



Shenzhen ALPHA Electric Co.,Ltd

Address :

No.21 Gui hua Jia yi Industrial Park, Gui yue Road, Guan lan Long hua
District Shenzhen City Guang dong Province China

Tel :

+86-0755-83152218 ; +86-0755-83313167

Fax :

+86-0755-83175185 ; +86-0755-83313165

E-mail :

info@szalpha.com

Website :

www.szalpha.com



ALPHA

A5T SERIES

Synchronous Motor Inverter

ELECTRIC SHOCK
In the user manual
when electrical power is
10 minutes after power off.
AC power to output terminals.
grounding techniques.

» Company Profile

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 fields, achieve win-win collaboration.



» Product Introduction

A5T vector inverter is specialized for Synchronous motor driving field. A5T developed by the most advanced open loop current vector control technology in the world, low speed rated torque output, super-silence stable running, multi-control mode, 31 types of protection and alarm functions, online surveillance many figure and online adjust. internal RS-485 communication ports. Flexible operation, can maximumly meet with multi-demand of users.



» Features

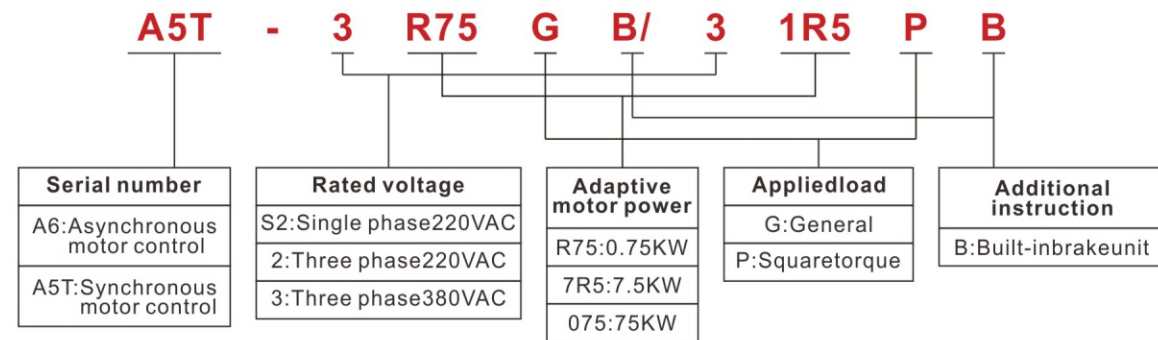
| | | |
|-----------------------|--|--|
| Compact Design | Hardware modularization platform, separate design for control layer, power layer, display and interactive layer | |
| | Perfect brake return circuit scheme | |
| | Optional internal built-in brake unit for 30KW~93KW | |
| Excellent Performance | Open loop vector control as good as closed loop vector, remove PG, save cost, improve system reliability | |
| | Advanced motor model control to ensure the quick response. Open loop vector control is able to quick response the load abrupt as well. | |
| | Wide week Magnetic control could increase the frequency adjustment range under certain conditions and meet the demand of overload short time operation | |
| | Decrease 30% loss of the inverter by low-loss modulated algorithm. | |
| | Low speed with big torque, small torque fluctuation | |
| High Reliability | High accuracy for Motor figure setting. | |
| | Reliable heat dissipation | Independent ventilator |
| | Temperature increase test | Standard international voltage input scope |
| | Auto-spraying technology | long life-time |
| Easy to use | Improved EMC design | CE Certification |
| | Monitoring and diagnosis software | Built-in RS485 communication port and MODBUS communication agreement |
| | Instant shut down without motor stop | Applied in energy saving of air compressor and plastic mechanism |
| | Improved protection | Motor over-heat protection |
| | Keyboard extension | Diverse terminal |

» Application

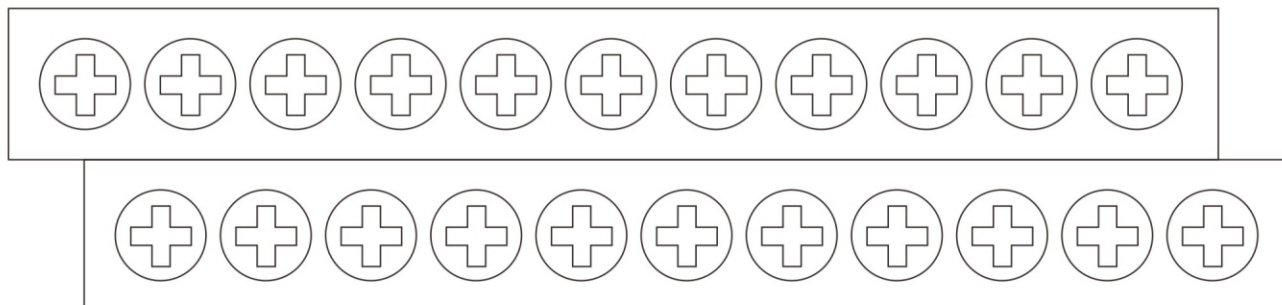
A5T inverter is applied to synchronous motor drive that includes air compressor, plastic machine etc. Well load adaption as a speed regulator, reliable and accurate. Improve the power and efficiency as an electric energy-saving application.

» Product Infomation

• Product naming rules



• Control loop terminal



| | | | | | | | | | | |
|------|------|-----|-----|----|----|-----|-----|-----|----|----|
| 485+ | 485- | AO1 | 10V | X1 | X3 | X5 | DO1 | COM | Y1 | TC |
| AI1+ | AI2- | GND | PT | X2 | X4 | COM | PLC | 24V | TA | TB |

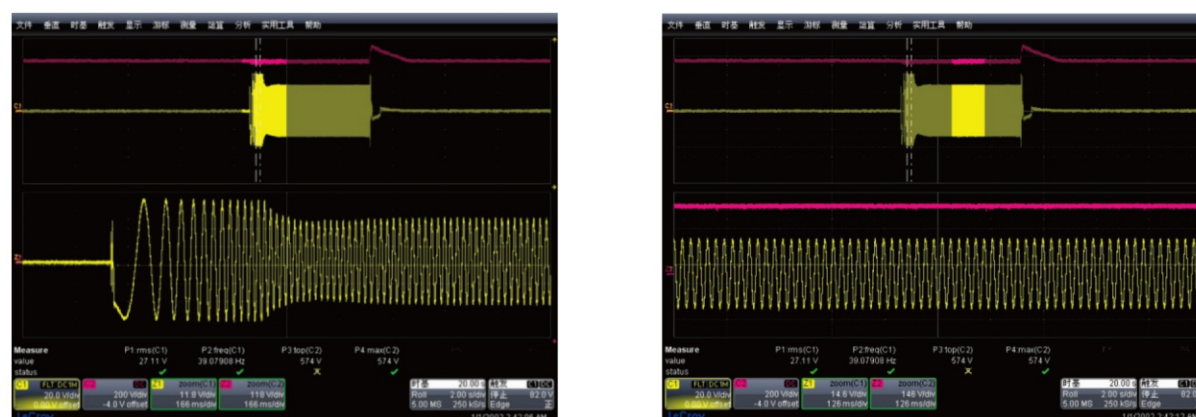
» Control Loop Terminal Function

| Type | No. | Name | Terminal function instruction | Specification |
|--|---|--|---|--|
| Analog Input | AI1 | Analog input 1 | Receive analog voltage input | AI1 input voltage: 0~10V (input resistance 22kΩ) Reference GND |
| | AI2 | Analog input 2 | Receive voltage/current input Voltage/current route selected by SW7 Defaulted voltage | AI2 input voltage: 0~10V AI2 input current: 0~20mA (Input resistance: 22kΩ/500Ω) Reference GND |
| Analogy Output | AO1 | Analog output | Provide analog voltage/current output Voltage/current route selected by SW2 Defaulted voltage | Input voltage scope 0~10V. Input current scope: 0~20mA Reference GND |
| Commu- nication | 485+ | Rs485 Communication port | 485 differential signal anode | Standard RS-485 communication port, not isolated with GND, twisted pair cable or barrier cable required |
| | 485- | | 85 differential signal cathode | |
| Multi- Functional Input Terminal | X1 | Multi-functional input terminal 1 | Programmable defines multi-functional switch of input terminal | Optical-coupler isolation input, Input resistance R=2.5kΩ Maximum input frequency: 400Hz, Input voltage: 0~30V, Reference: COM. |
| | X2 | Multi-functional input terminal 2 | | |
| | X3 | Multi-functional input terminal 3 | | |
| | X4 | Multi-functional input terminal 4 | | |
| | X5 | Multi-functional input terminal 5 | Programmable defines high speed pulse input port besides defines multi- functional switch of input terminal | Optical-coupler isolation input, Input resistance R=1.2kΩ Maximum input frequency: 50 Hz, Input voltage: 0~30V, Reference: COM. |
| Terminal Multi- Functional Output | DO | Open loop electrode output terminal | Programmable defined to be multi- functional pulse signal output terminal as well as switch output terminal | Optical-coupler isolated electrode output Working voltage: 0~26V Max output current: 50mA Output frequency: 0-100kHz |
| | Y1 | Open loop electrode output Y | Programmable defined to be multi- functional switch of input terminal I/O terminal control | Optical-coupler isolated output Working voltage: 0~26V Max output current: 50mA |
| Electric Replay Output | TA | Electric relay output | Programmable defines multi-functional electric relay output terminal | TA-TB Close, TA-TC Open Contact capacity: 250VAC/2A (COSφ=1) 250VAC/1A (COSφ=0.4) 30VDC/1A |
| | TB | | | |
| | TC | | | |
| PLC | Multi- functional input public terminal | Multi-functional input public terminal | Default connected with 24V, X terminal supports external 24V power supply, J5 jumper wire on the right side of control terminal need to be disconnected. | X terminal supports external 24V power supply |
| Power | 10V | +10V Power | Supply external +10V power | Maximum output current 20mA, Maximum open-loop voltage up to 12V |
| | 24V | +24V Power | Supply external +24V power | Maximum output current 100mA |
| | GND | +10V power reference | Analog signal and +10V power | Isolated with COM internally |
| | COM | +24V power reference | Combined with other terminals | Isolated with GND |

» Features Instruction:

- Easy to use
- Wide voltage input scope
- High accuracy for stable speed and wide scope for adjustment
- Quick response of torque
- Overload ability
- High speed output under vector control

• Current wave form of 100% overload



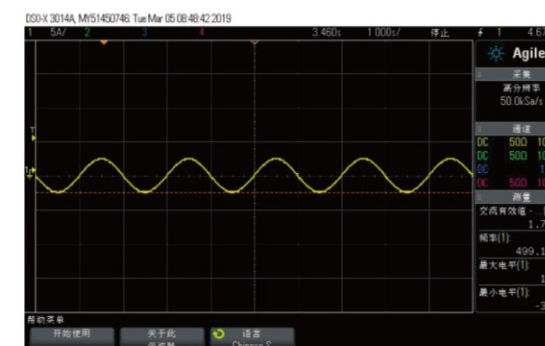
- Stable start, low harmonic wave, small torque pulse.

• Superior start performance



- Close loop start of 0 speed, accurate recognize of rotor's original position.
- High frequency algorithm with quick start.
- Big torque start without reverse.

• Open loop low-speed stable running with load(0.5HZ 150%)



0.5HZ Empty load

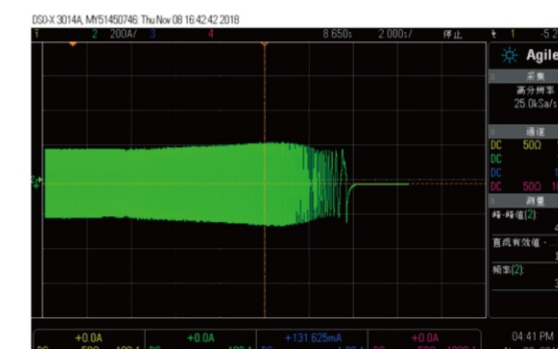


0.5HZ Load

• Performance of acceleration and deceleration



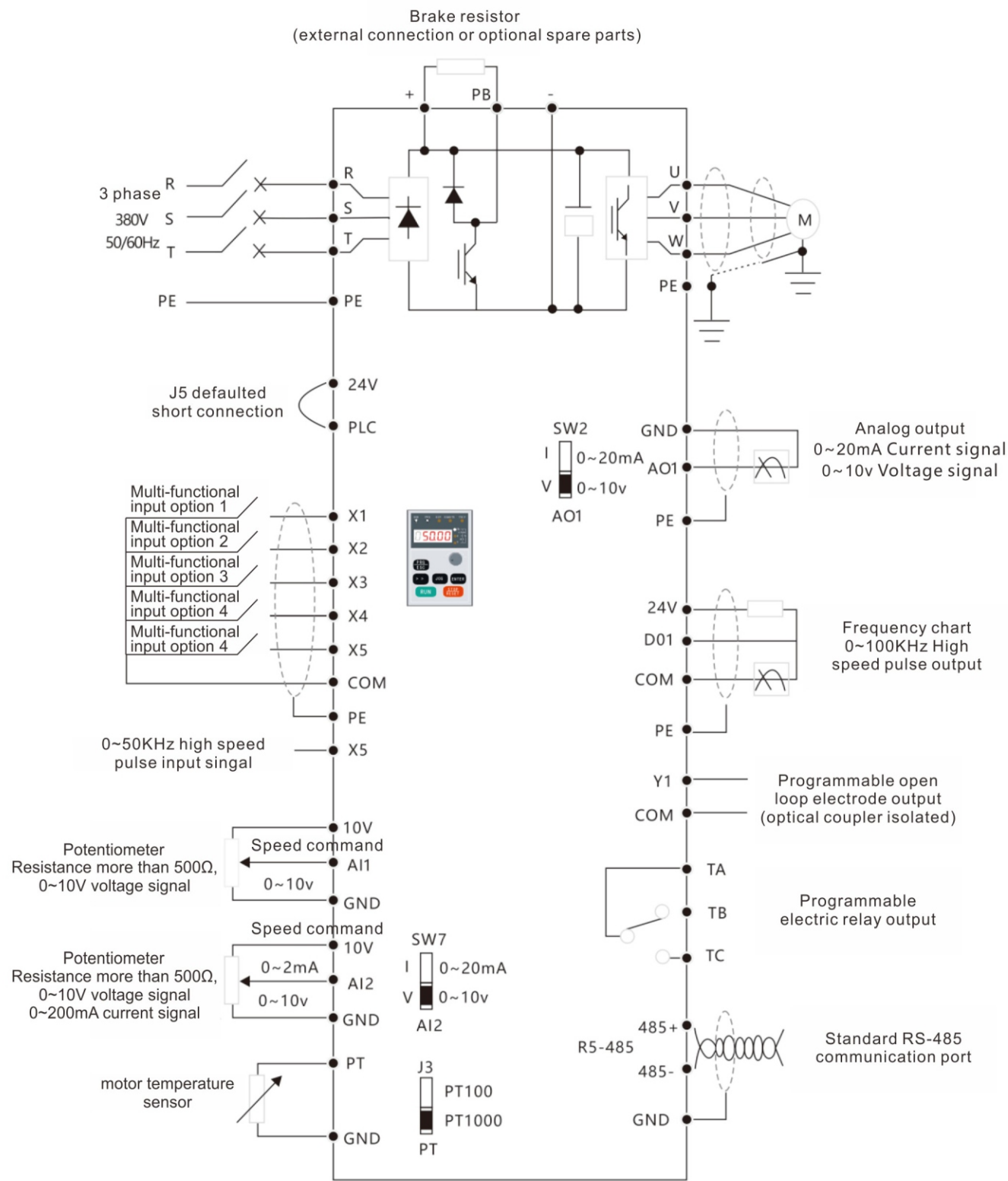
0.01S Acceleration



0.01S Deceleration

- Excellent performance of acceleration&deceleration, fulfill the demands of different conditions.
- No extra adjustment during accelerate&decelerate, small current impact.
- No over current & over voltage defective.
- Optional acceleration&deceleration methods according to the conditions.

» Wire Connection Diagram





» Generic Technical Specification

| Subject | Specification |
|-------------------------------------|---|
| Rated input voltage / frequency | 3 Phase 380V~440V, 50/60Hz |
| Allowed input voltage working scope | 3 phase 380V: 304~456VAC, Voltage imbalance less than 3%, frequency imbalance less than ±5% |
| Rated output voltage | 0~rated input voltage |
| Maximum overload current | G type: 150%/min, 180% /20 sec. |
| Control mode | Current Vector control / VF control |
| Frequency precision | Digital command ±0.01%(-10°C~+40°C), analog command ±0.01% (25°C~±10°C). |
| Setting frequency resolution | Digital command 0.01Hz, analog command 1/1000 maximum frequency |
| Output frequency resolution | 0.01Hz |
| Frequency setting signal | 0~10V, 0~20mA |
| Accelerate/deceleration time | 0~1800secs |
| Brake torque | Additional brake resistance can reach 125% |
| Protection | Over-voltage, under-voltage, current limit, over-current, over-load, electric relay, over-heat, over-voltage stall, load short circuit, touch ground, under-voltage protection, input phase loss, output phase loss, short circuit for touching ground, protection for motor overload, etc. |
| Working temperature | -10°C~40°C |
| Humidity | 5~95% |
| Storage temperature | -40°C~70°C |
| Working condition | Indoor |
| Installment condition | Altitude less than 1000m, without dust, corrosive gas and sunlight direct radiation. |
| Vibration | Less than 5.9m/s2 |
| Level of protection | Ip20 |

» Specification and Parameter

| Series | Model No | Input Power | Power Capacity(kVA) | Input Current(A) | Output Current(A) | Motor Power(kw) |
|--------|----------|---|---------------------|------------------|-------------------|-----------------|
| A5T | S21R5GB | 1ph 220v 50/60hz Voltage Scope: 176~264V Voltage Imbalance Rate: less than 3% Frequency Imbalance Rate: less than 5% | 2.8 | 13.1 | 7.0 | 1.5 |
| | S22R5GB | | 4.0 | 23 | 10 | 2.2 |
| | 3R75GB | 3PH 380V 50/60Hz Voltage Scope: 304V~456V Voltage Imbalance Rate: less than 3% Frequency Imbalance Rate: less than±5% | 1.6 | 3.7 | 2.5 | 0.75 |
| | 31R5GB | | 3.2 | 5.4 | 4.0 | 1.5 |
| | 32R2GB | | 4.8 | 7.0 | 6.0 | 2.2 |
| | 3004GB | | 6.0 | 10.7 | 9.0 | 4 |
| | 35R5GB | | 8.6 | 15.5 | 13.0 | 5.5 |
| | 37R5GB | | 11.2 | 20.5 | 17.0 | 7.5 |
| | 3011GB | | 17.0 | 26.0 | 25.0 | 11 |
| | 3015GB | | 21.0 | 35.0 | 32.0 | 15 |
| | 3018GB | | 24.0 | 38.5 | 37.0 | 18.5 |
| | 3022GB | | 30.0 | 46.5 | 45.0 | 22 |
| | 3030G | | 40.0 | 62.0 | 60.0 | 30 |
| | 3037G | | 50.0 | 76.0 | 75.0 | 37 |
| | 3045G | | 60.0 | 92.0 | 90.0 | 45 |
| | 3055G | | 72.0 | 113.0 | 110.0 | 55 |
| | 3075G | | 100.0 | 157.0 | 152.0 | 75 |
| | 3093G | | 116.0 | 180.0 | 176.0 | 93 |
| | 3110G | | 138.0 | 214.0 | 210.0 | 110 |
| | 3132G | | 167.0 | 256.0 | 253.0 | 132 |
| | 3160G | | 200.0 | 307.0 | 304.0 | 160 |
| | 3185G | | 230.0 | 350.0 | 342.0 | 185.0 |
| | 3200G | | 250.0 | 385.0 | 380.0 | 200.0 |
| | 3220G | | 280.0 | 430.0 | 426.0 | 220.0 |
| | 3250G | | 320.0 | 500.0 | 480.0 | 250.0 |

» Spare Parts

| Serial No | Part Name | Mode No | Specification | Picture |
|-----------|--------------------|------------------------------------|---|---|
| 1 | Keyboard extension | KB6-C020A | Cable for keyboard extending |  |
| 2 | Extension tray | 635MP03-A(big) 631MP08-A(samll) | Installation kit for fix the keyboard on the door while extend is necessary |  |

• Optional Function

- Built-in brake unit for big power**
 Invert built-in brake unit for the power 22KW or below , optional built-in brake unit for power 30KW~93KW, remark B when order placed. Extra brake unit is necessary due to there is no brake unit for power 100Kw or above.
- Configuration of direct current resistor**
 Built-in DC resistor for power 220kW or above, optional built-in DC resistor for power 75kW~200kW.

• Brake resistance & power chart

| Voltage (V) | Motor Power (KW) | Electric Resistance (Ω) | Electric Resistance Power(KW) | Voltage (V) | Motor Power (KW) | Electric Resistance (Ω) | Electric Resistance Power(KW) |
|------------------|------------------|-------------------------|-------------------------------|-----------------|------------------|-------------------------|-------------------------------|
| Single Phase 220 | 0.4 | 200 | 0.1 | Three Phase 380 | 55 | 20/2 | 12 |
| | 0.75 | 150 | 0.2 | | 75 | 13.6/2 | 18 |
| | 1.5 | 100 | 0.4 | | 93 | 20/3 | 18 |
| | 2.2 | 75 | 0.5 | | 110 | 20/3 | 18 |
| Three Phase 380 | 0.75 | 300 | 0.4 | | 132 | 20/4 | 24 |
| | 1.5 | 300 | 0.4 | | 160 | 13.6/4 | 36 |
| | 2.2 | 200 | 0.5 | | 185 | 13.6/4 | 36 |
| | 4 | 200 | 0.5 | | 200 | 13.6/5 | 45 |
| | 5.5 | 100 | 0.8 | | 220 | 13.6/5 | 45 |
| | 7.5 | 75 | 0.8 | | 250 | 13.6/5 | 45 |
| | 11 | 50 | 1 | | 280 | 13.6/6 | 54 |
| | 15 | 40 | 1.5 | | 315 | 13.6/6 | 54 |
| | 18.5 | 30 | 4 | | 355 | 13.6/7 | 63 |
| | 22 | 30 | 4 | | 400 | 13.6/8 | 72 |
| | 30 | 20 | 6 | | 450 | 13.6/8 | 81 |
| | 37 | 16 | 9 | | 500 | 13.6/8 | 90 |
| | 45 | 13.6 | 9 | | | | |

• Keyboard

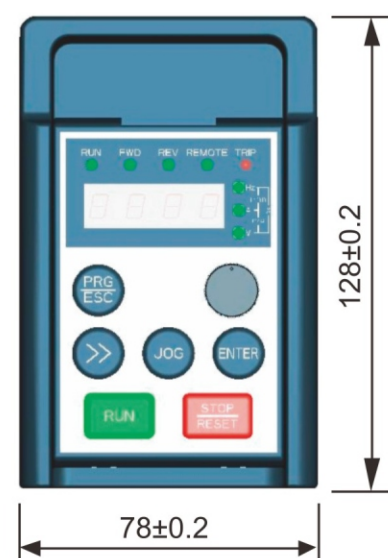


Keyboard install size (mm)

| Specification | w | h |
|--------------------------------|--------|----------|
| S2R4GB~S22R2GB / 3R75GB~35R5GB | 49±0.2 | 76.5±0.2 |
| 37R5GB and above | 61±0.2 | 96.5±0.2 |

Remark:
There are 2 types keyboard, standard and remote control box that are same size.

• Keyboard Tray



» Appearance Size and Installation Size

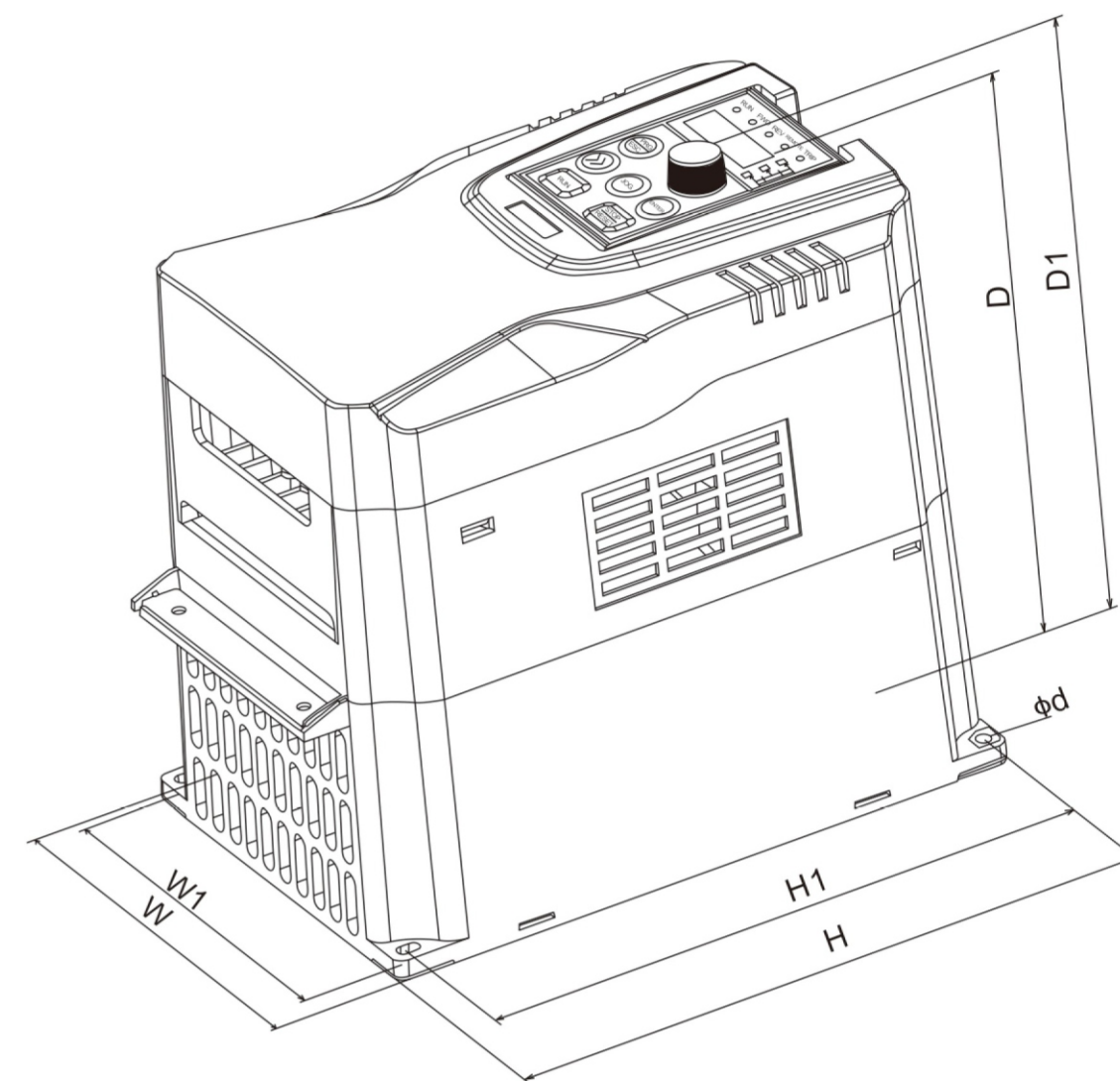


Chart 1: Appearance Size(mm)

| Series | Specification | H | H1 | W | W1 | D | D1 | d |
|--------|----------------------------------|-----|-----|-----|-----|-----|-----|-----|
| A5T | S21R5GB~S22R2GB 3R75GB~32R2GB | 195 | 175 | 120 | 110 | 162 | 172 | 4.5 |
| | 3004GB~35R5GB | 210 | 182 | 130 | 119 | 175 | 182 | 4.5 |
| | 375R5GB~3011GB | 255 | 238 | 180 | 166 | 191 | 200 | 7 |

» Appearance Size and Installation Size

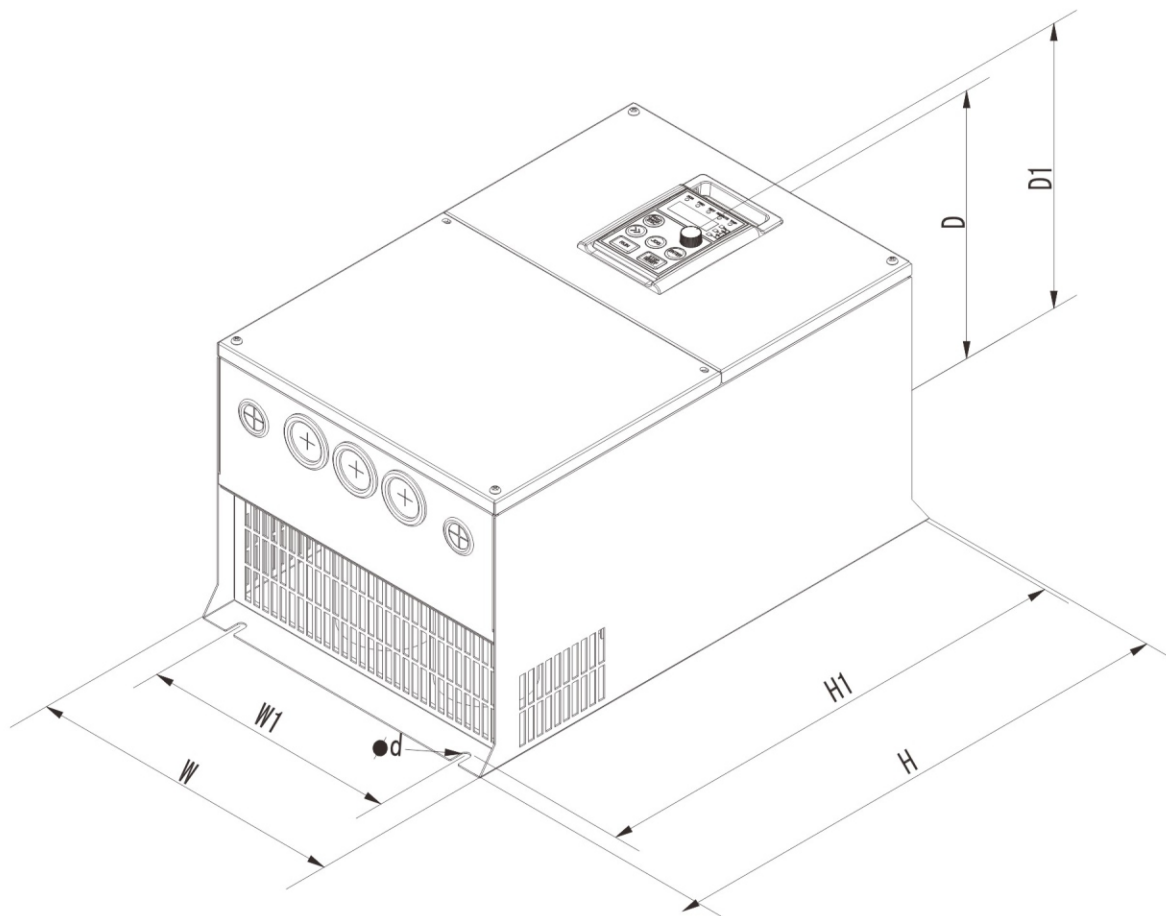


Chart 2: Appearance Size(mm)

| Series | Specification | H | H1 | W | W1 | D | D1 | d |
|--------|---------------|-----|-----|-----|-----|-----|-----|----|
| A5T | 3015GB~3018GB | 295 | 284 | 180 | 135 | 178 | 197 | 5 |
| | 3022GB | 375 | 360 | 235 | 193 | 184 | 199 | 8 |
| | 3030G~3037G | 460 | 440 | 285 | 230 | 188 | 203 | 8 |
| | 3045G~3055G | 535 | 512 | 320 | 180 | 231 | 250 | 8 |
| | 3075G~3093G | 560 | 542 | 375 | 245 | 274 | 292 | 8 |
| | 3110G~3132G | 657 | 630 | 458 | 338 | 285 | 303 | 10 |
| | 3160G~3200G | 809 | 783 | 520 | 420 | 360 | 378 | 10 |

» Appearance Size and Installation Size

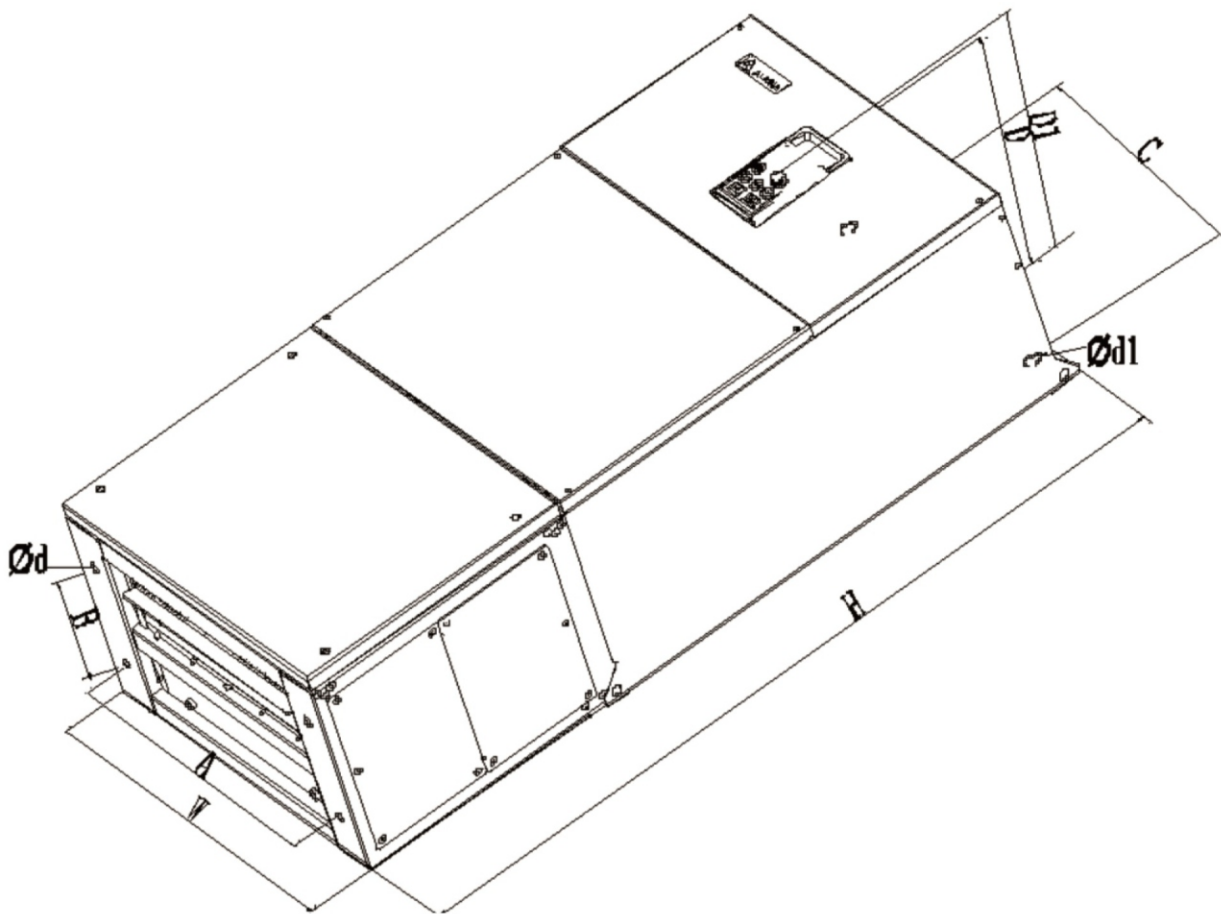


Chart 3: Appearance Size(mm)

| Series | Specification | H | W | D | D1 | A | B | C | Fd | Fd1 |
|--------|---------------|------|-----|-----|-----|-------|-----|-----|----|-----|
| A5T | 3220G~3250G | 1274 | 620 | 385 | 404 | 550.5 | 239 | 420 | 14 | 12 |