

FC1000

FC1000 SERIES FREQUENCY INVERTER

Technical innovation benefits the world

CAG FC1000 series frequency inverters are applicable to 3-phase squirrel cage asynchronous motor. With compact structure and high reliability, they are widely used in manufacturing and transportation and other industries.

- Fan and pump;
- Ceramic machinery;
- Machine tool;
- Woodworking machinery;
- Packing and printing machinery;
- Material transportation equipment and other universal equipment (conveyor and lifter).

Character	Description
FC	Frequency inverter
1	1000 series
XXXG/XXXXP	Code of power:
	XXX: Code of power, such as, 001:1.5 kW; 037:37 kW; 110:110 kW G: Constant torque load (heavy load); P: Variable torque load (light load); G/P: Integrator of type G and type P.
-X	Code of special machine: Default value stands for universal machine Such as – S stands for special frequency inverter for constant pressure water supply.

Product Characteristics

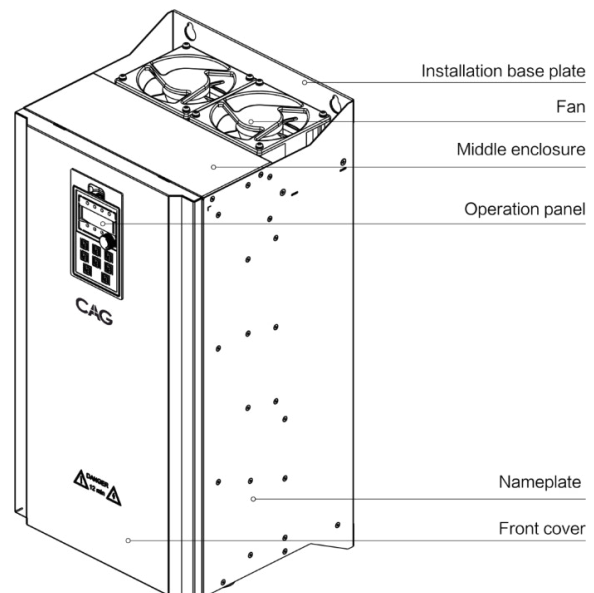
FC1000 series frequency inverters help users to raise production efficiency depending on their compact structure, powerful function and convenient operation.

- Under V/f control mode, the frequency inverters offer high-precision current limiting control. So the driver gets rid of over-current alarm no matter in fast acceleration/deceleration or during locked rotor. In such way the driver is protected reliably; Under vector control mode, high-precision torque limiting control allows the driver to output strong or soft torque according to the technological control of the user, and so reliably protect the mechanical equipment.
- Under V/f separation control mode, output frequency and output voltage can be set separately. This is applicable to variable frequency power supply, torque motor control and other applications.

Control mode	Start torque	Range of speed control	Speed precision	Torque response
V/F control	0.5Hz 180%	1:100	±0.5%	
Vector control without PG	0.5Hz 180%	1:100	±0.2%	<10ms

- Wave-by-wave current limiting function: During heavy load start or abrupt increase of heavy load, this function enables automatic limitation of the output current before the over-current fault occurs, and avoids frequent tripping of the frequency inverter.

Description of parts of the frequency inverter:



Product specifications:

	ITEM	INDEX AND SPECIFICATION
Main in-put power	Rated voltage	3-phase, AC 380V, 50/60Hz
	Frequency range	Voltage: 380V±20% Frequency: ±5%
Main out-put power	Rated voltage	0 ~ rated input voltage
	Output frequency	0Hz ~ 600 Hz
	PWM mode	SVPWM, 3-phase modulation and 2-phase modulation
	Control mode	V/F control, vector control without PG (open loop vector), torque control
	Operation command giving method	External terminals, keypad of the panel, serial communication
	Speed command giving method	Analog giving, keypad of the panel, communication, high-speed pulse, terminal multistage speed giving, PID control giving, simple PLC giving
Basic features	Range of speed control	Open loop vector control 1:100
	Speed control resolution	Open loop vector control ±0.5%
	Overload capacity	150% of rated output current for 60s; 185% of rated output current for 10s; 200% of rated output current for 1s
	Automatic voltage adjustment	When the power grid's voltage changes, the inverter can automatically maintain constant output voltage
	Speed search start	Enables no-impact smooth start of rotating motor.
Control terminal input	Available inner power	1 route, +10VDC, max. current: 50mA (used for potentiometer)
		1 route, +24VDC, max. current: 200mA (used for logic input port)
	Analog input	2 routes, 0, 10VDC or 0/4, 20mA DC, selectable
		1 route, -10 ~ +10VDC
	Switching amount input	8 routes of programmable logic inputs. NPN and PNP collector open loop signals are supported. 39 logic input functions, such as forward, reverse, fault reset are selectable.
Pulse signal input	1 route of high-speed pulse input, which can be used as switching amount input. Input frequency range: 0~50KHz. They can also be used as high-precision speed giving source or speed feedback resource with strong anti-interference capability.	
Control terminal output	Analog amount output	2 routes, 0 ~ 10VDC or 0 ~ 20mADC, selectable
	Switching amount output	2 routes of programmable logic outputs, NPN collector open loop signal, 20 logic input functions, such as in-operation, forward, reverse, fault output are selectable.
	Pulse signal output	1 route of high-speed pulse output. NPN collector open loop signal, 13 output functions selectable.
	Programmable relay output	2 routes with a couple of NO contacts and a couple of NC contacts separately, contact capacity: 250VAC/3A, 30VDC/1A
Communication interface		RS485 interface, supporting Modbus protocol
Operation panel	Display	Digitron panel or LED panel, displaying state parameters and fault codes etc, and for setting parameters
	Indication lamp	State indication lamp, displaying the operation state information of the inverter; Unit indication lamp, displaying the unit of the digital data shown by the LED
	Push button	For operating the inverter and setting parameters
	Parameter copy	The inverter supports upload of the data by the user to the panel for storage. It also supports download of the data stored by the user in the panel to the machine.
Fault protection		With 25 fault protection functions, such as output overcurrent, bus overvoltage, bus undervoltage, motor overload, inverter overload, input phase failure, output phase failure, rectification module overtemperature, inversion module overtemperature, external fault, communication fault, current detection fault, motor self-learning fault, EEPROM operation fault, PID feedback failure fault, braking unit fault and arrival of factory setting time etc.

Product specifications:

ITEM		INDEX AND SPECIFICATION
Environment	Standard	In compliance with diversity of international standards (IEC, EN), especially, IEC/EN61800-5-1(Low voltage), IEC/EN61800-3 (standard for anti-interference of conduction and radiation)
	Place of application	Indoors, altitude < 1000 m, no dust, no erosive gas and no exposure to direct sunshine
	Environmental temperature	Operation: -25 °C ~ 40 °C, reliable operation without derating; Within 40 °C ~ 50 °C, derating is necessary. The output current reduces by 1% for every rise of 1 °C. Storage: -40 °C ~ +70 °C
	Altitude	0 ~ 2000m, derating is necessary when altitude >1000m (The inverter is derated by 1% for each rise of 100m)
	Humidity	5% ~ 95%, no condensed water or dripping water
	Vibration strength	<5.9m/s ² (0.6g)
Other	Protection level	IP20
	Cooling	Forced air
	Installation method	0.75~315kW: Wall mounted: 350~500kW: Floor type

Type and specifications:

Model of inverter	Power (kW)	Input voltage (V)	Input current (A)	Output current (A)	Power of applicable motor (kW)
FC1000G/001P	0.75	3-phase, 400V	3.4	2.5	0.75
	1.5		5.0	3.8	1.5
FC1000G/001P	1.5		5.8	3.8	1.5
	2.2		5.8	5.1	2.2
FC1002G/004P	2.2		5.8	5.1	2.2
	4.0		12.0	9.5	4.0
FC1004G/005P	4.0		12.0	9.5	4.0
	5.5		18.5	14	5.5
FC1005G/007P	5.5		18.5	14	5.5
	7.5		22.5	18.5	7.5
FC1007G/011P	7.5		22.5	18.5	7.5
	11		30.0	25.0	11
FC1011G/015P	11		30.0	25.0	11
	15		39.0	32.0	15
FC1015G/018P	15		39.0	32.0	15
	18.5		45.0	38.0	18.5
FC1018G/022P	18.5		45.0	38.0	18.5
	22		54.0	45.0	22
FC1022G/030P	22		54.0	45.0	22
	30		68.0	60.0	30
FC1030G/037P	30		68.0	60.0	30
	37		84.0	75.0	37
FC1037G/045P	37		84.0	75.0	37
	45		98.0	92.0	45
FC1045G/055P	45	98.0	92.0	45	
	55	123.0	115.0	55	

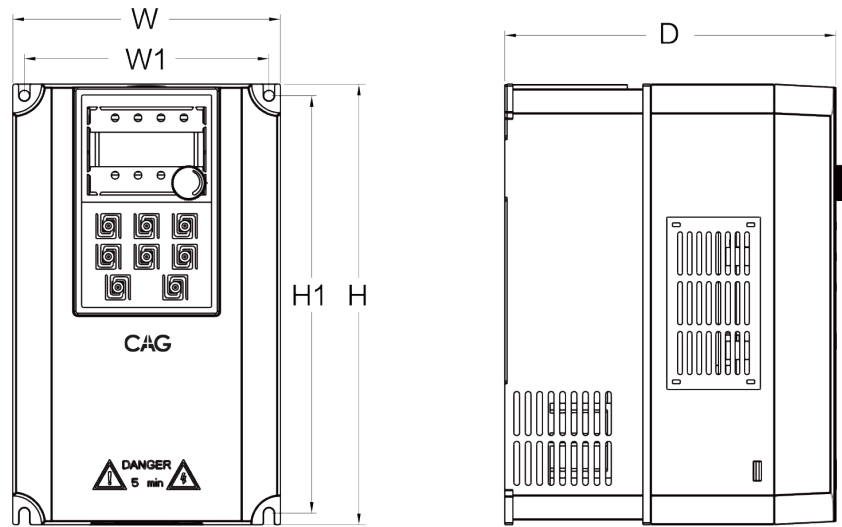
Type and specifications:

Model of inverter	Power (kW)	Input voltage (V)	Input current (A)	Output current (A)	Power of applicable motor (kW)
FC1055G/075P	55	3-phase, 400V	123.0	115.0	55
	75		157.0	150.0	75
FC1075G/090P	75		157.0	150.0	75
	90		188.0	180.0	90
FC1090G/110P	90		188.0	180.0	90
	110		221.0	215.0	110
FC1110G/132P	110		221.0	215.0	110
	132		267.0	260.0	132
FC1132G/160P	132		267.0	260.0	132
	160		309.0	305.0	160
FC1160G/185P	160		309.0	305.0	160
	185		344.0	340.0	185
FC1185G/200P	185		344.0	340.0	185
	200		384.0	380.0	200
FC1200G/220P	200		384.0	380.0	200
	220		429.0	425.0	220
FC1220G/250P	220		429.0	425.0	220
	250		484.0	480.0	250
FC1250G/280P	250		484.0	480.0	250
	280		539.0	530.0	280
FC1280G/315P	280		539.0	530.0	280
	315		612.0	600.0	315
FC1315G/350P	315		612.0	600.0	315
	350		665.0	650.0	350
FC1350G	350	715	720	400	
FC1400G	400	715	720	400	
FC1500G	500	890	860	500	

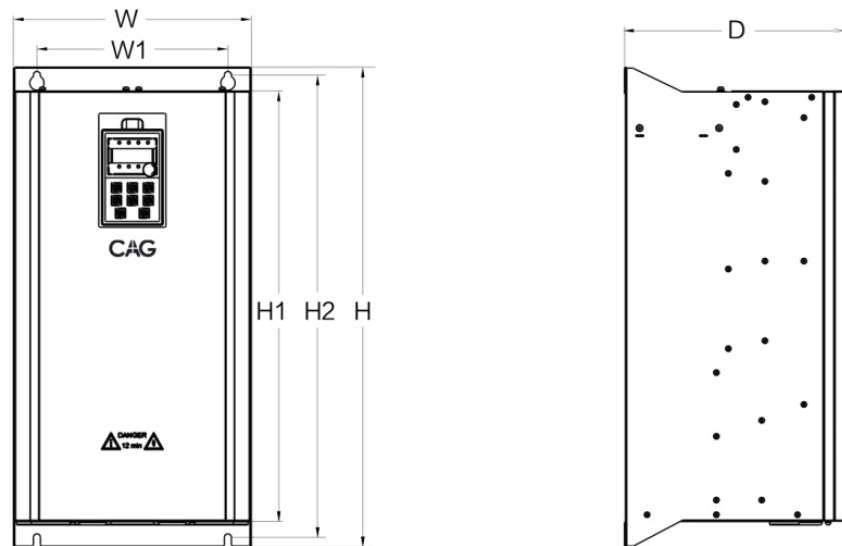
Note:

1. Frequency inverters of power rating below FC1037G/045P (included) have built-in braking unit, whose power and resistance value should meet the requirements in the above-mentioned table. Otherwise there is risk of damage to the product. Frequency inverters of power rating above FC1045G/055P (included) have external braking resistance, which is purchased by the customer itself.
2. Frequency inverters of power rating between FC1015G/018P (included) and FC1037G/045P (included) have built-in DC reactor. Frequency inverters of power rating between FC1045G/055P (included) and FC1315G/350P (included) have external DC reactor, which is purchased by the customer itself. Frequency inverters of power rating between FC1350G (included) and FC1500G (included) are equipped with AC input reactor.
3. The above machines are for general type, not including special machine type. Customization of non-standard machine type is available.

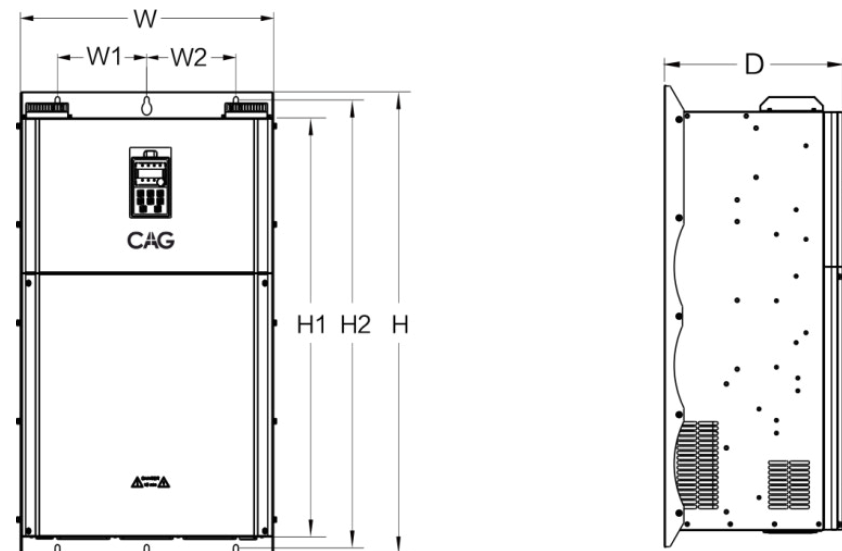
Product appearance and installation size and weight



a) Applicable for FC1000G/001P (incl.) ~ FC1011G/015P (incl.)

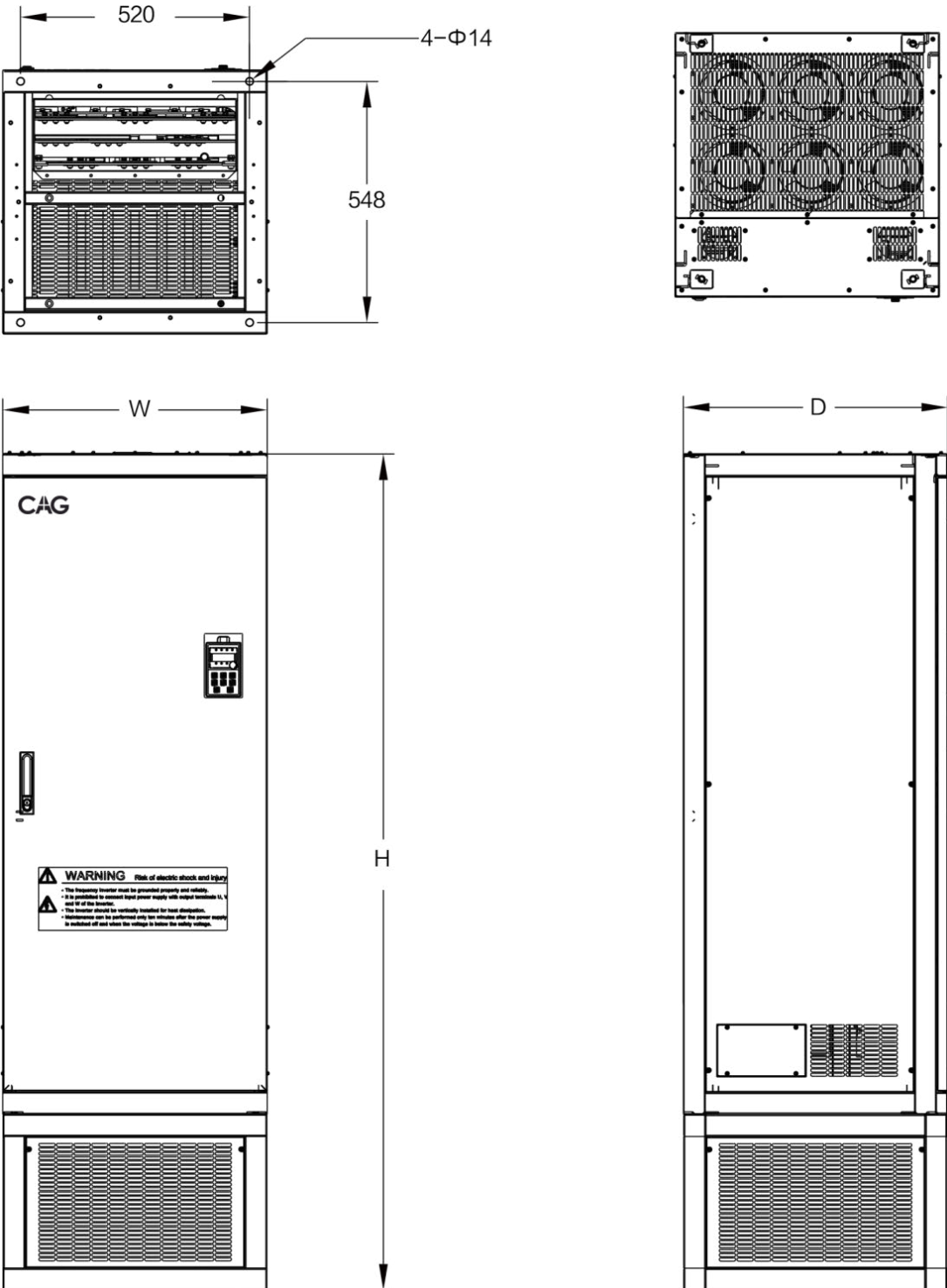


b) Applicable for FC1015G/018P (incl.) ~ FC1110G/132P (incl.)



c) Applicable for FC1132G/160P (incl.) ~ FC1315G/350P (incl.)

Product appearance and installation size and weight

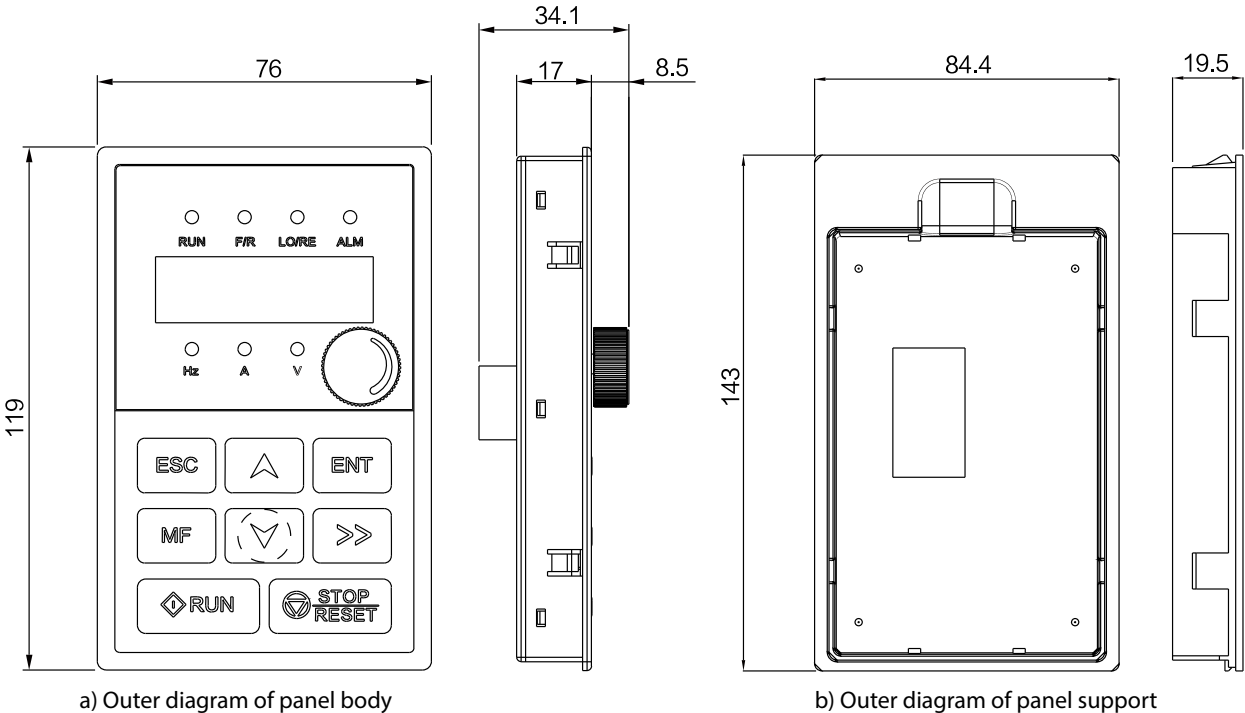


d) Applicable for FC1350G (incl.) ~ FC1500G (incl.)

Table of product outer and installation dimensions

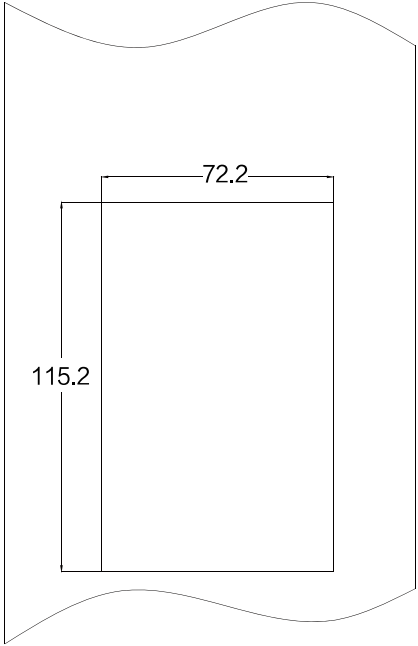
Model of inverter	I Outer and installation dimensions (mm)						Diameter of mounting hole	Weight (kg)	Enclosure type
	W	H	D	W1	H1	H2			
FC1000G/001P	140	230	172	128	218	---	5.5	3.5	S1
FC1001G/002P									
FC1002G/004P									
FC1004G/005P									
FC1005G/007P									
FC1007G/011P	165	285	200	153	273	---	5.5	5.2	S2
FC1011G/015P									
FC1015G/018P	214	410	203	184	360	385	6.5	11.5	S3
FC1018G/022P									
FC1022G/030P									
FC1030G/037P	250	450	230	220	400	425	6.5	19	S4
FC1037G/045P									
FC1045G/055P	300	600	280	240	540	580	8.5	30	S5
FC1055G/075P									
FC1075G/090P	330	660	330	250	600	640	8.5	56	S6
FC1090G/110P									
FC1110G/132P									
FC1132G/160P	485	850	355	180	772	826	11	110	S7
FC1160G/185P									
FC1185G/200P									
FC1200G/220P									
FC1220G/250P	683	940	355	240	860	910	13	165	S8
FC1250G/280P									
FC1280G/315P									
FC1315G/350P									
FC1350G	600	1700	600	---	---	---	---	200	S9
FC1400G									
FC1500G									

Shape and dimensions of operation panel

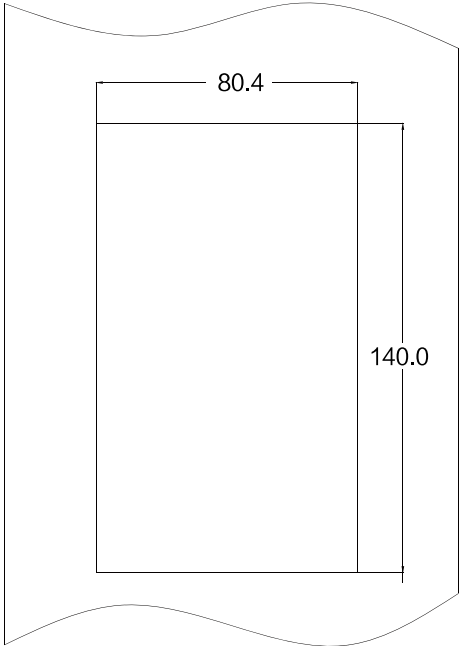


a) Outer diagram of panel body

b) Outer diagram of panel support

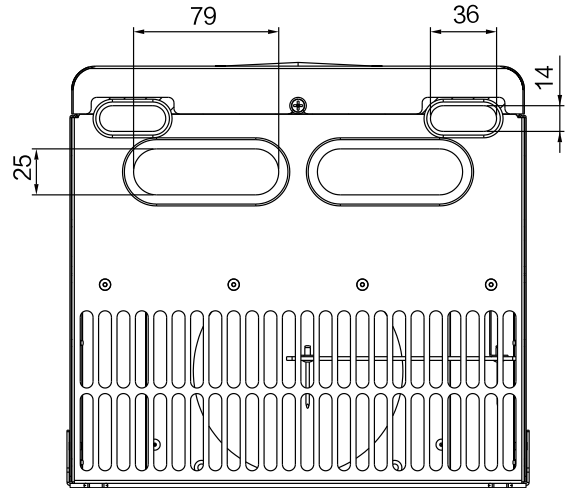
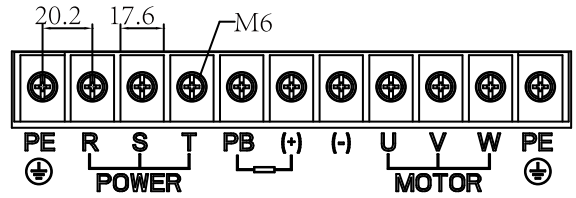
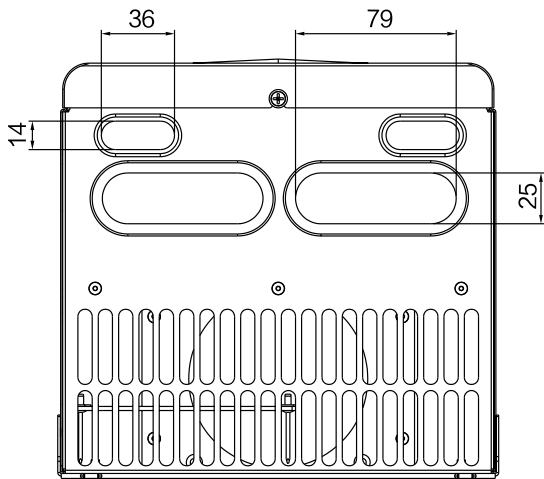
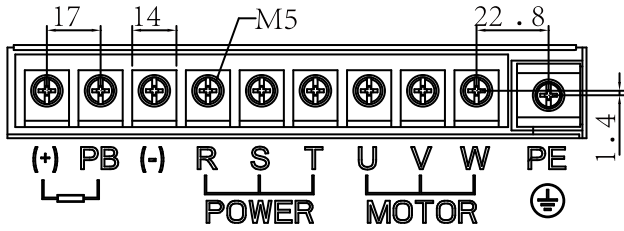


c) Hole diagram of panel body



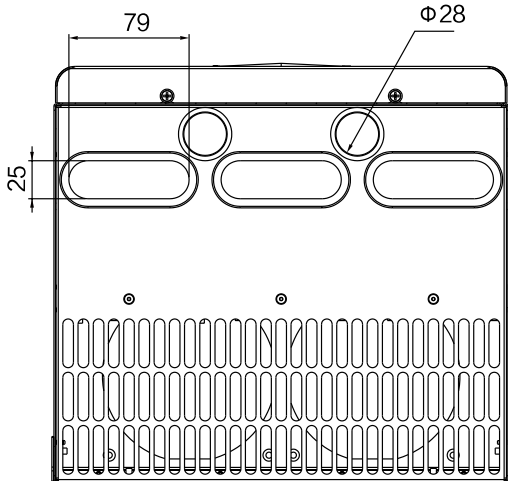
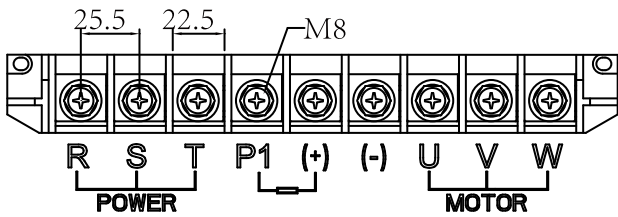
d) Hole diagram of panel support

Sizes of overcoils of main circuit wiring

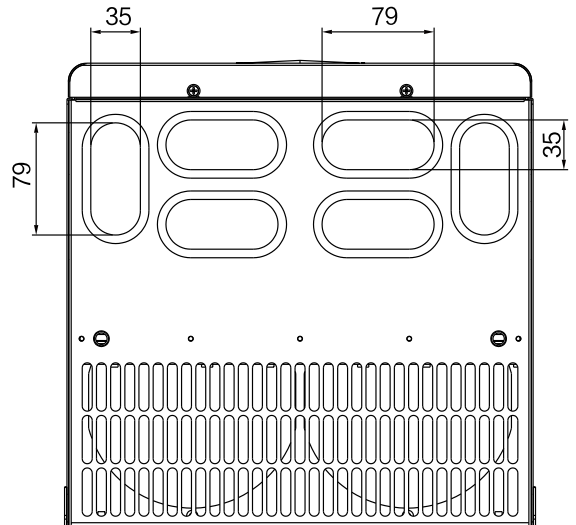
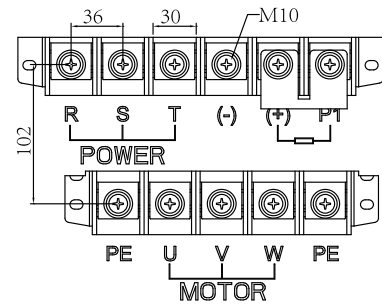


a) Applicable for FC1015G/018P (incl.) ~ FC1022G/030P (incl.)

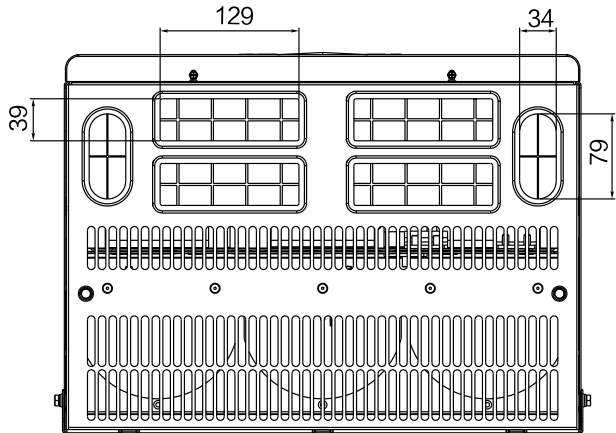
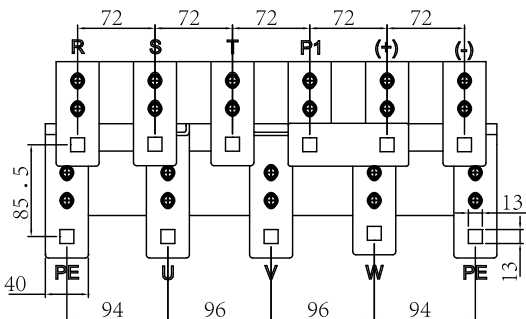
b) Applicable for FC1030G/037P (incl.) ~ FC1037G/045P (incl.)



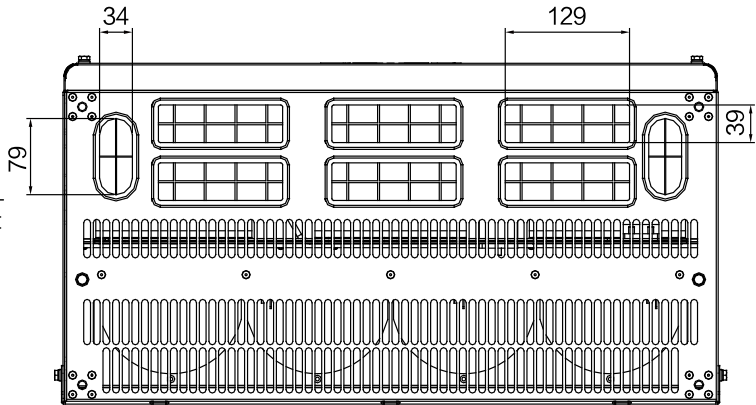
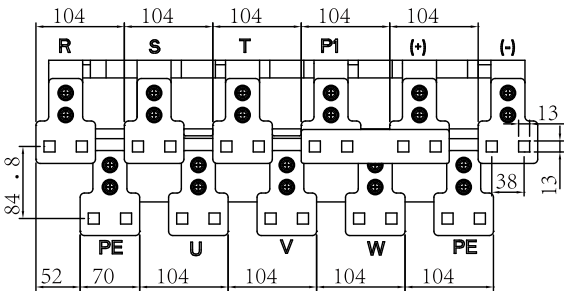
c) Applicable for FC1045G/055P (incl.) ~ FC1055G/075P (incl.)



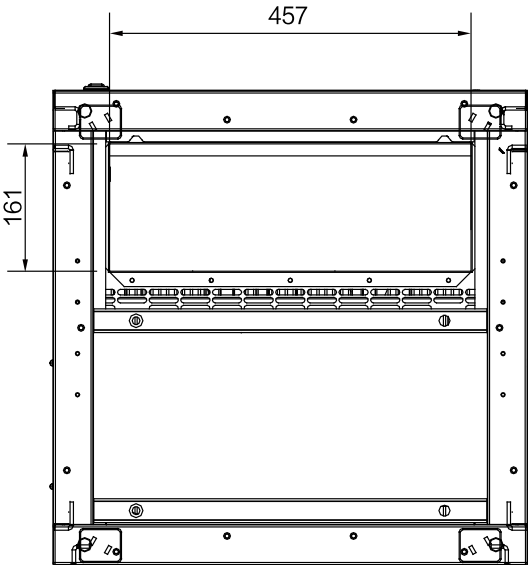
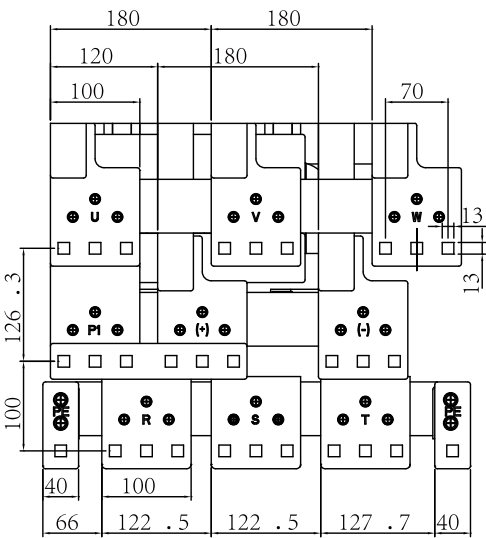
d) Applicable for FC1075G/090P (incl.) ~ FC1100G/132P (incl.)



e) Applicable for FC1132G/160P (incl.) ~ FC1200G/220P (incl.)



f) Applicable for FC1220G/250P (incl.) ~ FC1315G/350P (incl.)



g) Applicable for FC1350G (incl.) ~ FC1500G (incl.)

Table of functions of control board terminal

Type	Terminal	Terminal Function Description	Specification
Switch input	+24V	+24V power supply	24V±10%, internally isolated from GND. Max. load 200mA
	PW	External power supply input terminal (digital input terminal power source)	Short connected with +24V at factory
	DI1 ~DI7	Switch input terminal 1~7	Input specification: 24V, 5mA
	HDI1	High speed pulse input or switching input	Pulse input frequency range: 0~50KHz. High level voltage: 24V
	COM	+24V power supply or external power source	Internally isolated from GND
Switching output	DO	Open collector output. The common terminal is CME	External voltage range: 0~24V
	CME	Open collector output common terminal	Short connected with COM at factory
	HDO	High speed pulse output or open collector output. The common terminal is COM	Pulse output frequency range: 0~50KHz
	COM	Common terminal of HDO	Internally isolated from GND
Analog Input	+10V	+10V power output supplied by the inverter	Output current range: 0~50mA (if the potentiometer is connected between +10V and GND, its resistance should be no less than 2KΩ)
	A 1	Analog input terminal 1	Input voltage and current can be selectable Input voltage range: 0V~10V Input current range: 0/4~20mA
	A 2	Analog input terminal 2	Input voltage range: -10V~10V
	GND	Analog ground	Internally isolated with COM
Analog Output	AO1~AO2	Analog output terminal	Output voltage and current are selectable Output voltage range: 0~10V Output current range: 0~20mA
	GND	Analog ground	Internally isolated from GND
	Relay Output	T1A/T1B/T1C	Relay output
T1A-T1C: normally open			
250VAC/3A, 30VDC/1A Contact capacity: 250VAC/3A, 30VDC/1A			
T2A/T2B/T2C		Relay output	T2A-T2B: normally close
			T2A-T2C: normally open
			Contact capacity: 250VAC/3A, 30VDC/1A
Communication interface	485+/485-	RS485 communication interface	RS485 communication interface

Description of peripheral components of the product

Table of Functions of Peripheral Component

Name	Description of function
Circuit breaker	Application: To cut off the power when fault occurs in the back equipment and protect the equipment.
	Selection: Select the breaking current of the circuit breaker as twice the breaking current of the frequency inverter
Leakage protector	The high frequency leakage current is unavoidable due to the PWM high frequency output chopper voltage of the frequency inverter. Therefore special leakage protector must be selected.
Contactor	Please do not switch on and off the contactor frequently. This may result in the fault of frequency inverter, and do not start/stop the frequency inverter by switching on/off the main circuit. This may affect the service life of the inverter.
Input reactor and DC reactor	To improve the power factor
	To improve the influence caused by the imbalance of input power supply to the system.
	To suppress the high order harmonics and reduce the transmission of the harmonic to the outside.
	To restrain the influence of pulse current to the rectifier bridge effectively.
Input and output filter	To reduce the interference of frequency inverter to the peripheral devices.
Braking unit, braking resistor	To consume the feedback energy of the motor and quickly realize braking during braking.
Output reactor	To reduce the frequency inverter protection caused by the leakage current.
	It is suggested to install the output reactor when the cable length is longer than 100m between the frequency inverter and the motor.

