## Global Power Electronics Company


Advanced Drive Technology
motor control & power conversion

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Specifications of the product are subject to change without notice for quality improvement.



Printed in Korea

# iMASTER A1

## High Performance and Various applications
## Standard Drive

Advanced Drive Technology
motor control & power conversion

# High Performance and Various applications
# Standard Drive

Advanced Drive Technology
motor control & power conversion

Global Power Electronics Company

**User Friendly Interface**

LCD operator
Schedule Operation
Fieldbus Options

**Improved Performance and Torque**

V/F Control
Sensorless Vector Control
Vector Control

**High Reliability**

EMC Filter
DC Choke
Safety Function
Certification

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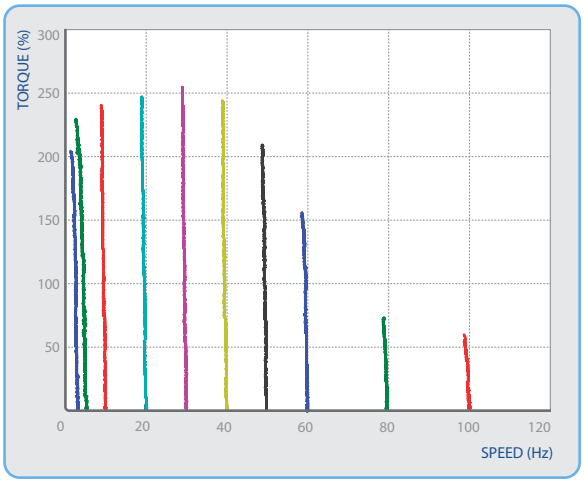
# Features

## Strong torque performance

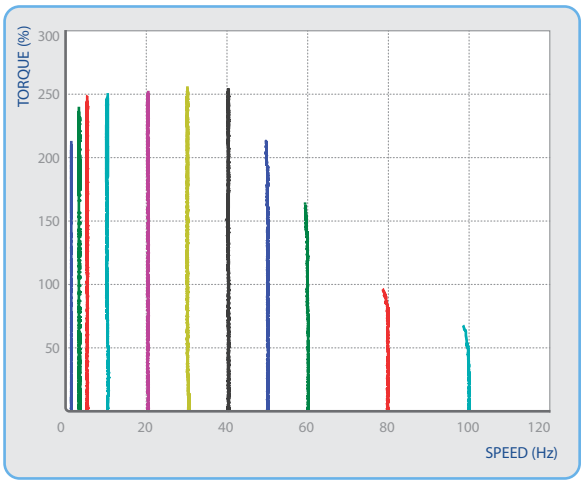
Stronger than or equal to competitors in terms of strong low-speed torque performance, high torque performance in all areas.

- ▶ Auto torque boost 200% 3Hz
- ▶ Sensorless vector control 200% 1Hz

● Auto Torque Boost ( T-N Curve )

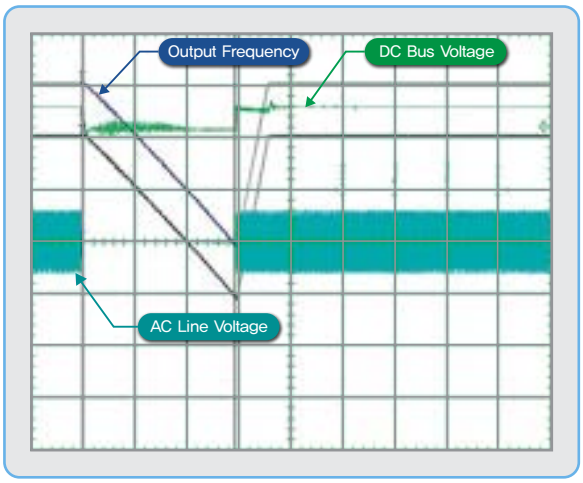



● Sensorless Vector Control ( T-N Curve )




## Instantaneous Interruption Energy Buffering Operation

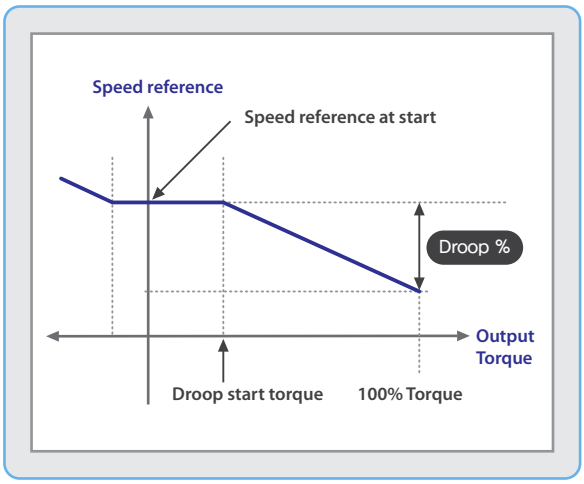
When instantaneous interruption occurs, regeneration energy induced by load inertia is used to keep DC link voltage and go down motor speed. In this way, normal operation is made possible when power is on again.




## Droop Control

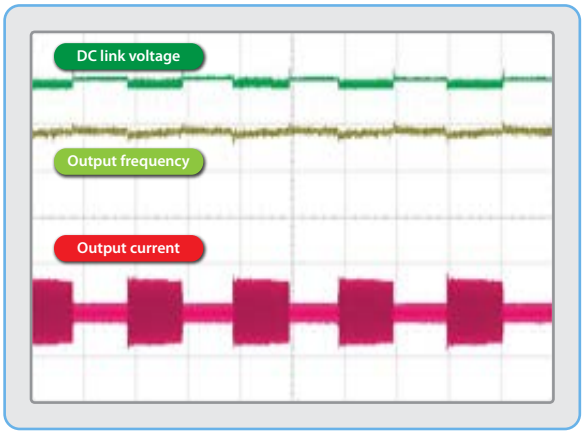
To drive the same load, the product responds to the torque change in each of multiple motors to control a speed and to enable each motor to keep an even load.

● Load balancing by droop control



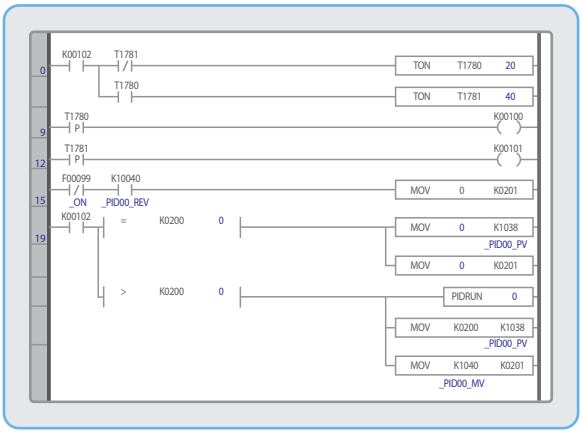
## Overcurrent Limit Performance

Even in the case of step load, it is possible to control output current smoothly and keep output frequency constantly.



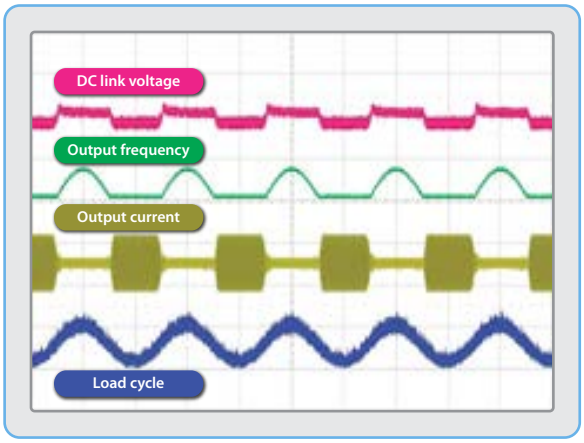

## PLC Function

PLC program runs for repeated operation from beginning step to last step in accordance with work procedure. Through simple input/output sequence control, it is possible to run without any external device.



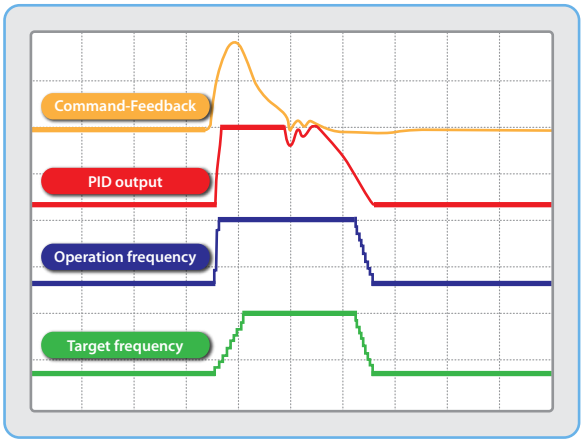

## Overvoltage Limit Performance (regeneration avoidance)

In the case of regular occurrence of regeneration load, it is possible to increase the output frequency of motor in regeneration zone and control DC link voltage rise.




## PID Control

The automatic control function 'PID control' makes it possible to adjust proportional, integral, and differential gains so as to implement flexible and precise control. It is applied to compressor, hydraulic pump, and other feedback systems.



# Features

## LCD Operator

Graphic LCD supports various information display on the screen and easy to use the button for operation.

- Multi-language support
- Schedule operation through timer (RTC)
- Connect to PC by USB port

* LED Operator (Option)

LCD (English)

LCD (Korean)

LED

| Symbol | Name | Function |
|---|---|---|
| — / PRG | Multi-function | Move to previous screen / Cancel at setting mode |
| — / SET | Setting | Select parameters / Save the value of parameter |
| ◀ ▶ ▲ ▼ | 4 way key | Move to display or group / Move the position of cursor |
| L/R | Local / Remote | Change local or remote mode |
| DIR | Direction | Switch rotating direction of motor |
| STOP / RESET | Stop / Reset | Stop drive at local mode / Fault reset |
| RUN | Start | Start drive at local mode |

## Fieldbus Option

- Built in RS-485 1 port
- Ethernet Type– Modbus-TCP, Ethernet/IP, Profinet-IO
- Serial Type - Profibus DP, DeviceNet

Ethernet Type

Serial (Profibus DP)

Serial (DeviceNet)

## Extended I/O

- Extended Input/Output
- Analog Input 2ea, Digital Input 2ea
- Analog Output 2ea, Digital Output 2ea

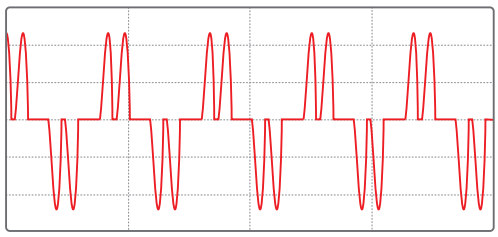
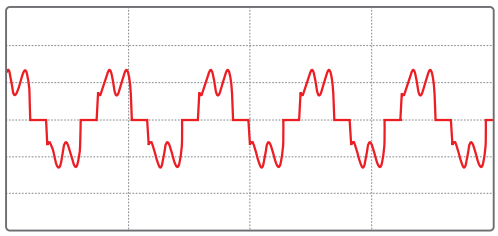
## Encoder Option

- Encoder I/F (Vector Control)
- Open Collector/Line Drive Type
- Supply Voltage 5/12V

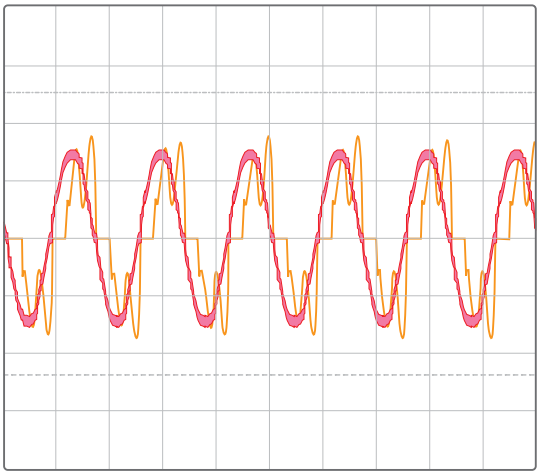
# Features

## DC Choke

- Built-in DC Choke for 30~132kW drives
- Improve the operation reliability of connected external devices by reducing harmonics
- Connect the power source without AC reactor by improving the power factor

| DCL | Waveform (132kw) |
|---|---|
| None<br>PF : 70%<br>THD : 88% |  |
| Built-in<br>PF : 90%<br>THD : 40% |  |

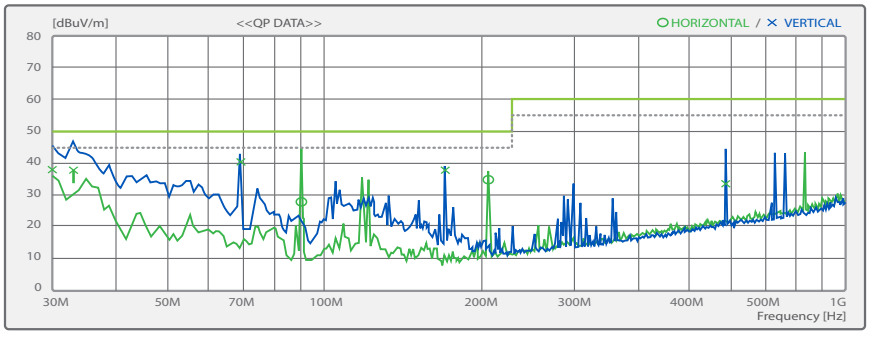
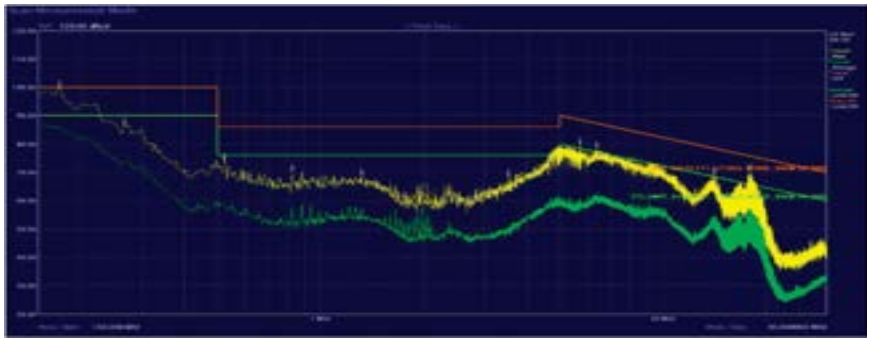
[Y:200A/div, X:20ms/div]

| DCL | Actual Waveform |
|---|---|
| Built-in<br>PF : 92%<br>THD : 40% |  |

[CH1:200A/div, CH2:350V/div X:10ms/div]

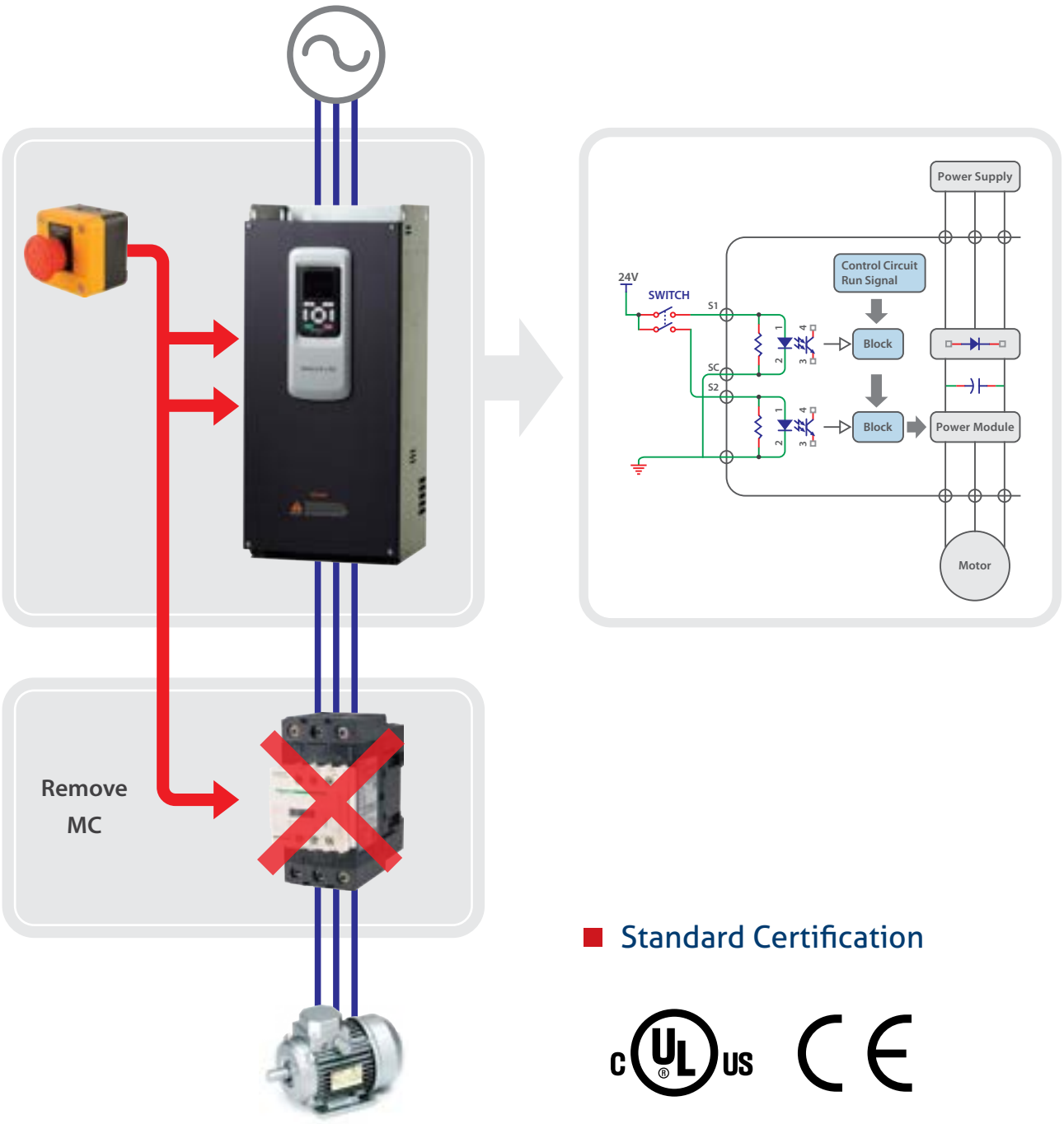
## Built-in EMC Filter

- Built-in EMC filter to reduce the noise
- Standard 61800-3 C3 (Class A) – Conform CE certification

| Emission | Measurement |
|---|---|
| Radiation |  |
| Conduction |  |

## Safety Function

- Embedded safety function meets safety standards.
- Easy to fit the safety standard of system level by built-in safety function with conforms EN ISO 13849-1 PLd and EN 61508 SIL2 (EN60204-1)
- Safety function provides reliable protection, space-saving and cost reduction by removing external protection device.




## Standard Certification

# Product Type and Model Name

## Product Type

| Motor Capacity (kW) | 3 Phase 200V | | | | 3 Phase 400V | | | |
|---|---|---|---|---|---|---|---|---|
| | Normal Duty | | Heavy Duty | | Normal Duty | | Heavy Duty | |
| | Model | FLA | Model | FLA | Model | FLA | Model | FLA |
| 5.5 | | | A1-032A-☐ | 24A | | | A1-016A-☐ | 12A |
| 7.5 | A1-032A-☐ | 32A | A1-045A-☐ | 32A | A1-016A-☐ | 16A | A1-023A-☐ | 16A |
| 11 | A1-045A-☐ | 45A | A1-064A-☐ | 45A | A1-023A-☐ | 23A | A1-032A-☐ | 23A |
| 15 | A1-064A-☐ | 64A | A1-076A-☐ | 64A | A1-032A-☐ | 32A | A1-038A-☐ | 32A |
| 18.5 | A1-076A-☐ | 76A | A1-090A-☐ | 76A | A1-038A-☐ | 38A | A1-045A-☐ | 38A |
| 22 | A1-090A-☐ | 90A | A1-114A-☐ | 90A | A1-045A-☐ | 45A | A1-058A-☐ | 45A |
| 30 | A1-114A-☐ | 114A | A1-140A-☐ | 114A | A1-058A-☐ | 58A | A1-075A-☐ | 58A |
| 37 | A1-140A-☐ | 140A | A1-170A-☐ | 140A | A1-075A-☐ | 75A | A1-090A-☐ | 75A |
| 45 | A1-170A-☐ | 170A | A1-205A-☐ | 170A | A1-090A-☐ | 90A | A1-110A-☐ | 90A |
| 55 | A1-205A-☐ | 205A | A1-261A-☐ | 211A | A1-110A-☐ | 110A | A1-149A-☐ | 110A |
| 75 | A1-261A-☐ | 261A | A1-310A-☐ | 261A | A1-149A-☐ | 149A | A1-176A-☐ | 149A |
| 90 | A1-310A-☐ | 310A | | | A1-176A-☐ | 176A | A1-217A-☐ | 176A |
| 110 | | | | | A1-217A-☐ | 217A | A1-260A-☐ | 217A |
| 132 | | | | | A1-260A-☐ | 260A | A1-296A-☐ | 260A |
| 160 | | | | | A1-296A-☐ | 296A | | |

## Model Name

| A1 | – | XXXA | – | 4 | – | C |
|---|---|---|---|---|---|---|
| Product Series | | Rating – Output Current | | Input Voltage<br>2: 200V Class<br>4: 400V Class | | Operator<br>C = LCD Type<br>E = LED Type |

## Input Voltage 200V Class

| Model Name (A1-□ □ □ A-2) | | | | 032 | 045 | 064 | 076 | 090 | 114 |
|---|---|---|---|---|---|---|---|---|---|
| Applicable Motor *1) [HP] | | | HD | 7.5 | 10 | 15 | 20 | 25 | 30 |
| | | | ND | 10 | 15 | 20 | 25 | 30 | 40 |
| Applicable Motor *1) [kW] | | | HD | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 |
| | | | ND | 7.5 | 11 | 15 | 18.5 | 22 | 30 |
| Rated Output | Current [A] | | HD | 24 | 32 | 45 | 64 | 76 | 90 |
| | | | ND | 32 | 45 | 64 | 76 | 90 | 114 |
| | Capacity [kVA] | HD | 200V | 8 | 11 | 16 | 22 | 26 | 31 |
| | | | 240V | 10 | 13 | 19 | 27 | 32 | 37 |
| | | ND | 200V | 11 | 16 | 22 | 26 | 31 | 39 |
| | | | 240V | 13 | 19 | 27 | 32 | 37 | 47 |
| | Frequency [Hz] | | | 0~400 Hz | | | | | |
| | Voltage *2) [V] | | | 3Φ 200~240V | | | | | |
| Rated Input | Available Voltage [V] | | | 3Φ 200~240V (±10%) | | | | | |
| | Frequency [Hz] | | | 50/ 60Hz (±5%) | | | | | |
| | Current *3) [A] | | HD | 20 | 28 | 40 | 55 | 68 | 81 |
| | | | ND | 28 | 40 | 55 | 68 | 81 | 110 |
| | Power Loss [kW] | | HD | 0.11 | 0.15 | 0.22 | 0.3 | 0.37 | 0.44 |
| | | | ND | 0.15 | 0.22 | 0.3 | 0.37 | 0.44 | 0.6 |
| FRAME | | | | F1 | F1 | F1 | F2 | F2 | F3 |

*1) Motor capacity(kW,HP) is based on standard 220V 4 pole 60Hz motor.
Drive's output current should be bigger than the rated current of motor or same as that of motor.
*2) Maximum output voltage dose not go over the supplied power voltage.
*3) Rated input current is based on 220V input voltage.

## Input Voltage 200V Class

| Model Name (A1-□ □ □ A-2) | | | | 140 | 170 | 205 | 261 | 310 |
|---|---|---|---|---|---|---|---|---|
| Applicable Motor *1) [HP] | | | HD | 40 | 50 | 60 | 75 | 100 |
| | | | ND | 50 | 60 | 75 | 100 | 125 |
| Applicable Motor *1) [kW] | | | HD | 30 | 37 | 45 | 55 | 75 |
| | | | ND | 37 | 45 | 55 | 75 | 90 |
| Rated Output | Current [A] | | HD | 114 | 140 | 170 | 211 | 261 |
| | | | ND | 140 | 170 | 205 | 261 | 310 |
| | Capacity [kVA] | HD | 200V | 39 | 48 | 59 | 71 | 90 |
| | | | 240V | 47 | 58 | 71 | 88 | 108 |
| | | ND | 200V | 48 | 59 | 71 | 90 | 107 |
| | | | 240V | 58 | 71 | 85 | 108 | 129 |
| | Frequency [Hz] | | | 0~400 Hz | | | | |
| | Voltage *2) [V] | | | 3Φ 200~240V | | | | |
| Rated Input | Available Voltage [V] | | | 3Φ 200~240V (±10%) | | | | |
| | Frequency [Hz] | | | 50/ 60Hz (±5%) | | | | |
| | Current *3) [A] | | HD | 102 | 126 | 154 | 187 | 257 |
| | | | ND | 126 | 154 | 188 | 257 | 308 |
| | Power Loss [kW] | | HD | 0.60 | 0.74 | 0.90 | 1.10 | 1.50 |
| | | | ND | 0.74 | 0.90 | 1.10 | 1.50 | 1.80 |
| FRAME | | | | F3 | F4 | F4 | F5 | F5 |

*1) Motor capacity(kW,HP) is based on standard 220V 4 pole 60Hz motor.
Drive's output current should be bigger than the rated current of motor or same as that of motor.
*2) Maximum output voltage dose not go over the supplied power voltage.
*3) Rated input current is based on 220V input voltage.

# Specification

## Input Voltage 400V Class

| Model Name (A1-□ □ □ A-4) | | | | 016 | 023 | 032 | 038 | 045 | 058 |
|---|---|---|---|---|---|---|---|---|---|
| Applicable Motor *1) [HP] | | | HD | 7.5 | 10 | 15 | 20 | 25 | 30 |
| | | | ND | 10 | 15 | 20 | 25 | 30 | 40 |
| Applicable Motor *1) [kW] | | | HD | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 |
| | | | ND | 7.5 | 11 | 15 | 18.5 | 22 | 30 |
| Rated Output | Current [A] | | HD | 12 | 16 | 23 | 32 | 38 | 45 |
| | | | ND | 16 | 23 | 32 | 38 | 45 | 58 |
| | Capacity [kVA] | HD | 380V | 8 | 11 | 15 | 21 | 25 | 30 |
| | | | 480V | 10 | 13 | 19 | 27 | 32 | 37 |
| | | ND | 380V | 11 | 15 | 21 | 25 | 30 | 38 |
| | | | 480V | 13 | 19 | 27 | 32 | 37 | 48 |
| | Frequency [Hz] | | | 0~400 Hz | | | | | |
| | Voltage *2) [V] | | | 3Φ 380~480V | | | | | |
| Rated Input | Available Voltage [V] | | | 3Φ 380~480V (±10%) | | | | | |
| | Frequency [Hz] | | | 50/ 60Hz (±5%) | | | | | |
| | Current *3) [A] | | HD | 10 | 14 | 20 | 28 | 34 | 40 |
| | | | ND | 14 | 20 | 28 | 34 | 40 | 55 |
| | Power Loss [kW] | | HD | 0.11 | 0.15 | 0.22 | 0.3 | 0.37 | 0.44 |
| | | | ND | 0.15 | 0.22 | 0.3 | 0.37 | 0.44 | 0.6 |
| FRAME | | | | F1 | F1 | F1 | F2 | F2 | F2 |

*1) Motor capacity(kW,HP) is based on standard 440V 4 pole 60Hz motor.
Drive's output current should be bigger than the rated current of motor or same as that of motor.
*2) Maximum output voltage dose not go over the supplied power voltage.
*3) Rated input current is based on 440V input voltage.

## Input Voltage 400V Class

| Model Name (A1-□ □ □ A-4) | | | | 075 | 090 | 110 | 149 | 176 | 217 | 260 | 296 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Applicable Motor *1) [HP] | | | HD | 40 | 50 | 60 | 75 | 100 | 125 | 150 | 200 |
| | | | ND | 50 | 60 | 75 | 100 | 125 | 150 | 200 | 250 |
| Applicable Motor *1) [kW] | | | HD | 30 | 37 | 45 | 55 | 75 | 90 | 110 | 132 |
| | | | ND | 37 | 45 | 55 | 75 | 90 | 110 | 132 | 160 |
| Rated Output | Current [A] | | HD | 58 | 75 | 90 | 110 | 149 | 176 | 217 | 260 |
| | | | ND | 75 | 90 | 110 | 149 | 176 | 217 | 260 | 296 |
| | Capacity [kVA] | HD | 380V | 38 | 49 | 59 | 72 | 98 | 116 | 143 | 171 |
| | | | 480V | 48 | 62 | 75 | 91 | 124 | 146 | 180 | 216 |
| | | ND | 380V | 49 | 59 | 72 | 98 | 116 | 143 | 171 | 195 |
| | | | 480V | 62 | 75 | 91 | 124 | 146 | 180 | 216 | 246 |
| | Frequency [Hz] | | | 0~400 Hz | | | | | | | |
| | Voltage *2) [V] | | | 3Φ 380~480V | | | | | | | |
| Rated Input | Available Voltage [V] | | | 3Φ 380~480V (±10%) | | | | | | | |
| | Frequency [Hz] | | | 50/ 60Hz (±5%) | | | | | | | |
| | Current *3) [A] | | HD | 59 | 73 | 89 | 109 | 149 | 178 | 218 | 262 |
| | | | ND | 73 | 89 | 109 | 149 | 178 | 218 | 262 | 317 |
| | Power Loss [kW] | | HD | 0.60 | 0.74 | 0.90 | 1.10 | 1.50 | 1.80 | 2.20 | 2.64 |
| | | | ND | 0.74 | 0.90 | 1.10 | 1.50 | 1.80 | 2.20 | 2.64 | 3.20 |
| FRAME | | | | F3 | | F4 | | F5 | | F6 | |

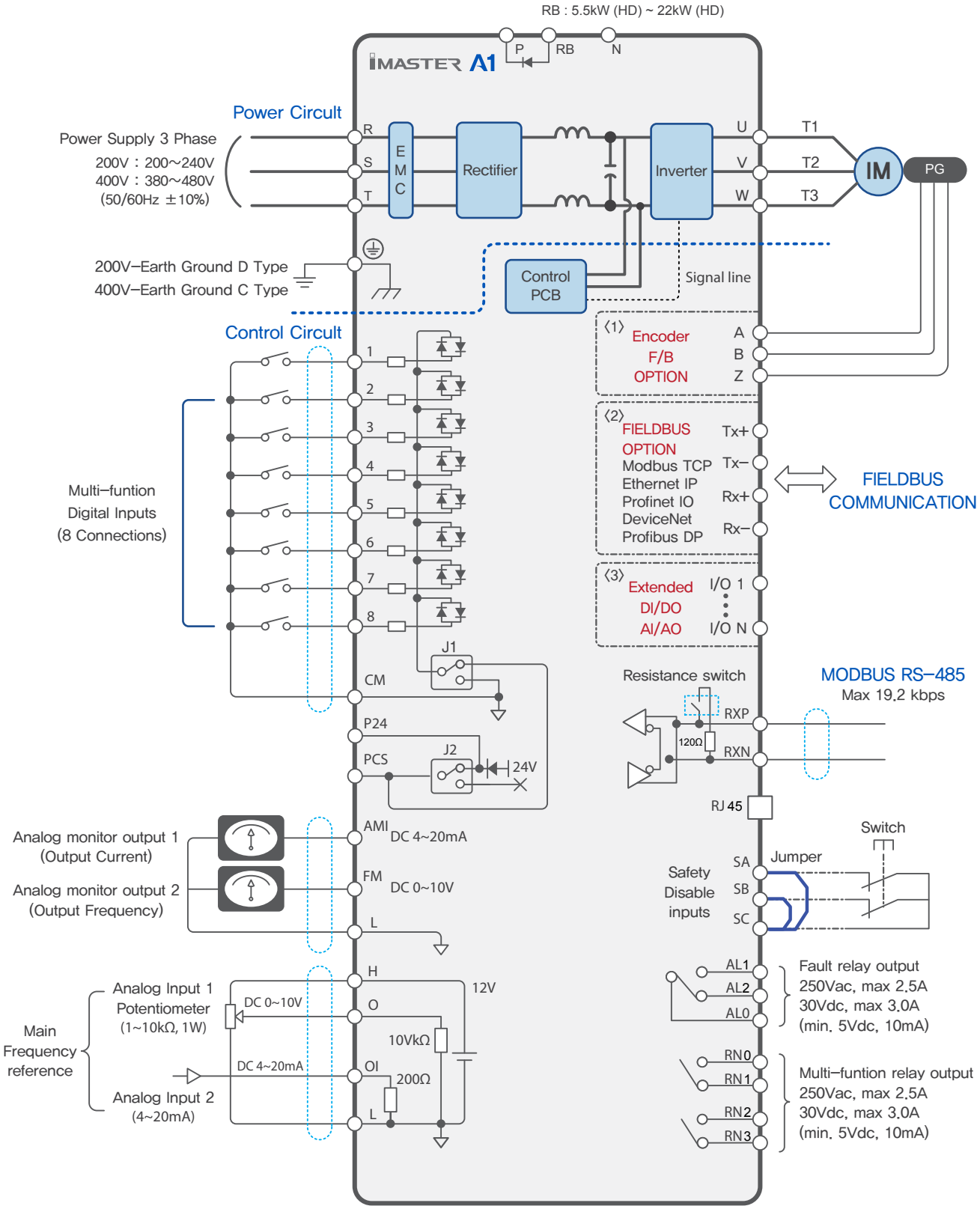
*1) Motor capacity(kW,HP) is based on standard 440V 4 pole 60Hz motor.
Drive's output current should be bigger than the rated current of motor or same as that of motor.
*2) Maximum output voltage dose not go over the supplied power voltage.
*3) Rated input current is based on 440V input voltage.

## Control

| Item | Specification |
|---|---|
| Control Mode | V/f Control, Sensorless Vector Control, Vector Control |
| Frequency Setting Range | 0.01 to 400Hz |
| Frequency Tolerance | Digital Reference : ±0.01%<br>Analog Reference : ±0.1% |
| Frequency Setting Resolution | Digital Command : 0.01 Hz<br>Analog Command : 0.03 Hz / 60 Hz |
| Output Frequency Resolution | 0.01 Hz |
| Frequency Setting | 0~10 [V], 4~20 [mA], Operator |
| Carrier Frenquency | 1~10kHz (default ND:3kHz, HD:5kHz) |
| ACC/DEC Time | 0.1~3000sec (linear , S curve, U curve) |
| Starting Torque | 100% / 3 Hz (V/f ) 200% / 1 Hz (SLV)<br>200% / 0 r/min (CLV) |

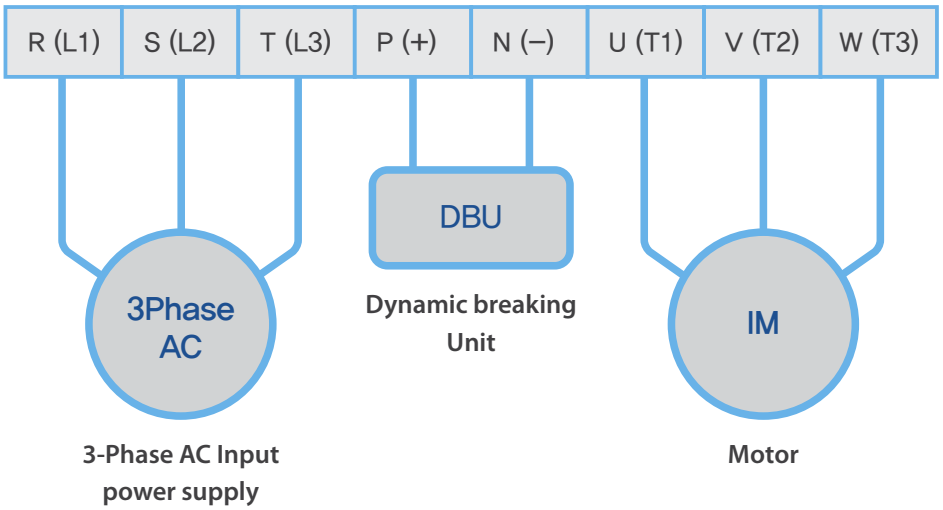
| Item | | Specification |
|---|---|---|
| Protective Function | Overcurrent | Exceeds internal over current trip level |
| | Overload | 150%(HD) ,120%(ND) 60s |
| | Overvoltage | 200V Class:410 V / 400V Class:820 V |
| | Low voltage | 200V Class:190 V / 400V Class:380 V |
| | Heat sink overheat | NTC on IGBT |
| | Stall Prevention | Stall prevention during acceleration |
| | Ground Fault | Protection by electric circuit |
| Environment | Area of Use | Indoor |
| | Ambient Temperature | HD : -10 to 50℃ / ND : -10 to 40℃ |
| | Humidity | 95% RH or less (no condensation) |
| | Storage Temperature | -20 to 60℃ |
| | Altitude | Up to 1000 m |
| | Vibration | 10Hz~20Hz 1G, 20Hz~55Hz 0.6G |
| Standard | | UL 508C, EN61800-3 C3(2004/108/EC)<br>EN61800-5-2, IEC6158:SIL 3 |
| Protective Design | | Open IP00, NEMA Type 1 Enclosure |

# Connection Diagram



## Using Dynamic Braking Unit(DBU)

P(+) terminal of drive connect to P(+) of DBU and N(-) terminal of drive connect to N(-) of DBU for use the DBU.




- **5.5~22kW Main Circuit Terminal**

| R (L1) | S (L2) | T (L3) | RB | P (+) | N (–) | U (T1) | V (T2) | W (T3) |
|---|---|---|---|---|---|---|---|---|

| Terminal Name | In/Out | Functional Description | Specification |
|---|---|---|---|
| **Main Circuit Connection** | | | |
| R,S,T (L1, L2, L3) | In | 3 Phase 50/60 Hz / AC input power supply. | 200 ~240V ±10%<br>380 ~480V ±10% |
| U,V,W (T1,T2,T3) | Out | 3 Phase PWM output power for motor | |
| P,N | | Optional External Braking Unit Connector. Recommend to use for 30~132 kW (40 ~ 250 HP) models | |
| RB | | Braking Resistor connection for 5.5~22kW | |
| G | | Ground Terminal | |

# Main Terminal

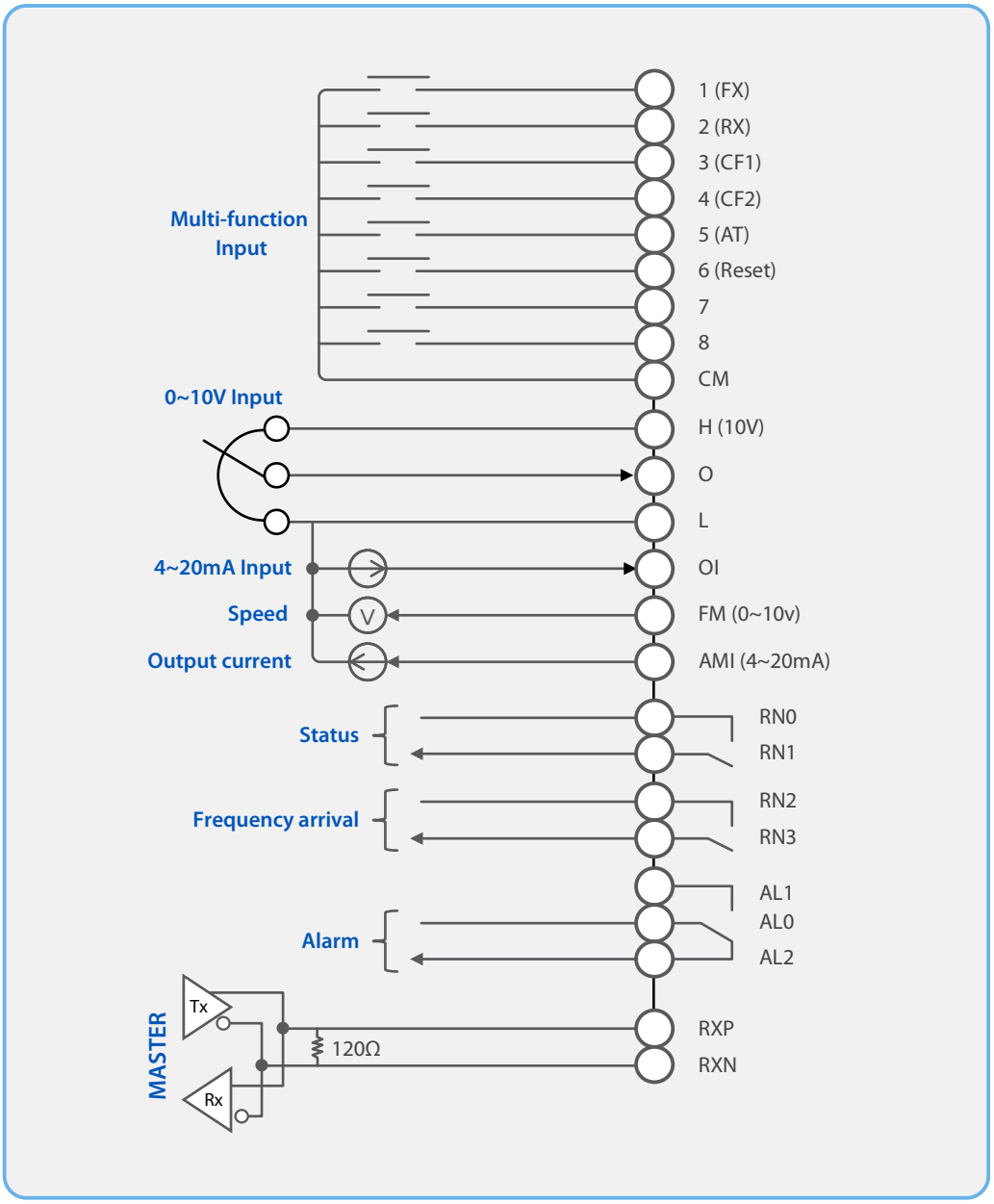
## Wiring Specification

| Class | Motor Output (kW) | VFD Model | Power lines R,S,T, U,V,W,P,N | | | Screw Size of Terminal | Torque N•m (lb•in) | FUSE [A] |
|---|---|---|---|---|---|---|---|---|
| | | | AWG | kcmil | Lug width (mm/inch) | | | |
| 200V Class | 37 | A1-140A-2 | 3*2P | (52.6)*2P | 22/0.87 | M8 | 0.80~1.20 (7.08~10.6) | FWH-350A |
| | 45 | A1-170A-2 | 2*2P | (66.4)*2P | 22/0.87 | M8 | 0.80~1.20 (7.08~10.6) | FWH-400A |
| | 55 | A1-205A-2 | 1*2P | (83.7)*2P | 22/0.87 | M8 | 0.80~1.20 (7.08~10.6) | FWH-400A |
| | 75 | A1-261A-2 | 2/0*2P | (133.1)*2P | 27/1.06 | M10 | 0.80~1.80 (7.08~15.9) | FWH-600A |
| | 90 | A1-310A-2 | 3/0*2P | (167.8)*2P | 27/1.06 | M10 | 0.80~1.80 (7.08~15.9) | FWH-700A |
| 400V Class | 37 | A1-075A-4 | 2 | 66.4 | 16/0.63 | M6 | 0.80~1.00 (7.08~8.85) | FWH-250A |
| | 45 | A1-090A-4 | 2 | 66.4 | 16/0.63 | M6 | 0.80~1.00 (7.08~8.85) | FWH-250A |
| | 55 | A1-110A-4 | 1/0 or 4*2P | 105.5 or (41.7)*2P | 22/0.87 | M8 | 0.80~1.20 (7.08~10.6) | FWH-250A |
| | 75 | A1-149A-4 | 3*2P | (52.6)*3P | 22/0.87 | M8 | 0.80~1.20 (7.08~10.6) | FWH-350A |
| | 90 | A1-176A-4 | 2*2P | (66.4)*2P | 22/0.87 | M8 | 0.80~1.20 (7.08~10.6) | FWH-400A |
| | 110 | A1-217A-4 | 1/0*2P | (105.5)*2P | 22/0.87 | M8 | 0.80~1.20 (7.08~10.6) | FWH-500A |
| | 132 | A1-260A-4 | 2/0*2P | (133.1)*2P | 24/0.94 | M10 | 0.80~1.80 (7.08~15.9) | FWH-600A |
| | 160 | A1-296A-4 | 3/0*2P | (167.8)*2P | 27/1.06 | M10 | 0.80~1.80 (7.08~15.9) | FWH-700A |

Note 1) Bolt for terminal should be used to standard torque. If not tighten a screw, it is caused of malfunction

In case of using circuit breaker, the circuit breaker current select 1.5~2 times of drive rated current.
Fuse specification is 600V class and UL certification product, maker is Bussmann.

# Control Terminal



# Control Terminal

## Control Terminal Description

| Terminal Name | In/Out | Functional Description | Value |
|---|---|---|---|
| P24 | OUT | Power Supply for external device (Always ON) | 24VDC ±7% P24+PCS = 300mA |
| PCS | OUT | Power Supply for external device such as PLC (Variable ON - OFF) | VDC ±7%, P24+PCS = 300mA |
| Multi function digital Input[1:8] | IN | 8 Bit Intelligent input terminal. By programming the respective terminal, can be used as command | Contact Closed : ON Contact Open : OFF Min ON Time : 12 ms |
| CM | IN/OUT | Common Terminal for Intelligent Input and Monitor Output | |
| AMI | OUT | Analog Current (4~20mA) Output | |
| FM | OUT | Analog Voltage (0~10V) Output | |
| L | OUT | DC Power Supply Common | |
| H (P12) | OUT | Power Supply for Potentiometer | 12VDC |
| O | IN | Analog Voltage for Frequency Setpoint | 0 ~ 10 VDC, Input Impedance 10 kΩ |
| OI | IN | Analog Current for Frequency Setpoint | 4~ 20mA, Input Impedance 200 Ω |
| ALO,AL1,AL2 | OUT | Intelligent output terminal: OUTPUT RELAY 1, 2 Run status signal(RUN), Frequency arrival signal(FA1), Set frequency arrival signal(FA2), Overload advance notice signal(OL), PID error deviation signal(OD), Alarm signal(AL) | AC 250V / 2.5A (resistor load) 0.2A (inductor load) DC 30V / 3.0A (resistor load) 0.7A (resistor load) |
| RN0,RN1 RN2,RN3 | OUT | Intelligent output terminal OUTPUT RELAY 3 | |
| SA | IN | Safety Input terminal: One or both open: Drive output disabled | |
| SB | | Both closed: Normal operation | |
| SC | | Common terminal for Safety Input | |

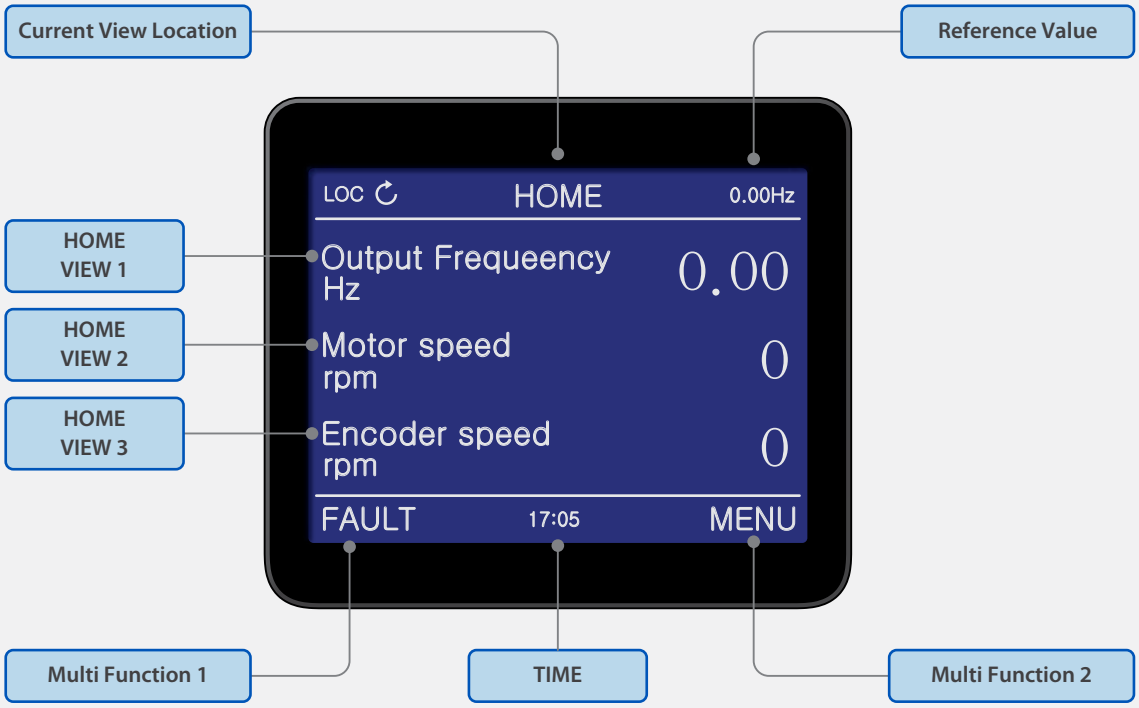
**Communication Connector**

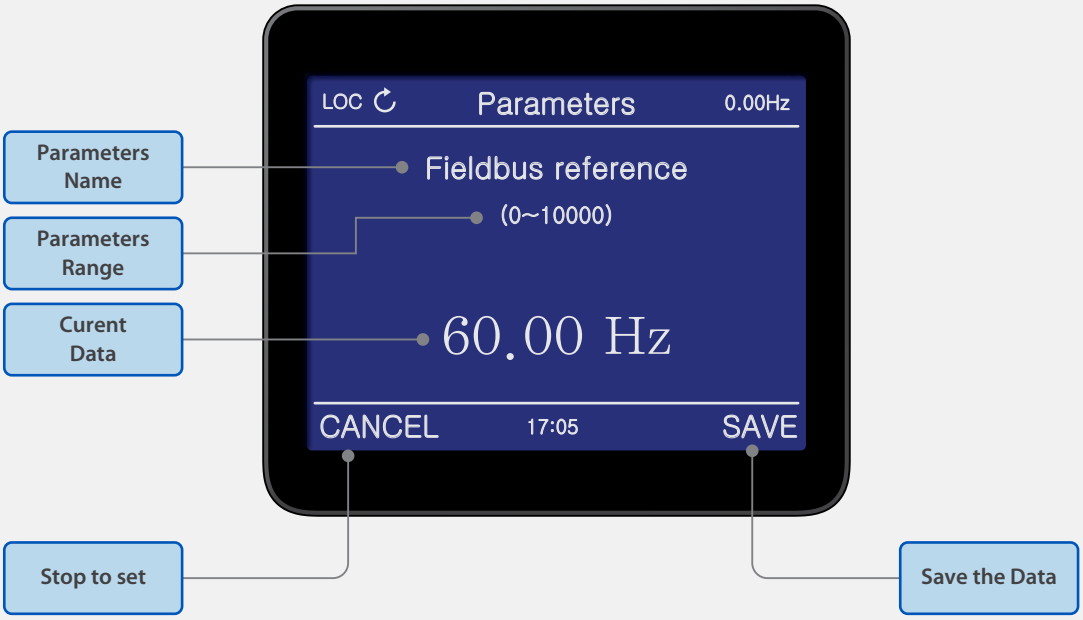
| | | |
|---|---|---|
| RXP | IN/OUT | RS 485 Positive Communication Terminal |
| RXN | IN/OUT | RS 485 Negative Communication Terminal |

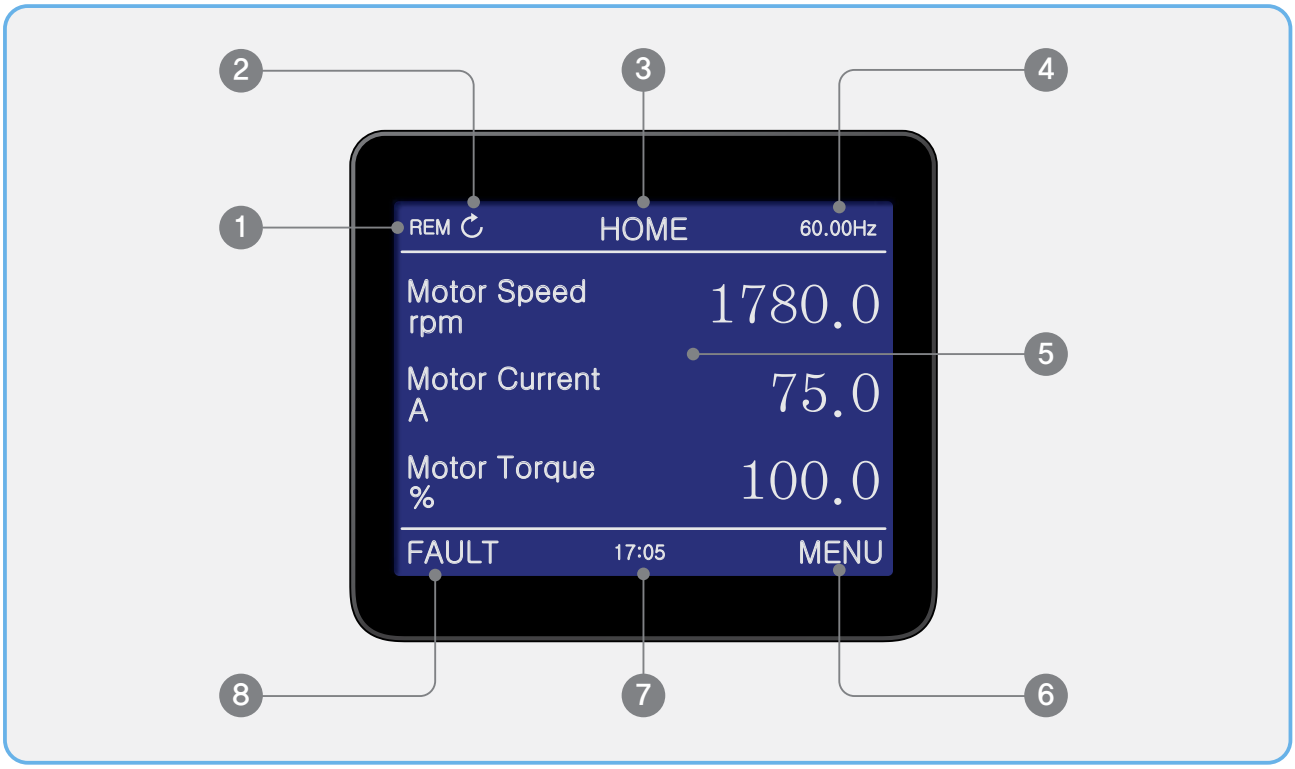
# Operator Instruction

| Symbol | Name | Function |
|---|---|---|
| — | Multi-function 1 | Move to previous screen<br>Cancel at setting mode<br>Move to trip history view |
| — | Multi-function 2 | Select parameters<br>Save the value of parameter |
| ◀ ▶ ▲ ▼ | 4 way key | Move to display or group<br>Move the position of cursor |
| L/R | Local / Remote | Change local or remote mode |
| DIR | Direction | Change rotating direction of motor |
| STOP/RESET | Stop / Reset | Stop drive at local mode<br>Fault reset |
| RUN | Start | Start drive at local mode |

# Operator Instruction

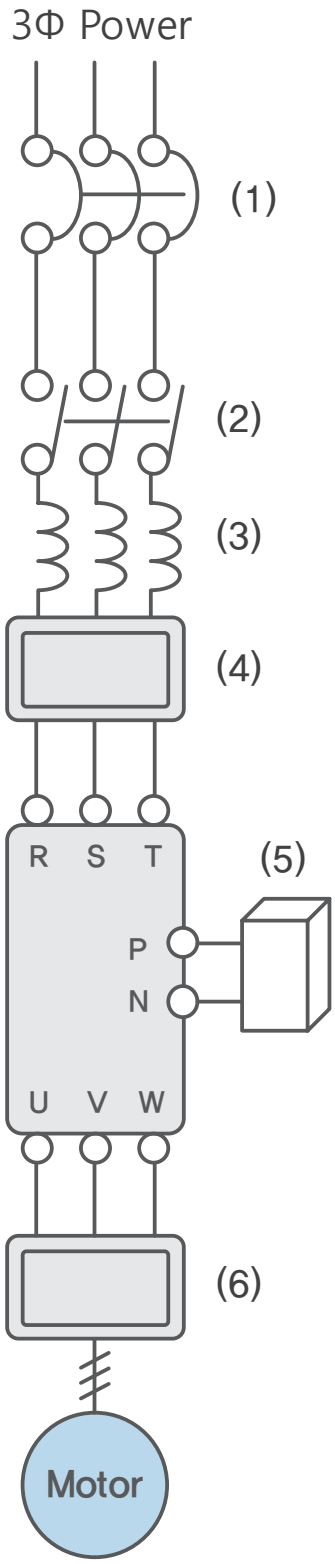





| No | Function | Display | Description |
|---|---|---|---|
| 1 | Control location | LOC | VFD is controlled by VFD Keypad |
| | | REM | VFD is controlled by terminal block |
| 2 | Running Status | Rotation | VFD is stop |
| | | Rotation | VFD is running to forward |
| | | Rotation | VFD is running to reverse |
| | | Flickering | VFD is stopping from forward |
| | | Flickering | VFD is stopping from reverse |
| 3 | Current Status | Home | Home mode |
| | | Menu | Menu mode |
| | | Fault | Fault status |
| 4 | Reference Value | 00.00Hz | Display referenced value |
| 5 | Current View | – | Display selected item |
| 6 | Multi Right Key | Menu | Move to menu view |
| | | Select | Select the item |
| | | Save | Save the parameter data |
| | | Read | Read all parameters for copy |
| | | Write | Write all parameters for copy |
| 7 | Time | 00:00 | Display the current time |
| 8 | Multi Left Key | Back | Move to previous view |
| | | Cancel | Cancel at parameter view |
| | | Fault | Move to fault view |

# Peripheral Devices




| | Name | Function |
|---|---|---|
| 1 | Molded case circuit breaker, or earth leakage circuit breaker | When inverter is powered on, big inrush current flows. Therefore, be careful to choose circuit breaker. |
| 2 | Electromagnetic contactor | It is not always required to be installed. With this electromagnetic contactor, do not run or stop inverter frequently. Otherwise, inverter lifespan is shortened. |
| 3 | AC reactor | In the case of power factor improvement, or of the installation in the place with big input power capacity (more than 500kVA, more than 10-fold of inverter capacity, more than 3% of voltage unbalance, within 10m of wiring), it is required to apply the reactor. Be careful to choose one. |
| 4 | Input noise filter | This device reduces the noise emitted by input power line. |
| 5 | Braking unit | This device is used to increase inverter braking torque, or to turn ON/OFF highly frequently, or to operate big inertia moment (GD2) load. |
| 6 | Output noise filter | This device is installed in between inverter and motor, reducing the noise emitted by wire. In addition, it alleviates radio or TV signal troubles or prevents malfunction of sensors or measuring instruments. |

## AC Reactor

| Voltage | Drive Model | Heavy Duty | | | Normal Duty | | |
|---|---|---|---|---|---|---|---|
| | | kW | mH | A | kW | mH | A |
| 3Φ 200V | A1-032A-2 | 5.5 | 0.34 | 30 | 7.5 | 0.25 | 40 |
| | A1-045A-2 | 7.5 | 0.25 | 40 | 11 | 0.17 | 59 |
| | A1-064A-2 | 11 | 0.17 | 59 | 15 | 0.13 | 75 |
| | A1-076A-2 | 15 | 0.13 | 75 | 18.5 | 0.11 | 96 |
| | A1-090A-2 | 18.5 | 0.11 | 96 | 22 | 0.09 | 112 |
| | A1-114A-2 | 22 | 0.09 | 112 | 30 | 0.06 | 160 |
| | A1-140A-2 | 30 | 0.07 | 160 | 37 | 0.05 | 200 |
| | A1-170A-2 | 37 | 0.05 | 200 | 45 | 0.044 | 240 |
| | A1-205A-2 | 45 | 0.044 | 240 | 55 | 0.038 | 280 |
| | A1-261A-2 | 55 | 0.038 | 280 | 75 | 0.026 | 360 |
| | A1-310A-2 | 75 | 0.026 | 360 | 90 | 0.02 | 500 |
| 3Φ 400V | A1-016A-4 | 5.5 | 1.35 | 15 | 7.5 | 1.01 | 20 |
| | A1-023A-4 | 7.5 | 1.01 | 20 | 11 | 0.67 | 30 |
| | A1-032A-4 | 11 | 0.67 | 30 | 15 | 0.53 | 38 |
| | A1-038A-4 | 15 | 0.53 | 38 | 18.5 | 0.40 | 50 |
| | A1-045A-4 | 18.5 | 0.40 | 50 | 22 | 0.35 | 58 |
| | A1-058A-4 | 22 | 0.35 | 58 | 30 | 0.25 | 80 |
| | A1-075A-4 | 30 | 0.287 | 80 | 37 | 0.232 | 98 |
| | A1-090A-4 | 37 | 0.232 | 98 | 45 | 0.195 | 118 |
| | A1-110A-4 | 45 | 0.195 | 118 | 55 | 0.157 | 142 |
| | A1-149A-4 | 55 | 0.157 | 142 | 75 | 0.122 | 196 |
| | A1-176A-4 | 75 | 0.122 | 196 | 90 | 0.096 | 237 |
| | A1-217A-4 | 90 | 0.096 | 237 | 110 | 0.081 | 289 |
| | A1-260A-4 | 110 | 0.081 | 289 | 132 | 0.069 | 341 |
| | A1-296A-4 | 132 | 0.069 | 341 | 160 | 0.057 | 420 |

# Peripheral Devices

## Braking Resistor

| 200V Drive | | 150% Torque, 5% ED | | 400V Drive | | 150% Torque, 5% ED | |
|---|---|---|---|---|---|---|---|
| Model Name | kW | Ω | W | Model Name | kW | Ω | W |
| A1-032A-2 | 5.5 | 20 | 800 | A1-016A-4 | 5.5 | 85 | 800 |
| A1-045A-2 | 7.5 | 15 | 1200 | A1-023A-4 | 7.5 | 60 | 1200 |
| A1-064A-2 | 11 | 10 | 2400 | A1-032A-4 | 11 | 40 | 2400 |
| A1-076A-2 | 15 | 8 | 2400 | A1-038A-4 | 15 | 30 | 2400 |
| A1-090A-2 | 18.5 | 5 | 3600 | A1-045A-4 | 18.5 | 20 | 3600 |
| A1-114A-2 | 22 | 5 | 3600 | A1-058A-4 | 22 | 20 | 3600 |

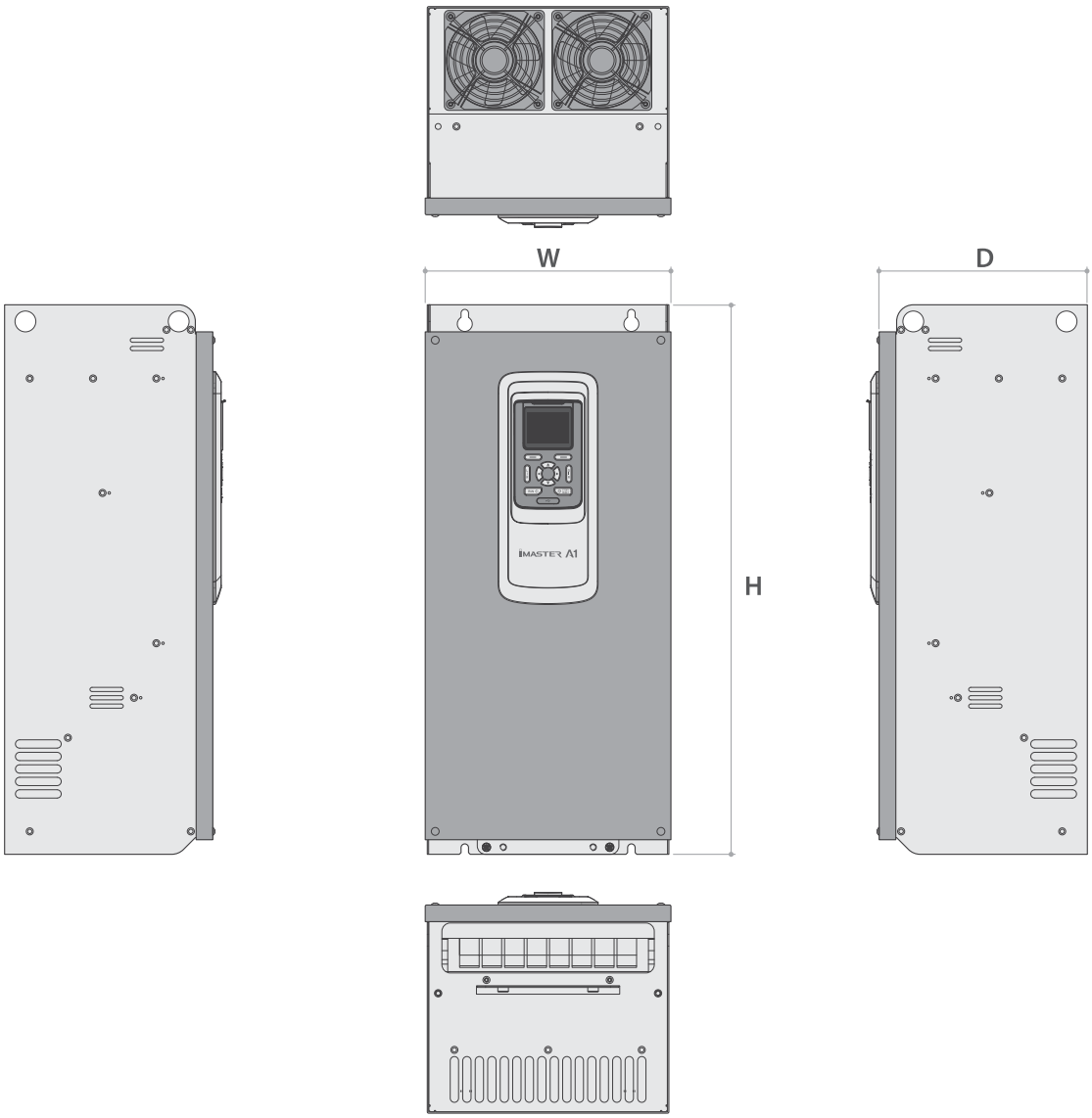
## Dynamic Braking Unit

| Voltage | Drive Model | kW | DBU Type | R [Ω] | Wattage [kW] | Specification |
|---|---|---|---|---|---|---|
| 3Φ 200V | A1-140A-2 | 30 | FBU100-037-2 | 4.5 | 10 | 150% Braking Torque10% ED |
| | A1-170A-2 | 37 | | 4.5 | 10 | |
| | A1-205A-2 | 45 | FBU100-075-2 | 2.5 | 10 | |
| | A1-261A-2 | 55 | | 2.5 | 20 | |
| | A1-310A-2 | 75 | | 2.5 | 20 | |
| 3Φ 400V | A1-075A-4 | 30 | FBU100-037-4 | 12 | 10 | |
| | A1-090A-4 | 37 | | 12 | 10 | |
| | A1-110A-4 | 45 | FBU100-075-4 | 6 | 10 | |
| | A1-149A-4 | 55 | | 6 | 20 | |
| | A1-176A-4 | 75 | | 6 | 20 | |
| | A1-217A-4 | 90 | FBU100-090-4 | 5 | 26 | |
| | A1-260A-4 | 110 | FBU100-132-4 | 3.4 | 40 | |
| | A1-296A-4 | 132 | | 3.4 | 40 | |

# Options

| Device | Model | Specification |
|---|---|---|
| **Encoder** | A1-ENOC | Open Collector Type<br>: 3 track(A,B,Z pulse) Voltage output for PG 12V 200mA |
| | A1-ENLD | Line Drive Type<br>: 3 track(A,B,Z pulse) Voltage output for PG 5 or 12V 200mA |
| **Extended I/O** | A1-EIO | Extended Input/Output |
| **LED Operator** | A1-LEDOP | 7 Segment Display<br>Set speed, acceleration and parameters in drive. |
| **LCD Operator** | A1-LCDOP | GRAPIC LCD Display<br>Set speed, acceleration and parameters in drive. |
| **Fieldbus** | A1-FB□ | Fieldbus option<br>□: Modbus TCP-T Ethernet/IP-E Profinet IO-P<br>DeviceNet- D Profibus DP-B |

# Dimension




| FRAME | Model | Dimension (mm) | | |
|---|---|---|---|---|
| | | W | H | D |
| F1 | A1-032A-2 ~ A1-064A-2<br>A1-016A-4 ~ A1-032A-4 | 180 | 360 | 235 |
| F2 | A1-076A-2, A1-090A-2<br>A1-038A-4 ~ A1-058A-4 | 220 | 440 | 235 |
| F3 | A1-114A-2, A1-140A-2<br>A1-075A-4, A1-090A-4 | 270 | 550 | 265 |
| F4 | A1-170A-2, A1-205A-2<br>A1-110A-4, A1-149A-4 | 295 | 660 | 265 |
| F5 | A1-261A-2, A1-310A-2<br>A1-176A-4, A1-217A-4 | 345 | 760 | 275 |
| F6 | A1-260A-4, A1-296A-4 | 385 | 800 | 275 |

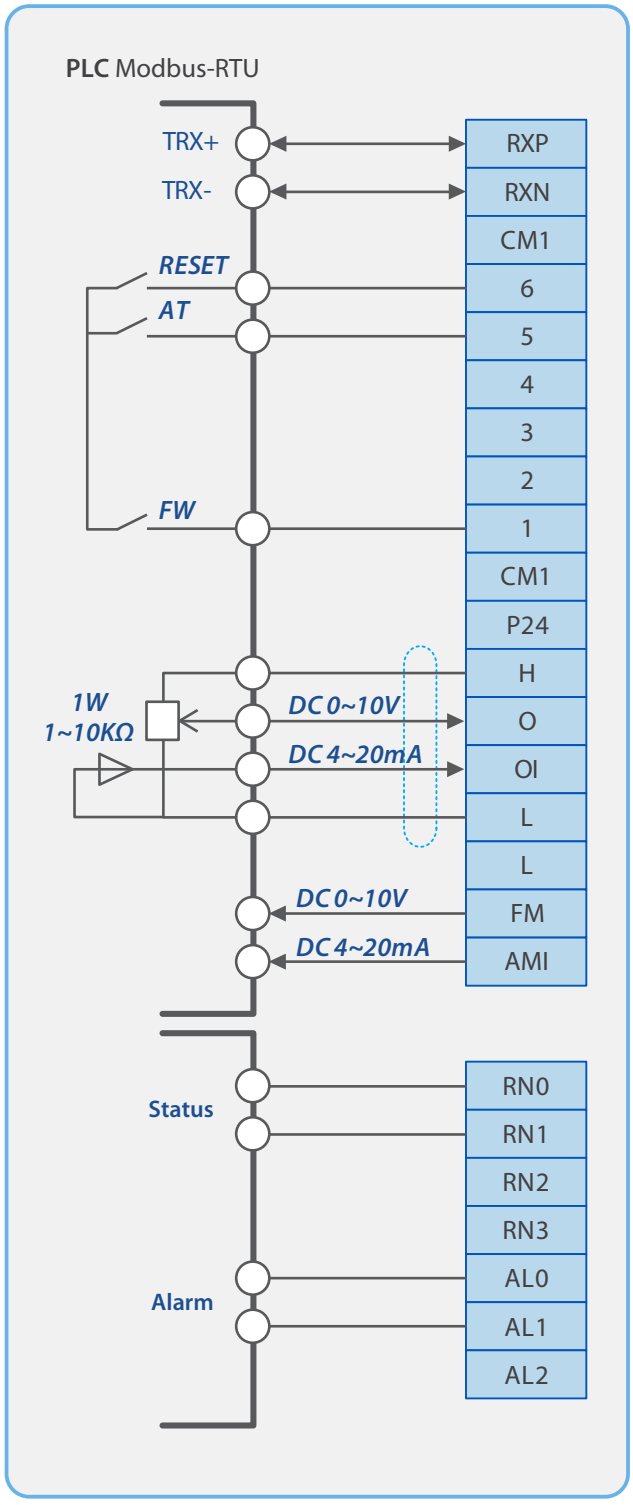
# Protective Functions

| Type | Description | Sign |
|---|---|---|
| Overcurrent | If inverter output has short-circuit, or if motor stalls, overcurrent goes to inverter. As a result, protection circuit works and inverter output is blocked. | oC |
| Output Short Circuit | If inverter output has short-circuit, overcurrent occurs in inverter. As a result, protection circuit works and inverter output is blocked. | oC or SC |
| Motor Overload | If the motor output current detected is determined to be motor overload, the digital thermal device built in inverter detects it and blocks inverter output. | EtH |
| Inverter Overload | This is the function for protecting inverter overheat. In the case of basic carrier frequency, 150% and 1 minute on the basis of inverter rated current; depending on operation conditions, operation time changes. Operation time is different depending on inverter capacity. | IoLt |
| Overvoltage | If regeneration energy and receiving voltage from motor are high, or if load falls sharply in overload limitation, the voltage of converter part goes higher than a specific voltage. As a result, inverter output is blocked. | ov |
| Low Voltage | If input voltage goes down to less than a specific voltage, inverter works abnormally. Therefore, it goes down to the low voltage detection level, inverter output is blocked. | Lv |
| EEPROM | If external noise and temperature rise lead to abnormality of inverter built-in EEPROM (memory), output is blocked. Check setting data again, if error occurs. Alarm signal may not go out accurately. If alarm is not released by error in power-on state, power OFF. 10 minutes later, in the full discharge state, power ON. | E2PE |
| Communication Error | If communication problem occurs between inverter and operator, or between external communication devices, this error is displayed. (this error also occurs if Reset signal remains over 4 seconds.) | CE |
| IGBT Over Temperature | If the temperature of inverter module goes up more than a specific value, the internal temperature sensor detects it, and inverter output is blocked. | ot |
| Input Phase Fail | Inverter damage is prevented when one of input R, S, or T has phase fail. | PF |
| Ground-fault | Ground-fault of inverter output and motor is detected in operation, and thus inverter is protected. | GF |
| USP Error | If inverter is powered on in its RUN state in terminal mode, this error is displayed (in the case of USP function selection) | USP |
| Cooling Fan Failure | If cooling fan fails and does not rotate, inverter output is blocked. | FF |
| OVS Control Failure | If OVS(over voltage stress) operation frequency exceeds maximum OVS frequency and OVS operation time, inverter output is blocked. | ovSF |
| External Event | If any abnormality is found in external devices, inverter receives its signal and blocks output. (intelligent input terminal setting is required.) | EE1~EE5 |
| Safe Input Error | If safe input terminal is opened, inverter output is blocked. | SAFE |

# Applications

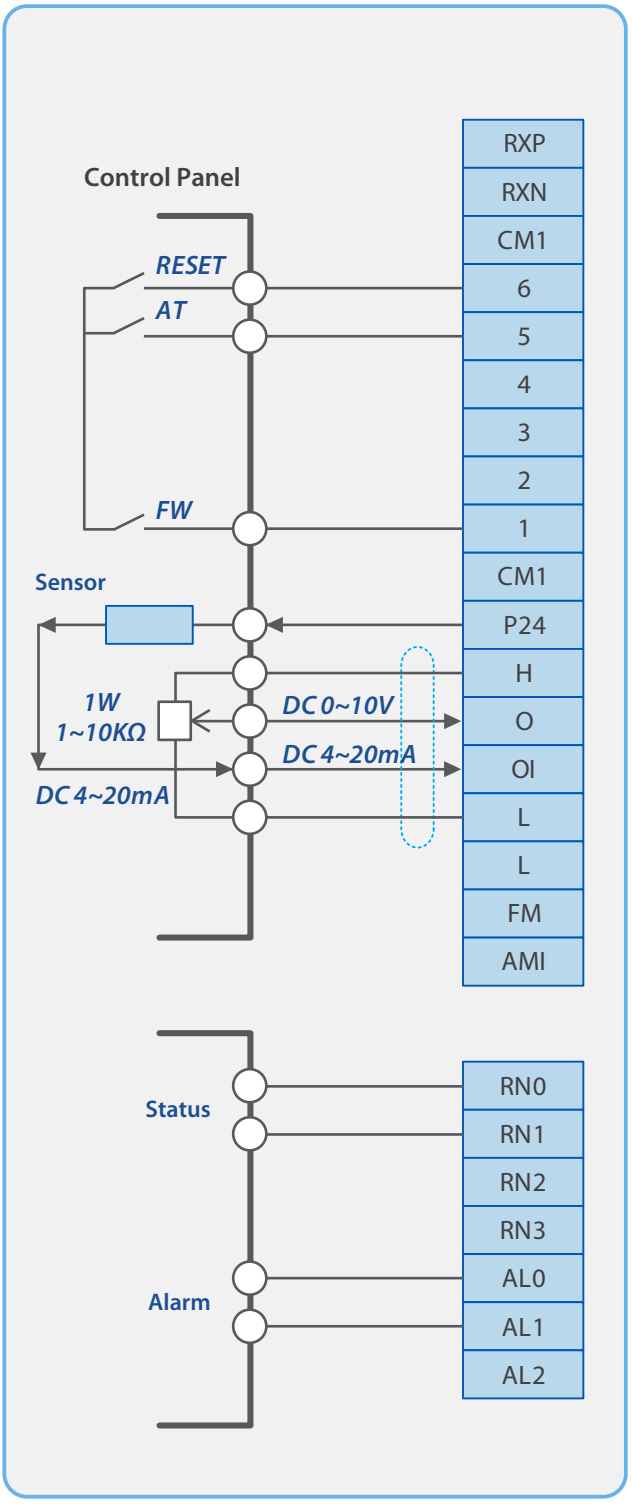
## HVAC / Extruder

Diagram describe the speed reference by analog input, start and stop by terminal input, speed display by analog output, Status monitoring by RN output and alarm.



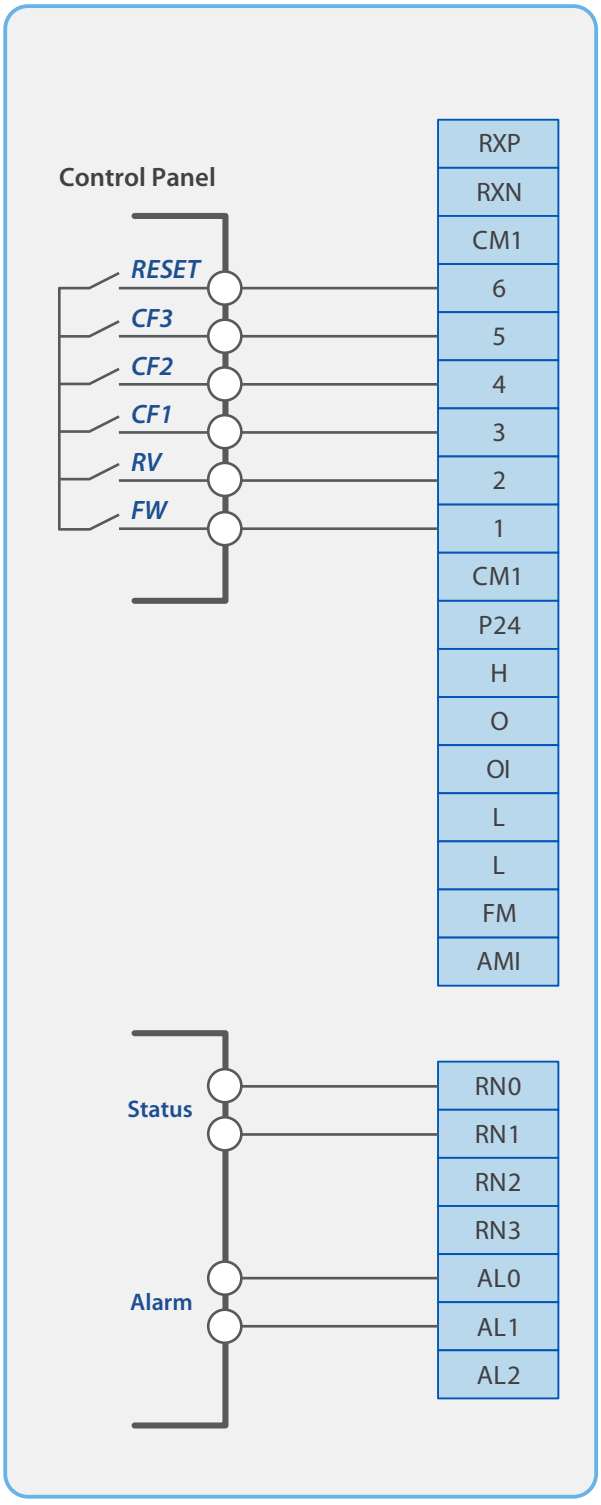

## PID Compressor

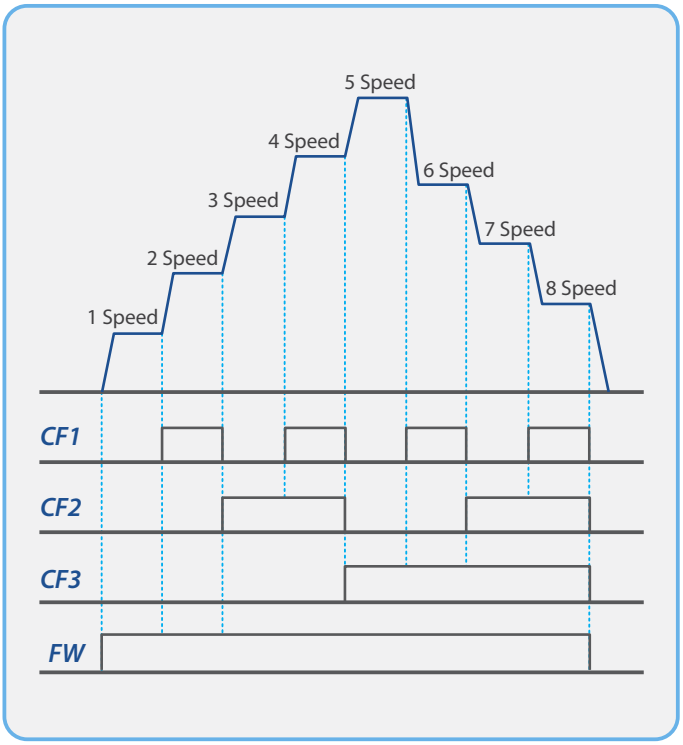
Diagram describes the speed reference by analog input, the start and stop of drive by terminal input. PID control by feedback of current input from the pressure sensor.



## Washing Machine/Mixer

The connection diagram describes the speed control by multi-speed input and the change rotating direction of motor by FW, RV terminal input. Operating speed change from 1 step to 8 step by combination of CF1~CF3 input. RN signal represents operating status and AL signal is the fault signal. Mixer is controlled by CF1,CF2 terminal.

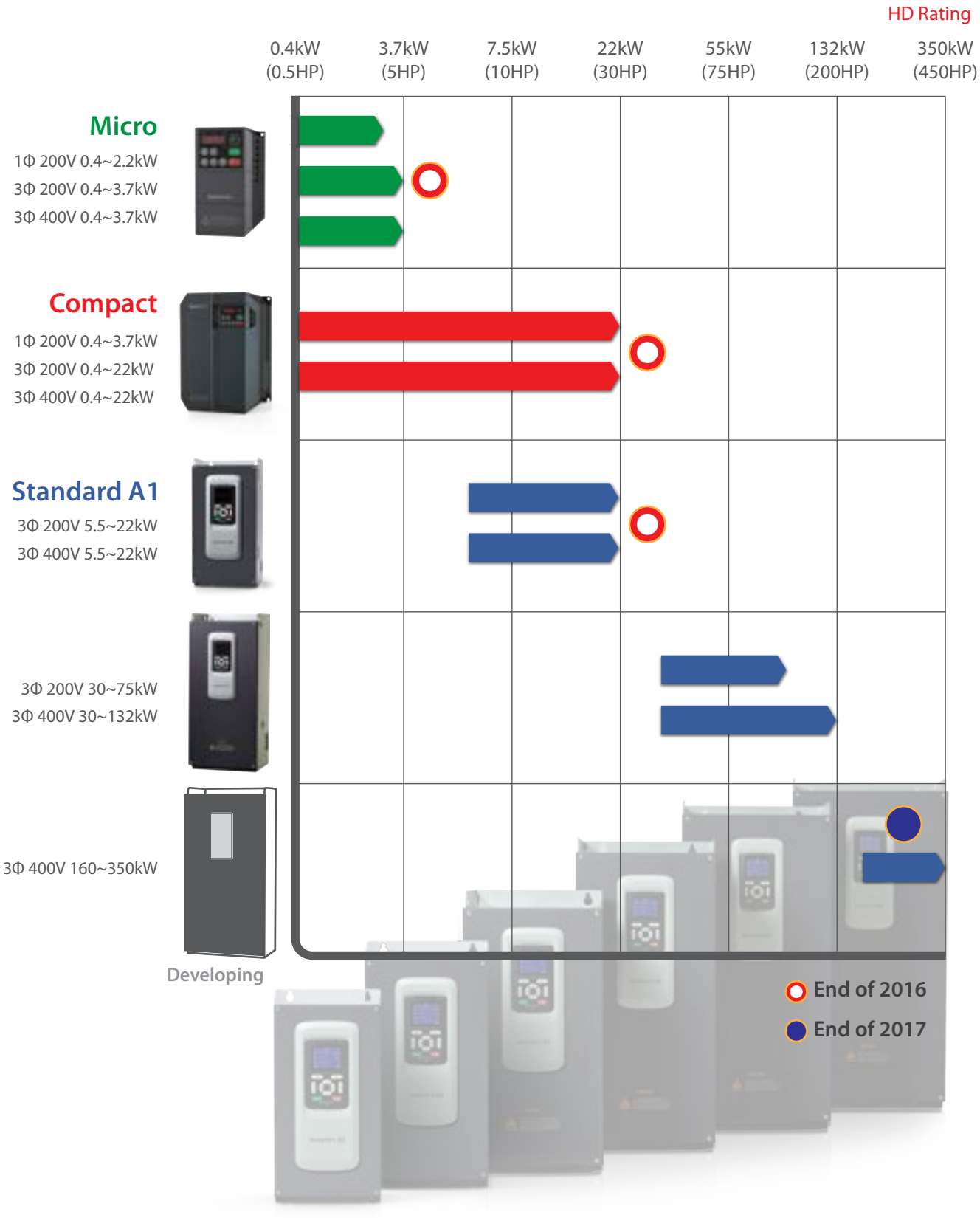



Multi-speed function diagram

# iMaster Series

## iMaster Series is consists of full range of capacity from Micro to Standard.



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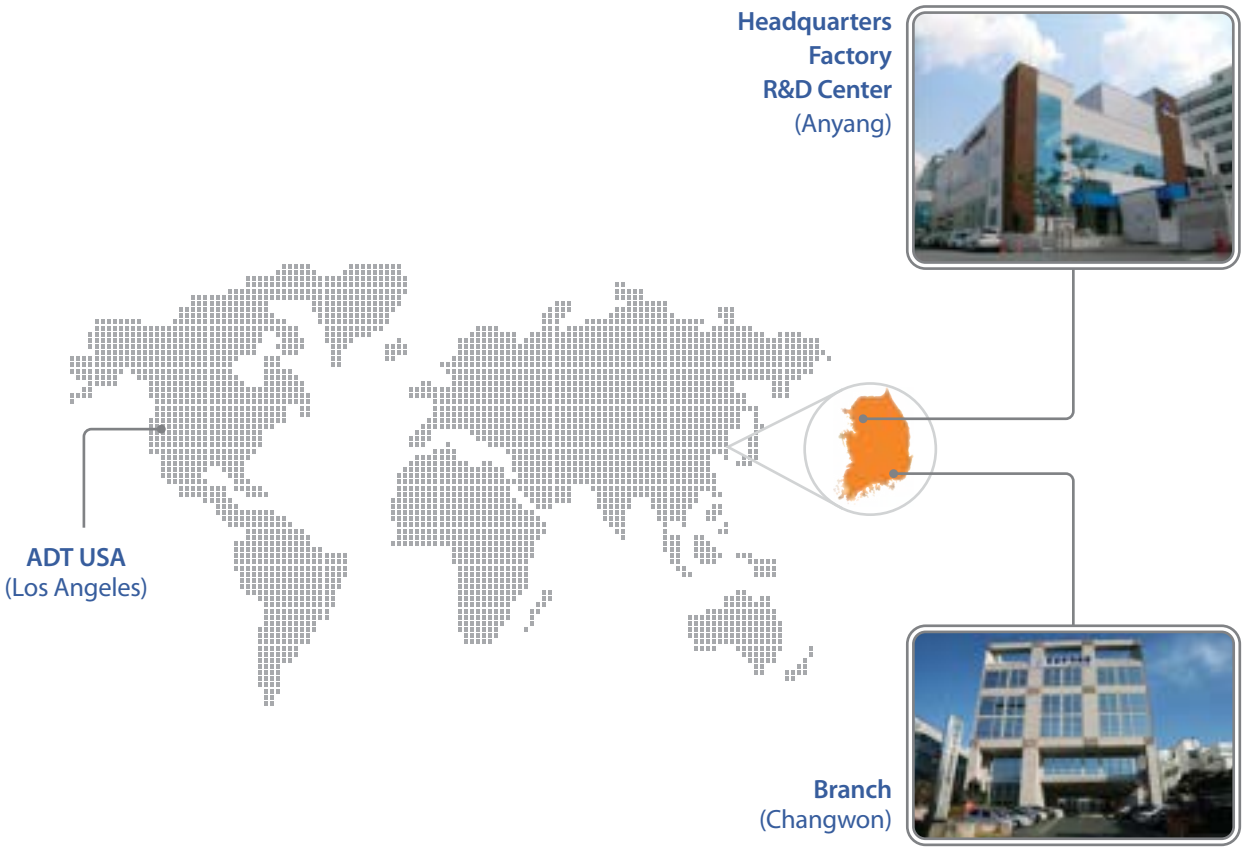
- Founded in November 1999
- Global Power Electronics Company



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