RX+	Receive Data+
4, 5, 7, 8	n/c	Not connected
6	RX-	Receive Data-

7.2 Common PG Cards

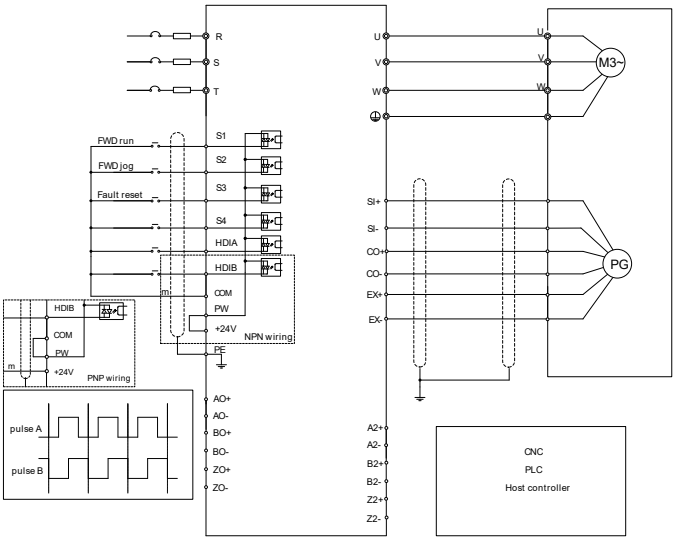
7.2.1 Sin/Cos PG Card (SPG502)

External wiring when the PG card works with an encoder with CD signals:



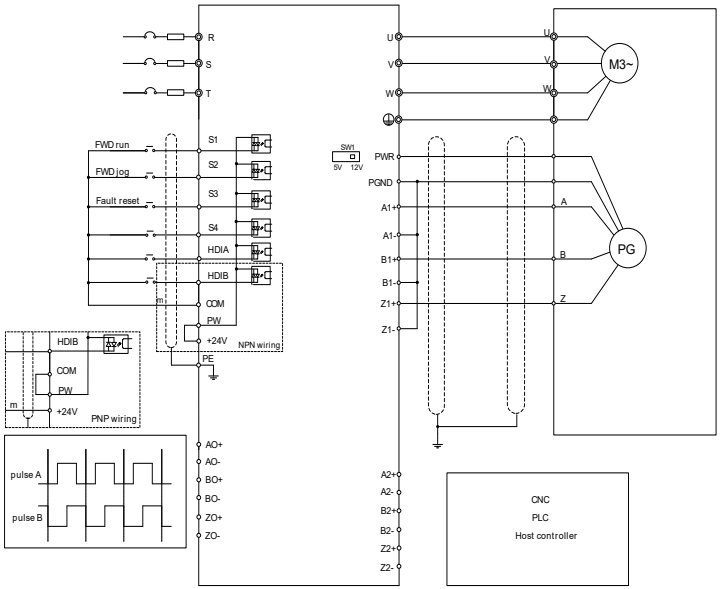
7.2.2 Resolver PG Card (SPG504-00)

External wiring when SPG504-00 is used:

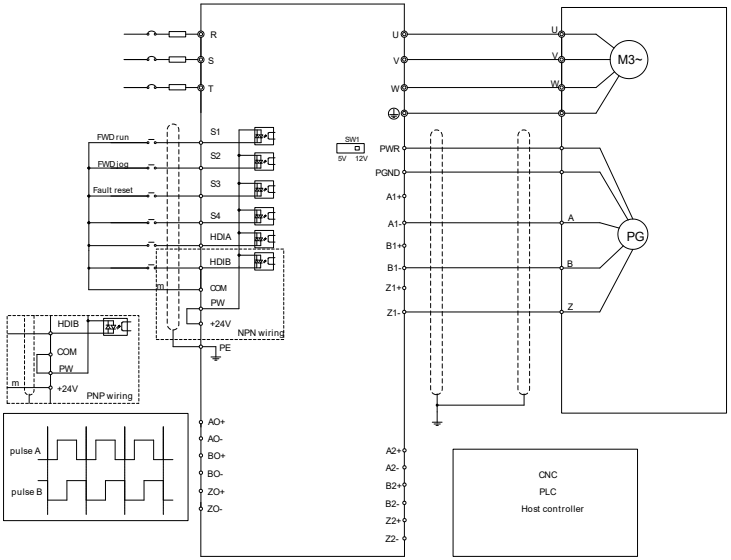


7.2.3 Multifunction Incremental PG Card (SPG505-12)

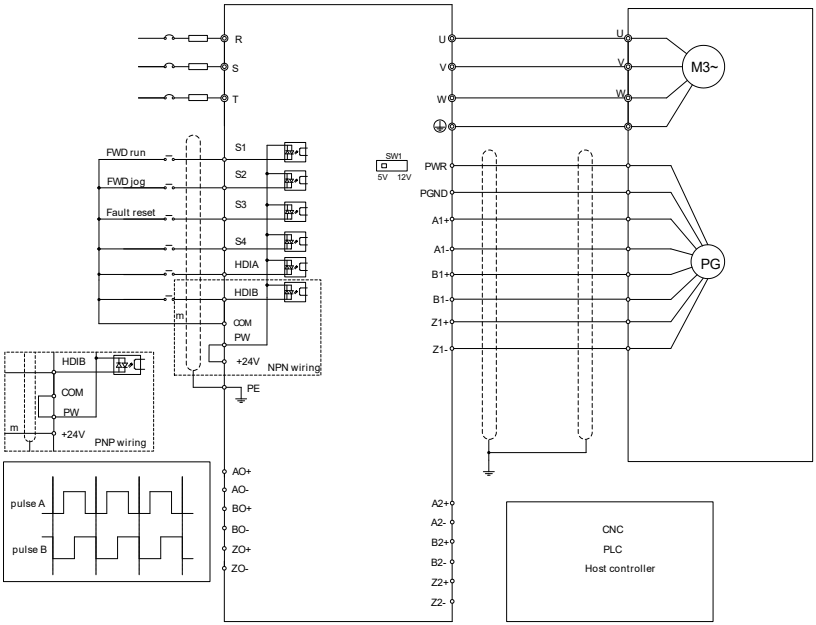
External wiring when the PG card utilizes an open collector encoder:



External wiring when the PG card utilizes a push-pull encoder:



External wiring when the PG card utilizes a differential encoder:


R
S
T
U
V
W
M3~
FWD run
FWD jog
Fault reset
S1
S2
S3
S4
HDIA
HDIB
COM
PW
+24V
NPN wiring
PE
SW1
5V 12V
PWR
PGND
A1+
A1-
B1+
B1-
Z1+
Z1-
PG
HDIB
COM
PW
+24V
PNP wiring
m
pulse A
pulse B
AO+
AO-
BO+
BO-
ZO+
ZO-
A2+
A2-
B2+
B2-
Z2+
Z2-
CNC
PLC
Host controller

Appendix A Energy Efficiency Data

Table A-1 Power Loss and IE Class of Standard Model VFDs

Product Model	Relative Loss (%)								Standby Loss (W)	IE Class
	(0;25)	(0;50)	(0;100)	(50;25)	(50;50)	(50;100)	(90;50)	(90;100)		
ST600-1R5G3	1.54	1.50	1.67	1.12	1.04	1.45	0.91	1.45	3	IE2
ST600-2R2G3	2.21	2.58	3.22	2.37	2.73	3.46	2.76	3.34	5	IE2
ST600-004G3	1.13	1.40	2.05	1.14	1.43	2.14	1.41	2.28	6	IE2
ST600-5R5G3	1.09	1.47	2.43	1.12	1.53	2.56	1.52	2.64	1	IE2
ST600-7R5G3	1.06	1.37	2.06	1.11	1.45	2.45	1.46	2.69	7	IE2
ST600-011G3	0.61	0.84	1.55	0.61	1.04	1.97	0.99	2.16	9	IE2
ST600-015G3	0.42	0.52	1.27	0.55	0.73	1.46	0.78	1.66	9	IE2
ST600-018G3	0.54	0.74	1.22	0.77	1.03	1.70	0.96	1.65	11	IE2
ST600-022G3	0.47	0.67	1.21	0.67	0.90	1.54	0.87	1.38	11	IE2
ST600-030G3	0.53	0.71	1.24	0.72	0.90	1.45	0.85	1.50	13	IE2
ST600-037G3	0.47	0.69	1.39	0.63	0.88	1.60	0.99	1.72	14	IE2
ST600-045G3	0.49	0.69	1.39	0.78	1.00	1.64	0.97	1.66	21	IE2
ST600-055G3	0.51	0.69	1.26	0.71	0.89	1.47	0.88	1.40	22	IE2
ST600-075G3	0.44	0.61	1.12	0.51	0.69	1.29	0.76	1.42	22	IE2
ST600-090G3	0.42	0.59	1.15	0.47	0.65	1.29	0.90	1.48	25	IE2
ST600-110G3	0.43	0.63	1.30	0.48	0.75	1.64	0.80	1.78	28	IE2
ST600-132G3	0.47	0.59	1.06	0.61	0.71	1.28	0.85	1.43	55	IE2
ST600-160G3	0.59	0.71	1.36	1.22	0.97	1.87	1.00	1.84	55	IE2
ST600-185G3	0.63	0.76	1.21	1.17	1.12	1.70	1.08	1.61	55	IE2
ST600-200G3	0.53	0.71	1.42	0.74	0.94	1.81	1.00	1.84	55	IE2
ST600-220G3	0.33	0.42	0.69	0.85	0.95	1.33	1.10	1.18	80	IE2
ST600-250G3	0.38	0.59	1.22	0.65	0.92	1.67	0.93	1.74	80	IE2
ST600-280G3	0.40	0.59	1.10	0.64	0.89	1.58	1.12	1.35	80	IE2
ST600-300G3	0.17	0.26	0.42	0.28	0.41	0.74	0.47	0.92	80	IE2
ST600-315G3	0.56	0.35	0.79	0.94	0.94	1.63	1.36	2.22	80	IE2
ST600-355G3	0.37	0.47	0.98	0.91	1.11	1.95	1.42	2.44	80	IE2
ST600-400G3	0.17	0.26	0.42	0.28	0.41	0.74	0.47	0.92	80	IE2
ST600-450G3	0.31	0.54	0.98	0.46	0.62	1.02	0.67	0.85	80	IE2
ST600-500G3	0.32	0.55	0.98	0.45	0.61	1.02	0.66	0.83	80	IE2

Table A-2 Power Loss and IE Class of SP Model VFDs

Product Model	Relative Loss (%)								Standby Loss (W)	IE Class
	(0;25)	(0;50)	(0;100)	(50;25)	(50;50)	(50;100)	(90;50)	(90;100)		
ST600SP-004G3	1.52	1.76	2.33	1.50	1.77	2.36	1.70	2.44	6	IE2
ST600SP-5R5G3	0.94	1.27	2.07	1.01	1.38	2.33	1.53	2.60	8	IE2
ST600SP-7R5G3	0.76	0.96	1.53	0.75	0.97	1.60	0.98	1.75	10	IE2
ST600SP-011G3	0.61	0.84	1.55	0.61	1.04	1.97	0.99	2.16	10	IE2
ST600SP-015G3	0.56	0.78	1.42	0.56	0.78	1.46	0.80	1.60	10	IE2
ST600SP-018G3	0.51	0.70	1.26	0.52	0.74	1.38	0.71	1.36	14	IE2
ST600SP-022G3	0.58	0.80	1.37	0.64	0.87	1.59	0.94	1.71	11	IE2
ST600SP-030G3	0.53	0.68	1.32	0.64	0.73	1.54	0.83	1.65	14	IE2
ST600SP-037G3	1.02	1.24	1.92	1.10	1.38	2.16	1.49	2.37	20	IE2
ST600SP-045G3	0.92	1.12	2.02	1.03	1.26	1.86	1.38	1.95	21	IE2
ST600SP-055G3	0.53	0.73	1.38	0.61	0.83	1.47	0.88	1.47	21	IE2
ST600SP-075G3	0.44	0.61	1.12	0.51	0.69	1.29	0.76	1.42	22	IE2
ST600SP-090G3	0.42	0.59	1.15	0.47	0.65	1.29	0.90	1.48	25	IE2
ST600SP-110G3	0.66	0.86	1.53	0.79	1.01	1.77	1.12	1.93	28	IE2

Table A-3 Rated Specifications of Standard & SP Model VFDs

Product Model	Apparent Power (Kva)	Rated Output Power (Kw)	Rated Output Current (A)	Max. Working Temperature (°C)	Rated Power Frequency (Hz)	Rated Power Voltage (V)
ST600-1R5G3	2.4	1.5	3.7	50°C, derate 1% for every increase of 1°C if the temperature exceeds 40°C	50Hz/60Hz, allowed range: 47-63Hz	3PH 380V
ST600-2R2G3	3.2	2.2	5			
ST600/ST600SP-004G3	6.2	4	9.5			
ST600/ST600SP-5R5G3	9.2	5.5	14			
ST600/ST600SP-7R5G3	12.2	7.5	18.5			
ST600/ST600SP-011G3	16.4	11	25			
ST600/ST600SP-015G3	21.0	15	32			
ST600/ST600SP-018G3	25.0	18.5	38			
ST600/ST600SP-022G3	29.6	22	45			
ST600/ST600SP-030G3	39.4	30	60			

ST600/ST600SP-037G3	49.3	37	75			
ST600/ST600SP-045G3	60.5	45	92			
ST600/ST600SP-055G3	75.7	55	115			
ST600/ST600SP-075G3	98.7	75	150			
ST600/ST600SP-090G3	118.5	90	180			
ST600/ST600SP-110G3	141.5	110	215			
ST600-132G3	171.1	132	260			
ST600-160G3	200.7	160	305			
ST600-180G3	223.7	185	340			
ST600-200G3	250.1	200	380			
ST600-220G3	279.7	220	425			
ST600-250G3	315.9	250	480			
ST600-280G3	348.8	280	530			
ST600-300G3	473.8	400	720			
ST600-315G3	394.9	315	600			
ST600-350G3	539.7	450	820			
ST600-355G3	427.8	355	650			
ST600-500G3	566.0	500	860			