

Frequency Converter XFC550

High performance vector control

Power supply voltage: three-phase 380V-480V

Range of power: 1.5kW-450kW





Model description

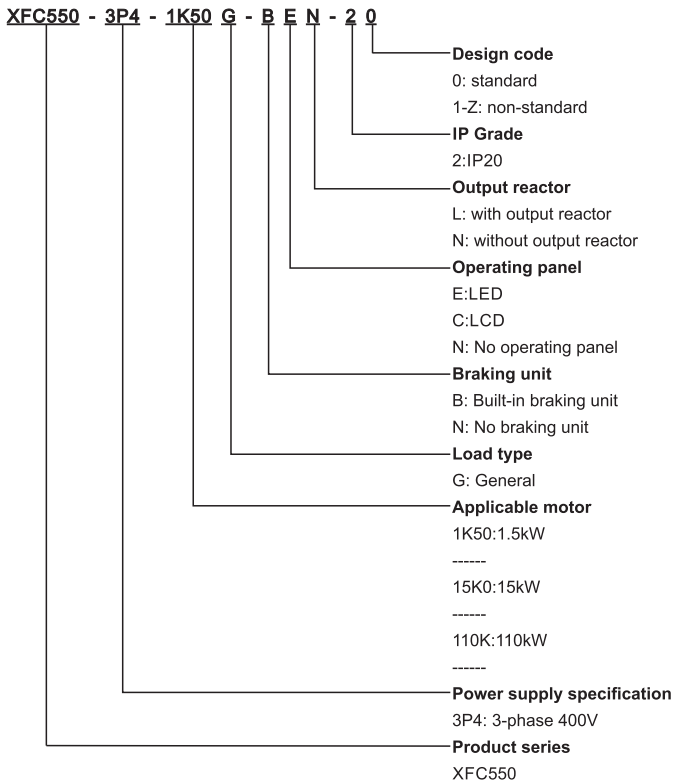


Fig.1 Model description of frequency converter

Specification

Table 1 Technical parameters of XFC550

Model XFC550-3P4□	Motor power kW	Rated input capacity kVA	Rated input current A	Rated output current A
1K50	1.5	3.2	4.8	4
2K20	2.2	4.5	6.8	5.6
4K00	4	7.9	12	9.7
5K50	5.5	11	16	13
7K50	7.5	14	21	17
11K0	11	16	24	25
15K0	15	21	32	33
18K5	18.5	26	39	40
22K0	22	29	44	45
30K0	30	39	60	61
37K0	37	48	73	74
45K0	45	58	88	90
55K0	55	71	107	109
75K0	75	96	145	147
90K0	90	114	174	176
110K	110	139	211	211
132K	132	167	253	253
160K	160	201	306	303
185K	185	233	353	350
200K	200	250	380	378
220K	220	275	418	416
250K	250	312	474	467
280K	280	350	531	522
315K	315	393	597	588
355K	355	441	669	659
400K	400	489	743	732
450K	450	550	835	822

Built-in DC reactor for 11K0 and above models.

Table 2 Technical specification of XFC550

Item		Specification
Power supply	Rated voltage	3-phase 380~480V
	Allowable voltage fluctuation	-15%~+10%
	Rated frequency	50~60Hz
	Allowable frequency fluctuation	±5%
Output	Max output voltage	Go after input voltage
	Max output frequency	500Hz
	Carrier frequency	0.5~16kHz (Automatic adjustment as per temperature. The adjustment range differs for different types)
	Overload capacity	150% rated current 60s 180% rated current 3s
Basic functions	Frequency setting resolution	Digital setting: 0.01Hz Analog setting: max frequency × 0.025%
	Control mode	Open-loop vector control (SVC) Closed-loop vector control (FOC) V/F control
	Pull-in torque	0.3Hz/150% (SVC) 0Hz/180% (FOC)
	Speed range	1:200 (SVC) 1:1000 (FOC)
	Speed stabilizing accuracy	±0.5% (SVC) ±0.02% (FOC)
	Control accuracy of torque	±5% (SVC)
	Torque boost	Automatic torque boost Manual torque boost 0.1%-30.0%
	V/F curve	Three modes: straight line type; multipoint type; Nth power type V/F curve(1.2th power, 1.4th power, 1.6th power, 1.8th power, 2th power)
	Acceleration-deceleration curve	Straight line or S curve acceleration-deceleration method; four kinds of acceleration-deceleration time, acceleration-deceleration range: 0.0-6500.0s
	DC braking	DC braking frequency:0.00Hz~max frequency Braking time: 0.0s~36.0s Braking action current value: 0.0%~100.0%
	Jogging control	Jogging freq. range: 0.00Hz~50.00Hz Jogging acceleration-deceleration time: 0.0s~6500.0s
	Simple PLC, multistage speed operation	Up to 16-stage speed operation via built-in PLC or control terminal
	Built-in PID	Closed-loop control realized in process control application
	Overvoltage and overcurrent stall control	Automatically limit current and voltage during operation to prevent shutdown due to frequent overcurrent and overvoltage
Fast current-limiting function	Minimize shutdown due to overcurrent to ensure the normal operation of frequency converter	

Item		Specification
Control interface	Digital input	5 multi-functional digital inputs, of which, one supports max 100kHz pulse input
	Analog input	2 analog inputs, both supporting 0~10V or 0~20mA analog input, switch voltage or current input via jumper
	Digital output	2 open collector digital outputs, of which, one supports max 100kHz square wave output
	Analog output	1 analog output, supporting 0~10V or 0~20mA analog input, switch voltage or current input via jumper
	Relay output	1-way relay output, including 1 normally-open contact and 1 normally-closed contact
	Standard comm. interface	1-way RS485 comm. Interface
Expansion interface	Functional expansion interface	Connectable to IO expansion card and PLC programmable expansion card
	Coder expansion interface	Connectable to compatible difference and OC coder expansion card
Operating interface	LED digital display	5-digit display of parameter and setting
	Indicator lamp	4 status indications and 3 unit indications
	Button's function	5 functional buttons, including 1 multi-functional button. Function can be set via parameter P0-00
	Shuttle knob	Add and minus plus confirm
	Parameter copy	Fast upload and download of parameters
Protection function	Basic protection	Phase loss, overvoltage, undervoltage, overcurrent, overload, overheat, interphase short circuit, grounding fault
Environment	Operation condition	Indoor without conductive dust and oil dirt
	Operational ambient temperature	-10℃~40℃(40℃~50℃ Derate 1.5% when the temperature rises by 1℃)
	Humidity	Less than 95%RH, without condensation
	Altitude	No derating less than 1000m, 1% derating when the altitude every rises by 100m
	Ambient temperature for storage	-20℃~+60℃
	Vibration	Less than 5.9m/s ² (0.6g)
	Installation mode	Wall-mounted or embedded installation in cabinet (installation accessories needed)
	IP grade	IP20

System wiring

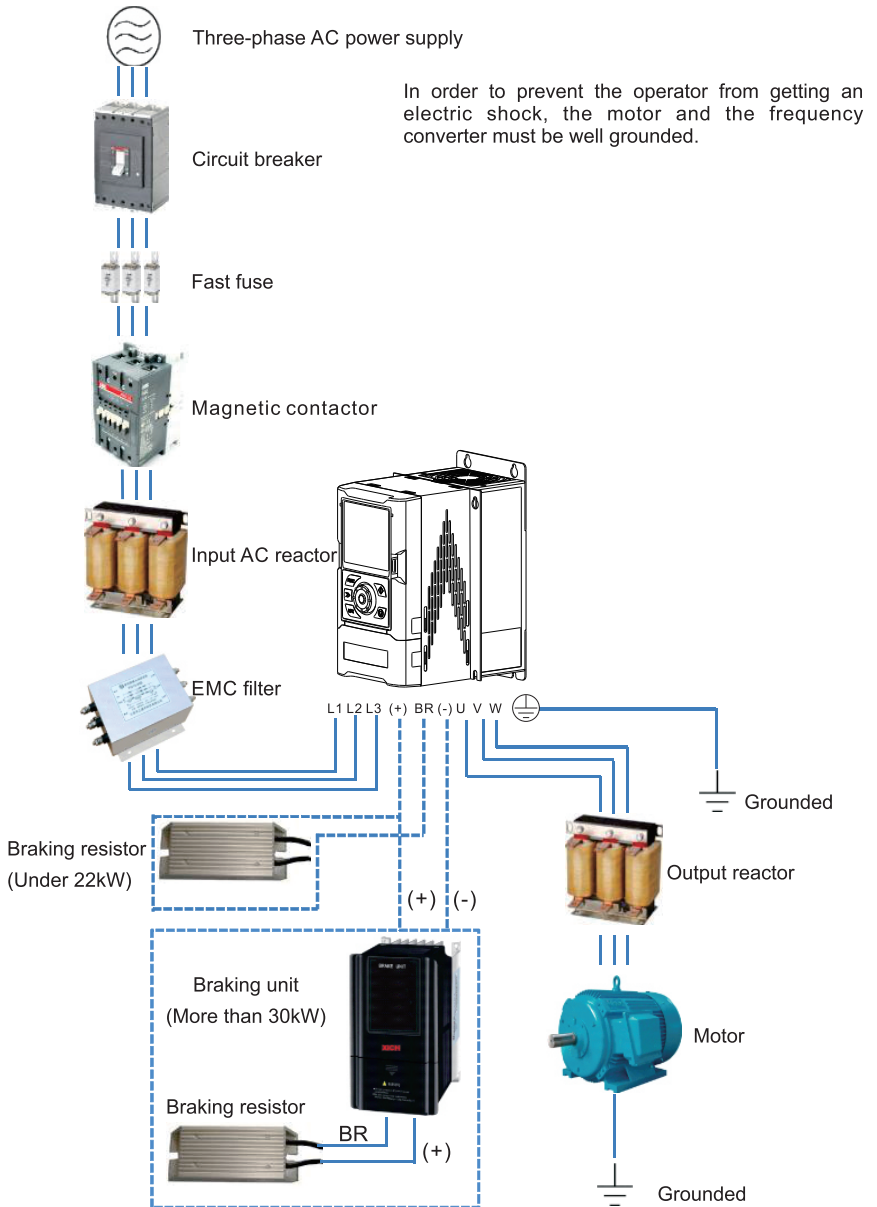


Fig.2 External wiring of the system

Instruction to use of peripheral elements

Table 3 Instruction to use of peripheral elements of XFC550 series frequency converter

Name of accessories	Position of installation	Description of function
Circuit breaker	Front end of input loop	Break power supply in case of overcurrent of downstream equipment
Electromagnetic contactor	Input side of air switch and frequency converter	The frequency converter should avoid frequent power-on and -off operation or direct start operation through the contactor.
Input AC reactor	Input side of frequency converter	Improve the power factor on the input side; effectively eliminate the higher harmonics on the input side, prevent damage to other equipment caused by voltage waveform distortion; eliminate input current imbalance caused by power phase imbalance.
EMC filter	Input side of frequency converter	Reduce the external conduction and radiation interference of the frequency converter; reduce the conduction interference from the power supply end to the frequency converter, and improve the anti-interference ability of the frequency converter.
DC reactor	XFC550 series frequency converter. DC reactors of 11K0 and above are standard configuration	Improve the power factor on the input side; improve the efficiency and thermal stability of the frequency converter; effectively eliminate the influence of the higher harmonics on the input side of the frequency converter and reduce external conduction and radiation interference.
AC output reactor	Installed close to frequency converter between output side of frequency converter and motor	The output side of the frequency converter generally contains more high-order harmonics. When the distance between the motor and the frequency converter is long, as there is a large distributed capacitance in the line, the harmonics may generate resonance in the loop, bringing about effects in two aspects; destroy the insulation performance of the motor, and damage the click function. Large leakage current will cause frequent protection of the frequency converter; when the distance between the frequency converter and the motor is too long, it is recommended to install an output AC reactor.

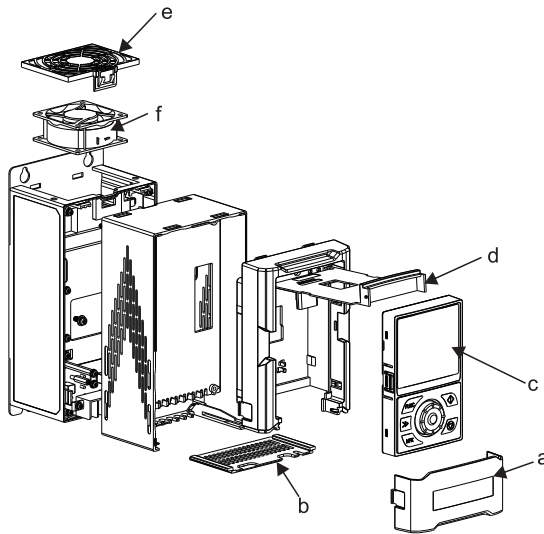
1. Do not install capacitors or surge suppressors on the output side of the frequency converter. This will result in malfunction of the frequency converter or damage to the capacitor and surge suppressor.

2. The input/output (main circuit) of the frequency converter contains harmonics that may cause interference to the communication equipment near the frequency converter. Therefore, install an anti-interference filter to minimize interference.

3. Refer to section 10 for peripheral components and options for details of peripheral devices and options.

ATTENTION:

Frequent ON and OFF may cause the frequency converter to malfunction. Considering the service life of the relay contacts and electrolytic capacitors inside the frequency converter, the maximum running and stopping frequency should not exceed 30 minutes. Please try to run and stop the motor through the operation of the frequency converter.

Components of frequency converter

- a-Bottom cover
- b-Wiring back plate
- c-Operating panel
- d-Rotational push plate
- e-Fan cover plate
- f-Fan

Fig.3 Parts of frequency converter

Dimensions and mounting dimensions

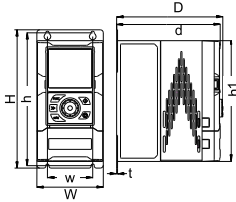


Fig.4 Outside view A

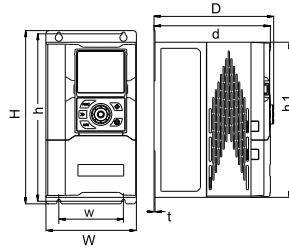


Fig.5 Outside view B

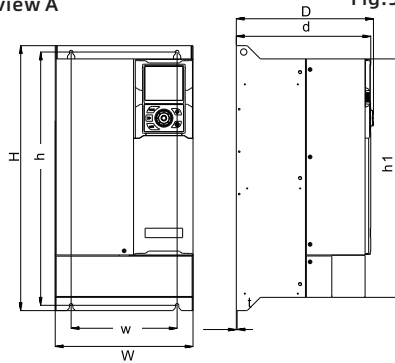


Fig.6 Outside view C

Table 4 Dimensions

Model XFC550-3P4-□	Dimensions (mm)									Set screw	Weight (kg)
	Outside view	W	H	D	w	h	h1	d	t		
1K50	A	110	228	177	75	219	200	172	1.5	M5	2.5
2K20											
4K00											
5K50	B	140	268	185	100	259	240	180	1.5	M5	3.2
7K50											
11K0											
15K0											
18K5											
22K0	C	190	348	245	150	339	320	240	1.5	M5	9
30K0											
37K0											
45K0											
55K0											
75K0											
90K0											
110K											
132K	450	850	355	300	824	800	350	2	M10	91	
160K											

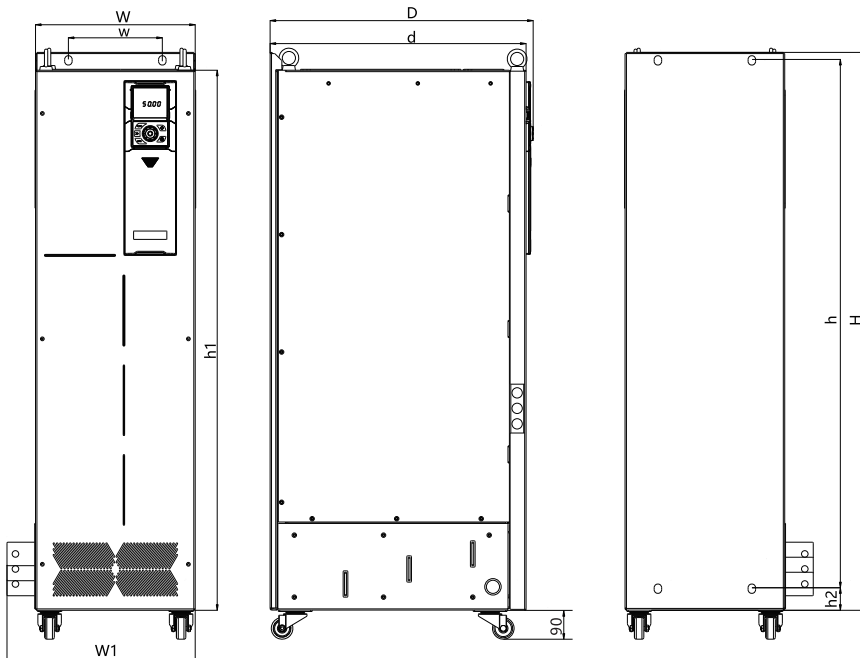


Fig.7 Outside view D

Table 5 Dimensions

Model XFC550-3P4-□	Dimensions (mm)											
	Outside view	W	H	D	w	h	h1	h2	d	W1	Set screw	Weight (kg)
185K	D	340	1218	560	200	1150	1180	53	545	400	M12	210
200K												
220K												
250K												
280K												
315K		340	1445	560	200	1375	1410	56	545	400	M12	245
355K												
400K												
450K												

Standard wiring diagram

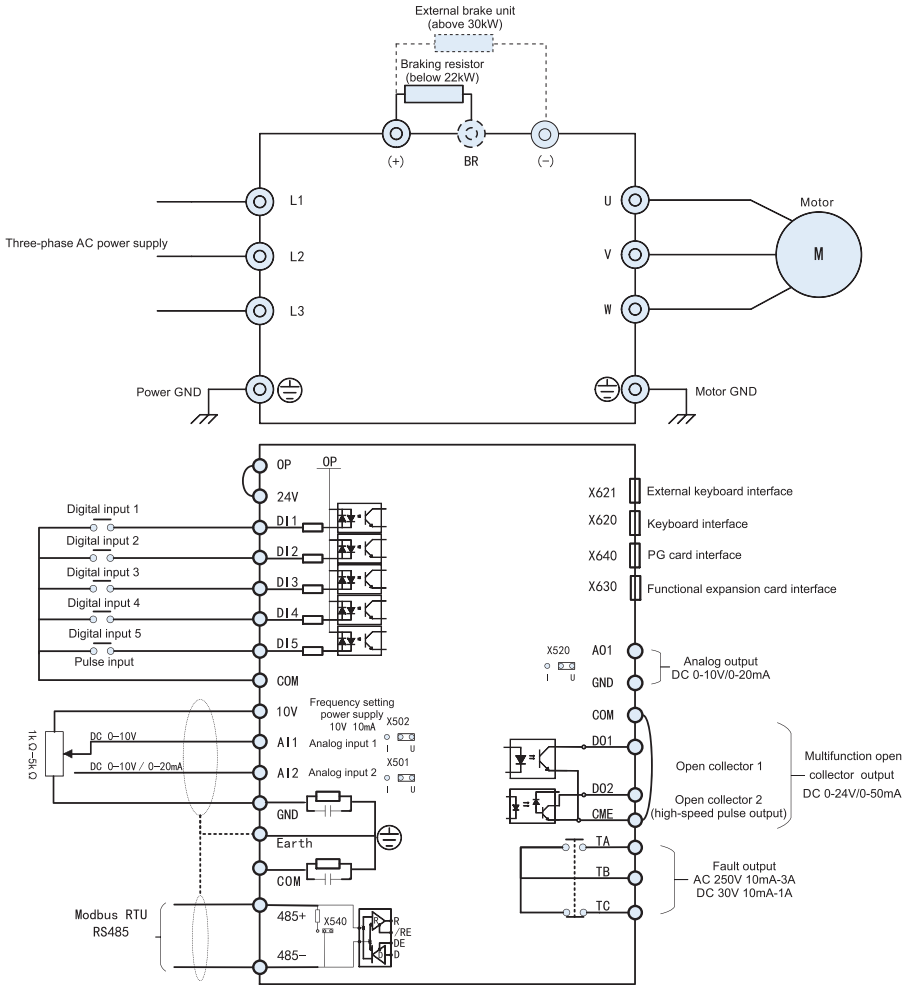


Fig. 8 Standard wiring diagram of frequency converter

Peripheral Elements and Optional Parts

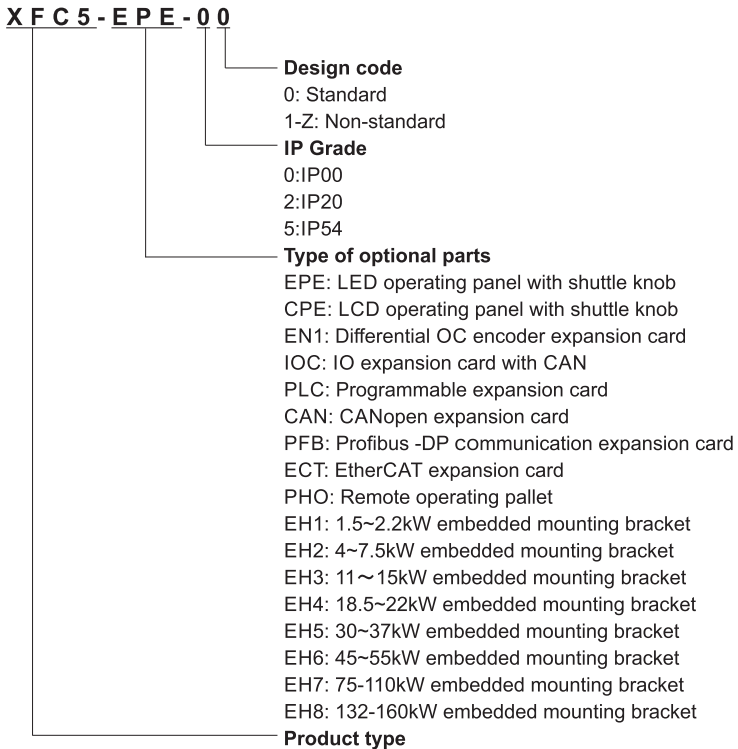


Fig.9 Instruction to optional parts type code

Expansion card



WARNING

To prevent electric shock, non-electrical professionals should not install, maintain, inspect, or replace parts. Otherwise there is a risk of electric shock. Please be familiar with the installation, adjustment and repair of the frequency converter for wiring, setting and operation.

ATTENTION

To prevent damage to the machine, when the frequency converter and the optional card are used, follow the procedures specified in the ESD. Otherwise, the circuit on the printed circuit board may be damaged by static electricity.

Tighten the terminal screws to the specified torque. Failure to do so may result in malfunction of the machine or damage to the terminal block.

Table 6 List of optional card's functions

Item	Model	Function	Remark
IO optional card	XFC5-IOC-00	Five digital inputs, one analog input, one relay output, one open collector output, one analog output, and CAN interface communication can be added.	Universal for all powers
Programmable optional card	XFC5-PLC-00	Connected to the frequency converter to form a PLC+ frequency converter combination, compatible with the Mitsubishi PLC programming environment. The card has five digital inputs, one analog input, two relay outputs, one analog output, and RS485 interface communication.	Universal for all powers
Encoder's optional card	XFC5-EN1-00	Converting the encoder signal of the differential or OC output to the frequency converter is an option for the closed loop vector control of the frequency converter. And output the encoder pulse signal for external monitoring	Universal for all powers
Profibus-DP communication card	XFC5-PFB-00	Profibus-DP card have communication function, and baud rate adapts itself. Frequency converter can be accessed to Profibus communication network. It can read all function codes. Realization of fieldbus control.	Universal for all powers
CANopen communication card	XFC5-CAN-00	Frequency converter access to high-speed CAN communication network. Realization of fieldbus control. CANopen card support heartbeat、NMT、SDO、3 TPDO、3 RPDO. Support for emergency respondents.	Universal for all powers
EtherCAT communication card	XFC5-ECT-00	Have EtherCAT communication function, and full support for protocol EtherCAT. Converter can be connected to EtherCAT Communication Network. Real-time reading of converter function code and fieldbus control are realized.	Universal for all powers

Installation of optional card

The optional card interface can be installed with different types of optional cards. Please install the optional card to the frequency converter according to Table 10-2.

Table 7 Installation of optional card

Item	Interface	Mounting number
IO optional card	X630	1
Programmable card	X630	1
Coder card	X640	1
Profibus-DP card	X630	1
CANopen card	X630	1
EtherCAT card	X630	1

When installing the optional card, first remove the lower cover and the operating panel, and then push the rotary push plate in the direction shown in the figure to start the installation of the optional card.

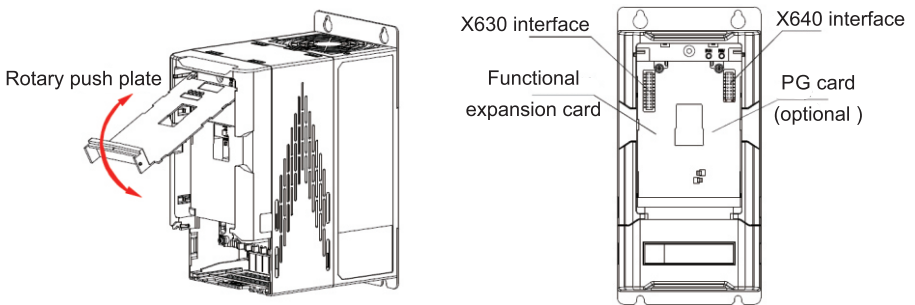


Fig. 10 Installation of optional card

Wiring diagram of encoder card XFC5-EN1-00

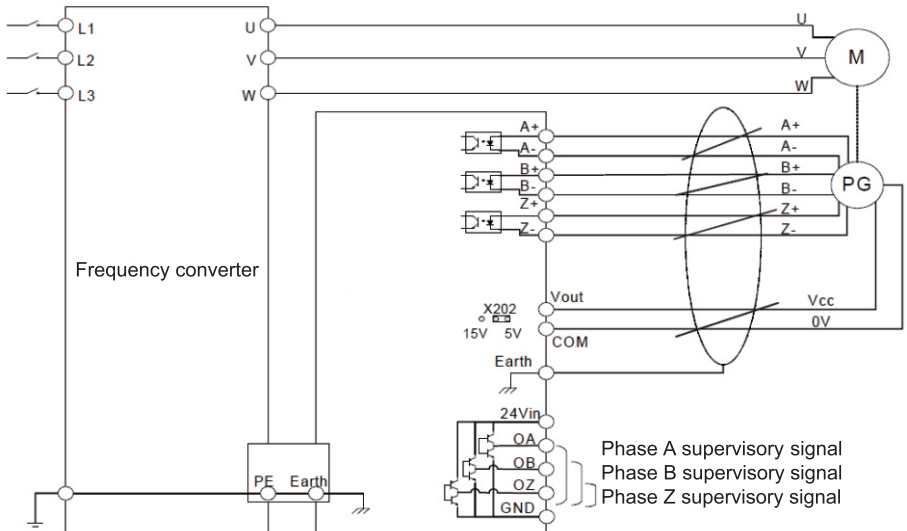


Fig. 11 Connection diagram of differential encoder

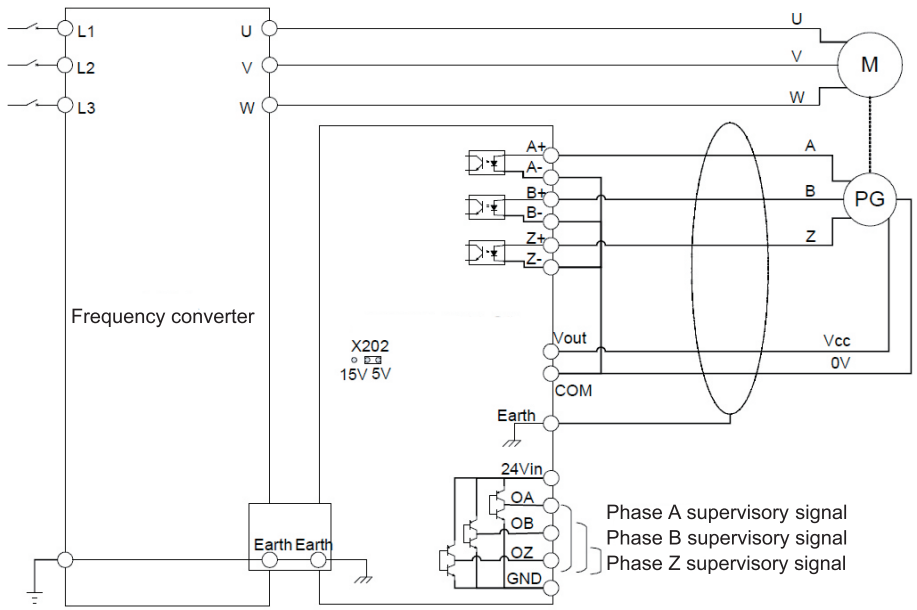


Fig.12 PNP connection diagram of OC type encoder

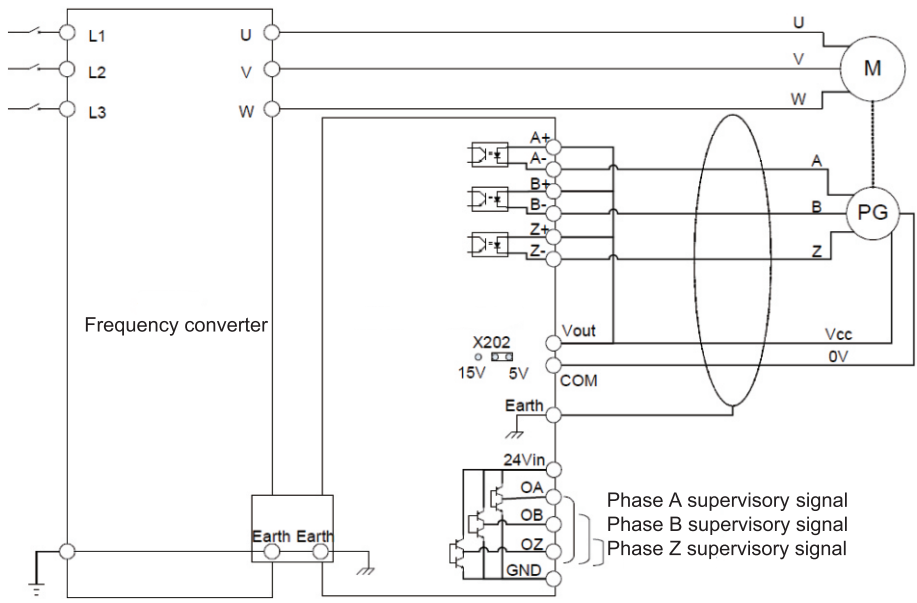


Fig.13 NPN connection diagram of OC type encoder

Note: X202 jumper determines output of 15V or 5V power supply.

Table 8 List of IO optional card' functions

Category	Terminal symbol	Terminal	Description of function
Power supply	24V - COM	External +24V power supply	Provide +24V power supply to the outside, generally used as digital input and output terminal working power supply and external sensor's power supply; Maximum output current: 200mA
	EOP	Digital input terminal's common port	The factory default is connected to +24V. When using external signal to drive DI6 ~ DI10, EOP needs to be connected to external power supply and disconnected from +24V power supply terminal.
Analog input	AI3 - GND	Analog input terminal 3	<ol style="list-style-type: none"> 1. Input range: DC -10V ~ 10V / -20mA ~ 20mA, determined by the X1 jumper selection on the optional card. 2. Input impedance: 22kΩ for voltage input and 500Ω for current input 3. Compatible with thermistor temperature detection input, the circuit design can be connected with 15V pull-up 1kΩ resistor for temperature sampling, whether connected to the resistor is determined by jumper X2.
Digital input (DI)	DI6 - EOP	DI6	<ol style="list-style-type: none"> 1. Optocoupler isolation, compatible with bipolar input 2. Input impedance: 2.4kΩ 3. Level input voltage range: 9V ~ 30V
	DI7 - EOP	DI7	
	DI8 - EOP	DI8	
	DI9 - EOP	DI9	
	DI10 - EOP	DI10	
Analog output	AO2 - GND	Analog output 2	The voltage or current output is determined by the X30 jumper selection on the optional card. Output voltage range: 0V - 10V (maximum output current: 5mA) Output current range: 0mA ~ 20mA (maximum load resistance: 500Ω)
Relay output	EA - EB	Normally open	Contact drive capability: 250VAC, 3A, COSφ=0.4, 30VDC, 3A
	EB - EC	Normally closed	
Open collector output	DO3 - ECME	DO3	Optocoupler isolation, bipolar open collector output Output voltage range: 0V ~ 24V Output current range: 0 mA ~ 50mA Note: ECME and COM have been externally shorted at the factory.
CAN communication	CANH - CANL	Comm interface terminal	CAN communication terminal resistor 120Ω has been disconnected by default when it leaves the factory. Whether it is connected or not depends on the X301 jumper on the optional card.

Table 9 List of programmable optional card's functions

Category	Terminal symbol	Terminal	Description of function
Power supply	24V - COM	External +24V power supply	Provide +24V power supply to the outside, generally used as digital input and output terminal working power supply and external sensor's power supply; Maximum output current: 200mA
	POP	Digital input terminal's common port	The factory default is connected to +24V. When using external signal to drive PDI1 - PDI5, POP needs to be connected to external power supply and disconnected from +24V power supply terminal.
Analog input	PAI1 - GND	Analog input terminal 1	<ol style="list-style-type: none"> 1. Input range: DC -10V ~ 10V / -20 mA ~ 20mA, determined by the X201 jumper selection on the optional card. 2. Input impedance: 22kΩ for voltage input and 500Ω for current input 3. Compatible with thermistor temperature detection input, the circuit design can be connected with 15V pull-up 1kΩ resistor for temperature sampling, whether connected to the resistor is determined by jumper X202.
Digital input	PDI1 - POP	DI1	<ol style="list-style-type: none"> 1. Optocoupler isolation, compatible with bipolar input 2. Input impedance: 2.4kΩ 3. Level input voltage range: 9V ~ 30V
	PDI2 - POP	DI2	
	PDI3 - POP	DI3	In addition to the characteristics of PDI1 ~ PDI3, it can also be used as a high-speed pulse input channel. Maximum input frequency: 100kHz
	PDI4 - POP	DI4	
	PDI5 - POP	DI5	
Analog output	PAO1 - GND	Analog output 1	The voltage or current output is determined by the X240 jumper selection on the optional card. Output voltage range: 0V ~ 10V Output current range: 0 mA ~ 20mA
Relay output	PA1 – PB1	Normally open contact 1	Contact drive capability: 250VAC, 3A, COSØ=0.4, 30VDC, 3A
	PA2 – PB2	Normally open contact 2	
RS485 comm	485+ - 485-	Comm interface terminal	RS485 communication terminal resistor 120Ω has been disconnected by default when it leaves the factory. Whether it is connected or not depends on the X301 jumper on the optional card.

Table 10 Encoder's optional card

Category	Terminal symbol	Terminal	Description of function
Differential input (Encoder's differential output)	A+ - A-	Differential input of phase A	Encoder's pulse output interface, resolution 250kHz
	B+ - B-	Differential input of phase B	
	Z+ - Z-	Differential input of phase Z	
Grounding	Earth	Grounding terminal	Connected to case and ground
Monitor output	OA - GND	Monitor output of phase A	Must be connected to the 24V power supply (24Vin - GND), push-pull 1:1 follow encoder pulse output, up to 250 kHz
	OB - GND	Monitor output of phase B	
	OZ - GND	Monitor output of phase Z	
Power supply	24Vin - GND	24V power input	Monitor 24V power supply
	Vout - COM	5V/15 power output	Encoder 5V/15V power supply, X202 jumper determines output 15V or 5V power supply

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