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POWERFUL OPERATION & EASY MAINTENANCE

HYUNDAI INVERTER hiRUN N100

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

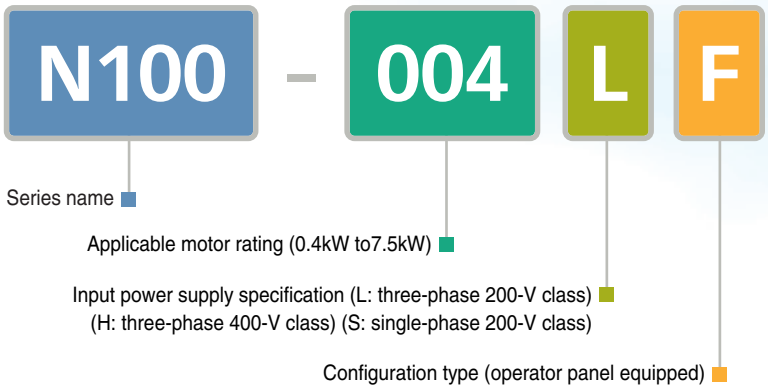
HYUNDAI INVERTER

HiRUN N100

N100 Inverter

Hyundai inverters feature sensorless vector & intelligent controls which allow more efficient use of the inherent power of a motor and an auto-tuning function capable of easily accomplishing powerful operation.

N100 Model number information



POWERFUL OPERATION & EASY MAINTENANCE

C O N T E N T S

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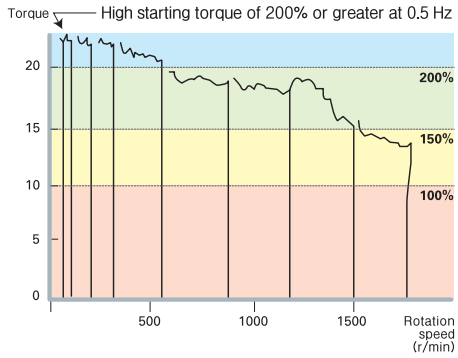
HYUNDAI INVERTER

Features

Advance sensorless vector control function

- Realize smooth driving without motor vibration and high precise driving no effect of changing load.
- Show high torque of 200% or greater at speeds as low as 0.5 Hz during starting and operation.



Strengthening auto-tuning function

- Automatically measure motor parameters.
- Realize optimal motor control without torque dropping and speed fluctuation.
- Realize precise driving without inconvenience of user measures motor parameters manually.

Strengthening the PID control function

- Strengthening the speed control program for controlling flux, temperature, pressure and so forth.
- Apply to high precision systems by high speed responsibility.

Realize tripless driving by adding current suppression

- Realize stable driving at instant impact load and overload by adding over-current level adjusting function.
- Maintain constant speed on changing load suddenly by rapidity speed restoration characteristics.
- Widely apply transfer machine, treadmill, industrial washing machine and so forth by momentary current suppressing.

MMI function using RS485 communication (HIMS 2000)

- Built-in RS485 communication standard using Modbus protocol possible flexible application for various FA system, on remote driving at upper system and easy monitoring the status of driving.
- Realize remote motor control drive using exclusive MMI program.

SINK/SOURCE type signal selectable

- Many types of programmable controllers are easily connected.

Global products

- Observe EN standard by attaching EMC filter (option)
- Obtain CE Standard, UL, cUL (0.4~3.7kW)

CE

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Compact size for easy to install

- Reduction in cubic volume 52% compare to the J100 series.

Develop option product for user convenience

- Digital Operator(operation and display)
- Remote Operator(read and copy function)
- EMI/EMC filter by EN standard


High torque at low speeds


Open network communication

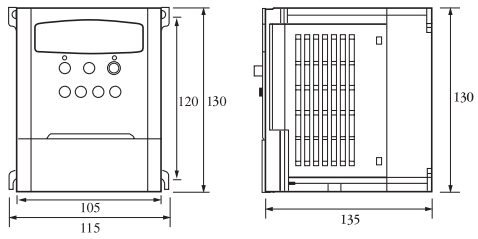

Compact size

Operation

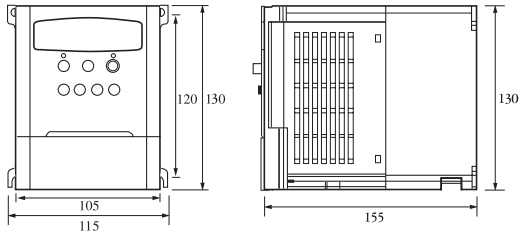
External Dimension Diagrams

The N100 series can be easily operated with the standard digital operator panel on the main unit.
For remote operation, a remote operator unit is available as an option.

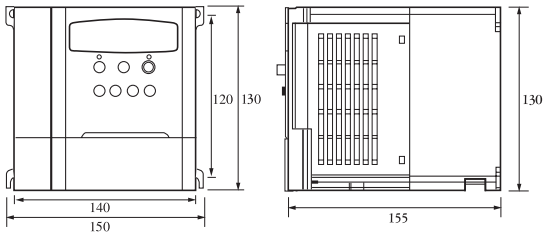
004SF/007SF/004LF/007LF/004HF



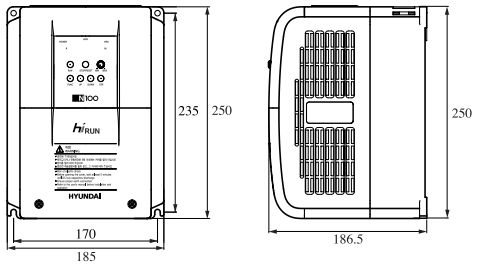
015SF/015LF/022LF/007HF/015HF



037LF/022HF/037HF



055LF/075LF/055HF/075HF

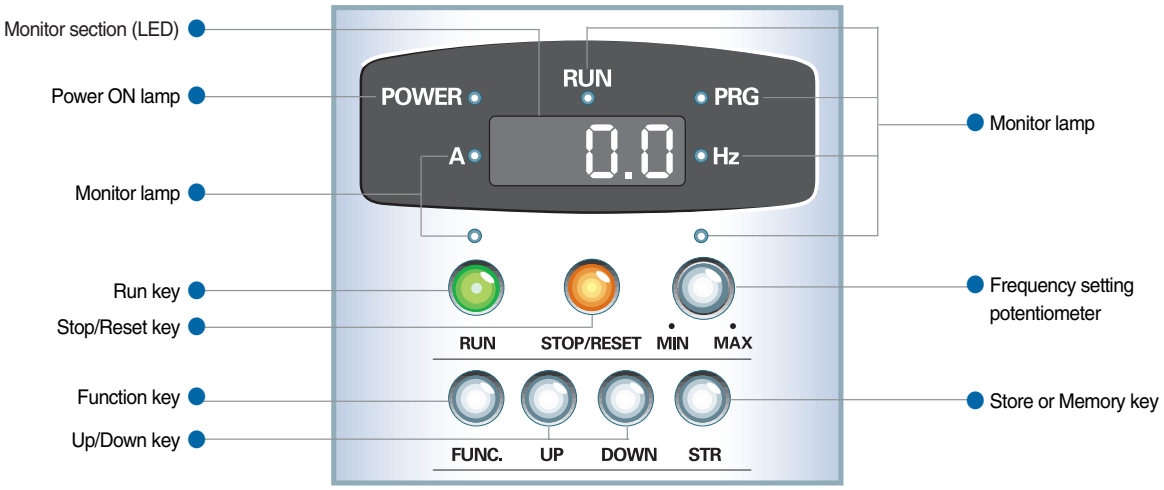


Dimension Table

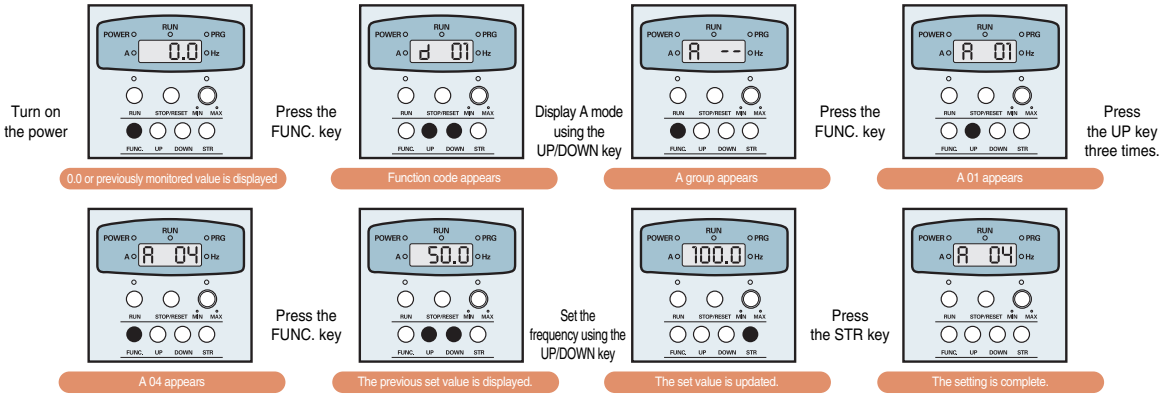
Type		External Dimension (mm)(W×H×D)	Installation Dimension (mm)(W×H,Ø)	Weight(kg)
Single-phase 200 V class	004SF	115×130×135	105×120, M4	1.2kg±0.1kg
	007SF			
	015SF	115×130×135	140×120, M4	1.5kg±0.1kg
3-phase 200 V class	004LF	115×130×135	105×120, M4	1.2kg±0.1kg
	007LF			
	015LF	115×130×135		1.5kg±0.1kg
	022LF			
	037LF	150×130×155	140×120, M4	2.0kg±0.1kg
	055LF	185×250×186.5	170×235, M5	5.3kg±0.1kg
	075LF			

Type		External Dimension (mm)(W×H×D)	Installation Dimension (mm)(W×H,Ø)	Weight(kg)
3-phase 400 V class	004HF	115×130×135	105×120, M4	1.2kg±0.1kg
	007HF	115×130×135		1.5kg±0.1kg
	015HF			
	022HF	150×130×155	140×120, M4	2.0kg±0.1kg
	037HF			
	055HF	185×250×186.5	170×235, M5	5.3kg±0.1kg
	075HF			

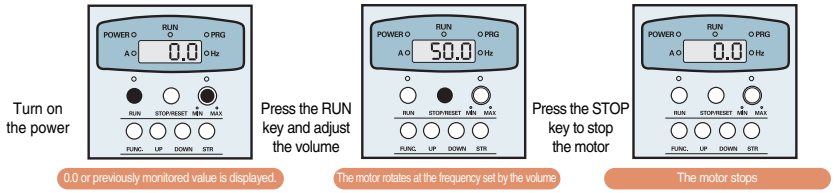
Operation



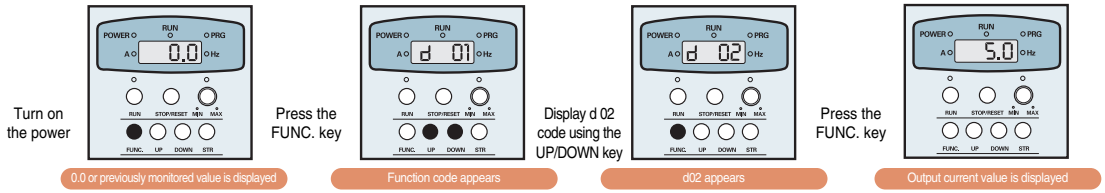
Setting the maximum frequency



Running the motor (using the speed POT)



Monitoring the output current



General Specifications

Item			200 V class									400 V class						
N100			004SF	007SF	015SF	004LF	007LF	015LF	022LF	037LF	055LF	075LF	004HF	007HF	015HF	022HF	037HF	055HF	075HF
Output	Applicable motor capacity (kW)		0.4	0.75	1.5	0.4	0.75	1.5	2.2	3.7	5.5	7.5	0.4	0.75	1.5	2.2	3.7	5.5	7.5
	Rated output capacity (kVA)		1.1	1.9	3.0	1.1	1.9	3.0	4.2	6.1	9.1	12.2	1.1	1.9	3.0	4.2	6.1	9.1	12.2
	Rated output current (A)		3.0	5.0	7.0	3.0	5.0	7.0	11.0	17.0	24.0	32.0	1.8	3.4	4.8	7.2	9.2	12.0	16.0
	Rated output voltage (V)		3-phase, 200~230 V										3-phase, 380~460 V						
	Maximum output frequency (Hz)		400 Hz																
Power supply	Phase, Voltage, Frequency		Single-phase,220~230 VAC, 50/60 Hz			Three-phase, 220~230 VAC, 50/60 Hz							Three-phase, 380~460 VAC, 50/60 Hz						
	Power Conditions		Voltage: ±10% / frequency: ±5%																
Environment Protection			IP20																
Cooling method			Self cooling		Forced cooling	Self cooling		Forced cooling					Self cooling		Forced cooling				
Control characteristic	Control system Torque control Output frequency range		Space vector PWM control V/F control, sensorless vector control 0.01 Hz ~ 400 Hz																
	Frequency setting resolution	Analog	Max. setting frequency÷500 (DC 5 V input) Max. setting frequency÷1000 (DC10 V, 4~20 mA input)																
		Digital	0.01 Hz (100 Hz and less), 0.1 Hz (100 Hz or more)																
	Frequency precision	Analog	Within 0.1% of maximum output frequency																
		Digital	Within 0.01% of maximum output frequency																
	Voltage/frequency characteristic Overload rating Starting torque Torque boost Acceleration/deceleration time setting Acceleration/deceleration pattern		Any base frequency setting possible between 0 Hz and 400 Hz, constant torque or variable torque pattern selectable 150% of rated current for 60 sec More than 200% (at 0.5 Hz) Manual torque boost can be set between 0~50% 0.1~3000 sec setting possible linear, S-curve, U-curve selection possible																
	Braking torque	Dynamic	150% (5 sec)																
		DC braking	Operating frequency (0~10 Hz), operating time (1~10 sec), operating braking force (0~50%) variable External DC braking setting possible																
	Current stall prevention operation level		Operation current level setting possible (20~200% variable), enable/disable selection																
	Voltage stall prevention operation level		Operation level constant, enable/disable selection																

General Specifications

Item				200 V class										400 V class						
N100				004SF	007SF	015SF	004LF	007LF	015LF	022LF	037LF	055LF	075LF	004HF	007HF	015HF	022HF	037HF	055HF	075HF
Control characteristic	Input signal	Frequency setting	Analog digital	0 to 5VDC, 0 to 10VDC, 4 to 20 mA, External variable resistor (1 kΩ~2 kΩ,1 W), main unit volume resistor Input from control panel																
		Starting signal		Individual selection of forward or reverse run																
		Abnormality reset		Used to reset fault output provided when protective function is activated																
		Multispeed selection		Maximum 16 speeds (each speed can be set between 0 and 400 Hz), speed can be changed during operation																
		2nd function selection		Acceleration/deceleration time, base frequency, maximum frequency, multistage frequency, torque boost, electronic thermal, control method, motor parameter																
		Output stop		Instant shut-off of inverter output (frequency/voltage)																
		Current input selection		Input selection of frequency setting current signal																
		Self-protection function at starting		Self-protection selection of start signal																
		External TRIP contact input		Contact input for when stopping the inverter with external terminal																
		External thermal input		Thermal contact input for when stopping inverter with externally mounted thermal relay																
		Operation mode selection		Control panel or external operation transition selection programmable.																
		Voltage/frequency characteristic		V/f control or sensorless vector control method selection programmable.																
	Operation functions			Multispeed operation, operation mode selection, DC braking, upper/lower frequency setting, frequency jump operation, PID control, AVR, 2-stage accel./decel., instantaneous power failure restart operation, electronic thermal, software lock, carrier frequency adjustment, auto tuning function, RS485 link operation, starting frequency adjustment, jogging operation, retry function, automatic torque boost function, usp function, second control function.															
	Output signals		Operation status	Inverter running, frequency reached, frequency detection, overload warning fault																
			For meter	Output frequency, output current, output voltage																
Display function	Displayed on control panel		Operation status	Output frequency, output current, output voltage, operation direction, PID feedback, terminal input, terminal output, transition frequency monitor, power consumption, operating time accumulation																
			Error details	Fault list, fault history																
	LED Display			Power on (POWER), operational state (RUN), PRG, frequency (Hz), output current (A), RUN terminal, MIN/MAX volume terminal																
Protective and warning functions				Overcurrent shut-off, regenerative overvoltage shut-off, undervoltage, output short circuit, temperature abnormality, overload shut-off (electronic thermal), ground fault protection, external trip, communication error, USP error, EEPROM error																
Environment	Ambient temperature			-10℃~40℃ (no freezing)																
	Ambient humidity			90%RH or less (non-condensing)																
	Storage temperature			-20℃~60℃																
	Installation area			Indoors without corrosive gases, flammable gases, oil mist or dust																
	Altitude and vibration			Maximum 1,000 m or less above sea level, 5.9 m/s² or less																
Operator				Standard operator built-in control panel, optional remote operator																
Misc.	International directive compliance			CE, UL/cUL directive compliance									to be scheduled	CE, UL/cUL directive compliance						to be scheduled

Function List

Monitor Mode / Basic Setting Mode

Function code		Name	Initial value	Minimum value	Maximum value	Unit	Code description
Monitor	d01	Output frequency monitor	-	0.00	400.0	Hz	0.00~99.99,100.0~400.0 Hz, "Hz" LED on
	d02	Output current monitor	-	0.0	99.9	A	0.0~99.9 A display, "A" LED on
	d03	Output voltage monitor	-	0	-	V	Output voltage display (V)
	d04	Rotation direction monitor	-	-	-	-	"F": forward run, "r": reverse run, "□": stop
	d05	PID feedback monitor	-	0	100	%	0~100% display, effective at PID function selection
	d06	Input terminal status monitor	-	-	-	-	Intelligent input terminal 1~6
	d07	Output terminal status monitor	-	-	-	-	Intelligent output terminal 1~2, alarm terminal
	d08	Scaled output frequency monitor	-	0.00	-	-	Scale factor (b14) × frequency data
	d09	Power consumption monitor	-	0	-	W	Displays power consumption at inverter start (W)
	d10	Operating time accumulation monitor		0	9999	Hr	Inverter operating accumulation time
	d11	Real operating time monitor		0	59	min	Inverter real operating time
	d12	DC link voltage	-	0	-	V	Display the inverter DC link voltage (V)
	d13	Trip event monitor	-	-	-	-	Present trip event
	d14	Trip history 1 monitor	-	-	-	-	Previous 1 trip event
	d15	Trip history 2 monitor	-	-	-	-	Previous 2 trip events
	d16	Trip history 3 monitor	-	-	-	-	Previous 3 trip events
	d17	Trip count	-	0	9999	-	Trip accumulation count
Setting	F01	Output frequency setting	60.00	0.00	400.0	Hz	0.00~99.99 Hz (by 0.01 Hz) 100.0~400.0 Hz (by 0.1 Hz)
	F02	Acceleration time 1 setting	10.0 30.0[1)]	0.1	3000	sec	0.1~999.9 sec (by 0.1 sec) 1000~3000 sec (by 1 sec)
	F03	Deceleration time 1 setting	10.0 30.0[1)]	0.1	3000	sec	0.1~999.9 sec (by 0.1 sec) 1000~3000 sec (by 1 sec)
	F04	Rotation direction setting	0	0	1	-	0: forward , 1: reverse
Expanded function	A--	Basic setting functions	-	-	-	-	Setting range: A01~A65
	b--	Fine tuning functions	-	-	-	-	Setting range: b01~b17
	C--	Terminal setting functions	-	-	-	-	Setting range: C01~C23
	S--	Second motor setting functions	-	-	-	-	Setting range: S01~S32
	H--	Sensorless vector setting functions	-	-	-	-	Setting range: H01~H15

※ 1) 5.5kW, 7.5kW

Function List

Expanded Function A Mode

Function code		Name	Initial value	Minimum value	Maximum value	Unit	Code description
Basic setting	A01	Frequency commanding	0	0	3	-	0: main unit volume, 1: control terminal, 2: standard operator, 3: remote operator (communication)
	A02	RUN commanding	0	0	2	-	0: standard operator, 1: control terminal, 2: remote operator (communication)
	A03	Base frequency setting	60.00	0.00	A04	Hz	0~maximum frequency (A04)
	A04	Maximum frequency setting	60.00	A03	400.0	Hz	A03~400 Hz
External frequency setting	A05	External frequency setting start	0.00	0.00	A04	Hz	0.0~400 Hz (by 0.01 Hz), start frequency at 0 V, 4 mA input
	A06	External frequency setting end	0.00	0.00	A04	Hz	0.0~400 Hz (by 0.01 Hz) end frequency at 10 V, 20 mA input
	A07	External frequency start rate setting	0.0	0.0	100.0	%	Start rate for the analog input
	A08	External frequency end rate setting	100.0	0.0	100.0	%	End rate for the analog input
	A09	External frequency start pattern setting	0	0	1	-	0: start at start frequency 1: start at 0 Hz
	A10	External frequency sampling setting	4	1	8	-	1~8 times, analog input filter sampling count
Multi - stage speed frequency setting	A11	Multispeed frequency 1 setting (1st, 2nd motor)	5.00	0.00	A04	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A12	Multispeed frequency 2 setting (1st, 2nd motor)	10.00	0.00	A04	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A13	Multispeed frequency 3 setting (1st, 2nd motor)	15.00	0.00	A04	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A14	Multispeed frequency 4 setting (1st, 2nd motor)	20.00	0.00	A04	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A15	Multispeed frequency 5 setting (1st, 2nd motor)	30.00	0.00	A04	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A16	Multispeed frequency 6 setting (1st, 2nd motor)	40.00	0.00	A04	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A17	Multispeed frequency 7 setting (1st, 2nd motor)	50.00	0.00	A04	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A18	Multispeed frequency 8 setting (1st, 2nd motor)	60.00	0.00	A04	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A19	Multispeed frequency 9 setting (1st, 2nd motor)	0.00	0.00	A04	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A20	Multispeed frequency 10 setting (1st, 2nd motor)	0.00	0.00	A04	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A21	Multispeed frequency 11 setting (1st, 2nd motor)	0.00	0.00	A04	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A22	Multispeed frequency 12 setting (1st, 2nd motor)	0.00	0.00	A04	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A23	Multispeed frequency 13 setting (1st, 2nd motor)	0.00	0.00	A04	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A24	Multispeed frequency 14 setting (1st, 2nd motor)	0.00	0.00	A04	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A25	Multispeed frequency 15 setting (1st, 2nd motor)	0.00	0.00	A04	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A26	Jog frequency setting	0.50	0.50	10.00	Hz	0.5~10.00 Hz (by 0.01 Hz)
	A27	Jog stop operation selection	0	0	2	-	0: free-run, 1: deceleration stop, 2: DC braking

Function code		Name	Initial value	Minimum value	Maximum value	Unit	Code description
V/f characteristic	A28	Torque boost mode selection	0	0	1	-	0: manual torque boost, 1: automatic torque boost
	A29	Manual torque boost voltage setting	5.0	0.0	50.0	%	Manual torque boost voltage setting
	A30	Manual torque boost frequency setting	10.0	0.0	100.0	%	Manual torque boost frequency setting
	A31	V/F characteristic curve selection	0	0	2	-	0: constant torque, 1: reduced torque (1.7), 2: sensorless vector control
	A32	Output voltage gain setting	100.0	20.0	100.0	%	20~100%
DC braking	A33	DC braking function selection	0	0	1	-	0: disable, 1: enable
	A34	DC braking frequency setting	0.50	0.00	10.00	Hz	0.50~10.00 Hz (by 0.01 Hz)
	A35	DC braking output delay time setting	0.0	0.0	5.0	sec	0.0~5.0 sec (by 0.1 sec), free run time
	A36	DC braking force setting	10.0	0.0	50.0	%	0~50%, by 1%
	A37	DC braking time setting	0.0	0.0	10.0	sec	0.0~10.0 sec (by 0.1 sec)
Upper/ lower limit jump frequenc y	A38	Frequency upper limit setting	0.00	0.00	400.0	Hz	A39~A04 (by 0.01 Hz)
	A39	Frequency lower limit setting	0.00	0.00	400.0	Hz	0.00~A38 (by 0.01 Hz)
	A40	Jump frequency setting 1	0.00	0.00	400.0	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A41	Jump frequency band-width setting 1	0.00	0.00	10.00	Hz	0.00~10.00 Hz (by 0.01 Hz)
	A42	Jump frequency setting 2	0.00	0.00	400.0	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A43	Jump frequency band-width setting 2	0.00	0.00	10.00	Hz	0.00~10.00 Hz (by 0.01 Hz)
	A44	Jump frequency setting 3	0.00	0.00	400.0	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A45	Jump frequency band-width setting 3	0.00	0.00	10.00	Hz	0.00~10.00 Hz (by 0.01 Hz)
PID control	A46	PID function selection	0	0	1	-	0: PID control off, 1: PID control on
	A47	PID P gain setting	10.0	0.1	100.0	%	0.1~100.0% (by 0.1 sec)
	A48	PID I gain setting	10.0	0.0	100.0	sec	0.0~100 sec (by 0.1 sec)
	A49	PID D gain setting	0.0	0.0	100.0	sec	0.0~100 sec (by 0.1 sec)
	A50	PID scale rate setting	100.0	0.1	1000	-	0.1~1000.0 (by 0.1 sec)
	A51	PID feedback input method setting	0	0	1	-	0: current input, 1: voltage input
Automatic Voltage Regulation (AVR)	A52	AVR function selection	0	0	2	-	0: constant on, 1: constant off, 2: off during deceleration
	A53	Motor input voltage setting	220 380	200 380	240 460	V	200/220/230/240 (200-V class) 380/400/415/440/460 (400-V class)
Acceleration /deceleration setting	A54	2-stage acceleration time setting	10.0 30.0 1)	0.1	3000	sec	0.1~999.9 sec (by 0.1 sec) 1000~3000 sec (by 1 sec)
	A55	2-stage deceleration time setting	10.0 30.0 1)	0.1	3000	sec	
	A56	2-stage accel./decel. switching method setting	0	0	1	-	0: terminal (2CH), 1: transition frequency (A57, A58)
	A57	Acceleration transition frequency setting	0.00	0.00	400.0	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A58	Deceleration transition frequency setting	0.00	0.00	400.0	Hz	0.00~400.0 Hz (by 0.01 Hz)
	A59	Acceleration pattern setting	0	0	2	-	0: linear, 1: S-curve, 2: U-curve
	A60	Deceleration pattern setting	0	0	2	-	0: linear, 1: S-curve, 2: U-curve
Input signal adjustment	A61	Voltage signal offset setting	0.0	-10.0	10.0	-	Voltage offset
	A62	Voltage signal gain setting	100.0	0.0	200.0	-	Voltage gain
	A63	Current signal offset setting	0.0	-10.0	10.0	-	Current offset
	A64	Current signal gain setting	100.0	0.0	200.0	-	Current gain
	A65	External voltage input selection	0	0	1	-	0: 5 V input, 1: 10 V input

※ 1) 5.5kW, 7.5kW

Function List

Expanded Function b Mode

Function code		Name	Initial value	Minimum value	Maximum value	Unit	Code description
Instan-taneous power failure restart	b01	Selection of restart mode after instantaneous failure	0	0	3	-	0: alarm output after trip 1: restart at 0 Hz 2: resume operation after frequency matching 3: resume previous frequency after frequency matching then decelerate to stop, trip after stop overcurrent trip, restart up to 3 times, overvoltage trip, restart up to 3 times, undervoltage trip, restart up to 10 times
	b02	Allowable instantaneous power failure time setting	1.0	0.3	1.0	sec	0.3~1.0 sec (by 0.1 sec)
	b03	Reclosing stand by after instantan-eous power failure recovered	1.0	0.3	3.0	sec	0.3~3.0 sec (by 0.1 sec)
Electronic thermal	b04	Electronic thermal level setting	100.0	20.0	120.0	%	0.2X (inverter rated current)~1.2X (inverter rated current)
	b05	Electronic thermal characteristic selection	1	0	1	-	0: SUB (reduced torque characteristic) 1: CRT (constant torque characteristic)
Overload restriction	b06	Overload restriction mode selection	1	0	3	-	0: overload, overvoltage restriction mode OFF 1: overload restriction mode ON 2: overvoltage restriction mode ON 3: overload, overvoltage restriction mode ON
	b07	Overload restriction level setting	125.0	20.0	200.0	%	0.2X (inverter rated current)~2.0X (inverter rated current)
	b08	Overload restriction constant setting	1.0	0.1	10.0	sec	Deceleration rate when inverter restricts overload 0.1~10.0 sec (by 0.1 sec)
Software lock (LOCK)	b09	Software lock selection	0	0	3	-	0: All parameters are locked when SFT from terminal is on. 1: All parameters except frequency setting are locked when SFT from terminal is on. 2: All parameters are locked 3: All parameters except frequency setting are locked.
Others	b10	Start frequency adjustment	0.50	0.50	10.00	Hz	0.50~10.00 Hz (by 0.01 Hz)
	b11	Carrier frequency adjustment	5.0	0.5	16.0	kHz	0.5~16 Hz (by 0.1 kHz)
	b12	Initialization mode selection	0	0	1	-	0: Trip history initialization 1: Data initialization
	b13	Initial value selection (country code)	0	0	2	-	0: Korea version 1: Europe version 2: US version
	b14	Frequency conversion value setting	1.00	0.01	99.99	-	0.01~99.99 (by 0.01)
	b15	Stop key validity selection during terminal operation	0	0	1	-	0: stop enabled 1: stop disabled
	b16	Restarting after free-run stop signal selection	0	0	2	-	Operation setting when the free-run stop is cancelled 0: 0 Hz restart 1: frequency matching restart 2: free run stop
	b17	Communication number	1	1	32	-	Communication number setting is 1 to 32

Expanded Function C Mode

Function code		Name	Initial value	Minimum value	Maximum value	Unit	Code description
Intelligent input terminal setting	C01	Intelligent input terminal 1 setting	0	0	14	-	0: forward run command (FW) 1: reverse run command (RV) 2: 1st multispeed command (CF1) 3: 2nd multispeed command (CF2) 4: 3rd multispeed command (CF3) 5: 4th multispeed command (CF4) 6: jog operation command (JG) 7: 2nd control function setting command (SET) 8: 2-stage acceleration/deceleration command (2CH) 9: free-run stop command (FRS) 10: external trip (EXT) 11: unattended start protection (USP) 12: software lock function (SFT) 13: analog input current selection signal (AT) 14: reset (RS)
	C02	Intelligent input terminal 2 setting	1	0	14	-	
	C03	Intelligent input terminal 3 setting	2	0	14	-	
	C04	Intelligent input terminal 4 setting	3	0	14	-	
	C05	Intelligent input terminal 5 setting	8	0	14	-	
	C06	Intelligent input terminal 6 setting	14	0	14	-	
Intelligent intput terminal contact	C07	Intelligent input terminal 1 contact	0	0	1	-	0: NO, 1: NC
	C08	Intelligent input terminal 2 contact	0	0	1	-	0: NO, 1: NC
	C09	Intelligent input terminal 3 contact	0	0	1	-	0: NO, 1: NC
	C10	Intelligent input terminal 4 contact	0	0	1	-	0: NO, 1: NC
	C11	Intelligent input terminal 5 contact	0	0	1	-	0: NO, 1: NC
	C12	Intelligent input terminal 6 contact	0	0	1	-	0: NO, 1: NC
Intelligent output terminal setting	C13	Intelligent output terminal 11 setting	1	0	5	-	0: running signal (RUN) 1: frequency arrival signal (FA1) 2: set frequency arrival signal (FA2) 3: overload advance notice signal (OL) 4: PID control error deviation signal (OD) 5: fault alarm signal (AL)
	C14	Intelligent output terminal 12 setting	0	0	5	-	
Intelligent output terminal contact	C15	Output terminal 11 a/b contact setting	0	0	1	-	0: NO, 1: NC
	C16	Output terminal 12 a/b contact setting	0	0	1	-	0: NO, 1: NC
Others	C17	Monitor signal (FM) selection	0	0	2	-	0: output frequency, 1: output current, 2: output voltage
	C18	Analog meter gain adjustment	100.0	0.0	250.0	%	0 (45%)~250 (220%) (by 1)
	C19	Analog meter offset adjustment	0.0	-3.0	10.0	%	-3.0~10.0% (by 0.1)
	C20	Overload advance notice signal level setting	100.0	50.0	200.0	%	0.5×inverter rated current~2.0×inverter rated current
	C21	Acceleration arrival signal frequency setting	0.00	0.00	400.0	Hz	0.0~400 Hz (by 0.01 Hz)
	C22	Deceleration arrival signal frequency setting	0.00	0.00	400.0	Hz	0.0~400 Hz (by 0.01 Hz)
	C23	PID deviation level setting	10.0	0.0	100.0	%	0~100% (by 0.01)

Function List

Expanded Function S Mode

Function code		Name	Initial value	Minimum value	Maximum value	Unit	Code description
2nd motor setting	S01	Multistage speed frequency setting, 2nd motor	60.00	0.00	400.0	Hz	0.00~99.99,100.0~S05 (by 0.01 Hz)
	S02	Acceleration time, 2nd motor	10.0 30.0[1)]	0.1	3000	sec	0.1~999.9 (by 0.1 sec) 1000~3000 (by 1 sec)
	S03	Deceleration time, 2nd motor	10.0 30.0[1)]	0.1	3000	sec	0.1~999.9 (by 0.1 sec) 1000~3000 (by 1 sec)
	S04	Base frequency, 2nd motor	60.00	0.00	S05	Hz	0~S05
	S05	Maximum frequency, 2nd motor	60.00	S04	400.0	Hz	S04~400 Hz
2nd motor V/F chracter-istic	S06	Torque boost mode selection, 2nd motor	0	0	1	-	0: manual torque boost 1: automatic torque boost
	S07	Manual torque boost setting , 2nd motor	5.0	0.0	50.0	%	0~50%, manual torque boost voltage setting
	S08	Manual torque boost frequency adjustment, 2nd motor	10.0	0.0	100.0	%	0~100%, manual torque boost frequency setting
	S09	V/f characteristic curve selection, 2nd motor	0	0	2	-	0: constant torque, 1: reduced torque (1.7) 2: sensorless vector control
2nd motor acceleration/ deceleration setting	S10	Acceleration time 2 setting, 2nd motor	10.0 30.0[1)]	0.1	3000	sec	0.1~999.9 (by 0.1 sec) 1000~3000 (by 1 sec)
	S11	Deceleration time 2 setting, 2nd motor	10.0 30.0[1)]	0.1	3000	sec	0.1~999.9 (by 0.1 sec) 1000~3000 (by 1 sec)
	S12	Acceleration pattern setting, 2nd motor	0	0	2	-	0: linear, 1:S-curve, 2: U-curve
	S13	Deceleration pattern setting, 2nd motor	0	0	2	-	0: linear, 1:S-curve, 2: U-curve
	S14	2-stage accel./decel. transition method setting, 2nd motor	0	0	1	-	0: terminal (2CH), 1: transition frequency (S15, S16)
	S15	Acceleration transition frequency setting , 2nd motor	0.00	0.00	400.0	Hz	0.00~99.99 Hz (by 0.01 Hz) 100.0~400.0 Hz (by 0.1 Hz)
	S16	Deceleration transition frequency setting, 2nd motor	0.00	0.00	400.0	Hz	0.00~99.99 Hz (by 0.01 Hz) 100.0~400.0 Hz (by 0.1 Hz)
2nd motor electronic thermal	S17	Electronic thermal setting, 2nd motor	100.0	20.0	120.0	%	0.2×inverter rated current~1.2×inverter rated current
	S18	Electronic thermal characteristic, 2nd motor	1	0	1	-	0: SUB (reduced torque characteristic) 1: CRT (constant torque characteristic)
2nd motor sensorless vector control	S19	2nd motor constant setting	0	0	1	-	0: standard motor constants, 1: auto tune data
	S20	2nd motor capacity	0	0	9	-	0~4: 0.4/0.75/.1.5/2.2/3.7 kW (200 V class) 5~9: 0.4/0.75/.1.5/2.2/3.7 kW (400 V class) 10, 11: 5.5/7.5 kW (200 V class) 12, 13: 5.5/7.5 kW (400 V class)
	S21	2nd motor poles	4	2	8	-	2/4/6/8
	S22	2nd motor rated current	-	0.1	100.0	A	motor rated current
2nd motor constant	S23	2nd motor constant R_1	-	0.001	30.00	Ω	setting range: 0.001~30.00 Ω
	S24	2nd motor constant R_2	-	0.001	20.00	Ω	setting range: 0.001~20.00 Ω
	S25	2nd motor constant L	-	0.1	999.9	mH	setting range: 0.1~999.9 mH
	S26	2nd motor leakage factor	-	0.01	100.0	mH	setting range: 0.01~100.0 mH
	S27	2nd motor constant Io	-	0.1	100.0	A	setting range: 0.1~100.0 A
Auto-tuning 2nd motor constant	S28	2nd motor constant R1 auto-tuning data	-	0.001	30.00	Ω	setting range: 0.001~30.00 Ω
	S29	2nd motor constant R2 auto-tuning data	-	0.001	20.00	Ω	setting range: 0.001~20.00 Ω
	S30	2nd motor constant L auto-tuning data	-	0.1	999.9	mH	setting range: 0.1~999.9 mH
	S31	2nd motor constant leakage factor auto-tuning data	-	0.01	100.0	mH	setting range: 0.01~100.0 mH
	S32	2nd motor constant Io auto-tuning data	-	0.1	100.0	A	setting range: 0.1~100.0 A

※ 1) 5.5kW, 7.5kW

Expanded Function H Mode

Function code		Name	Initial value	Minimum value	Maximum value	Unit	Code description
Sensorless vector control	H01	Auto-tuning setting	0	0	1	-	O: auto-tuning OFF, 1: auto-tuning ON
	H02	Motor data setting (standard/auto-tuning)	0	0	1	-	0: standard motor constant, 1: auto-tuning data
	H03	Motor capacity	0	0	13	-	0~4: 0.4/0.75/.1.5/2.2/3.7 kW (200 V class) 5~9: 0.4/0.75/.1.5/2.2/3.7 kW (400 V class) 10, 11: 5.5/7.5 kW (200 V class) 12, 13: 5.5/7.5 kW (400 V class)
	H04	Motor poles	4	2	8	-	2/4/6/8
	H05	Motor rated current	-	0.1	100.0	A	Motor rated current
Motor constant	H06	Primary resistance R_1	-	0.001	30.00	Ω	setting range: 0.001~30.00 Ω
	H07	Secondary resistance R_2	-	0.001	20.00	Ω	setting range: 0.001~20.00 Ω
	H08	Primary Inductance Ls	-	0.1	2000.0	mH	setting range: 0.1~2000.0 mH
	H09	Transient Inductance Lsig	-	0.01	100.0	mH	setting range: 0.01~100.0 mH
	H10	No-load current Io	-	0.1	100.0	A	setting range: 0.1~100.0 A
Auto-tuning motor constant	H11	Primary resistance R_1	-	0.001	30.00	Ω	setting range: 0.001~30.00 Ω
	H12	Secondary resistance R_2	-	0.001	20.00	Ω	setting range: 0.001~20.00 Ω
	H13	Primary inductance Ls	-	0.1	2000.0	mH	setting range: 0.1~2000.0 mH
	H14	Transient Inductance Lsig	-	0.01	100.0	mH	setting range: 0.01~100.0 mH
	H15	No-load current Io	-	0.1	100.0	A	setting range: 0.1~100.0 A

Protective Functions

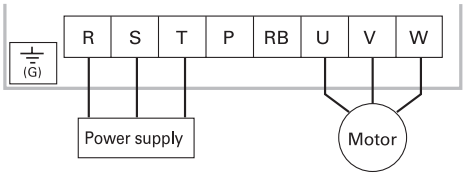
Various functions are provided for the protection of the inverter and motor, they also perform the protection function when the inverter breaks down.

Function	Description	Display	
		Standard operator	Remote operator
Overcurrent protection	When the inverter output current exceeds the rated current by more than approximately 200% while the motor is locked or reduced in speed,the protection circuit activates, halting inverter output.	E04	Over.C
Overload protection (electronic thermal) regenerative	When the inverter output current causes the motor to overload, the electronic thermal trip in the inverter cuts off the inverter output.	E05	Over.L
Overvoltage protection	If regenerative energy from the motor or the main power supply voltage is high , the protective circuit activates to cut off the inverter output when the voltage of DC link exceeds the specification.	E07	Over.V
Communication error	The inverter output is cut off when communication to the inverter has an error due to external noise, excessive temperature rise, or other factors.	E60	Com.ERR
Undervoltage protection	When the input voltage to the inverter decreases, the control circuit does not function normally. When the input voltage is below the specification, the inverter output is cut off.	E09	Under.V
Output short-circuit	The inverter output was short-circuited. This condition causes excessive current for the inverter, so the inverter output is turned off.	E34	PM.ERR
USP error	The USP error is indicated when the power is turned on with the inverter in RUN state. (Enabled when the USP function is selected.)	E13	USP
EEPROM error	The inverter output is cut off when the EEPROM in the inverter has an error due to external noise, excessive temperature rise, or other factors.	E08	EEPROM
External trip	When the external equipment or unit has an error, the inverter receives the corresponding signal and cuts off the output.	E12	EXTERNAL
Temperature trip	When the temperature in the main circuit increases due to cooling fan failure, the inverter output is cut off (only for the model with a cooling fan).	E21	OH.FIN

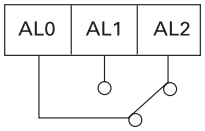
Terminal Functions

Main Circuit Terminal

Terminal symbol	Terminal name	Function
R.S.T	Main power supply input terminal	Connects the input power supply 220/440 V
U.V.W	Inverter output terminal	Connects to the motor
P.RB	External resistor connection terminal	Connects the braking resistor (option)
⏚	Ground connection terminal	Connects the die-casting (to prevent electric shock and reduce noise)



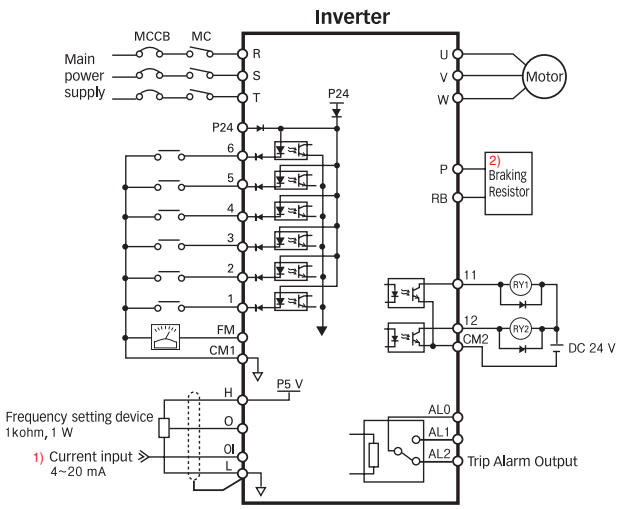
Control Circuit Terminal

Signal	Terminal symbol		Terminal name	Terminal function
Input signal	P24		Power terminal for input signals	24VDC±10%, 35 mA
	6	RS	Forward run command (FW), reverse run command (RV),	Contact input:
	5※	2CH	Multi-speed commands 1~4 (CF1~4), 2-stage accel./decel. command (2CH),	Closed: on (operating)
	4	CF2	Reset (RS), free run stop (FRS), external trip (EXT),	Open: off (stop)
	3	CF1	Second control function setting (SET), terminal software lock (SFT),	
	2	RV	Unattended start protection (USP),	
	1	FW	Current input selection (AT), jog operation (JG)	Minimum on time: over 12 ms
	CM1		Common terminals for input or monitor signal	
Monitor signal	FM		Output frequency meter, output current meter, output voltage meter	Analog frequency meter
Frequency command signal	H		Power supply for frequency setting	0~5VDC
	O		Voltage frequency command signal	0~5VDC (standard), 0~10VDC, input impedance 10 kΩ
	OI		Current frequency command signal	4~20 mA, input impedance 250 Ω
	L		Common terminal for frequency command	
Output signal	11	FA1, 2	Intelligent output terminal; Run status signal (RUN),frequency arrival signal (FA1), set frequency arrival signal (FA2), overload advance notice signal (OL), PID error deviation signal (OD), and alarm signal (AL)	Maximum 27 VDC, 50 mA
	12	RUN		
	CM2		Common terminal for output signals	
Trip alarm output signal	AL2		Alarm output signals: At normal status,power off (initial setting value): AL0-AL2 (closed) At abnormal status : AL0-AL1 (closed) 	Contact rating: AC 250 V 2.5 A (resistor load) 0.2 A (induction load) DC 30 V 3.0 A (resistor load) 0.7 A (induction load)
	AL1			
	AL0			

※ Please change terminal No.5 to No.13 AT(current input selection) in case of 4~20mA input.

Standard Connection Diagram

Terminal Connection Diagram

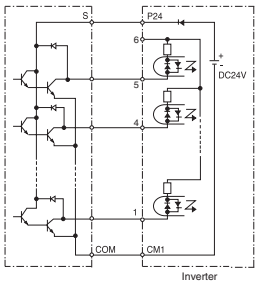
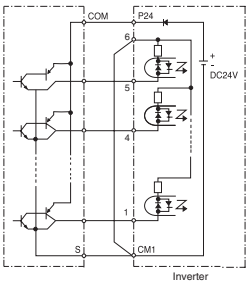


※ 1) In case of changing terminal No.5 to No. 13 AT(current input selection)
on : 4~20mA selection / off : Volume selection
2) Please refer to page 24.

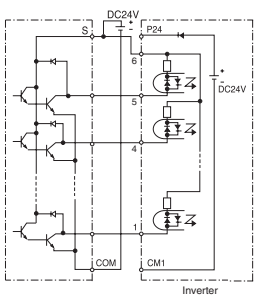
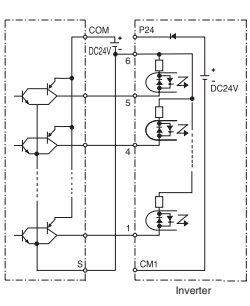
PLC Connection

Input Terminal Connection Diagram

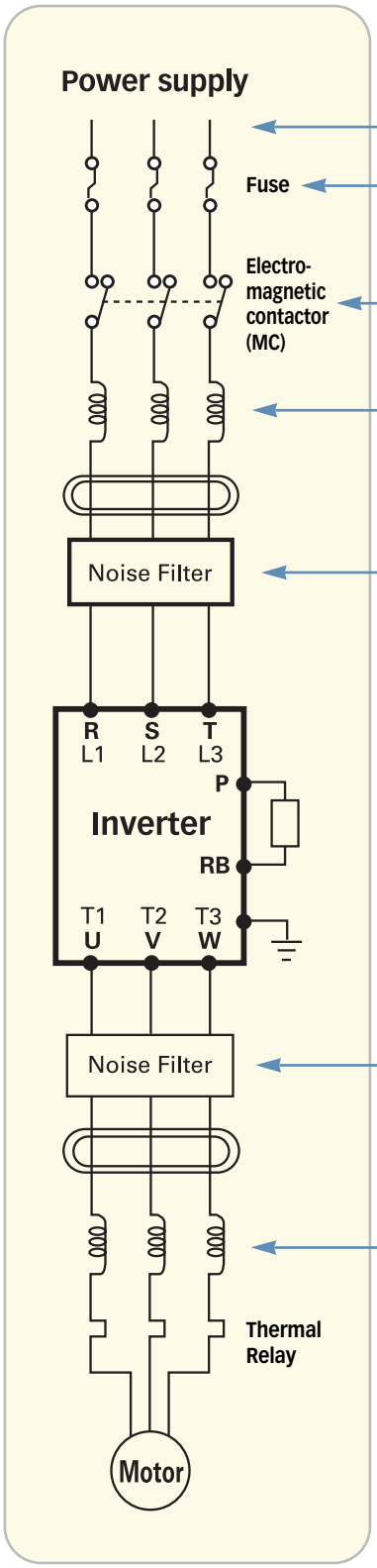
■ In case of using internal power

Sink type	Source type
	

■ In case of using external power

Sink type	Source type
	

Application Wiring Apparatus & Options



Standard Apparatus (3-Phase input reference)

Motor output (kW)	Inverter model (N100 Series)	Wiring		Applicable equipment
		Power lines	Signal lines	Fuse (class H)
0.4	N100-004SF	1.25 mm²	0.14 mm² ~ 0.75 mm² shielded cable	5A
	N100-004LF			
0.75	N100-007SF			10A
	N100-007LF			
1.5	N100-015SF	2.0 mm²		15A
	N100-015LF			
2.2	N100-022LF			20A
3.7	N100-037LF	3.5 mm²		30A
0.4	N100-004HF	1.25 mm²	0.14 mm² ~ 0.75 mm² shielded cable	5A
0.75	N100-007HF			
1.5	N100-015HF			10A
2.2	N100-022HF			
3.7	N100-037HF	2.0 mm²		15A
5.5	N100-055LF	5.5 mm²		50A
	N100-055HF	2.0 mm²		30A
7.5	N100-075LF	8.0 mm²		50A
	N100-075HF	3.5 mm²		30A

1. Field wiring connection must be made in accordance with a UL-listed and CSA-certified closed-loop terminal connector sized for the wire gauge required.
   Connector must be fixed using the crimping tool specified by the connector manufacturer.
2. Properly select the capacity of the circuit breaker to be used.
3. Check power wire size if cable length exceeds 20 m.
4. Use 0.75 mm² wire for the alarm signal wire.

Standard Apparatus (3-Phase input reference)

Name	Function
Input-side AC reactor for harmonic suppression/ power coordination/ power improvement	This is useful when harmonic suppression measures must be taken, when the main power voltage unbalance rate exceeds 3% and the main power capacity exceeds 500 kVA, or when a sudden power voltage variation occurs. It also helps to improve the power factor.
EMI filter	Reduces the conductive noise on the main power wires generated from the main power supply. Connect to the inverter primary side (input side).
Output noise filter	This is installed between the inverter and the motor to reduce noise radiated from the main control power wiring. It is useful for reducing radio-wave disturbance in a radio or TV sets and preventing malfunction of measuring instruments or sensors.
AC reactor for vibration reduction/thermal relay malfunction prevention	Vibration may increase when driving a general-purpose motor with an inverter as compared with commercial power operation. Connecting this reactor between the inverter and the motor allows reduction of motor pulsation. When the cable between the inverter and the motor is 10 m or more, inserting the reactor prevents thermal relay malfunction caused by harmonics resulting from inverter switching. A current sensor can be used instead of the thermal relay.

Remote Operator

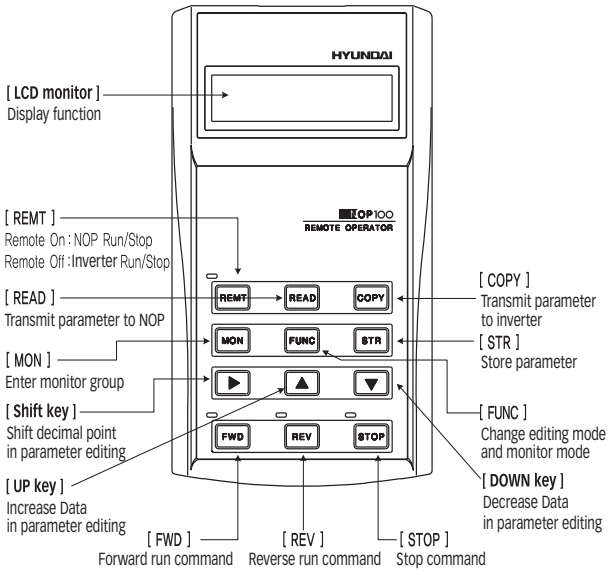
- With the remote operator, you can control the parameters of the inverter and the commands by using the optional remote operator cable.
- The NOP100 enables parameter sets to be read out of the inverter or to be written into the inverter with READ or COPY button.

Specification

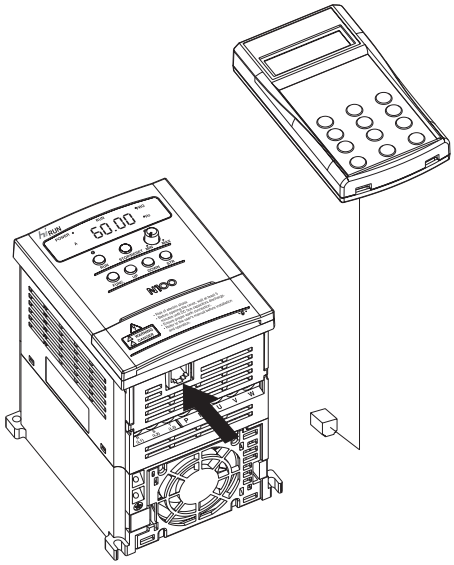
Item		Description
Model name		NOP100
External dimension		135 mm (H)×75 mm (W)×19 mm (D)
Display	LCD	2 Line×16 Character
	LED	Forward operation, reverse operation, Stop, mode changing display
Keypad		12 Key
Communication method		RS485 (Modular connection)
Function		Fault list storage count: 3 count Built-in READ/COPY function
Connection cable length		1.5 m, 3 m

Remote Operator (NOP100)

Key configuration



Connection diagram



Application Wiring Apparatus & Options

Digital Operator

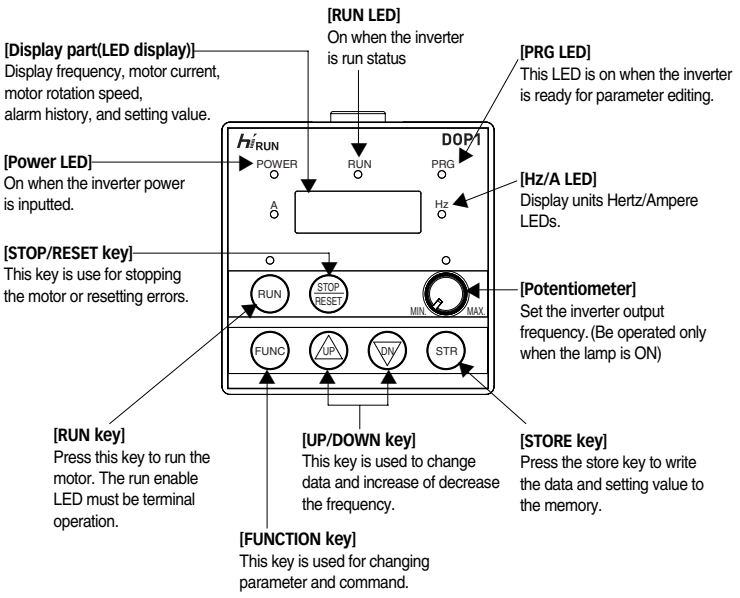
- Digital operator is economical remote operator.
- Digital operator can control inverter parameter and operating commands.
- Digital operator has a 4-digit 7-segment LED, so it is possible not only operate inverter but also display inverter status.

Specification

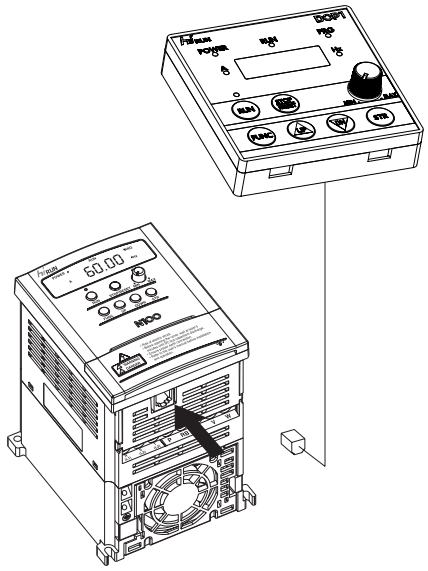
Item		Description
Model name		DOP1
External dimension		67.5 mm(H)×64.9 mm(W)×35.1 mm(D)
Display	7-segment LED	4-digit 7-segment LED
	Monitor lamp	7 (POWER/RUN/PRG/Hz/A/ RUN key/Volume LED)
Keypad		7 (RUN/STOP(RESET)/FUNC/ UP/DOWN/STR/Volume)
Communication method		RS485(Modular connection)
Function		Inverter operation & monitoring
Connection cable length		1.5 m, 3 m

Digital Operator (DOP1)

Key configuration



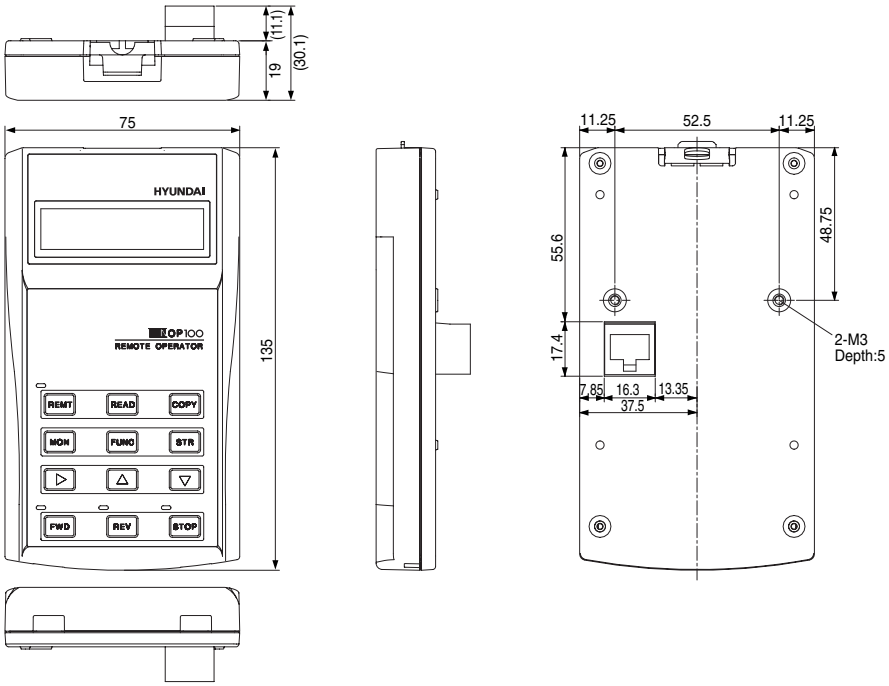
Connection diagram



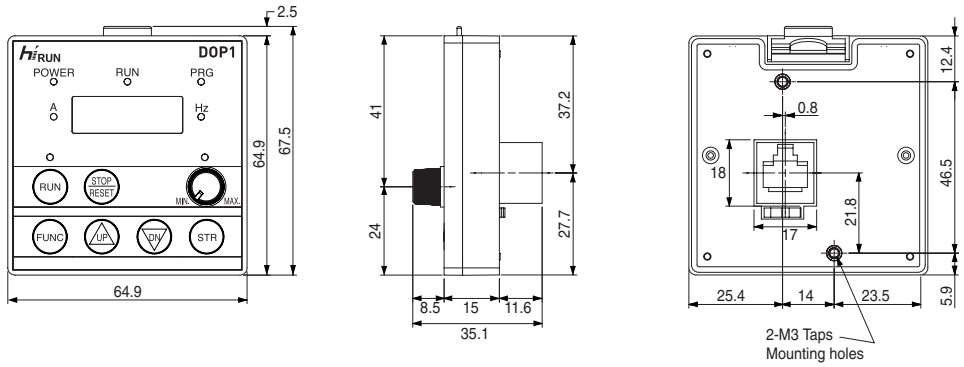
Remote Operator and Digital Operator Specification

(unit: mm)

Remote Operator(NOP100)



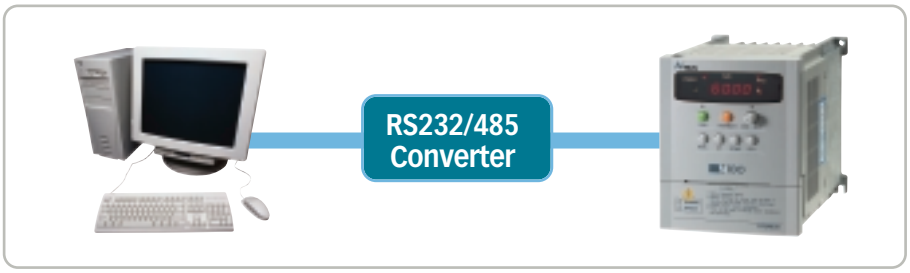
Digital Operator(DOP1)



Application Wiring Apparatus & Options

HMS2000(Hyundai Inverter Management System)

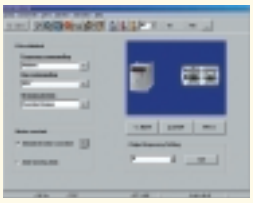
System constitution



- Setting the inverter parameter and command.
- Inverter parameter memory / download / comparison for easily manage inverter parameter.
- Monitoring inverter status for user facility.
- Add to simulation function for various inverter load and running pattern.

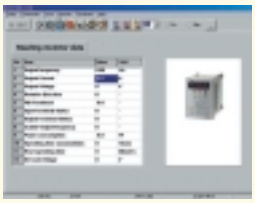
Screen constitution

Operation function



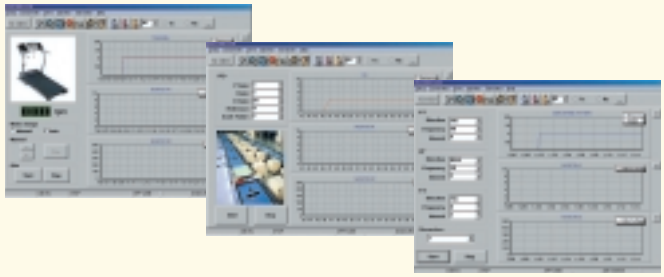
- Inverter RUN/STOP command
- Setting motor frequency
- Setting inverter parameter

Display function



- Display inverter running status
  - Frequency/Current/Voltage/Rotate direction
- Display inverter status
  - RUN/STOP/TRIP
- Display inverter parameter
  - All of the inverter parameter

Simulation function

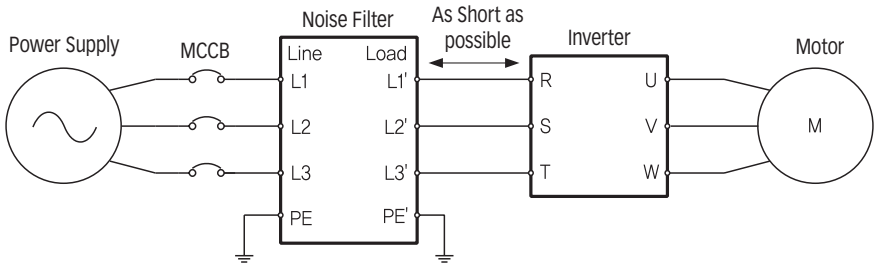


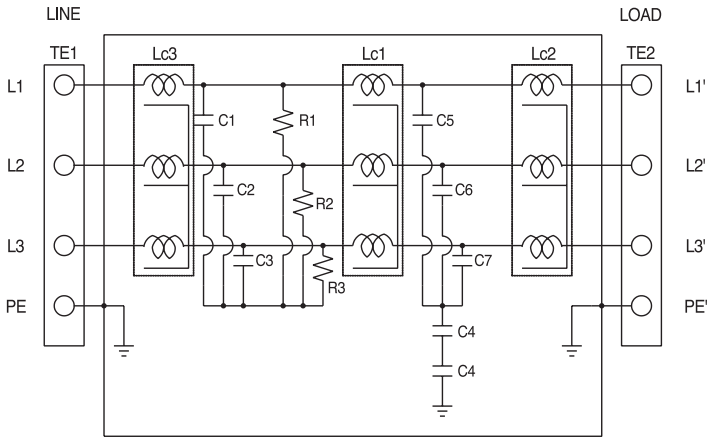
- Memory variable running pattern
  - Useful several motor control
  - Treadmill/Washing machine/Crane
  - Display inverter running status according to PID control gain.

Noise filter for inverter

- Reduces the conductive noise on the main power line generated from the inverter.
- Noise filter is the more near to noise source, the effect is the better.

Mounting position and constitution





Outlook of noise filter

Specification of noise filter

Model	Rated Voltage	Rated Current	Dimension			Applicable Inverter
			W	H	D	
FT-20301S-A	250V	30A	210	120	70	0.4~5.5kW
FT-20401S-A	250V	40A	210	120	70	7.5kW
FT-40201S-A	450V	20A	210	120	70	0.4~7.5kW

Application Wiring Apparatus & Options

Dynamic Braking Resistor

Dynamic braking uses the case of increase braking torque, frequently ON/OFF and large inertial load.

In case of light load

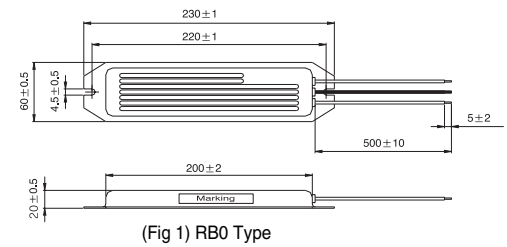
	Motor capacity (kW)	Dynamic braking resistance (200 V class)		Dynamic braking resistance (400 V class)	
		Resistance	Wattage	Resistance	Wattage
1	1.5 kW	50 Ω	0.2 kW	180 Ω	0.3 kW
2	2.2 kW	50 Ω	0.3 kW	100 Ω	0.3 kW
3	3.7 kW	35 Ω	0.6 kW	100 Ω	0.6 kW
4	5.5 kW	17 Ω	1.2 kW	70 Ω	1.2 kW
5	7.5 kW	17 Ω	1.2 kW	50 Ω	1.2 kW

In case of heavy load

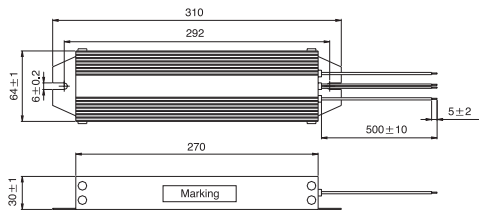
	Motor capacity (kW)	Dynamic braking resistance (200 V class)		Dynamic braking resistance (400 V class)	
		Resistance	Wattage	Resistance	Wattage
1	1.5 kW	50 Ω	0.2 kW	180 Ω	0.3 kW
2	2.2 kW	35 Ω	0.6 kW	100 Ω	0.6 kW
3	3.7 kW	35 Ω	1.2 kW	100 Ω	0.6 kW
4	5.5 kW	17 Ω	1.8 kW	70 Ω	1.8 kW
5	7.5 kW	17 Ω	2.4 kW	50 Ω	2.4 kW

Specification table

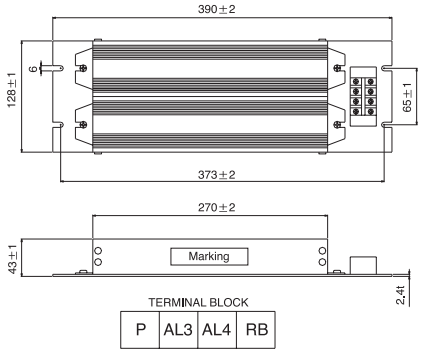
Name	Type name	Rating capacity	Resistance	Rating continuous ON time	Consuming power	Protect overheat	Figure
External resistance unit	RB0	200 W	180 Ω±5%	Maximum 10 sec.	Instance : 0.7 kW Rating : 200 kW	Built-in temperature relay in resistance. At disorder high temperature, “open”(b contact) signal occurred. Rating contact AC 240 V 3 A (R load) 0.2 A (L load) DC 36 V 2 A (R load)	Figure 1
	RB1	300 W	50 Ω±5%	Maximum 10 sec.	Instance : 2.6 kW Rating : 300 kW		Figure 2
	RB2	600 W	35 Ω±5%	Maximum 10 sec.	Instance : 3.8 kW Rating : 600 kW		Figure 3



(Fig 1) RB0 Type



(Fig 2) RB1 Type

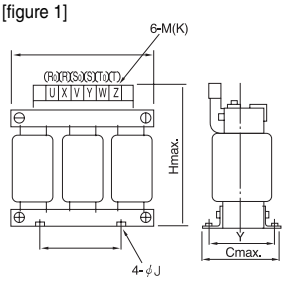


(Fig 3) RB2 Type

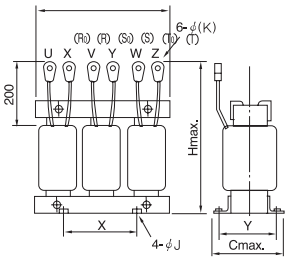
Input / Output AC reactor

External Diagram

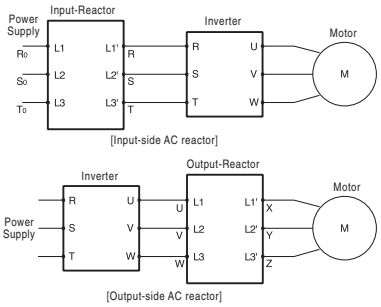
[figure 1]



[figure 2]



Connection Diagram



AC reactor input side

ACL-L I-2.5

- L : 3-Ø200 V
- H : 3-Ø400 V
- Input-side
- Inverter output capacity(kVA)

- Depress harmonic
- Cooperation power
- Improve power factor

AC reactor output side

ACL-L-2.5

- L : 3-Ø200 V
- H : 3-Ø400 V
- Inverter output capacity(kW)

- Depress vibration
- Thermal relay
- Prevent error operate

AC reactor size for improve power factor input side

Voltage	Capacity (kW)	Type	Wiring Dimension(mm)					J	Standard	Weight (Kg)	Figure No.
			A	C	H	X	T				
200 V class	0.75	ACL-LI-1.5	110	80	110	40	52	6	4	1.85	1
	1.5	ACL-LI-2.5	130	90	130	50	67	6	4	3.0	1
	2.2	ACL-LI-3.5	130	95	130	50	70	6	4	3.4	1
	3.7	ACL-LI-5.5	130	100	130	50	72	6	4	3.9	1
	5.5	ACL-LI-7.5	130	115	130	50	90	6	4	5.2	1
	7.5	ACL-LI-11	180	120	190	60	80	6	4	8.6	1
400 V class	3.7	ACL-HI-5.5	130	90	130	50	75	6	4	3.9	1
	5.5	ACL-HI-7.5	130	105	130	50	90	6	4	5.1	1
	7.5	ACL-HI-11	160	110	160	60	95	6	4	8.7	1

AC reactor size for improve power factor output side

Voltage	Capacity (kW)	Type	Wiring Dimension(mm)					J	Standard	Weight (Kg)	Figure No.
			A	C	H	X	T				
200 V class	0.4	ACL-L-0.4	110	90	110	40	65	6	4	2.7	1
	0.7	ACL-L-0.75	130	105	130	50	80	6	4	4.2	1
	1.5	ACL-L-1.5	160	100	160	80	75	6	4	6.6	1
	2.2	ACL-L-2.2	180	110	190	90	90	6	4	11.5	1
	3.7	ACL-L-3.7	220	110	210	125	90	6	4	14.8	1
	5.5	ACL-L-5.5	220	110	220	125	90	6	5.3	15.0	2
	7.5	ACL-L-7.5	220	130	220	120	112	7	6.7	22.0	2
400 V class	0.4	ACL-H-0.4	110	85	110	40	65	6	4	2.7	1
	0.75	ACL-H-0.75	130	100	130	50	80	6	4	4.2	1
	1.5	ACL-H-1.5	150	105	160	80	75	6	4	6.6	1
	2.2	ACL-H-2.2	180	105	190	90	90	6	4	11.0	1
	3.7	ACL-H-3.7	180	110	190	125	90	6	4	14.8	1
	5.5	ACL-H-5.5	180	110	190	125	90	6	4	15.5	1
	7.5	ACL-H-7.5	180	130	190	125	112	7	4	22.0	1

Proper Operation

- Before use, be sure to read through the Instruction Manual to insure proper operation.
- Note that the inverter requires proper electrical wiring; a specialist should carry out the wiring.
- The inverter in this catalog is designed for general industrial applications. For special applications in fields such as aircraft, outer space, nuclear power, electrical power, transport vehicles, clinics, and submarine relay equipment, please consult us in advance.
- For application in a facility where human safety is at stake or serious losses may occur, be sure to program all safety devices to avoid serious accidents.
- The inverter is used for three-phase AC motor.

Application to General-Purpose Motors

Operating frequency	The overspeed endurance of a general-purpose motor is 120% of the rated speed for 2 minutes (JIS C4004). For operation higher than 60 Hz, it is required to examine the allowable torque of the motor, useful-life of bearings, noise, vibration, etc. In this case, be sure to consult the motor manufacturer as the maximum allowable rpm differs depending on the motor capacity, etc.
Torque characteristics	The torque characteristics of driving a general-purpose motor with an inverter differ from those of driving it with commercial power (starting torque decreases in particular). Carefully check the load torque characteristic of a connected machine and the driving torque characteristic of the motor.
Motor loss & temperature increase	An inverter-driven general-purpose motor heats up swiftly at lower speeds. Consequently, the torque level permitting continuous use decreases with lower motor speeds. Carefully check the torque characteristics.
Noise	When run by an inverter, a general-purpose motor generates noise slightly greater than with commercial power.
Vibration	When run by an inverter at variable speeds, the motor may regenerate vibration, especially because of (a) unbalance of the rotor including a connected machine, or (b) resonance caused by the natural vibration frequency of a mechanical system. Particularly, be careful of (b) when operating a machine previously fitted with a constant speed motor at variable speed. Vibration can be minimized by (1) avoiding resonance points using the frequency jump function of the inverter, (2) using a flexible coupling, or (3) placing a rubber shock absorber beneath the motor base.
Power transmission mechanism	Under continuous, low-speed operation, oil lubrication can deteriorate in a power transmission mechanism with an oil-type gear box (gear motor) or reducer. Consult the motor manufacturer for the permissible range of continuous speed. To operate at more than 60 Hz, confirm the machine's ability to withstand the centrifugal force generated.

Application to Special Motors

Gear motor	The allowable rotation range of continuous drive varies depending on the lubrication method or motor manufacturer. (Particularly where oil lubrication is concerned, pay attention to the low frequency range). The Hitachi GA/GX/CX gear motors are of a grease lubrication type. Their grease lubrication capability remains unchanged even if the motor rotating speed decreases.		
Brake motor	When using a brake motor, be sure to connect the braking power supply on the primary side of the inverter.		
Pole-change motor	There are different kinds of pole-change motors: constant output characteristic type, constant torque characteristic type, etc., and different rated current values. In motor selection, check the maximum allowable current for each motor of a different pole count. At the time of pole changing, be sure to stop the motor.		
Submersible motor	The rated current of a submersible motor is significantly larger than that of the general-purpose motor. In inverter selection, be sure to check the rated current of the motor.		
Explosion-proof motor	Inverter drive is not suitable for a safety-enhanced explosion-proof type of motor. The inverter should be used in combination with a pressure-proof and explosion-proof type of motor. ※ Explosion-proof verification is not available for N100 Series. For explosion-proof operation, use an other series of motors.		
Synchronous (MS) motor High-speed (HFM) motor	In most cases,the synchronous (MS) motor and the high-speed (HFM) motor are designed and manufactured to meet the specifications suitable for a connected machine. Consult us to select an inverter.	**Single-phase motor**	A single-phase motor is not suitable for variable-speed operation by inverter drive. Therefore, use a three-phase motor.

Application to the 400-V Class Motor

A system applying a voltage-type PWM inverter with IGBT can have surge voltage at the motor terminals resulting from the cable constants including the cable length and the wiring method. Depending on the surge current magnification, the motor coil insulation may be degraded. In particular, when a 400-V class motor is used, a longer cable is used, and critical loss can occur. Take the following countermeasures:

(1) Install the LCR filter between the inverter and the motor. (2) Install the AC reactor between the inverter and the motor. (3) Enhance the insulation of the motor coil.

Notes on Use: Drive

Run/Stop	Run or stop of the inverter must be done with the keys on the operator panel or through a control circuit terminal. Do not operate by installing a electromagnetic contactor (M) in the main circuit.
Emergency motor stop	When the protective function is operating or the power supply stops, the motor enters the free run stop state. When an emergency stop is required or when the motor should be kept stopped, use the mechanical brake.
High-frequency run	A max. of 360 Hz can be selected on the N100 Series. However, a two-pole motor can attain up to approx. 21,600 rpm, which is extremely dangerous. Therefore, carefully make selection and settings by checking the mechanical strength of the motor and connected machines. Consult the motor manufacturer when it is necessary to drive a standard (general-purpose) motor at over 60 Hz. A full line of high-speed motors is available from manufacturer.

Notes on Use: Installation Location and Operating Environment

- Avoid installation in areas of high temperature, excessive humidity, or where moisture can easily condense, as well as areas that are dusty, subject to corrosive gasses, mist from liquid used for grinding, or salt. Install the inverter in a well-ventilated and vibration-free room avoiding direct sunlight.
- The inverter can be operated in an ambient temperature range of -10℃ to 50℃ (carrier frequency and output current must be reduced between 40℃ to 50℃).

Notes on Use: Main Power Supply

Installation of an AC reactor on the input side	In the cases below involving a general-purpose inverter, a large peak current flows on the main power supply side, and is able to destroy the converter module. Where such situations are foreseen or the connected equipment must be highly reliable, install an AC reactor between the power supply and the inverter. Also, where influence of on indirect lightning strike is possible, install a lightning conductor. (a) The unbalance factor of the power supply is 3% or higher. (Note) (b) The power supply capacity is at least 10 times greater than the inverter capacity (the power supply capacity is 500kVA or more) (c) Abrupt power supply changes are expected. **examples**: (1) Several inverters are interconnected with a short bus. (2) A thyristor converter and an inverter are interconnected with a short bus. (3) An installed phase advance capacitor opens and closes. In cases (a), (b) and (c), it is recommended to install an AC reactor on the main power supply side.
Using a private power generator	• An inverter run by a private power generator may overheat the generator or suffer from a deformed output voltage waveform from the generator. • Generally, generator capacity should be at least five times that of the inverter (kVA) in a PWM control system, or six times greater in a PAM control system.

Notes on Peripheral Equipment Selection

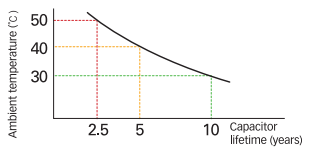
Wiring connections		(1) Be sure to connect main power cables to R, S, and T (input) terminals and motor to U, V, and W terminals (output). (Incorrect connection will cause a breakdown.) (2) Be sure to ground the inverter frame using the ground terminal.
Wiring between inverter and motor	**Electromagnetic contactor**	If an electromagnetic contactor is installed between the inverter and the motor, do not perform on-off switching during running operation.
	Thermal relay	When used with standard applicable output motors (Hyundai standard three-phase squirrel-cage four-pole motors), the N100 Series do not need a thermal relay for motor protection due to the internal electronic protective circuit. A thermal relay, however, should be used: (a) during continuous running at a range beyond 30 to 60 Hz (b) for motors exceeding the range of electronic thermal adjustment relay for each motor. (c) when several motors are driven by one inverter; a thermal relay should be installed for each motor. The RC value of the thermal relay should be more than 1.1 times the rated current of the motor. Where the wiring length is 10m or more, the thermal relay tends to turn off readily In this case. Provide an AC reactor on the output side or use a current sensor.
Installing a circuit breaker		• Install a circuit breaker on the main power input side to protect inverter wiring and ensure personal safety. • Choose an inverter-compatible circuit breaker.
Wiring distance		• The wiring length between the inverter and the remote operator panel should be 20 meters or less. • When this length is exceeded, use CVD-E (current-voltage converter) or RCD-E (remote control device). • Shielded cable should be used for the wiring. Be careful about the cable length to avoid line-voltage drop. (A large voltage drop causes a decrease in torque.)
Earth leakage relay		If the earth leakage relay (or earth leakage breaker) is used, it should have a sensitivity level of 15 mA or more (per inverter).
Phase advance capacitor		Do not use a capacitor for power factor improvement between the inverter and the motor because the high-frequency components of the inverter output may overheat or damage the capacitor.

High-Frequency Noise and Leakage Current

- High-frequency components are included in the input/output of the inverter main circuit, and they may cause interference in a transmitter, radio, or sensor if used near the inverter. The interference can be minimized by adopting noise filters (option).
- The switching action of an inverter causes an increase in leakage current. Be sure to ground the inverter and the motor.

Lifetime of Primary Parts

- Because a smoothing capacitor deteriorates as it undergoes internal chemical reaction, it should normally be replaced every five years. Be aware, however, that its life expectancy is considerably shorter when the inverter is subjected to such adverse factors such as high temperature, or heavy load exceeding the rated current of the inverter.
- Also, consumable parts such as cooling fans should be replaced according to the inverter periodic inspection of the maintenance guide (maintenance inspection and parts replacement must be performed by only specified trained personnel).



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