Panasonic

NEW

High Performance Compact Inverters

MK300 Series

Accurate control based on perfect function

200V 0.2 kW / 0.4 kW / 0.75 kW / 1.5 kW / 2.2kW NEW

400V 0.75 kW / 1.5 kW / 2.2 kW / 3.7 kW

400V 5.5 kW / 7.5 kW / 11 kW / 15 kW NEW

2016.01 | http://device.panasonic.cn/ac

MK300

Compact inverters with industry-leading control performance

• Top class overload and high-torque performance among small models

• Mode-selectable sensorless vector control function

Drive common motor without encoder to achieve high precision and high response speed.
200% torque output can be achieved at speed as low as 0.5Hz (in sensorless vector control mode).
Note) 150% torque output at 0.5Hz for 5.5kW or more

Speed - torque characteristics example

AMK3001P54 (sensorless vector control) Motor: 1.5kW 4P

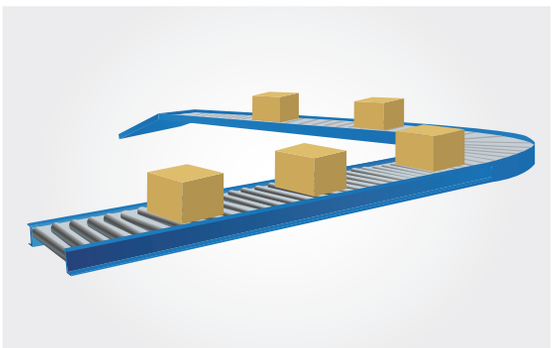
• Selected for dual-specification of standard load and light load

The product has clearly marked inverter power performance, which serves as a reference to the user in model selection.
The effect of "small horse drawing a big car" can be realized for particular industries.

- Standard load specification
  Overload current rating: 150% of rated output current, 1 minute.
  It can address motor applications of standard load specification of the current inverter.
- Light load specification
  Overload current rating: 120% of rated output current, 1 minute.
  It can address motor applications that are one grade higher than the current inverter specification.

Conveyor control application

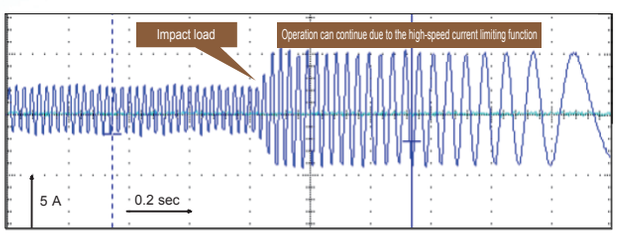
With torque control, superior driving power can be exerted in applications such as low speed starting.



A rich variety of functions and applications

• Provided with a high-speed current limiting function

Even if excessive current flows momentarily due to load variation, MK300 will continue operation instead of tripping, thus improving productivity. It is effective for rapid acceleration of heavy-duty turntable and stirring of viscous substances like bread and flour, etc.



200V 0.2kW
200V 0.4kW

200V 0.75kW
200V 1.5kW
400V 0.75kW
400V 1.5kW

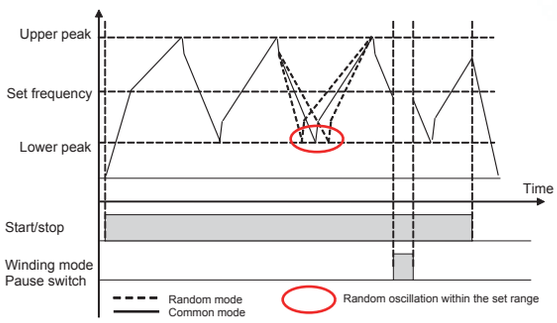
200V 2.2kW
400V 2.2kW
400V 3.7kW

• Corresponds to textile winder function

Textile winding reciprocal operation function will operate at the triangular-wave-shaped frequency as shown in the following graph.

Textile winding reciprocal operation function

Winding mode control function will operate at the triangular-wave-shaped frequency as shown.



More operation modes:

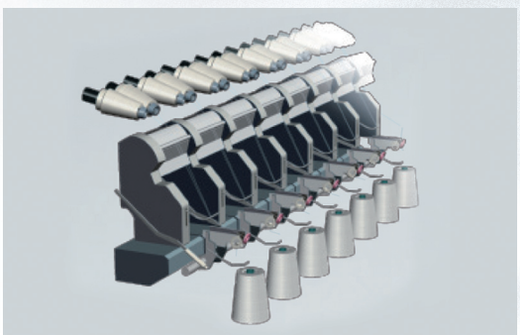
- **Random oscillation mode** Effectively prevent the windings from stacking on the same point
- **Winding length stop mode** The function of auto stop when the winding accumulatively reaches a certain length
- **Pulse input length calculation mode** It facilitates the display and statistics of winding length, and the calculation results can be communicated
- **Two-point mode** The reference frequency is smoothed with the winding length, and finally changes to the second frequency

400V 5.5kW
400V 7.5kW

400V 11kW
400V 15kW

Textile machinery application

Applied in most textile equipment using inverters.



Convenient operation

• Quick selection operation with knob

It includes a knob for confirming buttons, which enables quick selection and setting when selecting parameters.
The operational speed and precision are improved.

Rotation selection parameter

Button confirmation parameter

Free maintenance

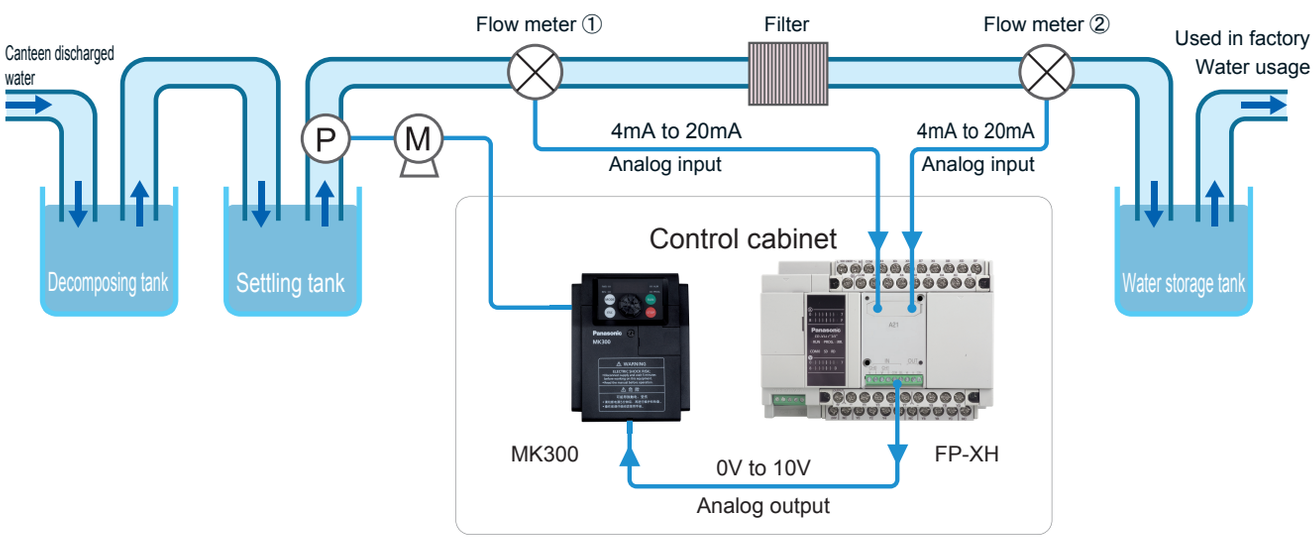
• Simple exchange of cooling fan

The exquisite design at the cooling fan makes it more convenient to replace the cooling fan. The product maintenance efficiency is greatly improved.

Accessories

Product name	Model	Product image	Supply voltage	Communication pattern	Function	Main features
MK300 operation panel	AMK300-REM1		MK300 inverter body power supply (+5V)	RS485	Remote operation function Parameter copy function Inverter multi-unit control function	• Requires no other power supply (MK300 body power supply) • Requires no special connecting cable (can be connected using commercially available standard LAN cable) • Can be installed using two M3 screws

The water tank pump pressure is controlled using our small PLC<FP-XH> and MK300



Application description

- The water discharged from the factory canteen is bacterially decomposed, and the fresh water accumulated in the settling tank is drawn using a pump, and after filtration using a filter, the water is sent to the storage tank as industrial water.
- MK300 is used to control the motor speed so as to regulate the pump pressure.
- PLC[FP-XH] is used to output speed instructions to MK300, and (0V-10V) is used to analog signal.
- The speed instruction output from FP-XH (0V-10V analog output) is based on the value of flow meter ②. After the value of flow meter becomes small, the analog output value is increased in order to boost the pump pressure.
- After the value difference between flow meter ① and flow meter ② exceeds a certain value, it is judged that the filter is clogged, and a replacement signal is output from FP-XH.
- After installing the analog I/O plug-in (AFPX-A21) onto FP-XH, the analog input of two flow meters and analog output of MK300 can be realized, and by utilizing the expanded plug-in of small installation area in combination with inverter MK300, great contribution can be made to the miniaturization of control cabinets.

Small programmable controllers FP-XH series product introduction

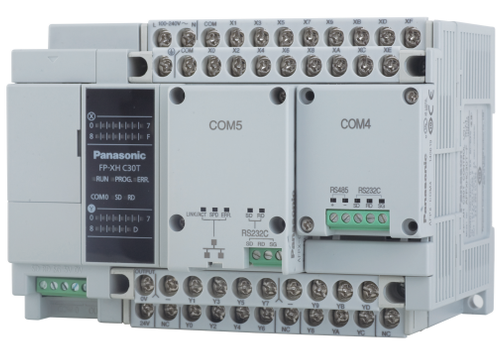
- High speed, high performance

  Basic instructions: 0.04ms within 5k steps; Large capacity of 32k by default (16k for 14-point model), programs/registers 3-phase capacity changeover.
- Position control

  All channels, maximum speed up to 100kHz, maximum 6-channel high-speed pulse output, versatile motion control including linear interpolation, home return, repetitive motion, etc.
- Scalability and compatibility

  A full lineup of expansion cards and expansion units, up to 452 points; simultaneous extended 4ch communication; used in common with the existing FP-X program.
- Communication

  Terminal block type RS232C communication port, cardless PC-Link; expanded RS485 communication card, enabling data share among up to 16 control units.



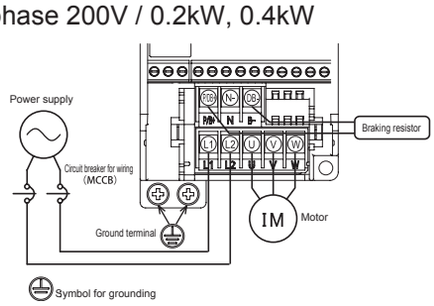
Ratings

Item		1-phase 200 V Input Type (Model AMK300□□□2)					3-phase 400 V Input Type (Model AMK300□□□4)							
		0P2	0P4	0P7	1P5	2P2	0P7	1P5	2P2	3P7	5P5	7P5	011	015
Standard load specification	Applicable motor output (kW) *1	0.2	0.4	0.75	1.5	2.2	0.75	1.5	2.2	3.7	5.5	7.5	11.0	15.0
	Rated output current (A) *2	1.5	3.0	5.0	8.0	11.0	2.6	4.0	6.0	9.5	12.0	17.0	23.0	31.0
	Rated output capacity (kVA) *3	0.6	1.2	2.0	3.2	4.4	2.1	3.2	4.8	7.6	9.6	13.5	18.3	24.7
	Rated input current (A) *4	3.9	8.0	12.6	18.5	23.8	3.9	6.0	9.0	14.3	15.6	22.1	29.9	40.3
	Power supply capacity (kVA) *4	0.9	1.8	2.9	4.3	5.5	3.1	4.8	7.2	11.4	12.4	17.6	23.8	32.1
Light load specification	Applicable motor output (kW) *1	0.4	0.75	1.5	2.2	3.0	1.5	2.2	3.7	5.5	7.5	11.0	15.0	18.5
	Rated output current (A) *2	1.9	3.5	6.0	9.6	12.0	3.6	5.4	6.9	11.1	17.0	17.0	31.0	38.0
	Rated output capacity (kVA) *3	0.8	1.4	2.4	3.8	4.8	2.9	4.3	5.5	8.8	13.5	13.5	24.7	30.3
	Rated input current (A) *4	5.1	9.1	15.2	22.3	25.8	5.4	8.1	10.4	16.7	22.1	22.1	40.3	49.4
	Power supply capacity (kVA) *4	1.2	2.1	3.5	5.1	5.9	4.3	6.5	8.2	13.3	17.6	17.6	32.1	39.4
Weight (kg)		Approx. 1.0	Approx. 1.0	Approx. 1.4	Approx. 1.6	Approx. 2.0	Approx. 1.5	Approx. 1.6	Approx. 1.9	Approx. 2.0	Approx. 3.6	Approx. 3.6	Approx. 8.2	Approx. 8.3

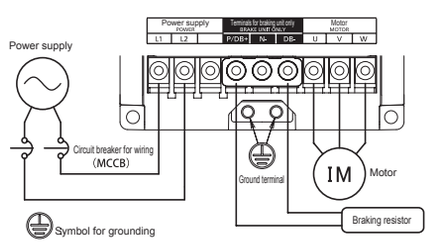
*1 "Applicable motor output" refers to the maximum applicable capacity of standard 4-pole motor.Make sure that the rated output current of inverter is higher than the rated current of motor during inverter selection.
*2 The rated output current of inverter varies with the set carrier frequency. Derate the output current for use.
*3 Rated output capacity refers to the value at output voltage of 230 VAC for 1-phase 200V input type and the value at output voltage of 460 VAC for 3-phase 400V input type.
*4 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.

Terminals for main circuit

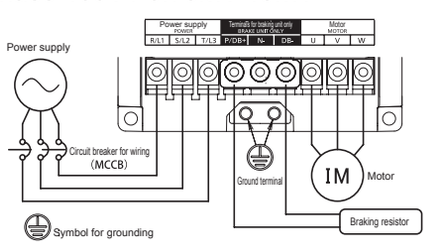
■ 1-phase 200V / 0.2kW, 0.4kW



■ 1-phase 200V / 0.75kW-2.2kW



■ 3-phase 400V / 0.75kW-15kW

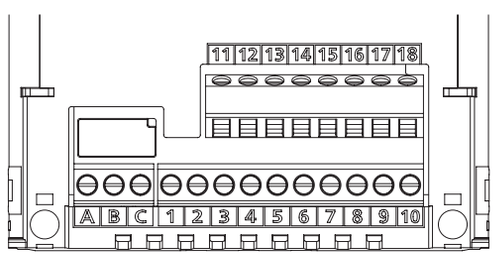


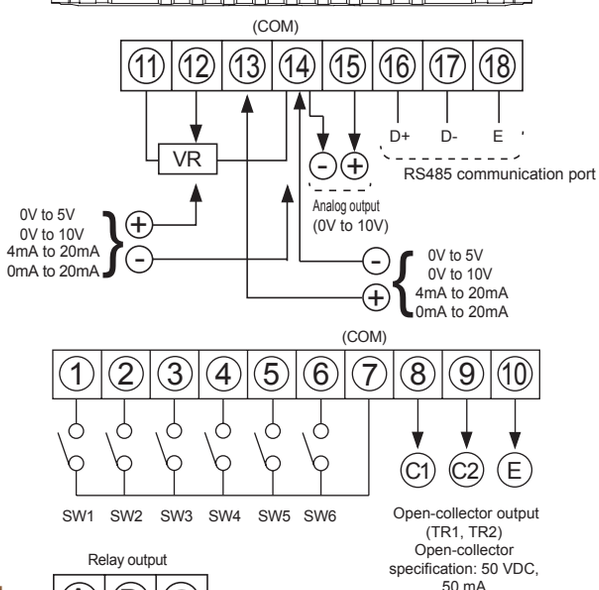
• Functions of terminals for main circuit

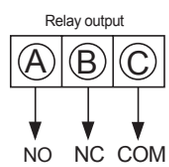
Terminal No.	Terminal name	Descriptions of terminal function
R/L1,S/L2,T/L3 L1,L2	Power supply for main circuit	Power supply for main circuit For 1-phase 200 V type, connect to terminal L1 and L2
U, V, W	Inverter output	Connects to 3-phase motor
P/DB+, DB-	Braking resistor connection	Connects to braking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

Terminals for control circuit

• Control circuit terminal arrangement







VR specification: 10 kW, 1/4 W or higher potentiometer
Relay specification: 1c non-voltage contact
230 VAC 0.25 A (resistive load)
30VDC 1 A (resistive load)

Specification

Item		Specification	
Standard output of applicable motor (kW)		0.2kW to 2.2kW	0.75kW to 15kW
Rated output	Rated voltage	3-phase 200V-230VAC (proportional to power supply voltage)	3-phase 380V-460VAC (proportional to power supply voltage)
	Overload current rating	Standard 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	3-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 165 VAC. • Operation continues for 15 ms when voltage drops below 165 VAC.	• Operation continues when voltage is above 323 VAC. • Operation continues for 15 ms when voltage drops below 323 VAC.
Output frequency	Frequency range	V/F control: 0.2Hz to 400Hz Sensorless vector control: 0.5 Hz to 120 Hz	
	Frequency display	Digital display	
	Frequency precision	Analog setting: within ±0.5% of maximum set frequency (25 °C±10 °C) Digital setting: within ±0.01% of maximum set frequency (-10°C to +50°C)	
	Frequency resolution	Analog setting: 0.1Hz (in 50 Hz/60 Hz 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(Note 3)		• V/F control setting: 9 options (adjustable from 0.8kHz to 15 kHz) 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)	
Run	Start/Stop	• Operation panel switches • 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	• Operation panel switches • 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 0.04 s to 3600 s	
	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	0 Hz 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	
Control	Frequency setting signal	Panel setting (operation panel): digital setting Analog setting signal input from external control: • Potentiometer (10 kΩ, 1/4 W or higher) • 0V to 5V DC, 0V to 10V DC • 4 mA to 20 mA, 0 mA to 20 mA 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%/auto 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	2nd function selection (acceleration/deceleration time, torque boost, V/F characteristics (base frequency/3-point V/F mode), electronic thermal and 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	

Item		Specification
Control	Lower frequency limit setting	Adjustable from 0.2 Hz to 400 Hz
	Bias/gain frequency setting	Bias frequency: adjustable from -99% to 250% Gain frequency: adjustable from 0 to 500%
	External stop function	External fault stop/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: 4800bps/9600bps/19200bps/38400bps/57600bps/115200bps (switchable) • Protocols: MEWTOCOL-COM/Modbus-RTU/Modbus-ASCII (switchable) • Communication method: half-duplex • Maximum number of connected units: 31 • Maximum transmission distance: 500 m (in total)
Braking	Regenerative braking torque	• 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	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	Output specification: 0V to 10V DC (max. 1 mA) Output function: output frequency and output current proportion (switchable)
	Open-collector output	Output specification: max. rating 50V DC/50mA Output functions: operation signal, arrival signal, overload alarm, frequency detection, reverse run signal, abnormal alarm, current detection, timer OFF signal and output frequency/current proportion PWM signal (cycle: 1ms) (switchable)
	Relay output	Output specification: 1c contact (contact capacity 230V AC, 0.25 A resistive load, 30V DC, 1 A resistive load) Output functions: operation signal, arrival signal, overload alarm, frequency detection, reverse run signal, abnormal alarm, current detection and timer OFF signal (switchable)
Display	Operation/Control status	Output frequency, linear speed display (switchable), rotation direction Output voltage, internal DC voltage, setting 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 operation time and accumulative operation 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) (Note 2) Overcurrent (OC1-3), overload and electronic thermal relay (OL), undervoltage (LU), overvoltage (OU1-3), cooling fan fault (FAn, FAn2), external fault (AU), operation fault (OP) and CPU fault (CPU)
	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	5.9 m/s^2 (0.6G) or lower
	Altitude	1000 m max.
	Location	Indoor areas free of corrosive gases, flammable gases, oil mist or dust
Protection		IP20 cabinet-mounted
Cooling method		0.75 kW 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. Temperature for 5.5 kW to 15 kW light load specification: -10°C to +40°C.
Note 2) The temperature protection level will be automatically changed when the output frequency is low.
Note 3) The carrier frequency will be automatically changed inside the inverter when the output frequency is low.

Product purchase numbering system

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

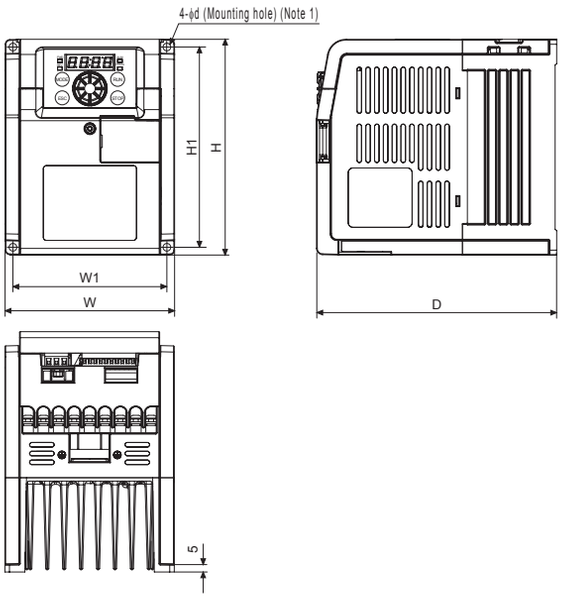
A MK300 0P7 4
① ② ③

① Series name MK300
② Applicable motor capacity
(Standard load specification)
0P2: 0.2kW 3P7: 3.7kW
0P4: 0.4kW 5P5: 5.5kW
0P7: 0.75kW 7P5: 7.5kW
1P5: 1.5kW 011: 11kW
2P2: 2.2kW 015: 15kW
③ Voltage class 2: 1-phase 200V
Voltage class 4: 3-phase 400V

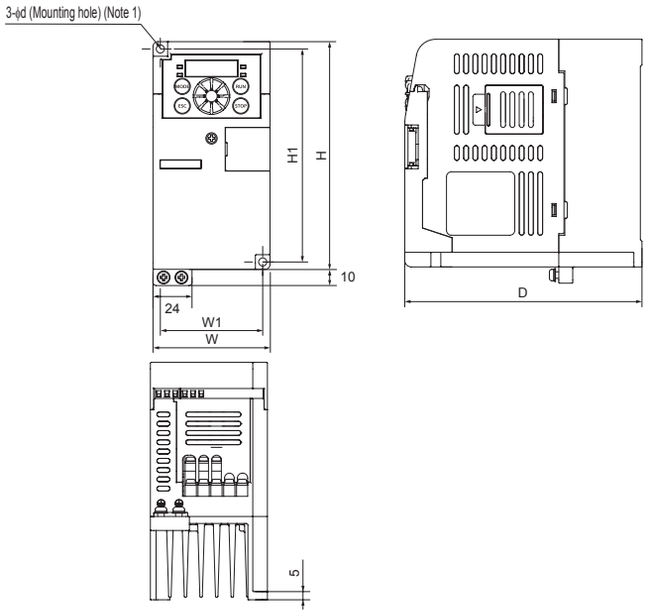
DIMENSIONS (Unit: mm)

• MK300 Inverter

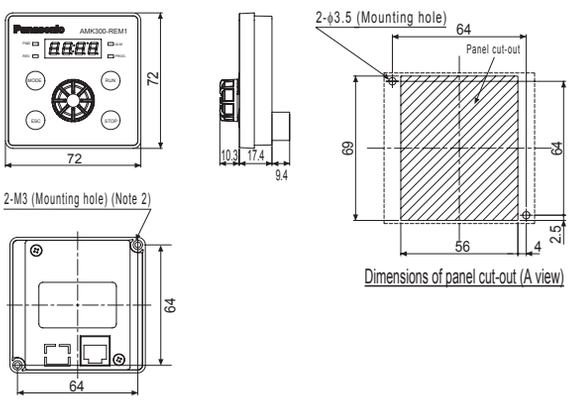
〈Above 0.75kW (included)〉



〈For 200V/0.2kW, 0.4kW〉



• AMK300-REM1 Operation Panel (Accessories sold separately)



■ 1-phase 200 V Input Type

Unit: mm

Inverter capacity	W1	W	H1	H	D	φd
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 400 V Input Type

Unit: mm

Inverter capacity	W1	W	H1	H	D	φd
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	185	7
AMK3000154						

Note 1) M6 screw is used in mounting holes for AMK300114 and AMK300154, while M4 screw is used in other mounting holes.
Note 2) M3 screw is used in mounting holes.

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