

Inverter **MK300** INSTALLATION MANUAL



[Applicable models]

- 1-phase 200V(0.2kW~2.2kW)
- 3-phase 400V(0.75kW~15kW)

* Before starting to use the product,
please read through this manual
carefully for proper use.

Thank you very much for purchasing Panasonic products.

Please read this Installation Manual carefully for the correct installation and use of it. After using, keep it in a safe place for reference when required. Refer to the manual for details.

Applicability of the Product

- The general inverter produced by our company is not intended to be used in machines or systems which may cause serious personnel injuries. Before using this product in special applications such as machinery or systems in movable object, medical, aerospace, nuclear energy control, submarine relay equipments or systems, please contact us.
- Although this product was manufactured under strict quality control system, it is strongly recommended to install safety devices to prevent serious accidents when used in facilities where a breakdown of this product is likely to cause a serious injury or major losses.
- Do not use this product for loads other than a 3-phase induction motor.
- Please dispose this product as industrial waste.

1 SAFETY PRECAUTIONS

SAFETY PRECAUTIONS

To prevent personal injuries or accidents, be sure to observe the following items.

It is divided into "⚠ DANGER" and "⚠ CAUTION" according to the risk degree in this Installation Manual.

⚠ DANGER Indicates an imminent hazardous situation where incorrect operation will result in serious personnel injury or death.

⚠ CAUTION Indicates a potentially hazardous situation where incorrect operation will result in personnel injury or property damage.

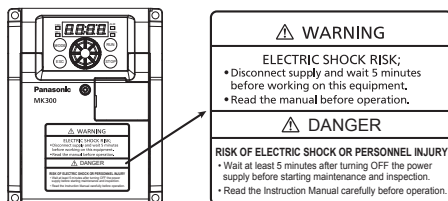
⚠ CAUTION

- Install the inverter on non-flammable materials such as metal etc. Failure to do so may lead to fire.
- Do not place the inverter near flammable materials. Failure to do so may lead to fire.
- Do not hold the inverter by terminal cover while transporting it. Failure to do so may result in personnel injury by its dropping.
- Do not let foreign matters such as metal sheet enter the inverter. Failure to do so may lead to fire.
- Install the inverter on a place strong enough to support its weight according to the Instruction Manual. Failure to do so may result in personnel injury by its dropping.
- Do not install or operate an inverter that is damaged or with part(s) missing. Failure to do so may result in personnel injury.
- Do not connect an AC power supply to output terminals (U, V, W). Failure to do so may result in personnel injury or fire.
- Make sure that the rated voltage of inverter matches with voltage of AC power supply. Failure to do so may result in personnel injury or fire.
- Tighten terminal screws to the specified tightening torque. Failure to do so may lead to fire.
- Do not connect resistor to DC terminals of P/DB+ and N-. Failure to do so may lead to fire.
- The heat sinks and braking resistors are at high temperature, so do not touch them. Otherwise it may result in burns.
- The inverter can easily be switched to high speed from low speed, so confirm the allowable range of the motor and machine before making settings. Failure to do so may result in personnel injury.
- Set separate holding brakes if required. Failure to do so may result in personnel injury.
- Employ an electrical engineering company to periodically tighten terminal screws. Loosen screws may lead to overheating even fire.

DANGER

- Make sure that power is turned OFF before starting wiring. Failure to do so may result in an electric shock or fire.
- Always connect ground wire. Failure to do so may result in an electric shock or fire.
- Wiring work should always be carried out by qualified electrician. Failure to do so may result in an electric shock or fire.
- Always install the unit before wiring. Failure to do so may result in an electric shock or personnel injury.
- Always close terminal cover before turning ON the inlet power and do not open terminal cover during power ON.
Failure to do so may result in an electric shock or fire.
- Do not operate switches or knobs with wet hands. Failure to do so may result in an electric shock.
- Do not touch inverter terminals during Power ON even in stopping status. Failure to do so may result in an electric shock.
- The STOP button is not designed for emergency stop purpose, so set a separate button for emergency stop. Failure to do so may result in personnel injury.
- Depending on the start mode and settings of ride-through function, if operating signal is ON or the power is restored from a power failure, the inverter may start (or restart) suddenly. Keep away from the unit to avoid injury.
【Design the machine so that it can ensure personal safety even if the inverter starts suddenly.】
- Depending on the setting of start mode function, when reset fault trip with the operating signal present, the inverter may restart suddenly.
(Always take measures to ensure personal safety.) Failure to do so may result in personnel injury.
- When retry function is in use, the inverter may automatically start (restart) suddenly, so do not approach it. (Always take measures to ensure personal safety.) Failure to do so may result in personnel injury.
- While auto-tuning function is in use, the inverter will automatically drive the motor in the stand-alone mode when the RUN button on the panel is pressed.
(Always take measures to ensure personal safety.) Failure to do so may result in personnel injury.
- Always confirm and adjust parameters before operation. An unexpected operation may occur on some parts.
(Always take measures to ensure personal safety.) Failure to do so may result in personnel injury.
- If data is changed during operation, the motor and motor load may suddenly start/stop for the great fluctuation.
(Always take measures to ensure personal safety.) Failure to do so may result in personnel injury.
- Wait at least 5 minutes after turning OFF the power before starting maintenance and inspection. Failure to do so may result in an electric shock.
- Maintenance, inspection and part replacement work must be done only by qualified persons. (Remove metal articles such as watch, bracelet(s) etc. before operation.)
(Use tools treated with insulation.) Failure to do so may result in an electric shock or personnel injury.
- Do not replace cooling fan during power ON. Failure to do so may result in an electric shock.
- Do not make modifications to the inverter. Failure to do so may result in personnel injury.

1.1 Warning Label on Inverter



1.2 Special Precautions for Correct Use

- Use the inverter only within allowable ambient temperature range. (-10°C to 50°C) (5.5kW/7.5kW/11kW/15kW Temperature for -10°C to 40°C light load specification)
Since service life of the inverter is greatly affected by ambient temperature, use it within allowable temperature range. Also, observe the installation direction and conditions.
- The inverter will be damaged if the power voltage is applied to its output side.
Applying power voltage to the output terminal U, V or W will damage the inverter.
Check carefully for faulty wiring and operation sequence (commercial switching circuit, etc.). Never apply a voltage exceeding the allowable range.
- Never touch the inside of inverter during operation.
Failure to do so could be extremely dangerous, since the inverter contains high-voltage circuit. Before making an internal check, be sure to wait at least 5 minutes after turning OFF the power supply of inverter. Do not touch heat sink or braking resistor during operation as these parts are under high temperature.
- Radio interference
The main circuit of the inverter contains a high-frequency harmonic component and may interfere with communicating equipment (such as AM radio) nearby. The severity of interference depends on the radio field strength and is hard to be eliminated completely. While it may be reduced by relocating radio antenna, using noise filter, housing the inverter in a metal box or routing cables in conduit. (Please consult with us separately.)
- Do not conduct insulation resistance test between wires of the inverter.
To measure insulation resistance between power cord and motor wires, please remove cables connected to the inverter and conduct test with them. Do not conduct insulation resistance test on the control circuits. However, insulation resistance test can be performed between charging unit and the ground.
- Do not use a magnetic contactor which is connected to power side or load side of the inverter to start or stop the motor (inverter).
Frequent ON/OFF switching on the power supply side can cause inverter malfunction. Also, do not conduct ON/OFF switching on load side during inverter operation, or it can cause fault trip of the inverter. Start or stop the motor by operating signals of the inverter only.
- Do not connect a phase advance capacitor or a surge absorber to output side of the inverter.
Such device can damage the inverter, resulting in broken of capacitors and other parts. Remove it if connected.
- Do not use the inverter for load other than a motor or for a 1-phase motor.
- Precautions for inverter's protection function
The inverter integrates various protection functions such as stall prevention, current limiting and overcurrent shut-off. These protection functions are functions used to protect the inverter against the sudden abnormal conditions, instead of general control functions. Therefore, avoid using them in applications where they will be activated under normal

conditions.

Failure to do so may reduce the inverter's service life or damage the inverter.

Always measure the output current, etc. with a meter, check the details of the fault trip memory, and confirm that operation conditions conform to the precautions specified in the Instruction Manual and specifications are correct.

When protection functions are enabled, reset the inverter and operate it again after troubleshooting.

In addition, if the circuit breaker of at input side of inverter trips, it may be caused by the wiring fault or damage of internal parts of inverter etc.

Determine the trip reason of circuit breaker and turn it ON again after troubleshooting.

- Take measures against higher harmonics.

The higher harmonics generated by inverter may cause overheating of or damage to phase advance capacitor or generator.

- Precautions on 400V series motor

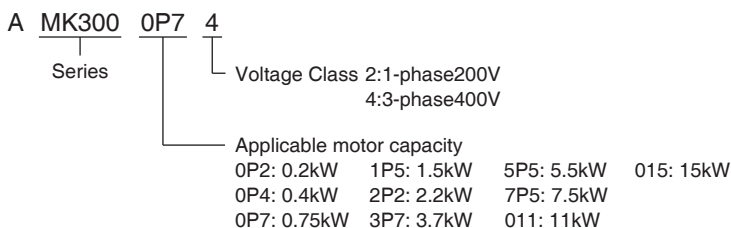
When 400V series motor is driven by the inverter, use the motor with reinforced insulation treatment or take measures against the surge voltage.

If the surge voltage generated on motor terminals due to the connection factor, it may cause the aging of motor insulation.

- Electronic thermal relay may not provide overheating protection for the motor. It is recommended to set the external thermal relay and PTC thermistor for overheating protection at the same time.

2 Part Names and Functions

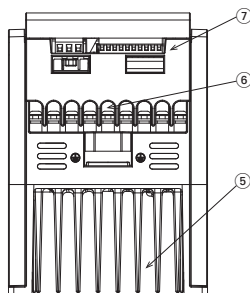
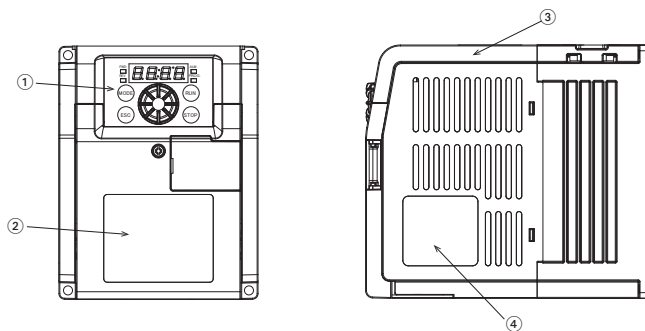
2.1 List of models



Power supply	Applicable motor capacity(kW)	Model No.
1-phase 200V	0.2	AMK3000P22
	0.4	AMK3000P42
	0.75	AMK3000P72
	1.5	AMK3001P52
	2.2	AMK3002P22

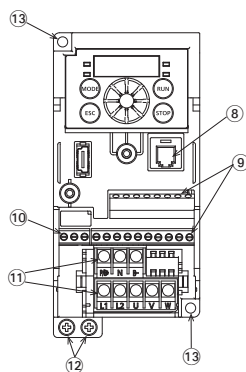
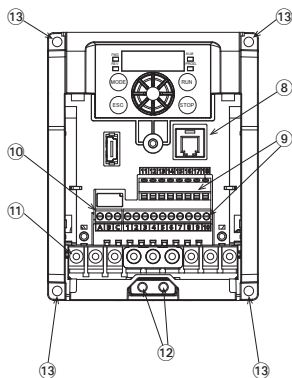
Power supply	Applicable motor capacity(kW)	Model No.
3-phase 400V	0.75	AMK3000P74
	1.5	AMK3001P54
	2.2	AMK3002P24
	3.7	AMK3003P74
	5.5	AMK3005P54
	7.5	AMK3007P54
	11	AMK3000114
	15	AMK3000154

2.2 Part Name

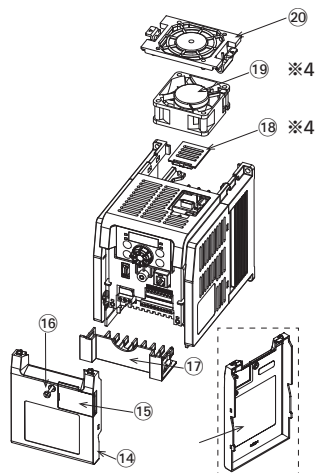


<For other models>

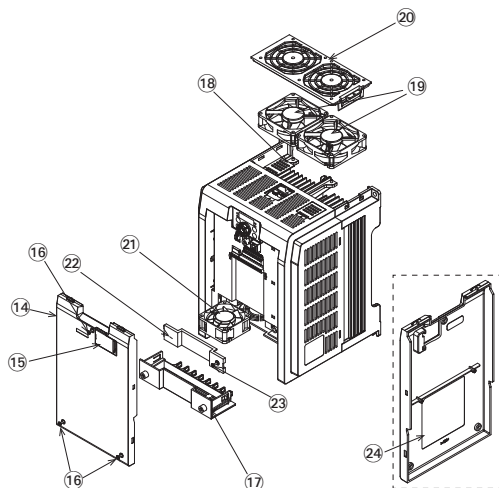
<For 200V/0.2kW,0.4kW>



<For 7.5kW or below>



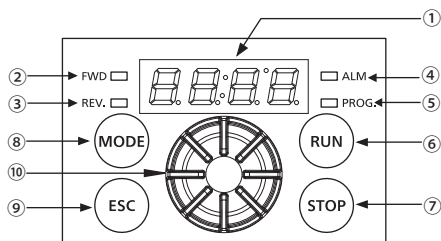
<For 11kW/15kW>









- | | |
|--|--|
| ① Operation panel unit | ⑬ Mounting holes |
| ② Waning label | ⑭ Terminal cover |
| ③ Enclosure | ⑮ Cover for option unit connection |
| ④ Rating nameplate(※1) | ⑯ Fixing screw for terminal casing |
| ⑤ Heat sink | ⑰ Terminal casing for main circuit |
| ⑥ Inlet hole for main circuit wire | ⑱ Cover of connector for cooling fan(※2) |
| ⑦ Inlet hole for control wire | ⑲ Cooling fan(※2) |
| ⑧ Port for connecting option unit(RJ45) | ⑳ Casing of Cooling fan(※2) |
| ⑨ Terminal block for control circuit (signal input/output) | ㉑ Internal component cooling fan (※3) |
| ⑩ Terminal block for control circuit (relay output) | ㉒ Casing of internal component cooling fan (※3) |
| ⑪ Terminal block for main circuit | ㉓ Fixing screw for casing of internal component cooling fan (※3) |
| ⑫ Ground terminal | ㉔ Wiring nameplate |

- ※1 Check that the rating nameplate confirms to your order.
- ※2 Models less than 0.75 kW are not equipped with cooling fan (equipped with item 18 and 20).
- ※3 11kW and 15kW models are equipped with internal cooling fans (item 21, 22 and 23).
- ※4 5.5kW and 7.5kW models are equipped with 2 fans.

2.3 Descriptions of Operation Panel



No	Part name	Function outline
①	Display part	Displays output frequency, current, linear speed, set frequency, communication station No., error details, each mode indication and function setting data.
②	FWD indicator (green)	For indicating forward run (ON during constant-speed running/Flashing during acceleration/deceleration running)
③	REV indicator (green)	For indicating reverse run (ON during constant-speed running/Flashing during acceleration/deceleration running)
④	ALM indicator (red)	Indicates abnormality and alarm.
⑤	PROG indicator (green)	Lights up during changing of parameter setting mode.
⑥	RUN button 	A button for making inverter running
⑦	STOP button 	A button for making inverter stopping
⑧	MODE button 	Switches between "Operation Status Display" and "Function Setting" and displays data. A button for switching to mode display
⑨	ESC button 	Returns to the previous operation during parameter setting.
⑩	Knob	Rotate  Switches among the parameter No., set values and direction setting.
		Press down  Pressing it down for confirming the mode, rotation direction, parameter No. and settings. In "Operation Status Display Mode", it is used for the switching between frequency display and current display.

3 INSTALLATION

3.1 Installation Precautions

■ Do not install the inverter in the following locations.

- Locations subject to direct sunlight.
- Locations subject to water vapor or high humidity.
- Locations with large amount of oil mist, dust or fiber dust.
- Locations where rain water, water drops or oil drops may come in contact.
- Locations subject to corrosive gases, explosive gases or flammable gases.
- Installation onto flammable materials such as wood or near flammable materials.
- Locations subject to vibration.

■ Make sure that ambient temperature is within the specifications.

If the inverter is installed near a heat generating device or is housed in a panel, surrounding temperature will increase, thus reducing the life of the inverter. When housing the inverter in a panel, give sufficient consideration to cooling method and panel size.

○ Allowable ambient temperature: -10°C to $+50^{\circ}\text{C}$

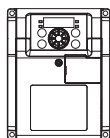
(5.5kW/7.5kW/11kW/15kW Temperature for -10°C to $+40^{\circ}\text{C}$ light load specification)
(Ambient temperature should be measured at a point 5cm away from the inverter.)

○ In case multiple inverters are installed

If multiple inverters are installed side-by-side, ambient temperature should be within -10°C to $+40^{\circ}\text{C}$.

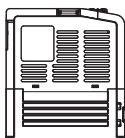
■ Install the inverter vertically.

Installing the inverter in any other way will decrease heat dissipation effect and result in malfunction.



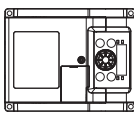
○

Vertical



×

Horizontal



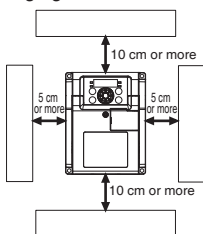
×

Side-by-side

■ Space for installation

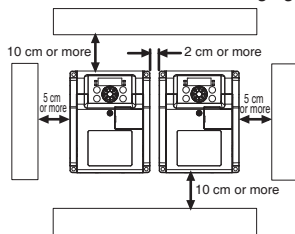
● When a single inverter is installed

To ensure sufficient space for ventilation (cooling) and wiring of the inverter, always provide a clearance as shown in the following figure.



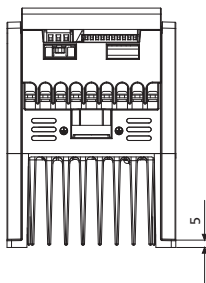
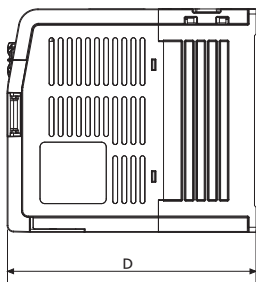
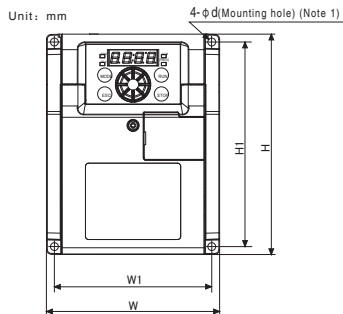
● When multiple inverters are installed side-by-side.

If multiple inverters are installed side-by-side inside control panel, always provide a clearance as shown in the following figure.

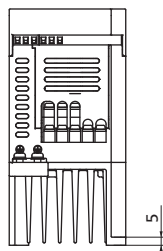
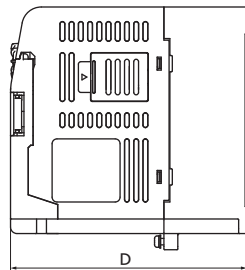
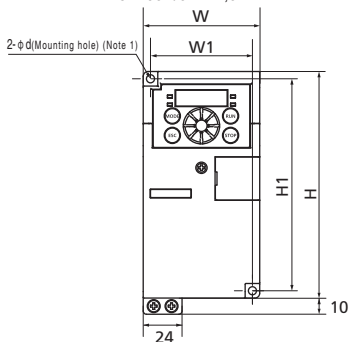


3.2 Dimensions

<For 0.75kW or above>



<For 200V/0.2kW,0.4kW>



■ 1-Phase 200V input type

Unit : mm

Inverter capacity	W1	W	H1	H	D	ϕ d
AMK3000P22	63	72	131	140	146	5
AMK3000P42						
AMK3000P72	100	110	130	140	156	5
AMK3001P52						
AMK3002P22	130	140	130	140	156	5

■ 3-phase 400V input type

Unit : mm

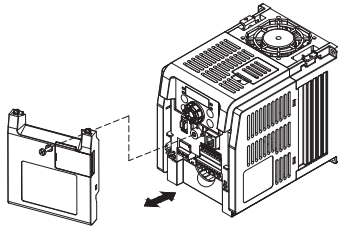
Inverter capacity	W1	W	H1	H	D	ϕ d
AMK3000P74	100	110	130	140	156	5
AMK3001P54						
AMK3002P24	130	140	130	140	156	5
AMK3003P74						
AMK3005P54	150	160	190	200	185	5
AMK3007P54						
AMK3000114	204	220	265	280	198	7
AMK3000154						

Note 1) M6 screws are used in mounting holes for AMK3000114 and AMK3000154, while M4 screws are used in other mounting holes.

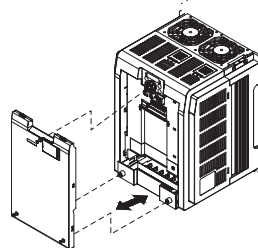
3.3 Removal and Installation of Terminal Casing

■ Removal and installation of terminal cover 1 (terminal casing)

- [Removal] ① Loosening the screw first, and pull it up lightly while holding the center bottom edge of the terminal casing.
- [Installation] ② Insert the mounting jaw of terminal casing into the slot on the casing, then lightly press down the center bottom edge of the terminal cover 1.



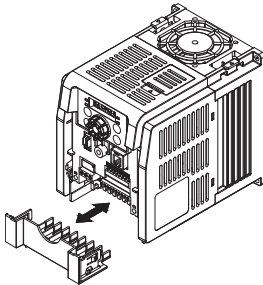
<For 7.5kW or below>



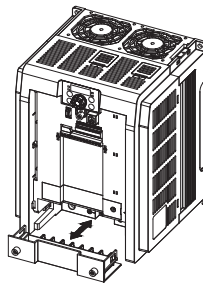
<For 11kW/15kW>

■ Removal and installation of terminal cover 2 (terminal casing for main circuit)

- [Removal] ① While holding the center part of the terminal casing for main circuit, pull it up lightly until the mounting jaw releases.
- [Installation] ② Insert the mounting jaw of terminal casing for main circuit into the slot on the casing, then lightly press it down.



<For 7.5kW or below>



<For 11kW/15kW>

Note) The screw with specially designed structure can not be removed from the casing to prevent dust from entering it.

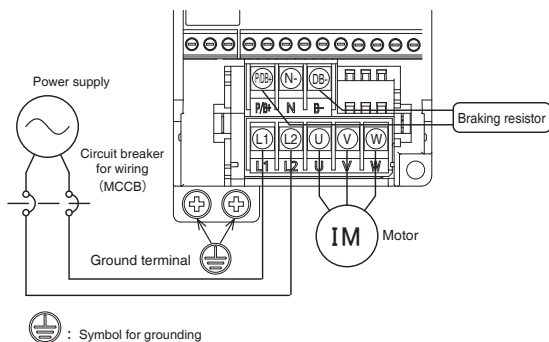
Note) After installation, make sure that the terminal cover 1 and 2 are fitted in position.

4 Wiring

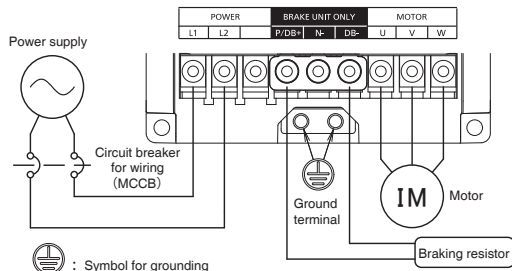
4.1 Terminals for Main Circuit

To conform to requirements of CE mark, protective devices against overcurrent, short-circuit and current leakage must be set up on the power supply side of the inverter.

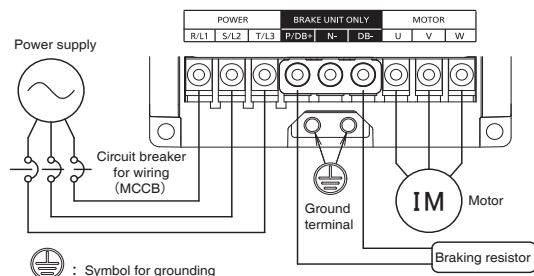
■ 1-Phase 200V / 0.2kW, 0.4kW




■ 1-Phase 200V / 0.75kW to 2.2kW



■ 3-Phase 400V / 0.75kW to 15kW



■ Functions of terminals for main circuit

Terminal No.	Terminal name	Descriptions of terminal function
R/L1, S/L2, T/L3 L1, L2	Power supply for main circuit	Connects the electricity for industrial use. For 1-phase 200V type, connect to terminal L1 and L2.
U, V, W	Inverter output	Connects to 3-phase motor.
P/DB+, DB-	Braking resistor connection	Connects to braking resistor.
N-	Internal DC voltage (negative)	Negative terminal of internal DC voltage.
 2 ↑	Ground	Ground terminal. For 1-phase 200V type: Grounding resistance of 100Ω or less 3-phase 400V: ground resistance 10Ω or less Ground the neutral of power supply.

4.2 Precautions on Wiring Main Circuit

■ Precautions on wiring

To avoid mistakes in wiring and operation, be sure to observe the following guides. (Failure to do so may damage the unit.)

- Always connect the power supply to input terminals (R/L1, S/L2, T/L3)(1-Phase 200V input terminals L1, L2), and connect the motor to output terminals (U, V, W). In addition, connect the output terminals (U, V, W) in correct order. Otherwise the motor will rotate reversely.
- Use round crimp terminals with sleeve for power supply and motor connections. Select crimp terminals according to wire sizes and screw sizes.
- After wiring main circuit, confirm the tightening condition of terminals.
- Main circuit must be wired prior to control circuit. Otherwise, re-tightening operation is not possible after control circuit wiring is completed.
- When connecting directly to a transformer of large capacity (500kVA or more), always install an AC reactor on the input side of the inverter.

Note 1) Maximum number of terminal blocks for main circuit: 2.

Note 2) It is recommended to use teflon insulated wire (600V, Class 2, continuous maximum allowable operating temperature up to 75°C) for main circuit wiring.

Note 3) Use wires with larger diameter if the wiring distance is long.

Note 4) If the overcurrent trip of the circuit breaker is magnetic type, the device could become overheated due to higher harmonics. Use a load rate of 50% or lower in this case.

Note 5) Do not use a circuit breaker for motor.

Note 6) Always connect protective devices against overcurrent, short-circuit and current leakage on the input side.

■ Precautions on using regenerative braking

- When using regenerative braking, set the parameter P026 to "0". Since the factory setting is "1", the braking will not work.

■ Connected device, wire size and tightening torque

• 1-Phase 200V

Inverter capacity	Rated current of circuit breaker (MCCB) for wiring	Wire size		Screw size	Tightening torque	Braking resistor *1		
		L1, L2 U, V, W	Ground wire			Allowable braking duty factor	Resistance	Allowable continuous power
0.2kW	10A	2mm ² (AWG14)	2mm ² (AWG14)	M3.5 (Ground : M4)	1.0 N · m (Ground : 1.2 N · m)	5%	120 Ω	80W
0.4kW	15A							
0.75kW	20A							
1.5kW	30A							
2.2kW	40A	3.5mm ² (AWG12)	3.5mm ² (AWG12)	M4	1.2 N · m		80 Ω	120W

• 3-phase 400V

Inverter capacity	Rated current of circuit breaker (MCCB) for wiring	Wire size		Screw size	Tightening torque	Braking resistor *1		
		L1, L2 U, V, W	Ground wire			Allowable braking duty factor	Resistance	Allowable continuous power
0.75kW	10A	2mm ² (AWG14)	2mm ² (AWG14)	M4	1.2 N · m	5%	470 Ω	80W
1.5kW	15A						470 Ω	80W
2.2kW	20A						320 Ω	120W
3.7kW	30A						190 Ω	220W
5.5kW	50A	3.5mm ² (AWG12)	3.5mm ² (AWG12)				117 Ω	340W
7.5kW	50A	3.5mm ² (AWG12)					95 Ω	440W
11kW	70A	8mm ² (AWG8)	8mm ² (AWG8)	M5	2.0 N · m	5%	63 Ω	660W
15kW	80A	14mm ² (AWG6)	14mm ² (AWG6)				63 Ω	660W

*1)The above data is only for the reference of the condition with braking torque of 100%, maximum time of 5s and maximum braking duty factor of 5%.

· Precautions on selection of braking resistor by customer himself/herself

1) Resistance (Ω)

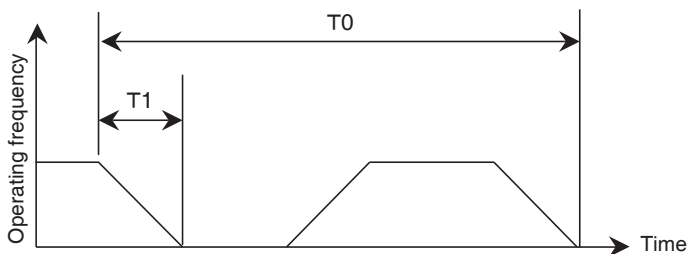
The resistance shown in the reference table during the resistor selection can be increased properly, but it will cause the braking torque reduced accordingly.

2) Allowable continuous power (W)

The allowable power shown in the reference table can be increased properly, but the higher power can make the resistor generate a lot of heat (300°C). Please consult with resistor manufacture, and provide protection during installation.

3) Allowable braking duty factor (%)

The higher the allowable continuous power for braking resistor is, the higher duty factor can be used theoretically. But the internal resistor of inverter will overheat, therefore please use duty factor of 5% shown in the reference table.



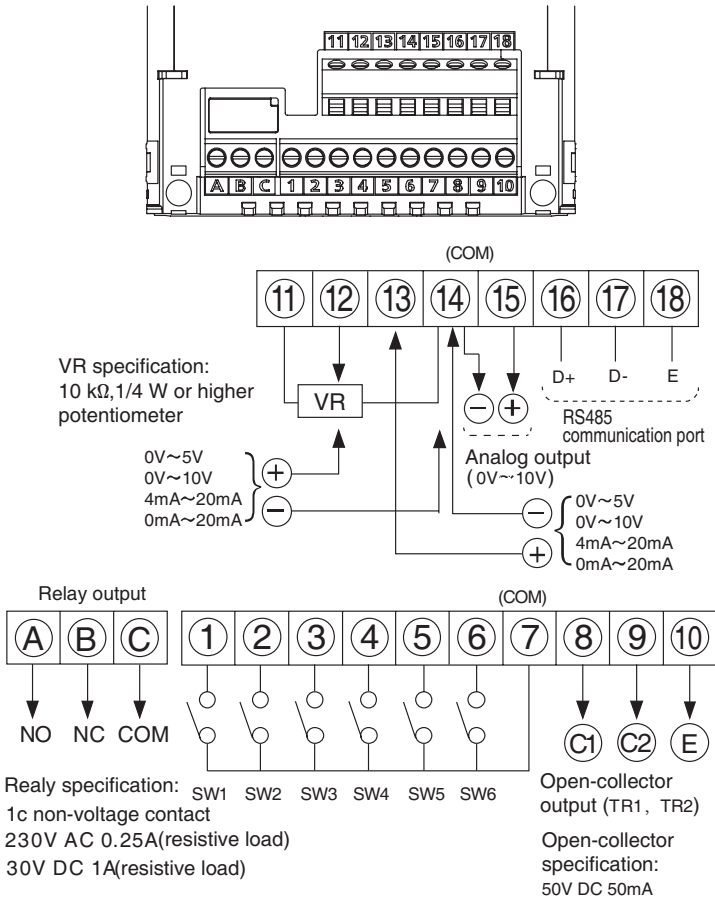
1) Braking torque: 100% min.

2) Maximum working time: $T1_{\max} = 5\text{s}$

3) Maximum duty factor: $T1/T0$ (%ED) = 5%

4.3 Wiring (Control Circuit)

■ Terminal arrangement



■ Descriptions of terminals for control circuit

Terminal No.	Terminal function
①	Input terminal for multi-function control signal SW1
②	Input terminal for multi-function control signal SW2
③	Input terminal for multi-function control signal SW3
④	Input terminal for multi-function control signal SW4
⑤	Input terminal for multi-function control signal SW5
⑥	Input terminal for multi-function control signal SW6
⑦	COM terminal for input signals (① to ⑥)
⑧	Output terminal for open-collector (TR1) (C1: Collector)
⑨	Output terminal for open-collector (TR2) (C2: Collector)
⑩	COM terminal for open-collector output (E: Emitter)
⑪	Connection terminal for frequency setting potentiometer(+5 V)
⑫	Input terminal for analog signal of frequency setting
⑬	Input terminal for 2nd analog signal
⑭	COM terminal for analog signals(⑪, ⑫, ⑬, ⑮)
⑮	Output terminal for multi-function analog signal (0 to 10 V)
⑯	Positive terminal for RS485 communication transmission line (D+)
⑰	Negative terminal for RS485 communication transmission line (D-)
⑱	Terminal for terminal station of RS485 communication (E)
A	Output terminal for relay contact (NO: factory setting)
B	Output terminal for relay contact (NC: factory setting)
C	Output terminal for relay contact (COM)

Note) COM terminals ⑦ ⑩ and ⑭ are connected internally. Do not ground them.

4.4 Common Precautions on Terminals for Control Circuit

■ Precautions on wiring

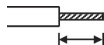
- For wiring of terminals for control circuit, strip specified length of insulation coating before connecting.
- Loosen terminal screws and insert wires from bottom of the terminal block, and tighten screws to specified tightening torque.
- Any loose connection could cause wire to come off and lead to malfunction. Also, over-tightening could cause short-circuit due to broken of screws or the unit, thus leading to malfunction.
- Use shielded cables for all control signal lines and separate them from power lines or high-voltage circuits (20cm or more).
- Wiring length of control signal lines should be within 30m.
- Since input signals of control circuit are feeble, use dedicated contact for feeble signals to avoid poor contact during contact input.

■ Wire size and tightening torque for control circuit terminal

Terminal symbol	Screw size	Tightening orque N · m	Wire size	Stripped length of cable sheath
A, B, C ① to ⑱	M3	0.3 to 0.4	0.25mm ² to 0.75mm ² (AWG24 to AWG18)	6mm

- Screwdriver : Small-size ⊖ screwdriver
- Stripped length of wire sheath

(Thickness of the edge: 0.4mm/ Width of the edge: 2.5mm)



- Terminal block for main circuit :

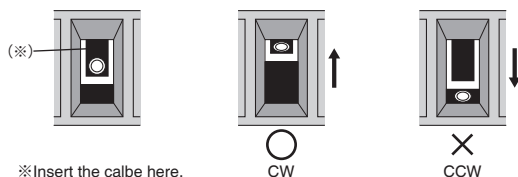
Terminal block for control circuit (Relay output/Signal input/output) : The maximum number of the conductors : 2 *1

- *1 The maximum number of the conductors should be made in the reach of the suitable electric wire size.

■ Precautions on wiring

Observe the following items to prevent wire breakage.

- Do not damage the core wire when tearing the insulation layer off.
- Connect the core wire together.
- Do not lift up the welded part of core wire. It may be broken by vibration.
- Do not apply force to cables after wiring.
- If the tightening direction of cable in terminal block is CCW, it is wrong. Remove the cable, and confirm the terminals before reconnect it.



※Insert the cable here.

CW

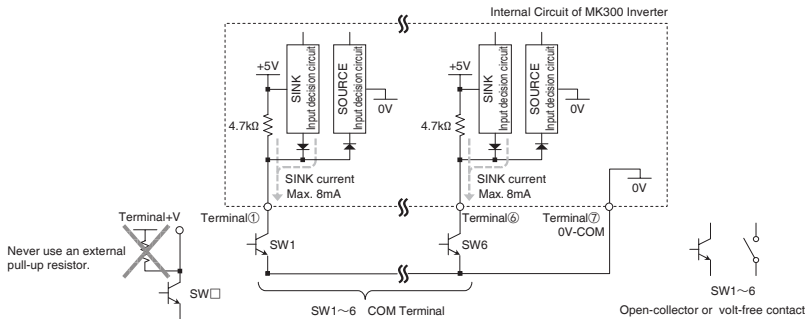
CCW

■ Input Terminal for Multi-function Control Signal(Terminals No.① to ⑥)

• General SINK/SOURCE input type. The external input devices, SINK input or SOURCE input type, can be applicable. Please carry out the wiring as the wiring example given below.

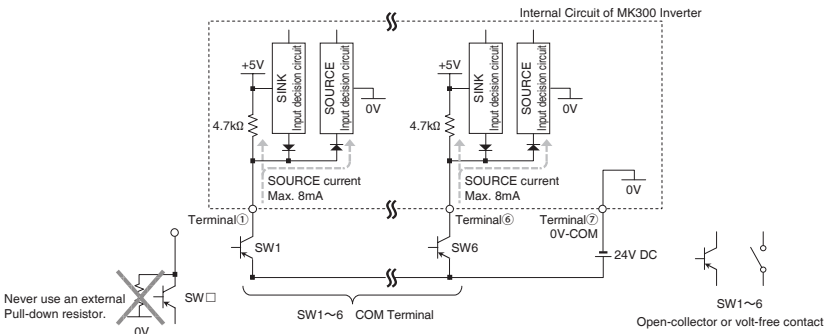
• Wiring Diagram and Precautions for SINK Input Setting

- Input open-collector signal or volt-free contact signal in between the input terminal (① to ⑥) and the 0V-COM terminal (⑦) .
- Never supply (+) voltage from an external power source or use an external pull-up resistor. Otherwise, it will cause malfunction.
- Note that the 0V-COM terminal (⑦) is internally connected with the terminal (⑩ , ⑭) and the internal circuit 0V. Moreover, never ground it.
- Each terminal has a max. SINK current of 8mA.



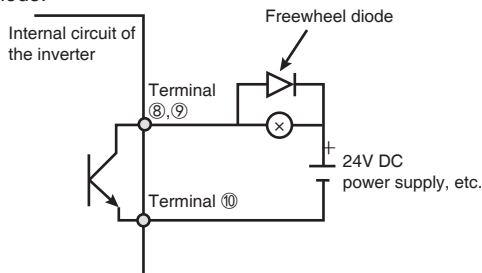
• Wiring Diagram and Precautions for SOURCE Input Setting

- Input open-collector signal or volt-free contact signal to the input terminal (① to ⑥) by supplying an external 24V power source. Connect the negative terminal (on the 0V side) of the external 24V power source to the 0V-COM terminal (⑦) .
- Never use an external Pull-down resistor. Otherwise, it will cause malfunction.
- Note that the 0V-COM terminal (⑦) is internally connected to the terminal (⑩ , ⑭) and the internal circuit 0V. Moreover, never ground it.
- Each terminal has a max. SOURCE current of 8mA.



■ Wiring for Open-collector Output Terminals (Terminal No.8 to 10)

- When using open-collector output terminals to drive inductive loads, always connect a freewheel diode.

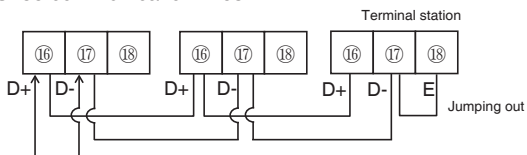


■ Wiring for analog signal terminals (Terminal No.11 to 14)

- When parameter P004 is set to "1", frequency setting will be made through external potentiometer.
- When parameter P004 is set to "4" (4 to 20mA) or "5" (0 to 20mA), frequency setting will be made through analog current signal.
- When the analog current signal is used, no resistor is required to be connected between external terminals. (Resistor is built in.)

■ Wiring for RS485 communication terminals (Terminal No.16 to 18)

The following figure shows the terminals used when connection is made between PC and PLC via RS485 communication lines.



- Use the shielded twisted-pair cable as communication cable, and separate it from power lines or high-voltage circuits (20cm or more).
- The total wiring length of the communication cables must not exceed 500m.
- Jump out the terminal "D-" and "E" of inverter used as terminal station. Jumping is not allowed for any other device.

■ Method for connection and use of accessory (AMK300-REM1)

For details, please refer to the “AMK300-REM1 Instruction Manual” .

1. AMK300-REM1 is connected with MK300 through RS485 communication and allows performing the setting operation. Before use, please confirm communication settings for the main unit of MK300.



Communication settings for the main unit of MK300 when using AMK300-REM1 (initial values of MK300 upon shipment)

P131: RS485 communication protocol selection "0"(MEWTOCOL)

P133: RS485 communication speed setting "1152" (115200 bps)




P134: RS485 stop length "1" (1 bit)

P135: RS485 parity "0" (no parity)

2. When AMK300-REM1 is connected, please set P003 for the main unit of MK300 as "0" or "1".
3. When AMK300-REM1 is connected, the main unit does not allow performing the following operations:
 - Operating  key (run) from the main unit of MK300 ( key works)
 - Changing parameters from the main unit of MK300 (only monitoring function works)









If AMK300-REM1 is disconnected for more than 1 second, the main unit of MK300 will automatically enable operation from the main unit of MK300 by default.

CAUTION:

- When AMK300-REM1 is connected, parameters for the main unit of MK300 cannot be set, but can only be monitored. After the main unit of MK300 and AMK300-REM1 are disconnected for 1 second, the main unit of MK300 restores the condition which allows performing parameter setting.
- When P003 = 0 or 1, if AMK300-REM1 is connected, the  key on the main unit of MK300 works, but  key does not work. After the main unit of MK300 and AMK300-REM1 are disconnected for 1 second, the main unit of MK300 restores the function of  key.
- When using AMK300-REM1 to upload, download and verify parameters with the main unit of MK300, the external SW run signal becomes invalid even if it is received. After the process of uploading, downloading and verifying is completed, the external SW run signal becomes valid.

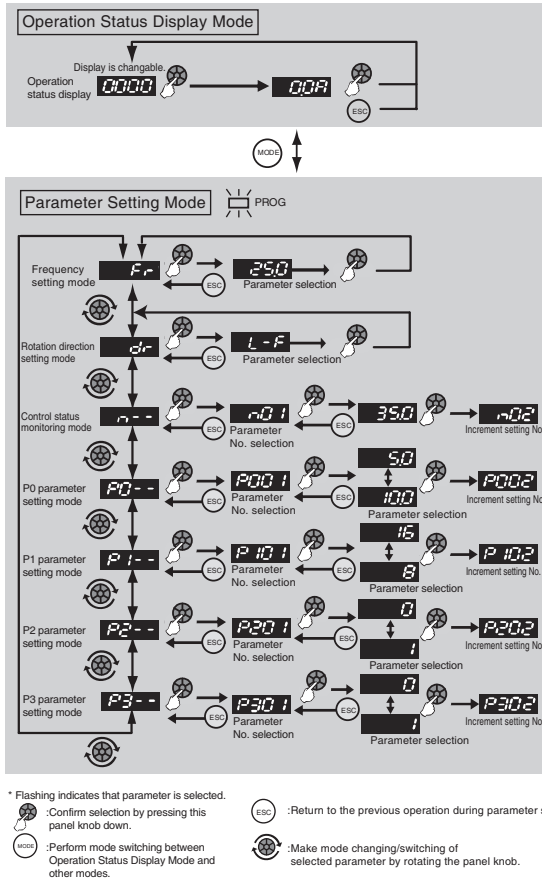
4.5 Operation Modes

■ Functions of operation modes

Mode	Description	Contents displayed on panel	
① Operation Status Display Mode	For displaying output frequency and output current		
② Frequency Setting Mode	For digital setting of frequency and frequency command monitoring		
③ Rotation Direction Setting Mode	For rotation direction setting of panel operation and control status (operation panel/external control/communication) monitoring		
④ Control Status Monitoring Mode	For monitoring of control status and abnormality		
⑤ P0** to P3** Parameter Setting Mode	For changing and monitoring parameter data as well as using copy function of parameter data.		

■ Switching method among various modes

- When MODE button is pressed, switching is enabled between Operation Status Display Mode and Parameter Setting Mode.
(In Parameter Setting Mode, PROG LED lights up.)
- In each mode, if Operation Knob button is pressed, data monitoring or changing function will be enabled; and if ESC button is pressed, it will return to the previous screen. Therefore, if “Operation Knob” button is pressed by mistake, just press “ESC” button to return to the previous screen.



5 ABNORMALITY DIAGNOSTIC FUNCTION AND RESET METHOD

5.1 Details and Remedies for Various Fault Trips

The fault trip memory stores the causes of trip in monitor modes n20 to n23. Even if the power is cut off, the fourth to the latest causes of trip will still be held. (Details of factory inspection are stored in the memory before delivery.)

Display	Details and causes of abnormality	Remedies
SC1	· Instantaneous overcurrent during acceleration	<ul style="list-style-type: none"> · Check for any shorted output or ground. · Eliminate sharp fluctuation at load side. · Extend acceleration/deceleration time (parameters P001, P002 and P317 to P322). · Stop ON/OFF operation of magnetic contactor at load side.
SC2	· Instantaneous overcurrent at constant speed	
SC3	· Instantaneous overcurrent during deceleration	
SC4	· Instantaneous overcurrent during acceleration/deceleration/constant speed	
SC5	· Shorted output or overcurrent during startup	· Check for any shorted output or ground.
SC6	· Failure detected during startup	· Check the internal switching module (Welcome to consult with us.)
OC1	· Overcurrent during acceleration	<ul style="list-style-type: none"> · Check output for open phase and eliminate sharp fluctuations at load side. · Extend acceleration/deceleration time (parameters P001, P002 and P317 to P322). · Adjust torque boost level (parameter P011). · Check for restart operation during normal operation. · Stop ON/OFF operation of magnetic contactor at load side.
OC2	· Overcurrent at constant speed	
OC3	· Overcurrent during deceleration	
OU1	· Internal DC overvoltage during acceleration	· Extend acceleration time (parameters P001, P317, P319 and P321).
OU2	· Internal DC overvoltage at constant speed	· Eliminate sharp fluctuations at load side.
OU3	· Internal DC overvoltage during deceleration	· Extend deceleration time (parameters P002, P318, P320 and P322)
LU	· Power supply voltage below 85% of its rating	<ul style="list-style-type: none"> · Measure power supply voltage and check input for open phase. · Check ride-through restart function.
OL	· The output current exceeds 125% of electronic thermal setting current or 140% of rated current of inverter for more than 1 minute.	<ul style="list-style-type: none"> · Check electronic thermal setting current. · Check and adjust torque boost level (parameter P011). · Reduce the load.
OH	· Heat sink overheated	· Check ambient temperature.
AU	· External fault stop input signal is input from control circuit terminals.	· Check if the external signal is proper and if timing circuit is correct.

Display	Details and causes of abnormality	Remedies
OP	<ul style="list-style-type: none"> The power supply is turned ON with run signal ON. Timeout detected The communication cable comes off. 	<ul style="list-style-type: none"> Check start mode (parameter P031). Check communication setting and wiring. Reduce the interference around the inverter.
FAn	Abnormal cooling fan	Check if the fan is locked.
FAn2	Abnormal upper cooling fan of 11kW or 15kW model	Check if the fan is locked.
SEr	<ul style="list-style-type: none"> Speed search failed The rotation direction of motor is different. The rating of the motor is too small compared with that of inverter. Speed is slow during normal operation. 	<ul style="list-style-type: none"> Reduce the noise around the inverter. Check the rotation direction of motor.
CPU	Too much interference is applied to the inverter	Reduce the interference around the inverter.
ErrC	Too much interference is applied to the inverter	Reduce the interference around the inverter.

5.2 Reset Method during Abnormal Trip



If the abnormality indicator in the display part of operation panel lights up and operation is stopped, please handle the abnormality before resetting operation.

Reset by power supply	The reset can be made by cutting off the power once. (The inverter can operate when powered on again.)
Reset by stop signal	<p>①For the operation in panel setting mode (parameter P003 is set to "0" or "1"), press "STOP" button on operation panel to reset, and then restart the inverter.</p> <p>②For the operation in external control mode (parameter P003 is set to "2" or "4"), turn off OPERATION COMMAND button designed for external control once to reset, and then restart the inverter. Note) Reset by stop signal cannot be made through communication.</p>
Reset by operation panel	For the operation in external control or communication setting mode (parameter P003 is set to "3", "5" or "7"), the reset cannot be made even if OPERATION COMMAND button designed for external control or communication is turned OFF once. Press STOP button on operation panel to reset, and then restart the inverter.
Reset by multifunction terminal	Set parameters P101 to P106 to "2" or "r2". Turn function setting button ON once and OFF again to reset, and then restart the inverter.
Reset by communication command	Write 0x9696 into register No. 505 (DT505) to reset the inverter.

*The error codes of SC6 and CPU cannot be reset through [Reset by stop signal], [Reset by operation panel], [Reset by multi-function terminal] and [Reset by communication command], they are only valid for [Reset by power supply].

6 Maintenance and Inspection

6.1 Safety Precautions

 Danger	Wait at least five minutes after turning off the input power before starting the maintenance and inspection work. Failure to do so may result in electric shock. Maintenance, inspection and part replacement work must be done only by qualified persons. (Remove metal articles such as watch, bracelet(s) etc. before operation.) (Please use insulated tools.) Failure to do so may result in electric shock or injury. Do not replace the cooling fan when power is ON. Failure to do so may result in electric shock
 Caution	Employ an electrical engineering company to periodically tighten the terminal screws. Loose terminal screws could lead to overheating or fire.

6.2 Precautions on Inspection

- To measure the insulation resistance between the power supply cable and the motor cable with a megger, always disconnect the wires connected to the inverter first before measuring. Do not make such measurement on the control circuit.
- The inverter is mainly consisted of semiconductor elements. To prevent the negative effects arising from the temperature, humidity, dust and vibration etc. in working environment and the malfunctions caused by components' aging and service life, please perform daily inspection. The following table shows the standard replacement interval (years) under normal working conditions (average annual ambient temperature = 30°C , load factor < 80% and average daily operation period < 12 h).

6.3 Inspection Items

1. Daily inspection: Basically check if abnormality occurs during operation. A multimeter is normally used to check the input and output voltages of the inverter during operation.
2. Periodic inspection: To check all locations where inspection can be performed only when the inverter is stopped and where periodic inspection is required.

6.4 Component Replacement

Wear-out faults are related to endurance period and service life. The endurance period largely depends on the working conditions.

1. For example, service life of relay is determined by the roughness of the contact surface. Contact current and load inductance are the major factors affecting its service life.

2. Capacitor inside the inverter is used mainly as a smoothing filter. Due to the chemical reaction that takes place internally, its service life is greatly affected by the temperature. Generally speaking, rising of 10°C in temperature reduces the service life of an aluminum electrolytic capacitor by half, which also affects the service life of inverter. When the inverter is used under high temperature, the aluminum electrolytic capacitor may suffer from wear-out faults prior to other components in normal status and must be replaced to extend the service life of inverter.

Component Name	Standard replacement interval (year)	Method of replacement/Others
Cooling fan	5 years	Replace with a new one
Smoothing capacitor	5 years	Investigate and replace with a new one if necessary.
Relays	—	Investigate and replace with a new one if necessary.

◆ Contact us for replacing or repairing the components.

6.5 Maintenance and Inspection Table

Note: Symbols used in “Inspection interval” are with different meanings: ☆ for “daily”, ○ for “yearly” and ◎ for “every two years” .

Location	Inspection item	Inspection details	Inspection interval		Inspection method	Judgment criteria	Instrument	
Whole unit	Ambient environment	Check the ambient temperature, humidity, dust level and etc.	☆		Refer to the “Precautions on installation”	Ambient temperature & humidity: -10°C to 50°C, 90% In case multiple inverters are installed, the temperature at 5.5 kW or above for light load specification: -10°C to +40°C	Thermometer Hygrometer	
	Whole unit	Check for abnormal vibration and noise.	☆		Check visually and listen	In normal state		
	Power supply voltage	Check the main circuit voltage for correct.	☆		Measure input voltage	200V type : 170V to 253V AC 400V type : 323V to 506V AC	Multimeter	
Main Circuit	The whole part	1) Check if fasteners are loose; 2) Check if there is any sign of component overheating; 3) Cleaning		○ ○	1) Strengthen the fasteners; 2) Check visually.	1), 2): In normal state		
	Connected conductors and wires	1) Check if conductors are crooked; 2) Check if the wire insulation is broken		○ ○	1), 2): Check visually.	1), 2): In normal state		
	Transformer	Check if there is burning smell.	☆		Just smell	In normal state		
	Terminal block	Check if there is sign of damage.		○	Check visually.	In normal state		
	Transistors and diodes	Check the resistance between the terminals.			◎	Disconnect the main circuit wires and measure at the terminals.		Multimeter
	Transistors and diodes	1) Check for liquid leakage; 2) Check if the safety valve is working correctly; 3) Measure electrostatic capacity.	☆ ☆		○	1), 2): Check visually. 3): Measure with a capacitance meter	1), 2): In normal state 3): Minimum 85% of rated capacity	Capacitance meter
	Smoothing capacitor	1) Check if the operation sound is normal; 2) Check the contact roughness.			○ ○	1) Just listen 2) Check visually.	1), 2): In normal state	
	Resistor	1) Check if there is cracking on the insulation; 2) Check if open circuit exists.			○ ○	1), 2): Check visually.	1), 2): In normal state	

Location	Inspection item	Inspection details	Inspection interval		Inspection method	Judgment criteria	Instrument
Main Circuit	Operation Check	1) Check the balance condition of the output voltage between each phase during operation of single unit; 2) Inspect the protection and display circuit with timing protection operation test.		○	1) Measure the voltage between output terminals 2) Simulate a short circuit condition between the inverter alarm outputs.	1) Line output balance is 4V max. (400V type is 8V max.) 2) Timing protection circuit must function properly.	Rectifier voltmeter
	Whole unit	1) Check if there is burning smell and discoloration. 2) Check if there is heavy rustling.		○	1), 2): Smell and check visually.	1), 2): In normal state	
	Capacitor	Check for liquid leakage and deformation.	☆		Check visually.	In normal state	
Cooling system	Cooling fan	1) Check for abnormal vibration and noise; 2) Check if connected parts are loose.	☆	○	1) Just listen; 2) Strengthen the fasteners.	1), 2): In normal state	
Display	Display unit	Check if the indicator malfunctions.	☆		Check visually.	In normal state	
	Meter	Check if the indication is correct.	☆		Check the indication.	Within specifications or control values.	Voltmeter Ammeter
Motor	Whole unit	1) Check for abnormal vibration and noise; 2) Check if there is burning smell.	☆	☆	Check visually, listen and smell	1), 2): In normal state	

7 RATINGS

■ 1-Phase 200V input type

Model AMK300 □□□ 2		0P2	0P4	0P7	1P5	2P2
Standard specification	Applicable motor output(kW) *1	0.2	0.4	0.75	1.5	2.2
	Rated output current(A) *2	1.5	3.0	5.0	8.0	11.0
	Rated output capacity(kVA) *3	0.6	1.2	2.0	3.2	4.4
	Rated input current(A) *4	3.9	8.0	12.6	18.5	23.8
	Power supply capacity(kVA) *4	0.9	1.8	2.9	4.3	5.5
Light load specification	Applicable motor output(kW) *1	0.4	0.75	1.5	2.2	3.0
	Rated output current(A) *2	1.9	3.5	6.0	9.6	12.0
	Rated output capacity(kVA) *3	0.8	1.4	2.4	3.8	4.8
	Rated input current(A) *4	5.1	9.1	15.2	22.3	25.8
	Power supply capacity(kVA) *4	1.2	2.1	3.5	5.1	5.9
Weight (kg)	Approx. 1.0	Approx. 1.0	Approx. 1.4	Approx. 1.6	Approx. 2.0	

■ 3-phase 400V input type

Model AMK300 □□□ 4		0P7	1P5	2P2	3P7	5P5	7P5	011	015
Standard specification	Applicable motor output(kW) *1	0.75	1.5	2.2	3.7	5.5	7.5	11.0	15.0
	Rated output current(A) *2	2.6	4.0	6.0	9.5	12.0	17.0	23.0	31.0
	Rated output capacity(kVA) *3	2.1	3.2	4.8	7.6	9.6	13.5	18.3	24.7
	Rated input current(A) *4	3.9	6.0	9.0	14.3	15.6	22.1	29.9	40.3
	Power supply capacity(kVA) *4	3.1	4.8	7.2	11.4	12.4	17.6	23.8	32.1
Light load specification	Applicable motor output(kW) *1	1.5	2.2	3.7	5.5	7.5	11.0	15.0	18.5
	Rated output current(A) *2	3.6	5.4	6.9	11.1	17.0	17.0	31.0	38.0
	Rated output capacity(kVA) *3	2.9	4.3	5.5	8.8	13.5	13.5	24.7	30.3
	Rated input current(A) *4	5.4	8.1	10.4	16.7	22.1	22.1	40.3	49.4
	Power supply capacity(kVA) *4	4.3	6.5	8.2	13.3	17.6	17.6	32.1	39.4
Weight (kg)	Approx. 1.5	Approx. 1.6	Approx. 1.9	Approx. 2.0	Approx. 3.6	Approx. 3.6	Approx. 8.2	Approx. 8.3	

*1 "Applicable motor output" refers to the maximum applicable capacity of standard 4-pole motor. Make sure that the rated output current of inverter is higher than the rated current of motor during inverter selection.

*2 The rated output current of inverter varies with the set carrier frequency. Derate the output current as shown in the following figure.

*3 Rated output capacity refers to the value at output voltage of 230V AC for 1-phase 200V input type and the value at output voltage of 460V AC for 3-phase 400V input type.

*4 The input current and the power supply capacity varies with the impedance at its side. Prepare the power supply with capacity larger than values shown in the above table.

■ Table 1 Relationship between carrier frequency and rater current

The rated output current of inverter varies with the set carrier frequency. Derate the output current as shown in Table 1, Fig.1 and Fig.5.

Unit : A

Model	1.6kHz or less		2.5kHz		5.0kHz		7.5kHz		10kHz		12.5kHz		15kHz	
	Light load	Heavy load	Light load	Heavy load	Light load	Heavy load	Light load	Heavy load	Light load	Heavy load	Light load	Heavy load	Light load	Heavy load
1-Phase 200V	AMK3000P22	1.9	1.5	1.9	1.5	1.9	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	AMK3000P42	3.5	3.0	3.5	3.0	3.5	3.0	3.0	3.0	3.0	3.0	2.7	2.7	2.4
	AMK3000P72	6.0	5.0	6.0	5.0	6.0	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.0
	AMK3001P52	9.6	8.0	9.6	8.0	9.6	8.0	8.0	8.0	8.0	8.0	7.2	7.2	6.4
	AMK3002P22	12.0	11.0	12.0	11.0	12.0	11.0	11.0	11.0	11.0	11.0	9.9	9.9	8.8
3-phase 400V	AMK3000P74	3.6	2.6	3.6	2.6	3.6	2.6	2.6	2.6	2.0	2.0	1.3	1.3	0.7
	AMK3001P54	5.4	4.0	5.4	4.0	5.4	4.0	4.0	4.0	3.4	3.4	2.8	2.8	2.2
	AMK3002P24	6.9	6.0	6.9	6.0	6.9	6.0	6.0	6.0	5.1	5.1	4.2	4.2	3.3
	AMK3003P74	11.1	9.5	11.1	9.5	11.1	9.5	9.5	9.5	8.1	8.1	6.7	6.7	5.2
	AMK3005P54	17.0	12.0	12.0	12.0	10.8	10.8	9.6	9.6	8.4	8.4	7.2	7.2	6.0
	AMK3007P54	17.0	17.0	17.0	17.0	15.3	15.3	13.6	13.6	11.9	11.9	10.2	10.2	8.5
	AMK3000114	31.0	23.0	31.0	23.0	23.0	23.0	20.7	20.7	18.4	18.4	16.1	16.1	13.8
	AMK3000154	38.0	31.0	38.0	31.0	31.0	31.0	27.9	27.9	24.8	24.8	21.7	21.7	18.6

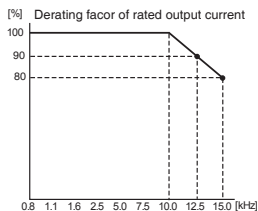


Fig.1 Derating Caused by Carrier Frequency (0P42, 0P72, 1P52, 2P22)

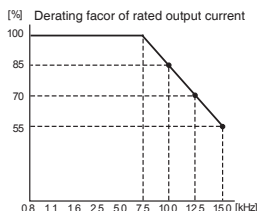


Fig.2 Derating Caused by Carrier Frequency (1P54, 2P24, 3P74)

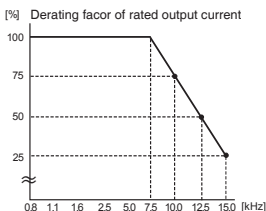


Fig.3 Derating Caused by Carrier Frequency (0P74)

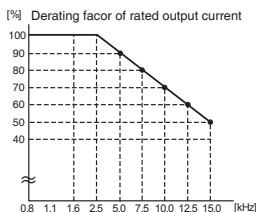


Fig.4 Derating Caused by Carrier Frequency (5P54, 7P54)

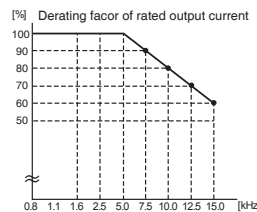


Fig.5 Derating Caused by Carrier Frequency (0114, 0154)

8 SPECIFICATIONS

■ Standard specifications (1-Phase 200V input type)

Item		Specifications
Standard output of applicable motor(kW)		0.2kW to 2.2kW
Rated output	Rated voltage	3-phase 200V to 230V AC(proportional to power supply voltage)
	Overload current rating	Heavy load specification: 150% of rated output current, 1 minute Light load specification: 120% of rated output current, 1 minute
Input power supply	Phase number/Voltage/Frequency	1-Phase,200V to 230V AC 50Hz/60Hz
	Allowable voltage fluctuation	+10% and -15% of rated input AC voltage
	Allowable frequency fluctuation	±5% of rated input frequency
	Instantaneous voltage drop ride-through capability	· Operation continues when voltage is above 165V AC. · Operation continues for 15ms when voltage drops below 165V AC.

■ Standard specifications (3-phase 400V input type)

Item		Specifications
Standard output of applicable motor(kW)		0.75kW to 15kW
Rated output	Rated voltage	3-phase 380V to 460V AC(proportional to power supply voltage)
	Overload current rating	Heavy load specification: 150% of rated output current, 1 minute Light load specification: 120% of rated output current, 1 minute
Input power supply	Phase number/Voltage/Frequency	Phase,380V to 460V AC 50Hz/60Hz
	Allowable voltage fluctuation	+10% and -15% of rated input AC voltage
	Allowable frequency fluctuation	±5% of rated input frequency
	Instantaneous voltage drop ride-through capability	· Operation continues when voltage is above 323V AC. · Operation continues for 15ms when voltage drops below 323V AC.

■ Common specifications

Item		Specifications	
Output frequency	Frequency range	VF control: 0.2Hz to 400Hz Sensorless vector control: 0.5Hz to 120Hz	
	Frequency display	Digital display	
	Frequency precision	Analog setting: within $\pm 0.5\%$ of maximum set frequency ($25^{\circ}\text{C} \pm 10^{\circ}\text{C}$) Digital setting: within $\pm 0.01\%$ of maximum set frequency (-10°C to $+50^{\circ}\text{C}$)	
	Frequency resolution	Analog setting : 0.1Hz (in 50/60Hz mode) Digital setting : 0.1Hz	
Inverter control mode	High carrier frequency sinusoidal PWM control (V/F control or sensorless vector control is available.)		
Carrier frequency	<ul style="list-style-type: none"> · V/F control setting: 9 options (adjustable from 0.8kHz to 15kHz) can be selected. · Sensorless vector control setting: 6 options (adjustable from 2.5kHz to 15kHz) can be selected. (0.8kHz, 1.1kHz, 1.6kHz, 2.5kHz, 5.0kHz, 7.5kHz, 10.0kHz, 12.5kHz, 15.0kHz) 		
Operation	Start/Stop	<ul style="list-style-type: none"> · Operation panel buttons · 1a contact signal and 3-wire input (1a and 1b contact signals) can be selected. · RS485 communication · Wait time (0.1s to 100s) can be set. 	
	Forward/Reverse run	<ul style="list-style-type: none"> · Operation panel buttons · 1a contact signal (reverse run can be disabled.) · RS485 communication 	
	Jogging operation	Operating frequency: adjustable from 0.2Hz to 400Hz Acceleration/deceleration time: adjustable from 0.04s to 3600s	
	Stop mode	Deceleration stop / coast-to-stop (switchable)	
	Reset function	Reset by stop signal/reset by external device/reset by operation panel(optional) / reset by power supply	
	Starting frequency	Adjustable from 0.2Hz to 60Hz	
	Stop frequency	Adjustable from 0.2Hz to 60Hz	
	Ride-through restart selection	0Hz restart/operation frequency restart/speed search restart (switchable)	
	Speed search	Speed search during startup (optional)	
	Retry function	Retry selection: validity of function, selection of details of retry faults Retry operations: adjustable from 1 to 10 operations	

Item		Specifications
Control	Frequency setting signal	Panel setting (operation panel): digital setting Analog setting signal input from external control : · Potentiometer (10k Ω , 1/4W or higher) · 0V to 5V DC, 0V to 10V DC · 4mA to 20mA, 0mA to 20mA Digital setting signal input from external control: · PWM signal(signal cycle: 1ms to 2000ms), pulse input signal · Frequency rise SW/reduction SW/storage SW signal Communication setting: RS485
	Frequency/Voltage characteristics	Base frequency: fixed at 50Hz/60Hz, adjustable from 45Hz to 400Hz 3-point V/F mode: adjustable voltage and frequency V/F curve: constant/reduced torque mode (switchable)
	Torque boost	Adjustable from 0% to 40% automatic torque boost (switchable)
	Acceleration/Deceleration time	0.04s to 3600s (independent acceleration / deceleration setting)
	Acceleration/Deceleration characteristics	Linear and S-shaped acceleration / deceleration (switchable)
	2nd function selection	Selects 2nd function (acceleration / deceleration time, torque boost, voltage/frequency characteristics (base frequency · 3-point type V/F mode), electronic thermal, analog frequency setting)
	Multi-step speed frequency setting	· Multi-step speed operation: up to 16-step speed setting (No limitation to frequency setting) · Timer operation: up to 8-step speed settings (No limitation to frequency setting) It can be linked with acceleration / deceleration time.
	Skip frequency setting	Up to 3 settings (skip frequency band adjustable from 1Hz to 10Hz)
	Upper frequency limit setting	Adjustable from 0.2Hz to 400Hz
	Lower frequency limit setting	Adjustable from 0.2Hz to 400Hz
	Bias/Gain frequency setting	Bias frequency : adjustable from -99% to 250% Gain frequency : adjustable from 0% to 500%
	External stop function	Stop by external fault / coast-to-stop (switchable)
	PID function	PID Control mode (optional)
	Offline automatic tuning function	Automatic tuning of motor constant
	Cooling fan ON/OFF control	Optional
Communication function	· Port: RS485 serial communication · Communication speed: 4800/9600/19200/38400/57600/115200 bps (switchable) · Protocols: MEWTOCOL-COM/Modbus (RTU)Modbus-ASCII (switchable) · Communication method: half-duplex Maximum number of connected units: 31 Maximum transmission distance: 500m (in total)	

Item		Specifications
Braking	Regenerative braking torque	<ul style="list-style-type: none"> · 200V 0.2kW : 100% or higher 0.4kW : 80% or higher 0.75kW to 2.2kW : 20% or higher · 400V 0.75kW to 15kW : 20% or higher
	DC injection braking	<ul style="list-style-type: none"> · Operate at the frequency below stop frequency · Braking torque level: 0 to 100 · Braking time: adjustable from 0.1s to 120s
Output signal	Analog output	<ul style="list-style-type: none"> Output specification: 0V to 10V DC (max. 1 mA) Output function: output frequency and output current proportion (switchable)
	Open-collector output	<ul style="list-style-type: none"> Output specification : max. rating 50V DC/50mA Output functions : operation signal, arrival signal, overload alarm, frequency detection, abnormal reverse run signal alarm, current detection, timer OFF signal, output frequency/current proportion PWM signal output frequency/current proportion pulse train signal
	Relay output	<ul style="list-style-type: none"> Output specification : 1c contact (Contact capacity: 230V AC 0.25A resistive load 30V DC 1A resistive load) Output functions : operation signal, arrival signal, overload alarm, frequency detection, abnormal reverse run signal alarm, current detection, timer OFF signal (switchable)
Display	Operation/Control status	Output frequency, linear speed display (switchable), rotation direction Output voltage, internal DC voltage, set frequency, communication station No., operation times of timer, alarm type, control circuit terminal status (I/O signal), operation status, PID (setting value, measured value and output value), progress of automatic tuning, accumulative operating time, accumulative operating time of fan
	Details of abnormality	Specific symbol is indicated when the protection function is activated (the latest four abnormalities are stored.)
Protection	Current limit	Current limit can be set within 1% to 200% of rated output current.
	Trip (stop)	Instantaneous overcurrent (SC1-6), abnormal temperature (OH) overcurrent(OC1-3),overload · electronic thermal relay (OL), undervoltage (LU), overvoltage (OU1-3), cooling fan fault (FAn,FAn2), external fault(AU), operation fault(OP), CPU error (CPU,ErrC)
	Stall prevention function	Overcurrent and overvoltage stall prevention
Environment	Ambient temperature and humidity	-10°C to + 50°C (Note 1) (without freezing) and below 90%RH (without condensation)
	Storage temperature and humidity	-25°C to +65°C and below 95%RH
	Vibration	5.9m/s ² (0.6 G) max.
	Altitude	1000m max.
	Location	Indoor areas free of corrosive gases, flammable gases, oil mist or dust
IP protection	IP20 cabinet-mounted	
Cooling method	0.75kW or lower: natural cooling; 1.5kW to 15kW: air-cooling	

Note 1) It is -10°C to +40°C when multiple inverters are installed side-by-side.

9 Function Parameter List

■ Monitor Parameter List

No	Monitor item	Unit	Display
n001	Output Frequency	Hz	Displays output frequency of inverter (in increments of 0.1Hz).
n002	Output Current	A	Displays output current of inverter (in increments of 0.1A).
n003	Output Voltage	V AC	Displays output voltage of inverter (in increments of 1V AC).
n004	Internal DC Voltage	V DC	Displays the internal DC voltage of inverter (in increments of 1V DC).
n005	Set Frequency	Hz	Displays the set frequency (in increments of 0.1Hz).
n006	Communication Station No.	—	Displays the current set communication station No.
n007	Operation Times of Timer	Times	Displays continuous operation times of timer in one cycle.
n008	Alarm Type	—	Displays the content of alarm LED.
n009	Input Signal Status	—	Displays contact data.
n010	Output Signal Status	—	Displays contact data.
n011	PID Set Value (SP)	%	Displays the set value during PID control (SP).
n012	PID Target Value (PV)	%	Displays the target value during PID control (PV).
n013	PID Output Value (MV)	%	Displays the output value during PID control (MV).
n014	Accumulative Operation Time	—	Displays the accumulative operation time of inverter.
n015	Accumulative Operation Time of Fan	—	Displays the accumulative operation time of inverter fan.
n016	Abnormality Display (Latest)	—	Displays abnormalities.
n017	Abnormality Display (Second to latest)	—	Displays abnormalities.
n018	Abnormality Display (Third to latest)	—	Displays abnormalities.
n019	Abnormality Display (Fourth to latest)	—	Displays abnormalities.
n020	Unit Program Version	—	1.00 to 99.99
n021	Detected Value of Pulse Input	Hz	Displays the frequency value detected according to the pulse input signal.
n022	Winding Length	m	Displays the current winding length.
n023	For Manufacturer Confirmation	—	—
n024	For Manufacturer Confirmation	—	—
n025	Analog Input 1	%	Displays the analog input terminal No.12 corresponding percentage
n026	Analog Input 2	%	Displays the analog input terminal No.14 corresponding percentage
n027	Internal Module Temperature	°C	Displays the internal module temperature.

■ P0 Parameter List

No.	Function name	Changes during RUN	Setting range				Unit	Initial value
P001	1st Acceleration Time	○	0.04 to 3600				0.01 [sec]*9	*4
P002	1st Deceleration Time	○	0.04 to 3600				0.01 [sec]*9	*4
P003	Run Command Selection	—	Setting value	*1Reset by panel	Control type	Details	—	0
			0	Yes	Panel	Operation: Stop: Rotation direction: dr Mode Setting		
			1	Yes	Panel	Forward: + Reverse: + Stop:		
			2	NO	External control	Operation: SW1 ON Stop: SW1 OFF Forward: SW2 OFF Reverse: SW2 ON		
			3	Yes	External control	Operation: SW1 ON Stop: SW1 OFF Forward: SW2 OFF Reverse: SW2 ON		
			4	NO	External control	Forward run: SW1 ON Stop: SW1 OFF Reverse ru: SW2 ON Stop: SW2 OFF		
			5	Yes	External control	Forward run: SW1 ON Stop: SW1 OFF Reverse run: SW2 ON Stop: SW2 OFF		
			6	NO	Communication	Communication command		
			7	Yes	Communication	Communication command		
P004	Frequency Setting Signal	—	0: Panel, input 1: External control, VR input 2: External control, 0 to 5V 3: External control, 0 to 10V 4: External control, 4 to 20mA 5: External control, 0 to 20mA 6: Communicatin, communication command 7: External control, PWM signal 8: External control, pulse train signal				—	0

No.	Function name	Changes during RUN	Setting range		Unit	Initial value
P005	Operation Status Monitor	—	0: Output frequency 1: Linear speed 2: Output current 3: Communication station No. 4: Setting frequency	5: Communication station No./Output frequency 6: Communication station No./Linear speed 7: Communication station No./Output current 8: Winding length	—	0
P006	Vector Control Selection	—	0: V/F control 1: Sensorless vector control		—	0
P007	Carrier frequency	○	During V/F control: 0.8 to 15.0 (9 steps) During sensorless vector control: 2.5 to 15.0 (6 steps)		[kHz]	2.5
P008	S-shaped Acceleration/Deceleration Mode	—	0: Linear acceleration/deceleration 1: S-shaped acceleration/deceleration (Quadratic curve) 2: S-shaped acceleration/deceleration (Cubic curve)		—	0
P009	V/FMode	—	50 : 50Hz mode 60 : 60Hz mode FF : Free mode 3C : 3-point type 3C1 : 3-point fixing 1	3C2 : 3-point fixing 2 3C3 : 3-point fixing 3 3C4 : 3-point fixing 4 3C5 : 3-point fixing 5 3C6 : 3-point fixing 6	—	50
P010	V/FCurve	—	0: Constant torque mode 1: Reduced torque mode		—	0
P011	Torque Boost*7	○	0 to 40: Manual torque boost Auto: Automatic torque boost		1[%]	*4
P012	Maximum Output Frequency	—	50.0 to 400.0		0.1[Hz]	50.0
P013	Base Frequency	—	45.0 to 400.0		0.1[Hz]	50.0
P014	Change Point Frequency 1	○	0.2 to 400.0		0.1[Hz]	0.2
P015	Change Point Voltage 1	○	0.0 to 100.0		0.1[%]	0.0
P016	Change Point Frequency 2	○	0.2 to 400.0		0.1[Hz]	0.2
P017	Change Point Voltage 2	○	0.0 to 100.0		0.1[%]	0.0
P018	Maximum Output Voltage	—	0(Power supply voltage), 1 to 500		1[V]	0
P019	JOG Frequency	○	0.2 to 400.0		0.1[Hz]	10.0

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P020	JOG Acceleration	○	0.04 to 3600	0.01 [sec]*9	*4
P021	JOG Deceleration	○	0.04 to 3600	0.01 [sec]*9	*4
P022	JOG Operation by Panel	—	0: JOG operation by panel disabled 1: JOG operation by panel enabled (JOG operation by external control disabled) 2: JOG operation by panel enabled (JOG operation by external control enabled)	—	0
P023	Electronic Thermal Selection	○	0: OL trip occurs with current up to 140% of its rating for 1 minute. 1: Without output frequency derated 2: With output frequency derated 3: Forced air-cooled motor specification	—	2
P024	Thermal Current Setting	○	0.1 to 100.0	0.1[A]	*4
P025	Overcurrent Stall Prevention Function	○	0: Overcurrent stall prevention function OFF Overcurrent trip prevention function OFF 1: Overcurrent stall prevention function ON Overcurrent trip prevention function ON 2: Overcurrent stall prevention function OFF Overcurrent trip prevention function ON 3: Overcurrent stall prevention function ON Overcurrent trip prevention function OFF	—	1
P026	Overvoltage Stall Prevention Function	○	0: Stall prevention function OFF 1: Stall prevention function ON (Regenerative braking resistor ON/OFF function disabled)	—	1
P027	Current Limit Function	○	0.0 · 0.1 to 9.9	0.1[sec]	0.0
P028	OCS Level	○	1 to 200	1[%]	140
P029	Retry Function Selection	○	0: No retry function 1: Only for abnormal overcurrent 2: Only for abnormal overvoltage 3: Only for abnormal overcurrent/overvoltage	—	0
P030	Retry Count	○	1 to 10	1[times]	1
P031	Start Mode	—	0: Run 1: OP stop 2: Run after standby time elapse 3: OP stop (standby time)	—	1
P032	Ride-through Restart Selection	—	0: Restart mode 1 1: Restart mode 2 2: Restart mode 3 3: Restart mode 4	—	0
P033	Standby Time	○	0.1 to 100.0	0.1[sec]	0.1

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P034	Reverse Run Lock	—	0: Forward/Reverse run enabled 1: Reverse run disabled	—	0
P035	Starting Frequency	○	0.2 to 60.0	0.1[Hz]	0.2
P036	Stop Mode	—	0: Deceleration stop 1: Coast-to-stop	—	0
P037	Stop Frequency	○	0.2 to 60.0	0.1[Hz]	0.2
P038	DC Braking Time	○	0.0 to 120.0	0.1[sec]	0.0
P039	DC Braking Level	○	0 to 100	1[%]	0
P040	Stop Frequency during Forward / Reverse Run	○	0.2 to 60.0	0.1[Hz]	0.2
P041	DC Braking Time during Forward / Reverse Run	○	0.0 to 120.0	0.1[sec]	0.0
P042	DC Braking Level during Forward/ Reverse Run	○	0 to 100	1[%]	0
P043	DC Braking Time during Startup	○	0.0 to 120.0	0.1[sec]	0.0
P044	DC Braking Level during Startup	○	0 to 100	1[%]	0
P045	Lower Frequency Limit	○	0.2 to 400.0	0.1[Hz]	0.2
P046	Upper Frequency Limit	○	0.2 to 400.0	0.1[Hz]	400.0
P047	Zero Dead Stop Function Selection	—	0.0 · 0.2 to 400.0	0.1[Hz]	0.2
P048	1st Skip Frequency	○	0.0 · 0.2 to 400.0	0.1[Hz]	0.0
P049	2nd Skip Frequency	○	0.0 · 0.2 to 400.0	0.1[Hz]	0.0

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P050	3rd Skip Frequency	○	0.0 - 0.2 to 400.0	0.1[Hz]	0.0
P051	Skip Frequency Bandwidth	○	0 to 10	1[Hz]	0
P052	Cooling Fan ON-OFF Control Selection	○	0: ON during power-on/OFF during power-off (with fan trip) 1: ON during power-on/OFF when internal module temperature below 100°C (with fan trip) 2: ON during power-on/OFF during power-off (without fan trip/with alarm) 3: ON during power-on/OFF when internal module temperature below 100°C (without fan trip/with alarm)	—	0
P053	Input Terminal Filter	○	5 to 100	1[times]	20
P054	Linear Speed Multiplier	○	0.1 to 100.0	1 [Multiplier]	3.0
P055	Setting Data Clear		0: Normal condition 1: Restore all the data (motor constant excluded) to factory settings. 2: Restore all the data to factory settings.	—	0
P056	Alarm LED Operation Selection	○	0: No setting 1: Full monitor alarm 2: Output voltage 3: Overload 4: Abnormal temperature 5: Timer operation stop 6: Abnormal cooling fan	—	0
P057	Upper Voltage Limit of Alarm LED	○	0.1 to 600.0	0.1[V]	*5
P058	Upper Current Limit of Alarm LED	○	0.1 to 100.0	0.1[A]	*4
P059	Password	○	0000 to 9999	—	0000
P060	MOP Operation Selection	○	0: MOP operation linked with acceleration/deceleration time 1: MOP operation linked with frequency setting 2: MOP function disabled	—	2
P061	Acceleration/Deceleration Time for MOP Operation	○	0.04 to 3600	0.01 [sec]*9	*4

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P062	Torque Boost Amplitude	—	0 to 200	1[%]	*4
P063	Torque Boost Reply Amplitude	—	0 to 200	1[%]	*4
P064	Internal component cooling fan ON-OFF control selection	○	0: ON – when Run command is ON OFF – when Run command is OFF (FAn2 Trip Yes) 1: ON – when Run command is ON and internal temperature is 40°C or above OFF – when Run command is OFF and internal temperature is 30°C or below (or power is turned off) (FAn2 Trip Yes) 2: ON – when Run command is ON OFF – when Run command is OFF (FAn2 Trip No/Alarm goes off) 3: ON – when Run command is ON and internal temperature is 40°C or above OFF – when Run command is OFF or internal temperature is 30°C or below (or power is turned off) (FAn2 Trip No/Alarm goes off)	—	3

■ P1 Parameter List

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P101	SW1 Function Selection	—	(*2) 0: No setting 1(r1): Multi-step speed 2(r2): Reset 3(r3): Reset lock 4(r4): Jogging selection 5(r5): Stop by external fault 6(r6): Parameter setting disabled 7(r7): Coast-to-stop 8(r8): Switching of frequency signal 9(r9): 2nd characteristics selection 10(r10): Switching of PID control 11(r11): 3-wire stop command 12(r12): Speed search 13(r13): Winding mode pause 14(r14): Winding length input mode 15(r15): Winding length clear 16(r16): Run/stop 17(r17): Forward/reverse run 18(r18): Forward run by jogging 19(r19): Reverse run by jogging 20(r20): Invalid	—	16
P102	SW2 Function Selection	—	(*2) 0: No setting 1(r1): Multi-step speed 2(r2): Reset 3(r3): Reset lock 4(r4): Jogging selection 5(r5): Stop by external fault 6(r6): Parameter setting disabled 7(r7): Coast-to-stop 8(r8): Switching of frequency signal 9(r9): 2nd characteristics selection 10(r10): Switching of PID control 11(r11): 3-wire stop command 12(r12): Speed search 13(r13): Winding mode pause 14(r14): Winding length input mode 15(r15): Winding length clear 16(r16): Run/stop 17(r17): Forward/reverse run 18(r18): Forward run by jogging 19(r19): Reverse run by jogging 20(r20): Invalid	—	17

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P103	SW3 Function Selection	—	(*2) 0: No setting 1(r1): Multi-step speed 2(r2): Reset 3(r3): Reset lock 4(r4): Jogging selection 5(r5): Stop by external fault 6(r6): Parameter setting disabled 7(r7): Coast-to-stop 8(r8): Switching of frequency signal 9(r9): 2nd characteristics selection 10(r10): Switching of PID control 11(r11): 3-wire stop command 12(r12): Speed search 13(r13): Winding mode pause 14(r14): Winding length input mode 15(r15): Winding length clear 16(r16): Run/stop 17(r17): Forward/reverse run 18(r18): Forward run by jogging 19(r19): Reverse run by jogging 20(r20): Frequency increment setting	—	0
P104	SW4 Function Selection	—	(*2) 0: No setting 1(r1): Multi-step speed 2(r2): Reset 3(r3): Reset lock 4(r4): Jogging selection 5(r5): Stop by external fault 6(r6): Parameter setting disabled 7(r7): Coast-to-stop 8(r8): Switching of frequency signal 9(r9): 2nd characteristics selection 10(r10): Switching of PID control 11(r11): 3-wire stop command 12(r12): Speed search 13(r13): Winding mode pause 14(r14): Winding length input mode 15(r15): Winding length clear 16(r16): Run/stop 17(r17): Forward/reverse run 18(r18): Forward run by jogging 19(r19): Reverse run by jogging 18(r18): Forward run by jogging 19(r19): Reverse run by jogging 20(r20): Frequency increment setting	—	0

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P105	SW5 Function Selection	—	(*2) 0: No setting 1(r1): Multi-step speed 2(r2): Reset 3(r3): Reset lock 4(r4): Jogging selection 5(r5): Stop by external fault 6(r6): Parameter setting disabled 7(r7): Coast-to-stop 8(r8): Switching of frequency signal 9(r9): 2nd characteristics selection 10(r10): Switching of PID control 11(r11): 3-wire stop command 12(r12): Speed search 13(r13): Winding mode pause 14(r14): Winding length input mode 15(r15): Winding length clear 16(r16): Run/stop 17(r17): Forward/reverse run 18(r18): Forward run by jogging 19(r19): Reverse run by jogging 20(r20): Frequency memory setting	—	0
P106	SW6 Function Selection	—	(*2) 0: No setting 1(r1): Multi-step speed 2(r2): Reset 3(r3): Reset lock 4(r4): Jogging selection 5(r5): Stop by external fault 6(r6): Parameter setting disabled 7(r7): Coast-to-stop 8(r8): Switching of frequency signal 9(r9): 2nd characteristics selection 10(r10): Switching of PID control 11(r11): 3-wire stop command 12(r12): Speed search 13(r13): Winding mode pause 14(r14): Winding length input mode 15(r15): Winding length clear 16(r16): Run/stop 17(r17): Forward/reverse run 18(r18): Forward run by jogging 19(r19): Reverse run by jogging 20(r20): Winding length	—	0
P107	Pulse Train Input Frequency	—	1.0 to 40.0	1[kHz]	1.0
P108	Pulse Train Input Filter	—	10 to 100	1[times]	50

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P109	PWM Signal Average Times	○	1 to 100	1[times]	1
P110	PWM Signal Cycle	○	1.0 to 2000	0.1[msec]	1.0
P111	Analog Input Filter	○	5 to 200	1[times]	10
P112	Bias Frequency Setting	○	-99.0 to 250.0	0.1[%]	0.0
P113	Gain Frequency Setting	○	0.0 to 500.0	0.1[%]	100.0
P114	Analog Direction Mode	○	0: No setting 1: Analog input can be reversed. (Forward → Reverse) 2: Analog input can be reversed. (Reverse → Forward)	—	0
P115	2nd Bias Frequency Setting	○	-99.0 to 250.0	0.1[%]	0.0
P116	2nd Gain Frequency Setting	○	0.0 to 500.0	0.1[%]	100.0
P117	2nd Analog Direction Mode	○	0: No setting 1: Analog input can be reversed. (Forward → Reverse) 2: Analog input can be reversed. (Reverse Forward)	—	0
P118	2nd Analog Input Function Selection	—	0: 2nd frequency setting signal 1: Measured value of PID control (PV) 2: Base frequency + PID adjusted value 3: Base frequency + Auxiliary frequency setting signal	—	0
P119	2nd Analog Input Signal Selection	—	2 : External control,0V to 5V 3 : External control,0V to 10V 4 : External control,4mA to 20mA 5 : External control,0mA to 20mA	—	2
P120	Analog Output Function Selection	○	0: Output frequency 1: Output current	—	0
P121	PWM Output Duty Ratio Compensation	○	25 to 100	1[%]	100

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P122	PWM/Pulse Output Function Selection	<input type="radio"/>	0: Output frequency 1: Output current	—	0
P123	PWM Output Cycle	<input type="radio"/>	1 to 2000	1[msec]	1
P124	Output TR1 Function Selection	<input type="radio"/>	0: Run signal 1: Reverse run signal 2: Arrival signal 3: Overload alarm 4: Frequency detection 5: Current detection (1) 6: Current detection (2) 7: Fault alarm (1) 8: Fault alarm (2) 9: Timer operation stop after one cycle 10: Timer operation stop 11: Alarm 12: Speed search operation 13: PWM output 14: Pulse train output	—	0
P125	Output TR2 Function Selection	<input type="radio"/>	0: Run signal 1: Reverse run signal 2: Arrival signal 3: Overload alarm 4: Frequency detection 5: Current detection (1) 6: Current detection (2) 7: Fault alarm (1) 8: Fault alarm (2) 9: Timer operation stop after one cycle 10: Timer operation stop 11: Alarm 12: Speed search operation	—	0
P126	Output RY Function Selection	<input type="radio"/>	(*3) 0(r0): Run signal 1(r1): Reverse run signal 2(r2): Arrival signal 3(r3): Overload alarm 4(r4): Frequency detection 5(r5): Current detection (1) 6(r6): Current detection (2) 7(r7): Fault alarm (1) 8(r8): Fault alarm (2) 9(r9): Timer operation stop after one cycle 10(r10): Timer operation stop 11(r11): Alarm 12(r12): Speed search operation	—	0

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P127	Detection Frequency (Output TR)	<input type="radio"/>	0.0, 0.2 to 400.0	0.1[Hz]	0.2
P128	Detection Frequency (Output RY)	<input type="radio"/>	0.0, 0.2 to 400.0	0.1[Hz]	0.2
P129	Current Detection Level	<input type="radio"/>	0.1 to 100.0	0.1[A]	*4
P130	Current Detection Delay Time	<input type="radio"/>	0.1 to 10.0	0.1[sec]	0.1
P131	RS485 Communication Protocol*6	<input type="radio"/>	0 : MEWTOCOL 1 : Modbus — RTU 2 : Modbus — ASCII	—	0
P132	RS485 Communication Station No.*6	<input type="radio"/>	01 to 31	—	01
P133	RS485 Communication Speed*6	<input type="radio"/>	48 : 4800 96 : 9600 192 : 19200 384 : 38400 576 : 57600 1152 : 115200	bps	1152
P134	RS485 Stop Bit Length*6	<input type="radio"/>	1 : 1bit 2 : 2bit	bit	1
P135	RS485 Parity Check*6	<input type="radio"/>	0: Without parity check 1: Odd parity 2: Even parity	—	0
P136	RS485 Timeout Detection*6	<input type="radio"/>	0.0 · 0.1 to 60.0	0.1[sec]	0.0
P137	Waiting Time for RS485 Transmission *6	<input type="radio"/>	1 to 1000	1[msec]	1
P138	Judging Time for RS485 TEXT Completion *6	<input type="radio"/>	3 to 200	1[msec]	3
P139	2nd Base Frequency		45.0 to 400.0	0.1[Hz]	50.0
P140	2nd Torque Boost*7	<input type="radio"/>	0 to 40: Manual torque boost Auto: Automatic torque boost	1[%]	*4
P141	2nd Electronic Thermal Selection	<input type="radio"/>	0: OL trip occurs with current up to 140% of its rating for 1 minute. 1: Without output frequency derating 2: With output frequency derating 3: Forced air-cooled motor specification	—	2
P142	2nd Thermal Current Setting	<input type="radio"/>	0.1 to 100.0	0.1[A]	*4
P143	2nd Change Point Frequency 1	<input type="radio"/>	0.2 to 400.0	0.1[Hz]	0.2
P144	2nd Change Point Voltage 1	<input type="radio"/>	0.0 to 100.0	0.1[%]	0.0

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P145	2nd Change Point Frequency 2	○	0.2 to 400.0	0.1[Hz]	0.2
P146	2nd Change Point Voltage 2	○	0.0 to 100.0	0.1[%]	0.0
P147	Pulse Train Output Frequency	○	1.0 to 10.0	0.1[kHz]	1.0
P148	Pulse Output Duty Ratio	○	25 to 75	1[%]	50
P149	Analog Output Voltage Compensation	○	25 to 100	1[%]	100
P150	TR1 output ON delay time	—	0.00, 0.01 to 99.99	0.01[sec]	0.00
P151	TR1 output OFF delay time	—	0.00, 0.01 to 99.99	0.01[sec]	0.00
P152	TR2 output ON delay time	—	0.00, 0.01 to 99.99	0.01[sec]	0.00
P153	TR2 output OFF delay time	—	0.00, 0.01 to 99.99	0.01[sec]	0.00
P154	RY output ON delay time	—	0.00, 0.01 to 99.99	0.01[sec]	0.00
P155	RY output OFF delay time	—	0.00, 0.01 to 99.99	0.01[sec]	0.00

■ P2 Parameter List

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P201	Load Rating	—	0: Heavy load rating 1: Light load rating	—	0
P202	Automatic Tuning	—	0: No tuning 1: All tuning	—	0
P203	Motor Capacity	—	0.2 : 0.2kW 3.7 : 3.7kW 0.4 : 0.4kW 5.5 : 5.5kW 0.7 : 0.75kW 7.5 : 7.5kW 1.5 : 1.5kW 11. : 11kW 2.2 : 2.2kW 15. : 15kW	—	*4
P204	Pole Number of Motor	—	2 : 2-pole 4 : 4-pole 6 : 6-pole	Pole	4
P205	Motor Rated Voltage	—	0 to 500	1[V]	*5
P206	Motor Rated Frequency	—	10.0 to 120.0	0.1[Hz]	50.0
P207	Motor Rated Current	—	0.01 to 99.99	0.01[A]	*4
P208	Primary Resistor	—	0.00 to 99.99 (*8)	0.01[Ω]	*4
P209	Secondary Resistor	—	0.00 to 99.99 (*8)	0.01[Ω]	*4
P210	Exciting Inductance	—	0.0 to 999.9 , 1000 to 5000 (in increments of 1 mH)	0.1[mH]	*4
P211	Leakage Inductance	—	0.0 to 999.9	0.1[mH]	*4
P212	Exciting Current	—	0.01 to 99.99	0.01[A]	*4
P213	Speed Control Proportion Amplitude	—	0.01 to 10.00	0.01	*4
P214	Speed Control Integral Amplitude	—	0.01 to 10.00	0.01	*4
P215	Torque Limit Level	—	50 to 400	1[%]	*4
P216	2nd Motor Capacity	—	0.2 : 0.2kW 3.7 : 3.7kW 0.4 : 0.4kW 5.5 : 5.5kW 0.7 : 0.75kW 7.5 : 7.5kW 1.5 : 1.5kW 11. : 11kW 2.2 : 2.2kW 15. : 15kW	—	*4
P217	Pole Number of 2nd Motor	—	2 : 2 Pole 4 : 4 Pole 6 : 6 Pole	Pole	4
P218	Rated Voltage of 2nd Motor	—	0 to 500	1[V]	*5
P219	Rated Frequency of 2nd Motor	—	10.0 to 120.0	0.1[Hz]	50.0
P220	Rated Current of 2nd Motor	—	0.01 to 99.99	0.01[A]	*4
P221	Primary Resistor of 2nd Motor	—	0.00 to 99.99 (*8)	0.01[Ω]	*4
P222	Secondary Resistor of 2nd Motor	—	0.00 to 99.99 (*8)	0.01[Ω]	*4

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P223	Exciting Inductance of 2nd Motor		0.0 to 999.9, 1000 to 5000 (in increments of 1 mH)	0.1[mH]	*4
P224	Leakage Inductance of 2nd Motor		0.0 to 999.9	0.1[mH]	*4
P225	Exciting Current of 2nd Motor		0.01 to 99.99	0.01[A]	*4
P226	Speed Control Proportion Amplitude of 2nd Motor		0.01 to 10.00	0.01	*4
P227	Speed Control Integral Amplitude of 2nd Motor		0.01 to 10.00	0.01	*4
P228	Torque Limit Level of 2nd Motor		50 to 400	1[%]	*4

■ P3 Parameter List

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P301	Multi-step Speed Function Selection	—	0: Multi-step speed frequency operation 1: 2nd/3rd/4th acceleration/deceleration function 2: Acceleration/deceleration linked with multi-step speed frequency operation 3: Multi-step speed frequency operation by timer 4: Acceleration/deceleration linked with multi-step speed frequency operation by timer	—	0
P302	2nd Step Speed Frequency	○	0.0, 0.2 to 400.0	0.1[Hz]	5.0
P303	3rd Step Speed Frequency	○	0.0, 0.2 to 400.0	0.1[Hz]	10.0
P304	4th Step Speed Frequency	○	0.0, 0.2 to 400.0	0.1[Hz]	12.5
P305	5th Step Speed Frequency	○	0.0, 0.2 to 400.0	0.1[Hz]	15.0
P306	6th Step Speed Frequency	○	0.0, 0.2 to 400.0	0.1[Hz]	17.5
P307	7th Step Speed Frequency	○	0.0, 0.2 to 400.0	0.1[Hz]	20.0
P308	8th Step Speed Frequency	○	0.0, 0.2 to 400.0	0.1[Hz]	22.5
P309	9th Step Speed Frequency	○	0.0, 0.2 to 400.0	0.1[Hz]	25.0
P310	10th Step Speed Frequency	○	0.0, 0.2 to 400.0	0.1[Hz]	27.5
P311	11th Step Speed Frequency	○	0.0, 0.2 to 400.0	0.1[Hz]	30.0

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P312	12th Step Speed Frequency	○	0.0, 0.2 to 400.0	0.1[Hz]	32.5
P313	13th Step Speed Frequency	○	0.0, 0.2 to 400.0	0.1[Hz]	35.0
P314	14th Step Speed Frequency	○	0.0, 0.2 to 400.0	0.1[Hz]	40.0
P315	15th Step Speed Frequency	○	0.0, 0.2 to 400.0	0.1[Hz]	45.0
P316	16th Step Speed Frequency	○	0.0, 0.2 to 400.0	0.1[Hz]	50.0
P317	2nd Acceleration Time	○	0.04 to 3600	0.01[sec]*9	*4
P318	2nd Deceleration Time	○	0.04 to 3600	0.01[sec]*9	*4
P319	3rd Acceleration Time	○	0.04 to 3600	0.01[sec]*9	*4
P320	3rd Deceleration Time	○	0.04 to 3600	0.01[sec]*9	*4
P321	4th Acceleration Time	○	0.04 to 3600	0.01[sec]*9	*4
P322	4th Deceleration Time	○	0.04 to 3600	0.01[sec]*9	*4
P323	Rotation Direction of Timer Operation	—	0 to 255	—	0
P324	Continuous Operation Times of Timer	○	0 · 1 to 9999	1[times]	1
P325	Continuous Operation Mode of Timer	○	0: Return to zero dead stop status and then start next cycle. 1: Change to 1st multi-step speed frequency for the next cycle.	—	0
P326	Continuous Standby Time of Timer Operation	○	0.0 · 0.1 to 6553	0.1[sec]	0.0
P327	1st Step Speed Runtime	○	0.0 · 0.1 to 6553	0.1[sec]	0.0
P328	2nd Step Speed Runtime	○	0.0 · 0.1 to 6553	0.1[sec]	0.0
P329	3rd Step Speed Runtime	○	0.0 · 0.1 to 6553	0.1[sec]	0.0
P330	4nd Step Speed Runtime	○	0.0 · 0.1 to 6553	0.1[sec]	0.0
P331	5nd Step Speed Runtime	○	0.0 · 0.1 to 6553	0.1[sec]	0.0
P332	6nd Step Speed Runtime	○	0.0 · 0.1 to 6553	0.1[sec]	0.0

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P333	7nd Step Speed Runtime	○	0.0 · 0.1 to 6553	0.1[sec]	0.0
P334	8nd Step Speed Runtime	○	0.0 · 0.1 to 6553	0.1[sec]	0.0
P335	Winding Mode Control Selection	○	0: Winding mode control OFF 1: Based on set frequency 2: Based on maximum frequency	—	0
P336	Amplitude in Winding Mode	○	0.0 to 100.0	0.1[%]	50.0
P337	Recoil Frequency Band in Winding Mode	○	0.0 to 100.0	0.1[%]	10.0
P338	Winding Mode Cycle	○	0.0 to 3600	0.1[sec]	10.0
P339	Rise Time Coefficient in Winding Mode	○	0.0 to 100.0	0.1[%]	50.0
P340	Operation Selection in Winding Mode	—	0: Normal mode 1: Normal 2-point mode 2: Random swing mode 3: 2-point random swing mode	—	0
P341	Maximum Random Rise Time Coefficient	—	0.0 to 100.0	0.1[%]	50.0
P342	Mimumum Random Rise Time Coefficient	—	0.0 to 100.0	0.1[%]	50.0
P343	Winding Length Multiplier	—	0 to 9999	—	1
P344	Winding Stop Length	—	0 · 1 to 9999, 1.000 to 60.00	1[m]	0
P345	PID Target Value	○	0.0 to 100.0	0.1[%]	0.0
P346	PID Upper Limit	○	0.0 to 100.0	0.1[%]	100.0
P347	PID Lower Limit	○	0.0 to 100.0	0.1[%]	0.0
P348	PID Bias Value	○	-100 to 100.0	0.1[%]	0.0
P349	Proportional Gain [Kp]	○	0.1 to 1000	—	1.0
P350	Integral Time [Ti]	○	0.00 to 360.0	0.01[sec]	0.00
P351	Derivative Time [Td]	○	0.00 to 10.00	0.01[sec]	0.00
P352	Control Cycle [Ts]	○	0.00 to 60.00	0.01[sec]	0.00
P353	PID Output Characteristics	—	0: Reverse operation 1: Forward operation	—	0
P354	PID Output Reverse Selection	—	0: Reverse operation invalid 1: Reverse operation valid	—	0
P355	Sleep Operation Frequency	○	0.0 · 0.2 to 400.0	0.1[Hz]	0.0

No.	Function name	Changes during RUN	Setting range	Unit	Initial value
P356	Sleep Operation Delay Time	○	0.0 to 25.0	0.1[sec]	0.0
P357	Speed Search Selection during Startup	○	0: Invalid 1: Valid	—	0
P359	Standby Time for Speed Search	○	0.0 to 100.0	0.1[sec]	0.5
P360	Recover Time for Speed Search Voltage	○	0.0 to 10.0	0.1[sec]	0.5
P361	Speed Search Selection during Retry	○	0: Invalid 1: Valid	—	0
P362	Speed Search Retry Selection	○	0: Stop by error 1: Operation with starting frequency	—	0
P363	Speed Search Retry Times	○	0 to 10	1[times]	0
P364	Upper Frequency Limit Selection for Speed Search	○	0: Lower than the maximum frequency 1: Lower than the previous frequency before operation coasts to stop.	—	0

- *1) When a fault trip occurs, reset cannot be made with stop signal input from external devices.
Therefore, use STOP SW on the panel to reset the fault trip.
But if the reset lock function is used, it will take precedence. In addition, reset function is also valid.
- *2) When the set value displayed with "r", it indicates the contact b output.
(If "r" is not displayed, it indicates contact a output.)
- *3) When the set value displayed with "r", ON indicates non-exciting operation.
(If "r" is not displayed, ON indicates exciting operation.)
- *4) Initial value varies with inverter capacity.
- *5) Initial value varies with applicable input voltage of inverter.
It is 200 for 200 V voltage and 380 for 400 V voltage.
P057: It is 275.0 for 200 V voltage and 550.0 for 400 V voltage.
P205, P218: It is 200 for 200 V voltage and 380 for 400 V voltage.
- *6) It is valid during power OFF. (The changed parameter value is valid when the power is turned ON from OFF.)
- *7) The change from manual torque boost to auto torque boost or vice versa cannot be made during operation.
- *8) For 5.5kW to 15kW, the setting range is 0.000 to 65.00, the setting unit is 0.001[Ω], please pay attention to the setting and response of communication function.
- *9) When the setting range is 0.04 to 99.99, the setting unit is 0.01; when the setting range is 100.0 or above, the setting unit is 0.1; when the setting range is 1000 or above, the setting unit is 1.

10 Names and Content Marks of Toxic or Hazardous Substances and Elements Specified in

Component Name	Toxic or hazardous substances or elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated Biphenyl (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Base plate assembly	×	○	○	○	○	○
Enlosure	○	○	○	○	○	○
Other accessories	○	○	○	○	○	○

This table is prepared in accordance with the provisions of SJ/T11364.

○ :Indicates that the content of toxic or hazardous substances contained in all homogeneous materials for this component is below the standard specified in GB/T 26572 "Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products".

× :Indicates that the content of toxic or hazardous substances contained in at least one homogeneous material for this component is above the standard specified in GB/T 26572 "Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products".

Note : This product complies with RoHS Directive.

The items that does not comply with RoHS Directive are also listed in the table.

• Please contact us _____

Panasonic Industrial Devices Sales (China) Co., Ltd.

2F, Buildings 7 & 8, No. 88, Maji Road, China (Shanghai) Pilot Free Trade Zone
Tel: 021-3855-2000

Customer Service Center of Panasonic Semiconductor (Suzhou) Co., Ltd.

Customer Service Hotline : 400-920-9200

Panasonic Industrial Devices SUNX (Suzhou) Co., Ltd.

Address: No.97 Huoju Road, New District Suzhou, Jiangsu Province, China
Postal Code: 215009
Tel: 0512-6843-2580

URL: panasonic.net/id/pidsx/global

© Panasonic Industrial Devices SUNX (Suzhou) Co., Ltd. 2017

Issued in November 2017 PRINTED IN CHINA ME-MK300SG