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CW23

Sumitomo Heavy Industries, Ltd.

No. D1401E-3.2
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Sumitomo Drive Technologies

Always on the Move

INVERTER HF-430 Series

Sensorless Vector Inverter

No. D1401E-3

HF-430

High-performance sensorless vector inverter

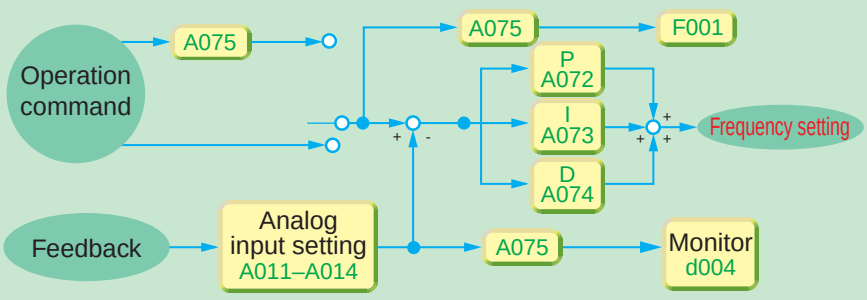
HF Series is much easier to use.

Meeting your needs for many applications

Global standard inverter for the new era

- **Downsizing**
  When compared with existing models, the size is upto 37% smaller (caparison with 5.5kW AF-3100α)
- **Global standards**
  Conforms to overseas standards (CE/UL/cUL) (The CE Marking requires installation with special noise filter.)
- **Communication function**
  DeviceNet
  - DeviceNet is the registered mark of the Open DeviceNet Vendor Association (ODVA).
- **Easy maintenance**
  The detachable cooling fan, power capacitors, and control terminal block facilitate maintenance.
- **Powerful operation**
  The sensorless control provides high starting torque, and high-performance operation.
  - The starting torque is 200% at 0.5 Hz and the torque during operation is more than 150%.
  - The on-line/off-line tuning identifies the motor characteristics for the best paformance.

- **PID control function provided as standard feature**



New HF-430 Series

Global application

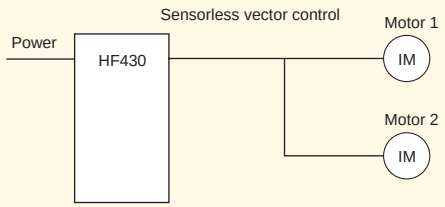
Standard products applicable to overseas standards

CONTENTS

List of models

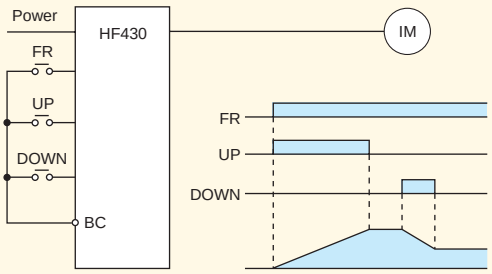
Applicable motors (kW)	5.5	7.5	11	15	22	30	37	45	55
200V-class	HF 4302–								
	5A5	7A5	011	015	022	030	037	045	055
400V-class	HF 4304–								
	5A5	7A5	011	015	022	030	037	045	055

Sensorless control operation allows simultaneous operation of two motors!!



Motor 1 and motor 2 are identical. Contact our company for details.

UP/DOWN function



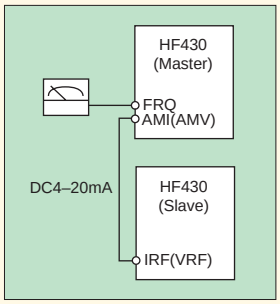
Built-in option cards

Digital input card	CHF43001-01
PG feedback card	CHF43002-01
DeviceNet card	CHF43003-01

Soon to be available

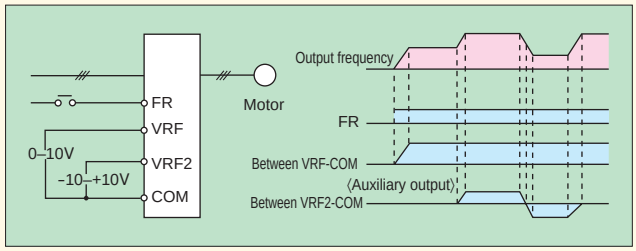
Input/output signal function for a variety of applications

In addition to the pulse output monitor, analog (current/voltage) output terminals 〈AMV/AMI terminals〉 are provided. Analog output from the master inverter can be fed directly into the slave inverter.



〈Functions available for AMV/AMI terminals〉
Output frequency, output current, torque, output voltage, electric power, thermal load factor, etc.

Multiple analog signals permit auxiliary speed input. Effective in speed adjustment during trial operation.



◆ Standard Specifications

Type			HF4302 -5A5	HF4302 -7A5	HF4302 -011	HF4302 -015	HF4302 -022	HF4302 -030	HF4302 -037	HF4302 -045	HF4302 -055	HF4304 -5A5	HF4304 -7A5	HF4304 -011	HF4304 -015	HF4304 -022	HF4304 -030	HF4304 -037	HF4304 -045	HF4304 -055
Max. applicable motor 4P (kW)			5.5	7.5	11	15	22	30	37	45	55	5.5	7.5	11	15	22	30	37	45	55
Rated capacity (kVA)		200V/400V	8.3	11	15.9	22.1	32.9	41.9	50.2	63.0	76.2	8.3	11	15.9	22.1	33.2	40.1	51.9	62.3	76.2
		240V/480V	9.9	13.3	19.1	26.6	39.4	50.2	60.2	75.6	91.4	9.9	13.3	19.1	26.6	39.9	48.2	62.3	74.8	91.4
Rated input AC voltage			3-phase (3-wire) 200–240 V (±10%), 50 Hz/60 Hz									3-phase (3-wire) 380–480 V (±10%), 50 Hz/60 Hz									
Rated output voltage (Note 3)			3-phase (3-wire) 200–240 V (±10%), (Corresponding to input voltage)									3-phase (3-wire) 380–480 V (±10%), (Corresponding to input voltage)									
Rated output current (A)			24	32	46	64	95	121	145	182	220	12	16	23	32	48	58	75	90	110
Braking	Regenerative braking (Note 5)		Built-in DBTR circuit (Discharging resistor installed separately)			Regenerative braking unit & discharging resistor installed separately						Built-in DBTR circuit (Discharging resistor installed separately)			Regenerative braking unit & discharging resistor installed separately					
	Connectable min. resistance (Ω)		17	17	17	–	–	–	–	–	–	70	50	50	–	–	–	–	–	–
Control method			Sinusoidal PWM method																	
Output frequency range (Note 4)			0.1–400Hz																	
Frequency accuracy			Digital command ±0.01% and analog command ±0.2% with respect to max. frequency (25±10˚C)																	
Frequency resolution			Digital setting: 0.01 Hz; analog setting: max. frequency/4000 (VRF terminal: 12 bit/0 to +10 V; VRF2 terminal: 12 bit/-10 to +10 V)																	
Voltage/frequency characteristics			V/F control constant torque, variable torque, variable vector control, base frequency 30-400 Hz (Note 7)																	
Speed fluctuation			±0.5% (under sensorless vector control)																	
Overload current rating			150%/60s, 200%/0.5s																	
Acceleration/deceleration time			0.01–3600.0 s (straight and curved line setting)																	
Starting torque			200%/0.5 Hz (under sensorless control); 150%/zero speed range torque																	
DC brake			Operation during starting, during deceleration by stop command, or by external input (Braking force, time, and frequency variable)																	
Input signal	Frequency setting	OPU	Setting by UP/DOWN key of digital operator																	
		External signal	DC0–+10V, -10–+10V (Input impedance 10kΩ), 4–20mA (Input impedance 100Ω)																	
		External port	Setting by RS485 communication																	
	Forward/reverse RUN/STOP	OPU	RUN/STOP (Forward and reverse derection are changed by command.)																	
		External signal	Forward rotation RUN/STOP and reverse rotation command are possible when the control terminal block is assignal (selection of NO or NC possible), 3-wire input possible																	
		External port	Setting by RS485 communication																	
	Multifunctional input terminal		8-terminal selection Terminals are selected from among the following for use: Reverse run command (RR), multistep speed (DFL-DFHH), jogging (JOG), external DC brake (DB), B mode (BMD), No.2 acceleration/deceleration (AD2), free run stop (MBS), external error (ES), USP function (USP), commercial changeover (CS), software lock (SFT), analog input changeover (AUT), C mode (CMD), reset (RST), 3-wire start (STA), 3-wire holding (STP), 3-wire forward/reverse (F/R), PID valid/invalid (PID), PID integral reset (PIDC), control gain changeover (CAS), remote operation speed up (UP), remote operation slow down (DWN), remote operation data clear (UDC), forced operation (OPE), multistep bit 1-7 (SF1-SF7), stall prevention changeover (OLR), torque limit provided/not provided(TL), torque limit changeover 1 (TRQ1), torque limit changeover 2 (TRQ2), P/PI changeover (P/PI), brake confirmation (BOK), orientation (ORT), LAD cancel (LAC), position deviation clear (PCLR), 90-degree phase difference permit (STAT), and no allocation (NO)																	
	Thermistor input terminal		1 terminal (positive temperature coefficient/negative temperature coefficient thermistor selection possible)																	
Output signal	Multifunctional output terminal		Selection of five open collector output terminals and one relay (1c contact point) terminal Driving (DRV), frequency reaching (UPF1), frequency detection 1 (UPF2), current detection 1 (OL), excessive PID deviation (OD), abnormal signal (AL), frequency detection 2 (UPF3), overtorque (OYQ), instantaneous stop signal (IP), insufficient voltage (UV), torque limit (TRQ), RUN time over (RNT), ON time over (ONT), electronic thermal alarm (THM), brake release (BRK), brake abnormal (BER), zero speed signal (ZS), excessive speed deviation (DSE), positioning complete (POK), frequency detection 3 (UPF4), frequency detection 4 (UPF5), current detection 2 (OL2), and alarm code 0-3 (AC0-AC3)																	
	Multifunctional monitor		0–10 VDC (max. 2 mA)/4–20 mADC (load 250Ω or less)/0–10 VDC (PWM, max. 1.2 mA)																	
Display monitor			Output frequency, output current, torque, frequency conversion value, error history, input/output terminal state, input power, etc.																	
Other functions			V/F free setting (7 points), upper/lower frequency limiter, frequency jump, curved-line acceleration/deceleration, manual torque boost level/break point, energy-saving operation, analog meter adjustment, starting frequency, carrier frequency adjustment, electronic thermal, free setting, external start/end (frequency/percentage), analog input selection, error retry, instantaneous stop and start, various signal output, reduced voltage starting, overload limit, initialization value setting, automatic deceleration for power cut off, AVR function, and auto tuning (on-/off-line)																	
Carrier frequency range			0.5–15kHz																	
Protective function			Overcurrent, overvoltage, insufficient voltage, electronic thermal, temperature error, start-up earth current, instantaneous stop, USP error, open-phase error, braking resistor overloading, CT error, external error, communication error, option error, etc.																	
Operating environment	Ambient temperature/storage temperature (Note 6)/humidity		-10–50˚C/-20–65˚C/20–90%RH (Dew condensation not allowed.)																	
	Vibration (Note 1)		5.9m/s^2 (0.6G), 10–55Hz																	
	Place of use		Not exceeding 1000 above sea level (Corrosive gas and dust not allowed.)																	
Option	Paint color		Blue																	
	Feedback option		PG vector control																	
	Digital input option		4-digit BCD, 16-bit binary																	
Other options			Braking resistor, AC reactor, DC reactor, various operator cables, noise filter, and regenerative braking unit																	
Approx. weight (kg)			3.5	5	5	12	12	20	30	30	50	3.5	5	5	12	12	20	30	30	50

Notes: 1. Conforms to the JIS C0911 (1984) test method.
2. The insulation distance conforms to UL and CE standards.
3. The output voltage lowers when the supply voltage lowers. (Except cases where the AVR function is selected.)
4. When the motor operation exceeds 50/60 Hz, contact our company to confirm the allowable max. speed, etc.
5. Inverters are not equipped with a braking resistor. When large regenerative torque is required, use an optional braking resistor or regenerative braking unit.
6. The storage temperature is the temperature during transportation.
7. When the base frequency is other than 60 Hz, the characteristics of the motor and speed reducer must be confirmed.

◆ Protective Functions

Name	Description		Display of digital operator	Display of remote operator/ Copy unit ERR1 ***
Over-current protection	Motor is restricted and decelerates rapidly, excessive current is drawn through the inverter and there is a risk of damage. Current protection circuit operates and the inverter output is switched off.	At constant Speed	E01	OC. Drive
		On decelertion Speed	E02	OC. Decel
		On acceleration Speed	E03	OC. Accel
		Other	E04	Over. C
Overload protection (Note 1)	When the Inverter detects an overload in the motor, the internal electronic thermal overload operates and the inverter output is switched off.		E05	Over. L
Braking resistor overload protection	When DBTR exceeds the usage ratio of the regenerative Braking resister, the over-voltage circuit operates and the inverter output is switched off.		E06	OL. BRD
Over-voltage protection	When regenerative energy from the motor exceeds the maximum level, the over-voltage circuit operates and the inverter output is switched off.		E07	Over. V
EEPROM error (Note 2)	When EEPROM in the inverter is subject to radiated noise or unusual temperature rises, the inverter output is switched off.		E08	EEPROM
Under-voltage	When the incoming voltage of inverter is low, the control circuit can't operate correctly. The under-voltage circuit operates and the inverter output is switched off		E09	Under. V
CT error	When an abnormality occurs to a CT (current detector) in the inverter, the inverter output is switched off.		E10	CT
CPU error	When a mistaken action causes an error to the inbuilt CPU, the inverter output is switched off.		E11	CPU
External trip	When a signal is given to the EXT multifunctional input terminal, the inverter output is switched off. (on external trip function select)		E12	EXTERNAL
USP error	This is the error displayed when the inverter power is restored while still in the RUN mode. (Valid when the USP function is selected)		E13	USP
Ground fault protection	When power is turned ON, this detects ground faults between the inverter output and the motor.		E14	GND. Flt.
Incoming over-voltage protection	When the incoming voltage is higher than the specification value, this detects it for 60 seconds then the over-voltage circuit operates and the inverter output is switched off.		E15	OV. SRC
Temporary power loss protection	When an instantaneous power failure occurs for more than 15ms, the inverter output is switched off. Once the instantaneous power failure wait time has elapsed and the power has not been restored it is regarded as a normal power failure. However, when the operation command is still ON with restart selection the inverter will restart. So please be careful of this.		E16	Inst. P-F
Abnormal temperature	When main circuit temperature raises by stopping of cooling fan, the inverter output is switched off.		E21	OH. FIN
Gate Allay error	Communication error between CPU and gate allay indicate		E23	GA
Open-phase protection	When an open-phase on the input supply occurs the inverter output is switched off.		E24	PH. Fail
Overload protection 2	When the Inverter detects an overload in the motor (under 0.2Hz), the inverter output is switched off.		E25	Over. L2
IGBT error	When an instantaneous over-current is detected on the output the inverter output is switched off to protect the main devices.		E30	IGBT
Thermistor error	When the Inverter detects a high resistance on the thermistor input from the motor the inverter output is switched off.		E35	TH
Abnormal brake	When inverter cannot detect switching of the brake (ON/FF) after releasing the brake, and for waiting for signal condition (b124) (When the braking control selection (b120) is enable.)		E36	BRAKE
Option 1 error 0-9	These indicate the error of option 1. You can realize the details each instruction manual.		E60 ~ E69	OP1-0–9
Option 2 error 0-9	These indicate the error of option 2. You can realize the details by each instruction manual.		E70 ~ E79	OP2-0–9
During under-voltage waiting	When the incoming voltage of the inverter has dropped, the inverter output is switched off and the inverter waits.		----	UV. WAIT

Note 1: After a trip occurs and 10 seconds pass, restart with reset operation.

2: When EEPROM error E08 occors, confirm the setting date again.

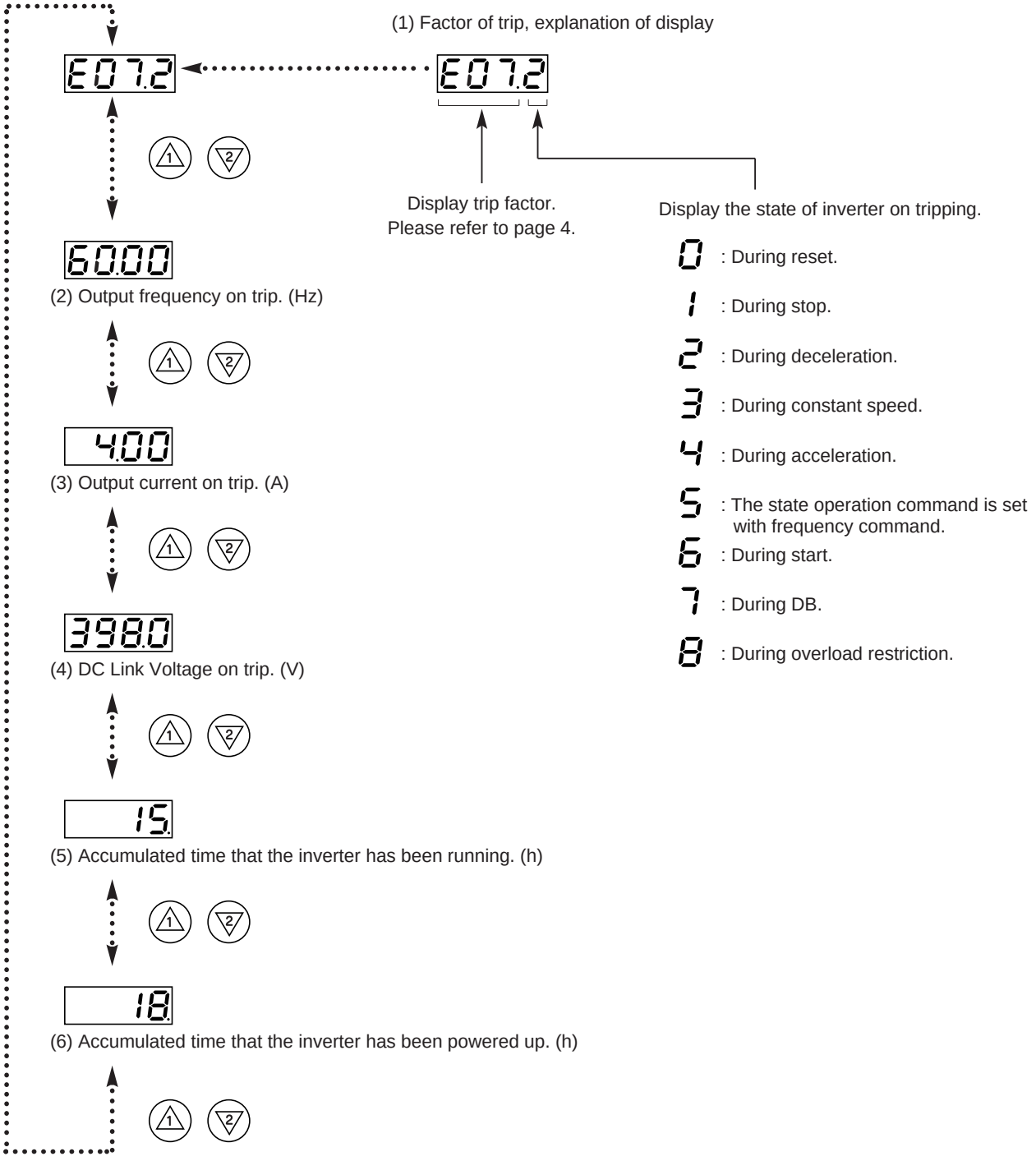
Protective Functions

State display

Code	Contents
0	Resetting
1	Stopping
2	Decelerating
3	At constant speed
4	Accelerating

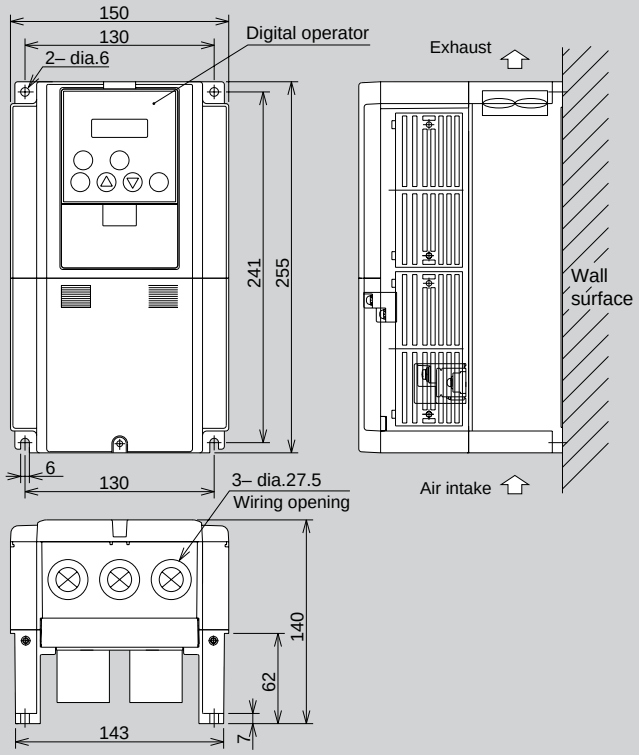
Code	Contents
5	f0 stopping
6	Starting
7	During DB
8	During overload rostriction
9	Auto tuning

Trip monitor display

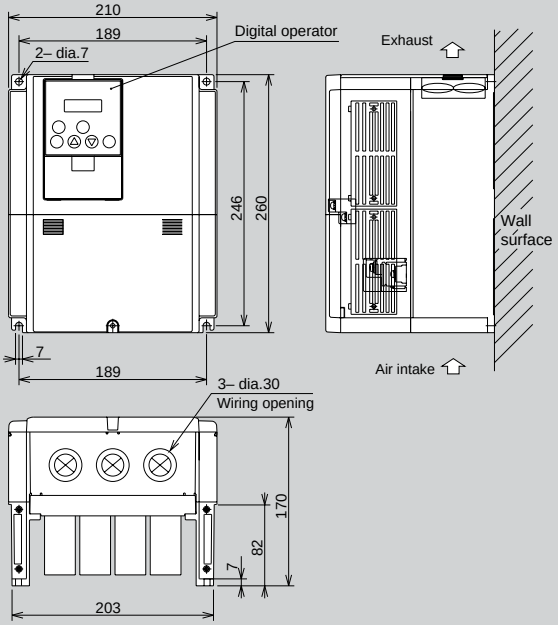


Dimensional Drawing

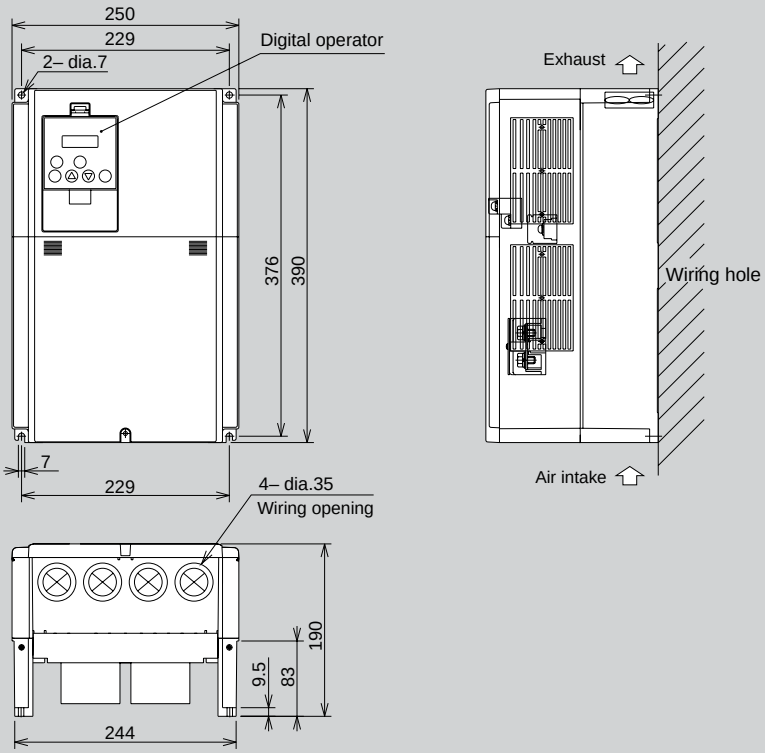
HF4302-5A5
HF4304-5A5



HF4302-7A5, 011
HF4304-7A5, 011

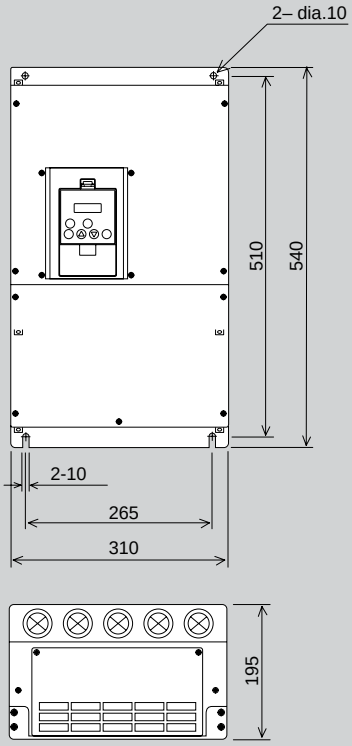


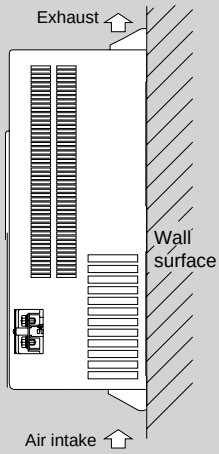
HF4302-015, 022
HF4304-015, 022



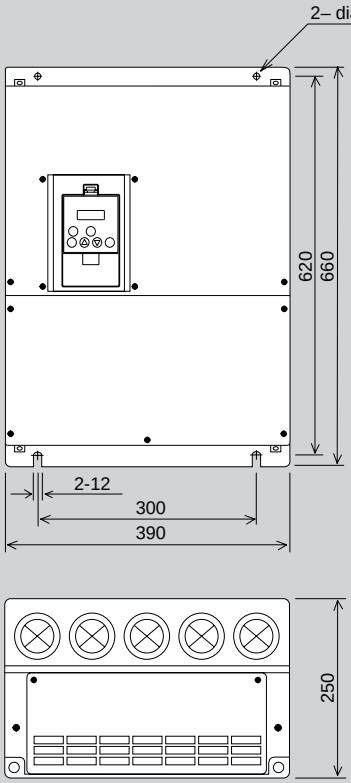
Dimensional Drawing

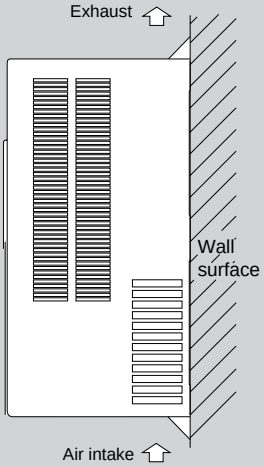
HF4302-030
HF4304-030





HF4302-037, -045
HF4304-037, -045, -055



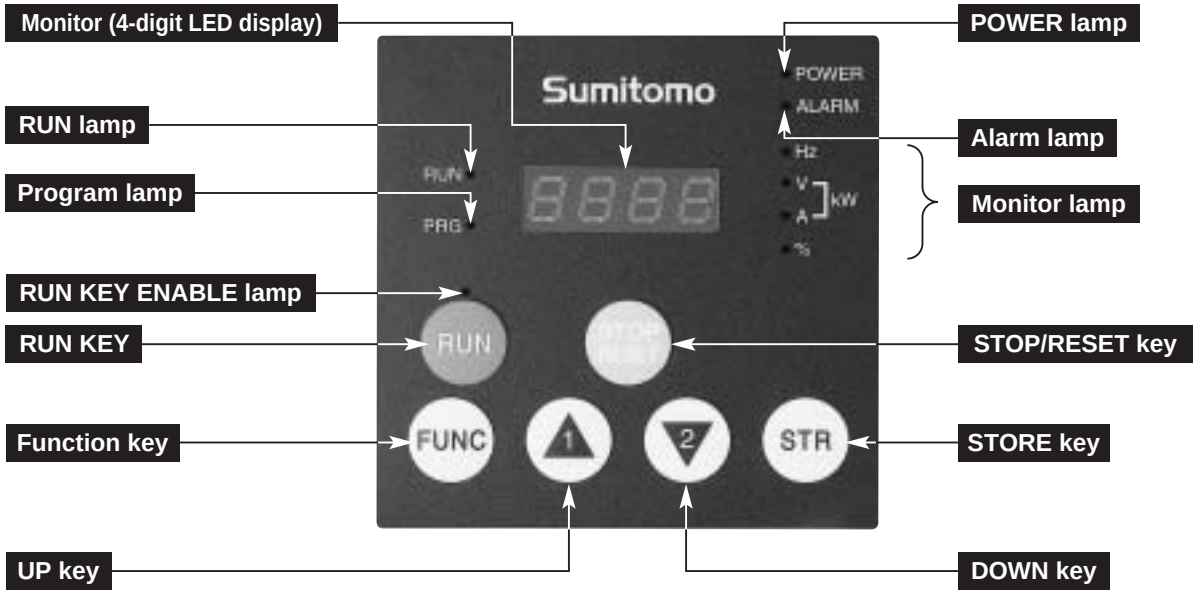


◆ Operation

■Operation with digital operator

The HF-430 Series is operated by the digital operator provided as standard equipment.

1. Name and details of each section of digital operator

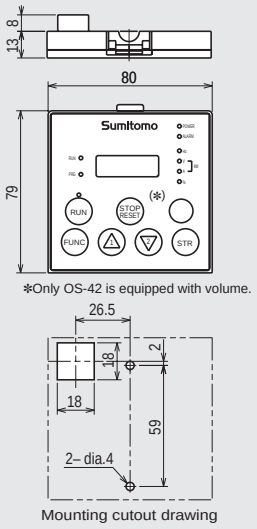


Name	Contents
Monitor	Displays frequency, output current, and set value
RUN lamp	ON during inverter operation
Program lamp	ON when set values of each functions are displayed on the monitor Blinking during warning (set value incomplete)
POWER lamp	Power lamp for control circuit
Alarm lamp	ON when the inverter trips
Monitor lamp	Indicates display on monitor Hz: Frequency V: Voltage A: Current kW: Electric power %: Percentage
RUN KEY ENABLE lamp	ON when the operation command selection (A002) is set in the operator (02) position.
Run key	Used to operate the motor. Valid only when the operation command selection (A002) is in the operator (02) position. (Check that the RUN KEY ENABLE lamp is ON.)
STOP/RESET key	Used for motor stop or error reset
Function key	Used to enter the monitor mode, basic setting mode, extension function mode, or function mode
STORE key	Used to store set values (Be sure to press this key to save set values.)
UP/DOWN key	Used to change the extension function mode, function mode, or set values

■Remote operator

■Dimensional drawing

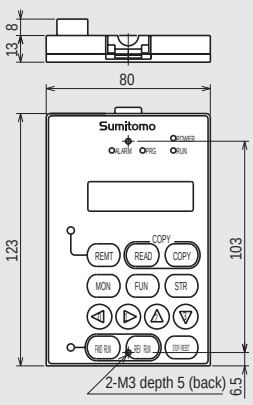
OS-40 OS-42

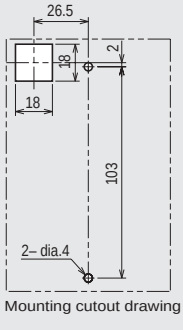


✻Only OS-42 is equipped with volume.

Mounting cutout drawing

OS-41

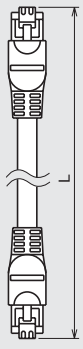




Mounting cutout drawing

IICS-1, 3

(Cable for OS-40, 41, and 42)



Model	Cable length L (m)
ICS–1	1
ICS–3	3

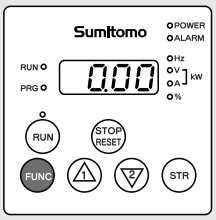
Operation

■Operation method

1. Setting method (Setting max. frequency)

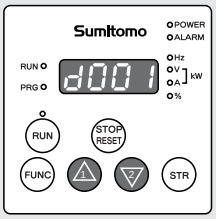
Power ON

(1) Display of 0.00 or the set value



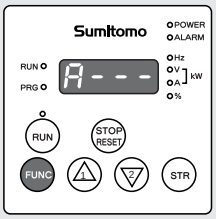
Press the FUNC key.

(2) Code No. is displayed.



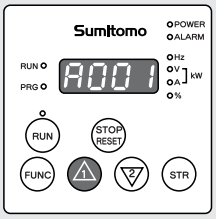
Keep pressing ▲1 and ▼2 until A - - - appears.

(3) A - - - appears.



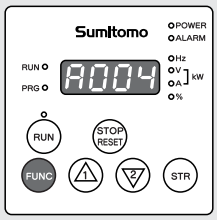
Press the FUNC key.

(4) A001 (or code No. set the last time) appears.



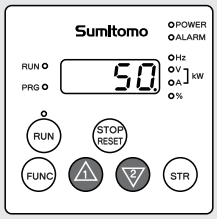
Keep pressing ▲1 and ▼2 until A004 appears.

(5) A004 appears.



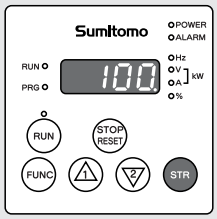
Press the FUNC key.

(6) The set value appears.



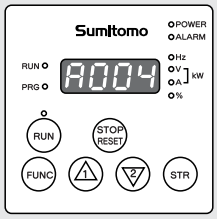
Change the set value with ▲1 and ▼2.

(7) A new set value appears.



Enter the value with the STR key.

(8) Setting end (Return to A004)

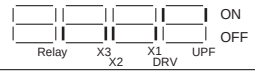


When starting operation, return to the monitor mode or basic setting mode.

◆ List of Functions

●Monitor mode/basic setting mode

"Setting possible in the change mode during operation" is valid when **b031** is set to 10.

Code		Name of function	Monitor/setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
Monitor	d001	Output frequency monitor	0.00–99.99/100.0–400.0Hz	–	–	–
	d002	Output current monitor	0.00–99.99/100.0–999.9A	–	–	–
	d003	Operation direction monitor	F (Forward)/o (Stop)/r (Reverse)	–	–	–
	d004	PID feedback monitor	0.00–99.99/100.0–999.9/1000.–9999./1000–9999/ ⌜100– ⌜999	–	–	–
	d005	Multifunctional input monitor	 (Example) ON :RST,ES,DFL,FR OFF :JOG,MBS,AD2,DFM	–	–	–
	d006	Multifunctional output monitor	 (Example) ON :UPF,DRV OFF :X1,X2,X3,relay	–	–	–
	d007	Frequency conversion monitor	0.00–99.99/100.0–999.9/1000.–9999./1000–3996 (10000–39960)	–	–	–
	d012	Output torque monitor	-300.–+300.	–	–	–
	d013	Output voltage monitor	0.0–600.0V	–	–	–
	d014	Input power monitor	0.0–999.9kW	–	–	–
	d016	Accumulated Run time monitor	0.00–99.99/100.0–999.9/1000.–9999./1000–9999 (10/hr unit) / ⌜100– ⌜999 (100/hr unit) h	–	–	–
	d017	Power ON time monitor	0.00–99.99/100.0–999.9/1000.–9999./1000–9999 (10/hr unit) / ⌜100– ⌜999 (100/hr unit) h	–	–	–
	d080	Number of trip time monitor	0.–9999./1000–6553 (10000–65530) times	–	–	–
	d081 ⌇ d086	Error history 1–6	Refer to p.4.	–	–	–
	d090	Warning monitor	Warning code	–	–	–
Setting	F001	Output frequency setting	0.0 starting frequency to max. frequency (B, C mode max. frequency)	0.00Hz	○	○
	F002	Acceleration time setting	0.01–99.99/100.0–999.9/1000.–3600.s	30.00s	○	○
	F202	B mode acceleration time setting	0.01–99.99/100.0–999.9/1000.–3600.s	30.00s	○	○
	F302	C mode acceleration time setting	0.01–99.99/100.0–999.9/1000.–3600.s	30.00s	○	○
	F003	Deceleration time setting	0.01–99.99/100.0–999.9/1000.–3600.s	30.00s	○	○
	F203	B mode deceleration time setting	0.01–99.99/100.0–999.9/1000.–3600.s	30.00s	○	○
	F303	C mode deceleration time setting	0.01–99.99/100.0–999.9/1000.–3600.s	30.00s	○	○
	F004	Operation direction selection	00 (Forward)/01 (Reverse)	00	×	×
Extension function	A---	Code to enter extension function A (basic function)				
	b---	Code to enter extension function B (protection function, fine adjustment function)				
	C---	Code to enter extension function C (terminal setting function)				
	H---	Code to enter extension function H (motor constant setting function)				
	P---	Code to enter extension function P (option setting function)				
	U---	Code to enter extension function U (user block area)				

●Extension function A

Code		Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
Basic setting	A001	Frequency command selection	00 (OPU volume)/01 (Terminal block)/02 (OPU)/03 (RS485)/04 (Option 1)/05 (Option 2)	02	×	×
	A002	Operation command selection	01 (Terminal block)/02 (OPU)/03 (RS485)/04 (Option 1)/05 (Option 2)	02	×	×
	A003	Base frequency	30. to max. frequency Hz	60.Hz	×	×
	A203	B mode base frequency	30. to max. B mode frequency Hz	60.Hz	×	×
	A303	C mode base frequency	30. to max. C mode frequency Hz	60.Hz	×	×
	A004	Max. frequency	30.–400.Hz	60.Hz	×	×
	A204	B mode max. frequency	30.–400.Hz	60.Hz	×	×
	A304	C mode max. frequency	30.–400.Hz	60.Hz	×	×
Analog input	A005	AUT terminal selection	00 (VRF and IRF changeover by AUT terminal)/01 (VRF and VRF2 changeover by AUT terminal) Note) AUT terminal: Analog input changeover (multifunctional input) terminal	00	×	×
	A006	VRF2 selection	74. 00 (Individual)/01 (Auxiliary speed (not reversible) for VRF and IRF)/02 (Auxiliary speed (reversible) for VRF and IRF)	00	×	×
	A011	VRF start	0.00–400.0Hz	0.00Hz	×	○
	A012	VRF end	0.00–400.0Hz	0.00Hz	×	○
	A013	VRF start rate	0–100%	0%	×	○
	A014	VRF end rate	0–100%	100%	×	○
	A015	VRF start selection	00 (External starting frequency)/01 (0 Hz)	01	×	○
	A016	VRF, IRF, VRF2 filter	1–30	8	×	○
Multi-speed/ jogging	A019	Multi-speed selection	00 (Binary: 4 terminals for 16-step speed change)/01 (Bit: 7 terminals for 8-step speed change)	00	×	×
	A020	Multi-speed 0	0.00 starting frequency to max. frequency Hz	10.00Hz	○	○
	A220	B mode Multi-speed 0	0.00 starting frequency to B mode max. frequency Hz	10.00Hz	○	○
	A320	C mode Multi-speed 0	0.00 starting frequency to C mode max. frequency Hz	10.00Hz	○	○
	A021 ⌇ A035	Multi-speed frequency (1st to 15th speed)	0.00. starting frequency to max. frequency Hz	A21=20.00HZ A22=30.00HZ A23=40.00HZ Others=0.00HZ	○	○

◆ List of Functions

●Extension function A

Code		Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
Multi-speed/ jogging	A038	Jogging frequency setting	0.00 starting frequency to 9.99 Hz	5.0Hz	○	○
	A039	Jogging selection	00 (Free run when JOG stops/invalid during operation)/01 (Deceleration stop when JOG stops/invalid during operation)/02 (DC brake when JOG stops/invalid during operation)/03 (Free run when JOG stops/valid during operation [After deceleration stop, JOG])/04 (Deceleration stop when JOG stops/valid during operation)/05 (DC brake when JOG stops/valid during operation)	01	×	○
V/f characteristics	A041	Torque boost selection	00 (Manual torque boost) 01/(Automatic torque boost)	00	×	×
	A241	B mode torque boost selection	00 (Manual torque boost) 01/(Automatic torque boost)	00	×	×
	A042	Manual torque boost	0.0–20.0%	1.0%	○	○
	A242	B mode manual torque boost	0.0–20.0%	1.0%	○	○
	A342	C mode manual torque boost	0.0–20.0%	1.0%	○	○
	A043	Manual torque boost point	0.0–50.0%	0.8%	○	○
	A243	B mode manual torque boost point	0.0–50.0%	0.8%	○	○
	A343	C mode manual torque boost point	0.0–50.0%	0.8%	○	○
	A044	Control method	00 (Constant torque characteristics)/01 (Variable torque characteristics)/02 (Free V/f characteristics)/	00 Note	×	×
	A244	B mode control method	00 (Constant torque characteristics)/01 (Variable torque characteristics)/02 (Free V/f characteristics)/03 (Sensorless control)/04 (0 speed area sensorless	00	×	×
	A344	C mode control method	00 (Constant torque characteristics)/01 (Variable torque characteristics)	00	×	×
	A045	Output voltage gain	20.0–100.0	100.0%	○	○
DC brake	A051	DC brakeking selection	00 (Invalid)/01 (Valid)	00	×	○
	A052	DC brakeking frequency	0.00–60.00Hz	0.50Hz	×	○
	A053	DC brakeking wait time	0.0–5.0s	0.0s	×	○
	A054	DC braking force	0.–100.%	0.%	×	○
	A055	DC braking time	0.0–60.0s	0.0s	×	○
	A056	DC braking edge/level selection	00 (Edge action)/01 (Level action)	01	×	○
	A057	DC braking force at start-up	0.–100.%	0.%	×	○
	A058	DC braking time at start-up	0.0–60.0s	0.0s	×	○
	A059	Carrier frequency for DC braking	0.5–15 kHz (Derating provided)	5.0kHz	×	×
Upper/lower limiter jump	A061	Frequency upper limiter	0.00, starting frequency to max. frequency Hz	0.00Hz	×	○
	A261	B mode frequency upper limiter	0.00, starting frequency to B mode max. frequency Hz	0.00Hz	×	○
	A062	Frequency lower limiter	0.00, starting frequency to max. frequency Hz	0.00Hz	×	○
	A262	B mode frequency lower limiter	0.00, starting frequency to B mode max. frequency Hz	0.00Hz	×	○
	A063	Jump frequency 1	0.00–400.0Hz	0.00Hz	×	○
	A064	Jump frequency width 1	0.00–10.00Hz	0.50Hz	×	○
	A065	Jump frequency 2	0.00.–400.0Hz	0.00Hz	×	○
	A066	Jump frequency width 2	0.00–10.00Hz	0.50Hz	×	○
	A067	Jump frequency 3	0.00–400.0Hz	0.00Hz	×	○
	A068	Jump frequency width 3	0.00–10.00Hz	0.50Hz	×	○
	A069	Acceleration stop frequency	0.00–400.0Hz	0.00Hz	×	○
	A070	Acceleration stop time	0.0–60.0s	0.0s	×	○
PID control	A071	PID selection	00 (Invalid)/01 (Valid)	00	×	○
	A072	P gain	0.2–5.0	1.0	○	○
	A073	I gain	0.0–3600.0s	1.0s	○	○
	A074	D gain	0.0–100.0s	0.0s	○	○
	A075	PID scale	0.01–99.99%	1.0	×	○
	A076	PID feedback \selection	00 (Feedback: IRF)/01 (Feedback: VRF)	00	×	○
AVR	A081	AVR selection	00 (Normally ON)/01 (Normally OFF)/02 (OFF during deceleration)	00	×	×
	A082	Motor voltage selection	200/215/220/230/240, 380/400/415/440/460/480V	200/400	×	×
Operation mode and acceleration/deceleration function	A085	Operation mode selection	00 (Normal operation)/01 (Energy-saving operation)/02 (Fuzzy operation)	00	×	×
	A086	Energy-saving response, accuracy adjustment	0.0–100.0.s	50.0	○	○
	A092	Acceleration time 2	0.01–3600.s	30.00s	○	○
	A292	B mode acceleration time 2	0.01–3600.s	30.00s	○	○
	A392	C mode acceleration time 2	0.01–3600.s	30.00s	○	○
	A093	Deceleration time 2	0.01–3600.s	30.00s	○	○
	A293	B mode deceleration time 2	0.01–3600.s	30.00s	○	○
	A393	C mode deceleration time 2	0.01–3600.s	30.00s	○	○
	A094	No.2 acceleration/deceleration selection	00 (Change with AD2 terminal)/01 (Change with setting)	00	×	×
	A294	B mode No.2 acceleration/deceleration selection	00 (Change with AD2 terminal)/01 (Change with setting)	00	×	×
	A095	No.2 acceleration frequency	0.00–400.0Hz	0.00Hz	×	×
	A295	B mode No.2 acceleration frequency	0.00–400.0Hz	0.00Hz	×	×
	A096	No.2 deceleration frequency	0.00–400.0Hz	0.00Hz	×	×
	A296	B mode No.2 deceleration frequency	0.00–400.0Hz	0.00Hz	×	×
	A097	Acceleration pattern selection	00 (Straight line)/01 (S-shaped curve)/02 (U-shaped curve)/03 (Reverse U-shaped curve)	00	×	×
	A098	Deceleration pattern selection	00 (Straight line)/01 (S-shaped curve)/02 (U-shaped curve)/03 (Reverse U-shaped curve)	00	×	×

Note: V/f (for constant torque operation) is preset before shipment. Change the setting to “03” for high starting torque or high-performance operation. Contact our technical section for the details of 04 and 05 operations.

●Extension function A

Code		Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
External frequency adjustment	A101	IRF start	0.00–400.0Hz	0.00Hz	×	×
	A102	IRF end	0.00–400.0Hz	0.00Hz	×	○
	A103	IRF start rate	0.–100.%	20.%	×	○
	A104	IRF end rate	0.–100.%	100.%	×	○
	A105	IRF start pattern selection	00 (External start frequency)/01 (0 Hz)	01	×	○
	A111	VRF2 start	-400.–400.Hz	0.00Hz	×	○
	A112	VRF2 end	-400.–400.Hz	0.00Hz	×	○
	A113	VRF2 start rate	-100–100%	-100.%	×	○
	A114	VRF2 end rate	-100–100%	100.%	×	○
Acceleration/ deceleration	A131	Acceleration curve constant	01 (Small swell) to 10 (Large swell)	02	×	○
	A132	Deceleration curve constant	01 (Small swell) to 10 (Large swell)	02	×	○

●Extension function b

Code		Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
Instantaneous restart	b001	Retry selection	00 (Trip)/01 (0 Hz start)/02 (Match speed start)/03 (Trip after match speed deceleration stop)	00	×	○
	b002	Allowable under-voltage time for restart	0.3–1.0s	1.0s	×	○
	b003	Retry wait time	0.3–100.0s	1.0s	×	○
	b004	Momentary power loss/trip selection	00 (Invalid)/01 (Valid)/02 (Invalid during stop or deceleration to stop)	00	×	○
	b005	Momentary power loss retry count	00 (16 times)/01 (Limitless)	00	×	○
	b006	Open-phase selection	00 (Invalid)/01 (Valid)	00	×	○
	b007	Lower limit match frequency	0.00–400.0Hz	0.00Hz	×	○
Electronic thermal	b012	Electronic thermal level	0.20 × Rated current to 1.20 × Rated current A	Inverter rated current A	×	○
	b212	B mode electronic thermal level	0.20 × Rated current to 1.20 × Rated current A	Inverter rated current A	×	○
	b312	C mode electronic thermal level	0.20 × Rated current to 1.20 × Rated current A	Inverter rated current A	×	○
	b013	Electronic thermal characteristics selection	00 (Reduction characteristics)/01 (Constant torque characteristics)/02 (Free setting)	00	×	○
	b213	B mode electronic thermal characteristics selection	00 (Reduction characteristics)/01 (Constant torque characteristics)/02 (Free setting)	00	×	○
	b313	C mode electronic thermal characteristics selection	00 (Reduction characteristics)/01 (Constant torque characteristics)/02 (Free setting)	00	×	○
	b015	Free electronic thermal frequency 1	0.–400.Hz	0.Hz	×	○
	b016	Free electronic thermal current 1	0.0–999.9A	0.0A	×	○
	b017	Free electronic thermal frequency 2	0.–400.Hz	0.Hz	×	○
	b018	Free electronic thermal current 2	0.0–999.9A	0.0A	×	○
	b019	Free electronic thermal frequency 3	0.–400.Hz	0.Hz	×	○
	b020	Free electronic thermal current 3	0.0–999.9A	0.0A	×	○
Stall prevention	b021	Stall prevention selection	00 (Invalid)/01 (Valid during acceleration and at constant speed)/02 (Valid at constant speed)/03 (Valid during acceleration and at constant speed (Speed increase during regeneration))/04 (Valid at constant speed (Speed increase during regeneration))	01	×	○
	b022	Stall prevention level	0.50 × Rated current to 2.00 × Rated current A	Inverter rated current X 1.5A	×	○
	b023	Stall prevention constant	0.10–30.00	1.00	×	○
	b024	Stall prevention 2 selection	00 (Invalid)/01 (Valid during acceleration and at constant speed)/02 (Valid at constant speed)/03 (Valid during acceleration and at constant speed (Speed increase during regeneration))/04 (Valid at constant speed (Speed increase during regeneration))	03	×	○
	b025	Stall prevention level 2	0.50 × Rated current to 2.00 × Rated current A	Inverter rated current X 1.5A	×	○
	b026	Stall prevention constant 2	0.10–30.00	1.00	×	○
Software lock	b031	Software lock selection	00 (When SFT terminal is ON, change of data other than this item impossible)/01 (When SFT terminal is ON, change in data other than this item and set frequency impossible)/02 (Change of data other than this item impossible)/03 (Change in data other than this item and set frequency impossible)/10 (Data changeable during operation mode)	03	×	○
Others	b034	Run time/ power ON time level	0.–6553 (× 10 h unit)	0 (× 10h)	×	○
	b035	Operation direction restrict	00 (Forward/reverse valid)/01 (Only forward valid)/02 (Only reverse valid)	00	×	×
	b036	Reduced voltage starting selection	00 (Short reduced voltage starting time) to 06 (Long reduced voltage starting time)	06	×	○
	b037	Display selection	00 (Indication of all items)/01 (Individual indication of function)/02 (User setting, indication of this item)	00	×	○
	b040	Torque limit selection	00 (4-quadrant)/01 (Terminal)/02 (Analog VRF2 input)/03 (Option 1)/04 (Option 2)	00	×	○
	b041	Torque limit 1 (Forward power running in 4-quadrant mode)	0.–200.%, no (Torque limiter invalid)	150.%	×	○
	b042	Torque limit 2 (Reverse regeneration in 4-quadrant mode)	0.–200.%, no (Torque limiter invalid)	150.%	×	○
	b043	Torque limit 3 (Reverse power running in 4-quadrant mode)	0.–200.%, no (Torque limiter invalid)	150.%	×	○
	b044	Torque limit 4 (Forward regeneration in 4-quadrant mode)	0.–200.%, no (Torque limiter invalid)	150.%	×	○
	b045	Torque LADSTOP selection	00 (Invalid)/01 (Valid)	00	×	○
	b046	Reverse run prevention selection	00 (Invalid)/01 (Valid)	00	×	○
	b050	Instantaneous stop non-stop selection	00 (Invalid)/01 (Valid)	00	×	×
	b051	Instantaneous stop non-stop start voltage	0.0–999.9V	0.0V	×	×
	b052	Instantaneous stop non-stop OV-LADSTOP level	0.0–999.9V	0.0V	×	×
	b053	Instantaneous stop non-stop deceleration time	0.01–99.99/100.0–999.9/1000.–3600s	1.00s	×	×
	b054	Instantaneous stop non-stop deceleration start width	0.00–10.00Hz	0.00Hz	×	×
	b080	AMV adjustment	0–255	180	○	○
	b081	FRQ adjustment	0–255	60	○	○
	b082	Starting frequency	0.10–9.99Hz	0.50Hz	×	○
	b083	Carrier frequency	0.5–15.0 kHz (Derating provided)	5.0kHz	×	×
	b084	Initialization selection	00 (Error history clear)/01 (Data initialization)/02 (Error history clear + Data initialization)	00	×	×

◆ List of functions

●Extension function b

Code		Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
Others	b085	Initialization data selection	00 (Domestic)	00		×
	b086	Frequency conversion factor	0.1–99.9	1.0	○	○
	b087	STOP/RESET key selection	00 (Valid during external operation)/01 (Invalid during external operation)	00		○
	b088	Free run stop selection	00 (0Hz start)/01 (Match frequency start)	00		○
	b090	Regenerative braking usage ratio	000.0–100.0%	0.0%		○
	b091	Operation during stop selection	00 (Deceleration)/01 (Free run stop)	00		×
	b092	Cooling fan operation selection	00 (Normally)/01 (During operation only (incl. 5 minutes after stop))	00		×
	b095	DBTR selection	00 (Invalid)/01 (Valid 〈Invalid during stop〉)/02 (Valid 〈valid during stop also〉)	00		○
	b096	DBTR ON level	330–380/660–760V	360/720V		○
	b098	Thermistor selection	00 (Invalid)/01 (PTC valid)/02 (NTC valid)	00		○
	b099	Thermistor error level	0.0–9999.Ω	3000Ω		○
Free V/f setting	b100	Free V/f frequency 1	0.–400.Hz	0.Hz		×
	b101	Free V/f voltage 1	0.0–800.0V	0.0V		×
	b102	Free V/f frequency 2	0.–400.Hz	0.Hz		×
	b103	Free V/f voltage 2	0.0–800.0V	0.0V		×
	b104	Free V/f frequency 3	0.–400.Hz	0.Hz		×
	b105	Free V/f voltage 3	0.0–800.0V	0.0V		×
	b106	Free V/f frequency 4	0.–400.Hz	0.Hz		×
	b107	Free V/f voltage 4	0.0–800.0V	0.0V		×
	b108	Free V/f frequency 5	0.–400.Hz	0.Hz		×
	b109	Free V/f voltage 5	0.0–800.0V	0.0V		×
	b110	Free V/f frequency 6	0.–400.Hz	0.Hz		×
	b111	Free V/f voltage 6	0.0–800.0V	0.0V		×
	b112	Free V/f frequency 7	0.–400.Hz	0.Hz		×
	b113	Free V/f voltage 7	0.0–800.0V	0.0V		×
	b120	Brake control selection	00 (Invalid)/01 (Valid)	00		○
	b121	Establishment waiting time	0.00–5.00s	0.00s		○
	b122	Acceleration waiting time	0.00–5.00s	0.00s		○
	b123	Stop waiting time	0.00–5.00s	0.00s		○
	b124	Brake confirmation waiting time	0.00–5.00s	0.00s		○
	b125	Brake release frequency setting	0.00–99.99/100.0–400.0Hz	0.00Hz		○
	b126	Brake release current setting	0.50 × Rated current to 2.00 × Rated current A	Inverter rated current A		○

●Extension function C

Code		Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
Multifunctional input terminal	C001	Multifunctional input terminal RST selection	01 (RR: Reverse rotation)/02 (DFL: Multistep speed 1)/03 (DFM: Multistep speed 2)/04 (DFH: Multistep speed 3)/05 (DFHH: Multistep speed 4)/06 (JOG: Jogging)/07 (DB: External DC brake)/08 (BMD: B mode)/09 (AD2: No.2 acceleration/deceleration)/11 (MBS: Free run)/12 (ES: External error)/13 (USP: Power recovery restart prevention function)/14 (CS: Commercial power changeover)/15 (SFT: Software lock)/16 (AUT: Analog input changeover)/17 (CMD: C mode)/18 (RST: Reset)/20 (STA: 3-wire start)/21 (STP: 3-wire holding)/22 (F/R: 3-wire forward/reverse)/23 (PID: PID valid/invalid)/24 (PIDC: PID integral reset)/26 (CAS: Control gain changeover)/27 (UP: Remote control speed up)/28 (DWN: Remote control speed down)/29 (UDC: Remote control data clear)/31 (OPE: Forced operation)/32 (SF1: Multistep speed bit 1)/33 (SF2: Multistep speed bit 2)/34 (SF3: Multistep speed bit 3)/35 (SF4: Multistep speed bit 4)/36 (SF5: Multistep speed bit 5)/37 (SF6: Multistep speed bit 6)/38 (SF7: Multistep speed bit 7)/39 (OLR: Stall prevention changeover)/40 (TL: Torque limit provided/not provided)/41 (TRQ1: Torque limit changeover 1)/42 (TRQ2: Torque limit changeover 2)/43 (PPI: P/PI changeover)/44 (BOK: Brake confirmation)/45 (ORT: Orientation)/46 (LAC: LAD cancel)/47 (PCLR: Position deviation clear)/48 (STAT: 90-degree phase difference permit)/255 (NO: No allocation)	18	×	○
	C002	Multifunctional input terminal ES selection		12	×	○
	C003	Multifunctional input terminal JOG selection		06	×	○
	C004	Multifunctional input terminal MBS selection		11	×	○
	C005	Multifunctional input terminal AD2 selection		09	×	○
	C006	Multifunctional input terminal DFM selection		03	×	○
	C007	Multifunctional input terminal DFL selection		02	×	○
	C008	Multifunctional input terminal RR selection		01	×	○
Multifunctional output terminal	C011	Multifunctional input RST A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	○
	C012	Multifunctional input ES A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	○
	C013	Multifunctional input JOG A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	○
	C014	Multifunctional input MBS A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	○
	C015	Multifunctional input AD2 A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	○
	C016	Multifunctional input DFM A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	○
	C017	Multifunctional input DFL A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	○
	C018	Multifunctional input FR A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	○
	C019	FR A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	○
	C021	Multifunctional output terminal UPF selection	00 (DRV: Driving)/01 (UPF1: Frequency arrival)/02 (UPF2: Frequency detection 1)/03 (OL: Current detection 1)/04 (OD: PID deviation excessive)/05 (AL: Alarm signal)/06 (UPF3: Frequency detection 2)/07 (OTQ: Torque detection 1)/08 (IP: Instantaneous stopping)/09 (UV: Insufficient voltage)/10 (TRQ: Torque limiting)/11 (RNT: RUN time over)/12 (ONT: Power ON time over)/13 (THM: Electronic thermal alarm)/19 (BRK: Brake release)/20 (BER: Brake error)/21 (ZS: 0 speed signal)/22 (DSE: Speed deviation maximum)/23 (POK: Positioning complete)/24 (UPF4: Frequency detection 3)/25 (UPF5: Frequency detection 4)/26 (OL2: Current detection 2) 〈When the alarm code output is selected by C062, AC0-AC2 or AC0-AC3 (Can: Alarm code output) is forcibly set for the multifunctional output terminals UPF-X2 or UPF-X3.〉	01	×	○
	C022	Multifunctional output terminal DRV selection		00	×	○
	C023	Multifunctional output terminal X1 selection		13	×	○
	C024	Multifunctional output terminal X2 selection		07	×	○
	C025	Multifunctional output terminal X3 selection		08	×	○
	C026	Alarm relay output terminal		05	×	○
Monitor terminal	C027	FRQ selection	00 (Output frequency)/01 (Output current)/02 (Output torque)/03 (Digital output frequency)/04 (Output voltage)/05 (Input power)/06 (Thermal load factor)/07 (LAD frequency) (03 can be set only for C027.)	00	×	○
	C028	AMV selection			×	○
	C029	AMI selection			×	○

●Extension function C

Code		Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
Output terminal state setting/output level setting	C031	Multifunctional output UPF A/B (NO/NVC) sekection	00 (NO) /01 (NC)	00	×	○
	C032	Multifunctional output DRV A/B (NO/NVC) sekection	00 (NO) /01 (NC)	00	×	○
	C033	Multifunctional output X1 A/B (NO/NVC) sekection	00 (NO) /01 (NC)	00	×	○
	C034	Multifunctional output X2 A/B (NO/NVC) sekection	00 (NO) /01 (NC)	00	×	○
	C035	Multifunctional output X3 A/B (NO/NVC) sekection	00 (NO) /01 (NC)	00	×	○
	C036	Abnormal contact point output A/B (NO/NVC) sekection	00 (NO) /01 (NC)	01	×	○
	C040	Current detection signal output mode selection	00 (During acceleration/deceleration/at constant speed)/01 (At constant speed)	00	×	○
	C041	Current detection level	0.00 × Rated current to 2.00 × Rated current A	Inverter rated current A	×	○
	C042	Acceleration reaching frequency	0.00–400.0Hz	0.00Hz	×	○
	C043	Deceleration reaching frequency	0.00–400.0Hz	0.00Hz	×	○
	C044	PID deviation level	0.0–100.0%	3.0%	×	○
	C045	Reaching frequency 2 during acceleration	0.00–99.99/100.0–400.0Hz	0.00	×	○
	C046	Reaching frequency 2 during acceleration	0.00–99.99/100.0–400.0Hz	0.00	×	○
	C055	Overtorque (forward power running) level	0.–200.%	100.	×	○
	C056	Overtorque (reverse regeneration) level	0.–200.%	100.	×	○
	C057	Overtorque (reverse power running) level	0.–200.%	100.	×	○
	C058	Overtorque (forward regeneration) level	0.–200.%	100.	×	○
	C061	Electronic thermal warning level	0.–100.%	85%	×	○
	C062	Alarm code selection	00 (Invalid)/01 (3 bits)/02 (4 bits)	00	×	○
	C063	Zero speed detection level	0.00–99.99/100.0Hz	0.00Hz	×	○
Communication function control	C070	Data command selection	02 (OPU)/03 (RS485)/04 (Option 1)/05 (Option 2)	02	×	×
	C071	Communication transmission speed	02 (Loop back test)/03 (2400bps)/04 (4800bps)/05 (9600bps)/06 (19200bps)	04	×	○
	C072	Communication station No.	1.–32.	1.	×	○
	C073	Communication bit length	7 (7 bits)/8 (8 bits)	7	×	○
	C074	Communication parity	00 (No parity)/01 (Even-parity)/02 (Odd-parity)	00	×	○
	C075	Communication stop bit	1 (1 bit)/2 (2 bits)	1	×	○
	C078	Communication waiting time	0.0–1000.ms	0.0ms	×	○
Analog meter setting	C081	VRF adjustment	0–6553 (65535)	Set for shipment	○	○
	C082	IRF adjustment	0–6553 (65535)	Set for shipment	○	○
	C083	VRF2 adjustment	0–6553 (65535)	Set for shipment	○	○
	C085	Thermistor adjustment	0.0–1000.	105.0	○	○
	C086	AMV offset adjustment	0.0–10.0V	0.0V	○	○
	C087	AMI adjustment	0–255	80	○	○
	C088	AMI offset adjustment	0–20.0mA	Set for shipment mA	○	○
Others	C091	Debug mode selection	00 (No indication)/01 (Indication)	00	×	○
	C101	UP/DWN selection	00 (Frequency data not stored)/01 (Frequency data stored)	00	×	○
	C102	Reset selection	00 (Trip cancel at ON)/01 (Trip cancel at OFF)/02 (Valid only during tripping 〈Cancelled at ON〉)	00	×	○
	C103	Reset match frequency selection	00 (0Hz start)/01 (Mach frequency start)	00	×	○
	C111	Current detection 2 level	0.00 × Rated current to 2.00 × Rated current	Inverter rated current	×	○
	C121	VRF zero adjustment	0–6553 (65535)	Set for shipment	○	○
	C122	IRF zero adjustment	0–6553 (65535)	Set for shipment	○	○
	C123	VRF2 zero adjustment	0–6553 (65535)	Set for shipment	○	○

●Extension function H

Code		Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
Motor constant/gain setting	H001	Auto tuning selection	00 (Invalid)/01 (No rotation)/02 (Rotation)	00	×	×
	H002	Motor type setting	00 (SUMITOMO general-purpose motor)/01 (SUMITOMO AF motor)/02 (Unusable)/03 (Auto tuning data)/04 (Auto tuning data (with on-line auto tuning))	00	×	×
	H202	B mode motor type selection	00 (SUMITOMO general-purpose motor)/01 (SUMITOMO AF motor)/02 (Unusable)/03 (Auto tuning data)/04 (Auto tuning data (with on-line auto tuning))	00	×	×
	H003	Motor capacity setting	0.20–75.0 (kW)	Set for shipment	×	×
	H203	B mode motor capacity setting	0.20–75.0 (kW)	Set for shipment	×	×
	H004	Number of motor poles setting	2/4/6/8	4	×	×
	H204	B mode number of motor poles setting	2/4/6/8	4	×	×
	H005	Speed response	0.001–65.53	1.590	○	○
	H205	B mode speed response	0.001–65.53	1.590	○	○
	H006	Stabilization constant	0–255	100	○	○
	H206	B mode stabilization constant	0–255	100	○	○
	H306	C mode stabilization constant	0–255	100	○	○
	H020	Motor primary resistance R1	0.000–9.999/10.00–65.53	By capacity	×	×
	H220	B mode motor primary resistance R1	0.000–9.999/10.00–65.53	By capacity	×	×
	H021	Motor secondary resistance R2	0.000–9.999/10.00–65.53	By capacity	×	×

List of functions

●Extension function H

Code		Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
Motor constant/gain setting	H221	B mode motor secondary resistance R2	0.000–9.999/10.00–65.53	By capacity	×	×
	H022	Motor inductance L	0.00–9.99/100.–655.3	By capacity	×	×
	H222	B mode motor inductance L	0.00–9.99/100.0–655.3	By capacity	×	×
	H023	Motor no-load current IO	0.00–9.99/100.0–655.3	By capacity	×	×
	H223	B mode motor no-load current IO	0.00–.99/100.0–655.3	By capacity	×	×
	H024	Motor inertial moment J	1.0–999.9/1000.–9999.	By capacity	×	×
	H224	B mode auto tuning motor inductance L	1.0–999.9/1000.–9999.	By capacity	×	×
	H030	Auto tuning motor primary resistance R1	0.000–9.999/10.00–65.53	By capacity	×	×
	H230	B mode auto tuning motor secondary resistance R2	0.000–9.999/10.00–65.53	By capacity	×	×
	H031	Auto tuning motor secondary resistance R2	0.000–9.999/10.00–65.53	Differs according to capacity	×	×
	H231	B mode auto tuning motor secondary resistance R2	0.000–9.999/10.00–65.53	Differs according to capacity	×	×
	H032	Auto tuning motor inductance L	0.00–9.99/100.0–655.3	Differs according to capacity	×	×
	H232	B mode auto tuning motor inductance L	0.00–9.99/100.0–655.3	Differs according to capacity	×	×
	H033	B mode auto tuning motor no-load current IO	0.00–9.99/100.0–655.3	Differs according to capacity	×	×
	H233	B mode auto tuning motor no-load current IO	0.00–9.99/100.0–655.3	Differs according to capacity	×	×
	H034	Auto tuning motor inductance L	1.0–999.9/1000.	Differs according to capacity	×	×
	H234	B mode auto tuning motor inductance L	1.0–999.9/1000.	Differs according to capacity	×	×
	H050	PI proportional gain	0.0–99.9/100.0–999.9/1000.%	100.0%	○	○
	H250	B mode PI proportional gain	0.0–99.9/100.0–999.9/1000.%	100.0%	○	○
	H051	PI integral gain	0.0–99.9/100.0–999.9/1000.%	100.0%	○	○
	H251	B mode PI integral gain	0.0–99.9/100.0–999.9/1000.%	100.0%	○	○
	H052	P proportional gain	0.00–10.00	1.00	○	○
	H252	B mode P proportional gain	0.00–10.00	1.00	○	○
	H060	0Hz SLV limiter	0.0–100.0%	100.0%	○	○
	H260	B mode zero sensorless limit	0.0–100.0%	100.0%	○	○
	H070	For PI proportional gain switching	0.0–99.9/100.0–999.9/1000.%	100.0%	○	○
	H071	For PI integral gain switching	0.0–99.9/100.0–999.9/1000.%	100.0%	○	○
	H072	For P proportional gain switching	0.00–10.00	1.00	○	○

●Extension function P

Code		Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
For options	P001	Operation for option 1 error selection	00 (Abnormal)/01 (Continuation of operation)	00	×	○
	P002	Operation for option 2 error selection	PG feedback option selection	00	×	○
	P010	PG feedback option selection	00 (Not provided)/01 (Provided)	00	×	×
	P011	Number of PG pulses setting	128–65000 pulses	1024 pulses	×	×
	P012	Control mode selection	00 (ASR mode)/01 (APR mode)	00	×	×
	P013	Pulse train mode selection	00/01/02	00	×	×
	P014	Orientation stop position setting	0.–4095.pulses	0.pulses	×	○
	P015	Orientation speed setting	0.00–99.99/100.0–120.0Hz	5.00Hz	×	○
	P016	Orientation direction setting	00 (Forward direction)/01 (Reverse direction)	00	×	×
	P017	Orientation completion range setting	0.–9999./1000 (10000) pulses	5.pulses	×	○
	P018	Orientation completion delay time setting	0.00–9.99s	0.00s	×	○
	P019	Electronic gear setting position selection	00 (Position feedback side)/01 (Position command side)	00	×	○
	P020	Electronic gear ratio numerator setting	1.–9999.	1.	×	○
	P021	Electronic gear ratio denominator setting	1.–9999.	1.	×	○
	P022	Position feed forward gain setting	0.00–99.99/100.0–655.3	0.00	×	○
	P023	Position loop gain setting	0.00–99.99/100.0	0.50	×	○
	P025	Secondary resistance correction selection	00 (Not provided)/01 (Provided)	00	×	○
	P026	Overspeed error detection level setting	0.0–150.0%	135%	×	○
	P027	Speed deviation error detection level setting	0.00–99.99/120.0Hz	7.5Hz	×	○
	P031	Option acceleration/deceleration time input selection	00 (Main unit)/01 (Option 1)/02 (Option 2)	00	×	×
	P032	Option position command input selection	00 (Main unit)/01 (Option 1)/02 (Option 2)	00	×	×

●Extension function U

Code		Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
	U001 ~ U012	User 1-12 selection	no/d001–P032	no	×	×

◆ Terminal function

Main circuit terminal

■ Terminal function

Terminal code	Terminal name	Function
R,S,T	Main power input terminal	Connect to the input power.
U,V,W	Inverter output terminal	Connect to 3-phase motor.
P,PR	External braking resistor connection terminal	Connect to braking resistor (option). (For 11 kW or less)
P,N,	External braking unit connection terminal	Connect to a braking unit (option).
P1,P	DC reactor connection terminal	Connect to a DC reactor (DCL).
E (G)⏚	Grounding wire connection terminal	Ground (Ground the equipment for prevention of electric shock and noise reduction.)
r1,t1	Control power input terminal	Connect to an input power supply.

■ Terminal arrangement

● HF4302-5A5 HF4304-5A5

		R (L1)	S (L2)	T (L3)	U (T1)	V (T2)	W (T3)
r1	t1	P1	P (+)	N (–)	PR	⏚ E(G)	⏚ E(G)

● HF4302-7A5–011
HF4304-7A5–011

R (L1)	S (L2)	T (L3)	U (T1)	V (T2)	W (T3)		
P1	P (+)	N (–)	PR	⏚ E(G)	⏚ E(G)	r1	t1

● HF4302-015, 030–037
HF4304-015–055

r1	t1

⏚ E(G)	R (L1)	S (L2)	T (L3)	P1	P (+)	N (–)	U (T1)	V (T2)	W (T3)	⏚ E(G)

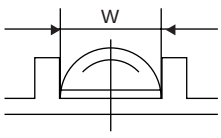
● HF4302-022, 045

r1	t1

R (L1)	S (L1)	T (L3)	P1	P (+)	N (–)	U (T1)	V (T2)	W (T3)

⏚ E(G) ⏚ E(G)

■ Terminal thread diameter/terminal width



W: Terminal width

Model	Terminal thread diameter	Thread width (mm)
HF 4302, HF 4304-5A5	M5	13
HF 4302, HF 4304-7A5	M5	17.5
HF 4302, HF 4304-011	M6	17.5
HF 4302-015, HF 4304-015–037	M6	18
HF 4302-022–037, HF 4304-045–055	M8	23
HF 4302-045	M10	35
t1 terminal (all models)	M4	9

Control circuit terminal

■ Terminal arrangement

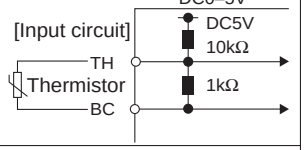
+V	VRF2	AMV	FRQ	TH	FR	RR	BC	AD2	JOG	RST	X2	X1	UPF	FB

COM	VRF	IRF	AMI	P24	PCS	BC	DFL	DFM	MBS	ES	X3	OM	DRV	FC	FA

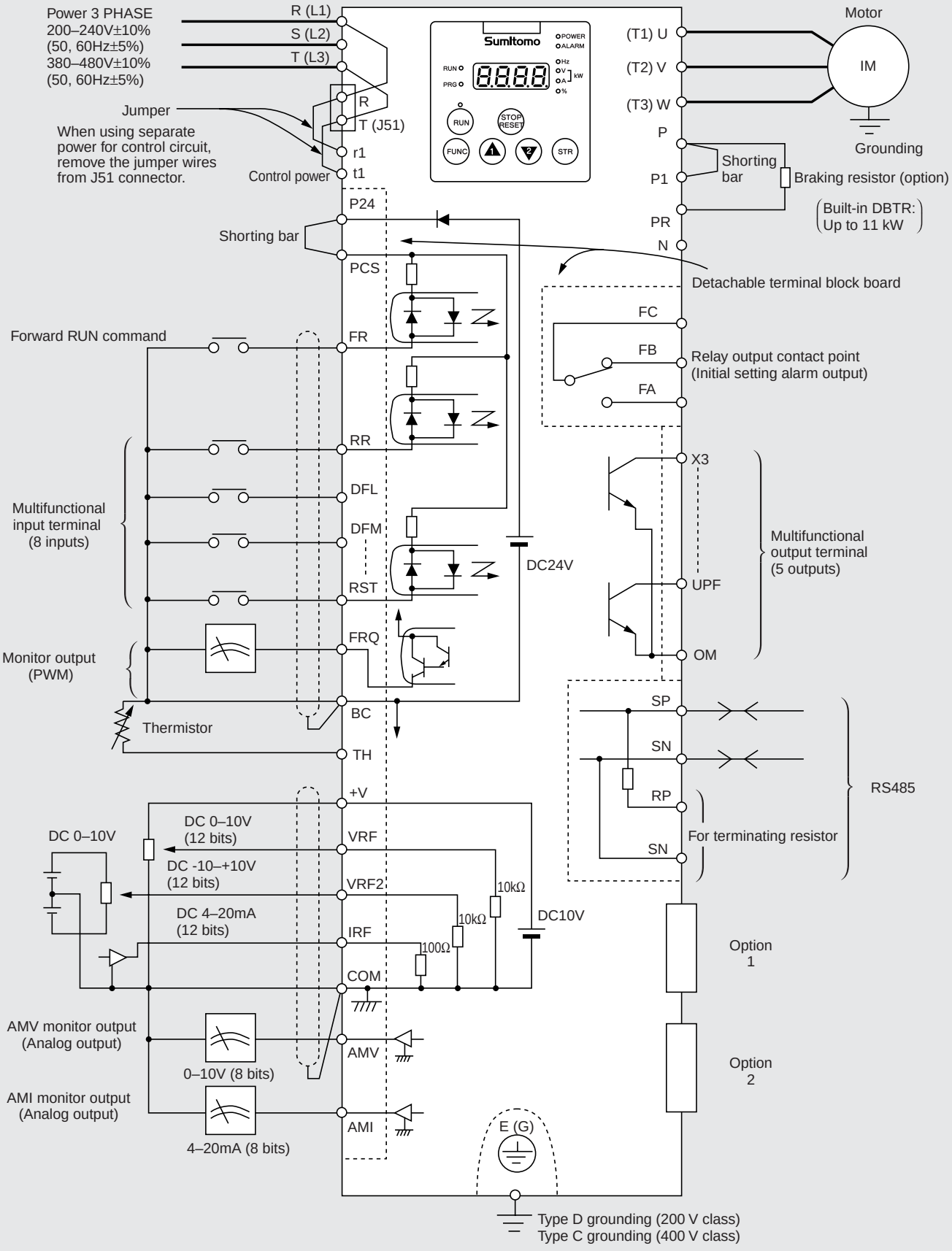
Terminal function

Control circuit terminal

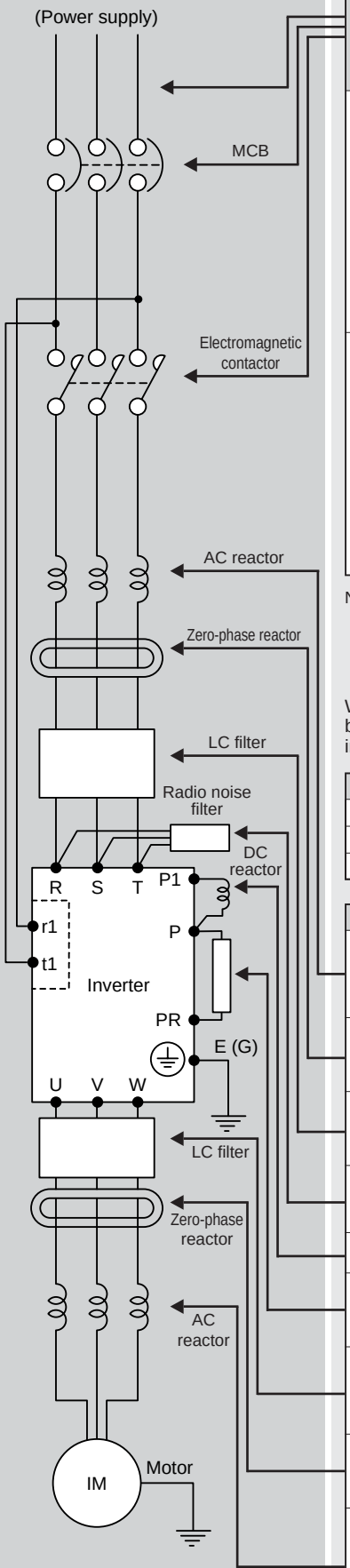
■ Terminal function

			Terminal code	Terminal name	Setting range	Electric characteristics
Analog	Power		COM	Analog power common	Common for analog input (VRF, VRF2, IRF) and analog output (AMV, AMI). *Do not ground to earth.	—
			+V	Power for frequency setting	10 VDC power for VRF terminal	Allowable load current: 20 mA or less
	Frequency setting input		VRF	Frequency command terminal (Voltage)	Max. frequency at 10 VDC when 0-10 VDC is input. Set A014 if max. frequency corresponds to voltage below 10 VDC.	Input impedance: 10Ω Allowable input voltage range: -0.3 to +12 VDC
			VRF2	Frequency command auxiliary terminal (Voltage)	VRF2 is a ±10 VDC signal. Use VRF2 for either an auxiliary signal added to VRF or IRF or as the main frequency reference. The that codes the direction with the voltage polarity.	Input impedance: 10Ω Allowable input voltage range: 0 to ±12 VDC
			IRF	Frequency command terminal (Current)	Max. frequency at 20 mADC when 4-20 mADC is input. The IRF signal is valid only when the AUT terminal is ON.	Input impedance: 100Ω Allowable input current range: 0 to 24 mADC
	Monitor output		AMV	Analog voltage output monitor	Select one of the monitor items for either output – output frequency, output current, torque, output voltage, input power, and electronic thermal load factor.	0-10 VDC voltage output Allowable load current: 2 mA or less
			AMI	Analog current output monitor		4-20 mADC current output Allowable load impedance: 250Ω or less
Digital	Monitor output		FRQ	Digital monitor (Voltage)	[0-10 VDC voltage output (PWM output method)] Select and input one of the monitor items – output frequency, output current, torque, output voltage, input power, and electronic thermal load factor. [Digital pulse output (Pulse voltage 0/10 VDC)] Use this method to output a pulse signal with a frequency that scales to the monitor item (duty 50%).	Allowable load current: 1.2 mA or less Digital output frequency range: 0-3.6 kHz 0–3.6kHz
	Power		P24	Power terminal for interface	24 VDC power for contact input Contact input common when sourcing output logic is selected	Allowable load current: 100 mA or less
			BC	Power common terminal for interface	Common terminal for power P24 terminal, thermistor input TH terminal, and digital monitor FRQ terminal for interface. Contact input common when the sinking output logic is selected. ✻Do not ground to earth.	—
	Contact input	Operation command	FR	Forward operation command terminal	FR signal ON for forward run command, and OFF for stop command	[Condition for contact input ON] Voltage between each input and PCS: 18 VDC or more [Condition for contact input OFF] Voltage between each input and PCS: 3 VDC or less Input impedance Between each input and PCS: 4.7 kΩ Allowable max. voltage Between each input and PCS: 27 VDC
		Function/selector	RST ES JOG MBS AD2 DFM DFL RR	Multifunctional input terminal	8 inputs programmable from the functions reverse rotation command, multistep speed 1-4, jogging, external DC braking, B mode, No.2 acceleration/deceleration, free run stop, external error, USP function, commercial power changeover, software lock, analog input changeover, C mode, error reset, 3-wire activation, 3-wire holding, 3-wire forward/reverse, PID valid/invalid, PID integral reset, remote control speed up, remote control slow down, remote control data clear, multistep bit 1-7, overload limit changeover, and no allocation.	
			PCS	Common for multifunctional input terminal	The input logic type can be selected from either sinking output or sourcing output using the PCS terminal. For sinking output type input logic connect the shorting bar between P24 and PCS terminals. For sourcing output type input logic connect the shorting bar between PCS and BC and use P24 or external power to drive the inputs.	
	Open collector output	State/factor	UPF DRV X1 X2 X3	Multifunctional output terminal	The 5 output terminals available are programmable for various functions. When alarm code is selected with C062, the output terminals UPF-X2 (3-bits) or the output terminals UPF-X3 terminals (4-bits) generate alarm codes. The output terminals and OM terminal are hardwired for both sourcing and sinking type output signals.	Between output terminals and OM Voltage drop of 4 V or less at ON Allowable max. voltage: 27 VDC Allowable max. current: 50 mA
			OM	Remote control for multifunctional output terminal	Common terminal for multifunctional output terminals	
Analog	Analog input	Sensor	TH	Thermistor input terminal	When the external thermistor is connected and the temperature foult occurs, the external thermistor trips the inverter. The BC terminal is the common terminal. [Recommended thermistor characteristics] Allowable rated power: 100 mW or more, impedance during temperature error: 3kΩ. ✻Detection level of temperature error is variable within the range between 0 and 9999Ω.	Allowable input voltage range DC0–5V 
Digital	Relay contact output	State/alarm	FA FB FC	Alarm output terminal	Function of output is programmable. Output is FORM C type relay output. The default function for this output is ALARM indicating that the protection feature tripped the drive and shut down motor operation.	Max. contact capacityFB-FC 250 VAC, 2A (resistance)/0.2 A (induction) FA-FC 250 VAC, 2A (resistance)/0.2 A (induction) Min. contact capacity AC100V, 10mA DC5V, 100mA

Standard connection diagram



Applicable wiring for accessories options



Standard Accessories

Rated input voltage	Applicable motor rating	Applicable inverter model	Circuit breaker and earth leakage breaker (Made by Mitsubishi Electric)		Electromagnetic contactor [MC] (Made by Fuji Electric)	Cable size (mm²) (Note)	
			No reactor		Input side No reactor	Input side No reactor	Inverter output side
200 V class	5.5	HF4302-5A5	NF50, NV50	50A	SC-1N	8 (5.5)	5.5 (5.5)
	7.5	HF4302-7A5	NF100, NV100	60A	SC-2N	14 (8)	8 (8)
	11	HF4302-011	NF100, NV100	75A	SC-2SN	22 (14)	14 (14)
	15	HF4302-015	NF100, NV100	100A	SC-3N	38 (14)	22 (14)
	22	HF4302-022	NF225, NV225	175A	SC-5N	60 (22)	38 (22)
	30	HF4302-030	NF225, NV225	200A	SC-7N	38*2 (38)	60 (30)
	37	HF4302-037	NF400, NV400	250A	SC-8N	50*2 (50)	50*2 (38)
	45	HF4302-045	NF400, NV400	300A	SC-10N	60*2 (60)	38*2 (50)
	55	HF4302-055	NF400, NN400	350A	SC-11N	80*2 (38*2)	60*2 (60)
400 V class	5.5	HF4304-5A5	NF30, NV30	30A	SC-5-1	5.5 (2)	3.5 (3.5)
	7.5	HF4304-7A5	NF30, NV30	30A	SC-5-1	5.5 (2)	3.5 (3.5)
	11	HF4304-011	NF50, NV50	50A	SC-1N	8 (3.5)	5.5 (3.5)
	15	HF4304-015	NF100, NV100	60A	SC-2N	14 (5.5)	8 (5.5)
	22	HF4304-022	NF100, NV100	100A	SC-2SN	30 (5.5)	14 (8)
	30	HF4304-030	NF225, NV225	125A	SC-3N	38 (14)	22 (14)
	37	HF4304-037	NF225, NV225	150A	SC-4N	60 (22)	38 (14)
	45	HF4304-045	NF225, NV225	175A	SC-5N	30*2 (30)	50 (22)
	55	HF4304-055	NF225, NV225	200A	SC-7N	38*2 (38)	60 (30)

Notes: 1. Type of cable: 600 V IV cable. 600 V crosslinked-polyethylene-insulated cable is shown in parentheses.
2. The above types may change depending on the operating environment.
3. Use thicker cables when wiring distance exceeds 20 m.
4. The shown accessories are for use with SUMITOMO 3-phase, 4-pole motors.

When using an earth leakage breaker (ELB), select the breaker's trip current from the table below based on the total wire distance (ℓ) by summing the distance from the breaker to the inverter and the inverter to the motor.

ℓ	Trip current (mA)
100m or less	30
300m or less	100
600m or less	200

Notes: 1. When CV wiring is used in metal conduit, the leakage current is approximately 30mA/km.
2. Leakage current will increase eightfold with IV type cable due to higher dielectric constant. In this case, use ELB with the next higher trip rating.

Name	Function
Input AC reactor For higher harmonic control /power smoothing/power factor improvement	This is useful in suppressing harmonics induced on the power supply lines, or when the main power voltage imbalance exceeds 3%, (and power source capacity is more than 500kVA), or to smooth out line fluctuations. It also improves the power factor.
Radio noise filter Zero-phase reactor	Electrical noise interference may occur on nearby equipment such as a radio receiver. This magenetic choke filter helps reduce radiated noise.
Input noise filter LC filter	This filter reduces the conducted noise in the power supply wiring between the inverter and the power distribution system. Connect it to the inverter primary (input side).
Input radio noise filter (XY filter)	This capacitive filter reduces radiated noise from the main power wires in the inverter input side.
DC reactor	The inductor or choke filter suppresses harmonics generated by the inverter.
Regenerative braking resistor	The regenerative braking resistor is useful for increasing the inverter's control torque for high duty-cycle (on-off) applications, and improving the decelerating capacity.
Output noise filter LC filter	This filter reduces radiated noise emitted on the inverter output cable that may interfere with radio or television reception and test equipment and sensor operation.
Radio noise filter Zero-phase reactor	Electrical noise interference may occur on nearby equipment such as a radio receiver. This magenetic choke filter helps reduce radiated noise.
Output AC reactor	Install the reactor on the output side to reduce leakage current contributed by high harmonics. Contact our company for details.

Note: Ground the LC filter according to the operation manual. Incorrect grounding will lessen the effectiveness.

Braking unit/braking resistor

Selection table

Voltage	Type of inverter	Motor rating (kW)	Braking torque 100%							
			Operation rate : 4%ED max. Braking time : 7 sec. max.				Operation rate : 10%ED max. Braking time : 15 sec. max.			
			Braking unit		Braking resistor ✻✻		Braking unit		Braking resistor ✻✻	
			Type	Qty	Type	Qty	Type	Qty	Type	Qty
200V Class	HF4302-5A5	5.5	−✻	−	Y135AA208 (70Ω 400W)	2P	−✻	−	X435AC069 (10Ω 750W)	2S
	HF4302-7A5	7.5	−✻	−	X435AC069 (10Ω 750W)	2S	−✻	−	X435AC069 (10Ω 750W)	2S
	HF4302-011	11	−✻	−	X435AC069 (10Ω 750W)	2S	−✻	−	X435AC094 (7Ω 750W)	3S
	HF4302-015	15	DU-207S	1	X435AC064 (2.5Ω 750W)	3S	DU-202S	1	X435AC064 (2.5Ω 750W)	4S
	HF4302-022	22	DU-207S	1	X435AC054 (1.6Ω 750W)	3S	DU-204S	1	X435AC065 (1.1Ω 750W)	6S
	HF4302-030	30	DU-208S	1	X435AC065 (1.1Ω 750W)	4S	DU-205S	1	X435AC066 (0.6Ω 750W)	8S
	HF4302-037	37	DU-208S	1	X435AC065 (1.1Ω 750W)	4S	DU-203S	2	X435AC054 (1.6Ω 750W)	5S×2
	HF4302-045	45	DU-207S	2	X435AC054 (1.6Ω 750W)	3S×2	DU-204S	2	X435AC065 (1.1Ω 750W)	6S×2
400V Class	HF4304-5A5	5.5	−✻	−	Y135AA205 (200Ω 300W)	2P	−✻	−	Y135AA209 (250Ω 400W)	3P
	HF4304-7A5	7.5	−✻	−	Y135AA153 (30Ω 400W)	2S	−✻	−	X435AC058 (30Ω 750W)	2S
	HF4304-011	11	−✻	−	X435AC058 (30Ω 750W)	2S	−✻	−	X435AC103 (20Ω 750W)	3S
	HF4304-015	15	DU-401S	1	X435AC069 (10Ω 750W)	3S	DU-402S	1	X435AC069 (10Ω 750W)	4S
	HF4304-022	22	DU-401S	1	X435AC063 (4.5Ω 750W)	3S	DU-403S	1	X435AC063 (4.5Ω 750W)	4S
	HF4304-030	30	DU-409S	1	X435AC063 (4.5Ω 750W)	4S	DU-404S	1	X435AC064 (2.5Ω 750W)	8S
	HF4304-037	37	DU-409S	1	X435AC064 (2.5Ω 750W)	4S	DU-405S	1	X435AC054 (1.6Ω 750W)	10S
	HF4304-045	45	DU-410S	1	X435AC054 (1.6Ω 750W)	5S	DU-406S	1	X435AC065 (1.1Ω 750W)	12S
	HF4304-055	55	DU-410S	1	X435AC054 (1.6Ω 750W)	6S	DU-407S	1	X435AC066 (0.6Ω 750W)	16S

✻ A braking unit is unnecessary because a braking circuit is built in the inverter. Use an external thermal relay for protection of the resistor from heating. When the thermal relay is activated, turn off the input power of the inverter. Set the usage rate with inverter parameters for protection from overloading.

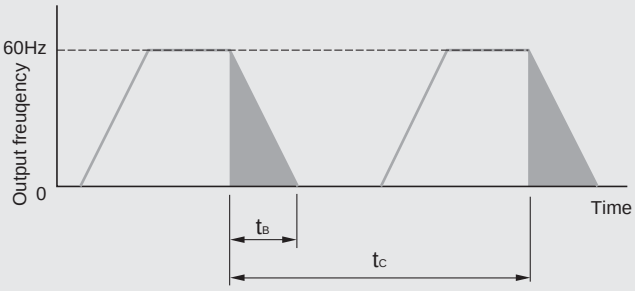
✻✻ P in the column of the number of resistors means parallel connection and S means series connection.

Wire size (Terminal P/PR/N)

Type of braking unit		Wire	Type of braking unit		Wire
200V class	DU-201S	3.5mm²	400V class	DU-401S	2mm²
	DU-202S			DU-402S	3.5mm²
	DU-203S	5.5mm²		DU-403S	
	DU-204S			DU-404S	
	DU-205S	8mm²		DU-405S	5.5mm²
	DU-207S	3.5mm²		DU-406S	
	DU-208S			DU-407S	8mm²
				DU-408S	2mm²
				DU-409S	3.5mm²
				DU-410S	

2mm² wire size (terminals P and PR) for HF4302-5A5, -7A5, -011 and HF4304-5A5, -7A5, -011

Operating rate %ED



Operating rate %ED = $\frac{t_B}{t_C} \times 100$

t_B =Braking time (sec)

t_C =Cycle time (sec)

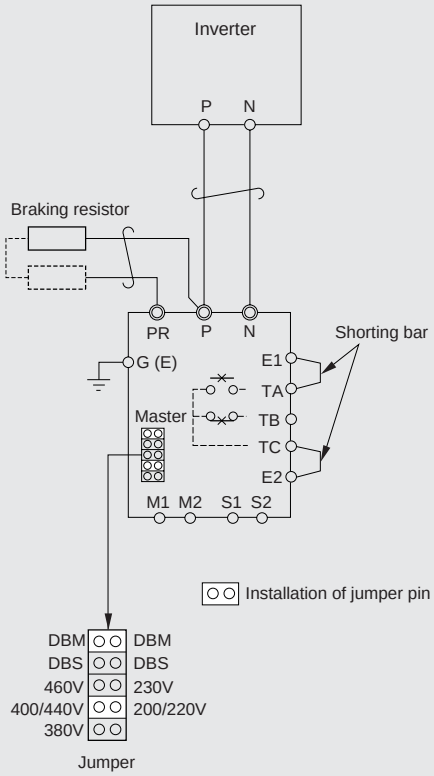
Notes:

1. The maximum temperature of the braking resistor is approx. 150˚C. Use heat-resistant wire. When installing the resistor pay close attention to the location with regards to clearance from heat sensitive elements.
2. The maximum wire length shall be 5 m. Twist the wire.
3. Improper connection of P, N, and PR will lead to failure of the inverter and braking unit. Make sure that the same terminal codes are connected.
4. The braking resistor may become hot during operation. Do not touch it directly with bare hands.

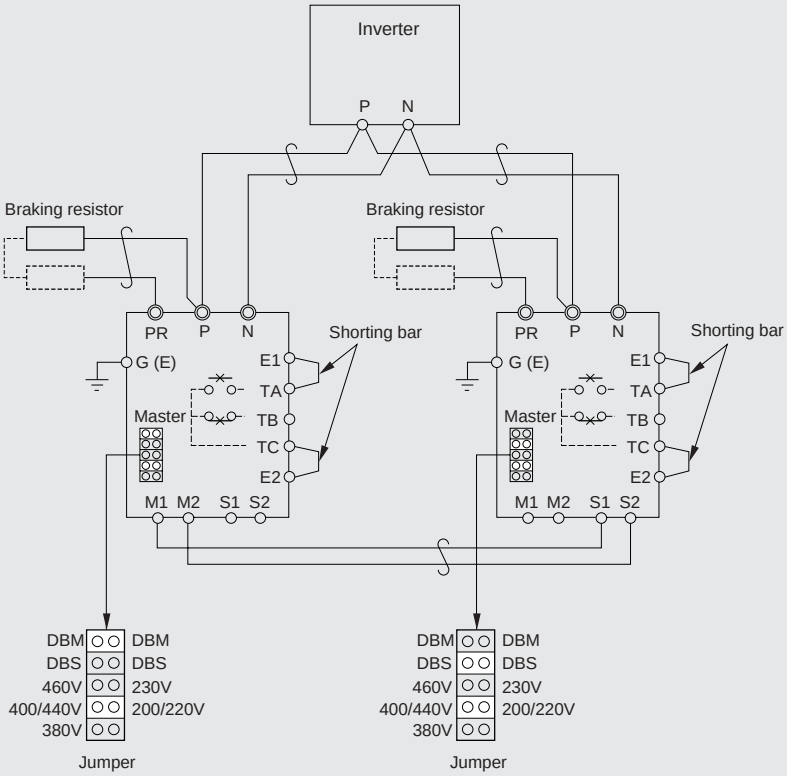
Braking unit/braking resistor

Connection diagram of braking unit/braking resistor

①When one braking unit is used

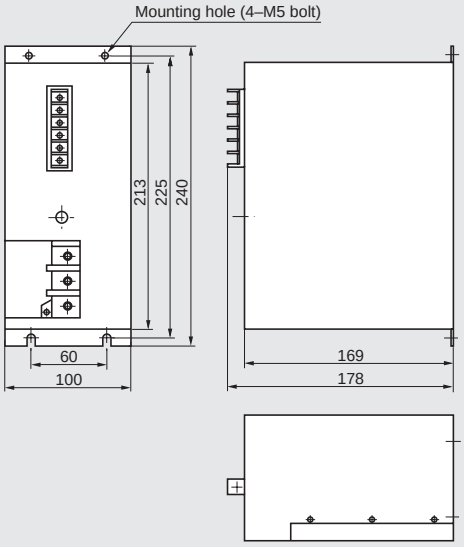


②When two braking units are used



The above are examples of installation of jumpers when the inverter supply voltage is 200/220 V and 400/440 V.

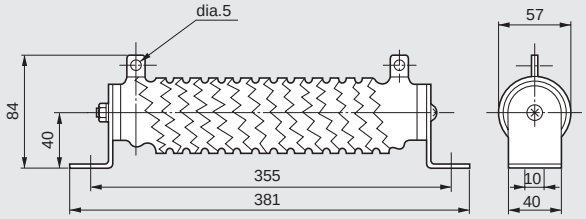
Dimensions of braking unit



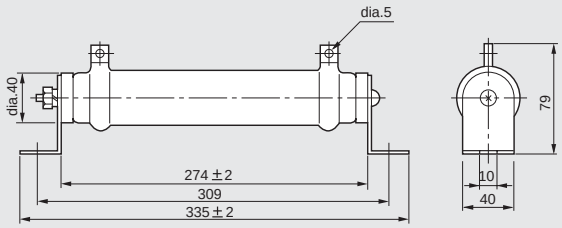
Size of terminal screw thread			Weight
Type	Main circuit terminal	Control circuit terminal	
DU–□□□□	P,PR,N	M1–E2	
201S,202S 207S,208S 401S,402S 403S,404S 408S,409S 410S	M4	M3	3kg
203S,204S 205S,206S 405S,406S 407S	M6		

Dimensions of braking resistor

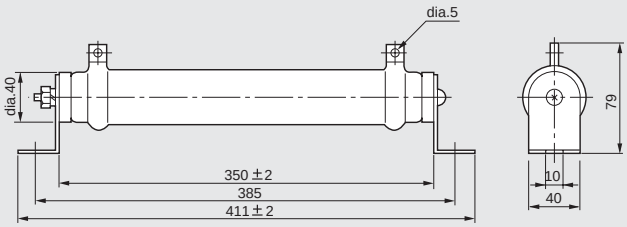
750W



300W



400W



Note. When mounting the braking resistor, keep at least a 50mm clearance around the resistor.

◆ Peripheral equipment

[Installation]

When the inverter installation conditions are as follows, install an AC reactor on the primary side:

(1) The capacity of the power transformer exceeds 500 kV.

(2) The capacity of the power transformer exceeds 30 times the inverter capacity. AC current with a large peak value flows through the primary side of the inverter. This peak current increases in proportion to the capacity of the power transformer, leading to failure of the converter section in some cases. For prevention of such failure, an AC reactor must be installed. Especially in the case of a 400 V class power supply, care must be exercised because operation with a large capacity transformer is common.

(3) Sudden change in supply voltage is expected.
(Example) When the phase advancing capacitor is changed over (charge/release) on the high voltage side.

(4) Large-capacity thyristor Leonard equipment or other phase control equipment is installed on the same power supply system as the inverter.

(5) The unbalance in the supply voltage is large

(6) A phase advancing capacitor is installed in the same power supply system as the inverter.

(7) Power factor improvement is necessary. Power factor can be improved by using AC or DC reactors on the inverter input side.

(8) Harmonic suppression is necessary.

AC reactor

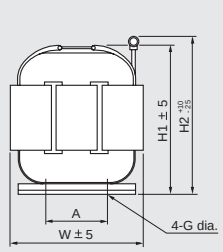
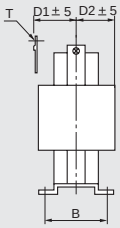


Fig. 1



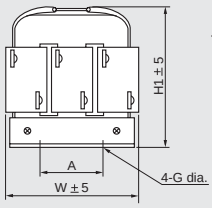
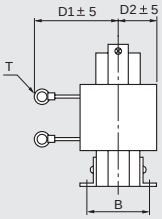


Fig. 2



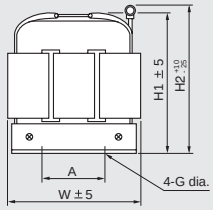
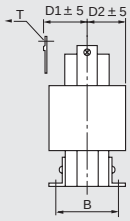
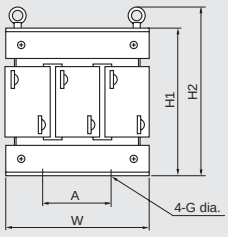


Fig. 3





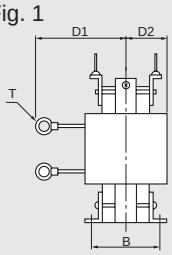


Fig. 4

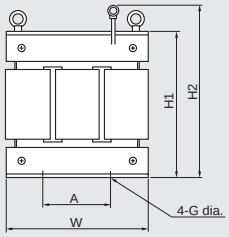
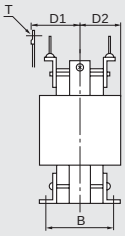


Fig. 5



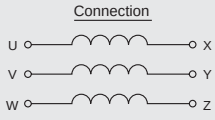


Fig. 6

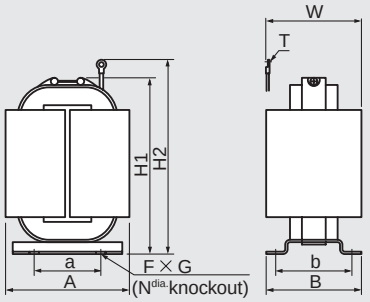
	Applicable rating (kW)	Specifications		Item No. Y220CA-	W	D1	D2	H1	H2	A	B	G	T	Weight (kg)	Insulation	Figure
		Current (A)	L (mH)													
200V series	5.5	24	0.5	058	155	45	40	150	180	80	50	5	M5	3.9	F	1
	7.5	33	0.4	059	155	45	40	150	185	80	50	5	M6	4.4	F	
	11	47	0.3	060	155	50	45	150	185	80	55	5	M6	5.4	F	
	15	63	0.2	061	185	60	55	175	215	80	65	6	M6	7.2	F	
	22	92	0.15	063	185	53	48	175	220	80	65	6	M8	8.6	F	
	30	130	0.1	064	185	60	55	175	230	80	80	6	M10	10.5	F	
	37	155	0.08	065	220	130	55	205	–	90	85	7	M10	13.0	F	2
	45	190	0.07	066	220	140	65	205	240	90	100	7	M10	16.0	F	4
	55	220	0.06	067	220	150	65	205	240	90	100	7	M12	19.0	F	

	Applicable rating (kW)	Specifications		Item No. Y220CA-	W	D1	D2	H1	H2	A	B	G	T	Weight (kg)	Insulation	Figure
		Current (A)	L (mH)													
400V series	5.5	13	2.0	085	155	45	40	150	175	80	50	5	M4	4.2	B	1
	7.5	17	1.5	086	155	45	40	150	175	80	50	5	M5	4.4	B	
	11	25	1.0	087	155	50	45	150	180	80	55	5	M5	5.5	F	
	15	33	0.7	088	185	53	48	175	210	80	65	6	M6	6.3	F	
	22	48	0.5	090	185	60	55	175	215	80	80	6	M6	9.0	F	
	30	66	0.4	091	185	60	55	175	215	80	80	6	M6	11.0	F	
	37	80	0.3	092	185	70	60	175	220	80	95	6	M8	12.0	F	
	45	100	0.25	093	220	60	55	205	250	90	85	7	M8	14.0	F	3
	55	120	0.21	094	220	75	65	205	265	90	100	7	M10	17.0	F	5

◆ Peripheral equipment

DC reactor

- Remove the shorting bar from the reactor connection terminal of the inverter, and connect the DC reactor before use.
- Determine the place of installation so that the wiring distance from the inverter will be as short as possible.
- As with any harmonic suppression techniques, using the DC reactor in combination with AC reactor will improve overall noise suppression.
- When installing in a location with substantial vibration, use vibration absorbing mounts or a stabilizer to dampen vibration to the reactor.



	Applicable rating (kW)	Specifications		Item No. Y220DA-	Dimension (mm)									N	T	Weight (kg)
		Current (A)	L (mH)		A	a	B	b	H_1	H_2	W	F	G			
200V series	5.5	28.0	1.47	038	90	60	62	52	140	170	75	–	–	dia.5	M5	2.4
	7.5	38.0	1.11	039	100	80	95	80	140	170	95	5.5	7	–	M5	3.5
	11	55.0	0.79	040	100	80	95	80	140	175	100	5.5	7	–	M6	4.1
	15	75.0	0.59	041	125	105	105	80	142	175	120	5.5	7	–	M6	5.3
	22	110.0	0.40	043	140	120	110	90	150	205	135	6.5	9	–	M8	7.5
	30	150.0	0.30	044	150	120	120	100	150	215	145	6.5	9	–	M8	9.4
	37	190.0	0.25	045	160	130	135	115	170	240	170	6.5	9	–	M10	12.3
	45	230.0	0.20	046	170	130	135	115	173	255	170	6.5	9	–	M10	13.3

	Applicable rating (kW)	Specifications		Item No. Y220DA-	Dimension (mm)									N	T	Weight (kg)
		Current (A)	L (mH)		A	a	B	b	H_1	H_2	W	F	G			
400V series	5.5	14.0	5.87	008	90	60	62	52	140	165	75	–	–	dia.5	M5	1.5
	7.5	19.0	4.46	009	100	80	95	80	140	165	95	5.5	7	–	M5	3.5
	11	27.5	3.13	010	100	80	95	80	140	165	100	5.5	7	–	M5	3.9
	15	37.5	2.35	011	125	105	105	80	142	175	120	5.5	7	–	M6	5.3
	22	55.0	1.60	013	140	120	110	90	150	185	135	6.5	9	–	M6	7.3
	30	75.0	1.22	014	150	120	120	100	150	205	145	6.5	9	–	M8	9.2
	37	92.5	0.99	015	160	130	135	115	170	225	170	6.5	9	–	M8	12.0
	45	113.0	0.81	016	170	130	135	115	170	230	170	6.5	9	–	M8	13.0
	55	138.0	0.66	017	180	150	145	120	170	255	170	–	–	dia.8	M8	15.3

Noise filter

1.Input/Output side filter

Install input/output side filters in order to lower the noise level from the inverter and protect peripheral equipment from the adverse effects of noise. The standard input-side filters are the LC-type noise filter, zero-phase reactor, and capacitive (XY) filter, while the standard output-side filter is the zero-phase reactor. When filters that conform to the noise control regulations is desired, contact our Sales Division.

LC filter : Substantially attenuates noise from the inverter.
Zero-phase reactor : Lowers the level of noise transmitted from the power supply side or output side
Capacitive filter : Lowers the level of noise in the AM radio frequency band.

2.Capacitive filter (XY filter) (Made by Okaya Denki Sangyo)

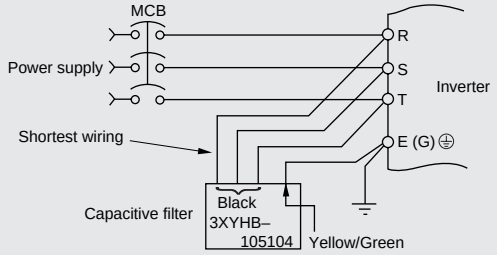
[Applicable type]

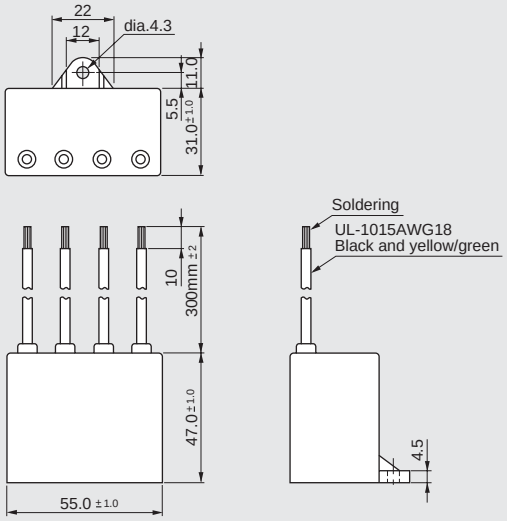
Common to all ratings; 200/400 V common 3XYHB-105104

X480AC185

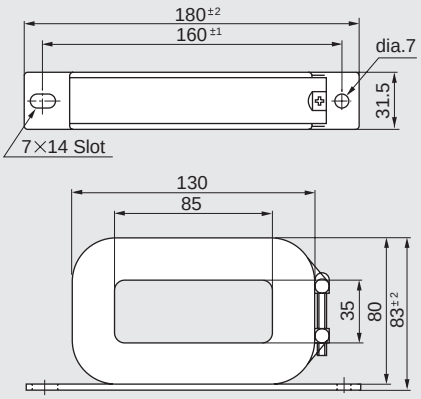
[Method of connection]

(1) Connect it directly to the inverter input (power supply) terminal. Make the connection line as short as possible.
(2) Ensure correct grounding. (Grounding resistance: 100 Ω or less)
(3) Do not use on the inverter output (motor) side.



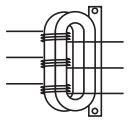
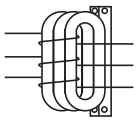
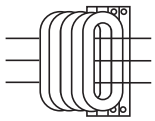


3.Zero-phase reactor: RC9129 (Made by Soshin Denki) X480AC192



[Method of connection]

(1) It can be used on both inverter input (power supply) side and output (motor) side.
(2) Wind the three wires of respective phases on the input or output side more than three times (4 turns) in the same direction. When winding wires more than three times (4 turns) is impossible because the wire is too thick, install two or more zero-phase reactors side by side to reduce the number of turns.
(3) Make the gap between the cable and core as small as possible.

Wire size (Note)	14 mm² or less	14–30mm²	22mm² –
Winding turns	3 times (4T)	Once (2T)	Through (1T)
Qty	1 pc	2 pcs	4 pcs
Winding method			

Note: The size of wire differs according to the kind of wire (flexblty).

4.LC filter (High attenuation filter made by Soshin Denki)

Contact our company for the general-purpose filter, output-side LC filter, and filters (installed on the output side) that conform to various standards (VCCI, FCC, and VDE).

List of LC filters

Applicable motor (kW)	Model	200V input side Type	Fig.
5.5	X480AC291	NF3030A-VZ	Fig.1
7.5	X480AC292	NF3040A-VZ	
11	X480AC293	NF3080A-RQ2	Fig.2
15			
22	X480AC294	NF3150A-RQ2	
–37	X480AC295	NF3200A-RQ2	Fig.3
–55	X480AC308	NF3250A-RQ2	

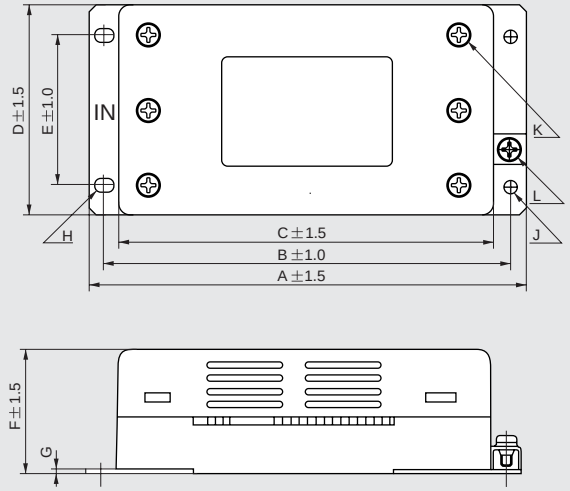
Note: Ground the LC filter with its own ground connection

Applicable motor (kW)	Model	400V input side Type	Fig.
5.5	X480AC297	NF3020C-VZ	Fig.1
7.5			
11	X480AC298	NF3030C-VZ	
15	X480AC299	NF3040C-VZ	
22	X480AC300	NF3080C-RQ2	Fig.2
30			
37	X480AC301	NF3100C-RQ2	
–55	X480AC303	NF3150C-RQ2	

◆ Peripheral equipment

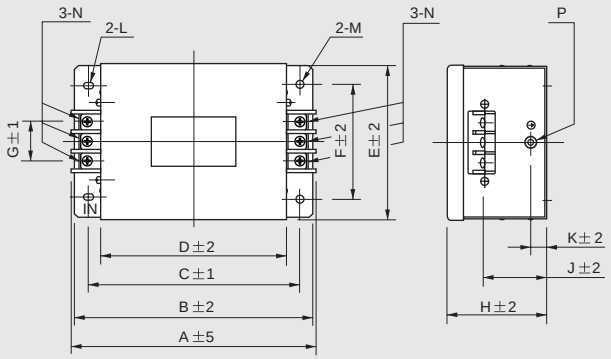
Dimensional drawing of LC filter

Fig.1



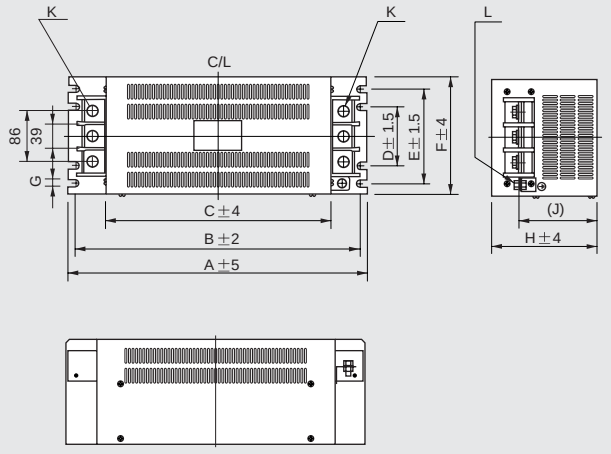
Model	Type	A	B	C	D	E	F	G	H	J	K	L
X480AC291	NF3030A–VZ	145	135	125	70	50	42	1.0	4.5×6	dia.4.5	M4	M4
X480AC292	NF3040A–VZ	179	167	155	90	70	54	1.6			M5	
X480AC296	NF3010C–VZ	128	118	108	63	43	42	1.0			M4	
X480AC297	NF3020C–VZ											
X480AC298	NF3030C–VZ	145	135	125	70	50						
X480AC299	NF3040C–VZ	179	167	155	90	70	54	1.6			M5	

Fig.2



Model	Type	A	B	C	D	E	F	G	H	J	K	L	M	N	P
X480AC293	NF3080A–RQ2	217	200	185	170	120	90	44	115	85	20	5.5×7	dia.5.5	M6	M4
X480AC294	NF3150A–RQ2	314	300	280	260	200	170	57	130	90	35	6.5×8	dia.6.5	M8	M6
X480AC300	NF3080C–RQ2	217	200	185	170	120	90	44	115	85	20	5.5×7	dia.5.5	M6	M4
X480AC301	NF3100C–RQ2	254	230	215	200	150	120	57	115	80	30	6.5×8	dia.6.5	M8	M6
X480AC302	NF3150C–RQ2	314	300	280	260	200	170	57	130	90	35	6.5×8	dia.6.5	M8	M6

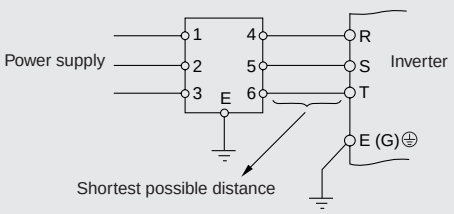
Fig.3



Model	Type	A	B	C	D	E	F	G	H	J	K	L
X480AC295	NF3200A–RQ2	450	430	338	100	190	230	7	180	(133)	M10	M8
X480AC308	NF3250A–RQ2											

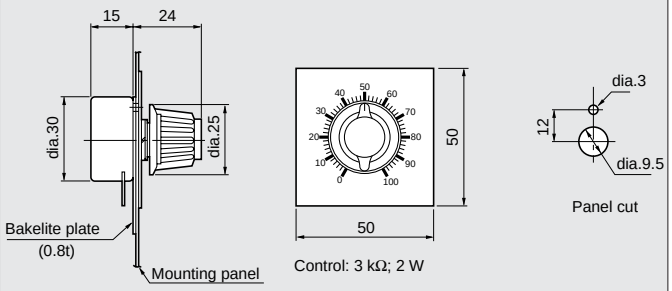
(Connection method)

(1) Install the filter between the power supply and inverter input terminal. Make the connection wire between the inverter and filter as short as possible.
(2) Use thick short grounding wire as much as possible. Connect the grounding wire correctly.
(3) Separate the input/output lines of the filter.
(4) The filter cannot be used on the inverter output (motor) side.



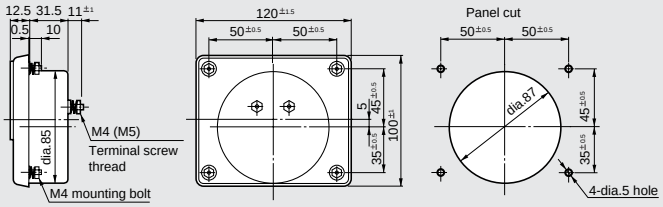
Frequency setting unit: VR-07 1k Ω, 2W

Unit VR07



% speed meter: DCF-12N [10V F.S.]

0-100%; 50divisions (X525AA048)



AC ammeter: ACF-12N

The CT directly detects the current of the secondary side of the inverter.

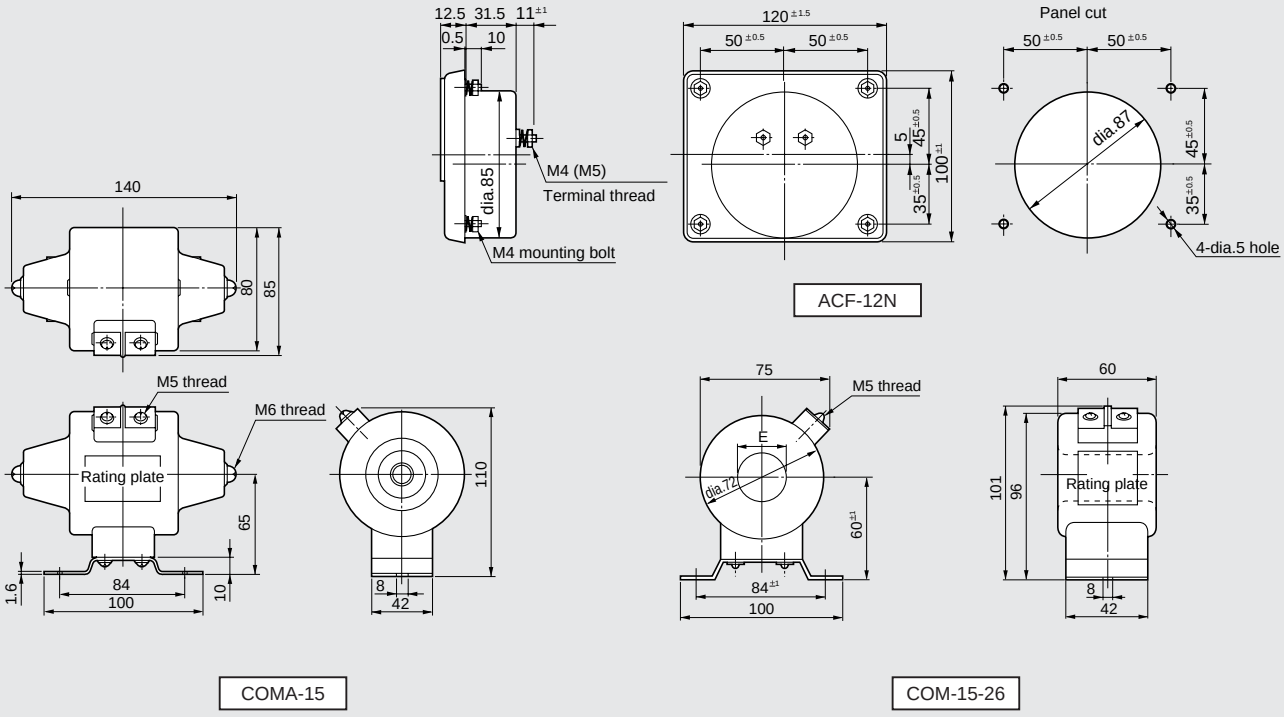


Table of combination of AC ammeter (ACF-12N) and current transformer

Motor capacity (kW)	200V class					400V class				
	Part No.	Meter		CT	Number of primary through holes	Part No.	Meter		CT	Number of primary through holes
		Rated current [A]	Max. scale [A]	Type			Rated current [A]	Max. scale [A]	Type	
5.5	X525AA042	5	50	COM-15-26 50/5A	3	X525AA082	5	20	COMA-15 20/5A	–
7.5	X525AA042	5	50	COM-15-26 50/5A	3	X525AA083	5	30	COMA-15 30/5A	–
11	X525AA043	5	75	COM-15-26 75/5A	2	X525AA042	5	50	COM-15-26 50/5A	3
15	X525AA116	5	100	COM-15-30 100/5A	2	X525AA042	5	50	COM-15-26 50/5A	3
22	X525AA044	5	150	COM-15-26 150/5A	1	X525AA043	5	75	COM-15-26 75/5A	2
30	X525AA045	5	200	COM-15-30 200/5A	1	X525AA116	5	100	COM-15-30 100/5A	2
37	X525AA046	5	250	COM-15-30 250/5A	1	X525AA044	5	150	COM-15-26 150/5A	1
45	X525AA047	5	300	COM-15-30 300/5A	1	X525AA044	5	150	COM-15-26 150/5A	1
55	X525AA121	5	400	COM-15-30 400/5A	1	X525AA045	5	200	COM-15-30 200/5A	1

Construction of current transformer (CT) COMA-15 type: Totally molded current transformer with primary winding
COM-15-26 type: Totally molded current transformer, throughholes type
COM-15-30 type: Totally molded current transformer, throughholes type

Install the current transformer (CT) on the output side of the inverter.

◆ Notes to inverter users

Motor temperature rise

When a general-purpose motor is used in variable-speed operation with an inverter, the temperature rise of the motor will be slightly greater than in cases where commercial power is used. The causes are shown below:

Influence of output waveform ····· Unlike commercial power, the output waveform of an inverter is not a perfect sine wave, and contains higher harmonics. Therefore, the motor loss increases and the temperature is slightly higher.

Reduction in the motor cooling effect during slow-speed operation ··· Motors are cooled by the fan on the motor itself. When the motor speed is reduced by an inverter, the cooling effect will decrease.

Therefore, lower the load torque or use an inverter motor to control temperature rise when the frequency is below the frequency of commercial power.

Life of major parts

The electrolytic capacitor, cooling fan, and other parts used for inverters are consumables. Their life substantially depends on the operating condition of inverters. When replacement is necessary, contact our dealer or service center. Refer to “Recommendation on periodical inspection of general-purpose inverters” published by the Japan Electrical Manufacturers’ Association.

Warranty

1. Warranty policy on inverter

Warranty period	The warranty shall be 18 months from date of shipment or 12 months after intial operation, whichever is shorter.
Warranty condition	In the event that any problem or damage to the Product arises during the "Warranty Period" from defects in the Product whenever the Product is properly installed and combined with the Buyer's equipment or machines maintained as specified in the maintenance manual, and properly operated under the conditions described in the catalog or as otherwise agreed upon in writing between the Seller and the Buyer or its customers; the Seller will provide, at its sole discretion, appropriate repair or replacement of the Product without charge at a designated facility, except as stipulated in the "Warranty Exclusions" as described below. However, if the Product is installed or integrated into the Buyer's equipment or machines, the Seller shall not reimburse the cost of: removal or re-installation of the Product or other incidental costs related thereto, any lost opportunity, any profit loss or other incidental or consequential losses or damages incurred by the Buyer or its customers.
Warranty exclusion	Not withstanding the above warranty, the warranty as set forth herein shall not apply to any problem or damage to the Product that is caused by: 1. Installation, connection, combination or integration of the Product in or to the other equipment or machine that rendered by any person or entity other than the Seller; 2. Insufficient maintenance or improper operation by the Buyer or its customers such that the Product is not maintained in accordance with the maintenance manual provided or designated by the Seller; 3. Improper use or operation of the Product by the Buyer or its customers that is not informed to the Seller, including, without limitation, the Buyer's or its customers' operation of the Product not in conformity with the specifications; 4. Any problem or damage on any equipment or machine to which the Product is installed, connected or combined or any specifications particular to the Buyer or its customers; 5. Any changes, modifications, improvements or alterations to the Product or those functions that are rendered on the Product by any person or entity other than the Seller; 6. Any parts in the Product that are supplied or designated by the Buyer or its customers; 7. Earthquake, fire, flood, salt air, gas, lightning, acts of God or any other reasons beyond the control of the Seller; 8. Normal wear and tear, or deterioration of the Product's parts, such as the cooling fan bearings; 9. Any other troubles, problems or damage to the Product that are not attributable to the Seller.
Others	The Seller will not be responsibility for the installation and removal of the inverter. Any inverter transportation cost shall be born by both Seller and Buyer.

2. Warranty policy on Repaired and returned products

Warranty period	The warranty shall be 6 months from date of repair and shipment.
Warranty condition	Warranty on repaired Product will apply only on the replacement parts used in the repair done or authorized by the Seller. All other aspects conform to the Warranty Conditions described in item 1.
Warranty exclusion	Please refer to Warranty Exclusions described in item 1.
Others	Please refer to Others described in item 1.

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