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INVERTER HF-430 Series **Sensorless Vector Inverter**

Fax: (60)3-8061-3909 Thailand

No. D1401E-3.2 Issued 2010.06

Sumitomo Drive Technologies Always on the Move



No. D1401E-3



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-3100 α)

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

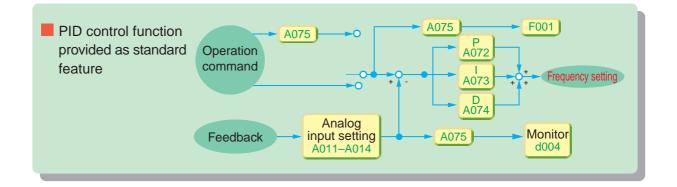
The detachable cooling fan, power capacitors, and control terminal block facilitate maintenance.

Powerful operation

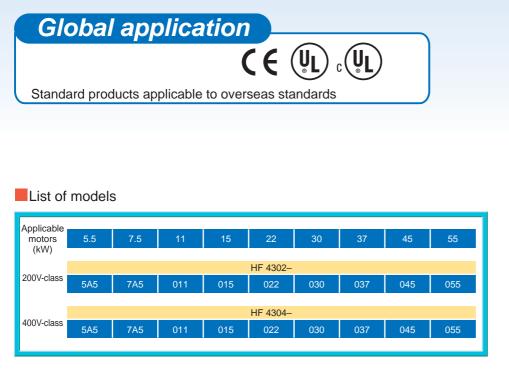
The sensorless control provides high starting torque, and high-performance operation.

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.



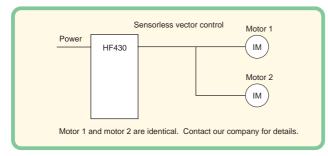




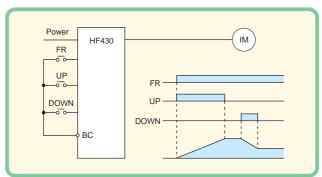
CONTENTS

Features ·····1-2	
Standard specifications/ protective functions ····· 3–5	
Dimensional drawing · · · · · · · · 6–7	
Operation ·····8–9	
List of functions ·····10–15	
Terminal function ······16–17	
Std. Connection diagram/ appliceble wing for accessories ··18–19 and options	
Braking unit/braking resistor ··21–22	
Peripheral equipment ·····23-26	
Note to inverter users ······27	
warranty ·····28	

Sensorless control operation allows simultaneous operation of two motors!!



UP/DOWN function

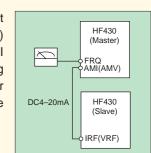


Built-in option cards



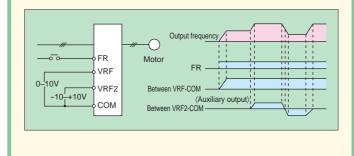
Input/output signal function for a variety of applications

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

Max. applicable motor 4P (kW) S 7.5 7.5 11 0.13 0.12 0.02 0.03 0.14 0.15 22 0.03 0.14 0.15 22 0.03 0.14 0.15 22 0.03 0.14 0.15 22 0.03 0.15 1 0.15 22 0.03 0.15 1 0.15 22 0.03 0.15 22 0.03 0.15 22 0.03 0.15 22 0.03 0.15 22 0.03 0.15 22 0.03 0.15 0.22 0.03 0.15 0.22 0.03 0.15 0.22 0.03 0.15 0.22 0.03 0.15 0.22 0.03 0.16 0.15 0.22 0.03 0.16 0.15 0.22 0.03 0.16		Туре				HF4302						HF4302	HF4304		HF4304				HF4304		
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Output frequency range (Note 4) 0.1-400Hz Frequency accuracy Digital setting: 0.01 Hz analog setting: max. frequency/3000 (NR1 terminal: 12 bit/to +10 V; VRF2 terminal: 15 VRF2 terminal: 10 VRF2 terminal:				17	17	17	-	-	-	_						_	-	-	_	-	-
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Frequency resolution Optial setting: 0.01 Hz; analog setting: max. frequency/4000 (VFF terminal: 12 bit/s 10 to +10 V) Voltage/frequency characteristics VF control constant torque, variable torque, variable vactor control, base frequency 30-400 Hz; (New 7) Speed fluctuation a.0.5% (under sensortess vector control) Overfoad current rating 0.01-360.00 cs (straight and curved line setting) Starting torque 200%/0.5 Hz (under sensortess control); 150%/zoros speed range torque DC brake Operation during starting, during decientation by stop command, or by setterain pty UPDOWN key of digital operator Frequency OPU Setting by UPDOWN key of digital operator Fueral signal DCO-10V, -1010V (fuput impedance 10x0), 420nA (fuput impedance 10x0), 4-20nA (fuput impedance 10x0), 5-8 in pt possible Multifunctional input Freed tota RUNSTOP ef reveare atable on ange feloloning for use: Reveare an omard (fit, multiss paed (fit-10HH, ipggit (fOC), eterator Date (fit), fuput impedance 10x0), for a date date (fit), fuput immid statestor Multifunctional output I terminal statestor Multifunctional input Setting by Fit, fuput impediance for (fit), fuput imt dategeoef 2 (fit), fuput imtegeoef 2 (fit), fuput imteg					Digit	al.com	mand	+0.019	% and	analo	a com			with		t to m	av fro	auenc	v (25±	10°C)	
Voltage/frequency characteristics V/F control constant torque, variable vector control, here frequency 30-400 Hz. (New 7) Speed fluctuation ±0.5% (under sensortiess vector control) Overload current rating 150%-K60s, 200%-0.5 s Acceleration/deceleration time 0.01-3800.0 s (straight and curred line esting) Starting torque 200%-0.5 th (under sensortiess 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). Frequency OPU Setting by (DPDO/WN key of digital operator) Frequency OPU RUN/STOP decentration Frequency OPU RUN/STOP decentration Setting by RS485 communication Multifunctional input Freed rotation RUNSTOP de rower utation commard and reverse deterction are changed by command.) Multifunctional input Freed rotation RUNSTOP def rower utation commard and speed rotation. Setting by RS485 communication Hornard/sever Multifunctional output Harmal stector Terminal stector Terminal Free unancy (B), linking set (D), linking dr), linking				Digital	-						-										±10 \/)
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Frequency setting OPU Setting by UP/DOWN key of digital operator Forward/reverse roward/reverse RUNVSTOP OPU DCD-+10V. (10-+10V (Input impedance 10k2))420mk (Input impedance 1002) Forward/reverse RUNVSTOP OPU RUNVSTOP (Forward and reverse derection are changed by command.) Multifunctional input terminal OPU RUNVSTOP (Forward and reverse derection are changed by command.) Multifunctional input terminal Setting by RS485 communication Setting by RS485 communication Multifunctional input terminal Setting by RS485 communication Setting by RS485 communication Multifunctional input terminal Setting by RS485 communication Setting by RS485 communication Multifunctional output terminal Setting by Index (IDE) Phyloping (JOG), setanal CD brake (DB), No2 acceleration/Bockeleration (AD2, Inser asset (RS1, 3+w are alkCR1), 3+w are alkCR1, 3+w a		<u> </u>			oration	during											<u> </u>		froquon	ov varial	ala)
Note External signal DCC++10V, -10++10V (Input Impedance 10kQ), 4-20mA (Input Impedance 100Q) External port Setting by RS485 communication External port Forward/reverse RUNSTOP Forward reverse derection are changed by command.) External signal Forward reverse derection are changed by command.) Multifunctional input terminal Forward reverse vision command as possible when the control terminal block is assignal (selection r1N0 or NC possible), 3-wire input possible External port Setting by RS485 communication Multifunctional input terminal Betminal selection Terminals are selected from among the lolowing for use: Reverse nu command RR, humites pased (DFL-DFHH), poging (OG), external DC trake (DB), B mode (BMD), No.2 accelerator/deseleration (AD2), there are set p(MBS), external error (ES), USP function (USP), commercial changever (CS), software lock (SFT), andog input changever (AUT), C mode (CMD), tereate prevention changever (DL), torque imit prevention data cider (UCC), costed pessition (PDF), multises training (DFL-DFHH), poging (IOC), tereate prevention (PL), metals persent and a circle (UCC), costed pessition (PL), FirstPST, sate prevention changever (DL), torque imit prevention coefficient (TRO), RDN imit and anone expense difference permit (STR), and an alconion (NO) there ever (UCR), the evention expense (PL), uncert detection 1 (DL), accessive PID deviation (DD), abnormal signal (AL) requency detection 2 (UPF), ourrent detection 1 (UDF), counce indiction value (IVR), torque imit dragsever (RPL), Ourpoint (TRO), RDN imit are used (RPL), the eventse (RPL), the eventse (RPL), the eventse (RPL), the eventse (RPL), DVD (IVRPL), unerevent detection 1 (UD, access			OPU			uunny a	starting,	uuning t								-		ie, anu	nequent	sy variai	JIC)
Setting External port Setting by RS485 communication OPU RUN/STOP (Forward and reverse detection are changed by command.) External signal Proved vision RUNSTOP and everse rotation command are possible inter the control terminal bok assayle (section of NO or NC possible), 3-wire input possible Multifunctional input External signal Everand vision among the blowing for use: Reverse nu command (RR), multilets greed (PL-DFHH), going (JOG), external DC trake (BB), B mode (BMD), No.2 acceleration/deceleration (AD2, Inceru verses (VIII), C mode (CMD), reset (VIIII), C mode (CMD), reset (VIIII), C mode (CMD), reset (VIIII), C mode (CMD), reset verses (VIII), compariso as selected from among the blowing for use: Reverse nu command (RR), multilets greed (PL-DFHH), going (JOG), external DC trake (BB), B mode (BMD), No.2 acceleration/deceleration (AD2, Inceru verset) Thermistor input terminal Terminal reverse (VIII), comparison developed (DL-DHH), travel operation aber (UIII), travel ind travpower (IRX), PL paramole (PR), Insuper (PR), PL paramole (DC	0_+10	V -10						-			nneda	nce 10	00)		
Provent/verses OPU External signal RUN/STOP (External signal Provent rutation RUNSTOP and reserve outcom command are possible with the control leminal block is assignal (external port External port Forward rutation RUNSTOP and reserve outcom command are possible with the control leminal block is assignal (external port External signal Provent rutation RUNSTOP and reserve outcom command are possible with the control leminal block is assignal (external port External port External port Setting by RS485 communication Multifunctional input terminal 4-terminal setection Setting by RS485 communication Setting by RS485 communication Multifunctional input terminal 4-terminal setection Setting by RS485 communication Setting by RS485 communication Multifunctional input terminal 4-terminal setection Setting by RS485 communication Setting by RS485 communication Multifunctional input terminal 1 terminal (DS11), sinte indication (UC), instance out (S10), instance out (S10), instance out (S10), instance out (S10), sinte and indication (NO), instance out (S10), instance out (S10), sinte and indication (S10), instance and S10), instance and S10, Single (P), instiglication (S10), instance and S10), instance out (S10), Sinte (S10), Sint		setting	<u>v</u>			00	0 110	v, -10	1101	•••						iput ii	npeua		/032)		
Privador/vertes External signal Forward rotation RUNSTOP and reverse rotation command are possible when the control terminal block is assignal (selection of NO or NC possible), 3-wire input possible Multifunctional input External point Setting by RS4885 communication Multifunctional input #-terminal selection #-terminal selection Terminal #-terminal selection Terminal sea selected from anong the following for use: Reverse nn command (RR), multisep seed (DF-DFHH), pogging (JOG), exteral (DR), Bonde (BMD), No 2 acceleration/deceleration (AD2), these nr tops (RS1), 3-wire binding (STP), 3-wire tomardiveness (FR), PD vald/maild (PD), PD integral reset (PDC), control gain drappeore (CR2), solution data clar (UDC), thread operation (OPE), multisep bit 17 (FS1+S7), stal prevention changeover (LNC), througe limit changeover (LNC), througe limit changeover (LNC), througe limit changeover (LNC), threagener top (PDR), threagener 2 (PR2), PD relangeover (PND), threagener 2 (PD relangeover PD relangeover 2 (PD relangeover PD relangeover 2 (PD relangeover PD rela							RUN		(Forw		<u> </u>					ned by	comm	(hand			
Build External port Setting by RS485 communication Multifunctional input terminal External port Berminal selection Terminal Berminal selection Terminal selection Terminal Reverse tun command (RR), multistip speed (PL-DFHH), joggin (JOG), external DC trake (DB), B mode (BMD), No.2 acceleration/deceleration (AD2), there un sop (MBS), external error (ES), USP hunchin (USP), commercial changever (CS), software tox (ST), analog input changever (ADD, trave (PDC), cort of gath changever (CR), existen box (ST), whice the oxpatines (RR), PD inegatines (PDC), cort of gath changever (2), whice shart (ST), whice the oxpatines (RR), PD inegatines (PDC), cort org than changever (CR), envison bard over (PR), PD inegatines (PDC), cort org than changever (CR), envison (QR), inertation (QR), Joba changever (CR), Boade perison (GR), multistip star (FCR), RJ, 94-depre phase difference perificities (PDC), cort org and no alconton (NO) Thermistor input terminal 1 terminal (positive temperature coefficient/negative temperature coefficient thermistor selection possible) Multifunctional output terminal 1 terminal (pOSItive temperature coefficient/negative temperature coefficient thermistor selection (DD), excessive speed deviation (DE), participant voltage (UN), torque limit (PD), RUP, Numer ver (RPI), Duitopant every detection 2 (UPF), overtorque (POV), instantaneous stop spinal (P), institute terminal state, input power, etc. Multifunctional monitor OUPC (max. 2 mA)/4–20 mADC (load 2 SOCO r less)/0–10 VDC (Forwar	d rotation	RI IN/ST													sible) 3-14	ire innut r	nesihla
Note Multifunctional input terminal 8-terminal selection Terminal are selected from among the following for use: Reverse un command (RR), multisep speed (DFL-DFHH), gopping (JOG), external DC brake (DB), B mode (BMD), No.2 acceleration/deceleration (AD2), thee run stop (MBS), external error (ES), USP function (USP), Summercial changeover (CS), software lock (SFT), analog input changeover (AUT). C mode (CMD), rese (RST), 3-wire start (STA), 3-wire holding (STP), 3-wire holding (STP), 3-wire brain (UPC), mortel gain changeover (CS), software lock (SFT), analog input changeover (AUT), C mode (CMD), rese (RST), 3-wire start (STA), 3-wire holding (STP), 3-wire holding (STP), 3-wire brain (STA), mortel gain changeover (CS), software lock (SFT), analog input changeover (PIP) brake confirmation (BOK), orientation (UPP), more person softwo dom (DWN), renote operation (SEA, Multisph 1-7, SFT), stall prevention changeover (QLR), torque limit provided(TL), torque limit changeover 2 (TRQ2), PIP changeover (PIP) brake confirmation (BOK), orientation (DRT), LAD cannel (LAC), position deviation del PICLR), sobgrege hase difference permit (STAT), and no allocatin (ND) Multifunctional output terminal Selection of five open collector output terminals and one rely (1c contact point) terminal Driving (DRV), frequency reaching (UPP), instantaneous stop signal (IPP), instaltaneous stop signal (IPP), instaltaneous stop signal (IPP), instaltaneous stop signal (IPR), instaltaneous stop signal (IPR), accessive speed deviation (DD), positioning complete (POK), frequency detection 3 (UPF4), frequency detection 4 (UPF5), current detection 2 (OL2), and atame or 0 = 0.4 (OL2), extensive speed deviation (DD), positioning complete (POK), frequency detection 3 (UPF4), frequency active terminal start, and treguency active terror, start-up earth (archaveca) = 0.4 (PCR), selection (IPF4),		RUN/STOP	U	TOTWA				10130 1010											51010 <i>]</i> , 5-w	nic input p	00001010
sub (Nes), external end (ES), US* Inductin (DSP), Buttinetical crasplever (C), Subvect (C), Pointed (Not), external end (ES), external end (ES), Subvect (E), ES), Subvec	gug	C External port Setti							ing by	110-10-	0 0011	munic	ation								
sub (Nes), external end (ES), US* Inductin (DSP), Buttinetical crasplever (C), Subvect (C), Pointed (Not), external end (ES), external end (ES), Subvect (E), ES), Subvec	t si																				
sub (Nes), external end (ES), US* Inductin (DSP), Buttinetical crasplever (C), Subvect (C), Pointed (Not), external end (ES), external end (ES), Subvect (E), ES), Subvec	nd				Reverse run command (RR), multistep speed (DFL-DFHH), jogging (JOG), external DC brake (DB), B mode (BMD), No.2 acceleration/deceleration (AD2), free run																
Image: Second	<u> </u>			stop (M	stop (MBS), external error (ES), USP function (USP), commercial changeover (CS), software lock (SFT), analog input changeover (AUT), C mode (CMD), reset																
Image: Prevention changeover (0IR), torque limit providedint providedint), torque limit changeover 1 (TRQ1), torque limit changeover 2 (TRQ2), PIP changeover (PIP) brake confination (BOK), orientation (ORT), LDD cancel (LAC), position deviation clear (PCLR), 90-degree phase difference permit (STAT), and na allocation (NO) Image: Thermistor input terminal 1 terminal (positive temperature coefficient/thermistor selection possible) Multifunctional output terminal 1 terminal (positive temperature coefficient) Image: PIP (PA),					3-wire sta	art (STA)	3-wire h	olding (S	TP), 3-wi	re forwa	rd/reverse	(F/R), P	ID valid/	invalid (P	ID), PID i	integral r	eset (PID	C), contr	ol gain ch	nangeove	r (CAS),
Image: 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/hegative temperature coefficient thermistor selection possible) Selection of five open collector output terminals and one relay (1c contact point) therminal Selection of five open collector output terminals and one relay (1c contact point) therminal Multifunctional output Eventsor Selection of five open collector output terminals and one relay (1c contact point) therminal Multifunctional monitor Onitro (DRY), idectroin: thermal alarm (THM), brake release (BRK), brake abnormal (BER), zero speed signal (2S), excessive speed deviation (DS) positioning complete (POK), frequency detection 3 (UPF4), frequency detection 4 (UPF5), current detection 2 (OL2), and alarm code 0-3 (AC0-AC3) 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 input, sating 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 imit, initialization value setting, automatic deceleration for power cut of, AVR function, and auto turing (on-/off-line) Output frequency range Overcurrent, overvoltage, insufficient voltage, electronic thermal, temperat											· /·			,	· · ·		· ·	<i>,</i> .		·	· ·
Thermistor input terminal 1 terminal (positive temperature coefficient/negative temperature coefficient thermistor selection possible) Multifunctional output terminal Selection of five open collector output terminals and one relay (1c contact point) terminal Driving (DRV), frequency reaching (UPF), frequency detection 1 (UPF2), current detection 1 (OL), excessive PID deviation (OD), abnormal signal (AL) frequency detection 2 (UPF3), vertorque (OVQ), instantaneous stop signal (PP, insufficient voltage (UV), torque limit (TRQ), RUN time over (RRT), ON ine over (ORT), feetoronic 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 alarn code 0-3 (AC0-AC3) Multifunctional monitor O-10 VDC (max. 2 mA)/4–20 mADC (load 250Ω or less)/0–10 VDC (PWM, max. 1.2 mA) Obsplay monitor Output frequency, output current, torque, frequency jump, curved-line acceleration/deceleration, annual torque boost level/break point, energy-asving operation, analog meter adjustment, starting 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 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, communicat													-				-			-	
Multifunctional output terminal Selection of five open collector output terminals and one relay (1c contact point) terminal Diving (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), RUM time over (RNT), Ok 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 alarn code 0.3 (AC0AC3) 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, carrier frequency adjustment, electronic thermal, free setting external star/den (frequency/percentage), analog meter adjustment, starting frequency, carrier frequency adjustment, electronic thermal, free setting external star/dend (frequency/percentage), analog input settion, error retry, instantaneous stop and star, various signal output, reduced voltage starting, overload limit, initialization value setting, automatic deceleration for power cut off, AVR function, and auto turing (n-/off-line) 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. Output frequency/foreceding 1000 above sea level (Corrosive gas and dust not allowed				brake co	onfirmatio	on (BOK),	orientatio	on (ORT),	LAD cano	cel (LAC)	, position	deviation	clear (PC	CLR), 90-	degree ph	ase diffe	rence per	mit (STAT	F), and no	allocation	n (NO)
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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 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 star/ed (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. Vibration (Note 1) 5.9m/s² (0.6G), 10–55Hz Vite color Blue Paint color Blue Feedback option PG vector control Digital input option 4-requercy, various operator, various operator cables, noise filter, and regenerative braking unit	tpu				- (-)	,,			())			<i>,,</i>		. (,,		. (- //				(- //
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USP error, open-phase error, braking resistor overloading, CT error, external error, communication error, option error, etc. Mbient temperature/storage temperature (Note 6)/humidity -10–50°C/-20–65°C/20–90%RH (Dew condensation not allowed.) Vibration (Note 1) 5.9m/s² (0.6G), 10–55Hz Place of use Not exceeding 1000 above sea level (Corrosive gas and dust not allowed.) 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				Overe	urrent	OVATVO	tano in	neufficio	nt volto		otronic			Aratura	Arror	etart	n parth	curront	incton	taneou	e eton
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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	Dp						Not a:	(00 c d);	ng 100				,			4 4	not o!!	ower'	\ \		
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							INUT EX	ceedli	ig 100	o abo	ve sea			sive g	as and	u dust	not all	owed.)		
Other options Braking resistor, AC reactor, DC reactor, various operator cables, noise filter, and regenerative braking unit	U		tion											440							
Other options Braking resistor, AC reactor, DC reactor, various operator cables, noise filter, and regenerative braking unit	Opt																				
		• •	option	.		•					-										
Approx. weight (kg) 3.5 5 5 12 12 20 30 30 50 3.5 5 5 12 12 20 30 30 50 3.5 5 5 12 12 20 30 30 50		•	`		-	1	1	1			1		1		1	1			1		
	Appr	ox. 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.

- 3

Protective Functions

Name	Description		Display of digital operator	Display of remote operator/ Copy unit ERR1 ***
		At constant Speed	E0 1	OC. Drive
	Motor is restricted and decelerates rapidly, excessive current is drawn through the inverter and	On decelertion Speed	503	OC. Decel
Over-current protection	there is a risk of damage. Current protection circuit operates and the inverter output is switched off.		E 0 3	OC. Accel
		Other	E () 4	Over. C
Overload protection (Note 1)	When the Inverter detects an overload in the motor, the in thermal overload operates and the inverter output is switc		E 0 5	Over. L
Braking resistor overload protection	When DBTR exceeds the usage ratio of the regenerative the over-voltage circuit operates and the inverter output is		606	OL. BRD
Over-voltage protection	When regenerative energy from the motor exceeds the the over-voltage circuit operates and the inverter output is	maximum level, switched off.	E 0 7	Over. V
EEPROM error (Note 2)	When EEPROM in the inverter is subject to rad unusual temperature rises, the inverter output is switc		E 0 8	EEPROM
Under-voltage	When the incoming voltage of inverter is low, the cor operate correctly. The under-voltage circuit ope inverter output is switched off		609	Under. V
CT error	When an abnormality occurs to a CT (current d inverter, the inverter output is switched off.	etector) in the	E 10	CT
CPU error	When a mistaken action causes an error to the ir inverter output is switched off.	nbuilt CPU, the	E I I	CPU
External trip	When a signal is given to the EXT multifunctional inp inverter output is switched off. (on external trip function		E 12	EXTERNAL
USP error	This is the error displayed when the inverter power is still in the RUN mode. (Valid when the USP function i	s restored while s selected)	E 13	USP
Ground fault protection	When power is turned ON, this detects ground fau inverter output and the motor.	Its between the	E 14	GND. Flt.
Incoming over-voltage protection	When the incoming voltage is higher than the spectrum this detects it for 60 seconds then the over-voltage and the inverter output is switched off.		E 15	OV. SRC
Temporary power loss protection	When an instantaneous power failure occurs for m the inverter output is switched off. Once the instar failure wait time has elapsed and the power has not be regarded as a normal power failure. However, when the operation command is still C selection the inverter will restart. So please be carefu	ntaneous power een restored it is DN with restart	E 16	Inst. P-F
Abnormal temperature	When main circuit temperature raises by stopping of inverter output is switched off.	cooling fan, the	621	OH. FIN
Gate Allay error	Communication error between CPU and gate allay in	dicate	623	GA
Open-phase protection	When an open-phase on the input supply occurs the in switched off.	nverter output is	624	PH. Fail
Overload protection 2	When the Inverter detects an overload in the motor (un inverter output is switched off.	nder 0.2Hz), the	625	Over. L2
IGBT error When an instantaneous over-current is detected on th inverter output is switched off to protect the main device			630	IGBT
Thermistor error	Thermistor error When the Inverter detects a high resistance on the thermistor input from the motor the inverter output is switched off.			TH
Abnormal brake	bnormal 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.)		636	BRAKE
Option 1 error 0-9	These indicate the error of option 1. You can realize instruction manual.	the details each	E60~E69	OP1-0-9
Option 2 error 0-9	These indicate the error of option 2. You can realize the instruction manual.	e details by each	E 70~E 79	OP2-0-9
During under-voltage waiting	When the incoming voltage of the inverter has dropp output is switched off and the inverter waits.	bed, the inverter		UV. WAIT

Note 1: After a trip occurs and 10 seconds pass, restart with reset operation. 2: When EEPROM error [2] a occors, confirm the setting date again.

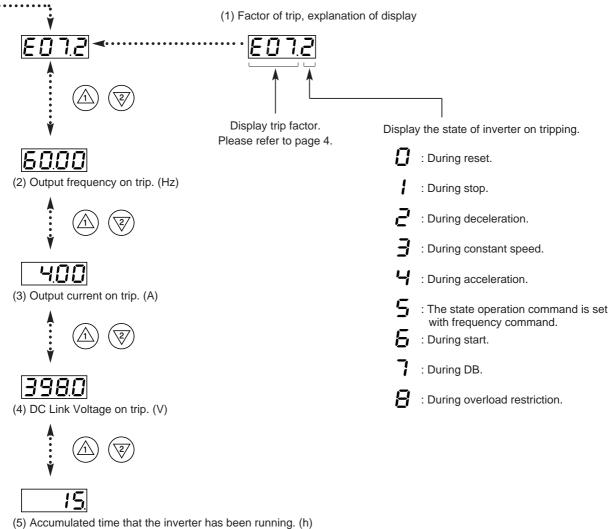
Protective Functions

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



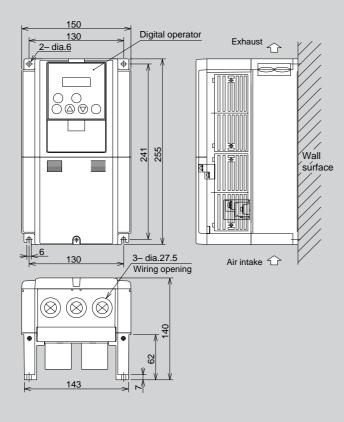


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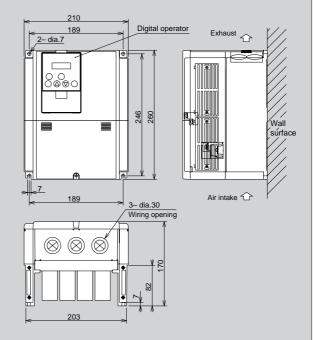
(6) Accumulated time that the inverter has been powered up. (h)

Dimensional Drawing

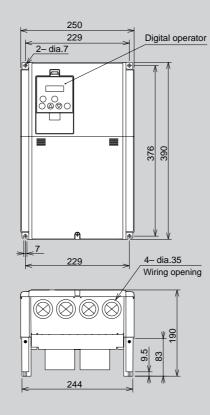
HF4302-5A5 HF4304-5A5

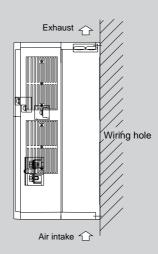


HF4302-7A5, 011 HF4304-7A5, 011



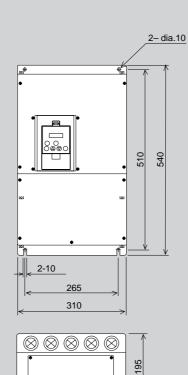
HF4302-015, 022 HF4304-015, 022





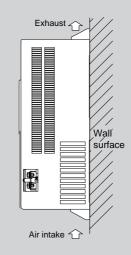
Dimensional Drawing

HF4302-030 HF4304-030



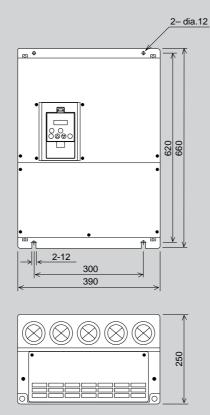
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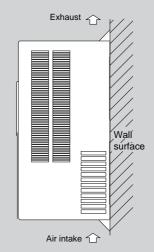
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HF4302-037, -045 HF4304-037, -045, -055

•



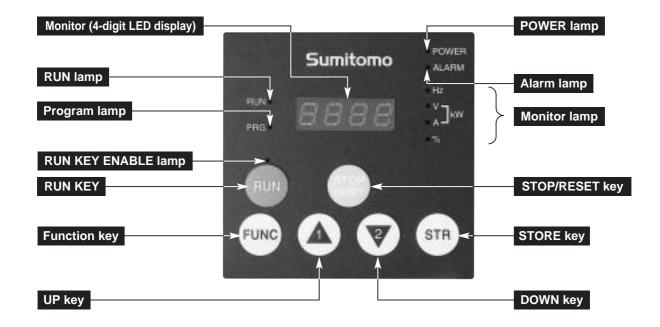


Operation

Operation with digital operator

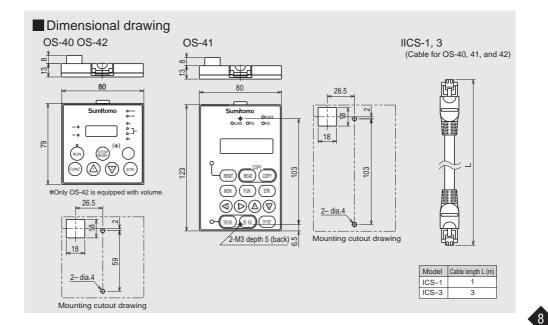
The HF-430 Series is operated by the digital operator provided as standard equipment.

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

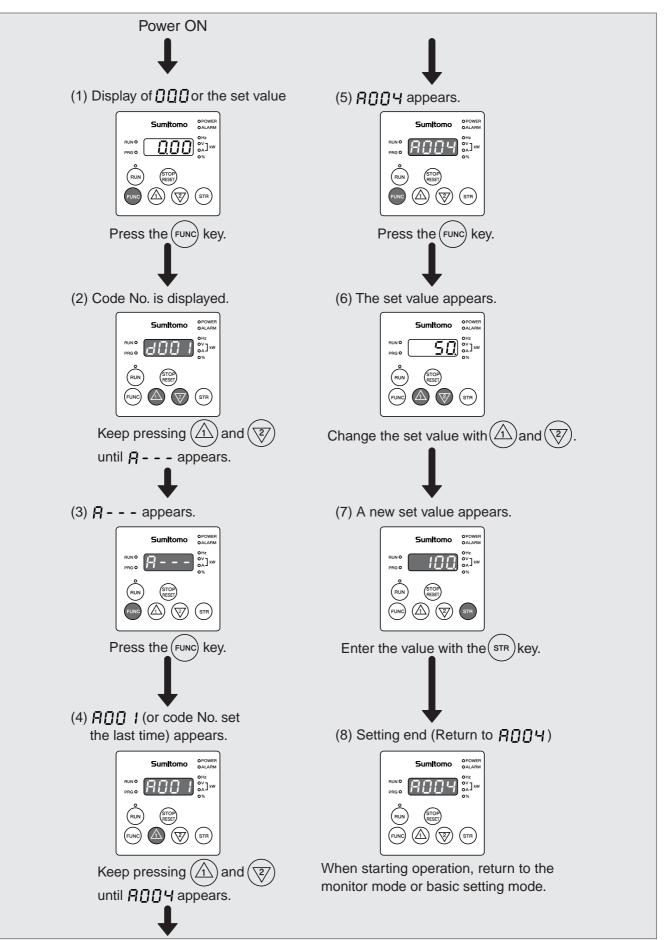
Remote operator



• Operation

Operation method

1. Setting method (Setting max. frequency)



List of Functions-

•Monitor mode/basic setting mode

"Setting possible in the change mode during operation" is valid when $\fbox{b031}$ is set to 10.

Code Name of function Monitor entrop Initial setting			Name of function	Monitor/setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
d002 Output current monitor 0.00-99.99/100.0-999.9A - - - d003 Operation direction monitor F (Forward)/o (Stop)/r (Reverse) - <t< td=""><td></td><td>1</td><td></td><td></td><td>miliai selling</td><td>during operation</td><td>mode during operation</td></t<>		1			miliai selling	during operation	mode during operation
d003 Operation direction monitor F (Forward/Jo (Stop)/r (Reverse) - - - d004 PID feedback monitor 0.00-99.9/1000-999.1/1000-999.1/1000-9999.1 - - - - d005 Multifunctional input monitor Image by 1000-999.1/1000-999.1/1000-9999.1 - - - - d006 Multifunctional ouput monitor Image by 1000-999.1/1000-9999.1 Image by 1000-9999.1 - - - - d007 Frequency conversion monitor 0.00-99.99/1000-9999.1/1000-3996 (10000-39960) - - - - d007 Frequency conversion monitor 0.00-99.99/1000-9999.1/1000-3996 (10000-39960) - - - - d010 Input power monitor 0.0-999.99/1000-999.9/1000-3996 (1000-39960) -		L	,		_	_	_
4004 PID feedback monitor 0.00-99.9/1000-999.9/1000-9999./1000-9					-	-	_
Image: Control of the setting Im						-	-
doos Multifunctional input monitor Image: Digram Mage: Digram Mag		d004	PID feedback monitor		-	-	-
Ope Multifunctional output monitor Image: Signal state		d005		I I I ON (Example) ON :RST,ES,DFL,FR I I I OFF OFF :JOG,MBS,AD2,DFM	-	-	-
OP Frequency conversion monitor 0.00-99.99/100.0-999.9/1000-3996 (10000-39960) - - - d012 Output torque monitor 3004300. - - - - d013 Output voltage monitor 0.0-690.9V - - - - d014 Input power monitor 0.00-999.94/00.0-999.94/W - - - - d016 Accumulated Run time monitor 0.00-999.94/100.0-9999.94/0009999.94/000.regol (10hr unit) /*100- ⁵ 999 (10hr unit) h - - - - d016 Accumulated Run time monitor 0.00-999.94/100.0-9999.94/1000-9999 (10hr unit) /*100- ⁵ 99 (10hr unit) h - <td>or</td> <td>d006</td> <td></td> <td></td> <td>-</td> <td>-</td> <td>-</td>	or	d006			-	-	-
Build Output torque monitor	onit	d007	Frequency conversion monitor		-	-	-
Imput power monitor 0.0-999.9kW - - - d014 Input power monitor 0.0-99.9kW - - - d016 Accumulated Run time monitor 0.0-99.99/1000-9999.1/1000-9999 (100hr unit) / ¹ 100- ¹ 999 (100hr unit) h - - - d017 Power ON time monitor 0.0-99.99/1000-9999.1/1000-6553 (10000-65530) times - - - d080 Number of trip time monitor 09999.1/1000-6553 (10000-65530) times - - - d081 Error history 1-6 Refer to p.4. - - - - d090 Warning monitor Warning code - - - - f001 Output frequency setting 0.0 starting frequency (B, C mode max. frequency) 0.00Hz O O f202 B mode acceleration time setting 0.01-99.99/100.0-999.9/100.0-3600.s 30.00s O O f203 B mode deceleration time setting 0.01-99.99/100.0-999.9/100.0-3600.s 30.00s O O f203 B mode deceleration time setting 0.01-99.99/100.0-	Σ	d012	Output torque monitor	-300+300.	-	-	-
Image: Constraint of the setting is a constraint of the setting is constraint of the setting is a constraint of the setting is a con		d013	Output voltage monitor	0.0-600.0V	-	-	-
d017 Power ON time monitor 0.00-99.99/1000-999.9/1000-9999 (10hr unit) / ¹ 100 ⁻ ¹ 999 (10hr unit) / 100 ⁻ ¹ d08 Error history 1–6 Refer to p.4. - - - - d090 Warning monitor Warning code - - - - - f001 Output frequency setting 0.01 starting frequency (B, C mode max. frequency) 0.00Hz O O F202 B mode acceleration time setting 0.01-99.99/10003600.s 30.00s O O F302 C mode acceleration time setting 0.01-99.99/1000999.9/10003600.s 30.00s O O F302 B mode deceleration time setting 0.01-99.99/1000999.9/10003600.s 30.00s O O F303 <t< td=""><td></td><td>d014</td><td>Input power monitor</td><td>0.0–999.9kW</td><td>-</td><td>-</td><td>-</td></t<>		d014	Input power monitor	0.0–999.9kW	-	-	-
d080 Number of trip time monitor 09999./1000-6553 (10000-65530) times - - - d081 d086 Error history 1-6 Refer to p.4. - - - - d090 Warning monitor Warning code - - - - f001 Output frequency setting 0.0 starting frequency to max. frequency (B, C mode max. frequency) 0.00Hz O O f002 Acceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O O f202 B mode acceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O O f203 Deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O O f203 B mode acceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O O f203 B mode deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O O f203 B mode deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O X X <t< td=""><td></td><td>d016</td><td>Accumulated Run time monitor</td><td>0.00–99.99/100.0–999.9/1000.–9999./1000–9999 (10/hr unit) / ^r100– ^r999 (100/hr unit) h</td><td>-</td><td>-</td><td>-</td></t<>		d016	Accumulated Run time monitor	0.00–99.99/100.0–999.9/1000.–9999./1000–9999 (10/hr unit) / ^r 100– ^r 999 (100/hr unit) h	-	-	-
d08 d08e Error history 1–6 Refer to p.4. – D111111111111111111111111111111111111		d017	Power ON time monitor	0.00–99.99/100.0–999.9/1000.–9999./1000–9999 (10/hr unit) / ^r 100– ^r 999 (100/hr unit) h	-	-	-
ddg Error history 1-6 Refer to p.4. - - - - d090 Warning monitor Warning code -		d080	Number of trip time monitor	09999./1000-6553 (10000-65530) times	-	-	-
F001 Output frequency setting 0.0 starting frequency to max. frequency (B, C mode max. frequency) 0.00Hz O F002 Acceleration time setting 0.01–99.99/100.–999.9/1000.–3600.s 30.00s O O F202 B mode acceleration time setting 0.01–99.99/100.–999.9/1000.–3600.s 30.00s O O F302 C mode acceleration time setting 0.01–99.99/100.–999.9/1000.–3600.s 30.00s O O F003 Deceleration time setting 0.01–99.99/100.–999.9/1000.–3600.s 30.00s O O F203 B mode deceleration time setting 0.01–99.99/100.–999.9/1000.–3600.s 30.00s O O F303 C mode deceleration time setting 0.01–99.99/100.0–999.9/100.–3600.s 30.00s O O F303 C mode deceleration time setting 0.01–99.99/100.0–3600.s 30.00s O O X F004 Operation direction selection 0.01 (Forward)/01 (Reverse) 00 X X F004 Operation direction selection 00 (Forward)/01 (Reverse) 00 X X F00		1 1	Error history 1–6	Refer to p.4.	-	_	-
F002 Acceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O F202 B mode acceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O F302 C mode acceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O F302 C mode acceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O F003 Deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O F203 B mode deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O F303 C mode deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O F303 C mode deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O O F404 Operation direction selection 0.01-99.99/100.0-999.9/10003600.s 30.00s O O F004 Operation direction selection 0.01-99.99/100.0-999.9/100.0-3600.s 30.00s O X F004 Operation direction selection 0.01-99.99/100.0-3600.s 30.00s C C F004 Operation direc		d090	Warning monitor	Warning code	-	-	-
F202 B mode acceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s 0 F302 C mode acceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s 0 0 F003 Deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s 0 0 F203 B mode deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s 0 0 F303 C mode deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s 0 0 F303 C mode deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s 0 0 F004 Operation direction selection 0.01-99.99/100.0-999.9/10003600.s 30.00s 0 0 F004 Operation direction selection 0.01-99.99/100.0-999.9/100.0-3600.s 30.00s 0 0 F004 Operation direction selection 0.01-99.99/100.0-999.9/100.0-3600.s 30.00s 0 0 × F004 Operation direction selection 0.01-99.99/100.0-999.9/100.0-3600.s 30.00s 0 × × F004 Operation direction selection 0.0		F001	Output frequency setting	0.0 starting frequency to max. frequency (B, C mode max. frequency)	0.00Hz	0	0
F302 C mode acceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O F003 Deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O O F203 B mode deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O O F303 C mode deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O O F303 C mode deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O O F303 C mode deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s O O F004 Operation direction selection 0.01-99.99/100.0-999.9/100.0-3600.s 30.00s O O F004 Operation direction selection 0.01-99.99/100.0-999.9/100.0-3600.s 30.00s O O X X A Code to enter extension function A (basic function) E Code to enter extension function C (terminal setting function) E E E E E E E E E E E E E E E E E <td></td> <td>F002</td> <td>Acceleration time setting</td> <td>0.01-99.99/100.0-999.9/10003600.s</td> <td>30.00s</td> <td>0</td> <td>0</td>		F002	Acceleration time setting	0.01-99.99/100.0-999.9/10003600.s	30.00s	0	0
F203 B mode deceleration time setting 0.01-99.99/100999.9/10003600.s 30.00s 0 F303 C mode deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s 0 0 F004 Operation direction selection 0.01-99.99/100.0-999.9/10003600.s 00 x x F004 Operation direction selection 0.0 (Forward)/01 (Reverse) 00 x x F005 Code to enter extension function A (basic function) Code to enter extension function B (protection function, fine adjustment function) C Code to enter extension function C (terminal setting function) F Code to enter extension function H (motor constant setting function) H Code to enter extension function P (option setting function) P Code to enter extension function P (option setting function)		F202	B mode acceleration time setting	0.01–99.99/100.0–999.9/1000.–3600.s	30.00s	0	0
F203 B mode deceleration time setting 0.01-99.99/100999.9/10003600.s 30.00s 0 F303 C mode deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s 0 0 F004 Operation direction selection 0.01-99.99/100.0-999.9/10003600.s 00 x x F004 Operation direction selection 0.0 (Forward)/01 (Reverse) 00 x x F005 Code to enter extension function A (basic function) Code to enter extension function B (protection function, fine adjustment function) C Code to enter extension function C (terminal setting function) F Code to enter extension function H (motor constant setting function) H Code to enter extension function P (option setting function) P Code to enter extension function P (option setting function)	ting	F302	C mode acceleration time setting	0.01–99.99/100.0–999.9/1000.–3600.s	30.00s	0	0
F203 B mode deceleration time setting 0.01-99.99/100999.9/10003600.s 30.00s 0 F303 C mode deceleration time setting 0.01-99.99/100.0-999.9/10003600.s 30.00s 0 0 F004 Operation direction selection 0.01-99.99/100.0-999.9/10003600.s 00 x x F004 Operation direction selection 0.0 (Forward)/01 (Reverse) 00 x x F005 Code to enter extension function A (basic function) Code to enter extension function B (protection function, fine adjustment function) C Code to enter extension function C (terminal setting function) F Code to enter extension function H (motor constant setting function) H Code to enter extension function P (option setting function) P Code to enter extension function P (option setting function)	Sett	F003	Deceleration time setting	0.01-99.99/100.0-999.9/10003600.s	30.00s	0	0
Food Operation direction selection OO (Forward)/01 (Reverse) OO X X A Code to enter extension function A (basic function)		F203	B mode deceleration time setting	0.01–99.99/100.0–999.9/1000.–3600.s	30.00s	0	0
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) P Code to enter extension function P (option setting function)		F303	C mode deceleration time setting	0.01–99.99/100.0–999.9/1000.–3600.s	30.00s	0	0
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 V (user block area)		F004	Operation direction selection	00 (Forward)/01 (Reverse)	00	×	×
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 V (user block area)	u	A	Code to enter extension fu	nction A (basic 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)	lotic	b	Code to enter extension fu	nction B (protection function, fine adjustment 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)	i fur	C	Code to enter extension fu	nction C (terminal setting function)			
P Code to enter extension function P (option setting function) U Code to enter extension function U (user block area)	sior	H	Code to enter extension fu	nction H (motor constant setting function)			
U Code to enter extension function U (user block area)	ten	P	Code to enter extension fu	nction P (option setting function)			
	Ě	U	Code to enter extension fu	nction U (user block area)			

Extension function A

		TUTICUOTIA				
C	ode	Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
	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	×	x
ing	A003	Base frequency	30. to max. frequency Hz	60.Hz	×	×
setting	A203	B mode base frequency	30. to max. B mode frequency Hz	60.Hz	×	×
Basic ;	A303	C mode base frequency	30. to max. C mode frequency Hz	60.Hz	×	x
Ba	A004	Max. frequency	30.–400.Hz	60.Hz	x	×
	A204	B mode max. frequency	30.–400.Hz	60.Hz	×	x
	A304	C mode max. frequency	30.–400.Hz	60.Hz	×	×
	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	×	x
	A006	VRF2 selection	74. 00 (Individual)/01 (Auxiliary speed (not reversible) for VRF and IRF)/02 (Auxiliary speed (reversible) for VRF and IRF)	00	×	x
out	A011	VRF start	0.00–400.0Hz	0.00Hz	×	0
g inp	A012	VRF end	0.00–400.0Hz	0.00Hz	×	0
aloç	A013	VRF start rate	0–100%	0%	×	0
Analog input	A014	VRF end rate	0–100%	100%	x	0
	A015	VRF start selection	00 (External starting frequency)/01 (0 Hz)	01	×	0
	A016	VRF, IRF, VRF2 filter	1–30	8	×	0
	A019	Multi-speed selection	00 (Binary: 4 terminals for 16-step speed change)/01 (Bit: 7 terminals for 8-step speed change)	00	×	x
ed/	A020	Multi-speed 0	0.00 starting frequency to max. frequency Hz	10.00Hz	0	0
Multi-speed/ jogging	A220	B mode Multi-speed 0	0.00 starting frequency to B mode max. frequency Hz	10.00Hz	0	0
Jogo	A320	C mode Multi-speed 0	0.00 starting frequency to C mode max. frequency Hz	10.00Hz	0	0
ML	A021 I 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	0	0

List of Functions-

Extension function A

	ode	Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change
	A038	Jogging frequency setting	0.00 starting frequency to 9.99 Hz	5.0Hz	during operation	mode during operation
Multi-speed/ jogging	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)/04 (Deceleration stop when JOG stops/valid during operation)/05 (DC brake when JOG stops/valid during operation)/05 (DC	01	×	0
	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%	0	0
	A242	B mode manual torque boost	0.0–20.0%	1.0%	0	0
stics	A342	C mode manual torque boost	0.0–20.0%	1.0%	0	0
V/f characteristics	A043	Manual torque boost point	0.0–50.0%	0.8%	0	0
arac	A243	B mode manual torque boost point	0.0–50.0%	0.8%	0	0
ç	A343	C mode manual torque boost point	0.0-50.0%	0.8%	0	0
⇒	A044	Control method	00 (Constant torque characteristics)/01 (Variable torque characteristics)/02 (Free V/f	00 Note	×	×
	A244	B mode control method	characteristics)/ 00 (Constant torque characteristics)/01 (Variable torque characteristics)/02	00	X	X
	A344	C mode control method	(Free V/f characteristics)/03 (Sensorless control)/04 (0 speed area sensorless 00 (Constant torque characteristics)/01 (Variable torque characteristics)	00	×	×
	A045	Output voltage gain	20.0–100.0	100.0%	0	0
	A051	DC brakeking selection	00 (Invalid)/01 (Valid)	00	×	0
	A052	DC brakeking frequency	0.00–60.00Hz	0.50Hz	×	0
	A053	DC brakeking wait time	0.0–5.0s	0.0s	×	0
U	A054	DC braking force	0100.%	0.%	×	0
DC brake	A055	DC braking time	0.0-60.0s	0.0s	×	
0 Q		<u> </u>	00 (Edge action)/01 (Level action)	0.03	×	0
	A056 A057	DC braking edge/level selection	0100.%	0.%	×	0
	A057	DC braking force at start-up DC braking time at start-up	0.0-60.0s	0.78 0.0s	X	0
	<u> </u>		0.5–15 kHz (Derating provided)	5.0kHz		
	A059	Carrier frequency for DC braking		0.00Hz	×	×
	A061	Frequency upper limiter	0.00, starting frequency to R mode may frequency Hz	0.00Hz	×	0
	A261	B mode frequency upper limiter	0.00, starting frequency to B mode max. frequency Hz		X	0
du	A062	Frequency lower limiter	0.00, starting frequency to max. frequency Hz	0.00Hz 0.00Hz	X	0
Upper/lower limiter jump	A262	B mode frequency lower limiter	0.00, starting frequency to B mode max. frequency Hz		X	0
nite	A063	Jump frequency 1	0.00-400.0Hz	0.00Hz	×	0
er lir	A064	Jump frequency width 1	0.00–10.00Hz	0.50Hz		0
DWe	A065	Jump frequency 2	0.00400.0Hz	0.00Hz	×	0
er/lo	A066	Jump frequency width 2	0.00–10.00Hz	0.50Hz	×	0
dd	A067	Jump frequency 3	0.00–400.0Hz	0.00Hz	×	0
	A068	Jump frequency width 3	0.00–10.00Hz	0.50Hz	×	0
	A069	Acceleration stop frequency	0.00–400.0Hz	0.00Hz	×	0
	A070	Acceleration stop time	0.0–60.0s	0.0s	×	0
	A071	PID selection	00 (Invalid)/01 (Valid)	00	×	0
trol	A072	P gain	0.2–5.0	1.0	0	0
PID control	A073	l gain	0.0–3600.0s	1.0s	0	0
Q	A074	D gain	0.0–100.0s	0.0s	0	0
L C	A075	PID scale	0.01–99.99%	1.0	×	0
	A076	PID feedback \selection	00 (Feedback: IRF)/01 (Feedback: VRF)	00	×	0
AVR	A081	AVR selection	00 (Normally ON)/01 (Normally OFF)/02 (OFF during deceleration)	00	×	×
A	A082	Motor voltage selection	200/215/220/230/240, 380/400/415/440/460/480V	200/400	×	×
ы	A085	Operation mode selection	00 (Normal operation)/01 (Energy-saving operation)/02 (Fuzzy operation)	00	×	×
ncti	A086	Energy-saving response, accuracy adjustment	0.0–100.0.s	50.0	0	0
n fu	A092	Acceleration time 2	0.01–3600.s	30.00s	0	0
atio	A292	B mode acceleration time 2	0.01–3600.s	30.00s	0	0
elera	A392	C mode acceleration time 2	0.01–3600.s	30.00s	0	0
dece	A093	Deceleration time 2	0.01–3600.s	30.00s	0	0
Operation mode and acceleration/deceleration function	A293	B mode deceleration time 2	0.01–3600.s	30.00s	0	0
erati	A393	C mode deceleration time 2	0.01–3600.s	30.00s	0	0
cele	A094	No.2 acceleration/deceleration selection	00 (Change with AD2 terminal)/01 (Change with setting)	00	×	×
aci	A294	B mode No.2 acceleration/deceleration selection	00 (Change with AD2 terminal)/01 (Change with setting)	00	×	×
and	A095	No.2 acceleration frequency	0.00–400.0Hz	0.00Hz	×	×
ode	A295	B mode No.2 acceleration frequency	0.00–400.0Hz	0.00Hz	×	×
mc	A096	No.2 deceleration frequency	0.00–400.0Hz	0.00Hz	×	×
tion	A296	B mode No.2 deceleration frequency	0.00–400.0Hz	0.00Hz	×	×
)era	A097		00 (Straight line)/01 (S-shaped curve)/02 (U-shaped curve)/03 (Reverse U-shaped curve)	00	×	×
Q	A098	Deceleration pattern selection	00 (Straight line)/01 (S-shaped curve)/02 (U-shaped curve)/03 (Reverse U-shaped curve)	00	×	×
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11

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

Co	ode	Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
Ę	A101	IRF start	0.00–400.0Hz	0.00Hz	×	×
mer	A102	IRF end	0.00–400.0Hz	0.00Hz	×	0
adjustment	A103	IRF start rate	0.–100.%	20.%	×	0
	A104	IRF end rate	0100.%	100.%	×	0
External frequency	A105	IRF start pattern selection	00 (External start frequency)/01 (0 Hz)	01	×	0
requ	A111	VRF2 start	-400.–400.Hz	0.00Hz	×	0
nal f	A112	VRF2 end	-400400.Hz	0.00Hz	×	0
xter	A113	VRF2 start rate	-100–100%	-100.%	×	0
	A114	VRF2 end rate	-100–100%	100.%	×	0
Accel eration/ decel eration	A131	Acceleration curve constant	01 (Small swell) to 10 (Large swell)	02	×	0
Accele	A132	Deceleration curve constant	01 (Small swell) to 10 (Large swell)	02	×	0

•Extension function b

Under Transmission Name Name Operating Operating <th< th=""><th></th></th<>	
b007 Lower limit match frequency 0.00-400.0Hz X b012 Electronic thermal level 0.20 X Rated current to 1.20 X Rated current A Inverter rated current A X b112 Electronic thermal level 0.20 X Rated current to 1.20 X Rated current A Inverter rated current A X b121 Encode electronic 0.20 X Rated current to 1.20 X Rated current A Inverter rated current A X b1312 Cmode electronic 0.20 X Rated current to 1.20 X Rated current A Inverter rated current A X b1313 Encode electronic 0.20 X Rated current to 1.20 X Rated current A Inverter rated current A X b1313 Encode electronic 0.0 (Reduction characteristics)/01 (Constant torque characteristics)/02 (Free setting) 00 X b1515 Free electronic fremal lequency 1 0400.Hz 0.Hz X b016 Free electronic fremal lequency 2 0400.Hz 0.Hz X b018 Free electronic fremal lequency 3 0400.Hz 0.Hz X b020 Free electronic fremal lequency 3 0400.Hz 0.Hz X b0215 </td <td>0 0 0 0</td>	0 0 0 0
b007 Lower limit match frequency 0.00-400.0Hz 0.00Hz × b012 Electronic thermal level 0.20 × Rated current to 1.20 × Rated current A Inverter rated current A × b112 Electronic thermal level 0.20 × Rated current to 1.20 × Rated current A Inverter rated current A × b112 Electronic thermal level 0.20 × Rated current to 1.20 × Rated current A Inverter rated current A × b112 Cmode electronic 0.20 × Rated current to 1.20 × Rated current A Inverter rated current A × b113 Cmode electronic 0.20 × Rated current to 1.20 × Rated current A Inverter rated current A × b131 Enverters retreated 00 (Reduction characteristics)/01 (Constant torque characteristics)/02 (Free setting) 00 × b115 Free electronic thermal inquero; 1 0400.Hz 0.Hz × b016 Free electronic thermal aurent 1 0.0-999.9A 0.0A × b018 Free electronic thermal aurent 3 0.0-999.9A 0.0A × b020 Free electronic thermal aurent 3 0.0-999.9A 0.0A ×	0 0 0 0
b007 Lower limit match frequency 0.00-400.0Hz 0.00Hz X b012 Electronic thermal level 0.20 X Rated current to 1.20 X Rated current A Inverter rated current A X b112 Electronic thermal level 0.20 X Rated current to 1.20 X Rated current A Inverter rated current A X b112 Cmode electronic 0.20 X Rated current to 1.20 X Rated current A Inverter rated current A X b112 Cmode electronic 0.20 X Rated current to 1.20 X Rated current A Inverter rated current A X b112 Cmode electronic 0.20 X Rated current to 1.20 X Rated current A Inverter rated current A X b1312 Envertering invertering inverteri	0 0 0
b007 Lower limit match frequency 0.00-400.0Hz 0.00Hz X b012 Electronic thermal level 0.20 X Rated current to 1.20 X Rated current A Inverter rated current A X b112 Electronic thermal level 0.20 X Rated current to 1.20 X Rated current A Inverter rated current A X b112 Cmode electronic 0.20 X Rated current to 1.20 X Rated current A Inverter rated current A X b112 Cmode electronic 0.20 X Rated current to 1.20 X Rated current A Inverter rated current A X b112 Cmode electronic 0.20 X Rated current to 1.20 X Rated current A Inverter rated current A X b1312 Envertering invertering 00 (Reduction characteristics)/01 (Constant torque characteristics)/02 (Free setting) 00 X b115 Free electronic thermal inspano_1 0400.Hz 0.Hz X b016 Free electronic thermal aurent1 0.0-999.9A 0.0A X b018 Free electronic thermal aurent2 0.0-999.9A 0.0A X b020 Free electronic thermal aurent2 0.0-999.9A 0.0A X <tr< td=""><td>0 0</td></tr<>	0 0
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Understand Dot 3 Electronic thermany consistence of the section in the section of the section of the section in the section of the section of the section in the section of the section of the section of the section in the section of the section of the section of the section in the section of the section of the section of the section in the section of the section in the section of th	0
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b017 Free electronic thermal frequency 2 0400.Hz 0.Hz × b018 Free electronic thermal current 2 0.0-999.9A 0.0A × b019 Free electronic thermal frequency 3 0400.Hz 0.Hz × b020 Free electronic thermal infrequency 3 0400.Hz 0.Hz × b021 Stall prevention selection of forwald/01 (Vaid during accoleration and at constant speed)/02 (Vaild at constant speed	0
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b021 Stall prevention selection 00 (Invalid)/01 (Valid during acceleration and at constant speed)/02 (Valid at constant speed)/02 (Va	0
b022 Stall prevention level 0.50 X Rated current to 2.00 X Rated current A Inverter rated current X1.5A X b023 Stall prevention constant 0.10–30.00 1.00 X b024 Stall prevention 2 selection OP (Invalid/O1 (Valid during acceleration and at constant speed/O2 (Valid At con	0
b022 Stall prevention level 0.50 X Rated current to 2.00 X Rated current A Inverter rated current X 1.5A X b023 Stall prevention constant 0.10–30.00 1.00 X b024 Stall prevention 2 selection OP (Invalid/O1 (Valid during acceleration and at constant speed)/O2 (Valid at const	0
Image: constant speed (speed increase during regeneration)/(24 (value at constant speed (speed increase during regeneration)) Inverter rated current X 1.5A X b025 Stall prevention level 2 0.50 X Rated current to 2.00 X Rated current A Inverter rated current X 1.5A X b026 Stall prevention constant 2 0.10–30.00 1.00 X 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 impossible)/02 (Change of data other than this item impossible)/03 (Change in data	0
Image: constant speed (speed increase during regeneration)/24 (valid at constant speed (speed increase during regeneration)) Inverter rated current X 1.5A X b025 Stall prevention level 2 0.50 X Rated current to 2.00 X Rated current A Inverter rated current X 1.5A X b026 Stall prevention constant 2 0.10–30.00 1.00 X 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 impossible)/02 (Change in data other than this item impossible)/02 (Change in data other than this item impossible)/03 (Change in data other than this item imposside)/04 (Change in data other than this ite	0
viscol b025 Stall prevention level 2 0.50 × Rated current to 2.00 × Rated current A Inverter rated current X1.5A × b026 Stall prevention constant 2 0.10–30.00 1.00 × viscol Software lock selection 00 (When SFT terminal is ON, change of data other than this item and set frequency 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 and set frequency impossible)/02 (Change of data other than this item and set frequency impossible)/02 (Change of data other than this item and set frequency impossible)/02 (Change of data other than this item and set frequency impossible)/03 03 × b034 Run time/ power ON time level power ON time level 06553 (X 10 h unit) 0 (X 10h) ×	0
Both 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 X b034 Run time/ power ON time level 00 (Change of data other than this item impossible)/10 (Data changeable during operation mode) 0 (X 10h) X	0
b031 Software lock selection 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 X b034 Run time/ power ON time level power ON time level 06553 (X 10 h unit) 0 (X 10h) X	0
b034 Run time/ power ON time level 06553 (X 10 h unit) 0 (X 10h) X b035 Operation direction 00 (Forward/values a valid)/01 (Opty forward valid)/02 (Opty fo	0
	0
buss restrict 00 (Folward/reverse valid)/01 (Only folward valid)/02 (Only reverse valid) 00 X	×
b036 Reduced voltage starting selection 00 (Short reduced voltage starting time) to 06 (Long reduced voltage starting time) 06 X	0
b037 Display selection 00 (Indication of all items)/01 (Individual indication of function)/02 (User setting, indication of this item) 00 X	0
b040 Torque limit selection 00 (4-quadrant)/01 (Terminal)/02 (Analog VRF2 input)/03 (Option 1)/04 (Option 2) 00 X	0
b041 Torque limit 1 (Forward power running in 4-quadrant mode) 0200.%, no (Torque limiter invalid) 150.% X	0
b042 (Torque limit 2 normion) 0200.%, no (Torque limiter invalid) 150.% X	0
b043 Torque limit 3 (Reverse power running in 4-quadrant mode) 0.–200.%, no (Torque limiter invalid) 150.% X	0
b044 Torque limit 4 (Forward regeneration in 4-quadrant mode) 0.–200.%, no (Torque limiter invalid) 150.% X	0
20 b045 Torque LADSTOP selection 00 (Invalid)/01 (Valid) 00 X	0
b046 Reverse run prevention selection 00 (Invalid)/01 (Valid) 00 X	0
O Instantaneous stop non-stop selection 00 (Invalid)/01 (Valid) 00 X	×
b051 Instantaneous stop non-stop start voltage 0.0–999.9V 0.0V X	×
b052 Instantaneous stop non-stop OV-LADSTOP level 0.0–999.9V 0.0V X	×
b053 Instantaneous stop non-stop deceleration time	×
b054 Instantaneous stop non-stop deceleration start width 0.00–10.00Hz 0.00Hz X	×
b080 AMV adjustment 0-255 180 O	0
b081 FRQ adjustment 0-255 60 O	0
b082 Starting frequency 0.10–9.99Hz 0.50Hz X	0
b083 Carrier frequency 0.5–15.0 kHz (Derating provided) 5.0kHz X	×
b084 Initialization selection 00 (Error history clear)/01 (Data initialization)/02 (Error history clear + Data initialization) 00 X	×

List of functions -

Extension function b

		Name of function	Setting range	Initial setting	Setting possible	Setting possible in the change mode during operation
	b085	Initialization data selection	00 (Domestic)	00		X
	b086	Frequency conversion factor	0.1–99.9	1.0	0	0
	b087	STOP/RESET key selection	00 (Valid during external operation)/01 (Invalid during external operation)	00		0
	b088	Free run stop selection	00 (0Hz start)/01 (Match frequency start)	00		0
ú	b090	Regenerative braking usage ratio	000.0–100.0%	0.0%		0
Free V/f setting	b091	Operation during stop selection	00 (Deceleration)/01 (Free run stop)	00		×
Ó	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		0
	b096	DBTR ON level	330–380/660–760V	360/720V		0
	b098	Thermistor selection	00 (Invalid)/01 (PTC valid)/02 (NTC valid)	00		0
	b099	Thermistor error level	0.0–9999.Ω	3000Ω		0
	b100	Free V/f frequency 1	0400.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		x
	b103	Free V/f voltage 2	0.0-800.0V	0.0V		×
	b104	Free V/f frequency 3	0400.Hz	0.Hz		x
	b105	Free V/f voltage 3	0.0-800.0V	0.0V		×
	b106	Free V/f frequency 4	0400.Hz	0.Hz		×
	b107	Free V/f voltage 4	0.0-800.0V	0.0V		x
b	b108	Free V/f frequency 5	0400.Hz	0.Hz		×
ettir	b109	Free V/f voltage 5	0.0-800.0V	0.0V		x
∕/f s	b110	Free V/f frequency 6	0400.Hz	0.Hz		×
ree	b111	Free V/f voltage 6	0.0-800.0V	0.0V		×
	b112	Free V/f frequency 7	0400.Hz	0.Hz		×
	b113	Free V/f voltage 7	0.0-800.0V	0.0V		×
	b120	Brake control selection	00 (Invalid)/01 (Valid)	00		0
	b121	Establishment waiting time	0.00–5.00s	0.00s		0
	b122	Acceleration waiting time	0.00–5.00s	0.00s		0
	b123	Stop waiting time	0.00–5.00s	0.00s		0
	b124	Brake confirmation waiting time	0.00–5.00s	0.00s		0
	b125	Brake release frequency setting	0.00–99.99/100.0–400.0Hz	0.00Hz		0
	b126	Brake release current setting	0.50 X Rated current to 2.00 X Rated current A	Inverter rated current A		0

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	18	×	0
	C002	Multifunctional input terminal ES selection	(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	12	×	0
	C003	Multifunctional input terminal JOG selection	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	06	×	0
	C004	Multifunctional input terminal MBS selection	(PID: PID valid/invalid)/24 (PIDC: PID integral reset)/26 (CAS: Control gain changeover)/27 (UP: Remote control speed	11	×	0
	C005	Multifunctional input terminal AD2 selection	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	09	×	0
Incti	C006	Multifunctional input terminal DFM selection	(SF5: Multistep speed bit 5)/37 (SF6: Multistep speed bit 6)/38 (SF7: Multistep speed bit 7)/39 (OLR: Stall prevention	03	×	0
ultifu	C007	Multifunctional input terminal DFL selection	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	02	×	0
Ĕ	C008	Multifunctional input terminal RR selection	(PCLR: Position deviation clear)/48 (STAT: 90-degree phase difference permit)/255 (NO: No allocation)	01	×	0
	C011	Multifunctional input RST A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	0
	C012	Multifunctional input ES A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	0
	C013	Multifunctional input JOG A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	0
_	C014	Multifunctional input MBS A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	0
nina	C015	Multifunctional input AD2 A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	0
terr	C016	Multifunctional input DFM A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	0
Itput	C017	Multifunctional input DFL A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	0
Multifunctional output terminal	C018	Multifunctional input FR A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	0
tion	C019	FR A/B (NO/NC) selection	00 (NO) /01 (NC)	00	×	0
nuc	C021	Multifunctional output terminal UPF selection	00 (DRV: Driving)/01 (UPF1: Frequency arrival)/02 (UPF2: Frequency detection 1)/03 (OL: Current detection	01	×	0
lultif		Multifunctional output terminal DRV selection	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	00	×	0
2	C023	Multifunctional output terminal X1 selection	(RNT: RUN time over)/12 (ONT: Power ON time over)/13 (THM: Electronic thermal alarm)/19 (BRK: Brake	13	×	0
	C024	Multifunctional output terminal X2 selection	release)/20 (BER: Brake error)/21 (ZS: 0 speed signal)/22 (DSE: Speed deviation maximum)/23 (POK:	07	×	0
	C025	Multifunctional output terminal X3 selection	Positioning completel/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	08	×	0
	C026	Alarm relay output terminal	output) is forcibly set for the multifunctional output terminals UPF-X2 or UPF-X3.>	05	×	0
ninal	C027	FRQ selection	00 (Output frequency)/01 (Output current)/02 (Output torque)/03 (Digital output frequency)/04		×	0
Monitor terminal	C028	AMV selection	(Output voltage)/05 (Input power)/06 (Thermal load factor)/07 (LAD frequency) (03 can be set only for C027.)	00	×	0
Monit	C029	AMI selection			×	0

Extension function C

Code		Name of function	Setting range	Initial setting	Setting possible	Setting possible in the change
C00e		Multifunctional output UPF A/B (NO/NVC) sekection	00 (NO) /01 (NC)	00	during operation	mode during operation
	C032	Multifunctional output DRV	00 (NO) /01 (NC)	00	×	0
	C032	A/B (NO/NVC) sekection Multifunctional output X1	(1) 00 (10) (01 (10))		X	0
	C033	A/B (NO/NVC) sekection Multifunctional output X2		00	X	0
bL	C034	A/B (NO/NVC) sekection Multifunctional output X3	00 (NO) /01 (NC)			0
settin		A/B (NO/NVC) sekection Abnormal contact point output A/B (NO/NVC) sekection	00 (NO) /01 (NC)	00	X X	0
vels	C036 C040	Current detection signal	00 (NO) /01 (NC)	00	X	0
ut le		output mode selection	00 (During acceleration/deceleration/at constant speed)/01 (At constant speed)			0
Output terminal state setting/output level setting	C041	Current detection level	0.00 X Rated current to 2.00 X Rated current A	Inverter rated current A	X	0
o/ɓu	C042	Acceleration reaching frequency	0.00-400.0Hz	0.00Hz	X	
settin	C043	Deceleration reaching frequency	0.00-400.0Hz	0.00Hz	X	0
ate s	C044	PID deviation level	0.0–100.0%	3.0%	X	0
al sta	C045	Reaching frequency 2 during acceleration	0.00–99.99/100.0–400.0Hz	0.00	X	0
nina	C046	Reaching frequency 2 during acceleration	0.00–99.99/100.0–400.0Hz	0.00	X	0
terr	C055	Overtorque (forward power running) level	0.–200.%	100.	X	0
tput	C056	Overtorque (reverse regeneration) level	0200.%	100.	×	0
Ő	C057	Overtorque (reverse power running) level	0200.%	100.	×	0
	C058	Overtorque (forward regeneration) level	0.–200.%	100.	×	0
	C061	Electronic thermal warning level	0.–100.%	85%	×	0
	C062	Alarm code selection	00 (Invalid)/01 (3 bits)/02 (4 bits)	00	×	0
	C063	Zero speed detection level	0.00–99.99/100.0Hz	0.00Hz	×	0
ntrol	C070	Data command selection	02 (OPU)/03 (RS485)/04 (Option 1)/05 (Option 2)	02	×	×
Communication function control	C071	Communication transmission speed	02 (Loop back test)/03 (2400bps)/04 (4800bps)/05 (9600bps)/06 (19200bps)	04	×	0
nctio	C072	Communication station No.	1.–32.	1.	×	0
on fu	C073	Communication bit length	7 (7 bits)/8 (8 bits)	7	x	0
icatio	C074	Communication parity	00 (No parity)/01 (Even-parity)/02 (Odd-parity)	00	x	0
unu	C075	Communication stop bit	1 (1 bit)/2 (2 bits)	1	x	0
Com	C078	Communication waiting time	0.0–1000.ms	0.0ms	х	0
_	C081	VRF adjustment	0–6553 (65535)	Set for shipment	0	0
Analog meter setting	C082	IRF adjustment	0–6553 (65535)	Set for shipment	0	0
r se	C083	VRF2 adjustment	0–6553 (65535)	Set for shipment	0	0
lete	C085	Thermistor adjustment	0.0–1000.	105.0	0	0
u ɓc	C086	AMV offset adjustment	0.0–10.0V	0.0V	0	0
Vnalo	C087	AMI adjustment	0–255	80	0	0
4	C088	AMI offset adjustment	0–20.0mA	Set for shipment mA	0	0
	C091	Debug mode selection	00 (No indication)/01 (Indication)	00	x	0
	C101	UP/DWN selection	00 (Frequency data not stored)/01 (Frequency data stored)	00	x	0
	C102	Reset selection	00 (Trip cancel at ON)/01 (Trip cancel at OFF)/02 (Valid only during tripping (Cancelled at ON))	00	×	0
ers	C103	Reset match frequency selection	00 (0Hz start)/01 (Mach frequency start)	00	×	0
Others	C111	Current detection 2 level	0.00 X Rated current to 2.00 X Rated current	Inverter rated current	x	0
	C121	VRF zero adjustment	0–6553 (65535)	Set for shipment	0	0
	C122	IRF zero adjustment	0-6553 (65535)	Set for shipment	0	0
	C123	VRF2 zero adjustment	0-6553 (65535)	Set for shipment	0	0
	0.20					

Extension function H

Co	ode	Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
	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	×	x
	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	×	×
setting	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	×	×
gain	H204	B mode number of motor poles setting	2/4/6/8	4	×	×
Motor constant/gain	H005	Speed response	0.001–65.53	1.590	0	0
onst	H205	B mode speed response	0.001–65.53	1.590	0	0
or co	H006	Stabilization constant	0–255	100	0	0
Mot	H206	B mode stabilization constant	0–255	100	0	0
	H306	C mode stabilization constant	0–255	100	0	0
	H020	Motor primary resistance R1	0.000-9.999/10.00-65.53	By capacity	×	x
	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

Co	de	Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
	H221	B mode motor secondary resistance R2	0.000-9.999/10.00-65.53	By capacity	x	×
	H022	Motor inductance L	0.00–9.99/100.–655.3	By capacity	x	×
	H222	B mode motor inductance L	0.00-9.99/100.0-655.3	By capacity	x	x
	H023	Motor no-load current IO	0.00–9.99/100.0–655.3	By capacity	x	×
	H223	B mode motor no-load current IO	0.0099/100.0-655.3	By capacity	x	x
	H024	Motor inertial moment J	1.0–999.9/1000.–9999.	By capacity	x	×
	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	x	×
	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	x	×
ing	H231	B mode auto tuning motor secondary resistance R2	0.000–9.999/10.00–65.53	Differs according to capacity	×	×
setting	H032	Auto tuning motor inductance L	0.00-9.99/100.0-655.3	Differs according to capacity	x	x
ain	H232	B mode auto tuning motor inductance L	0.00–9.99/100.0–655.3	Differs according to capacity	×	×
nt/g	H033	B mode auto tuning motor no-load current IO	0.00-9.99/100.0-655.3	Differs according to capacity	x	×
star	H233	B mode auto tuning motor no-load current IO	0.00–9.99/100.0–655.3	Differs according to capacity	×	×
con	H034	Auto tuning motor inductance L	1.0–999.9/1000.	Differs according to capacity	x	×
Motor constant/gain	H234	B mode auto tuning motor inductance L	1.0–999.9/1000.	Differs according to capacity	×	×
Mo	H050	PI proportional gain	0.0-99.9/100.0-999.9/1000.%	100.0%	0	0
	H250	B mode PI proportional gain	0.0-99.9/100.0-999.9/1000.%	100.0%	0	0
	H051	PI integral gain	0.0-99.9/100.0-999.9/1000.%	100.0%	0	0
	H251	B mode PI integral gain	0.0-99.9/100.0-999.9/1000.%	100.0%	0	0
	H052	P proportional gain	0.00-10.00	1.00	0	0
	H252	B mode P proportional gain	0.00–10.00	1.00	0	0
	H060	0Hz SLV limiter	0.0–100.0%	100.0%	0	0
	H260	B mode zero sensorless limit	0.0–100.0%	100.0%	0	0
	H070	For PI proportional gain switching	0.0-99.9/100.0-999.9/1000.%	100.0%	0	0
	H071	For PI integral gain switching	0.0–99.9/100.0–999.9/1000.%	100.0%	0	0
	H072	For P proportional gain switching	0.00–10.00	1.00	0	0

Extension function P

Code		Name of function	Setting range	Initial setting	Setting possible during operation	Setting possible in the change mode during operation
	P001	Operation for option 1 error selection	00 (Abnormal)/01 (Continuation of operation)	00	×	0
	P002	Operation for option 2 error selection	PG feedback option selection	00	×	0
	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	04095.pulses	0.pulses	×	0
	P015	Orientation speed setting	0.00-99.99/100.0-120.0Hz	5.00Hz	×	0
	P016	Orientation direction setting	00 (Forward direction)/01 (Reverse direction)	00	x	x
options	P017	Orientation completion range setting	09999./1000 (10000) pulses	5.pulses	×	0
opti	P018	Orientation completion delay time setting	0.00–9.99s	0.00s	x	0
For	P019	Electronic gear setting position selection	00 (Position feedback side)/01 (Position command side)	00	×	0
	P020	Electronic gear ratio numerator setting	1.–9999.	1.	×	0
	P021	Electronic gear ratio denominator setting	1.–9999.	1.	x	0
	P022	Position feed forward gain setting	0.00-99.99/100.0-655.3	0.00	×	0
	P023	Position loop gain setting	0.00–99.99/100.0	0.50	x	0
	P025	Secondary resistance correction selection	00 (Not provided)/01 (Provided)	00	x	0
	P026	Overspeed error detection level setting	0.0–150.0%	135%	×	0
	P027	Speed deviation error detection level setting	0.00–99.99/120.0Hz	7.5Hz	x	0
	P031	Option acceleration/deceleration time input selection	00 (Main unit)/01 (Option 1)/02 (Option 2)	00	x	×
	P032	Option position command input selection	00 (Main unit)/01 (Option 1)/02 (Option 2)	00	x	×

•Extension function U

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

Terminal function

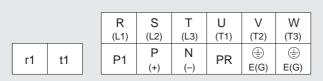
Main circuit terminal

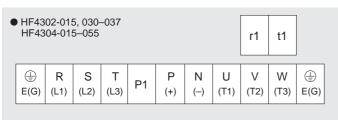
Terminal function

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

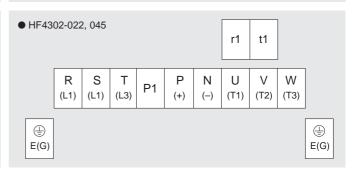
• HF4302-5A5 HF4304-5A5



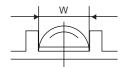


HF4302-7A5-011 HF4304-7A5-011

111 4304	-173-0						
R	S	Т	U	V	W		
(L1)	(L2)	(L3)	(T1)	(T2)	(T3)		
P1	Р	N	PR			r1	t1
	(+)	(-)		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

Terr	ninal	arrang	emen	t																		
	+V	VRF2		/V FI	RQ 1	гн	FR	R	R E	BC	AD	02	JOG	RS	ST Z	X2	X	1	UPF	F	в	
COM	VF	RF I	IRF	AMI	P24	PCS	S E	SC	DFL	DF	М	MBS	B E	s	Х3	O	N	DRV	'	FC	FA	

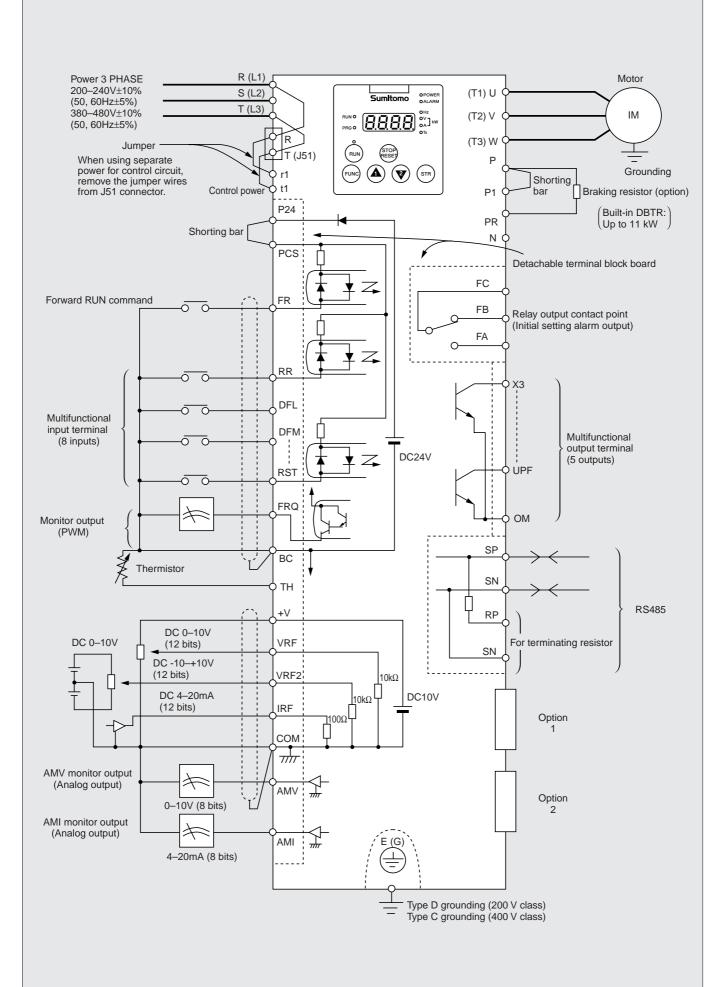
Terminal function -

Control circuit terminal

Terminal function

	CIII		l tuncti Terminal			
			code	Terminal name	Setting range	Electric characteristics
	Dower		COM	Analog power common	Common for analog input (VRF, VRF2, IRF) and analog output (AMV, AMI). *Do not ground to earth.	
		L_	+V	Power for frequency setting	10 VDC power for VRF terminal	Allowable load current: 20 mA or less
		indiii fi	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
Analog	Fragilarcy setting input		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
	Fradita	anhaiu	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	I output	AMV	Analog voltage output monitor	Select one of the monitor items for either output – output frequency, output current, torgue, output voltage, input power, and electronic thermal load	0-10 VDC voltage output Allowable load current: 2 mA or less
	Monito		AMI	Analog current output monitor	factor.	4-20 mADC current output Allowable load impedance: 250Ω or less
	Monitor output		FRQ	Digital monitor	[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.	Allowable load current: 1.2 mA or less Digital output frequency range: 0-3.6 kHz
	Monito		TRQ	(Voltage)	[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%).	0–3.6kHz
	Mor		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
	Dower		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.	
		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
Digital	Contact input	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.	Voltage between each input and PCS: 18 VDC of hinde [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
			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.	Allowable max. voltage Between each input and PCS: 27 VDC
	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
	Open co	Sta	ОМ	Remote control for multifunctional output terminal	Common terminal for multifunctional output terminals	Allowable max. current: 50 mA
Analog	Analog input	When the external thermistor is connected and the temperature foult occur			Allowable input voltage range DC0–5V [Input circuit] Thermistor BC	
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



18

HF-430

Applicable wiring for accessories options

	Stand	dard Ac	cessories	
(Power supply)	Rated input voltage	Applicable motor rating	Applicab inverter model	
		5.5	HF4302-5/	45
		7.5	HF4302-7/	45
		11	HF4302-02	11
$\phi/\phi/\phi/$	200 V	15	HF4302-02	15
		22	HF4302-02	22
	class	30	HF4302-03	30
		37	HF4302-03	37
		45	HF4302-04	15
		55	HF4302-05	55
		5.5	HF4304-54	45
contactor		7.5	HF4304-7A	۹5
666		11	HF4304-02	11
Ť Ť Ť	400 V	15	HF4304-02	15
	class	22	HF4304-02	22
	Ciass	30	HF4304-03	30
		37	HF4304-03	37
		45	HF4304-04	45
AC reactor		55	HF4304-05	55
Zero-phase reactor	2. 3. 4. When u based o	parenthes The above Use thicke The show	e types may cl er cables when n accessories earth leakage I wire distand	hange d n wiring are for e break
Radio noise		l	Trip curi	rent (m
filter	100r	n or less		30
	300r	n or less	1	00
reactor	600r	n or less	2	00
, S T P1 3 -				
		Nam		
Inverter	For hig /power	AC reactor her harmon smoothin mprovemon	onic control g/power	This i lines, powe fluctu
		noise filt hase rea		Elect as a radiat

LC filter

Zero-phase reactor

AC reactor

Motor

-

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19

IM

Rated	Applicable	Applicable	Circuit breaker a leakage brea	aker	Electromagnetic contactor [MC] (Made by Fuji Electric)	Cable size ((mm²) (Note
input voltage	motor rating	inverter model	(Made by Mitsubis	hi Electric)	Input side	Input side	Inverter
Ũ	J		No reacto	or	No reactor	No reactor	output side
	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)
200 V	15	HF4302-015	NF100, NV100	100A	SC-3N	38 (14)	22 (14)
class	22	HF4302-022	NF225, NV225	175A	SC-5N	60 (22)	38 (22)
class	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)
	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)
400 V	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)
class	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)
	parenthes	es.	e. 600 V crosslinked-p			ble is shown in	1

. 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)	Notes: 1. When CV wiring is used in metal conduit, the leakage current is approximately 30mA/km.
100m or less	30	2. Leakage current will increase eightfold with IV
300m or less	100	type cable due to higher dielectric constant. In
600m or less	200	this case, use ELB with the next higher trip
		rating.

		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

					Bral	king tor	que 100%						
	Туре	Motor	Ор	eratior	n rate : 4%ED max.			Operat	tion rate : 10%ED max.				
Voltage	of	rating	Bra	aking ti	me : 7 sec. max.			Braking time : 15 sec. max.					
	inverter	(kW)	Braking ur	nit	Braking resistor	* *	Braking ur	nit	Braking resistor	* *			
			Туре	Qty	Туре	Qty	Туре	Qty	Туре	Qty			
	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			
200V	HF4302-015	15	DU-207S	1	X435AC064 (2.5Ω 750W)	3S	DU-202S	1	X435AC064 (2.5Ω 750W)	4S			
Class	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			
	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			
400V Class	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.

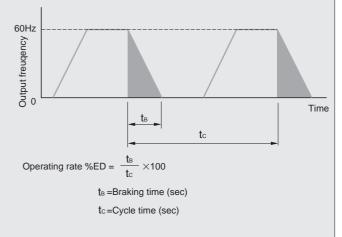
** P in the column of the number of resistors means parallel connection and S means series connection.

Wire size (Terminal P/PR/N)

Type of	braking unit	Wire	Type of	f braking unit	Wire
	DU-201S	3.5mm ²		DU-401S	2mm ²
	DU-202S	3.500		DU-402S	
	DU-203S	5.5mm ²		DU-403S	3.5mm ²
200V class	DU-204S	5.50002		DU-404S	
01033	DU-205S	8mm ²	400V	DU-405S	5.5mm ²
	DU-207S	3.5mm ²	class	DU-406S	5.5mm²
	DU-208S	3.50002		DU-407S	8mm ²
				DU-408S	2mm ²
				DU-409S	3.5mm ²
				DU-410S	3.5mm²

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

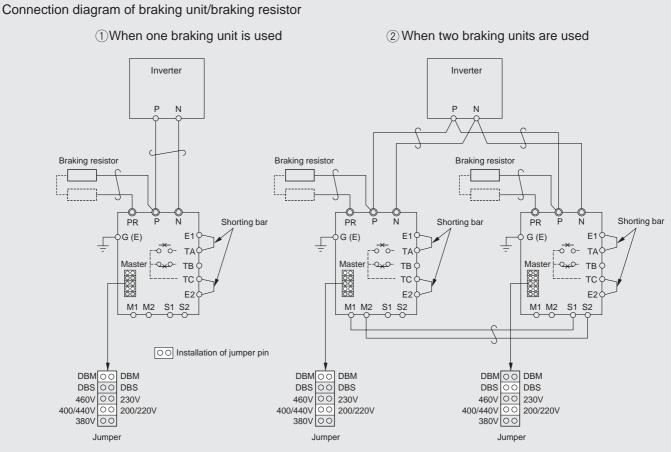
Operating rate %ED



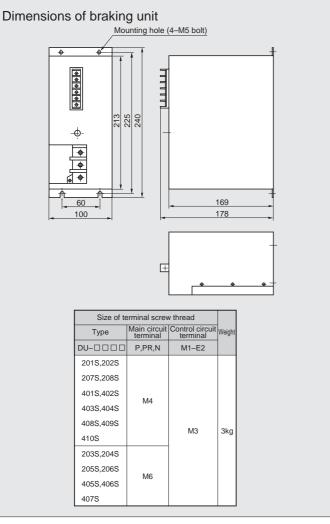
Notes:

- 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.

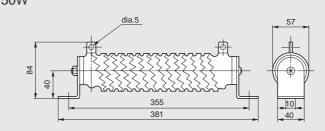
Braking unit/braking resistor



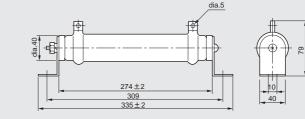
The above are examples of installation of jumpers when the inverter supply voltage is 200/220 V and 400/440 V.



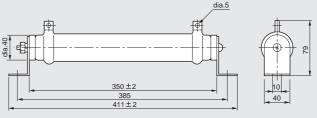
Dimensions of braking resistor 750W



300W



400W



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

 $(A) \xrightarrow{50 \text{mm}} (B)$

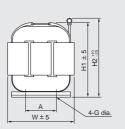
Peripheral equipment

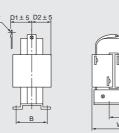
[Installation]

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

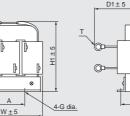
- (1) The capacity of the power transformer exceeds 500 kV.
- (2) The capacity of the power transformer exceeds 30 times the inverter capacity. AC current with a large peak value flows through the primary side of the inverter. This peak current increases in proportion to the capacity of the power transformer, 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

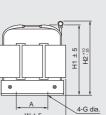


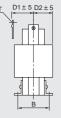


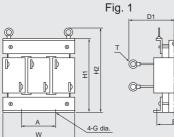
D2

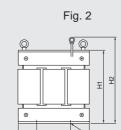


D2 ± 5









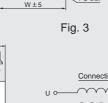






Fig. 6





W

-ig.	5
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4-G dia

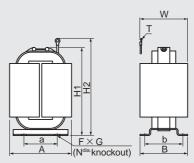
	Applicable rating	Specifi	cations	Item No.	W	D1	D2	H1	H2	A	В	G	т	Weight	Insulation	Figuro
	(kW)	Current (A)	L (mH)	Y220CA-	vv	DI	DZ		ΠZ	A	Б	G	1	(kg)	insulation	Figure
	5.5	24	0.5	058	155	45	40	150	180	80	50	5	M5	3.9	F	
l o	7.5	33	0.4	059	155	45	40	150	185	80	50	5	M6	4.4	F	
series	11	47	0.3	060	155	50	45	150	185	80	55	5	M6	5.4	F	1
	15	63	0.2	061	185	60	55	175	215	80	65	6	M6	7.2	F	
200V	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	Specifi	cations	Item No.		54	D2	H1	H2	А	в	G	т	Weight		
	rating (kW)	Current (A)	L (mH)	Y220CA-	W	D1	112									
		Current (A)		12200/1			02		112	~	Б	G		(kg)	Insulation	Figure
	5.5	13	2.0	085	155	45	40	150	175	80	50	5	M4		Insulation B	Figure
0	5.5 7.5	. ,	. ,		155 155	45 45						-		(kg)	Insulation	Figure
eries		13	2.0	085		-	40	150	175	80	50	5	M4	(kg) 4.2	B	Figure
V series	7.5	13 17	2.0 1.5	085	155	45	40 40	150 150	175 175	80 80	50 50	5	M4 M5	(kg) 4.2 4.4	B	1 - Igure
	7.5	13 17 25	2.0 1.5 1.0	085 086 087	155 155	45 50	40 40 45	150 150 150	175 175 180	80 80 80	50 50 55	5 5 5 5	M4 M5 M5	(kg) 4.2 4.4 5.5	B B F	
400V series	7.5 11 15	13 17 25 33	2.0 1.5 1.0 0.7	085 086 087 088	155 155 185	45 50 53	40 40 45 48	150 150 150 175	175 175 180 210	80 80 80 80	50 50 55 65	5 5 5 6	M4 M5 M5 M6	(kg) 4.2 4.4 5.5 6.3	B B F F	
	7.5 11 15 22	13 17 25 33 48	2.0 1.5 1.0 0.7 0.5	085 086 087 088 090	155 155 185 185	45 50 53 60	40 40 45 48 55	150 150 150 175 175	175 175 180 210 215	80 80 80 80 80	50 50 55 65 80	5 5 5 6 6	M4 M5 M5 M6 M6	(kg) 4.2 4.4 5.5 6.3 9.0	B B F F F	
	7.5 11 15 22 30	13 17 25 33 48 66	2.0 1.5 1.0 0.7 0.5 0.4	085 086 087 088 090 091	155 155 185 185 185	45 50 53 60 60	40 40 45 48 55 55	150 150 150 175 175 175	175 175 180 210 215 215	80 80 80 80 80 80 80	50 50 55 65 80 80	5 5 5 6 6 6 6	M4 M5 M5 M6 M6 M6	(kg) 4.2 4.4 5.5 6.3 9.0 11.0	Insulation B F F F F	

HF-430

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	Specifi	cations	Item No.				Dime	ension ((mm)				N	т	Weight
		Current (A)	L (mH)	Y220DA-	A	а	В	b	H₁	H ₂	W	F	G		1	(kg)
s	5.5	28.0	1.47	038	90	60	62	52	140	170	75	-	-	dia.5	M5	2.4
ries	7.5	38.0	1.11	039	100	80	95	80	140	170	95	5.5	7	-	M5	3.5
Se	11	55.0	0.79	040	100	80	95	80	140	175	100	5.5	7	-	M6	4.1
200V	15	75.0	0.59	041	125	105	105	80	142	175	120	5.5	7	-	M6	5.3
20	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	Specific	cations	Item No.				Dime	ension ((mm)				N	т	Weight
		Current (A)	L (mH)	Y220DA-	A	а	В	b	H₁	H2	W	F	G		1	(kg)
	5.5	14.0	5.87	008	90	60	62	52	140	165	75	-	-	dia.5	M5	1.5
es	7.5	19.0	4.46	009	100	80	95	80	140	165	95	5.5	7	-	M5	3.5
series	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
400\	22	55.0	1.60	013	140	120	110	90	150	185	135	6.5	9	-	M6	7.3
4	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)

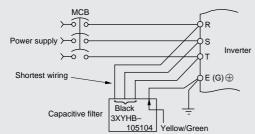
[Applicable type]

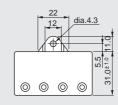
Common to all ratings; 200/400 V common 3XYHB-105104

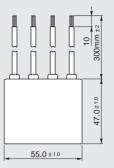
X480AC185

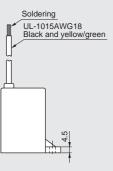
[Method of connection]

- (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

₽₩

35 83±2

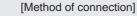
dia.7

31.5

180^{±2} 160^{±1}

130

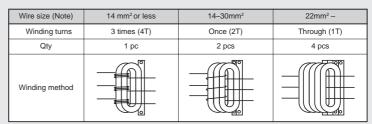
85



(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 zerophase reactors side by side to reduce the number of turns.

(3) Make the gap between the cable and core as small as possible.



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

Þ

7×14 Slot

Applicable	Model	200V input side	Fig.
motor (kW)	Model	Туре	r ig.
5.5	X480AC291	NF3030A-VZ	
7.5	X480AC292	NF3040A-VZ	Fig.1
11	X480AC293	NF3080A-RQ2	
15	A400AC293	NF3000A-RQ2	Fig.2
22	X480AC294	NF3150A-RQ2	
-37	X480AC295	NF3200A-RQ2	Fig.3
-55	X480AC308	NF3250A-RQ2	rig.5

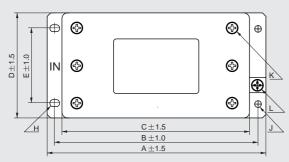
Note: Ground the LC filter with its own ground connection

Applicable	Model	400V input side	Fig.
motor (kW)	Model	Туре	i ig.
5.5	X480AC297	NF3020C-VZ	
7.5	A400AC297	NF3020C-VZ	Fig 1
11	X480AC298	NF3030C-VZ	Fig.1
15	X480AC299	NF3040C-VZ	
22	X480AC300	NF3080C-RQ2	
30	A400AC300	NF3000C-RQ2	Fig.2
37	X480AC301	NF3100C-RQ2	1 19.2
-55	X480AC303	NF3150C-RQ2	

Peripheral equipment

Dimensional drawing of LC filter

Fig.1



Model	Туре		-	_	-	-	-	~			14	
woder	туре	A	В	С	D	E	F	G	н	J	K	L
X480AC291	NF3030A-VZ	145	135	125	70	50	42	1.0			M4	
X480AC292	NF3040A-VZ	179	167	155	90	70	54	1.6			M5	
X480AC296	NF3010C-VZ	128	118	108	63	43			15.6	dia.4.5		M4
X480AC297	NF3020C-VZ	120	110	100	03	43	42	1.0	4.5×0	uia.4.5	M4	1014
X480AC298	NF3030C-VZ	145	135	125	70	50						
X480AC299	NF3040C-VZ	179	167	155	90	70	54	1.6			M5	

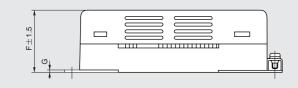
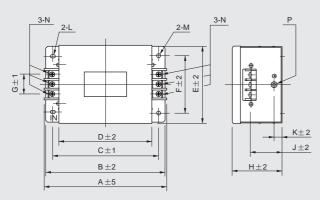
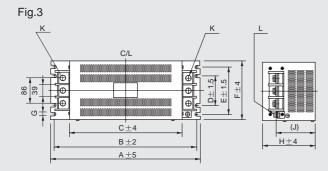


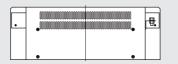
Fig.2



	Model	Туре	А	В	С	D	Е	F	G	Н	J	К	L	М	Ν	Ρ
Ī	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
Ī	X480AC302	NF3150C-RQ2	314	300	280	260	200	170	57	130	90	35	6.5×8	dia.6.5	M8	M6



Model	Туре	А	В	С	D	Е	F	G	Н	J	К	L
X480AC295	NF3200A-RQ2		420	220	100	100	220	7	180	(133)	M10	M8
X480AC308	NF3250A-RQ2	450	430	330	100	190	230	'	100	(133)	WITU	IVIO

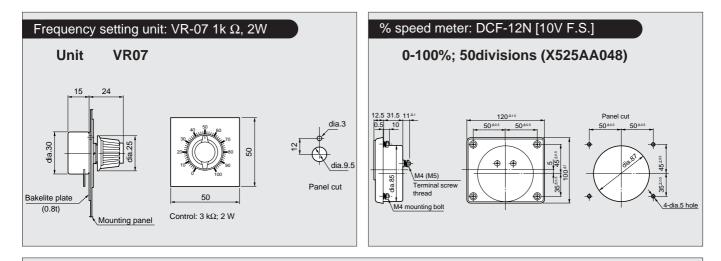


Power supply 1 4 R R S Inverter 3 E 6 T E $G) \oplus$ Shortest possible distance $\overline{-}$

(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.

HF-430



AC ammeter: ACF-12N

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

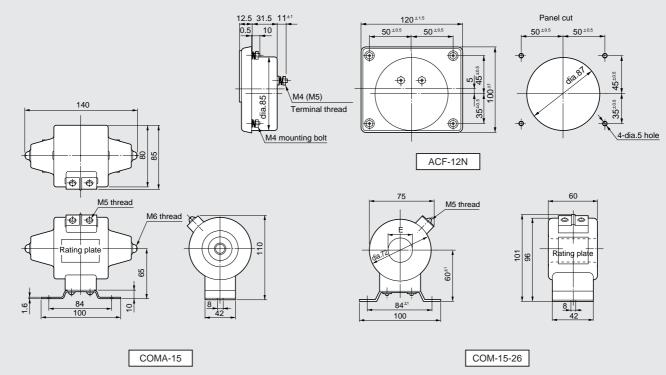


Table of combination of AC ammeter (ACF-12N) and current transformer

			200V	class			400V class										
Motor capacity		Me	ter	СТ		Number		Me	ter	СТ		Number					
(kW)	Part No.	Rated current [A]	Max. scale [A]	Тур	e	primary through holes	Part No.	Rated current [A]	Max. scale [A]	Тур	e	of primary through holes					
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.

during slow-speed operation

Reduction in the motor cooling effect ... 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.



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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