ALPHA

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A6 F20

High-Performance Vector Inverter

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Alpha Electric

Company Introduction

Shenzhen ALPHA Electric Co.,Ltd was established in 2000, and owns more than 30 subsidiaries and 50 after-sale service centers across China. Our headquarter is located in Longhua district of Shenzhen City , and has another 2 manufacturing bases are located in Zhejiang Province and Jiangxi Province. The company employs more than 500 people, of which about 60 percent are technology staff.

Our main business is in the design, development, and sales of industrial automation, power assembly of new energy automobile, and intelligent elevator control system. Meanwhile, as a High-Tech enterprise, we put a lot of focus in R&D expenditures. We have several comprehensive laboratories, we have introduced the advanced technology from both domestic and abroad, we also allied with a number of scientific research institutions and universities.

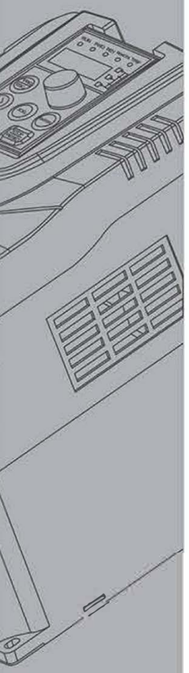
Through years of efforts, our professional sales and after-sale service teams help Alpha not only gain the customers recognition by reliable products, but also gain the customers trust by premium services. In the future, we will continue to serve our partners with professional spirit and excellent services based on industrial automation, new energy vehicle, and elevator control field,achieve win-win collaboration.

Product Introduction

A6 F20 Magnetic vector frequency inveter specialized in synchronous motor, A6 F20 adopted the most advanced open - loop vector control technology, low speed rated torque output, mute and stable operation, versatile controlling, 31 security and alarm functions, online parameter supervision and adjustment, built-in RS-485 communication port, easy to use, and meet the multiple demands of users.

Applications

A6F20 series VFD has been widely using in synchronous motor that includes air compressor, plastic machinery, oil and machine tool. As a speed control device, it has well load adaption, high precision and high reliability. A6F20 is able to maximum increase the power and efficiency as electrified energy-saving application.



Features

A. Excellent open-loop vector control as well as close-loop vector control, high cost effective and better stability.

B. Superior dynamic response, adopting advanced motor control and open-loop control which is able to response the difference of the load.

C. Widely weak magnet control, increasing frequency adjustments range under certain condition, meets the requirement of short time over-load operation.

D. Efficient MTPA algorithm, use particular low waste algorithm, reduce 30% loss of the VFD, also promoting energy saving rate while combining with the energy saving operation of the motor.

E Multiple protection of motor and VFD, the motor protection includes overheat protection, motor overload protection , motor lack phase protection, speed limit protection and torque limit protection. VFD protection includes output current limit, overload protection, heatsink overheat protection, power fault, IGBT overheat protection, analog input signal lost, communication protect, etc.

F. Superior environment adaption, PCB coating, customized cooling design, smaller VFD size.

G. VFD hardware modularization platform, different tiers for controlling, power and interactive.

H. Built-in RS485 communication port, supports MODBUS-RTU communication.

I. Independent air duct design, well dusty proof, removable fan with better radiator and high reliability.

J. Optional PG and IO card meets variable requirements.

Production

A6-3 R75 G B/ 3 1R5 P B F20

Rated voltage
S2: 1-phase 220V
3: 3-phase 380V

Power of motor
R75: 0.75KW
7R5: 7.5KW
075: 75KW

Suitable load
G: General purpose
P: Square torque load

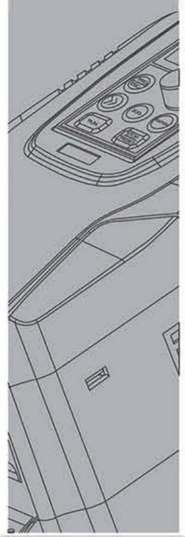
Additional info.
B: with brake unit

motor
F20: Asynchronous motor
F21: Synchronous motor

Production Naming Rule

485+	485-	10V	X1	X2	X3	X4	X5	Y1	TB
AO1	AI1	AI2	GND	COM	PLC	24V	DO	TC	TA

Terminal arrangement



Control Loop Terminal Function

Type	Terminal No	Name	Terminal Funciton	Specification
Analog Input	AI1	Analog input 1	Receive voltage input.	Input voltage: 0~10V Reference ground: GND Input resistance: R=22kΩ
	AI2	Analog input 2	Receive voltage/current input. Voltage or current are selected by DIP switch SW7. Voltage input mode is the default mode.	Input voltage: 0~10V Input current: 0~20mA Reference ground: GND Input resistance: R=22kΩ
Analog Output	AO1	Analog output	Be able to output analog voltage/current. Voltage or current are selected by DIP switch SW2.	Output voltage: 0/2~10V Output current: 0/4~20mA Reference ground: GND
Commu-nication	485+	RS485 interface	485 differential signal positive terminal	Standard RS-485 communication interface, Not isolated to GND
	485-		485 differential signal negative terminal	
Multi-Functional Input	X1~X5	Multi-function input terminals	It can be defined as a multi-function discrete input terminal through programming.	Optical-isolator input Input resistance: R=3.9kΩ Input voltage: 0~30V Reference ground: COM
Multi-Function Output	DO	Open collector output terminal	It can be defined as a multi-function output terminal for pulse signal through programming. It can also be used as an on-off output terminal.	Opto-coupler isolated OC output. operating voltage: 0V~26V Maximum current: 50mA Output frequency: 0~50kHz Reference ground: COM
	Y1	Open collector output terminal	It can be defined as a multi-function output terminal for pulse signal through programming.	Opto-coupler isolated OC output. operating voltage: 0V~26V Maximum current: 50mA Output frequency: 0~50kHz Reference ground: COM
Electric Replay Output	TA	Relay output	It can be defined as a multi-function relay output terminal through programming.	TA-TB: NC TA-TC: NO Contact capacity: 250VAC/2A (COSΦ=1.0) 250VAC/1A (COSΦ=0.4) 30VDC/1A
	TB			
	TC			
	PLC	Multifunctional input common terminal	When leaving the factory, it is shorted to 24V, and the PLC is internally isolated from 24V. Note: When using PLC, the SW4 jumper on the right side of the control terminal must be disconnected.	X terminal supports NPN and PNP connection methods.
Power	10V	+10V power supply	Provide +10V power supply externally (Reference ground: GND)	Maximum output current 20 mA Open circuit voltage can be up to
	24V	+24V power supply	Provide +24V power supply externally (Reference ground: COM)	Maximum output current 100mA
	GND	+10V Reference GND	Reference GND for analog signal and +10V power supply	Inner Isolated from COM GND for +10V, AI1, AI2, and
	COM	+24V Common GND	Used with other terminals	Isolated from GND

Features Introduction

(1) Easy to use

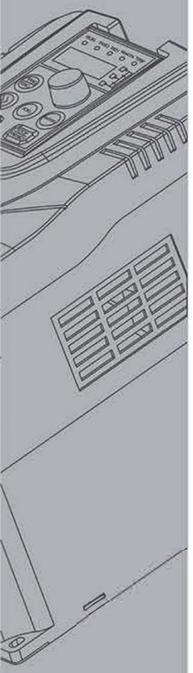
(2) Widely voltage input range

(3) High reliability and precision, wide testing range

(4) Quick torque response

(5) Overload ability

(6) High speed output under vector control



A、Output current wave of 100% load

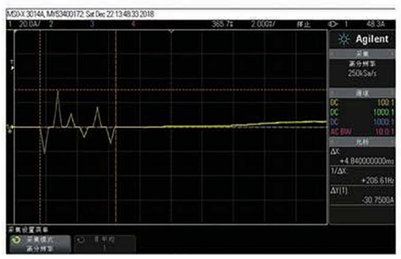
Stable start, low harmonic, small torque ripple

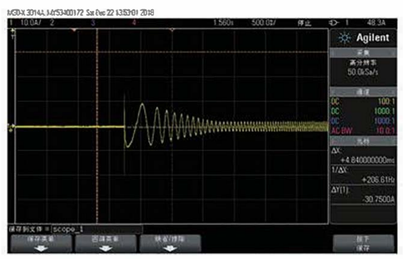
B、Superior start performance

0 Speed close-loop start, precise recognize the original location of the rotor

Millisecond high frequency algorithm, quick start

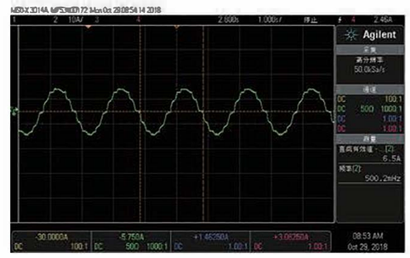
No reverse start with big torque



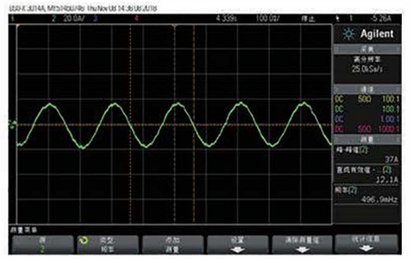


C、Open-loop low speed stable operation(0.5HZ 150%)

0.5HZ Empty Load



0.5HZ Load



D、Accelerate and decelerate performance.

Superior accelerate and decelerate performance meets variable strictly demands.

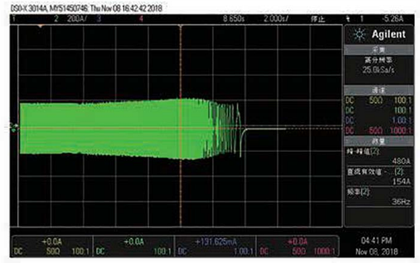
No overshoot and small current impact during accelerate and decelerate.

No overcurrent and overvoltage fault during Acc. and Dec..

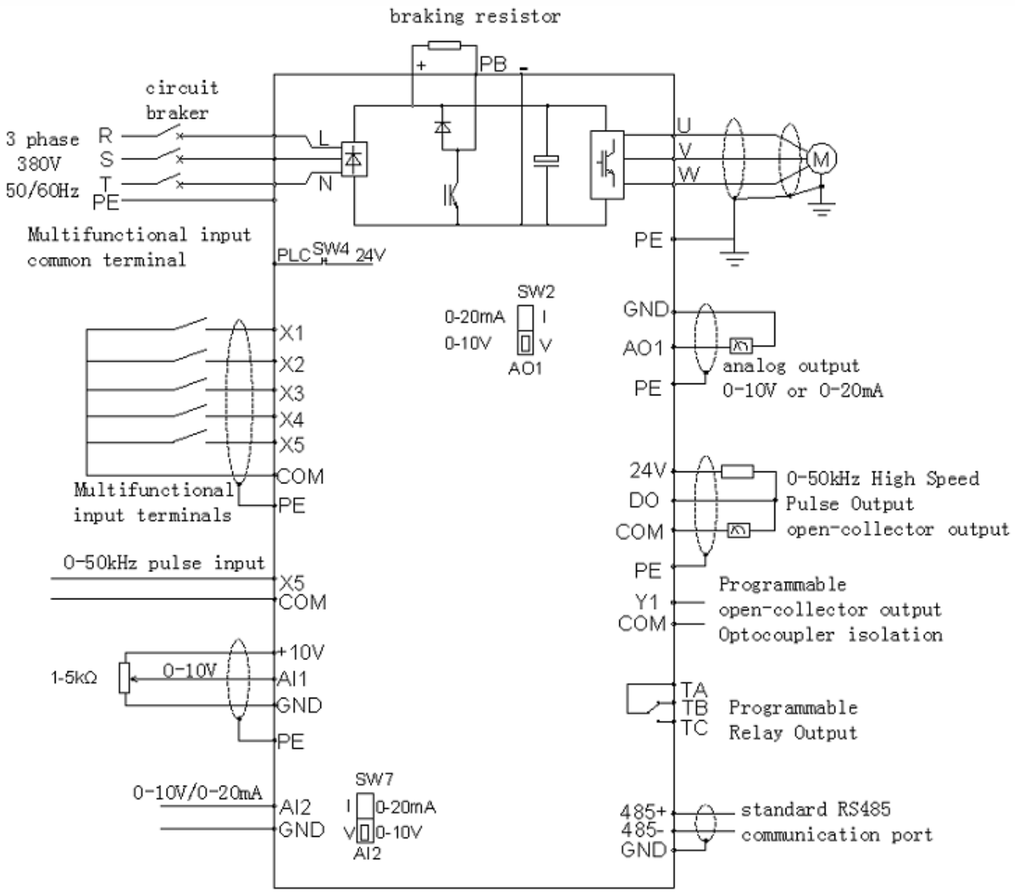
Variable accelerate and decelerate methods under different conditions.

0.01S Accelerate

0.01S Decelerate



Wiring Diagram



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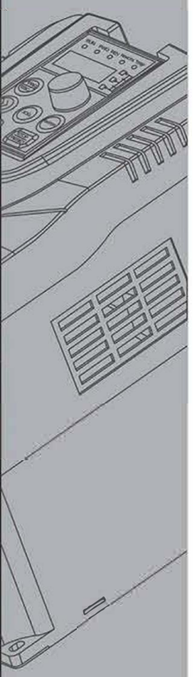
Generic Technical Specification

Item	Specification
Rated input voltage and frequency	Three phase: 380-440V 50/60Hz
Allowable input voltage range	Three phase 380V: 304-456V, voltage imbalance rate less than 3%, frequency imbalance rate less than±5%
Rated output voltage	0~Rated input voltage
Maximum overload current	G- type: 150% for 1 minute, 180% for 20 seconds
Control mode	V /F control mode or Current vector control
Frequency control range	Low frequency mode: 0~500.00Hz
Frequency control accuracy	Digital setting: ±0.01% (-10 ° C~+40 ° C) Analog setting:±0.01% (15 ° C~35 ° C)
Set frequency resolution	Digital setting: 0.01Hz; Analog setting: 1/1000 maximum frequency
Output frequency resolution	0.01Hz
Frequency analog setting signal	0~10V, 0~20mA
Acceleration and deceleration time	0.1~6500 seconds (acceleration and deceleration time are independently set)
Braking torque	Up to 125% with additional braking resistor
Protection function	Overvoltage, undervoltage, current limiting, overcurrent, overload, electronic thermal relay, overheating, overvoltage stall, load short circuit, grounding, input phase loss, output phase loss, short circuit to ground or between phases, motor overload protection, etc
Operating ambient temperature and humidity	-10 ° C~+40 ° C; 5-95% RH (without condensation)
Storage temperature	-40 ° C~+70 ° C
Working condition	Indoor (without corrosive gases);At an altitude of no more than 1000 meters, free from dust, corrosive gases, and direct sunlight.
Vibration limitation	Less than 5.9m/s2 (0.6g)
Ingress Protection	IP20 at least

Specification

Series	Model	Input power	Power capacity (kVA)	Input current (A)	Output current (A)	Motor (kW)
A6-	3R75GB/31R5PB	3PH 380V 50/60Hz Voltage: 304~456V Voltage unbalance rate: less than 3% Frequency unbalance rate:±5%	1.6/3.2	3.7/5.4	2.5/4.0	0.75/1.5
	31R5GB/32R2PB		3.2/4.8	5.4/7.0	4.0/6.0	1.5/2.2
	32R2GB/3004PB		4.8/6.0	7.0/10.7	6.0/9.0	2.2/4
	3004GB/35R5PB		6.0/8.6	10.7/15.5	9.0/13	4/5.5
	35R5GB/37R5PB		8.6/11.2	15.5/20.5	13.0/17.0	5.5/7.5
	37R5GB/3011PB		11.2/17.0	20.5/26.0	17.0/25.0	7.5/11
	3011GB/3015PB		17.0/21.0	26.0/35.0	25.0/32.0	11/15
	3015GB/3018PB		21.0/24.0	35.0/38.5	32.0/37.0	15/18.5
	3018GB/3022PB		24.0/30.0	38.5/46.5	37.0/45.0	18.5/22
	3022GB		30.0	46.5	45.0	22
	3030P		40.0	62.0/	60.0	30
	3030G/3037P		40.0/50.0	62.0/76.0	60.0/75.0	30/37
	3037G/3045P		50.0/60.0	76.0/92.0	75.0/90.0	37/45
	3045G/3055P		60.0/72.0	92.0/113.0	90.0/110.0	45/55
	3055G/3075P		72.0/100.0	113.0/157.0	110.0/152.0	55/75
	3075G/3093P		100.0/116.0	157.0/180.0	152.0/176.0	75/93
	3093G/3110P		116.0/138.0	180.0/214.0	176.0/210.0	93/110
	3110G/3132P		138.0/167.0	214.0/256.0	210.0/253.0	110/132
	3132G/3160P		167.0/200.0	256.0/307.0	253.0/304.0	132/160
	3160G/3185P		200.0/230.0	307.0/350.0	304.0/342.0	160/185.0
	3185G/3200P		230.0/250.0	350.0/385.0	342.0/380.0	185.0/200.0
	3200G/3220P		250.0/280.0	385.0/430.0	380.0/426.0	200.0/220.0
	3220G/3250P		280.0/320.0	430.0/500.0	426.0/480.0	220.0/250.0
	3250G/3280P		320.0/342.0	500.0/548.0	480.0/520.0	250.0/280.0
	3280G/3315P		342.0/395.0	548.0/625.0	520.0/600.0	280.0/315.0
	3315G/3355P		395.0/445.0	625.0/710.0	600.0/680.0	315.0/355.0
	3355G/3400P		445.0/500.0	710.0/760.0	680.0/750.0	355.0/400.0
	3400G/3450P		500.0/565.0	760.0/830.0	750.0/820.0	400.0/450.0
	3450G/3500P		565.0/625.0	830.0/910.0	820.0/900.0	450.0/500.0
	3500G/3560P		625.0/690.0	910.0/970.0	900.0/950.0	500.0/560.0



Accessories

No.	Name	Model	Specification	Picture
1	Keyboard extension	KB6-C020A	Extension cord for keyboard extension	
2	Extension tray	635MP03-A (Big) 631MP08-A (Small)	Install package for fix the keyboard on the door when extension needed	
3	A33PI01	BA6-PI01	Multifunctional IO expansion card, which can expand 5 channels of digital signal input, 1 channel of relay signal output, 1 channel of digital output, 1 channel of analog voltage signal output, 1 channel of analog signal output, 1 channel of CAN communication interface	
4	A33PG01	BA6-PG01	Differential input PG card	
5	A33PG04	BA6-PG04	Resolver PG card	

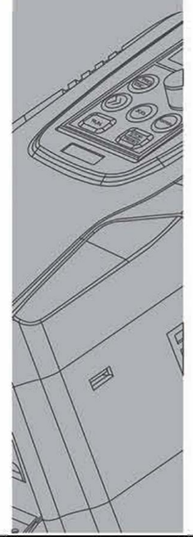
A、Optional function

① Big power embedded brake unit

Built-in brake unit for 22KW and below, optional embedded brake unit for power from 30KW to 132KW, Mark B after the model number when place order

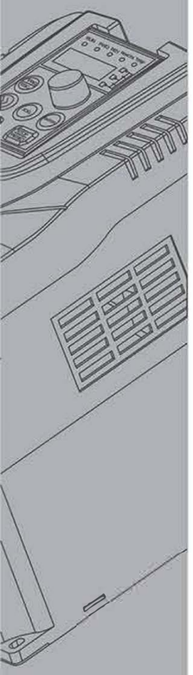
② DC line choke configuration

Embedded DC line choke for power 220KW and above, optional for 75KW-200KW



B、Brake resistance value and power sheet

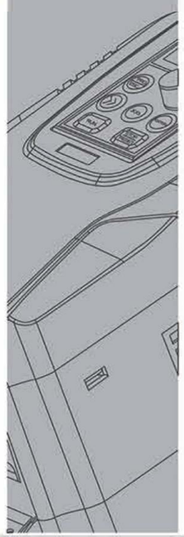
Voltage	Motor Power (kW)	Resistance value	Resistance power (kW)	Voltage	Motor Power (kW)	Resistance value	Resistance power (kW)
3 phase 380V	0.75	300	0.4	3 phase 380V	93	20/3	18
	1.5	300	0.4		110	20/3	18
	2.2	200	0.5		132	20/4	24
	4	200	0.5		160	13.6/4	36
	5.5	100	0.8		185	13.6/4	36
	7.5	75	0.8		200	13.6/5	45
	11	50	1		220	13.6/5	45
	15	40	1.5		250	13.6/5	45
	18.5	30	4		280	13.6/6	54
	22	30	4		315	13.6/6	54
	30	20	6		355	13.6/7	63
	37	16	9		400	13.6/8	72
	45	13.6	9		450	13.6/8	81
	55	20/2	12		500	13.6/8	90
	75	13.6/2	18				



C、Keyboard

Keyboard installation size (mm)

Specification	W	D
3R75GB～35R5GB	49±0.2	76.5±0.2
37R5GB and above	61±0.2	96.5±0.2



D、Keyboard tray

Appearance size and installation size

Figure A1-1 Outline diagram

Table A1-1 Dimensions (Unit: mm)

Specification	H	H1	W	W1	D	D1	d
3R75GB/31R5PB~32R2GB/3004PB	185	175	120	110	164	174	4.5
3004GB/35R5PB~35R5GB/37R5PB	195	182	130	119	178	188	4.5
37R5GB/3011PB~3011GB/3015PB	255	238	180	166	194	204	7
3015GB/3018PB~3022GB	295	284	180	135	210	220	6

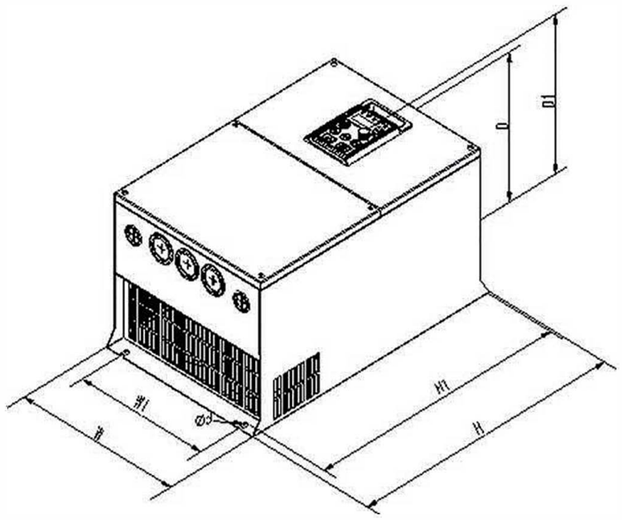
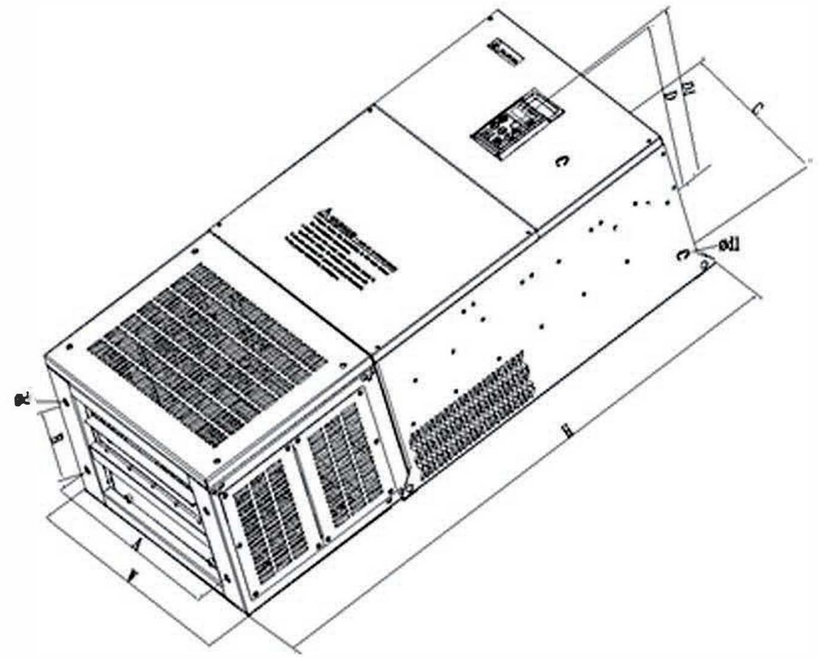


Figure A1-2 Outline diagram

Table A1-2 Dimensions (Unit: mm)

Specification	H	H1	W	W1	D	D1	d
3030P~3037G/3045P	460	440	285	230	188	203	8
3045G/3055P~3055G/3075P	535	512	320	180	231	250	8
3075G/3093P~3093G/3110P	560	542	375	245	274	292	8
3110G/3132P~3132G	657	630	458	338	285	303	10
3160P~3200G/3220P	809	783	520	420	360	378	10



Dimensions (unit: mm)

Specification	H	W	D	D1	A	B	C	Φ d	Φ d1
3220G/3250P~ 3250G/3280P	1274	620	385	404	550.5	239	420	14	12
3280G/3315P~ 3355G/3400P	1608	800	412	431	733	288	600	14	14
3400G/3450P~ 3500G/3560P	1800	1000	480	499	900	300	/	22	/