COMPACT, SENSORLESS VECTOR INVERTER FOR GENERAL-USE

VARISPEED-606V7

200V CLASS, THREE-PHASE INPUT : 0.1 TO 7.5kW (0.13 TO 10HP)
200V CLASS, SINGLE-PHASE INPUT: 0.1 TO 3.7kW (0.13 TO 5HP)
400V CLASS, THREE-PHASE INPUT : 0.2 TO 7.5kW (0.25 TO 10HP)

YASKAWA

Certified for ISO9001 and ISO14001

JQA-0422 JQA-EM0498

LITERATURE NO. KAE-S606-11.1J

A Different Breed of Inverter

Delivering the Performance and Functions You Need for Every Type of Application.

Introducing the VS-606V7 inverter, a compact design that is just what you've been waiting for. With enhanced performance and functions, it can handle all types of applications, quickly and easily, around the globe. Upgrade equipment of all types with this new breed of compact inverter.

POINT 1 Handles All Types of Applications

Powerful performance and flexibility mean the V7 can handle every type of application, providing both strong starting torque and stable operation at low speed through Yaskawa's unique sensorless vector control technology. An extensive software library and flash memory with instant backup makes the V7 the ideal drive for demanding customers.

POINT 2 Easier than Ever to Use

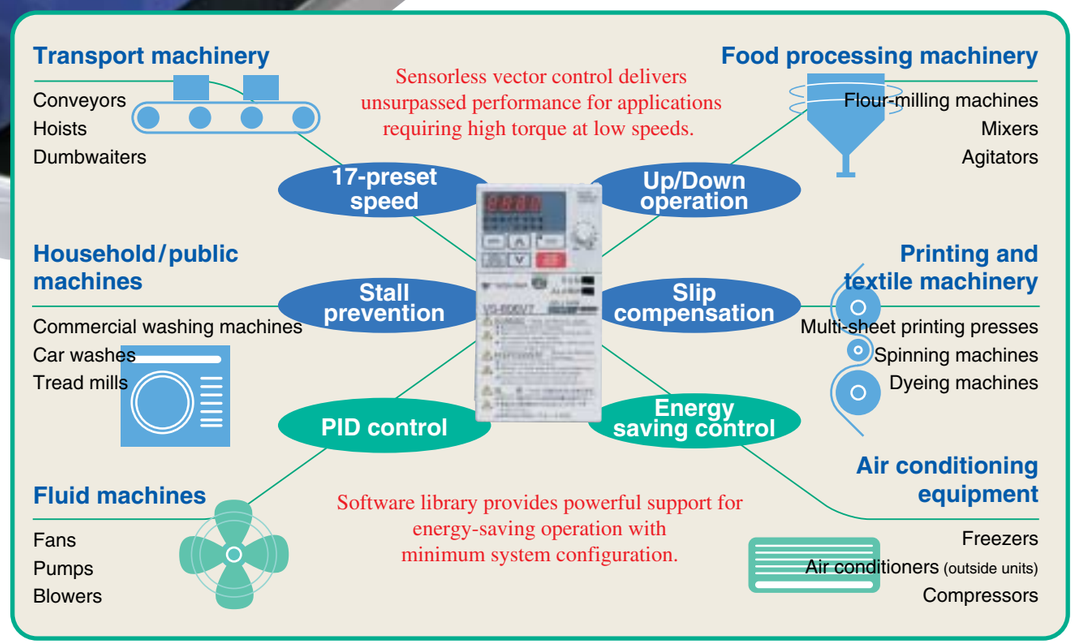
Operation and maintenance are simple, both designed for one-touch control. The frequency setting potentiometer, for example, is just "plug-and-play." The cooling fan can be replaced in a flash. And an operator with a copy function is provided for batch management of constant upload/downloads.

POINT 3 Worldwide Recognition

With Yaskawa's unsurpassed quality and global specifications, the V7 is designed to fully comply with international standards, voltages (200/400V) and networks, providing reliability to answer customer trust around the world.

CONTENTS

VS-606V7

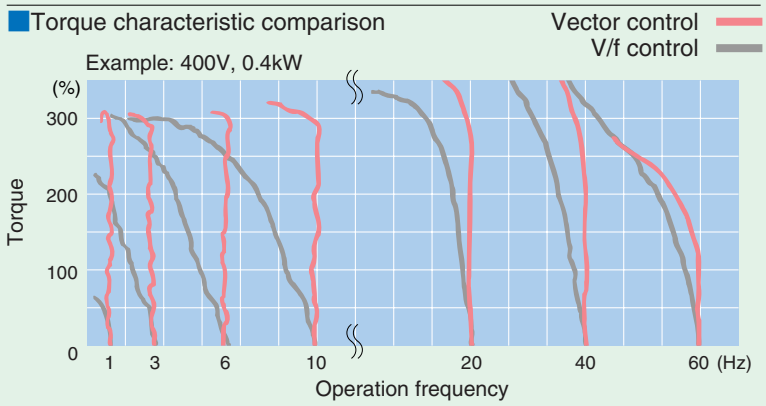


Main Features of the VS-606V7 Inverter

1 Powerful and Flexible

High Starting Torque (> 150% at 1Hz)

Yaskawa's unique sensorless vector Technology delivers superb torque characteristics.



Braking transistor standard

Delivers high braking power by incorporating a braking resistor (optional).

Improved protection functions

- High-speed current limiting suppresses overcurrent trips (250% or more of rated current), giving new meaning to the term, to tripless operation.
- Inrush current suppression circuit is built in.

Internal flash memory for user needs

Special application software easily and quickly installs, making a customized inverter simple and painless.

2 Extensive Array of Functions

Wide range of operation methods

Multi-speed step operation (up to 16-step speed), up/down operation, jog operation, etc.

Software library incorporating exceptional drive expertise

- PID control
- Energy-saving control

Extensive selection of handy functions

Slip compensation function, overtorque detection function, speed search function, etc.

Supports diverse input/output specifications

- 0 to 10V, 4 to 20mA, 0 to 20mA input, pulse train input, multi-function I/O terminals, analog monitor, pulse train monitor, etc.
- Logic level of multi-function inputs can be switched (PNP/NPN), providing enhanced flexibility.

3

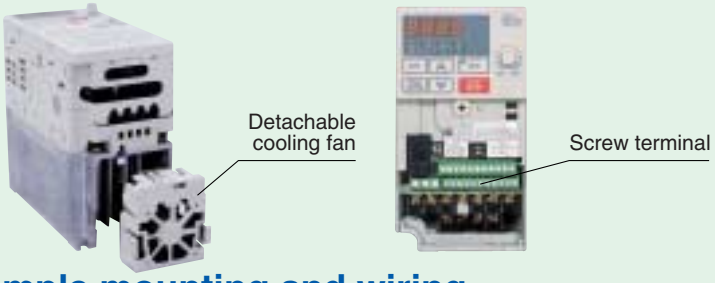
Simple Operation and Easy Maintenance

"Plug-and-play" operation

- The control panel (digital operator) comes with a frequency setting potentiometer as standard. Just hook it up, turn ON the power and you're ready to go.
- An optional operator and cable are available for remote operation/monitoring.

Simple maintenance

The cooling fan is detachable for simple maintenance, and the built-in fan ON/OFF control assures you of long, reliable service.



Simple mounting and wiring

- Both main and control circuit terminals are screw-type, assuring simple wiring and high reliability.
- DIN rail attachments are available to simplify mounting and detaching.

Simple constant management

- The operator has a copy function for constant upload/download.
- A support tool using a PC is also available.

Control of Power Supply High Harmonic Currents

An optional DC reactor can be connected to suppress high harmonic currents. An AC reactor is also available.

4

Global Specifications

Complies with global standards for world-wide acceptance

Certified by UL/cUL and CE marking.

Note: Use a special EMC-compatible noise filter with the inverter to meet the CE marking standards. Contact your Yaskawa representative. For details about a CC-Link model with CE marking, contact your Yaskawa representative.

c UL us LISTED — UL/cUL mark

CE — CE mark

Support for worldwide voltages

- 200 V (Three-phase, single-phase) series
- 400 V (Three-phase) series

Support for field networks around the world

- RS485/422 (MEMOBUS protocol) support standard.
- Optional units available for Device Net*, Profibus-DP, and CC-Link
- For DeviceNet and CC-Link communications, the Varispeed V7 is available for open-field networks without the need for any additional devices.

DeviceNet Model

* DeviceNet is a registered trademark of Open DeviceNet Vendors Association.

Display and keypad Description

Data Display

Function Display LEDs
Selected function is lit (See the functions below). Its data is displayed on data display.

Display Selection Key
Switch functions among function display LEDs.

Enter Key
Enter data when setting constants. After selecting constant No. at PRGM mode, data are displayed.

Increment Key
Increase constant No. or data.

Decrement Key
Decrease constants No. or data.

Digital Operator

Frequency Setting Volume
Set operational frequency with volume.

Operation Key
Press to run the motor. The left light is ON while running.

Stop/Reset Key
Press to stop the motor. If fault occurs, reset the inverter.

Run LED

Alarm LED

Function Display LED Description

FREF Frequency reference setting/monitoring

FOUT Output frequency monitoring

IOUT Output current monitoring

MNTR Multi-function monitoring

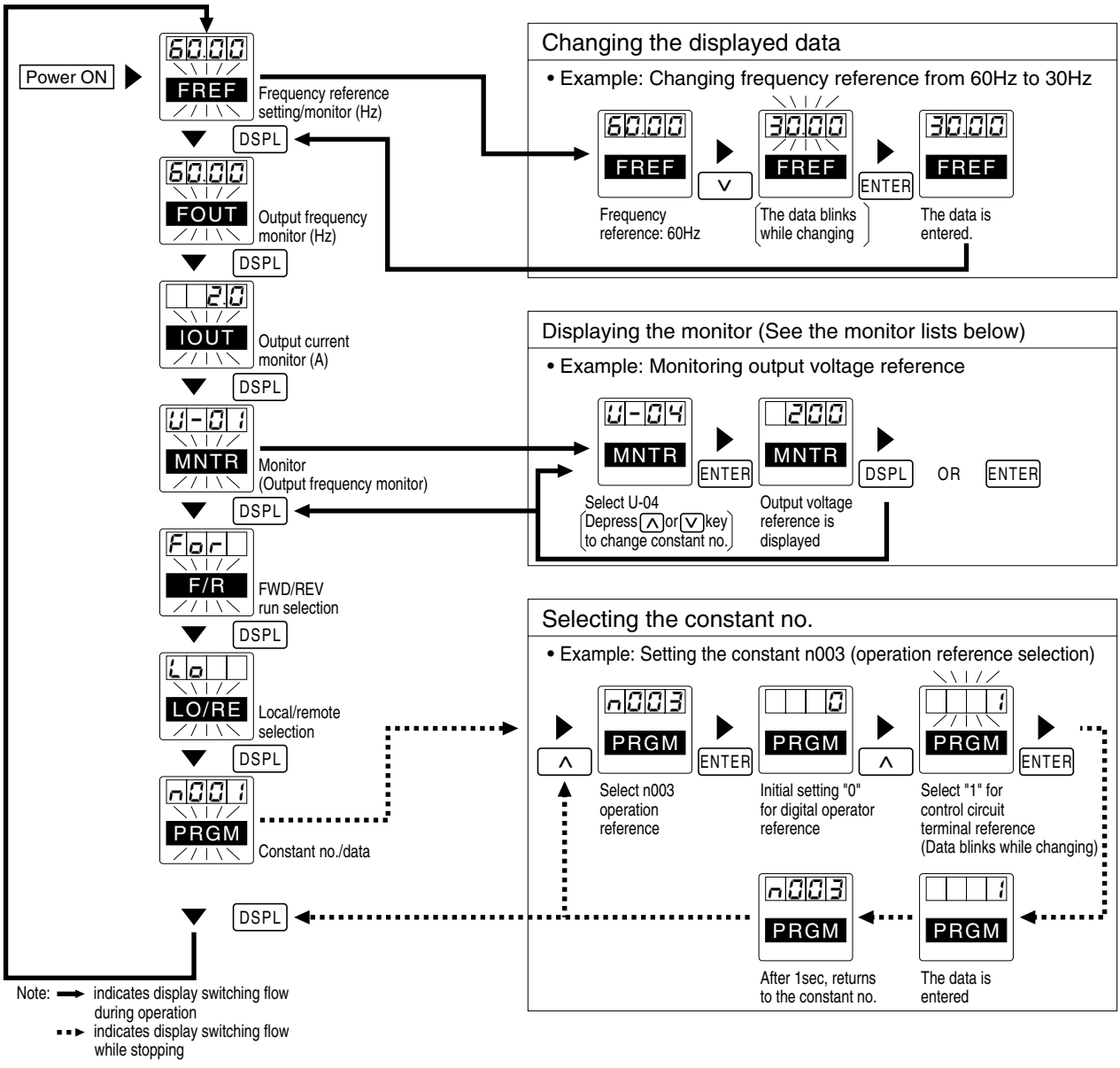
F/R Operator RUN command FWD/REV selection

LO/RE LOCAL/REMOTE selection

PRGM Constant No./data

Switching the Function LEDs

Changing the Constant Data



Monitor (MNTR) Lists

Constant No.	Monitor	Unit	Constant No.	Monitor	Unit
U-01	Frequency reference (FREF)*1	Hz	U-09	Fault history (The last four faults are displayed.)	—
U-02	Output frequency (FOUT)*1	Hz	U-10	Software No. (Four digits of PROM are displayed.)	—
U-03	Output current (IOUT)*1	A	U-11	Output power	kW
U-04	Output voltage (1V unit) Example: 200V	V	U-13*3	Cumulative operation time	×10H
			U-15	Received data error at MEMOBUS communication	—
U-05	DC voltage (1V unit) Example: 300V	V	U-16	PID feedback amount (Max. output ratio)	%
U-06	Input terminal status	—	U-17	PID input amount	%
U-07	Output terminal status	—	U-18	PID output amount	%
U-08	Torque monitor*2	%	U-19	Frequency reference bias monitor	%

*1 The digital operator LED is not lit.
*2 When V/f control is selected,"----" is displayed.
*3 Applicable only for inverters of 5.5 kW and 7.5 kW (200-V and 400-V classes).

Fault display method

- Display format

■ □ □ □ : 4-digit, 7-segment LED

Fault description example:
"EF3" is displayed at EF3 fault.
"- - -" is displayed when there is no fault.
Order of fault up to 4 (1 is the most recent.)

- Switching fault history
Fault history can be viewed by ∧ or ∨ key.
- Clearing fault history
Set the constant n001 to "6," then the n001 data returns to the previous value. Or initialize the constant, then n001 returns to the default setting.

STANDARD SPECIFICATIONS

VS-606V7

Voltage Class			200V single-/ three-phase									400V three-phase								
Model CIMR-V7AA□□□□		Three-phase	20P1	20P2	20P4	20P7	21P5	22P2	23P7	25P5	27P5	40P2	40P4	40P7	41P5	42P2	43P0	43P7	45P5	47P5
		Single-*1 phase	B0P1	B0P2	B0P4	B0P7	B1P5	B2P2	B3P7	—	—	—	—	—	—	—	—	—	—	—
Max. Applicable Motor Output*2 kW (HP)			0.1 (0.13)	0.2 (0.25)	0.4 (0.5)	0.75 (1)	1.5 (2)	2.2 (3)	3.7 (5)	5.5 (7.5)	7.5 (10)	0.2 (0.25)	0.4 (0.5)	0.75 (1)	1.5 (2)	2.2 (3)	3.0 (4)	3.7 (5)	5.5 (7.5)	7.5 (10)
Rated Input Current*3		Three-phase	1.1	1.8	3.9	6.4	11.0	15.1	24.0	33.0	39.6	1.6	2.4	4.7	7.0	8.1	10.6	12.0	19.6	23.8
		Single-phase	1.8	3.5	7.4	12.8	20.5	24	40	—	—	—	—	—	—	—	—	—	—	—
Output Characteristics	Inverter Capacity kVA		0.3	0.6	1.1	1.9	3.0	4.2	6.7	9.5	13	0.9	1.4	2.6	3.7	4.2	5.5	7.0	11	14
	Rated Output Current A		0.8	1.6	3	5	8	11	17.5	25	33	1.2	1.8	3.4	4.8	5.5	7.2	8.6	14.8	18
	Max. Output Voltage V		For 3-phase power supply: 3-phase, 200 to 230V (proportional to input voltage) For single-phase power supply: 3-phase, 200 to 240V (proportional to input voltage)									3-phase, 380 to 460V (proportional to input voltage)								
	Max. Output Frequency		400Hz (Programmable)																	
Power Supply	Rated Input Voltage and Frequency		For 3-phase power supply: 3-phase, 200 to 230V, 50/60Hz For single-phase power supply: Single-phase, 200 to 240V, 50/60Hz									3-phase, 380 to 460V, 50/60Hz								
	Allowable Voltage Function		-15 to +10%																	
	Allowable Frequency Function		±5%																	
Control Characteristics	Control Method		Sine wave PWM (V/f control, sensorless vector control)																	
	Frequency Control Range		0.1 to 400Hz																	
	Frequency Accuracy (Temperature Change)		Digital reference: ±0.01% (-10 to +50°C, 14 to 122°F) Analog reference: ±0.5% (25±10°C, 77±18°F)																	
	Frequency Setting Resolution		Digital reference: 0.01Hz (less than 100Hz), 0.1Hz (100Hz or more) Analog reference: 1/1000 of max. output frequency																	
	Output Frequency Resolution		0.01Hz																	
	Overload Capacity		150% rated output current for one minute																	
	Frequency Reference Signal		0 to 10VDC (20kΩ), 4 to 20mA (250Ω), 0 to 20mA (250Ω) pulse train input, frequency setting volume (selectable)																	
	Accel/Decel Time		0.00 to 6000 s (accel/decel time are independently programmed)																	
	Braking Torque		Short-term average deceleration torque*4 : 0.1, 0.2kW (0.13HP, 0.25HP):150% or more; 0.4/0.75kW (0.5HP,1HP): 100% or more; 1.5kW (2HP): 50% or more; 2.2kW (3HP) or more: 20% or more Continuous regenerative torque: Approx. 20% (approx. 125% with optional braking resistor, 10%ED, 10s, braking transistor built-in)																	
	V/f Characteristics		Possible to program any V/f pattern																	
Protective Functions	Motor Overload Protection		Electronic thermal overload relay																	
	Instantaneous Overcurrent		Motor coasts to a stop at approx. 250% of inverter rated current																	
	Overload		Motor coasts to a stop after 1 minute at 150% of inverter rated output current																	
	Overvoltage		Motor coasts to a stop if DC bus voltage exceed 410V									Motor coasts to a stop if DC bus voltage exceed 820V								
	Undervoltage		Stops when DC bus voltage is approx. 200V or less (approx. 160V or less for single-phase series)									Stops when DC bus voltage is approx. 400V or less								
	Momentary Power Loss		Following items are selectable: Not provided (stop if power loss is 15ms or longer), continuous operation if power loss is approx. 0.5s or shorter, continuous operation																	
	Cooling Fin Overheat		Protected by electronic circuit																	
	Stall Prevention Level		Individual levels during accel/constant speed. Decel ON/OFF available. During decel enable/disable selectable.																	
	Cooling Fan Fault		Detected by electronic circuit (fan lock detection)																	
	Ground Fault*5		Protected by electronic circuit (operation level is approx. 250% of rated output current)*6																	
	Power Charge Indication		RUN lamp stays ON or digital operator LED stays ON until the DC bus voltage becomes 50V or less. (Charge LED is provided for 400V)																	
Other Functions	Input Signals	Multi-function Input	Seven of the following input signals are selectable: Forward/reverse run (3-wire sequence), fault reset, external fault (NO/NC contact input), multi-step speed operation, Jog command, accel/decel time select, external baseblock, speed search command, UP/DOWN command, accel/decel hold command, LOCAL/REMOTE selection, communication/control circuit terminal selection, emergency stop fault, emergency stop alarm, self test																	
	Output Signals	Multi-function Output	Following output signals are selectable (NO/NC contact output, 2 photo-coupler outputs): Fault, running, zero speed, speed agree, frequency detection (output frequency ≤ or ≥ set value), during overtorque detection, minor error, during baseblock, operation mode, inverter run ready, during fault retry, during undervoltage detection, reverse running, during speed search, data output through communication																	
	Standard Functions		Voltage vector control, full-range automatic torque boost, slip compensation,17-step speed operation (max.), restart after momentary power loss, DC injection braking current at stop/start (50% of inverter rated current, 0.5 sec, or less), frequency reference bias/gain, MEMOBUS communications (RS-485/422, max. 19.2K bps), fault retry, speed search, frequency upper/lower limit setting, overtorque detection, frequency jump, accel/decel time switch, accel/decel prohibited, S-curve accel/decel, PID control, energy-saving control, constant copy, frequency reference with built-in volume																	
	Display	Status Indicator LED	RUN and ALARM provided as standard LED's																	
		Digital Operator (JVOP-140)	Available to monitor frequency reference, output frequency, output current																	
	Terminals		Main circuit: screw terminals Control circuit: plug-in screw terminal																	
	Wiring Distance between Inverter and Motor		100m (328ft) or less																	
Enclosure			Open chassis (IP20) and [NEMA1 (Type1)]																	
Cooling Method			Cooling fan is provided for 200V, 0.75kW (1HP)(3-/single-phase), 400V, 1.5kW (2HP)(3-phase), others are self-cooling																	
Environmental conditions	Humidity		95% RH or less (non-condensing)																	
	Storage Temperature		-20 to +60°C (-4 to 140°F) (Temperature during shipping for short period)																	
	Location		Indoor (free from corrosive gases or dust)																	
	Elevation		1000m (3280ft) or less																	
	Vibration		Up to 9.8m/s² at 10 to less than 20Hz Up to 2m/s² at 20 to 50Hz																	

*1 Single-phase series inverter output is three-phase (for three-phase motors).
Single-phase motor cannot be applied.
*2 Based on a standard 4-pole motor for max. applicable motor output. Select the inverter model within the allowable motor rated current.
*3 Rated input current depends on the power-source impedance including the power transformer, the input reactor, and wires.
*4 Shows deceleration torque for uncoupled motor decelerating from 60Hz with the shortest possible deceleration time.
*5 The ground fault here is one which occurs in the motor wiring while the motor is running.
A ground fault may not be detected in the following cases.
• A ground fault with low resistance which occurs in motor cables or terminals.
• A ground fault occurs when the power is turned ON.
*6 The operation level becomes approx. 50% of inverter rated output current in case of inverters of 5.5 kW or 7.5 kW.

■ Model Designation

CIMR—V7AA20P1

Inverter

VS-606V7 series

No.	Type	Remarks
A	Standard model	With digital operator (with volume control)
B		Without digital operator (with blank cover)
C		With digital operator (without volume control)
D	CC-Link model	With digital operator (with volume control)
E		Without digital operator (with blank cover)
F		With digital operator (without volume control)
N	DeviceNet model	With digital operator (with volume control)
P		Without digital operator (with blank cover)
M		With digital operator (without volume control)

No.	Specifications
A	Japan domestic standards*
C	European standards

* Conforms to UL/cUL, CE requirements.

No.	Applicable Maximum Motor Output
0P1	0.1kW (0.13HP)
0P2	0.2kW (0.25HP)
0P4	0.4kW (0.5HP)
0P7	0.75kW (1HP)
1P5	1.5kW (2HP)
2P2	2.2kW (3HP)
3P0	3.0kW (4HP)
3P0	3.7kW (5HP)
5P5	5.5kW (7.5HP)
7P5	7.5kW (10HP)

No.	Voltage Class
B	Single-phase 200VAC
2	Three-phase 200VAC
4	Three-phase 400VAC

■ Models

○: Provided

Voltage class	Description		Model	Capacity code to be filled in model ☐☐☐ (Max. applicable motor output kW)									
	Digital Operator	Analog Volume		0P1 (0.1)	0P2 (0.2)	0P4 (0.4)	0P7 (0.7)	1P5 (1.5)	2P2 (2.2)	3P0 (3.0)	3P7 (3.7)	5P5 (5.5)	7P5 (7.5)
Single-phase 200V	Provided	Provided	CIMR-V7AAB☐☐☐	○	○	○	○	○	○	—	○	—	—
		Not Provided	CIMR-V7CAB☐☐☐										
	Not Provided*	—	CIMR-V7BAB☐☐☐	○	○	○	○	○	○	—	○	—	—
Three-phase 200V	Provided	Provided	CIMR-V7AA2☐☐☐	○	○	○	○	○	○	—	○	○	○
		Not Provided	CIMR-V7CA2☐☐☐										
	Not Provided*	—	CIMR-V7BA2☐☐☐	○	○	○	○	○	○	—	○	○	○
Three-phase 400V	Provided	Provided	CIMR-V7AA4☐☐☐	—	○	○	○	○	○	○	○	○	○
		Not Provided	CIMR-V7CA4☐☐☐										
	Not Provided*	—	CIMR-V7BA4☐☐☐	—	○	○	○	○	○	○	○	○	○

* A blank cover is provided for a VS-606 V7 inverter without a digital operator.

Notes: 1 Models without cooling fin are available.
Contact your YASKAWA representative.
2 Contact your YASKAWA representative for details about CC-Link and DeviceNet models.

■ Capacity Code Designation

20P10

No.	Phase / Voltage
B	Single-phase 200VAC
2	Three-phase 200VAC
4	Three-phase 400VAC

No.	Applicable maximum motor output
0P1	0.1kW (0.13HP)
0P2	0.2kW (0.25HP)
0P4	0.4kW (0.5HP)
0P7	0.75kW (1HP)
1P5	1.5kW (2HP)
2P2	2.2kW (3HP)
3P0	3.0kW (4HP)
3P0	3.7kW (5HP)
5P5	5.5kW (7.5HP)
7P5	7.5kW (10HP)

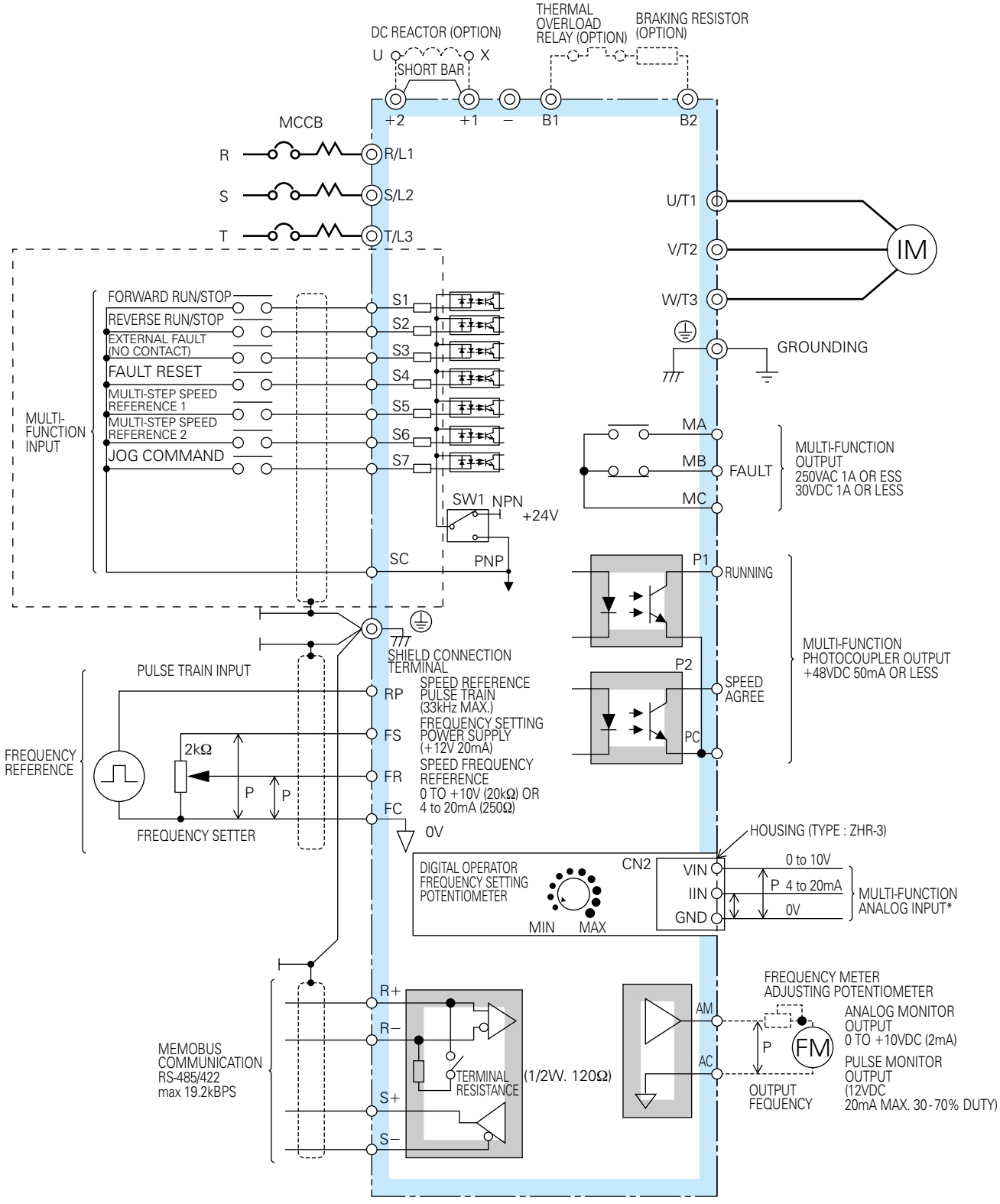
No.	Protective structure
0	Open chassis (IP20)
1	Enclosed wall-mounted (NEMA1)

Note: Enclosed wall-mounted [NEMA1 (Type1) type only for 5.5 / 7.5kW (7.5 / 10HP).

STANDARD WIRING (Example of a model with digital operator and analog volume)

VS-606V7

Build a sequence to shut OFF the power supply side at thermal trip contact when using a braking resister.



* A housing is required when using the CN2 terminal on the back side of the digital operator. 1m analog input cable (Order no. WV201) is available for housing on request. Contact your YASKAWA representative.

: shielded wire P : twisted pair shielded wire

Shows the following two kinds of connections (factory setting) :

- Input signals (S1 to S7) are non-voltage contacts
- Sequence connection by NPN transistor (0V common)

A +24V power supply is required for sequence connection by PNP transistor (+24V common) .

■ Model Description

Type		Terminal		Name	Function (Signal Level)	
Main Circuit		R/L1, S/L2, T/L3		AC Power Supply Input	Main circuit power supply input (Use R/L1 and S/L2 for single-phase power supply inverter. Do not use T/L3 of the models less than 0.75kW for other usage, such as a junction terminal.)	
		U/T1, V/T2, W/T3		Inverter Output	For inverter output	
		B1, B2		Braking Resistor Connection	For braking resistor connection	
		+2, +1		DC Reactor Connection	Remove the short bar between +2 and +1 when connecting DC reactor (option)	
		+1, –		DC Power Supply Input	For power supply input (+1: positive electrode; – : negative electrode)*1	
		⏚		Grounding	For grounding (Grounding should be conforming to the local grounding code.)	
Control Circuit	Input	Sequence	S1	Multi-function Input Selection 1	Factory setting: Runs when CLOSED, stops when OPEN.	24VDC, 8mA photocoupler insulation
			S2	Multi-function Input Selection 2	Factory setting: Runs when CLOSED, stops when OPEN.	
			S3	Multi-function Input Selection 3	Factory setting: “External fault (NO contact)”	
			S4	Multi-function Input Selection 4	Factory setting: “Fault reset”	
			S5	Multi-function Input Selection 5	Factory setting: “Multi-step speed reference 1”	
			S6	Multi-function Input Selection 6	Factory setting: “Multi-step speed reference 2”	
			S7	Multi-function Input Selection 7	Factory setting: “JOG command”	
			SC	Multi-function Input Selection Common	Common for control signal	
		Frequency Reference	RP	Speed Reference Pulse Train Input	33kHz max.	
			FS	Power Supply Terminal for Frequency Setting	+12V (allowable current: 20mA max.)	
			FR	Speed Frequency Reference	0 to +10V DC (20kΩ) or 4 to 20mA (250Ω), 0 to 20mA (250Ω) (resolution 1/1000)	
			FC	Frequency Reference Common	0V	
	Output	Multi-function Contact Output	MA	NO Contact Output	Factory setting: “Fault”	Contact capacity*2 250VAC, 1A or less 30VDC, 1A or less
			MB	NO Contact Output		
			MC	Contact Output Common		
			P1	Photocoupler Output 1	Factory setting: “Running”	Photocoupler output: +48VDC, 50mA or less
			P2	Photocoupler Output 2	Factory setting: “At frequency”	
			PC	Photocoupler Output Common	0V	
		AM		Analog Monitor Output	Factory setting: “Output frequency” 0 to +10V output (Pulse monitor output available by setting constants. Duty: 30 to 70%)	0 to 10V 2mA or less Resolution: 8bits
		AC		Analog Monitor Common	0V	
Communication Circuit		MEMOBUS Communication	R+	Communication Input (+)	For MEMOBUS communication Operation by RS-485 or RS-422 communication is available.	RS-485/422 MEMOBOS protocol 19.2kBPS max.
			R–	Communication Input (–)		
			S+	Communication Output (+)		
			S–	Communication Output (–)		

Notes: 1 Contact your Yaskawa representative if the input terminals for the DC power supply are required to meet UL/cUL and CE standards.
2 Minimum permissible load: 5 VDC, 10 mA (as reference value)

DIMENSIONS

When replacing the VS-606PC3 with a VS-606V7, a separate attachment will be required. Refer to Attachment for Replacing PC3 Series on page 59.

■ Open Chassis Type (IP20)

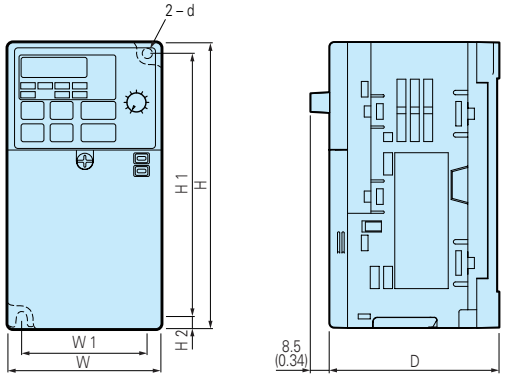


Figure 1

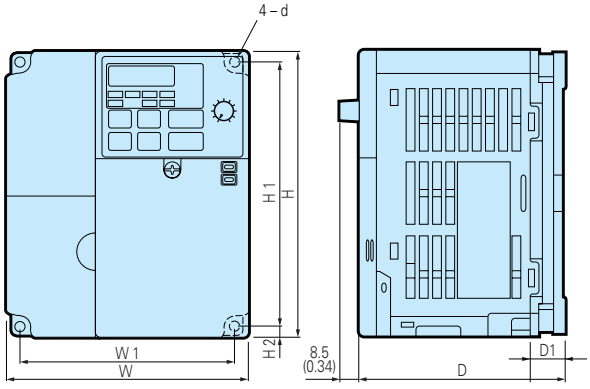


Figure 2

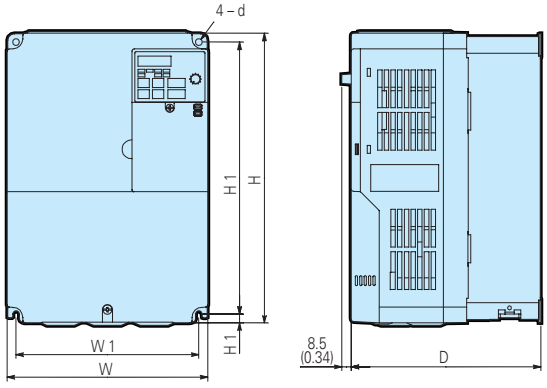


Figure 3

Voltage Class	Max. Applicable Motor Output kW (HP)	Inverter Model CIMR-V7AA ☐	Figure	Dimension in mm (inches)							Mass kg (lb)
				W	H	D	W1	H1	H2	d	
Three-phase 200V	0.1 (0.13)	20P1	1	68 (2.68)	128 (5.04)	76 (2.99)	56 (2.20)	118 (4.65)	5 (0.20)	M4	0.6 (1.32)
	0.2 (0.25)	20P2				76 (2.99)					0.6 (1.32)
	0.4 (0.5)	20P4				108 (4.25)				M4	0.9 (1.98)
	0.75 (1)	20P7				128 (5.04)				M4	1.1 (2.43)
	1.5 (2)	21P5	2	108 (4.25)	128 (5.04)	131 (5.16)	96 (3.78)	118 (4.65)	5 (0.20)	M4	1.4 (3.09)
	2.2 (3)	22P2		108 (4.25)		140 (5.51)	96 (3.78)				1.5 (3.31)
	3.7 (5)	23P7		140 (5.51)		143 (5.63)	128 (5.04)			M4	2.1 (4.62)
	5.5 (7.5)	25P5	3	180 (7.08)	260 (10.23)	170 (6.69)	164 (6.46)	244 (9.60)	8 (0.31)	M5	4.6 (10.14)
	7.5 (10)	27P5									4.8 (10.58)
Single-phase 200V	0.1 (0.13)	B0P1	1	68 (2.68)	128 (5.04)	76 (2.99)	56 (2.20)	118 (4.65)	5 (0.20)	M4	0.6 (1.32)
	0.2 (0.25)	B0P2				76 (2.99)					0.7 (1.54)
	0.4 (0.5)	B0P4				131 (5.16)				M4	1.0 (2.20)
	0.75 (1)	B0P7	2	108 (4.25)	128 (5.04)	140 (5.51)	96 (3.78)	118 (4.65)	5 (0.20)	M4	1.5 (3.31)
	1.5 (2)	B1P5		108 (4.25)		156 (6.14)	96 (3.78)				1.5 (3.31)
	2.2 (3)	B2P2		140 (5.51)		163 (6.42)	128 (5.04)			M4	2.2 (4.85)
	3.7 (5)	B3P7		170 (6.69)		180 (7.09)	158 (6.22)				2.9 (6.39)
Three-phase 400V	0.2 (0.25)	40P2	2	108 (4.25)	128 (5.04)	92 (3.62)	96 (3.78)	118 (4.65)	5 (0.20)	M4	1.0 (2.20)
	0.4 (0.5)	40P4				110 (4.33)				M4	1.1 (2.43)
	0.75 (1)	40P7				140 (5.51)				M4	1.5 (3.31)
	1.5 (2)	41P5				156 (6.14)					1.5 (3.31)
	2.2 (3)	42P2				156 (6.14)					1.5 (3.31)
	3.0 (4)	43P0		140 (5.51)		143 (5.63)	128 (5.04)			M4	2.1 (4.62)
	3.7 (5)	43P7									2.1 (4.62)
	5.5 (7.5)	45P5	3	180 (7.08)	260 (10.23)	170 (6.69)	164 (6.46)	244 (9.60)	8 (0.31)	M5	4.8 (10.58)
	7.5 (10)	47P5									4.8 (10.58)

Note: Remove the top and bottom covers so that inverters of 5.5/7.5 kW (200/400-V Classes) can be used as IP00.

■ Enclosed Wall-mounted Type [NEMA1 (Type1)] 0.1 to 3.7kW (0.13 to 5HP)

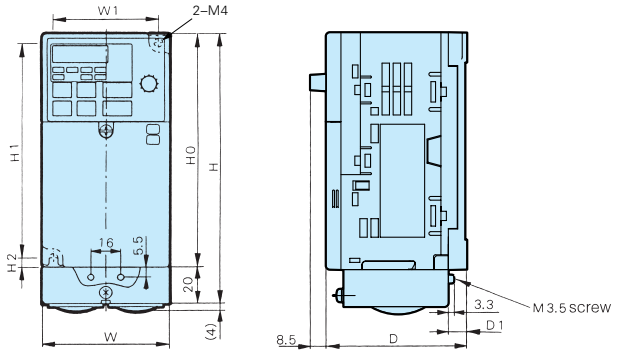


Figure 1

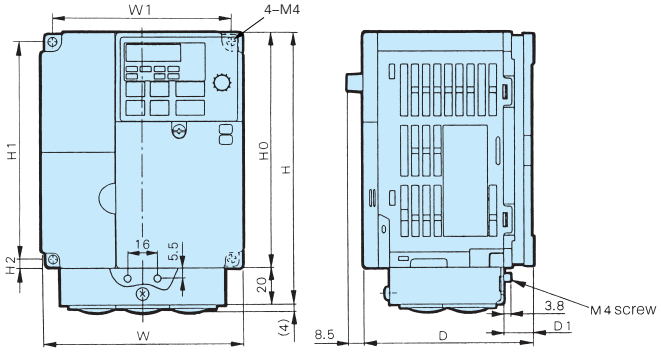
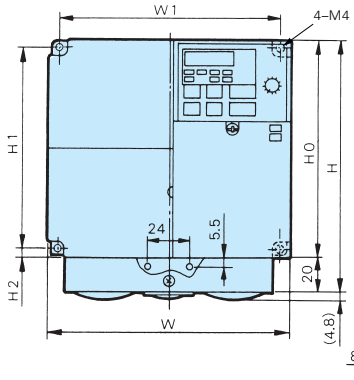


Figure 2



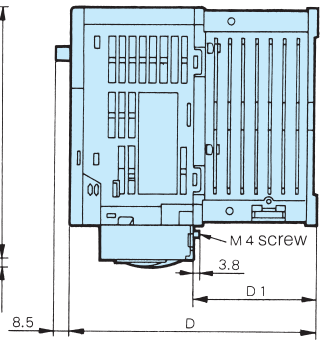


Figure 3

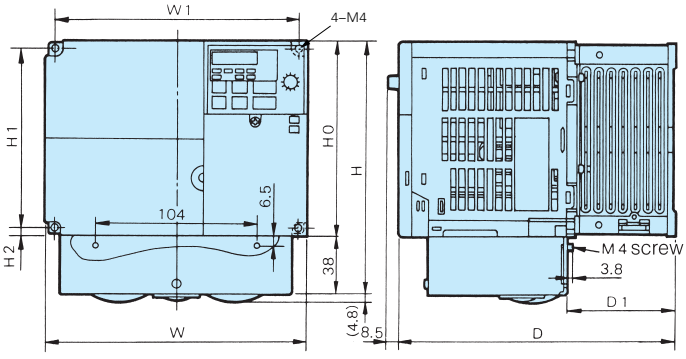


Figure 4

Voltage Class	Max. Applicable Motor Output kW (HP)	Inverter Model CIMR-V7AA ☐	Figure	Dimension in mm (inches)								Mass kg (lb)
				W	H	D	W1	H0	H1	H2	D1	
Three-phase 200V	0.1 (0.13)	20P1	1	68 (2.68)	148 (5.83)	76 (2.99)	56 (2.20)	128 (5.04)	118 (4.65)	5 (0.20)	10 (0.39)	0.7 (1.54)
	0.2 (0.25)	20P2				76 (2.99)						0.7 (1.54)
	0.4 (0.5)	20P4				108 (4.25)					42 (1.65)	1.0 (2.20)
	0.75 (1)	20P7				128 (5.04)					62 (2.44)	1.2 (2.65)
	1.5 (2)	21P5	2	108 (4.25)		131 (5.16)	96 (3.78)				64 (2.52)	1.6 (3.53)
	2.2 (3)	22P2		108 (4.25)		140 (5.51)	96 (3.78)					1.7 (3.75)
	3.7 (5)	23P7	3	140 (5.51)		143 (5.63)	128 (5.04)				71 (2.80)	2.4 (5.29)
Single-phase 200V	0.1 (0.13)	B0P1	1	68 (2.68)	148 (5.83)	76 (2.99)	56 (2.20)	128 (5.04)	118 (4.65)	5 (0.20)	10 (0.39)	0.7 (1.54)
	0.2 (0.25)	B0P2				76 (2.99)						0.8 (1.76)
	0.4 (0.5)	B0P4				131 (5.16)					42 (1.65)	1.1 (2.43)
	0.75 (1)	B0P7	2	108 (4.25)		140 (5.51)	96 (3.78)				64 (2.52)	1.7 (3.75)
	1.5 (2)	B1P5		108 (4.25)		156 (6.14)	96 (3.78)					1.7 (3.75)
	2.2 (3)	B2P2	3	140 (5.51)		163 (6.42)	128 (5.04)				71 (2.80)	2.5 (5.51)
	3.7 (5)	B3P7	4	170 (6.69)		180 (7.09)	158 (6.22)					3.4 (7.50)
Three-phase 400V	0.2 (0.25)	40P2	2	108 (4.25)	148 (5.83)	92 (3.62)	96 (3.78)	128 (5.04)	118 (4.65)	5 (0.20)	16 (0.63)	1.2 (2.65)
	0.4 (0.5)	40P4				110 (4.33)					34 (1.34)	1.2 (2.65)
	0.75 (1)	40P7				140 (5.51)					64 (2.52)	1.7 (3.75)
	1.5 (2)	41P5				156 (6.14)						1.7 (3.75)
	2.2 (3)	42P2				156 (6.14)						1.7 (3.75)
	3.0 (4)	43P0	3	140 (5.51)		143 (5.63)	128 (5.04)				71 (2.80)	2.4 (5.29)
	3.7 (5)	43P7										2.4 (5.29)

Note: Enclosed wall-mounted inverters with a motor output of 3.7 kW or less are open-chassis inverters that have been modified with NEMA1 kits. Contact your Yaskawa representative for a NEMA1 kit.

■ Enclosed Wall-mounted Type [NEMA1 (Type1)] 5.5/7.5kW (7.5/10HP)

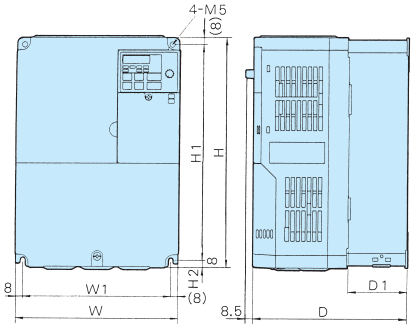


Figure 5

Voltage Class	Max. Applicable Motor Output kW (HP)	Inverter Model CIMR-V7AA	Figure	Dimensions in mm (inches) W	H	D	W1	H1	H2	D1	Mass kg (lb)
200V (Three-phase)	5.5 (7.5)	25P5	5	180 (7.09)	260 (10.24)	170 (6.70)	164 (6.46)	244 (9.61)	8 (0.31)	65 (2.56)	4.6 (10.14)
	7.5 (10)	27P5									4.8 (10.58)
400V (Three-phase)	5.5 (7.5)	45P5	5	180 (7.09)	260 (10.24)	170 (6.70)	164 (6.46)	244 (9.61)	8 (0.31)	65 (2.56)	4.8 (10.58)
	7.5 (10)	47P5									4.8 (10.58)

Note: To use 5.5/7.5kW enclosed wall-mounted type inverters as open chassis type, remove the top and the bottom covers.

INVERTER HEAT LOSS

When mounting the inverter inside the panel, or installing more than one inverter, consider each inverter heat loss, and arrange enough installation space to dissipate the heat.

Three-phase 200V Class

Model CIMR-V7AA□		20P1	20P2	20P4	20P7	21P5	22P2	23P7	25P5	27P5
Inverter Capacity kVA		0.3	0.6	1.1	1.9	3.0	4.2	6.7	9.5	13
Rated Current A		0.8	1.6	3	5	8	11	17.5	25	33
Heat Loss W	Fin	3.7	7.7	15.8	28.4	53.7	60.4	96.7	170.4	219.2
	Inside Unit	9.3	10.3	12.3	16.7	19.1	34.4	52.4	79.4	98.9
	Total Heat Loss	13.0	18.0	28.1	45.1	72.8	94.8	149.1	249.8	318.1
Fin Cooling		Self cooled			Forced fan cooled					

Single-phase 200V Class

Model CIMR-V7AA□		B0P1	B0P2	B0P4	B0P7	B1P5	B2P2	B3P7
Inverter Capacity kVA		0.3	0.6	1.1	1.9	3.0	4.2	6.7
Rated Current A		0.8	1.6	3	5	8	11	17.5
Heat Loss W	Fin	3.7	7.7	15.8	28.4	53.7	64.5	98.2
	Inside Unit	10.4	12.3	16.1	23.0	29.1	49.1	78.2
	Total Heat Loss	14.1	20.0	31.9	51.4	82.8	113.6	176.4
Fin Cooling		Self cooled			Forced fan cooled			

Three-phase 400V Class

Model CIMR-V7AA□		40P1	40P2	40P4	40P7	41P5	42P2	43P7	45P5	47P5
Inverter Capacity kVA		0.9	1.4	2.6	3.7	4.2	5.5	7.0	11	14
Rated Current A		1.2	1.8	3.4	4.8	5.5	7.2	8.6	14.8	18
Heat Loss W	Fin	9.4	15.1	30.3	45.8	50.5	58.2	73.4	168.8	209.6
	Inside Unit	13.7	15.0	24.6	29.9	32.5	37.6	44.5	87.7	99.3
	Total Heat Loss	23.1	30.1	54.9	75.7	83.0	95.8	117.9	256.5	308.9
Fin Cooling		Self cooled			Forced fan cooled					

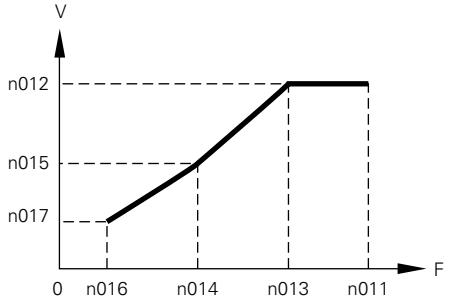
Relation between new constants and version of VS-606V7 software

#1: Available in version VSP010028 or later. (3.7kW max.)
#2: Available in version VSP010032 or later. (3.7kW max.)
#3: Available in version VSP010106 or later. (5.5kW min.)

How to read this list

- Constants not described in this list are not displayed in the digital operator.
- Setting constants vary in accordance with password setting (n001). The frequency reference FREF can be changed regardless of the n001 settings.
- Constants displayed in ☐ can be set and changed during operation.

Primary Function (Constant n001 to n049)

Function	Constant No. n□□□	Function Name	Description	Setting Range	Setting Unit	Factory Setting	Ref. Page
Selecting Constant Group Initializing	001	Password	0 : n001 read and set, n002 to n179 read only (FREF of digital operator can be set) 1 : n001 to n049 read and set 2 : n001 to n079 read and set 3 : n001 to n119 read and set 4 : n001 to n179 read and set 5 : n001 to n179 read and set (Run command can be received in Program mode.) 6 : Fault history clear 8 : Initialization-reset (multi-function terminal to initial setting) 9 : 3-wire initialization-reset	0 to 6, 8, 9	1	1	25
Selecting Control Mode	002	Control mode selection	0 : V/f control 1 : Vector control	0, 1	1	0*1	24
Selecting Operation Mode	003	Run command selection	0 : Digital operator 1 : Control circuit terminal 2 : MEMOBUS Communication 3 : Communication unit (Option)	0 to 3	1	0	25
	004	Frequency reference selection	0 : Volume 1 : Frequency Reference 1 (n024) 2 : Control circuit terminal (0 to 10 V) 3 : Control circuit terminal (4 to 20 mA) 4 : Control circuit terminal (0 to 20 mA) 5 : Pulse train 6 : MEMOBUS Communication (register No. 0002H) 7 : Operator circuit terminal (0 to 10V) 8 : Operator circuit terminal (4 to 20mA) 9 : Communication unit (Option)	0 to 9	1	0*2	
Selecting Stopping Method	005	Selecting Stopping Method	0 : Deceleration to stop 1 : Coast to a stop	0, 1	1	0	31
Reverse Run Prohibited	006	Selecting reverse run prohibited	0 : Reverse run enabled 1 : Reverse run disabled	0, 1	1	0	26
Selecting Digital Operator Key Function	007	Stop key function	0 : Stop key is always effective 1 : Stop key is effective when operated from digital operator	0 , 1	1	0	31
	008	Selecting frequency reference in local mode	0 : Volume 1 : Frequency reference 1 (n024)	0, 1	1	0*2	–
	009	Frequency reference setting method from digital operator	0 : Enter key used 1 : Enter key not used	0, 1	1	0	–
	010	Detecting fault contact of digital operator	0 : No fault contact 1 : Fault contact detected	0, 1	1	0	–
Setting V/f Pattern	011	Max. output frequency	 When V/f pattern is a straight line, set n014 and n016 to the same value. In this case, n015 is disregarded.	50.0 to 400.0Hz	0.1Hz	60.0Hz	24 34
	012	Max. voltage		0.1 to 255.0V*2	0.1V	200.0V*3	24 34
	013	Max. voltage output frequency (base frequency)		0.2 to 400.0Hz	0.1Hz	60.0Hz	24 34
	014	Mid. output frequency		0.1 to 399.9Hz	0.1Hz	1.5Hz (3.0Hz)	34
	015	Mid. output frequency voltage		0.1 to 255.0V*2	0.1V	12.0V*3 (1.0Hz)	34
	016	Min. output frequency		0.1 to 10.0Hz	0.1Hz	1.5Hz (1.0Hz)	34
	017	Min. output frequency voltage		0.1 to 50.0V*2	0.1V	12.0V*3 (4.3V)	34
Selecting Acceleration/ Deceleration Time (Cont'd)	018	Selecting setting unit of accel./decel. time	Selecting setting unit of accel./decel. time Constant n018 / Setting unit / Setting range 0 / 0.1s / 0.00 to 999.9 s (less than 1000 s) 1000 to 6000 s (more than 1000 s) 1 / 0.01s / 0.00 to 99.99 s (less than 100 s) 100.0 to 600.0 s (more than 100 s)	0, 1	1	0	–

Note: Factory setting values in parentheses are those in vector control mode.
*1 The set value is not changed by constant initialization.
*2 The factory setting of the model with operator without volume (JVOP-146) is "1." When initialized, turned to "0."
*3 For 400V class inverter, the upper limit of voltage setting range and the setting value before shipment are twice that of 200V class.

Relation between new constants and version of VS-606V7 software
#1: Available in version VSP010028 or later. (3.7kW max.)
#2: Available in version VSP010032 or later. (3.7kW max.)
#3: Available in version VSP010106 or later. (5.5kW min.)

How to read this list
• Constants not described in this list are not displayed in the digital operator.
• Setting constants vary in accordance with password setting (n001). The frequency reference FREF can be changed regardless of the n001 settings.
• Constants displayed in ▭ can be set and changed during operation.

Primary Function (Constant n001 to n049) (cont'd)

Function	Constant No. n□□□	Function Name	Description	Setting Range	Setting Unit	Factory Setting	Ref. Page
Selecting Acceleration/ Deceleration Time	019	Acceleration time 1	Sets acceleration time in the unit selected with n018 when frequency reference changes from 0 to 100 %.	0.00 to 6000s	Unit selected with n018	10.0s	24 28
	020	Deceleration time 1	Sets deceleration time in the unit selected with n018 when frequency reference changes from 100 to 0 %.	0.00 to 6000s		10.0s	
	021	Acceleration time 2	Effective when acceleration time 2 is selected at multi-function contact input selection. Setting is the same as n019.	0.00 to 6000s		10.0s	
	022	Deceleration time 2	Effective when deceleration time 2 is selected at multi-function contact input selection. Setting is the same as n020.	0.00 to 6000s		10.0s	
Selecting S-curve	023	S-curve selection	0 : S-curve not provided 2 : 0.5 s 1 : 0.2 s 3 : 1.0 s	0 to 3	1	0	28
Frequency Reference (FREF)	024	Frequency reference 1 (Master speed frequency reference)	Sets master speed frequency reference. Setting is the same as simple operation lamp FREF).	0.00 to 400.0Hz	0.01 Hz (less than 100Hz) 0.1 Hz (more than 100Hz)	6.00Hz	26
	025	Frequency reference 2	Sets second frequency reference. It is effective when multi-step speed reference 1 is selected in multi-function contact input.			0.00Hz	
	026	Frequency reference 3	Sets third frequency reference. It is effective when multi-step speed reference 2 is selected in multi-function contact input.				
	027	Frequency reference 4	Sets fourth frequency reference. It is effective when multi-step speed references 1 and 2 are selected in multi-function contact input.				
	028	Frequency reference 5	Sets fifth frequency reference. It is effective when multi-step speed reference 3 is selected in multi-function contact input.				
	029	Frequency reference 6	Sets sixth frequency reference. It is effective when multi-step speed references 1 and 3 are selected in multi-function contact input.				
	030	Frequency reference 7	Sets seventh frequency reference. It is effective when multi-step speed references 2 and 3 are selected in multi-function contact input.				
	031	Frequency reference 8	Sets eighth frequency reference. It is effective when multi-step speed references 1, 2, and 3 are selected in multi-function				
	032	Jog frequency	Sets jog frequency. It is effective when jog frequency is selected in multi-function contact input.			6.00Hz	27
Frequency Reference Limit	033	Frequency reference upper limit	Sets upper limit of frequency reference in units of 1 %. Max. output frequency (n011) is 100 %.	0 to 110%	1%	100%	28
	034	Frequency reference lower limit	Sets lower limit of frequency reference in units of 1 %. Max. output frequency (n011) is 100 %.	0 to 110%	1%	–	
	035	Selecting setting/ displaying unit of frequency reference	0 : 0.01Hz for less than 100Hz, 0.1Hz for 100Hz or more. 1 : 0.1% 2 to 39 : Set the number of motor poles for unit of min^{-1} (o to 9999 displayed). 40 to 3999 : Custom units.	0 to 3999	1	0	–
Motor Protection by Electric Thermal	036	Motor rated current	Sets motor rated current of the motor nameplate. It is the standard current for motor electro-thermal protection.	0 to 150 % of inverter rated output current	0.1A	*	25 36
	037	Electronic thermal motor protection selection	0 : Standard motor 1 : Inverter motor 2 : No protection	0 to 2	–	0	36
	038	Electronic thermal motor protection time constant setting	Sets constant for motor protection. For standard and inverter motors (standard rating), 8min., for others (short period rating), 5min.	1 to 60min	1min	8min	
Selecting Cooling Fan Operation	039	Selecting cooling fan operation	1 : Operates with power supply ON 0 : ON/OFF control (ON while running, OFF when stopped. ON for one minute after stopping.)	0.1	–	0	–
Selecting Direction for Rotation	040	Selecting direction for motor rotation	Direction of rotation as viewed from load side when running forward. 0 : Counter clockwise (CCW) 1 : Clockwise (CW)	0, 1	1	0	–
Adjusting Acceleration/ Deceleration Time	041	Acceleration time 3	Sets acceleration time in the unit selected with n018 when frequency reference changes from 0 to 100 %.	0.00 to 6000s	Unit selected with n018	10.0s	–
	042	Deceleration time 3	Sets deceleration time in the unit selected with n018 when frequency reference changes from 100 to 0 %.	0.00 to 6000s		10.0s	–
	043	Acceleration time 4	Sets acceleration time in the unit selected with n018 when frequency reference changes from 0 to 100 %.	0.00 to 6000s		10.0s	–
	044	Deceleration time 4	Sets deceleration time in the unit selected with n018 when frequency reference changes from 100 to 0 %.	0.00 to 6000s		10.0s	–

* Factory setting values are different according to inverter capacity (kVA).

Secondary Function (Constant n050 to n079)

Function	Constant No. n□□□	Function Name	Description	Setting Range	Setting Unit	Factory Setting	Ref. Page
UP/DOWN command 2	#1, #3 045	Frequency reference bias step amount	–	0.00 to 99.99 Hz	0.01 Hz	0.00 Hz	–
	#1, #3 046	Frequency reference bias accel/decel rate	–	0, 1	–	0	–
	#1, #3 047	Frequency reference bias operation mode selection	–	0, 1	–	0	–
	#1, #3 048	Frequency reference bias value	–	–99.9 to 100.0 % (n011/100%)	0.1 %	0.0 %	–
	#1, #3 049	Analog frequency reference fluctuation limit level	–	0.1 to 100.0 % (n011/100%)	0.1 %	1.0 %	–
Selecting Sequence Input Functions	050	Multi-function input selection 1 (Terminal S1)	1 : FWD run command (2-wire sequence) 2 : REV run command (2-wire sequence) 3 : External fault (NO contact input) 4 : External fault (NC contact input) 5 : Fault reset 6 : Multi-step speed reference 1 7 : Multi-step speed reference 2 8 : Multi-step speed reference 3 9 : Multi-step speed reference 4 10 : Jog reference 11 : Accel/Decel time selection 12 : External baseblock (NO contact input) 13 : External baseblock (NC contact input) 14 : Search command from max. output frequency 15 : Search command from set frequency 16 : Accel/Decel prohibit 17 : Local/Remote selection 18 : Comm./Control circuit terminal selection 19 : Emergency stop fault (NO contact input) 20 : Emergency stop alarm (NO contact input) 21 : Emergency stop fault (NC contact input) 22 : Emergency stop alarm (NC contact input) 23 : PID control cancel (ON : PID control disabled) 24 : PID control integral reset (ON : Integral reset) 25 : PID control integral hold (ON : Integral hold) 26 : Inverter overheating pre-alarm (OH3) 27 : Accel/Decel time selection 2	1 to 27	1	1	26 27 29 30 32
	051	Multi-function input selection 2 (Terminal S2)	Set items are same as n050	1 to 27	1	2	
	052	Multi-function input selection 3 (Terminal S3)	0 : FWD/REV run command (3-wire sequence) Other set items are same as n050	0 to 27	1	3	
	053	Multi-function input selection 4 (Terminal S4)	Set items are same as n050	1 to 27	1	5	
	054	Multi-function input selection 5 (Terminal S5)	Set items are same as n050.	1 to 27	1	6	
	055	Multi-function input selection 6 (Terminal S6)	Set items are same as n050.	1 to 27	1	7	
	056	Multi-function input selection 7 (Terminal S7)	Set items are same as 050. 34 : UP/DOWN command (Terminal S6/S7 is UP command/DOWN command and the setting of n055 is invalid) 35 : Loop test (MEMOBUS) 36 : UP/DOWN command 2	1 to 27, 34 to 36	1	10	
Selecting Sequence Output Functions	057	Multi-function output selection 1 (Contact output terminal MA-MB-MC)	0 : Fault 1 : Running 2 : Speed agree 3 : Zero speed 4 : Frequency detection 1 (Output frequency ≧ Custom frequency detection) 5 : Frequency detection 2 (Output frequency ≦ Custom frequency detection) 6 : Overtorque detection (NO contact output) 7 : Overtorque detection (NC contact output) 8 : Undertorque detection (NO contact output) 9 : Undertorque detection (NC contact output) 10 : Minor fault (alarm displays) 11 : During baseblock 12 : Operation mode 13 : Inverter operation ready 14 : During fault retry 15 : Low voltage detecting 16 : In REV running 17 : Speed searching 18 : Output from communication 19 : PID feedback loss 20 : Operation when frequency reference is missing 21 : Inverter overheating pre-alarm (OH3)	0 to 21	1	0	33
	058	Multi-function output selection 2 (Photocoupler output terminal P1-C)		0 to 21	1	1	
	059	Multi-function output selection 3 (Photocoupler output terminal P2-C)		0 to 21	1	2	
Selecting Frequency Reference Functions	060	Analog frequency reference gain	Sets internal reference level in units of 1 % when frequency reference voltage (current) is 10V (20mA). Max. output frequency (n011) is 100 %.	0 to 225%	1%	100%	27
	061	Analog frequency reference bias	Sets internal reference level in units of 1 % when frequency reference voltage (current) is 0V (4mA or 0mA). Max. output frequency (n011) is 100 %.	–100 to 100%	1%	0%	27
	062	Filter time constant for analog frequency reference constant	Sets filter time constant for analog input primary lag. (to avoid noise)	0.00 to 2.00s	0.01s	0.10s	–

Relation between new constants and version of VS-606V7 software

#1: Available in version VSP010028 or later. (3.7kW max.)
#2: Available in version VSP010032 or later. (3.7kW max.)
#3: Available in version VSP010106 or later. (5.5kW min.)

How to read this list

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Secondary Function (Constant n050 to n079) (cont'd)

Function	Constant No. n□□□	Function Name	Description	Setting Range	Setting Unit	Factory Setting	Ref. Page
MECHATROLINK Communications	#2 063	Watchdog error operation selection (For SI-T/V7)	0: Coast to a stop 1: Deceleration to a stop using Deceleration Time 1 in n020. 2: Deceleration to a stop using Deceleration Time 2 in n022. 3: Continuous operation (Alarm) 4: Continuous operation (Alarm, no fault)	0 to 4	–	0	–
Selecting Frequency Reference Functions	064	Operation when frequency reference is missing	0 : Stop 1 : Operation continued at 80% speed of frequency reference before it missed.	0, 1	1	0	–
Selecting Analog Monitor Functions	065	Monitor output type	0 : Analog monitor output (0 to + 10VDC 2mA max.) 1 : Pulse monitor output (12VDC -20mA max. 30 to 70% duty)	0, 1	1	0	–
	066	Multi-function analog output (terminal AM-AC)	0 : Output frequency (10V/Max. frequency n011) 1 : Output current (10V/Inverter rated current) 2 : Main circuit DC voltage [10V/400VDC (800VDC for 400V class)] 3 : Torque monitor (10V/motor rated torque) 4 : Output power (10V/inverter output kW) 5 : Output voltage reference [10V/200VAC (400VAC for 400V class)] 6 : Frequency reference monitor (10 V/Max. output frequency n011) Note: Valid when n065=0 (analog output monitor) selected.	0 to 6	1	0	30
	067	Analog monitor gain	Adjusts output voltage level of analog monitor. (ex.) when 3V is 100 % level, sets as n067 = 0.30	0.00 to 2.00	0.01	1.00	31
Selecting Frequency Reference Functions (Operator Side Input)	068	Analog frequency reference gain (CN2 terminal VIN)	Multiplies input frequency reference by the gain set at this constant. 100% is 1.00.	-255 to 255%	1%	100%	–
	069	Analog frequency reference bias (CN2 terminal VIN)	Adds the bias set at this constant to input frequency reference. Max. output frequency (n011) is 100%	-100 to 100%	1%	0%	–
	070	Filter time constant for analog frequency reference (CN2 terminal VIN)	Sets filter time constant for analog input primary lag. (to avoid noise)	0.00 to 2.00s	0.01s	0.10s	–
	071	Analog frequency reference gain (CN2 terminal IIN)	Multiplies input frequency reference by gain set by this constant. 100% is 1.00.	-255 to 255%	1%	100%	–
	072	Analog frequency reference bias (CN2 terminal IIN)	Adds the bias set at this constant to input frequency reference. Max. output frequency (n011) is 100%	-100 to 100%	1%	0%	–
	073	Filter time constant for analog frequency reference (CN2 terminal IIN)	Sets filter time constant for analog input primary lag. (to avoid noise)	0.00 to 2.00s	0.01s	0.10s	–
Selecting Pulse Train Frequency Reference Functions	074	Pulse-train frequency reference gain	Sets internal reference level in units of 1% when pulse-train input frequency is that set at pulse-train input scaling (n149). Max. output frequency (n011) is 100%.	0 to 255%	1%	100%	–
	075	Pulse-train frequency reference bias	Sets internal reference level in units of 1% when pulse-train input frequency is 0Hz. Max. output frequency (n011) is 100%.	-100 to 100%	1%	0%	–
	076	Filter time constant for pulse-train frequency reference	Sets filter time constant for pulse-train input primary lag. (to avoid noise)	0.00 to 2.00s	0.01s	0.10s	–
Selecting Multi-function Analog Input	077	Multi-function analog input selection	0 : Not valid 1 : Auxiliary frequency reference (FREF2) 2 : Frequency reference gain (FGAIN) 3 : Frequency reference bias (FBIAS) 4 : Output voltage bias (VBIAS)	0 to 4	1	0	–
	078	Multi-function analog input signal selection	0 : Operator CN2 terminal VIN (0 to 10V) 1 : Operator CN2 terminal IIN (4 to 20mA)	0.1	1	0	–
	079	Amount of frequency reference bias setting (FBIAS)	Max. output frequency (n011) is 100%.	0 to 50%	1%	10%	–
Adjusting Carrier Frequency	080	Carrier frequency selection	Carrier frequency 1, 2, 3, 4 : Set value ×2.5 Hz 7, 8, 9 : Proportional to output frequency of 2.5 kHz max. (lower limit 1 kHz)	1 to 4 7 to 9	1	4*	31

Tertiary Function (Constant n080 to n119)

Function	Constant No. n□□□	Function Name	Description	Setting Range	Setting Unit	Factory Setting	Ref. Page
Momentary Power Loss Ridethrough	081	Momentary power loss ridethrough method	0 : Not provided 1 : Continuous operation after power recovery within the power loss ridethrough time. 2 : Continuous operation after power recovery (no fault output of UV1)	0 to 2	1	0	28
Fault Retry	082	Automatic retry attempts	Sets automatic retry times after self-diagnosis when an inverter fault occurs.	0 to 10	1	0	29
Jump Frequency Control	083	Jump frequency 1	Sets frequency to jump. Disabled when setting value is 0.00.	0.00 to 400.0Hz	0.01 Hz (less than 100 Hz) 0.1 Hz (more than 100 Hz)	0.00Hz	29
	084	Jump frequency 2					
	085	Jump frequency 3					
	086	Jump frequency range	Sets the frequency range to jump. Disabled when setting value is 0.00.	0.00 to 25.50Hz	0.01Hz		
Cumulative Operation Time	#3 087	Cumulative operation time function selection	0 : Adds time while the power for the inverter is ON until it is turned OFF. 1 : Adds time while the inverter is running and data is being output.	0, 1	–	0	–
	#3 088	Cumulative operation time	The factory setting is set in units of ten hours (10 H). The operation time is added to this value.	0 to 6550	1=10H	0H	–
DC Injection Braking	089	DC injection braking current	Sets current value at DC injection braking. Inverter rated current is 100 %.	0 to 100%	1%	50%	30 31
	090	DC injection braking time at stop	Sets DC injection braking time at ramp to stop in units of 0.1 sec. Disabled at stop when the setting value is 0.0.	0.0 to 25.5s	0.1s	0.5s	31
	091	DC injection braking time at start	Sets DC injection braking time at start in units of 0.1 sec. Disabled at start when the setting value is 0.0.	0.0 to 25.5s	0.1s	0.0s	30
Stall Prevention	092	Stall prevention during deceleration	0 : Enabled (Sets 1 with braking resistor) 1 : Disabled	0, 1	1	0	34
	093	Stall prevention level during acceleration	Sets stall prevention level in units of 1 % during acceleration. Inverter rated current is 100 % (Notes: ・Disabled with setting of 200 %. ・In constant output area, prevention level is automatically lowered.)	30 to 200%	1%	170%	
	094	Stall prevention level during running	Sets stall prevention level in units of 1 % during running. Inverter rated current is 100 %. (Note：Disabled with setting of 200 %)	30 to 200%	1%	160%	
Frequency Detection	095	Frequency detection (multi-function contact output)	Sets frequency to detect when selected frequency detection at multi-function contact output or multi-function photocoupler output.	0.00 to 400.0Hz	0.01 Hz (less than 100 Hz) 0.1 Hz (more than 100 Hz)	0.00Hz	29
Detecting Overtorque	096	Overtorque detecting function selection 1	0 : Detection disabled 1 : Detected during constant-speed running, and operation continues during and after detection. 2 : Detected during constant-speed running, and inverter output is shut OFF after detection. 3 : Detected during running, and operation continues during and after detection. 4 : Detected during running, and inverter output is shut OFF after detection.	0 to 4	1	0	29
	097	Torque selection 2 (Vector control mode)	0 : Detected by torque. 1 : Detected by current.	0, 1	1	0	
	098	Overtorque detection level	Sets overtorque detection level when detecting at multi-function contact output and multi-function photocoupler output. •Inverter rated current is 100% when detecting by current. •Motor rated torque is 100% when detecting by torque.	30 to 200%	1%	160%	
	099	Overtorque detection time	Sets overtorque detection time. Overtorque is detected when the set time or the overtorque detection level setting is exceeded.	0.1 to 10.0s	0.1s	0.1s	
Holding Output Frequency	100	Hold output frequecy saving selection	Selects whether or not to save the frequency when holding at UP/DOWN command from multi-function input terminal. 0 : Output frequency is not saved while holding 1 : When holding more than 5 sec, saves output frequency at holding and operates at this frequency when restarted.	0, 1	1	0	–
Speed Search	101	Speed search deceleration time	Sets deceleration time for search speed when frequency reference changes from 100% to 0%.	0.1 to 10.0s	0.1s	2.0s	–
	102	Speed search operating current	Sets operating current for search speed.	0 to 200%	1%	150%	–

∗ Factory setting values are different according to inverter capacity.

Relation between new constants and version of VS-606V7 software
#1: Available in version VSP010028 or later. (3.7kW max.)
#2: Available in version VSP010032 or later. (3.7kW max.)
#3: Available in version VSP010106 or later. (5.5kW min.)

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Tertiary Function (Constant n080 to n119) (cont'd)

Function	Constant No. n□□□	Function Name	Description	Setting Range	Setting Unit	Factory Setting	Ref. Page
Torque Compensation	103	Torque compensation gain	Sets torque compensation gain in units of 0.1. Normally, no adjustment necessary.	0.0 to 2.5	0.1	1.0	34
	104	Torque compensation time constant	Adjusts when motor output current is unstable or speed response is delayed.	0.0 to 25.5s	0.1s	0.3s (0.2s)	–
	105	Torque compensation iron loss (in V/f control mode)	Used when operating torque compensation inside the inverter. As appropriate value is set before shipment, no adjustment is necessary. (Adjust only when inverter capacity and motor capacity are different)	0.0 to 6550W	0.1 W (less than 1000W) 1W (more than 1000W)	*	–
Motor Constants	106	Motor rated slip	Sets motor rated slip in units of 0.1 Hz.	0.0 to 20.0Hz	0.1Hz		–
	107	Line to neutral (per phase)	Sets one phase resistance value (the half value). [Yaskawa standard motor constant for the inverter capacity (kVA) is set before shipment]	0.00 to 65.50Ω	0.001Ω (less than 10Ω) 0.01Ω (more than10Ω)		–
	108	Motor leakage inductance (in vector control mode)	Sets motor leakage inductance in units of 0.01 or 0.1mH. [Yaskawa standard motor constant for the inverter capacity (kVA) is set before shipment]	0.00 to 655.0mH	0.01mH (less than 100mH) 0.1mH (more than 100mH)		–
	109	Torque compensation voltage limiter (in vector control mode)	Sets the upper limit value of torque compensation voltage.	0 to 250%	1%	150%	–
	110	Motor no-load current	Sets motor no-load current proportional to the motor rated current.	0 to 99%	1%	*	35
Slip Compensation Function	111	Slip compensation gain	For motor slipping calculated from the output current, sets gain to correct output frequency in units of 0.1.	0.0 to 2.5	0.1	0.0 (1.0)	35
	112	Slip compensation time constant	Adjusts for unstable speed and slow speed response.	0.0 to 25.5s	0.1s	2.0s (0.2s)	–
	113	Slip correction during regenerative operation (in vector control mode)	0 : Invalid 1 : Valid	0, 1	–	0	–
MECHATROLINK Communications	#2 114	Number of transmission cycle error detection (For SI-T/V7)	Assigns a number, which is the allowable number of transmission-cycle errors.	2 to 10	1	2	–
Stall Prevention during Running	115	Auto-lowering function selection of stall prevention level during running	Stall prevention level during running can be lowered within the constant output area. 0 : Not valid 1 : Valid	0, 1	1	0	–
	116	Accel / decel time selection at stall prevention during running	Accel / decel time at stall prevention during running can be fixed at accel / decel time 2 (n021, n022). 0 : Not valid 1 : Valid	0, 1	1	0	–
Detecting Undertorque	117	Undertorque detecting function selection	0 : Detection disabled 1 : Detected during constant-speed running, and operation continues during and after detection. 2 : Detected during constant-speed running, and inverter output is shut OFF after detection. 3 : Detected during running, and operation continues during and after detection. 4 : Detected during running, and inverter output is shut OFF after detection.	0 to 4	1	0	–
	118	Undertorque detection level	Sets undertorque detection level when detecting at multi-function contact output and multi-function photocoupler output. • Inverter rated current is 100% when detecting by current. • Motor rated torque is 100% when detecting by torque.	0 to 200%	1%	10%	
	119	Undertorque detection time	Sets undertorque detection time. Undertorque is detected when a current under the detection level is output for longer than the set time.	0.1 to 10.0s	0.1s	0.1s	

* Factory setting values are different according to inverter capacity.
Note: Factory setting values in parentheses are those in vector control mode.

Quaternary Function (Constant n120 to n179)

Function	Constant No. n□□□	Function Name	Description	Setting Range	Setting Unit	Factory Setting	Ref. Page
Frequency Reference FREF	120	Frequency reference 9	Sets ninth frequency reference. It is effective when multi-step speed reference 4 is selected in multi-function contact input.	0.00 to 400.0Hz	0.01 Hz (less than 100 Hz) 0.1 Hz (more than 100 Hz)	0.00Hz	27
	121	Frequency reference 10	Sets tenth frequency reference. It is effective when multi-step speed references 1 and 4 are selected in multi-function contact input.				
	122	Frequency reference 11	Sets eleventh frequency reference. It is effective when multi-step speed references 2 and 4 are selected in multi-function contact input.				
	123	Frequency reference 12	Sets twelfth frequency reference. It is effective when multi-step speed references 1, 2, and 4 are selected in multi-function contact input.				
	124	Frequency reference 13	Sets thirteenth frequency reference. It is effective when multi-step speed references 3 and 4 are selected in multi-function contact input.				
	125	Frequency reference 14	Sets fourteenth frequency reference. It is effective when multi-step speed references 1, 3, and 4 are selected in multi-function contact input.				
	126	Frequency reference 15	Sets fifteenth frequency reference. It is effective when multi-step speed references 2, 3, and 4 are selected in multi-function contact input.				
	127	Frequency reference 16	Sets sixteenth frequency reference. It is effective when multi-step speed references 1, 2, 3, and 4 are selected in multi-function contact input.				
PID Control	128	PID control selection	0 : PID control disabled. 1 : Deviation D-control 2 : Feedback value D-control 3 : Frequency reference + PID output, deviation D-control 4 : Frequency reference + PID output, feedback value D-control 5 : Deviation D-control 6 : Feedback value D-control 7 : Frequency reference + PID output, deviation D-control 8 : Frequency reference + PID output, feedback value D-control } PID control valid Note: PID output characteristics for setting 5 to 8 are reversed (output code is reversed).	0 to 8	1	0	–
	129	PID feedback gain	–	0.00 to 10.00	0.01	1.00	–
	130	Proportional gain (P)	Sets P-control proportional gain by multiplication. Note: P-control invalid at 0.0.	0.0 to 25.0	0.1	1.0	–
	131	Integral time (I)	Sets I-control integral time in units of seconds. Note: I-control invalid at 0.0.	0.0 to 360.0	0.1s	1.0	–
	132	Differential time (D)	Sets D-control differential time in units of seconds. Note: D-control invalid at 0.0.	0.00 to 2.50	0.01s	0.00	–
	133	PID offset adjustment	Sets PID offset as % (max output frequency as 100%). (100%/max. output frequency)	–100 to +100%	1%	0%	–
	134	Upper limit of integral values	Sets the upper limit after I-control as % (max. output frequency as 100%) (100%/max. output frequency)	0 to 100%	1%	100%	–
	135	Primary Delay Time Constant of PID output	Sets low pass filter time constant for PID control output in units of seconds.	0.0 to 10.0	0.1s	0.0	–
	136	Selection of PID feedback loss detection	0 : PID feedback loss not detected. 1 : PID feedback loss detected (operation continued: FbL alarm.) 2 : PID feedback loss detected (output shut down: FbL fault)	0 to 2	1	0	–
	137	PID feedback loss detection level	Sets PID feedback loss detection level as % (100%/max. output frequency)	0 to 100%	1%	0%	–
	138	PID feedback loss detection time	Sets PID feedback loss detection time in units of seconds.	0.0 to 25.5	0.1s	1.0	–

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#3: Available in version VSP010106 or later. (5.5kW min.)

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Quarternary Function (Constant n120 to n179) (cont'd)

Function	Constant No. n□□□	Function Name	Description	Setting Range	Setting Unit	Factory Setting	Ref. Page
Energy-saving Control*1	139*1	Energy-saving control selection (V/f control mode)	0 : Energy-saving control disabled 1 : Energy-saving control enabled	0, 1	1	0	–
	140	Energy-saving coefficient K2	Sets the coefficient to maximize the motor efficiency.	0.0 to 6550	0.1 (less than 1000) 1 (more than 1000)	*2	–
	141	Energy-saving control voltage lower limit (At 60Hz)	Sets the lower limit for the output voltage reference calculated at 60Hz in the energy-saving mode. Motor rated voltage is 100%.	0 to 120%	1%	50%	–
	142	Energy-saving control voltage lower limit (At 6Hz)	Sets the lower limit for the output voltage reference calculated at 6Hz in the energy-saving mode. Motor rated voltage is 100%.	0 to 25%	1%	12%	–
	143	Power average time	Sets the power average time calculated in the energy-saving mode (1=24ms)	1 to 200	1=24ms	1 (24ms)	–
	144	Voltage-limit during automatic optimum voltage tuning	Limits the voltage-control range when adjusting automatic optimum voltage.	0 to 100%	1%	0%	–
	145	Voltage step width during automatic optimum voltage tuning (At 100%)	Sets the voltage step width in units of 0.1% when the starting voltage is 100% when adjusting automatic optimum voltage. Motor rated voltage is 100%.	0.1 to 10%	0.1%	0.5%	–
	146	Voltage step width during automatic optimum voltage tuning (At 50%)	Sets the voltage step width in units of 0.1% when the starting voltage is 5% when adjusting automatic optimum voltage. Motor rated voltage is 100%.	0.1 to 10.0%	0.1%	0.2%	–
Pulse-Train Input	149	Pulse-train input scaling	Sets pulse-train input frequency at max. output frequency (n011). (n149/max. output frequency : eg. 2500/60 Hz)	100 to 3300 [1 to 33kHz]	1 [10Hz]	2500 [25kHz]	23
Pulse Output Monitor	150	Pulse train signal output	Using analog output (AM-AC) as follows: Output frequency monitor 0 : 1440 Hz/Max. output frequency (n011) 12 : 12f output 1 : 1f output 24 : 24f output 6 : 6f output 36 : 36f output Frequency reference monitor 40 : 1440 Hz/Max. output frequency (n011) 43 : 12f output 41 : 1f output 44 : 24f output 42 : 6f output 45 : 36f output	0, 1, 6, 12, 24, 36, 40 to 45	1	0	–
MEMOBUS Communication	151	MEMOBUS time-over detection	0 : Time-over detection is enabled. (Coast to a stop) 1 : Time-over detection is enabled. (Ramp to stop-Decel. 1) 2 : Time-over detection is enabled. (Ramp to stop-Decel. 2) 3 : Time-over detection is enabled. (Continue operation - alarm) 4 : Time-over detection is disabled.	0 to 4	1	0	36
	152	MEMOBUS frequency reference and frequency monitor unit	0 : 0.1 Hz 1 : 0.01 Hz 2 : 30000/100% (30000=MAX. output frequency) 3 : 0.1 %	0 to 3	1	0	
	153	MEMOBUS slave address	Allocates inverter MEMOBUS communication slave address between 0 and 32. Note: When set to "0", ignores command from master and does not respond.	0 to 32	1	0	
	154	MEMOBUS BPS selection	0 : 2400 bps 1 : 4800 bps 2 : 9600 bps 3 : 19200 bps	0 to 3	1	2	
	155	MEMOBUS parity selection	0 : Even parity 1 : Odd parity 2 : No parity	0 to 2	1	0	
	156	Transmission waiting time	–	0 to 65ms	1ms	10ms	
	157	RTS Control	0 : Enabled 1 : Disabled (RS-422: at 1 : 1 communication)	0, 1	1	0	

*1 Energy-saving control can be used in the V/f control mode.
*2 The factory setting value is different according to inverter capacity.

Function	Constant No. n□□□	Function Name	Description	Setting Range	Setting Unit	Factory Setting	Ref. Page
Energy-saving Control*1	158	Motor code (Energy-saving control)	–	0 to 70	1	*2	–
	159	Upper voltage limit for energy-saving control (At 60Hz)	Sets the upper limit for the output voltage reference calculated at 60Hz in energy-saving mode. Motor rated voltage is 100%.	0 to 120%	1%	120%	–
	160	Upper voltage limit for energy-saving control (At 60Hz)	Sets the upper limit for the output voltage reference calculated at 6Hz in energy-saving mode. Motor rated voltage is 100%.	0 to 25%	1%	16%	–
	161	Power detection hold width during automatic optimum voltage tuning	The output voltage is held when the power variance is less than this value. Note: When 0% is set, functions at initial value 10%.	0 to 100%	1%	10%	–
PID Control	162	Time constant of power detection filter	Response at load change is improved when this value is small. Note: When set to 0, functions at initial value 5 (20ms).	0 to 255	1=4ms	5 [20ms]	–
	163	PID output gain	Adjusts PID control gain	0.0 to 25.0	0.1	1.0	–
	164	PID feedback value selection	0 : Control circuit terminal FR (Voltage 0 to 10V) 1 : Control circuit terminal FR (Current 4 to 20mA) 2 : Control circuit terminal FR (Current 0 to 20mA) 3 : Operator terminal (Voltage 0 to 10V) 4 : Operator terminal (Current 4 to 20mA) 5 : Pulse train	0 to 5	1	0	–
Braking Resistor Protection	#3 165	Externally-mounting type braking resistor overheat protection selection	0 : With protection. 1 : Without protection. Note: Set to zero (0) if not using an externally mounted braking resistor.	0, 1	1	0	–
Open-phase Detection	166	Input open-phase detection level	Sets by direct-voltage level the level at which the input open phase can be detected. 400 VDC at 100% in 200V class. (800 VDC at 100% in 200V class.) Note : Disabled with a setting of 0%.	0 to 100%	1%	0%	–
	167	Input open-phase detection time	Sets the time for detection of the input open-phase. The input open phase is detected when the open-phase voltage is output for longer than the set time. Note : Disabled with a setting of 0s.	0 to 255s	1s	0s	–
	168	Output open-phase detection level	Sets by direct-current level the level at which the output open phase can be detected. 100%/Inverter rated current Note : Disabled with a setting of 0%.	0 to 100%	1%	0%	–
	169	Output open-phase detection time	Sets the time for detection of the output open phase. The output open phase is detected when the open-phase current is output for longer than the set time. Note : Disabled with a setting of 0s.	0.0 to 2.0s	0.1s	0.0s	–
UP/DOWN Command 2	#1 170	ENTER command operation selection (MEMOBUS communications)	–	0, 1	–	0	–
	#1 171	Frequency reference bias upper limit (UP/DOWN command 2)	–	0.0 to 100.0% (n011/100%)	0.1%	0.0%	–
	#1 172	Frequency reference bias lower limit (UP/DOWN command 2)	–	–99.9 to 0.0% (n011/100%)	0.1%	0.0%	–
DC Braking	173	Proportional (P) gain	Adjusts P-gain for DC braking.	1 to 999	1 = 0.001	83 [0.083]	–
	174	Integral (I) time constant	Adjusts the I-time constant for DC braking.	1 to 250	1 = 4ms	25 [100ms]	–
Carrier Frequency Selection	175	Reducing carrier frequency selection at low speed	0 : Invalid 1 : Valid	0, 1	1	0	–
Control Copy Function	176	Constant copy function selection	rdy : READY vFy : VERIFY rEd : READ vA : Inverter capacity display Cpy : COPY Sno : Software No. display	rdy, rEd cPy, uFu vA, Sno	–	rdy	–
	177	Constant Read selection Prohibit	0 : READ prohibited 1 : READ allowed	0, 1	1	0	–
Fault History	178	Fault history	Displays the most recent 4 faults (only for monitoring)	–	–	–	–
Software Version	179	Software Version No.	Displays the lowest 4 digits of software No. (only for monitoring)	–	–	–	–

*1 Energy-saving control can be used in the V/f control mode.
*2 Initial setting values are different according to inverter capacity (kVA).

VS-606V7 functions are described in accordance with following objectives.

Objectives	Functions	Ref. Page
Items Should be Verified Before Operation	• Control mode selection	24
	• Accel/decel time setting	24
	• V/f pattern setting	24
	• Motor rotation direction setting	25
	• LOCAL (operator)/REMOTE (control circuit terminal) selection	25
	• Motor rated current setting	25
	• Operation mode selection	25
	• Constant set-up	25
Setting Operating Condition	• Reverse run prohibit	26
	• Frequency reference setting by pulse train input	26
	• Multi-step speed selection	26
	• Adjusting frequency setting signal	27
	• Jog operation	27
	• Adjusting frequency upper and lower limits	28
	• Using two accel/decel times	28
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The set value displayed in ▭ is factory setting.

Items Should be Verified Before Operation

Control mode selection

Control mode n002

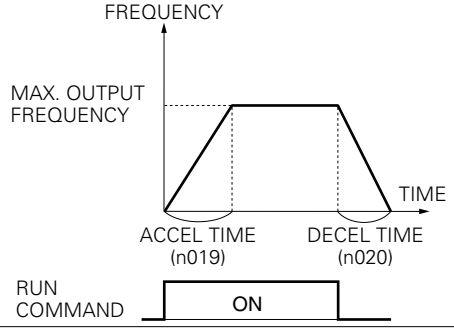
Selects control mode according to your application.
0 : V/f control
1 : Vector control
The initial value is set to V/F control.

- "V/f control" is optimum for fluid machines such as fans, blowers and pumps, while "Vector control" for machines required for high-torque at low speeds such as for carriers and extruder.
- For Vector control, set motor constants (n106 to n110). For details, refer to the instruction manual.

Accel/decel time setting

Accel time 1, 2 n019 n021
Decel time 1, 2 n020 n022

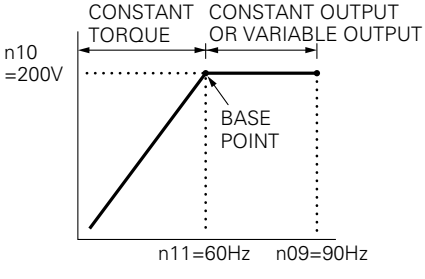
Accel time : Sets the time needed for the motor to accelerate to the maximum output frequency from the stopped status.
Decel time : Sets the time needed for the motor to stop from the maximum output frequency.



V/f pattern setting

Max. output frequency n011
Max. voltage n012
Max. voltage output frequency n013

Sets the V/f pattern which matches the motor characteristics.
When operating at 50/60Hz or more frequency, change only



Motor rotation direction setting

FWD/REV direction selection F/R

Sets the motor rotation direction when run command is given by the digital operator.
FWD and REV run can be switched by pressing ∧ or ∨ key.

FWD (FWD RUN) ⇄ rEv (REV RUN)

LOCAL (operator)/REMOTE (control circuit terminal) selection

LOCAL/REMOTE switching LO/RE

Operation can be switched from digital operator or control circuit terminal. This function is valid only when stopped.
Eg : Digital operator/control circuit terminal selection:
Operation mode selection n003=1
Frequency reference selection n004=2, 3, 4 or 5
Local (LO) : Receives frequency reference (set at n008) and run command from digital operator
Remote (RE) : Receives frequency reference (FR, RP) and run command (terminals S1 and S2) of circuit control terminal

Note: When local/remote selection function is allocated to multi-function input terminal, switching operation using ∧ and ∨ keys is invalid.

Motor rated current setting

Motor rated current n036

Sets motor rated current. The following table shows the standard set value for each inverter capacity. When the applicable motor rated current value differs from the value listed below, change the set value.

VS-606V7 model CIMR-V7□C□	20P1 B0P1	20P2 B0P2	20P4 B0P4	20P7 B0P7	21P5 B1P5	22P2 B2P2	23P7 B3P7	25P5	27P5
Max. Applicable Motor Output kW(HP)	0.1 (0.13)	0.2 (0.25)	0.4 (0.5)	0.75 (1)	1.5 (2)	2.2 (3)	3.7 (5)	5.5 (7.5)	7.5 (10)
Motor Current Factory Setting A	0.6	1.1	1.9	3.3	6.2	8.5	14.1	19.6	26.6

VS-606V7 model CIMR-V7□C□	40P2	40P4	40P7	41P5	42P2	43P0	43P7	45P5	47P5
Max. Applicable Motor Output kW(HP)	0.2 (0.25)	0.4 (0.5)	0.75 (1)	1.5 (2)	2.2 (3)	3 (4)	3.7 (5)	5.5 (7.5)	7.5 (10)
Motor Current Factory Setting A	0.6	1.0	1.6	3.1	4.2	7.0	7.0	9.8	13.3

Operation mode selection

Run command selection n003
Frequency reference selection n004

Selects whether operation is performed by digital operator or control circuit terminal.

Setting	Run Command n003
0	Operator
1	Control circuit terminal S1, S2
2	Communication

Setting	Frequency Reference n004
0	Volume
1	Operator (Frequency reference 1) n024
2	Control circuit terminal FR (0 to 10V)
3	Control circuit terminal FR (4 to 20mA)
4	Control circuit terminal FR (0 to 20mA)
5	Control circuit terminal RP (pulse-train)
6	Communication (register No., 0002H)

Notes: • When set to 3 or 4 (current input reference), dip switch setting must be changed. For details, refer to the instruction manual.
• When set to 5 (pulse-train input reference), set the input pulse frequency for the max. output frequency (n011). With pulse train input scaling (n149), reference frequency is (n149)/max. output frequency (n011). [Factory setting is 2500 (25kHz)/ max. output frequency.]
• The n004 initial setting (frequency reference selection) is "1" when the model has operator without volume (JVOP-147). When initialized, n004 setting is turned to "0".

Constant set-up

Password n001

The following table describes the data which can be set or read when n001 is set.

Setting	Constant that can be set	Constant that can be read
0 (Constant write disable)	n001 only	n001 to 0179
1	n001 to n049 read/set	
2	n001 to n079 read/set	
3	n001 to n119 read/set	
4	n001 to n179 read/set	
5	n001 to n179 read and set (Run command can be received in Program mode.)	
6	Fault history clear	
8*	Constant initialization (factory setting: 2-wire sequence)	
9*	Constant initialization (3-wire sequence)	

* Initialization resets the value to factory setting.

The set value displayed in [ ] is factory setting.

Setting Operating Condition

Reverse run prohibit

Reverse run prohibit n006

"Reverse run disabled" setting does not accept a reverse run command from the control circuit terminal or digital operator. This setting is used for applications where a reverse run command can cause problems.

Setting	Description
0	Reverse run enabled.
1	Reverse run disabled.

Frequency reference setting by pulse train input

Frequency reference selection n004

With pulse-train input from control circuit terminals, frequency reference can be set.

Input pulse specifications

- LOW level voltage 0.8 or less
- HIGH level voltage 3.5 to 13.2V
- H duty 30 to 70%
- Pulse frequency 0 to 33kHz

Frequency setting method

The command frequency can be calculated by multiplying the max. output frequency by the ratio of the set max. value of input pulse frequency to the actual input pulse frequency.

$$\text{Reference frequency} = \frac{\text{Input pulse frequency}}{\text{Pulse-train max. frequency (n149)} \times 10} \times \text{Max. output frequency (n011)}$$

Constant No.	Function Name	Setting Range	Factory Setting
n003	Run command selection	0 to 3	0
n004	Frequency reference selection	0 to 9	0
n149	Pulse train input scaling 1= 10Hz	100 to 3300 (33kHz)	2500 (25kHz)

Multi-step speed selection

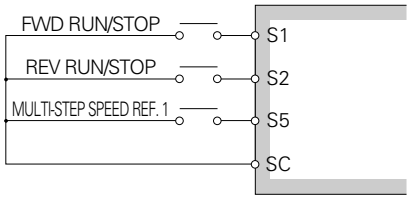
Frequency reference FREF n024 to n031
Multi-function input terminal function selection n050 to n056

By combining 16-step frequency references, one jog frequency reference and multi-function terminal function selection, up to 17 steps of speed variations can be set step by step.

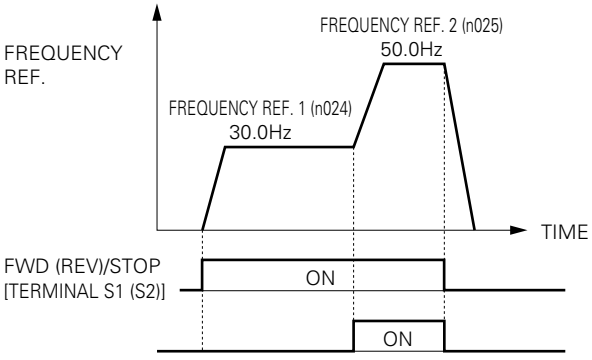
An example of 2-step speed change

n003 = 1 (Operation mode selection)
n004 = 1 (Frequency reference selection)

n024 = 30.0Hz
n025 = 50.0Hz



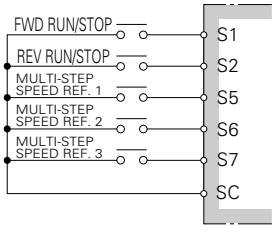
Note : When n004 is set to 0, 2 ,3, 4, or 5, frequency reference 1 (n024) is disabled and frequency reference from volume (0) or control circuit terminal (FR, RP) is enabled.

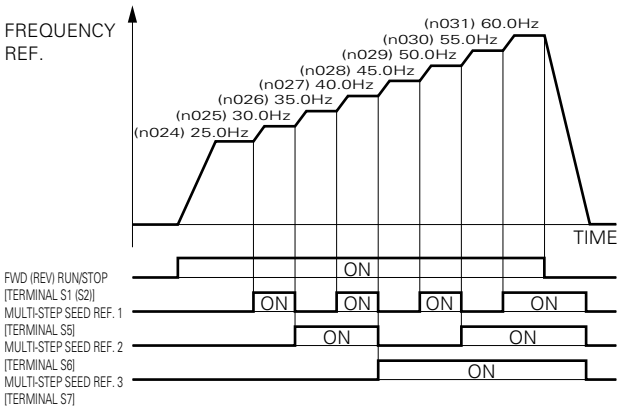


An example of 8-step speed change

n003 = 1 (Operation mode selection)
n004 = 1 (Frequency reference selection)
n056 = 8 (Multi-function input terminal S7)

n024 = 25.0 Hz
n025 = 30.0 Hz
n026 = 35.0 Hz
n027 = 40.0 Hz
n028 = 45.0 Hz
n029 = 50.0 Hz
n030 = 55.0 Hz
n031 = 60.0 Hz





An example of 16-step speed change (9 to 16 steps)

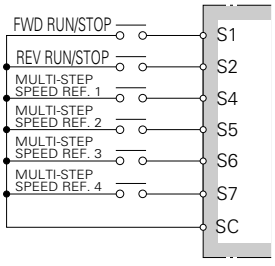
16-step speed operation can be set by the following setting of multi-function input terminals (S4 to S7) with combination of 4 inputs in the same way as for 8-step speed operation.

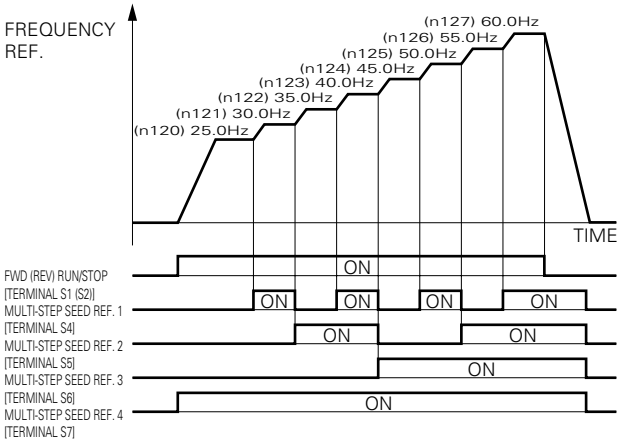
- Multi-step speed reference 1 → Terminal S4 (n053 = 6)
- Multi-step speed reference 2 → Terminal S5 (n054 = 7)
- Multi-step speed reference 3 → Terminal S6 (n055 = 8)
- Multi-step speed reference 4 → Terminal S7 (n056 = 9)

Note: 8-step speed operation is when multi-step speed reference 4 = OFF, and 16-step speed operation is when multi-step speed reference 4 = ON.
Frequency reference for 9-step to 16-step speed operation is the setting of n120 to n127 respectively.

n003 = 1 (Operation mode selection)
n004 = 1 (Frequency reference selection)

n120 = 25.0Hz
n121 = 30.0Hz
n122 = 35.0Hz
n123 = 40.0Hz
n124 = 45.0Hz
n125 = 50.0Hz
n126 = 55.0Hz
n127 = 60.0Hz





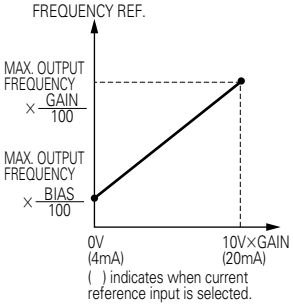
Adjusting frequency setting signal

Frequency reference gain n060
Frequency reference bias n061

When the frequency reference is output by analog input of control circuit terminals FR and FC, the relation between analog voltage and frequency reference can be set.

Frequency reference gain (n060)
The analog input voltage value for the maximum output frequency (n011) can be set in units of 1%.
Factory setting : 100%

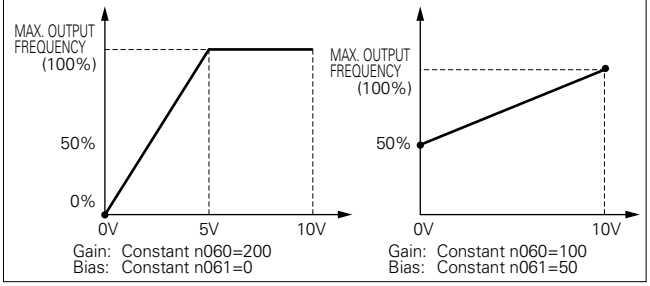
Frequency reference bias (n061)
The frequency reference provided when analog input is 0V (4mA or 0mA) can be set in units of 1%.
[n011 : Maximum output frequency = 100%]
Factory setting : 0%



Gain : Outputs A% (ratio to max. output frequency n011) at 10V.
➡ n060 = A %
Bias : Outputs B% (ratio to max. output frequency n011) at 0V.
➡ n061 = B %

Typical Settings

- At 0 to 5V input
- To operate the inverter with frequency reference of 50% to 100% at 0 to 10V input



Jog Operation

Jog frequency reference FREF n032
Jog command selection n050 to n056

By inputting a jog command and then a forward (reverse) run command, operation is enabled at the jog frequency set in n032. When multi-step speed references 1, 2, 3 or 4 are input simultaneously with the jog command, the jog command has priority.

Name	Constant no.	Setting
Jog frequency reference	n032	Factory setting : 6.00Hz
Jog command	n050 to 056	Set to "10" for any constant.

The set value displayed in ▭ is factory setting.

Adjusting frequency upper and lower limits

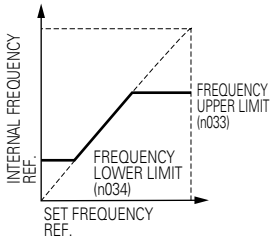
Frequency reference upper limit n033
Frequency reference lower limit n034

Frequency reference upper limit (n033)

Sets the upper limit of the frequency reference in units of 1%.

[n011 : Maximum output frequency = 100%]

Factory setting : 100%



Frequency reference lower limit (n034)

Sets the lower limit of the frequency reference in units of 1%.

[n011 : Maximum output frequency = 100%]

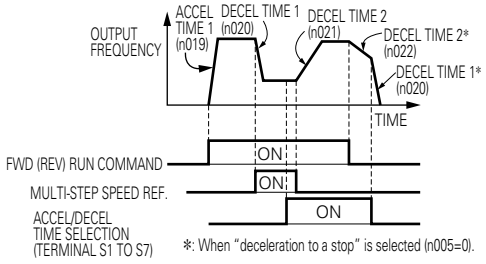
When operating at frequency reference 0, operation continues at the frequency reference lower limit.

However, when frequency reference lower limit is set to less than the minimum output frequency (n016), operation is disabled.

Factory setting : 0%

Using two accel/decel times

Accel time 1, 2 n019 n021
Decel time 1, 2 n020 n022
Input terminal function selection n050 to n056



By setting input terminal function selection (one of n050 to n056) to "8" (accel/decel time select), accel/decel time is selected by turning ON/OFF the accel/decel time select (one terminal of S1 to S7).

At OFF : n019 (accel time 1)
n020 (decel time 1)
At ON : n021 (accel time 2)
n022 (decel time 2)

No.	Name	Unit*	Setting range	Factory setting
n019	Accel time 1	0.1s	0.0 to 6000s	10.0s
n020	Decel time 1	0.1s	0.0 to 6000s	10.0s
n021	Accel time 2	0.1s	0.0 to 6000s	10.0s
n022	Decel time 2	0.1s	0.0 to 6000s	10.0s

*: Setting unit differs depending on the constant n018.

- **Accel time**
  Set the time needed for output frequency to reach 100% from 0%.
- **Decel time**
  Set the time needed for output frequency to reach 0% from 100%.

Automatic restart after momentary power loss

Operation selection after momentary power loss n081

When momentary power loss occurs, operation restarts automatically.

Setting*1	Description
0	Continuous operation after momentary power loss not provided.
1*2	Continuous operation after power recovery within 0.5 second.
2*3	Continuous operation after power recovery (Fault output not provided).

*1 Do not select 5 to 100 as they are reserved for future use.

*2 Hold the operation command to continue the operation after recovery from a momentary power loss.

*3 When 2 is selected, operation restarts if power supply voltage reaches its normal level. No fault signal is output.

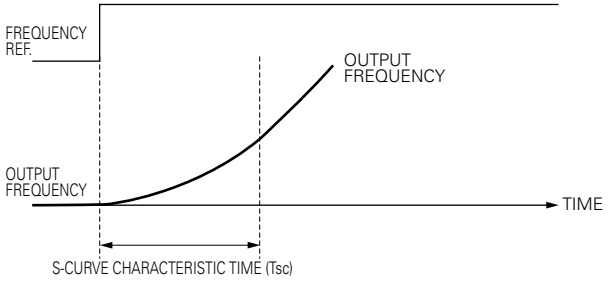
Soft-start characteristics (S-curve)

S-curve accel/decel time selection n023

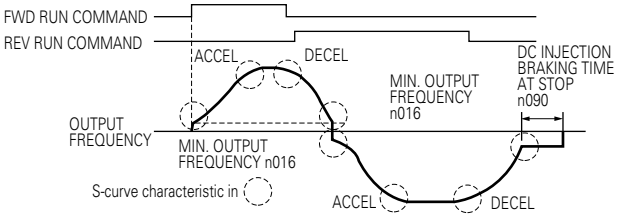
To prevent shock at machine start/stop, accel/decel can be performed in S-curve pattern.

Setting	S-curve characteristic time
0	S-curve characteristic not provided
1	0.2 second
2	0.5 second
3	1.0 second

Note : S-curve characteristic time is the time from accel/decel rate 0 to a regular accel/decel determined by the set accel/decel time.



Time chart at FWD/REV run switching at deceleration to a stop



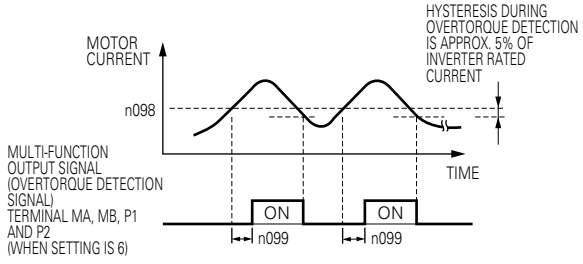
Torque detection

Overtorque detection function selection 1, (2) n096 (n097)

Overtorque detection level n098

Overtorque detection time n099

If excessive load is applied to the machine, output current increase can be detected by output alarm signals at multi-function output terminals MA, MB and MC or multi-function photocoupler output P1, P2 and PC.
To output overtorque detection signal, set multi-function output terminal selection n057, n058 or n059 to "overtorque detection (set 6 or 7)".



Overtorque detection function selection 1 (n096)

Setting	Description
0	Overtorque detection not provided.
1	Detected only during constant-speed running, and operation continues after detection.
2	Detected only during constant-speed running, and operation stops after detection.
3	Detected during running, and operation continues after detection.
4	Detected during running, and operation stops after detection.

Overtorque detection function selection 2 (n097) : only for vector control

Setting	Description
0	Detected by torque
1	Detected by current

Note : When V/f control mode is selected, the setting of n097 is invalid and overtorque is detected by output current.

Continuing operation by automatic fault reset

No. of fault retry times n082

Sets the inverter to restart and reset fault detection after a fault occurs.
The number of self-diagnosis and retry attempts can be set at n082 up to 10 times.
The inverter will automatically restart after the following faults occur :

- OC (overcurrent)
- OV (overvoltage)

The number of retry attempts are cleared to 0 in the following cases :

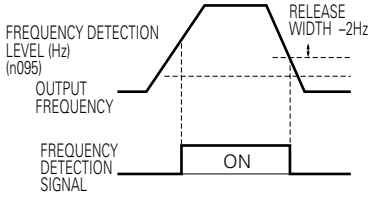
- If no other fault occurs within 10 minutes after retry
- When the fault reset signal is ON after the fault is detected
- Power supply is turned OFF

Frequency detection

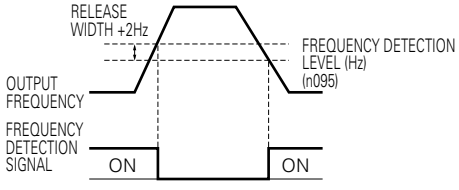
Frequency detection level n095

Effective when output terminal function selections n057, n058 or n059 are set to "frequency detection (setting : 4 or 5). "Frequency detection" turns ON when output frequency is higher or lower than the frequency detection level (n095).

Frequency detection 1 (Output frequency ≧ Frequency detection level)
(Set n057, n058 or n059 to "4")



Frequency detection 2 (Output frequency ≦ Frequency detection level)
(Set n057, n058 or n059 to "5")

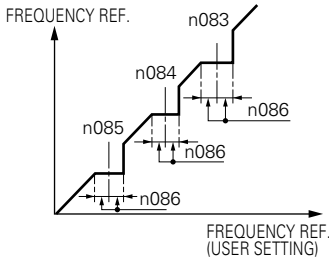


Avoiding resonance

Jump frequency 1, 2, 3 n083 n084 n085

Jump width n086

This function allows the prohibition or "jumping" of critical frequencies so that the motor can operate without resonance caused by machine systems. This function is also used for dead band control. Setting the value to 0.0Hz disables this function.
Set jump frequency 1, 2 or 3 as follows:



n083 ≧ n084 ≧ n085

If this condition is not satisfied the inverter displays Err for one second and restores the data to original settings.

Note : Gradually changes without jumping during accel/decel.

The set value displayed in ☐ is factory setting.

Starting into a coasting motor

Speed search command

Input terminal function selection n050 to n056

DC injection braking at start

DC injection braking current n089

DC injection braking time at start n091

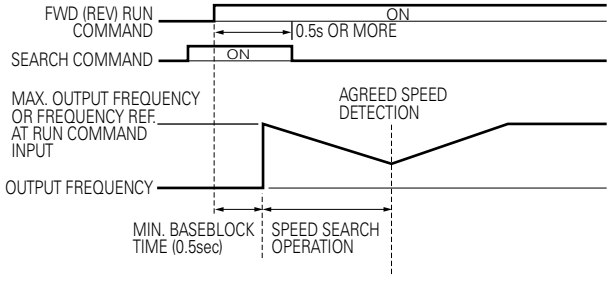
To operate coasting motor without trip, use the speed search command or DC injection braking at start.

Speed search command

Restarts a coasting motor without stopping it. This function enables smooth switching between motor commercial power supply operation and inverter operation.

Set input terminal function selection (n050 to n056) to "14" (search command from maximum output frequency) or "15" (search command from set frequency).

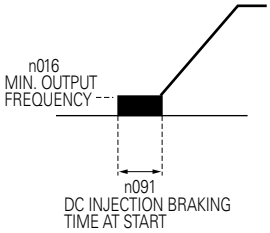
Build a sequence so that FWD (REV) run command is input at the same time as the search command or after the search command. If the run command is input before the search command, the search command becomes disabled.



Time chart at search command input

DC injection braking at start (n089, n091)

Restarts a coasting motor after stopping it. Set DC injection braking time at start in n091 in units of 0.1 second. Set DC injection braking current in n089 in units of 1%. When the setting of n091 is "0", DC injection braking is not performed and acceleration starts from the minimum output frequency.



Holding accel/decel temporarily

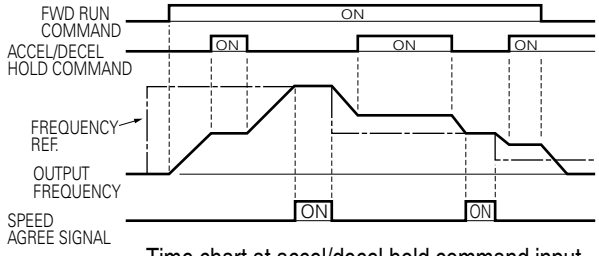
Accel/decel hold command

Input terminal function selection n050 to n056

To hold acceleration, input accel/decel hold command. The output frequency is maintained when the aceel/decel hold command is input during acceleration or deceleration.

The stop command releases the accel/decel hold and the operation ramps to stop while inputting accel/decel hold command.

Set input terminal function selection (n050 to n056) to 16 (accel/decel hold command).



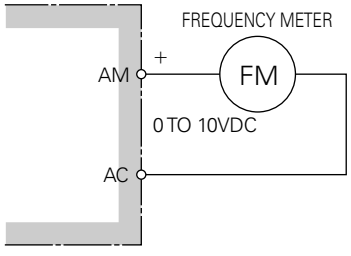
Time chart at accel/decel hold command input

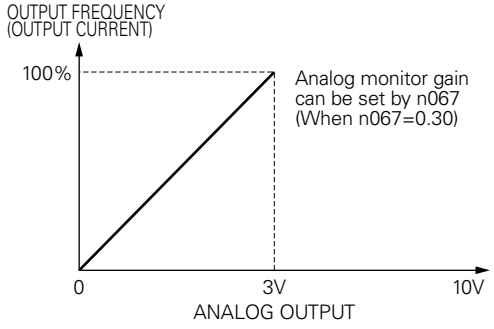
Using frequency meter or ammeter

Analog monitor selection n066

Selects to output either output frequency or output current to analog output terminals AM-AC for monitoring.

Setting	Description
0	Output frequency
1	Output current

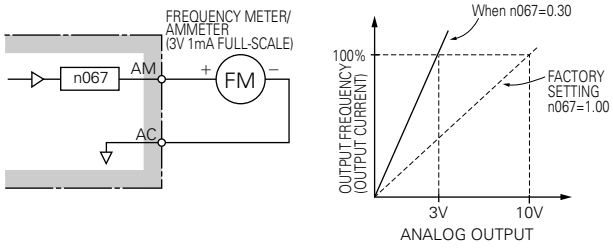




Adjusting frequency meter or ammeter

Analog monitor gain n067

Used to adjust analog output gain.



Set analog output voltage at 100% of output frequency (output current).
Frequency meter displays 0 to 60Hz with a 0 to 3V change.

$$10V \times \frac{\text{n067 Setting}}{0.30} = 3V \quad \left(\text{Output frequency becomes 100\% at this value.}\right)$$

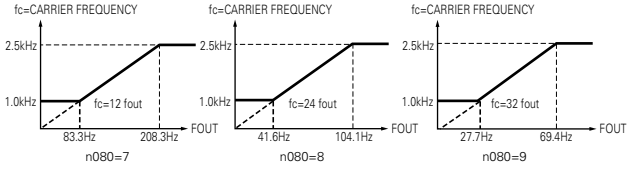
Note : Set 1.00 in n067 when using a 10V full-scale meter.

Reducing motor noise and leakage current

Carrier frequency n080

Sets inverter output transistor switching frequency (carrier frequency).

Setting	Carrier frequency (Hz)	Metallic noise from motor	Leakage current
1	2.5	Higher	Smaller
2	5.0	↕	↕
3	7.5	↕	↕
4	10.0	Not audible	Larger
7 to 9	Synchronized type with lower limit 1kHz and upper limit 2.5Hz	–	–



Carrier frequency initial value differs depending on inverter capacity as follows :
- 10kHz (setting n080 = 4) : 200V three-phase 0.1 to 0.75kW
- 7.5kHz (setting n080 = 3) : 200V three-phase/single-phase, 1.5 to 7.5kW
  400V three-phase, all models

To change the initial value 7.5kHz to 10kHz, continuous output current must be lowered. For details, refer to the instruction manual.

Operator stop key selection

Operator stop key selection n007

Selects processing when STOP key is depressed during operation from control circuit terminal or communication.

Setting	Description
0	STOP key effective when running from terminals or communication. When STOP key is depressed, the inverter stops according to the setting of constant n005. At this time, the digital operator displays "StP" alarm (blinking). This stop command is held in the inverter until both forward and reverse run commands are open or operation command from communication is "0".
1	STOP key ineffective when running from terminals or communication.

Selecting stopping method

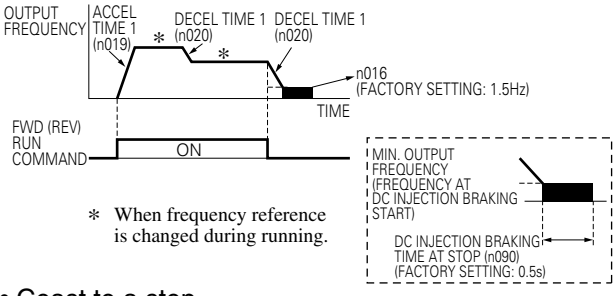
Stopping method selection n005

Selects the stopping method suitable for application.

Setting	Description
0	Deceleration to stop
1	Coast to stop

- **Deceleration to stop**

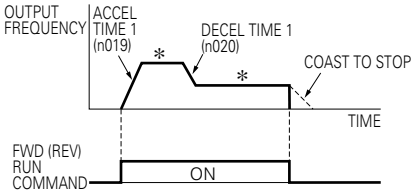
  Example when accel/decel time 1 is selected



* When frequency reference is changed during running.

- **Coast to a stop**

  Example when accel/decel time 1 is selected

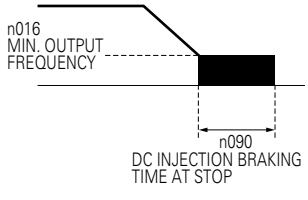


* When frequency reference is changed during running.

Applying DC injection braking

DC injection braking current n089
DC injection braking time at stop n090

When coasting to a stop is specified in stopping method selection (n005), DC injection braking at stop does not operate.



The set value displayed in ▭ is factory setting.

Building Interface Circuits with External Devices

Using multi-function input signals

Input terminal function selection n050 to n056

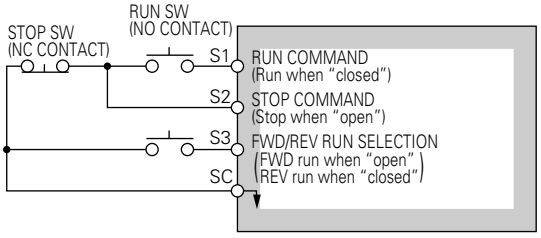
Multi-function input terminals S1 to S7 functions can be changed when necessary by setting constants n050 to n056, respectively. The same value can not be set to different constant setting.

- Terminal S1 function : Set to n050 : Factory setting 1
- Terminal S2 function : Set to n051 : Factory setting 2
- Terminal S3 function : Set to n052 : Factory setting 3
- Terminal S4 function : Set to n053 : Factory setting 5
- Terminal S5 function : Set to n054 : Factory setting 6
- Terminal S6 function : Set to n055 : Factory setting 7
- Terminal S7 function : Set to n056 : Factory setting 10

Setting	Function Name	Description	Ref.
0	FWD/REV run command (3-wire sequence selection)	Setting enabled only for n052	32
1	FWD run command (2-wire sequence)	–	–
2	REV run command (2-wire sequence)	–	–
3	External fault (NO contact input)	Inverter stops by external fault signal input. Digital operator display is "EF□*"	–
4	External fault (NC contact input)		
5	Fault reset	Resets fault. It is disabled with run signal entered.	–
6	Multi-step speed reference 1	–	27
7	Multi-step speed reference 2	–	27
8	Multi-step speed reference 3	–	27
9	Multi-step speed reference 4	–	27
10	Jog command	–	27
11	Accel/decel time select	–	28
12	External baseblock (NO contact input)	Motor coasts to stop by this signal input. Digital operator display "bb" (blinking).	–
13	External baseblock (NC contact input)		
14	Search command from max. output frequency	Speed search command signal	30
15	Search command from set frequency		
16	Accel/decel hold command	–	30
17	LOCAL/REMOTE selection	–	32
18	Communication/Control circuit terminal selection	–	32
19	Emergency stop fault (NO contact input)	Inverter stops by emergency stop signal input according to stopping method selection (n005). When frequency deceleration to a stop (n005=0) is selected, inverter decelerates to a stop according to decel time setting 2 (n022). Digital operator displays "STP" (lights at fault, blinks at alarm).	–
20	Emergency stop alarm (NO contact input)		–
21	Emergency stop fault (NC contact input)		–
22	Emergency stop alarm (NC contact input)		–
23	PID control cancel	–	–
24	PID integral reset	–	–
25	PID integral hold	–	–
26	Inverter overheat alert (OH3 alarm)	When the Inverter overheat signal turns ON, oH3 (flashing) is displayed at the Digital Operator.	–
27	Acceleration/deceleration time selection 2	–	–
34	UP/DOWN command	Setting is enabled only for n056.	33
35	Self-test	Setting is enabled only for n056.	33
36	UP/DOWN command 2	Setting is enabled only for n056.	–

* A number 1 to 7 is displayed in □ corresponding to the number of terminal S1 to S7 respectively.

Terminal function at 3-wire sequence selection



Note: Set parameters before wiring.

LOCAL/REMOTE select (setting : 17)

Select operation reference by the digital operator or by the control circuit terminal.

LOCAL/REMOTE select is valid only during stop.

Open : Run by setting at run command selection (n003) and frequency reference selection (n004).

Closed : Run by frequency reference and run command from digital operator.

eg : When the digital operator/control circuit terminal selection setting is n003 = 1 and n004 = 2, 3, 4 or 5

Open : Receives frequency reference (terminal FR, RP) and run command (terminals S1 to S7) from control circuit terminal

Closed : Receives frequency reference (setting at n008) and run command from digital operator.

Communication/control circuit terminal selection (setting : 18)

Selects operation reference by communication or by control circuit terminal. Communication/control circuit terminal selection is valid only during stop.

Open : Run according to the setting at n003 and n004 (operation method selection).

Closed : Run by frequency reference and run command from communication.

eg : When used for communication/control circuit terminal selection, set n003 = 1 and n004 = 2, 3, 4 or 5

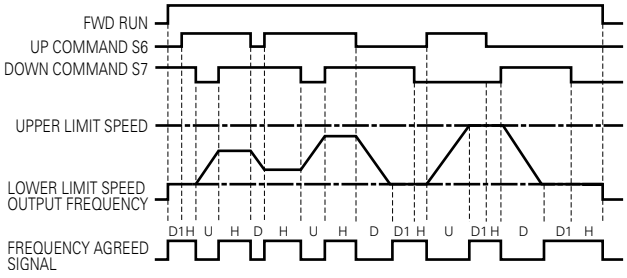
Open : Receives frequency reference (terminal FR, FP) and run command (terminals S1 to S7) from control circuit terminal

Closed: Receives frequency reference and run command from communication

UP/DOWN command (setting : n056 = 34)

With the FWD (REV) run command entered, accel/decel is enabled by inputting the UP or DOWN signals to control circuit terminals S6 and S7 without changing the frequency reference, so that operation can be performed at the desired speed. When UP/DOWN commands are specified by n056, any function set to n055 becomes disabled; terminal S6 becomes an input terminal for UP command and terminal S7 for DOWN command.

Control circuit terminal S6 (UP command)	Closed	Open	Open	Closed
Control circuit terminal S7 (DOWN command)	Open	Closed	Open	Closed
Operation status	Accel	Decel	Hold	Hold



Time chart at UP/DOWN command input

U = UP (accelerating) status
D = DOWN (decelerating) status
H = HOLD (constant speed) status
U1 = UP status, clamping at upper limit speed
D1 = DOWN status, clamping at lower limit speed

Note : • When UP/DOWN command is selected, the upper limit speed is set regardless of frequency reference.
Upper limit speed = Max. output frequency (n011) × Frequency reference upper limit (n033) /100

- The lower limit speed is the largest value among min. output frequency (n016) and frequency reference lower limit (n034).
- When the FWD (REV) run command is input, operation starts at the lower limit speed without UP/DOWN command.
- When the jog command is input while running by the UP/DOWN command, the jog command has priority. The UP/DOWN command can not be input together with multi-step speed reference.
- By setting hold output frequency memory selection (n100) to 1, the output frequency during hold can be saved.

Setting at n100	Description
0	Output frequency during hold is not saved.
1	After 5 sec. of hold state, the output frequency during hold is saved and the operation will restart with the saved output frequency

Self-test (MEMOBUS communication circuit check) (Setting : n056 = 35)
Performs operation check of serial I/F circuit. "CE" is displayed on digital operation at occurrence of fault.
Operation procedures

1. After power ON of the inverter, set multi-function contact input selection (n056) to 35, shutting down the inverter power supply.
2. Short-circuit between terminal S7 and SC, (R+) and (S+), and (R-) and (S-).
3. Turn SW1 switch on board to NPN side.
4. Power ON the inverter and starts self-test.

After completion of self-test, the digital operator displays frequency reference in normal state. Before starting operation after self-test, turn OFF the power supply to remove the short-circuit leads used at the step 2.

Using multi-function output signals

Multi-function output terminal function selection

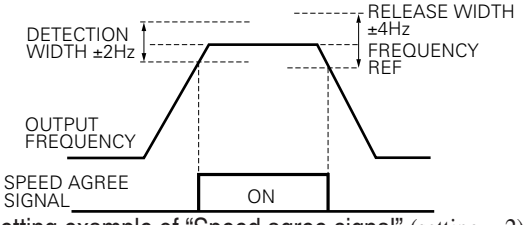
n057 n058 n059

Multi-function output terminal MA, MB, P1 and P2 functions can be changed when necessary by setting constants n057, n058 and n059.

- Terminal MA and MB functions : Set to n057
- Terminal P1 and P2 functions : Set to n058 and n059

Setting	Function Name	Description	Ref. Page
0	Fault	"Closed" (ON) when inverter fault occurs.	–
1	Running	"Closed" (ON) when FWD or REV run command is input, or when the inverter outputs voltage.	–
2	Speed agree	–	Figure below
3	Zero speed	"Closed" (ON) when the inverter output frequency is less than min. output frequency	–
4	Frequency detection 1 (output frequency ≧ frequency detection level)	–	29
5	Frequency detection 2 (output frequency ≦ frequency detection level)	–	29
6	Overtorque detection (NO contact output)	–	29
7	Overtorque detection (NC contact output)	–	29
10	Minor fault (alarm display)	–	37
11	During baseblock	"Closed" (ON) when the inverter output is shut off.	–
12	Operation mode	"Closed" (ON) when "LOCAL" is selected by LOCAL/REMOTE selection	–
13	Inverter run ready	"Closed" (ON) when the inverter is ready to operate without any fault.	–
14	In fault retry	"Closed" (ON) during fault retry.	–
15	Low voltage (UV) detected	"Closed" (ON) when the inverter is detecting low voltage.	–
16	In REV run	–	–
17	In speed search	"Closed" (ON) during speed search of inverter.	30
18	Data output from communication	By command from MEMOBUS communication, multi-function output terminal is operated independently from the inverter operation.	–

Factory settings: n057 = 0, n058 = 1, n059 = 2



Setting example of "Speed agree signal" (setting = 2)

The set value displayed in ▭ is factory setting.

Adjusting Motor Torque

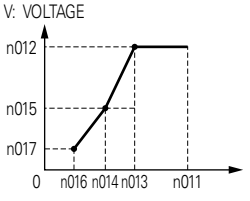
Adjusting torque according to application

Max. output frequency	n011
Max. voltage	n012
Max. voltage output frequency	n013
Mid. output frequency	n014
Mid. output frequency voltage	n015
Min. output frequency	n016
Min. output frequency voltage	n017
Torque compensation gain	n103

Adjust motor torque by using "V/f pattern" and "full-range automatic torque boost".

V/f pattern setting

Set V/f pattern by n011 to n017 as described below. Set each pattern when using a special motor (high-speed motor, etc.) or when requiring special torque adjustment of machine. Refer to the instruction manual for details of setting.



Be sure to satisfy the following conditions for the setting of n011 to n017.
n016 ≦ n014 < n013 ≦ n011
If n016 = n014 is set, the set value of n015 is disabled.

Constants No.	Name	Unit	Setting Range	Factory Setting
n011	Max. output frequency	0.1Hz	50.0 to 400Hz	60.0Hz
n012	Max. voltage	0.1V	0.1 to 255V	200V*1
n013	Max. voltage output frequency (base frequency)	0.1Hz	0.2 to 400Hz	60.0Hz
n014	Mid. output frequency	0.1Hz	0.1 to 399Hz	1.5Hz
n015	Mid. output frequency voltage	0.1V	0.1 to 255V	12V*1, *2
n016	Min. output frequency	0.1Hz	0.1 to 10.0Hz	1.5Hz
n017	Min. output frequency voltage	0.1V	0.1 to 50V	12V*1, *2

*1 Twice for 400V class.
*2 10.0 V for inverters of 5.5 kW and 7.5 kW in the 200-V class.
20.0 V for inverters of 5.5 kW and 7.5 kW in the 400-V class.

Full-range automatic torque boost

Motor torque requirement changes according to load conditions. Full-range automatic torque boost adjusts voltage of V/f pattern according to the requirement. The VS-606V7 automatically adjusts the voltage during constant-speed operation as well as during acceleration. The required torque is calculated by the inverter.

Normally, no adjustment is necessary for torque compensation gain (n103 factory setting = 1.0). When the wiring distance between the inverter and the motor is long, or when the motor generates vibration, change the torque compensation gain. In these cases, reset the V/f pattern (n011 to n017).

Preventing motor from stalling (Current limit)

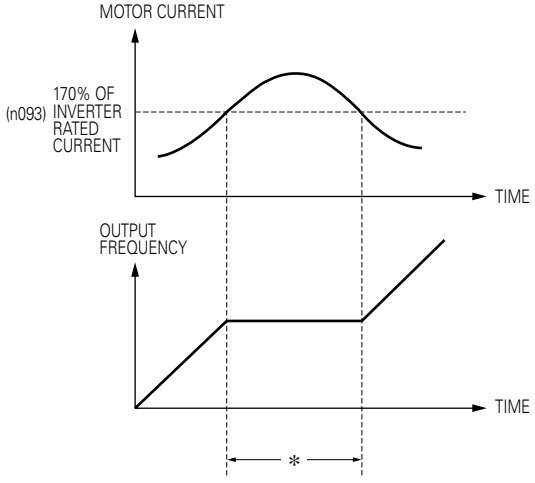
Stall prevention (current limit) level during accel	n093
Stall prevention (current limit) level during running	n094
Stall prevention during decel	n092

Stall prevention (current limit) level during accel (n093)

Automatically adjusts the output frequency and the output current according to the load to continue operation without stalling the motor.

During acceleration if the output current exceeds 170% of the inverter rated current [the value set for n093], acceleration stops and the frequency is maintained.

When the output current goes down to 170% [the value set for n093], acceleration starts. Inverter rated current equals 100%.



*: Holds the acceleration to prevent the motor from stalling.

Factory setting of n093 = 170%
When set to 200%, this function becomes disabled.

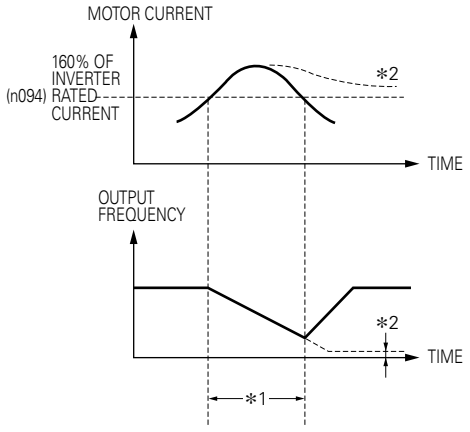
In the constant output area [output frequency ≧ max. voltage output frequency (n013)], the stall prevention level during acceleration is automatically decreased by the following equation.

Stall prevention (current limit) level during accel in constant output area

$$= 170\% \text{ [n093 setting]} \times \frac{\text{Max. voltage output frequency (n013)}}{\text{Output frequency}}$$

Stall prevention (current limit) level during running

During agreed speed if the output current exceeds 160% of the inverter rated current [the value set for n094], deceleration starts.
When the output current exceeds 160% [the value set for n094], deceleration continues.
When the output current goes down to the value, acceleration starts, up to the set frequency.



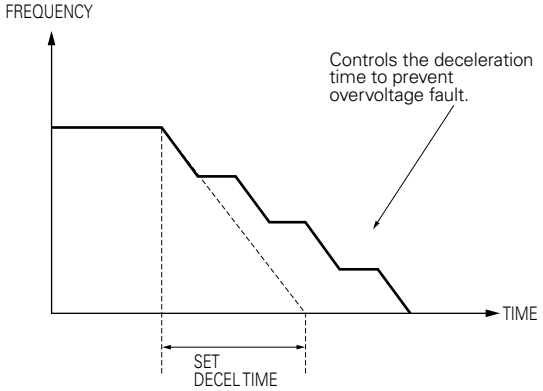
*1. Decreases frequency to prevent the motor from stalling.
*2. If the output current does not become set level or less, the operation will be held at the min. output frequency.

Factory setting of n094 = 160%
When set to 200%, this function becomes disabled.

Stall prevention (current limit) during deceleration (n092)

To prevent overvoltage during deceleration, the inverter automatically extends the deceleration time according to the value of main circuit DC voltage.
When using an optional braking resistor, set n092 to 1.

Setting	Stall prevention during deceleration
0	Provided
1	Not Provided (when braking resistor mounted)



Slip compensation

Slip compensation gain n111
Motor no-load current n110

As the load becomes larger, the motor speed is reduced and motor slip value is increased when V/f control mode is selected.
The slip compensating function controls the motor speed at a constant value even if the load varies. When inverter output current is equal to the motor rated current, compensation frequency is added to the output frequency.

$$\text{Compensation frequency} = \text{Motor rated slip value (n106)} \times \frac{\text{Output current} - \text{Motor no-load current (n110)}}{\text{Motor rated current (n036)} - \text{Motor no-load current (n110)}} \times \text{Slip compensation gain (n111)}$$

Constants

Constant No.	Function Name	Setting Unit	Setting Range	Factory Setting
n036	Motor rated current	0.1A	0 to 150% of inverter rated current	*
n106	Motor rated slip	0.1Hz	0.0 to 20.0Hz	*
n111	Slip compensation gain	0.1	0.0 to 2.5	0.0
n110	Motor no-load current	1%	0 to 99% (100% = motor rated current n036)	*
n112	Slip compensation primary delay time	0.1s	0.0 to 25.5s When 0.0s is set, delay time becomes 2.0s	2.0s

* Differs depending on inverter capacity.

Notes :
- When output frequency < min. output frequency (n016), slip compensation is not performed.
- During regenerative operation, slip compensation is not performed.
- When vector control mode is selected, slip compensation is performed with slip compensation selection (n113) during regenerative operation.

Motor Protection

Motor overload detection

Motor rated current n036

Electronic thermal motor protection selection n037

Electronic thermal motor protection time constants setting n038

The VS-606V7 protects against motor overload with a built-in electronic thermal overload relay.

Motor rated current (electric thermal base current) (n036)

Set to the rated current value shown on the motor nameplate.

Motor overload protection selection (n037)

Setting	Electronic Thermal Characteristics
0	For standard motor
1	For inverter motor
2	Electronic thermal motor protection not provided

Motor overload protection selection (n037)

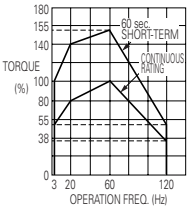
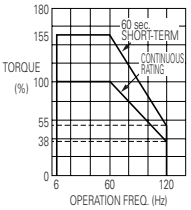
The initial value is 8 min. of standard rating (Set 5-min. rating for short-term rating).

When operating with one inverter connected to one motor, an external thermal relay is not required.

When operating several motors with one inverter, install a thermal relay on each motor.

Standard motors and inverter motors

Motors are classified into standard motors and inverter motors according to its cooling capabilities. Therefore, the motor overload function operates differently between motor types.

	Cooling Effect	Torque Characteristic	Electronic Thermal
Standard Motors	Since designed for operation with commercial power supply, cooling effect is lowered as speed lowered.	 BASE FREQUENCY 60Hz (V/f for 60Hz, 220V input voltage) As the motor temperature rise is controlled at low-speed operation, the load should be limited.	"OL1" error (motor overload protection) occurs when continuously operated at 50/60Hz or less at 100% load.
Inverter Motors	Designed for heat-resistant in case of lowered cooling capability in low-speed range (approx. 6Hz).	 BASE FREQUENCY 60Hz (V/f for 60Hz, 220V input voltage) For continuous operation in low-speed range, use inverter motors.	Electric thermal overload protection not activated even when continuously operated at 50/60Hz or less at 100% load.

Controlling by MEMOBUS Communication

VS-606V7 can perform serial communication by using a programmable controller (PLC) and MEMOBUS communication. MEMOBUS is composed of one master PLC and 1 to 31 (max.) slave units (VS-606V7).

In signal transmission (serial communication) between the master and slaves, the master always starts transmission and the slaves respond to it.

The master performs signal transmission with one slave at one time. Therefore address numbers are assigned to each slave in advance and the master specifies a number to perform signal transmission. The slave which receives the command from the master executes the function and returns the response to the master.

Communication Specifications

- Interface : RS-485/422
- Synchronization : Asynchronous (start-stop)
- Transmission parameter : Baud rate : Selectable from 2400, 4800, 9600, 19200 bps (constant n154)
  Data length : Fixed to 8 bits
  Parity : Parity/no-parity, even/odd selectable (constant n155)
  Stop bit : Fixed to 1 bit
- Protocol : In accordance with MEMOBUS
- Maximum number of units to be connected : 31 units (when RS-485 is used)

Data to be Sent/Received by Communication

Data to be sent/received by Communication are run commands, frequency reference, fault contents, inverter status and constant setting/reading.

Operation Mode Selection (n003, n004)

Select the run command and frequency reference input method in constant n003 and n004. To provide a run command and frequency reference by communication, set n003 and n004 to 2 and 6 respectively. Also, without regard to this selection, monitoring of running status, constant setting/reading, fault reset and multi-function input command from the PLC are enabled. The multi-function input command becomes OR with the command input from control circuit terminals S1 to S7.

MEMOBUS Frequency Reference Unit (n152)

The frequency reference units from the PLC and the frequency reference and output frequency monitors (by communication) are selected.

The output frequency resolution of the VS-606V7 is 0.01Hz.

MEMOBUS Slave Address (n153)

The slave address number is set. it is necessary to set the address number so that it will not overlap with the address number of another slave connected on the same transmission line.

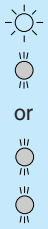
Note : To change the values set in constants n153 to n157 and enable new setting, it is necessary to turn OFF the power supply, and then turn it ON again.

☼ : ON ◉ : BLINKING ● : OFF

Alarms and Corrective Actions

Alarm Display		Inverter Status	Explanation	Causes and Corrective Actions
Digital Operator	RUN (Green) ALARM (Red)			
UV BLINKING		Warning Does not output fault. Auto-matically recover after the fault eliminated	UV (Main circuit low voltage) Main circuit DC voltage drops below the low-voltage detection level while the inverter output is OFF. Detection level 200V class : Approx. 200V or less (for single-phase, approx. 160V or less) 400V class : Approx. 400V or less Control power fault : Control power fault detected while inverter stopped.	Check the following : • Power supply voltage • Main circuit power supply wiring is connected. • Terminal screws are securely tightened.
OV BLINKING			OV (Main circuit overvoltage) Main circuit DC voltage exceeds the overvoltage detection level while the inverter output is OFF. Detection level 200V class : Approx. 410V or more 400V class : Approx. 820V or more	Check the power supply voltage.
oH BLINKING	◉		OH (Cooling fin overheat) Intake air temperature rises while the inverter is stopped.	Check the intake air temperature.
CAL BLINKING			CAL (MEMOBUS in waiting) After power ON with n003 (operation mode selection) set to 2 and n004 (frequency reference selection) to 6, normal transmission data is not received from PLC.	Check communication devices and transmission signals.
oP□			OP □ (Constant setting error when setting constants from MEMOBUS) OP1 : Same set values are input to constants n050 to n056 for multi-function input selection. OP2 : Improper size comparison of setting for V/f constants n011, n013, n014 and n016 OP3 : Set value of motor rated current (n036) exceeds 150 % of inverter rating. OP4 : Frequency reference upper limit (n033) < Frequency reference lower limit (n034) OP5 : Improper size comparison among jump frequency 1 (n083), 2 (n084) and 3 (n085) OP9 : The setting of the Inverter capacity does not coincide with the Inverter. (Contact your Yaskawa representative.)	Check set value.
oL3 BLINKING			Inverter output current exceeds overtorque detection level (n098)	Decrease load, increase accel/decel time.
SEr BLINKING	☼		SER (sequence error) Inverter received LOCAL/REMOTE selection command signal, or communication/control circuit selection command signal during operation.	Check external circuit (sequence).
UL3 BLINKING			UL3 (undertorque detection) When the V/f mode is selected, the inverter's output current is under the undertorque detection level (n118). When the vector mode is selected, the output current or output torque is under the undertorque detection level (n097 and n118). If undertorque is detected, the inverter operates according to the setting at n117.	• Check the setting at n118. • Check the driven machine and correct the cause of the fault.

Alarms and Corrective Actions (Cont'd)

Fault Display		Inverter Status	Explanation	Causes and Corrective Actions
Digital Operator	RUN (Green) ALARM (Red)			
bb BLINKING		Warning Does not output fault. Auto-matically recover after the fault eliminated	BB (external base blocked) Inverter stops output upon receiving an external base block signal. (Note : Resetting external base block signal restarts operation.	Check external circuit (sequence).
EF BLINKING			EF (FWD and REV command simultaneous input) FWD command and REV command from control circuit terminal are simultaneously "Closed". When command is "Closed" for 500ms and more, inverter stops operation by setting stopping method selection (n005).	Check external circuit (sequence).
SrP BLINKING			STP (Operator function stop) STOP/RESET key is pressed during running by FWD or REV command from control circuit terminal or communication. In this case, inverter stops operation by setting of stopping method selection (n005). STP (emergency stop) At receiving emergency stop alarm signal, inverter stops operation by setting of stopping method selection (n005).	•Open FWD or REV command from control circuit terminal. •Check external circuit (sequence)
FAn BLINKING			FAN (Cooling fan fault) Cooling fan is locked.	Check the followings : •Cooling fan •Power supply connection of cooling fan
CE BLINKING			CE (MEMOBUS communication fault) Communication data are not received normally	Check communication devices and communication signals.
FbL BLINKING			FBL (PID feedback loss detection) PID feedback value dropped below the detection level (n137). When PID feedback loss is detected, the inverter operates according to the n136 setting.	Check the mechanical system and correct the cause, or increase the value of n137.
bUS BLINKING			Option card communications fault. Communication fault has occurred in a mode that RUN command and frequency reference are set from the communication option card.	Check the communications devices or communications signals.
oH3 BLINKING			OH3 (inverter overheating alarm signal) An OH3 alarm signal (inverter overheating alarm signal) was input from a multi-function input terminal (S1 to S7)	Change the setting to stop the OH3 alarm signal from being sent.

Faults and Corrective Actions

Fault Display		Inverter Status	Explanation	Causes and Corrective Actions
Digital Operator	RUN (Green) ALARM (Red)			
oC	●	Protective Operation Output is shut OFF and motor coasts to a stop.	OC (overcurrent) Inverter output current momentarily exceeds approx. 250 % of rated current.	•Short-circuit or grounding at inverter output side •Excessive load GD² •Extremely rapid accel/decel time (n019 to n022) •Special motor used •Starting motor during coasting •Motor of a capacity greater than the inverter rating has been started. •Magnetic contactor open/closed at the inverter output side ⬇ Check the cause, and restore the operation. Note: Before turning the power ON again, make sure that no short-circuit or ground fault occurs at the Inverter output.
GF			GF (Grounding) *1 *2 Grounding current exceeded approx. 50% of inverter rated output current at the inverter output side.	Inverter output grounded. ⬇ Check the cause, and restore the operation. Note: Before turning the power ON again, make sure that no short-circuit or ground fault occurs at the Inverter output.
SC			SC (Load shortcircuit) *1 Inverter output or load shortcircuited.	Inverter output shortcircuited or grounded. ⬇ Check the cause, and restore the operation.
ov			OV (main circuit overvoltage) Main circuit DC voltage exceeds the overvoltage detection level due to excessive regenerative energy from the motor. Detection level 200V class : approx. 410V and more 400V class : approx. 820V and more	•Insufficient decel time (constants n020 and n022) •Large minus load at lowering (elevator, etc.) ⬇ •Increase decel time. •Connect optional braking resistor.
Uv 1	☼		UV1 (main circuit low-voltage) Main circuit DC voltage drops below the low-voltage detection level while inverter output is ON. Detection level 200V class : approx. 200V and less (approx. 160V and less for single-phase) 400V class : approx. 400V and less	•Reduction of input power supply voltage •Open phase of input supply •Occurrence of momentary power loss ⬇ Check the following: •Power supply voltage •Main circuit power supply wiring is connected •Terminal screws are securely tightened.
Uv2			UV2 (control power supply fault) Voltage fault of control power supply is detected.	Turn OFF, and ON power. If the fault remains, replace the inverter.
oH			OH (cooling fin overheat) Temperature rise due to inverter overload operation or intake air temperature rise.	•Excessive load •Improper V/f pattern setting •Insufficient accel time if the fault occurs during acceleration •Intake air temperature exceeding 50 ℃ •Cooling fan is stopped. •Cooling fan deteriorates its cooling capability or stops. •Fin is clogged. •There is a thermal source around the inverter ⬇ Check the following: •Load size •V/f pattern setting (n011 to n017) •Intake air temperature •Cooling fan is turning while the inverter is running. •Any foreign matters adhere to the fan and that they do not interrupt the rotation. •Fan is mounted properly. •There is not a thermal source around the inverter.

*1 : Only for inverters of 5.5 kW and 7.5 kW (200-V and 400-V classes).
*2 : The ground fault here is one which occurs in the motor wiring while the motor is running.
A ground fault may not be detected in the following cases.
• A ground fault with low resistance which occurs in motor cables or terminals.
• A ground fault occurs when the power is turned ON.

Faults and Corrective Actions (Cont'd)

Fault Display		Inverter Status	Explanation	Causes and Corrective Actions
Digital Operator	RUN (Green) ALARM (Red)			
rH	● ☼	Protective Operation Output is shut OFF and motor coasts to a stop.	RH (Externally-mounting-type braking resistor overheat) * Protection of externally-mounting type braking resistor operated.	•Insufficient deceleration time •Excessive motor regenerative energy ⬇ •Increase deceleration time •Reduce regenerative load
oL1			OL1 (motor overload) Motor overload protection activated by built-in electronic thermal overload relay.	•Check the load size and V/f pattern setting (n011 to n017) •Set n036 to the rated current on motor nameplate.
oL2			OL2 (inverter overload) Inverter overload protection activated by built-in electronic thermal overload relay.	•Check the load size and V/f patter setting (n011 to n017) •Check the inverter capacity
oL3			OL3 (overtorque detection) When V/f mode is selected, inverter output current exceeds the overtorque detection level (n098). When Vector mode is selected, output current or output torque exceeds overtorque detection level (n097 and n098). If overtorque is detected, inverter operates according to the setting at n096.	Check the driven machine and correct the cause of the fault, or increase the value of n098 up to the highest allowable value for the machine.
PF			PF (main circuit voltage fault) Main circuit voltage oscillates, except during regeneration.	•Open phase of input supply •Occurrence of momentary power loss •Excessive change in input supply voltage •Imbalance in line voltage ⬇ Check the following: •Main circuit power supply wiring •Power supply voltage •Terminal screws are securely tightened.
LF			LF (output open phase) An open phase occurred at the inverter output side.	•Disconnection of output wiring. •Disconnection of motor wiring. •Output terminal screws are loose. ⬇ Check the following: •Output wiring. •Impedance of motor •Output terminal screws are securely tightened.
UL3			UL3 (undertorque detection) When the V/f mode is selected, the inverter's output current is under the undertorque detection level (n118). When the vector mode is selected, the output current or output torque is under the undertorque detection level (n097 and n118). If undertorque is detected, the inverter operates according to the setting at n117.	•Check the setting at n118. •Check the driven machine and correct the cause of the fault.
EF□			EF□ (external fault) Received an external fault signal. EF0 : External fault command from MEMOBUS EF1 : External fault input from control circuit terminal S1 EF2 : External fault input from control circuit terminal S2 EF3 : External fault input from control circuit terminal S3 EF4 : External fault input from control circuit terminal S4 EF5 : External fault input from control circuit terminal S5 EF6 : External fault input from control circuit terminal S6 EF7 : External fault input from control circuit terminal S7	Check external circuit (sequence).

*: Only for Inverters of 5.5 kW and 7.5 kW (200-V and 400-V classes).

Faults and Corrective Actions (Cont'd)

Fault Display		Inverter Status	Explanation	Causes and Corrective Actions
Digital Operator	RUN (Green) ALARM (Red)			
F00		Protection Operation Output is shut OFF and motor coasts to a stop.	CPF-00 (CPF : control circuit fault) Communication with digital operator is disabled even 5 sec. after power is ON.	Turn OFF power and check the mounting of digital operator, then turn ON power again. If fault remains, replace the digital operator or the inverter.
F01			CPF-01 Communication fault occurs for 5 sec. or more after communication started with digital operator	Turn OFF power and check the mounting of digital operator, then turn ON power again. If fault remains, replace the digital operator or the inverter.
F04			CPF-04 EEPROM fault of inverter control circuit	• Save all the constant data, then initialize the constants (refer to page 19 for initialization of constants) • Turn OFF power, then ON again. If the fault remains, replace the inverter.
F05			CPF-05 A/D converter fault of inverter control circuit	Turn OFF power, and ON again. If fault remains, replace the inverter.
F06	● ☼		CPF-06 • Optional card connection fault • Non-applicable option card is connected.	• Turn OFF power and properly connect the card, then turn ON power. • Check the inverter software NO (n179).
F07			CPF-07 Digital operator control circuit (EEPROM, A/D converter fault	Turn OFF power once and check the mounting of digital operator, then turn ON power again. If fault remains, replace the digital operator or the inverter.
F11			CPF-11 Combination error	Control circuit is not combined with correct software. (Contact your Yaskawa representative.)
oPr			OPR (digital operator connection fault)	Turn OFF power, and properly connect the digital operator, then turn ON power.
CE			CE (MEMOBUS fault) Communication data cannot be received properly.	Check communication device and signals.
STP	☼ ☼ or ● ☼	Stops according to constant setting	STP (emergency stop) At receiving an emergency stop fault signal, inverter stops output by setting stopping method selection (n005)	Check external circuit (sequence).
OFF	● ●	Protective Operation Output is shut OFF and motor coasts to a stop.	• Insufficient power supply voltage • Control power supply fault • Hardware fault	Check the following: • Power supply voltage • Main circuit power supply wiring • Terminal screws are securely tightened. • External control circuit (sequence) • Replace the inverter

Inverter

Selection

- Use a DC reactor (option) or an AC reactor (option) on the inverter power side when the inverter is connected directly to a large-capacity power transformer (600kVA and over within 10m distance) or when a phase advance capacitor is switched. Otherwise excess peak current may occur in the power feed circuit and the converter section may be damaged. A DC reactor or an AC reactor is also required when a thyristor converter such as a DC drive is connected to the same power system.
- When a special motor is used or more than one motor is driven in parallel with a single inverter, select the inverter capacity so that 1.1 times of the total motor rated current does not exceed the inverter rated output current.
- The starting and accelerating characteristics of the motor driven by an inverter are restricted by the overload current ratings of the inverter. Compared to running with commercial power supply, lower torque output should be expected. If high starting torque is required, use an inverter of higher capacity or increase the capacities of both the motor and the inverter.
- When an error occurs, a protective circuit is activated and the inverter output is turned OFF. However, the motor cannot be stopped immediately. Use a mechanical brake and hold the equipment for a fast stop if necessary.
- Terminals B1 and B2 are for YASKAWA options. Do not connect equipment other than braking resistor (option). And the terminals +1 and +2 are for YASKAWA options. Do not connect equipment other than DC Reactor (option).

Installation

- Avoid oil mist or dust. Place the inverter in a clean area or house it in a totally-enclosed case so that no contamination enters. To use the totally-enclosed case, select the cooling method and panel dimensions so the inverter ambient temperature will be within the allowable range.
- Do not install the inverter on flammable material, such as wood.
- Install the inverter on a wall with the longer side in the vertical position.

Setting

- The inverter can be driven at an output frequency of up to 400Hz with the digital operator. Setting errors may create a dangerous situation. Set the upper limit with the upper limit frequency setting function. (Maximum output frequency in external input signal operation is preset to 60Hz at the factory.)
- Large DC injection braking operating voltages and times may cause motor overheating.
- Motor accel/decel time is determined by the motor generating torque, load torque, and load inertia WK^2 (GD^2). If the stall prevention function is activated during accel/decel, set the accel/decel time longer. After the stall prevention function is activated, the accel/decel time is extended to a length that the inverter can handle. To shorten the accel/decel time, increase the capacity of the inverter and possibly the motor.

Operation

- Never connect the AC main-circuit power supply to output terminals U/T1, V/T2, W/T3, B1, B2, –, +1, or +2. The inverter will be damaged. Double check wiring and sequence before turnig the power ON.
- If magnetic contactor (MC) is used on the primary side of the inverter, do not use the MC for starting and stopping the inverter. Otherwise, the inverter life may be reduced.
- After turning power to the inverter OFF, electric charges in the internal capacitors are retained temporarily. Wait until the charge LED goes off before touching the inside of the inverter.
- Do not subject the inverter to halogen gases, such as fluorine, chlorine, bromine, and iodine, at any time even during transportation or installation.

Peripheral Devices

Installation and selection of molded-case circuit breaker

On the input power side, a molded-case circuit breaker (MCCB) to protect inverter primary wiring should be installed. The inverter power-factor (depending on power voltage, output frequency, and load) must be taken into account for selecting MCCB. For standard settings, see page 38. If a full electromagnetic MCCB is to be used, select a larger capacity because the operating characteristics are altered by harmonic current. A leakage current breaker threshold of 200mA and above, or of inverter (suppressing high frequency) use is recommended.

Input side magnetic contactor

The inverter can be used without an input side magnetic contactor (MC). An input MC can be used to prevent an automatic restart after recovery from an external power loss during remote control operation. However, do not use the MC frequently for start/stop operation, or it will lead to a reduced reliability. When the digital operator is used, automatic restart after power failure is disabled so that MC starting is impossible. Although the MC can stop the inverter, regeneration braking is disabled and the motor coasts to a stop. When braking resistor unit is used, build a sequence where MC is turned OFF at the braking resistor unit thermal relay contact.

Secondary magnetic contactor

In general magnetic contactors on the output of the inverter, for motor control should not be used. Starting a motor with the inverter running will cause large surge currents and the inverter overcurrent protector to trigger. If an MC is used for switching to commercial power supply, switch MC after the inverter and the motor stop. To switch during motor rotation, use the speed search function. (See page 27.)

Overload relay

The inverter includes an electronic thermal protective function to protect the motor from overheating. But, when multi-drive by one inverter is used, place a overload relay between the inverter and the motor. Set 2 in n037 (or set 0.0 in n036), and set the overload relay to the current nameplate value at 50Hz, or 1.1 times of that at 60Hz.

Power-factor improvement (elimination of phase advance capacitor)

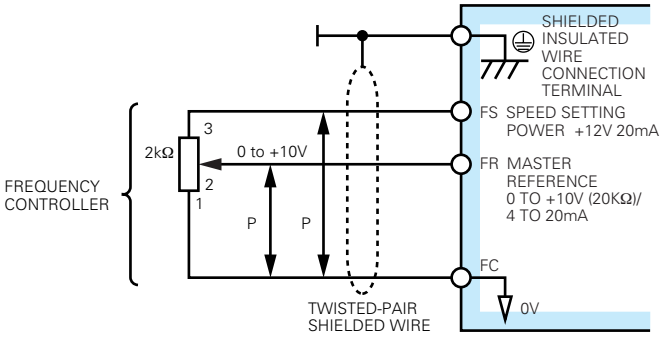
To improve the power-factor, install a DC reactor or an AC reactor on the inverter power side. Power-factor improvement capacitor or surge suppressors on the inverter output side will be damaged by the harmonic component in the inverter output. Also, the overcurrent caused in the inverter output will trigger the overcurrent protection. To avoid this, do not use capacitors or surge suppressors in the inverter's output. To improve the power-factor, install an AC reactor on the inverter primary side.

Radio frequency interference

Because the inverter I/O (main circuit) contains a higher harmonics component, it may emit RFI noise to communication equipment (AM radio, etc.) near the inverter. Use a noise filter to decrease the noise. Use of a metallic conduit between the inverter and motor and grounding the conduit is also effective. Proper routing of input and output lead is also recommended.

Wire thickness and cable length

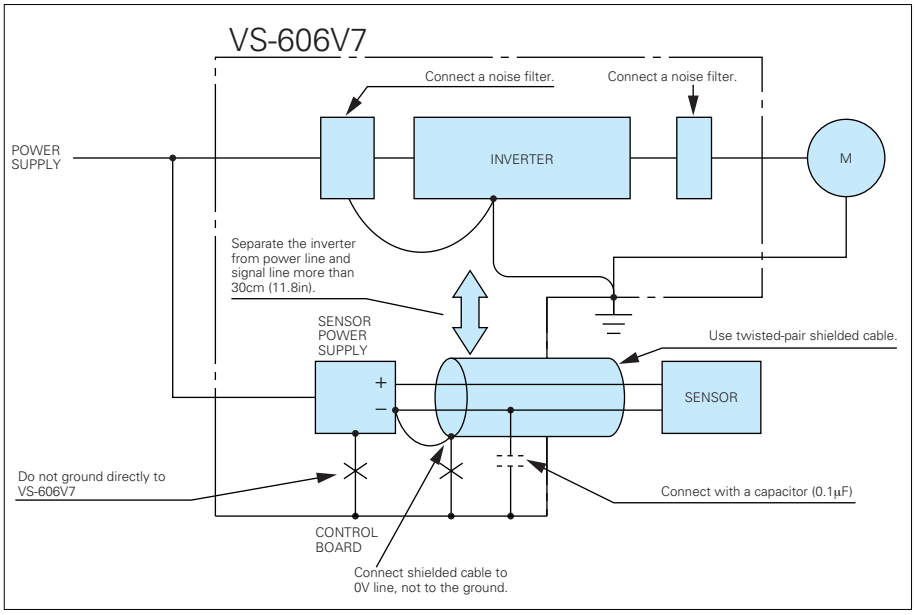
If a long cable is used between the inverter and a motor (especially when low frequency is output), motor torque decreases because of voltage drop in the cable. Use sufficiently thick wire. If a long cable is used and inverter carrier frequency (main transistor switching frequency) is high, harmonic leakage current from the cable will increase to affect the inverter unit or peripheral devices. Reduce the inverter carrier frequency.
When a digital operator is to be installed separately from the inverter, use the YASKAWA remote interface and special connection cable (option). For remote control with analog signals, connect the operating signal terminal and the inverter within 98.4ft (30m) of the inverter. The cable must be routed separately from power circuits (main circuit and relay sequence circuit) so that it is not subjected to inductive interference by other equipment. if frequencies are set not only from the digital operator but also with external frequency controller, use twisted-pair shielded wire as shown in the following figure and connect the shielding to terminal ⏚ .



Noise Control Measures

The low-noise type uses high-carrier frequency PWM control, and compared to the low-carrier type tends to suffer from increased electromagnetic interference (EMI). Following are suggestions that may be effective in reducing EMI effects in your installation:

- Lower the carrier frequency (constant n080) and the interference will be reduced.
- A line noise filter is effective in eliminating sensor malfunction or AM radio static (see page 41).
- To eliminate inductive noise from the inverter power line, separate the signal lines [recommended 30cm (11.8in), minimum 10cm (3.94in)] and use twisted-pair shielded cable.



From the JEMA report

Current Leakage Control Measures

A floating capacitance exists between the inverter power line and other drive lines, and between ground (earth) and the motor. This may carry high-frequency leakage current and affect other equipment. This phenomenon varies with the carrier frequency and the wiring distance between inverter and motor. The following measures may help to minimize the effects.

	Characteristics	Corrective Actions
Current Leakage to Ground (earth)	Malfunction of ground fault interrupters and leakage relays	• Lower the carrier frequency (constant n080) • Use a ground fault interrupter resistant to high frequencies (e. g. Mitsubishi Electric NV Series)
Inter-line Leakage Current	Malfunction of external thermal overload relays due to high-frequency component of leakage current	• Lower the carrier frequency (constant n080) • Use an inverter with a built-in electronic thermal overload relay.

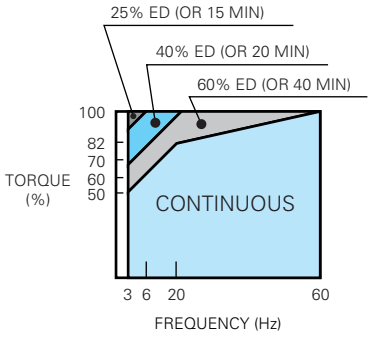
Wiring distance between inverter and motor, and setting of carrier frequency

Wiring Distance	Up to 50m (164.0ft)	Up to 100m (328.1ft)	More than 100m (328.1ft)
Allowable carrier frequency (Constant n080 set value)	10kHz or less (1 to 4, 7, 8, 9)	5kHz or less (1, 2, 7, 8, 9)	2.5kHz or less (1, 7, 8, 9)

Motor

Application for Existing Standard Motors

A standard motor driven by the inverter generates slightly less power than it does when it is driven with commercial power supply.
Also, the cooling effect deteriorates in low speed range so that the motor temperature rise increases. Reduce load torque in the low speed range. Allowable load characteristics of the standard motor are shown in the figure. If 100% continuous torque is required in the low speed range, use an inverter duty motor.
Also, if input voltage is high (440V or more) or wiring distance is long, consider the withstand voltage of the motor. For details, contact your YASKAWA representative.



Allowable Load Characteristics of a Standard Motor

■ High speed operation

When the motor is used above 60Hz, the motor mechanical design should be verified. Contact your motor manufacturer.

■ Torque characteristics

Motor torque characteristics vary when the motor is driven by an inverter instead of commercial power supply. Check the load torque characteristics of the machine to be connected.

■ Vibration

Because of the high carrier modulation technique for PWM control, the VS-606V7 reduces motor vibration to a level equal to running with a commercial power supply. Larger vibrations may occur under the following conditions:

- Response at resonant frequency of the mechanical system.
  Special care is required if a machine which has previously been driven at a constant speed, is to be driven at varying speeds. Installation of antivibration rubber padding under the motor base and prohibited frequency control are recommended.
- Rotator residual imbalance
  Special care is required for operation at frequencies higher than 60Hz.

■ Noise

Inverter operation is as quiet as operation with commercial power supply: At above rated speed (60Hz), noise may increase by motor cooling fan.

Application for Special Purpose Motors

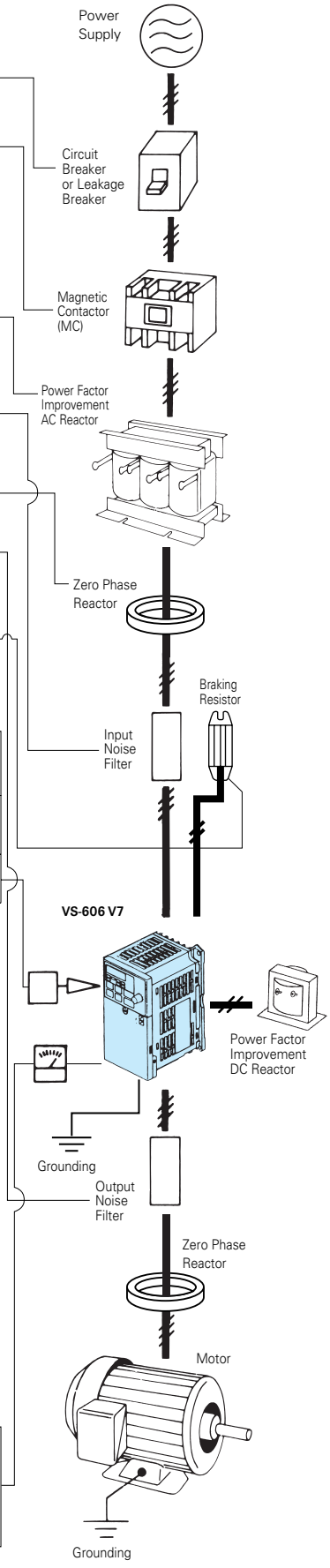
Synchronous Motors	Contact your YASKAWA representative for selecting inverter since starting current and rated current is larger than those of standard motor. Be careful when several motors are turned ON and OFF individually at group control. They may step out.
Pole Change Motors	Select the inverter with a capacity exceeding the rated current of each pole. Pole change should be made only after the motor stops. If a pole changed while the motor is rotating, the regenerative overvoltage or overcurrent protection circuit is activated and the motor coasts to a stop.
Submersible Motors	Since the rated current of underwater motors is large compared with general purpose motors, select an inverter with a larger capacity. If the wire length between the inverter and the motor is large, use cables with sufficiently large diameter.
Explosion-proof Motors	Explosion-proof motors which are applied to an inverter must be approved as explosion-proof equipment. The inverter is not explosion-proof and should not be located where explosive gases exist.
Geared Motors	Lubrication method and continuous rotation limit differ with manufacturers. When oil lubrication is employed, continuous operation only in low speed range may cause burnout. Before operating the motor at more than 60Hz you should consult the motor manufacturer.
Single-phase Motors	Single-phase motors are not suitable for variable speed operation with an inverter. If the inverter is applied to a motor using a capacitor stack, a high harmonic current flows and the capacitor may be damaged. For split-phase start motors and repulsion start motors, the internal centrifugal switch will not be actuated and the starting coil may be burned out. Therefore, use only 3-phase motors. Single-phase models provide a three-phase output (for three-phase motors). They cannot drive single-phase motor.

Power Transmission Mechanism (Gear Reduction, Belt, Chain, etc.)

When gear boxes and change/reduction gears lubricated with oil are used in power transmission systems, continuous low speed operation decreases the oil lubrication function. Also, operation at more than 60Hz may result in noise, reduced life, etc.

OPTIONS AND PERIPHERAL UNITS

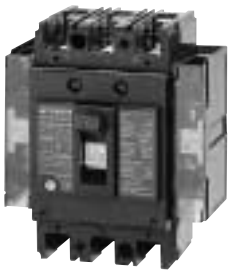
Purpose	Name	Model (Parts Code No.)	Description	Ref. Page
Protection of inverter wiring	Molded-case circuit breaker (MCCB) or ground fault interrupter	NF□	To protect inverter wiring, always install it on the power supply side. Use a ground fault interrupter with resistance to high frequencies.	47
Preventing damage to braking resistor	Magnetic contactor	SC series	If a braking resistor is used, install so as to protect it from burn-out. Always use a surge suppressor on the coil.	47
Preventing output of open/close surge current	Surge suppressor	DCR2-□	Absorbs surge current by opening and closing of magnetic contactors and control relays. Must be installed on magnetic contactors or control relays near the inverter.	47
Isolation of I/O signals	Isolator	DGP□	Isolates the inverter input and output signals to reduce noise.	48
Improvement of inverter input power factor	AC reactor	UZBA-B	When the inverter input power factor is to be improved, mount on the input side. With large-capacity power supplies (600kVA or higher), install an AC reactor.	50
	DC reactor	UZDA-A		49
Reducing effects of radio and controller noise	Input noise filter	LNFB-□ [Single-phase] LNFD-□ [3-phase]	Reduces noise through the inverter input power system or wirings. Install as close to the inverter as possible.	52
	Finemet zero-phase reactor to reduce radio noise	F6045GB (FIL001098) F11080GB (FIL001097)	Reduces noise from the line that sneaks into the inverter input power system. Insert as close to the inverter as possible. Can be used on both the input side and output side.	51
	Output noise filter	LF-□	Reduces noise as the inverter output wirings. Install as close to the inverter as possible.	53
Stopping machinery within specified time	Braking resistor	ERF-150WJ□□ (ROO□□□□)	Motor regenerative energy consumption by the resistor allows reduced decel time (duty cycle: 3% ED).	54
	Braking resistor unit	LKEB-□	Motor regenerative energy consumption by the resistor allows reduced decel time (duty cycle:10% ED). Thermal relay for protection built in.	54
Operating inverter externally	Digital operator for remote operation	JVOP-144 JVOP-146	Use in combination with the remote interface for remote operation.	53
	Cable for remote interface	(WV001) 1m	Use to control digital operator when using remote interface.	53
		(WV003) 3m		
	Blank cover for remote interface	CVST31060	Use together with digital operator for remote operation.	53
	Operator attachment	EZZ08386A	Insert the digital operator of the inverter (JVOP-140, 147) in this attachment to use it as remote operator (equivalent to JVOP-144, 146).	53
Connecting inverter with field network	MECHATROLINK communication interface unit	SI-T/V7	Used as interface unit when performing MECHATROLINK communication with host controller.	56
	Inverter for DeviceNet communications	CIMR-V7 NA□□□□	Used when performing DeviceNet communication with host controller.	58
	CC-Link communication interface unit	SI-C/V7	Used as interface unit when performing CC-Link communication with host controller.	56
	Inverter for CC-Link communication	CIMR-V7 DA□□□□	Used when performing CC-Link communications with host controller. (No models currently available for 5.5-kW and 7.5-kW motors.)	58
	Profibus-DP communication interface unit	SI-P1/V7	Used as interface unit when performing Profibus-DP communication with host controller.	56
Using instead of each individual digital operator	Blank cover	CVST31059	Mounted instead of a digital operator when constant setting or run command with a operator is not necessary, such as group drives.	–
Simple mounting of inverter on control board inside the enclosure	DIN rail mounting attachment	(EZZ08122A) [W-length: 68mm] (EZZ08122B) [W-length: 108mm] (EZZ08122C) [W-length: 140mm] (EZZ08122D) [W-length: 170mm]	Attachment to mount inverter on DIN rail. Attach to rear of inverter.	–
Replacing with PC3 series inverter	PC3 series replacing attachment	(EZZ0811□□)	Attachment to install in the same way as VS-606 PC3 series. Attach to rear of inverter.	59
External setting and monitoring of frequency and voltage	Frequency meter	DCF-6A	Used to set and monitor frequency externally.	55
	Frequency setter	RH000739		
	Frequency setting knob	CM-3S		
	Output voltmeter	SCF-12NH	Used to monitor output voltage. The volt-meter can be used only with PWM inverters.	55
Frequency reference input, and calibration of frequency meter and ammeter scales	Frequency meter adjusting potentiometer	RH000850	Used to calibrate frequency meter and ammeter scales.	55



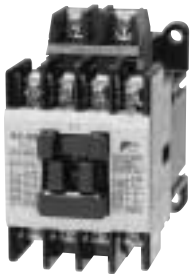
∗: When using a ground fault interrupter, select one not affected by high frequencies. To prevent malfunctions, the current should be 200mA or more and the operating time 0.1s or more.
Recommended ground fault interrupters:
- NV series by Mitsubishi Electric Co., Ltd.
- EG, SG series by Fuji Electric Co., LTD.

Molded-case Circuit Breaker (MCCB) and Magnetic Contactor (MC)

Be sure to connect a MCCB between the power supply and the input AC reactor.
Connect a MC if required.



Molded-case Circuit Breaker (MCCB)
[Mitsubishi Electric Corporation]



Power Supply Magnetic Contactor (MC)
[Fuji Electric FA Components & Systems Co., Ltd.]

200V Three-phase Input Series

Motor Capacity kW	VS-606 V7 Model CIMR-V7□A□	Molded-Case Circuit Breaker (MCCB)				Magnetic Contactor (MC)			
		Without Reactor		With Reactor		Without Reactor		With Reactor	
		Model	Rated Current A	Model	Rated Current A	Model	Rated Current A	Model	Rated Current A
0.1	20P1	NF30	5	NF30	3	SC-03	11	SC-03	11
0.2	20P2	NF30	5	NF30	3	SC-03	11	SC-03	11
0.4	20P4	NF30	5	NF30	5	SC-03	11	SC-03	11
0.75	20P7	NF30	10	NF30	10	SC-03	11	SC-03	11
1.5	21P5	NF30	20	NF30	15	SC-4-0	18	SC-03	11
2.2	22P2	NF30	20	NF30	15	SC-N1	26	SC-4-0	18
3.7	23P7	NF30	30	NF30	20	SC-N2	35	SC-N1	26
5.5	25P5	NF50	50	NF50	40	SC-N2S	50	SC-N2	35
7.5	27P5	NF100	60	NF50	50	SC-N3	65	SC-N2S	50

200V Single-phase Input Series

Motor Capacity kW	VS-606 V7 Model CIMR-V7□A□	Molded-Case Circuit Breaker (MCCB)				Magnetic Contactor (MC)			
		Without Reactor		With Reactor		Without Reactor		With Reactor	
		Model	Rated Current A	Model	Rated Current A	Model	Rated Current A	Model	Rated Current A
0.1	B0P1	NF30	5	NF30	3	SC-03	11	SC-03	11
0.2	B0P2	NF30	5	NF30	5	SC-03	11	SC-03	11
0.4	B0P4	NF30	10	NF30	10	SC-03	11	SC-03	11
0.75	B0P7	NF30	20	NF30	15	SC-4-0	18	SC-4-0	18
1.5	B1P5	NF30	30	NF30	30	SC-N2	35	SC-N1	26
2.2	B2P2	NF30	40	NF30	30	SC-N2	35	SC-N2	35
3.7	B3P7	NF50	50	NF50	40	SC-N2S	50	SC-N2S	50

400V Three-phase Input Series

Motor Capacity kW	VS-606 V7 Model CIMR-V7□A□	Molded-Case Circuit Breaker (MCCB)				Magnetic Contactor (MC)			
		Without Reactor		With Reactor		Without Reactor		With Reactor	
		Model	Rated Current A	Model	Rated Current A	Model	Rated Current A	Model	Rated Current A
0.2	40P2	NF30	5	NF30	3	SC-03	11	SC-03	11
0.4	40P4	NF30	5	NF30	3	SC-03	11	SC-03	11
0.75	40P7	NF30	5	NF30	5	SC-03	11	SC-03	11
1.5	41P5	NF30	10	NF30	10	SC-03	11	SC-03	11
2.2	42P2	NF30	20	NF30	10	SC-4-0	18	SC-03	11
3.0	43P0	NF30	20	NF30	15	SC-4-0	18	SC-03	11
3.7	43P7	NF30	20	NF30	15	SC-N1	26	SC-4-0	18
5.5	45P5	NF30	30	NF30	20	SC-N2	35	SC-N1	26
7.5	47P5	NF30	30	NF30	30	SC-N2	35	SC-N2	35

Surge Suppressor (Manufactured by NIPPON CHEMI-CON CORPORATION)

Connect surge suppressors to coils in magnetic contactors, control relays, electromagnetic valves, and electromagnetic brakes used as the VS-606 V7 peripheral units.

Coils of Magnetic Contactor and Control Relay			Surge Suppressor		
			Model	Specifications	Code No.
200V to 230V	Large-size Magnetic Contactors		DCR2-50A22E	220VAC 0.5 μF+200Ω	C002417
	Control Relay	MY2*1, MY3*1 MM2*1, MM4*1 HH22*2, HH23*2	DCR2-10A25C	250VAC 0.1 μF+100Ω	C002482
380 to 460V			RFN3AL504KD	1000VDC 0.5 μF+220Ω	C002630

DCR2-50A22E

DCR2-10A25C

RFN3AL504KD

*1: Manufactured by Omron Corporation.
*2: Manufactured by Fuji Electric FA Components & Systems Co., Ltd.

Isolator

(Insulation Type DC Transmission Converter)

690-169

Performance

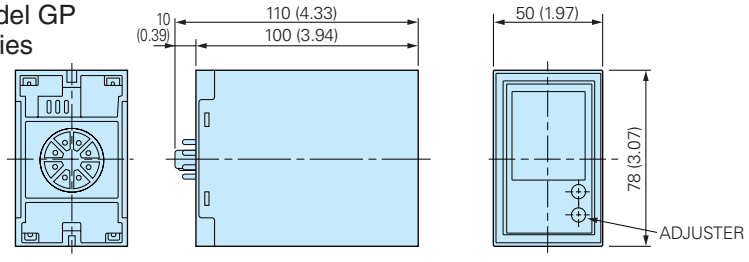
Allowance	±0.25% of output span [Ambient temp : 23°C, (73.4°F)]
Temperature Influence	With ±0.25% of output span [The value at ±10°C (±50°F) of ambient temp.]
Aux. Power Supply Influence	With ±0.1% of output span (The value at ±10% of aux. power supply)
Load Resistance Influence	With ±0.05% of output span (In the range of load resistance)
Output Ripple	With ±0.5%P-P of output span
Response Time	0.5 sec. or less (Time to settle to ±1% of final steady value)
Withstand Voltage	2000VAC for one min. (between each terminal of input, output, power supply and enclosure)
Insulation Resistance	20MΩ and above (by 500VDC megger) (between each terminal of input, output, power supply and enclosure)

Product Line

Model	Input Signal	Output Signal	Power Supply	Code No.
DGP2-4-4	0-10V	0-10V	100VAC	CON 000019.25
DGP2-4-8	0-10V	4-20mA	100VAC	CON 000019.26
DGP2-8-4	4-20mA	0-10V	100VAC	CON 000019.35
DGP2-3-4	0-5V	0-10V	100VAC	CON 000019.15
DGP3-4-4	0-10V	0-10V	200VAC	CON 000020.25
DGP3-4-8	0-10V	4-20mA	200VAC	CON 000020.26
DGP3-8-4	4-20mA	0-10V	200VAC	CON 000020.35
DGP3-3-4	0-5V	0-10V	200VAC	CON 000020.15

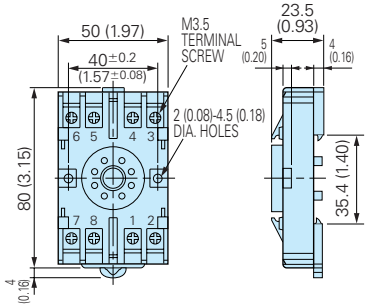
Dimensions in mm (inches)

Model GP Series

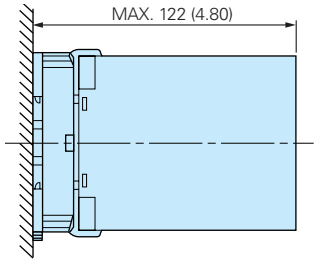


Adjuster's position or PC's varies due to models.

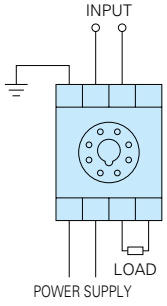
Socket



View of socket mounted



Connection



Terminal	Description
1	Output +
2	Output –
3	–
4	Input +
5	Input –
6	Grounding
7	Power supply
8	

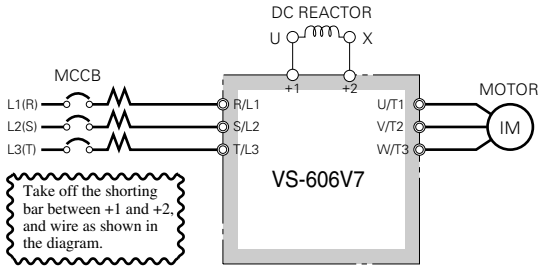
Cable length

- 4 to 20mA : Within 100m
- 0 to 10V : Within 50m

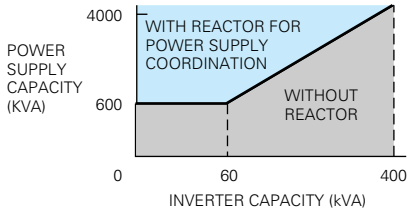
DC Reactor (UZDA-B for DC circuit)

95-68088

Connection Example



When power capacity is significantly greater when compared to inverter capacity, or when the power-factor needs to be improved, connect the AC or DC reactor.
AC reactor can be used at the same time for harmonic measure.



200V Class

Max. Applicable Motor Output kW (HP)	Current Value A	Inductance mH	Parts Code No.	Fig. No.	Dimensions in mm (inches)										Approx. Mass kg (lb)	Loss W	Wire Size* mm² (in²)
					X	Y_1	Y_2	Z	B	H	K	G	ϕ1	ϕ2			
0.4 (0.5)	5.4	8	X010048	1	85 (3.35)	—	—	53 (2.09)	74 (2.91)	—	—	32 (1.26)	M4	—	0.8 (2.3)	8	2 (0.0031)
0.75 (1)																	
1.5 (2)	18	3	X010049	2	86 (3.39)	36 (1.41)	80 (3.15)	76 (2.99)	60 (2.36)	55 (2.17)	18 (0.71)	—	M4	M5	2.0 (5.6)	18	5 (0.0085)
2.2 (3)																	
3.7 (5)																	
5.5 (7.5)	36	1	X010050		105 (4.13)	90 (3.54)	46 (1.81)	93 (3.66)	64 (2.52)	80 (3.15)	26 (1.02)	—	M6	M6	3.2 (0.13)	22	8 (0.0124)
7.5 (10)																	

400V Class

Max. Applicable Motor Output kW (HP)	Current Value A	Inductance mH	Parts Code No.	Fig. No.	Dimensions in mm (inches)										Approx. Mass kg (lb)	Loss W	Wire Size* mm² (in²)
					X	Y_1	Y_2	Z	B	H	K	G	ϕ1	ϕ2			
0.4 (0.5)	3.2	28	X010052	1	85 (3.35)	—	—	53 (2.09)	74 (2.91)	—	—	32 (1.26)	M4	—	0.8 (2.3)	9	2 (0.0031)
0.75 (1)																	
1.5 (2)	5.7	11	X010053		90 (3.54)	—	—	60 (2.36)	80 (3.15)	—	—	32 (1.26)	M4	—	1.0 (2.8)	11	2 (0.0031)
2.2 (3)																	
3.7 (5)	12	6.3	X010054	2	86 (3.39)	36 (1.41)	80 (3.15)	76 (2.99)	60 (2.36)	55 (2.17)	18 (0.71)	—	M4	M5	2.0 (5.6)	16	2 (0.0031)
5.5 (7.5)	23	3.6	X010055		105 (4.13)	90 (3.54)	46 (1.81)	93 (3.66)	64 (2.52)	80 (3.15)	26 (1.02)	—	M6	M5	3.2 (0.13)	27	5.5 (0.0085)
7.5 (10)																	

∗ 75°C(167°F), IV cable, 45°C (113°F) ambient temperature, three or less wires connected.

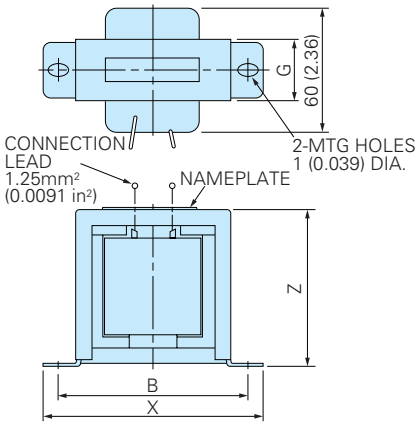


Figure 1

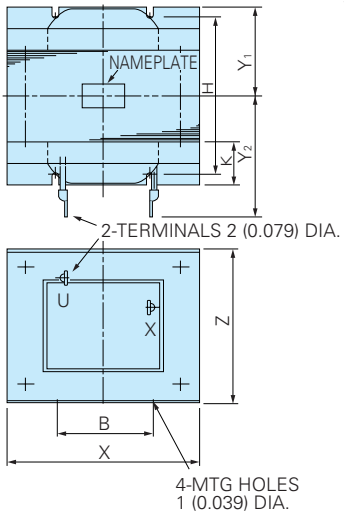
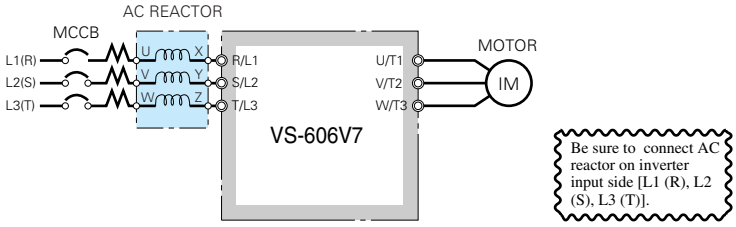


Figure 2

AC Reactor (Model UZBA-B for Input 50/60Hz)

96-72111

Connection Example



When power capacity is significantly greater when compared to inverter capacity, or when the power-factor needs to be improved, connect the AC or DC reactor. In order to suppress high harmonic wave, DC reactor can be used with AC reactor.

200V Class (Three-phase Input)

Max. Applicable Motor Output kW (HP)	Current Value A	Inductance mH	Parts Code No.	Fig. No.	Dimensions in mm (inches)													Approx. Mass kg (lb)	Loss W
					A	B	B_1	C	D	E	F	H	J	K	L	M			
0.1 (0.13)	2	7.0	X002764	1	120 (4.72)	71 (2.80)	—	120 (4.72)	40 (1.57)	50 (1.97)	105 (4.13)	20 (0.79)	M6	10.5 (0.41)	7 (0.28)	M4		2.5 (5.51)	15
0.2 (0.25)																			
0.4 (0.5)	2.5	4.2	X002553																
0.75 (1)	5	2.1	X002554																
1.5 (2)	10	1.1	X002489		130 (5.12)	88 (3.46)	—	130 (5.12)	50 (1.97)	70 (2.76)	130 (5.12)	22 (0.87)		11.5 (0.45)				3 (6.62)	25
2.2 (3)	15	0.71	X002490																30
3.7 (5)	20	0.53	X002491	2	130 (5.12)	88 (3.46)	114 (4.49)	105 (4.13)	50 (1.97)	70 (2.76)	130 (5.12)	22 (0.87)	M6	11.5 (0.45)	7 (0.28)	M5		3 (6.62)	35
5.5 (7.5)	30	0.35	X002492		130 (5.12)	88 (3.46)	119 (4.69)	105 (4.13)	50 (1.97)	70 (2.76)	130 (5.12)	22 (0.87)		9 (0.35)	7 (0.28)	M5		3 (6.62)	45
7.5 (10)	40	0.265	X002493		130 (5.12)	98 (3.86)	139 (5.47)	105 (4.13)	50 (1.97)	80 (3.15)	130 (5.12)	22 (0.87)		11.5 (0.45)	7 (0.28)	M6		4 (8.82)	50

400V Class (Three-phase Input)

Max. Applicable Motor Output kW (HP)	Current Value A	Inductance mH	Parts Code No.	Fig. No.	Dimensions in mm (inches)													Approx. Mass kg (lb)	Loss W
					A	B	B_1	C	D	E	F	H	J	K	L	M			
0.2 (0.25)	1.3	18.0	X002561	1	120 (4.72)	71 (2.80)	—	120 (4.72)	40 (1.57)	50 (1.97)	105 (4.13)	20 (0.79)	M6	10.5 (0.41)	7 (0.28)	M4		2.5 (5.51)	15
0.4 (0.5)																			
0.75 (1)	2.5	8.4	X002562																
1.5 (2)	5	4.2	X002563		130 (5.12)	88 (3.46)		130 (5.12)	50 (1.97)	70 (2.76)	130 (5.12)	22 (0.87)		9 (0.35)				3 (6.62)	25
2.2 (3)	7.5	3.6	X002564																35
3.7 (5)	10	2.2	X002500											11.5 (0.45)		M5			40
5.5 (7.5)	15	1.42	X002501		130 (5.12)	98 (3.86)	—	130 (5.12)	50 (1.97)	80 (3.15)	130 (5.12)	22 (0.87)		11.5 (0.45)	7 (0.28)	M4		4 (8.82)	50
7.5 (10)	20	1.06	X002502	2	160 (6.30)	90 (3.54)	115 (4.53)	130 (5.12)	75 (2.95)	70 (2.76)	160 (6.30)	25 (0.98)	M6	10 (0.39)	7 (0.28)	M5		5 (11.02)	50

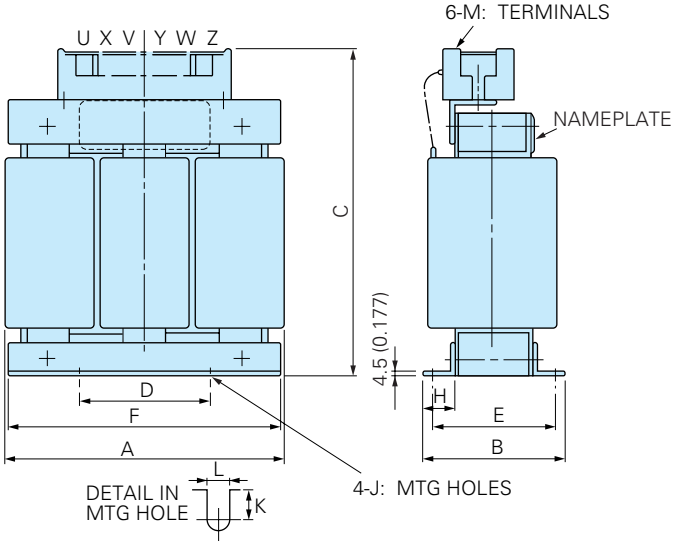


Figure 1

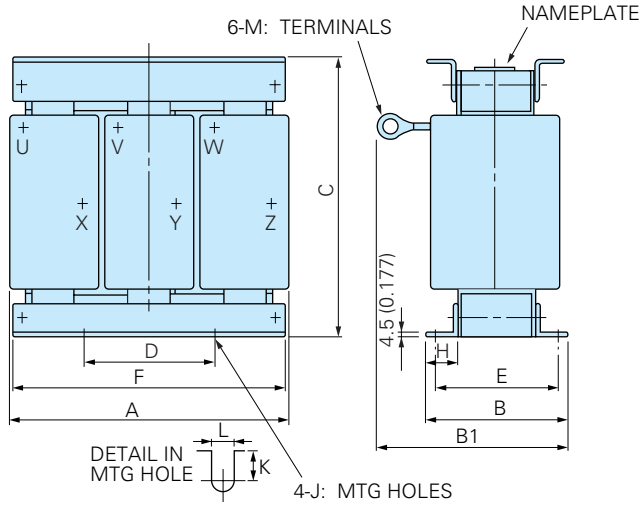
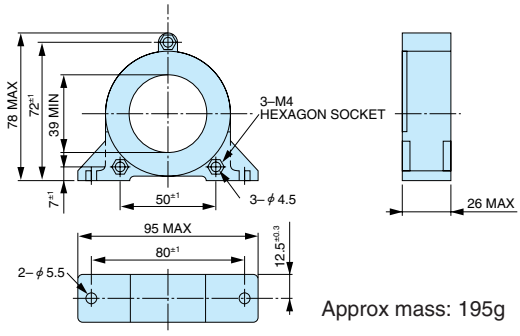


Figure 2

Zero Phase Reactor

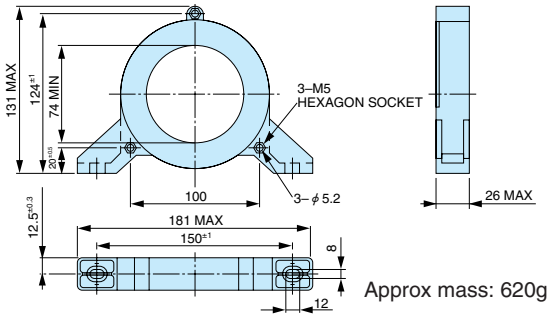
Finemet Zero Phase Reactor to Reduce Radio Noise (Made by Hitachi Metals, Ltd.)

Note: Finemet is a registered trademark of Hitachi Metals, Ltd.



Approx mass: 195g

Model F6045GB



Approx mass: 620g

Model F11080GB

200V Three-phase Input Series

Inverter		Finemet Zero Phase Reactor			
Model	Recommended Wire Size mm²	Model	Code No.	Qty.	Recommended Wiring Method
CIMR-V7□A20P1	2	F6045GB	FIL001098	1	4 passes through core
CIMR-V7□A20P2					
CIMR-V7□A20P4					
CIMR-V7□A20P7					
CIMR-V7□A21P5					
CIMR-V7□A22P2	3.5				
CIMR-V7□A23P7	5.5				
CIMR-V7□A25P5	8	F11080GB	FIL001097		
CIMR-V7□A27P5					

200V Single-phase Input Series

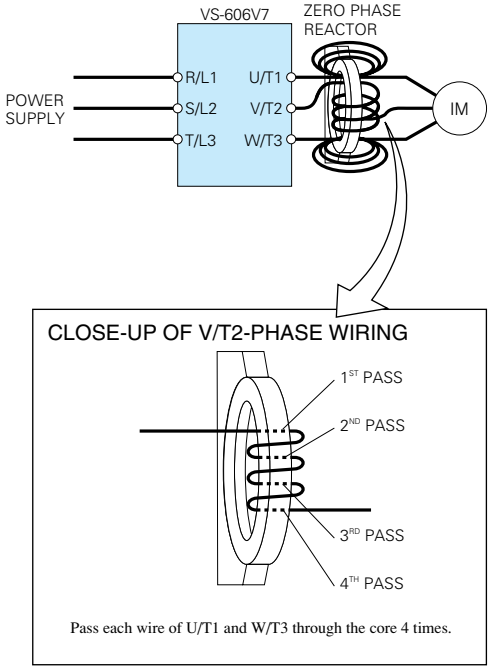
Inverter		Finemet Zero Phase Reactor			
Model	Recommended Wire Size mm²	Model	Code No.	Qty.	Recommended Wiring Method
CIMR-V7□AB0P1	2	F6045GB	FIL001098	1	4 passes through core
CIMR-V7□AB0P2					
CIMR-V7□AB0P4					
CIMR-V7□AB0P7	3.5				
CIMR-V7□AB1P5	5.5				
CIMR-V7□AB2P2					
CIMR-V7□AB3P7	8	F11080GB	FIL001097		

400V Three-phase Input Series

Inverter		Finemet Zero Phase Reactor			
Model	Recommended Wire Size mm²	Model	Code No.	Qty.	Recommended Wiring Method
CIMR-V7□A40P2	2	F6045GB	FIL001098	1	4 passes through core
CIMR-V7□A40P4					
CIMR-V7□A40P7					
CIMR-V7□A41P5					
CIMR-V7□A42P2					
CIMR-V7□A43P7					
CIMR-V7□A45P5	5.5				
CIMR-V7□A47P7					

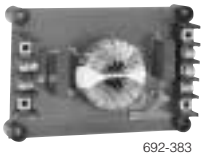
Can be used both for input and output sides of the inverter and effective on noise reduction. Pass each wire (R/L1, S/L2, T/L3 or U/T1, V/T2, W/T3) through the core 4 times.

Connection Diagram (Output)

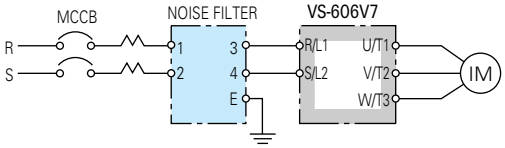


Input Noise Filter

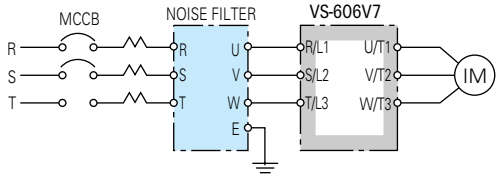
Note: Use a special EMC-compatible noise filter with the inveter to meet the CE marking standards. Contact your Yaskawa representative.


692-383

Example: Single-phase input (LNFB type)



Three-phase input (LNFD type)



Noise Filter without Case

Specifications	Max. Applicable Motor Output kW (HP)	Inverter Capacity kVA	Rated Current A	Model	Product Code	Parts Codes No.	Figure No.	Dimensions in mm (inches)						Mounting Screw	Approx. Mass kg (lb)
								W	D	H	A	A'	B		
200V Class (Single-phase)	0.1 (0.13), 0.2 (0.25)	0.3, 0.6	10	LNFB-2102DY	72600-B2102DY	FIL 128	1	120 (4.72)	80 (3.15)	50 (1.97)	108 (4.25)	–	68 (2.68)	M4×4, 20mm (0.79in.)	0.1 (0.22)
	0.4 (0.5)	1.1	15	LNFB-2152DY	72600-B2152DY	FIL 129	1	120 (4.72)	80 (3.15)	50 (1.97)	108 (4.25)	–	68 (2.68)	M4×4, 20mm (0.79in.)	0.2 (0.44)
	0.75 (1)	1.9	20	LNFB-2202DY	72600-B2202DY	FIL 130	1	120 (4.72)	80 (3.15)	50 (1.97)	108 (4.25)	–	68 (2.68)	M4×4, 20mm (0.79in.)	0.2 (0.44)
	1.5 (2)	3.0	30	LNFB-2302DY	72600-B2302DY	FIL 131	1	130 (5.12)	90 (3.54)	65 (2.56)	118 (4.65)	–	78 (3.07)	M4×4, 20mm (0.79in.)	0.3 (0.66)
	2.2 (3)	4.2	20×2P	LNFB-2202DY	72600-B2202DY	FIL 130	1	120 (4.72)	80 (3.15)	50 (1.97)	108 (4.25)	–	68 (2.68)	M4×4, 20mm (0.79in.)	0.2 (0.44)
	3.7 (5)	6.7	30×2P	LNFB-2302DY	72600-B2302DY	FIL 131	1	130 (5.12)	90 (3.54)	65 (2.56)	118 (4.65)	–	78 (3.07)	M4×4, 20mm (0.79in.)	0.3 (0.66)
200V Class (Three-phase)	0.1 (0.13) to 0.75 (1)	0.3 to 1.9	10	LNFD-2103DY	72600-D2103DY	FIL 132	2	120 (4.72)	80 (3.15)	55 (2.17)	108 (4.25)	–	68 (2.68)	M4×4, 20mm (0.79in.)	0.2 (0.44)
	1.5 (2)	3.0	15	LNFD-2153DY	72600-D2153DY	FIL 133	2	120 (4.72)	80 (3.15)	55 (2.17)	108 (4.25)	–	68 (2.68)	M4×4, 20mm (0.79in.)	0.2 (0.44)
	2.2 (3)	4.2	20	LNFD-2203DY	72600-D2203DY	FIL 134	2	170 (6.69)	90 (3.54)	70 (2.76)	158 (6.22)	–	78 (3.07)	M4×4, 20mm (0.79in.)	0.4 (0.88)
	3.7 (5)	6.7	30	LNFD-2303DY	72600-D2303DY	FIL 135	3	170 (6.69)	110 (4.33)	70 (2.76)	–	79 (3.11)	98 (3.86)	M4×6, 20mm (0.79in.)	0.5 (1.10)
	5.5 (7.5)	9.5	20×2P	LNFD-2203DY	72600-D2203DY	FIL 134	2	170 (6.69)	90 (3.54)	70 (2.76)	158 (6.22)	–	78 (3.07)	M4×4, 20mm (0.79in.)	0.4 (0.88)
	7.5 (10)	13	30×2P	LNFD-2303DY	72600-D2303DY	FIL 135	3	170 (6.69)	110 (4.33)	70 (2.76)	–	79 (3.11)	98 (3.86)	M4×6, 20mm (0.79in.)	0.5 (1.10)
400V Class (Three-phase)	0.2 (0.25) to 0.75 (1)	0.9 to 2.6	5	LNFD-4053DY	72600-D4053DY	FIL 144	3	170 (6.69)	130 (5.12)	75 (2.95)	–	79 (3.11)	118 (4.65)	M4×6, 30mm (1.18in.)	0.3 (0.66)
	1.5 (2), 2.2 (3)	3.7 to 4.2	10	LNFD-4103DY	72600-D4103DY	FIL 145	3	170 (6.69)	130 (5.12)	95 (3.94)	–	79 (3.11)	118 (4.65)	M4×6, 30mm (1.18in.)	0.4 (0.88)
	3.0 (2.2), 3.7 (5)	5.5 to 7.0	15	LNFD-4503DY	72600-D4153DY	FIL 146	3	170 (6.69)	130 (5.12)	95 (3.94)	–	79 (3.11)	118 (4.65)	M4×6, 30mm (1.18in.)	0.4 (0.88)
	5.5 (7.5)	11	20	LNFD-4203DY	72600-D2203DY	FIL 147	3	200 (7.87)	145 (5.71)	100 (3.94)	–	94 (3.70)	133 (5.24)	M4×6, 30mm (1.18in.)	0.5 (1.10)
	7.5 (10)	14	30	LNFD-4303DY	72600-D2303DY	FIL 148	3	200 (7.87)	145 (5.71)	100 (3.94)	–	94 (3.70)	133(5.24)	M4×6, 30mm (1.18in.)	0.6 (1.32)

Note: "2P" in the column for the rated current indicates that the two noise filters on the input-terminal side are connected in parallel.

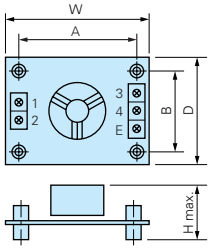


Figure 1

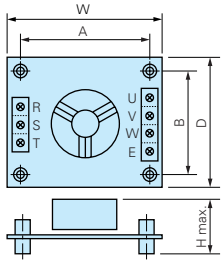


Figure 2

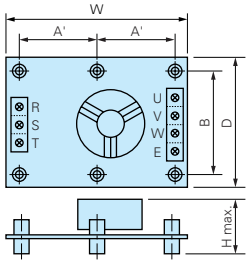
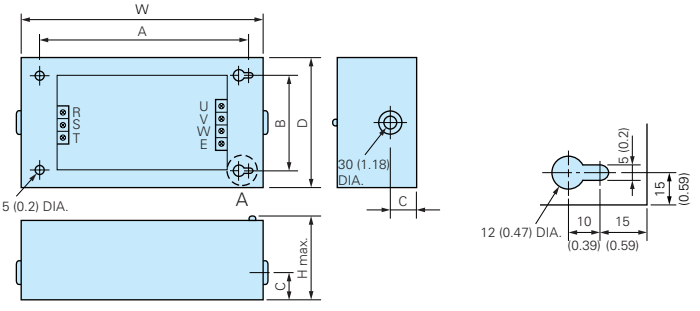


Figure 3

Noise Filter with Case

Specifications	Max. Applicable Motor Output kW (HP)	Inverter Capacity kVA	Rated Current A	Model	Product Code	Parts Codes No.	Dimensions in mm (inches)						Mounting Screw	Approx. Mass kg (lb)
							W	D	H	A	B	C		
200V Class (Single-phase)	0.1 (0.13), 0.2 (0.25)	0.3, 0.6	10	LNFB-2102HY	72600-B2102HY	FIL 136	185 (7.28)	95 (3.74)	85 (3.35)	155 (6.10)	65 (2.56)	33 (1.30)	M4×4, 10mm (0.39in.)	0.8 (1.77)
	0.4 (0.5)	1.1	15	LNFB-2152HY	72600-B2152HY	FIL 137	185 (7.28)	95 (3.74)	85 (3.35)	155 (6.10)	65 (2.56)	33 (1.30)	M4×4, 10mm (0.39in.)	0.8 (1.77)
	0.75 (1)	1.9	20	LNFB-2202HY	72600-B2202HY	FIL 138	185 (7.28)	95 (3.74)	85 (3.35)	155 (6.10)	65 (2.56)	33 (1.30)	M4×4, 10mm (0.39in.)	0.9 (1.99)
	1.5 (2)	3.0	30	LNFB-2302HY	72600-B2302HY	FIL 139	200 (7.87)	105 (4.13)	95 (3.74)	170 (6.69)	75 (2.95)	33 (1.30)	M4×4, 10mm (0.39in.)	1.1 (2.43)
	2.2 (3)	4.2	20×2P	LNFB-2202HY	72600-B2202HY	FIL 138	185 (7.28)	95 (3.74)	85 (3.35)	155 (6.10)	65 (2.56)	33 (1.30)	M4×4, 10mm (0.39in.)	0.9 (1.99)
	3.7 (5)	6.7	30×2P	LNFB-2302HY	72600-B2302HY	FIL 139	200 (7.87)	105 (4.13)	95 (3.74)	170 (6.69)	75 (2.95)	33 (1.30)	M4×4, 10mm (0.39in.)	1.1 (2.43)
200V Class (Three-phase)	0.1 (0.13) to 0.75 (1)	0.3 to 1.9	10	LNFD-2103HY	72600-D2103HY	FIL 140	185 (7.28)	95 (3.74)	85 (3.35)	155 (6.10)	65 (2.56)	33 (1.30)	M4×4, 10mm (0.39in.)	0.9 (1.99)
	1.5 (2)	3.0	15	LNFD-2153HY	72600-D2153HY	FIL 141	185 (7.28)	95 (3.74)	85 (3.35)	155 (6.10)	65 (2.56)	33 (1.30)	M4×4, 10mm (0.39in.)	0.9 (1.99)
	2.2 (3)	4.2	20	LNFD-2203HY	72600-D2203HY	FIL 142	240 (9.45)	125 (4.92)	100 (3.94)	210 (8.27)	95 (3.74)	33 (1.30)	M4×4, 10mm (0.39in.)	1.5 (3.31)
	3.7 (5)	6.7	30	LNFD-2303HY	72600-D2303HY	FIL 143	240 (9.45)	125 (4.92)	100 (3.94)	210 (8.27)	95 (3.74)	33 (1.30)	M4×4, 10mm (0.39in.)	1.6 (3.53)
	5.5 (7.5)	9.5	20×2P	LNFD-2203HY	72600-D2203HY	FIL 142	240 (9.45)	125 (4.92)	100 (3.94)	210 (8.27)	95 (3.74)	33 (1.30)	M4×4, 10mm (0.39in.)	1.5 (3.31)
	7.5(10)	13	30×2P	LNFD-2303HY	72600-D2303HY	FIL 143	240 (9.45)	125 (4.92)	100 (3.94)	210 (8.27)	95 (3.74)	33 (1.30)	M4×4, 10mm (0.39in.)	1.6 (3.53)
400V Class (Three-phase)	0.2 (0.25) to 0.75 (1)	0.9 to 2.6	5	LNFD-4053HY	72600-D4053HY	FIL 149	235 (9.25)	140 (5.51)	120 (4.72)	205 (8.07)	110 (4.33)	43 (1.69)	M4×4, 10mm (0.39in.)	1.6 (3.53)
	1.5 (2), 2.2 (3)	3.7 to 4.2	10	LNFD-4103HY	72600-D4103HY	FIL 150	235 (9.25)	140 (5.51)	120 (4.72)	205 (8.07)	110 (4.33)	43 (1.69)	M4×4, 10mm (0.39in.)	1.7 (3.75)
	3.0 (2.2), 3.7 (5)	5.5 to 7.0	15	LNFD-4153HY	72600-D4153HY	FIL 151	235 (9.25)	140 (5.51)	120 (4.72)	205 (8.07)	110 (4.33)	43 (1.69)	M4×4, 10mm (0.39in.)	1.7 (3.75)
	5.5 (7.5)	11	20	LNFD-4203HY	72600-D4203HY	FIL 152	270 (10.63)	155 (6.10)	125 (4.92)	240 (9.45)	125 (4.92)	43 (1.69)	M4×4, 10mm (0.39in.)	2.2(4.85)
	7.5(10)	14	30	LNFD-4303HY	72600-D4303HY	FIL 153	270 (10.63)	155 (6.10)	125 (4.92)	240 (9.45)	125 (4.92)	43 (1.69)	M4×4, 10mm (0.39in.)	2.2(4.85)

Note: "2P" in the column for the rated current indicates that the two noise filters on the input-terminal side are connected in parallel.

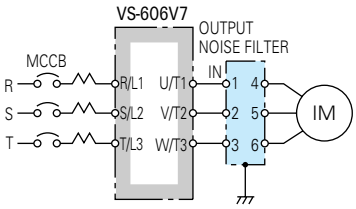


Example three-phase input.

Output Noise Filter
(Tohoku Metal Industries Co., Ltd.)

690-119

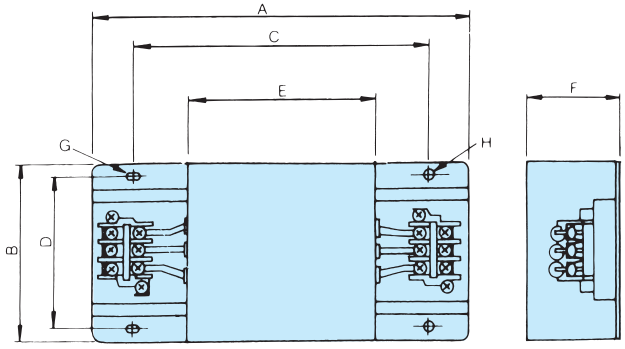
Example



Specifications

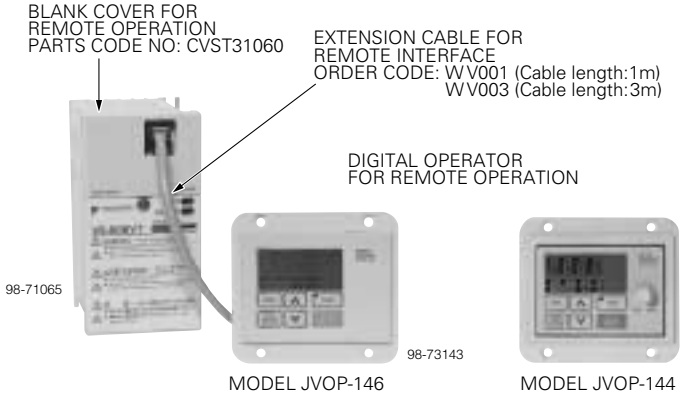
Spec. / Voltage	Max. Applicable Motor Output kW (HP)	Inverter Capacity kVA	Model	Rated Current A	Part Code No.
200V class Three-phase	0.1 (0.13)	0.3	LF-310KA	10	FIL 000068
	0.2 (0.25)	0.6	LF-310KA	10	FIL 000068
	0.4 (0.5)	1.1	LF-310KA	10	FIL 000068
	0.75 (1)	1.9	LF-310KA	10	FIL 000068
	1.5 (2)	3.0	LF-310KA	10	FIL 000068
	2.2 (3)	4.2	LF-320KA	20	FIL 000069
	3.7 (5)	6.7	LF-320KA	20	FIL 000069
	5.5 (7.5), 7.5 (10)	9.5, 13	LF-350KA	50	FIL 000070
400V class Three-phase	0.2 (0.25), 0.4 (0.5)	0.9, 1.4	LF-310KB	10	FIL 000071
	0.75 (1)	2.6	LF-310KB	10	FIL 000071
	1.5 (2)	3.7	LF-310KB	10	FIL 000071
	2.2 (3)	4.2	LF-310KB	10	FIL 000071
	3.0 (2.2), 3.7 (5)	5.5, 7.0	LF-310KB	10	FIL 000071
	5.5 (7.5), 7.5 (10)	11, 14	LF-320KB	20	FIL 000072

Dimensions



Model	Terminal Plate	Dimensions in mm (inches)								Approx. Mass kg (lb)
		A	B	C	D	E	F	G	H	
LF-310KA	TE-K5.5M4	140 (5.51)	100 (3.94)	100 (3.94)	90 (3.54)	70 (2.76)	45 (1.77)	7×4.5 (0.18) dia.	4.5 (0.18) dia.	0.5 (1.10)
LF-320KA	TE-K5.5M4	140 (5.51)	100 (3.94)	100 (3.94)	90 (3.54)	70 (2.76)	45 (1.77)	7×4.5 (0.18) dia.	4.5 (0.18) dia.	0.6 (1.32)
LF-350KA	TE-K22M6	260 (10.24)	180 (7.09)	180 (7.09)	160 (6.30)	120 (4.72)	65 (2.56)	7×4.5 (0.18) dia.	4.5 (0.18) dia.	2.0 (4.41)
LF-310KB	TE-K5.5M4	140 (5.51)	100 (3.94)	100 (3.94)	90 (3.54)	70 (2.76)	45 (1.77)	7×4.5 (0.18) dia.	4.5 (0.18) dia.	0.5 (1.00)
LF-320KB	TE-K5.5M4	140 (5.51)	100 (3.94)	100 (3.94)	90 (3.54)	70 (2.76)	45 (1.77)	7×4.5 (0.18) dia.	4.5 (0.18) dia.	0.6 (1.32)

Digital Operator for Remote Operation (Model JVOP-146/144)



Note: Order digital operator, cable, and blank cover separately.

Attachment for Mounting Digital Operator on Panel (EZZ08386A)

An attachment is available to use the digital operator JVOP-140 (with analog volume) or JVOP-147 (without analog volume) on control panel.
For details, contact your YASKAWA representative.

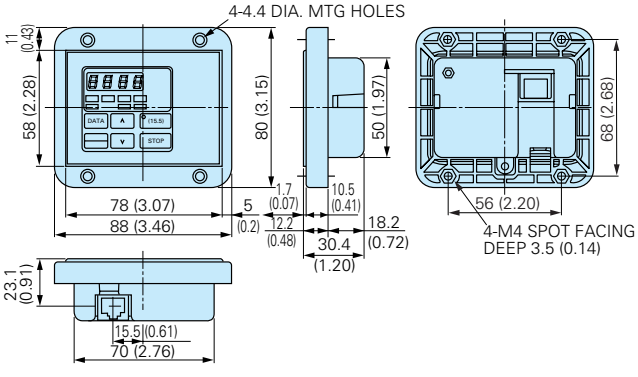
Analog Input Cable (WV201)

If using the CN2 terminal on the back of the digital operator, an analog input cable (cable length:1m) is available for the housing.

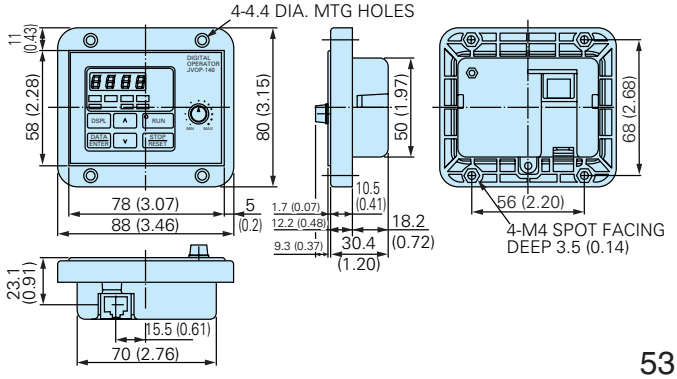
PC Communications Support Tool Cable

PC \ Inverter	Varispeed G7/ F7 VS-606 V7/J7
IBM-compatible computer (DOS/V) (DSUB9P)	WV103 (Cable length: 3m)

Dimensions in mm (inches) (Model: JVOP-146)



(Model: JVOP-144)



Braking Resistor, Braking Resistor Unit (Standard Specifications for 200-V and 400-V Classes)

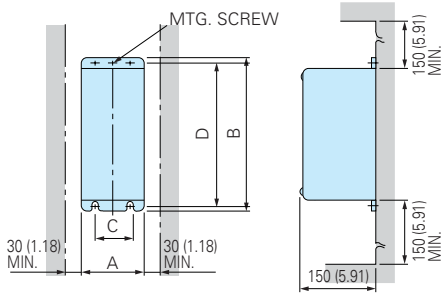
Voltage	Max. Applicable Motor Output kW (HP)	Inverter Model CIMR-V7□C□ Three-phase	Inverter Model CIMR-V7□C□ Single-phase	Braking Resistor Model ERF-150WJ□	Braking Resistor Resistance Ω	Braking Resistor Parts Code No.	Braking Resistor No. of Used	Braking Torque (3% ED) %	Overload Relay Model	Overload Relay Setting Current A	Braking Resistor Unit (Overload Relay Built-in) Model LKEB-□	Braking Resistor Unit (Overload Relay Built-in) Resistor Spec. (Per One Unit) W Ω	Braking Resistor Unit (Overload Relay Built-in) No. of Used	Braking Torque (10% ED) %	Connectable Min. Resistance Ω
200V (Single-/Three-phase)	0.1 (0.13)	20P1	B0P1	401	400	R007507	1	220	RH-13/0.15P	0.16	–	–	–	–	300
	0.2 (0.25)	20P2	B0P2	401	400	R007507	1	220	RH-13/0.3P	0.22	–	–	–	–	300
	0.4 (0.5)	20P4	B0P4	201	200	R007505	1	220	RH-13/0.5P	0.44	20P7	70 200	1	220	200
	0.75 (1)	20P7	B0P7	201	200	R007505	1	125	RH-13/0.5P	0.46	20P7	70 200	1	125	120
	1.5 (2)	21P5	B1P7	101	100	R007504	1	125	RH-13/0.8P	0.91	21P5	260 100	1	125	60
	2.2 (3)	22P2	B2P2	700	70	R007503	1	120	RH-13/1.2P	1.1	22P2	260 70	1	120	60
	3.7 (5)	23P7	B3P7	620	62	R007510	1	100	RH-13/1.4P	1.4	23P7	390 40	1	125	32
	5.5 (7.5)	25P5	–	–	–	–	–	–	–	–	25P5	520 30	1	115	9.6
	7.5 (10)	27P5	–	–	–	–	–	–	–	–	27P5	780 20	1	125	9.6
400V (Three-phase)	0.2 (0.25)	40P2	–	751	750	R007508	1	230	RH-13/0.15P	0.17	–	–	–	–	750
	0.4 (0.5)	40P4	–	751	750	R007508	1	230	RH-13/0.3P	0.24	40P7	70 750	1	230	750
	0.75 (1)	40P7	–	751	750	R007508	1	130	RH-13/0.3P	0.24	40P7	70 750	1	130	510
	1.5 (2)	41P5	–	401	400	R007507	1	125	RH-13/0.5P	0.46	41P5	260 400	1	125	240
	2.2 (3)	42P2	–	301	300	R007506	1	115	RH-13/0.5P	0.61	42P2	260 250	1	135	200
	3.0 (4)	43P0	–	401	400	R007507	2	105	RH-13/0.8P	0.93	43P7	390 150	1	135	100
	3.7 (5)	43P7	–												
	5.5 (7.5)	45P5	–	–	–	–	–	–	–	–	45P5	520 100	1	135	32
	7.5 (10)	47P5	–	–	–	–	–	–	–	–	47P5	780 75	1	130	32

Braking Resistor Unit
Model : LKEB

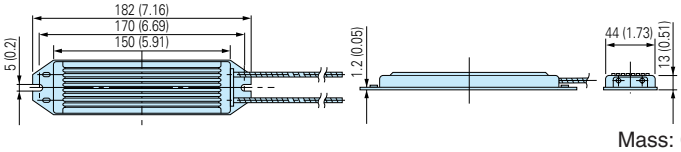
Braking Resistor
Model : ERF-150WJ

Braking Resistor Unit [Dimensions in mm (inches)]

Voltage	Model LKEB-□	Dimensions in mm (inches) A	B	C	D	MTG. Screw	Approx. Mass kg (lb)	Average Allowable Power Consumption W
200V Class	20P7	105 (4.13)	275 (10.83)	50 (1.97)	260 (10.24)	M5×3	3.0 (6.62)	30
	21P5	130 (5.12)	350 (13.78)	75 (2.95)	335 (13.19)	M5×4	4.5 (9.93)	60
	22P2	130 (5.12)	350 (13.78)	75 (2.95)	335 (13.19)	M5×4	4.5 (9.93)	89
	40P7	130 (5.12)	350 (13.78)	75 (2.95)	335 (13.19)	M5×4	5.0 (11.0)	150
	25P5	250 (9.84)	350 (13.78)	200 (7.87)	335 (13.19)	M6×4	7.5 (16.53)	220
	27P5	250 (9.84)	350 (13.78)	200 (7.87)	335 (13.19)	M6×4	8.5 (18.74)	300
400V Class	40P7	105 (4.13)	275 (10.83)	50 (1.97)	260 (10.24)	M5×3	3.0 (6.62)	30
	41P5	130 (5.12)	350 (13.78)	75 (2.95)	335 (13.19)	M5×4	4.5 (9.93)	60
	42P2	130 (5.12)	350 (13.78)	75 (2.95)	335 (13.19)	M5×4	4.5 (9.93)	89
	43P0	130 (5.12)	350 (13.78)	75 (2.95)	335 (13.19)	M5×4	5.0 (11.0)	150
	43P7							
	45P5	250 (9.84)	350 (13.78)	200 (7.87)	335 (13.19)	M6×4	7.5 (16.53)	220
	47P5	250 (9.84)	350 (13.78)	200 (7.87)	335 (13.19)	M6×4	8.5 (18.74)	300

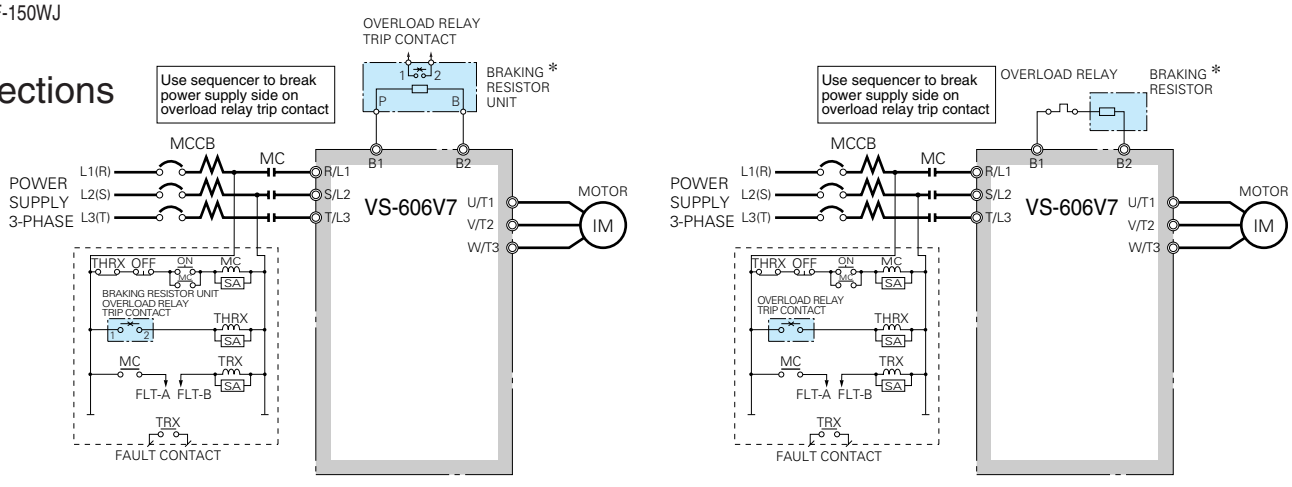


Braking Resistor [Dimensions in mm (inches)]



Mass: 0.2kg (0.44lb)

Connections



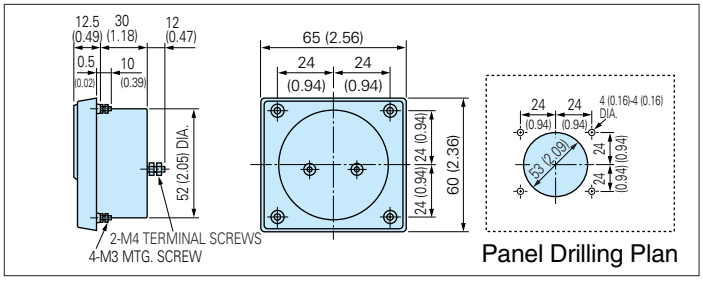
* When using a braking resistor (option), set the stall prevention during deceleration to "Disabled" (n092=1) or the motor might not stop within the set deceleration time.

Notes:
1 The load factor is for deceleration to stop a load with constant torque.
With constant output or continuous regenerative braking, the load factor is smaller than the specified value.
2 For an application with large regenerative power such as hoisting, the braking torque or other items may exceed the capacity of a braking unit with a braking resistor in a standard combination (and result in capacity overload). Contact your YASKAWA representatives when the braking torque or any other item exceeds the values in the table.
3 When using an externally-mounted braking unit for Varispeed series (model CDBR) instead of the built-in braking transistor, contact your YASKAWA representative.

Frequency Meter/Ammeter

MODEL DCF-6A*, 3V, 1mA : Analog frequency indicating meter is available as an option.


690-121



Panel Drilling Plan

Scale parts code no.

75Hz full scale: FM000065
60/120Hz full scale: FM000085

*: DCF-6A is 3V, 1mA, 3kΩ.
For VS-606V7 multi-function analog monitor output, set frequency meter adjusting potentiometer or constant n067 (analog monitor output gain) within the range of 0 to 3V (Initial setting is 0 to 10V).

Frequency Setting Potentiometer

MODEL RV30YN 20S, 2kΩ: Adjusts motor frequency through use of frequency setting knob located over the potentiometer.
(Parts code no.: RH000739)

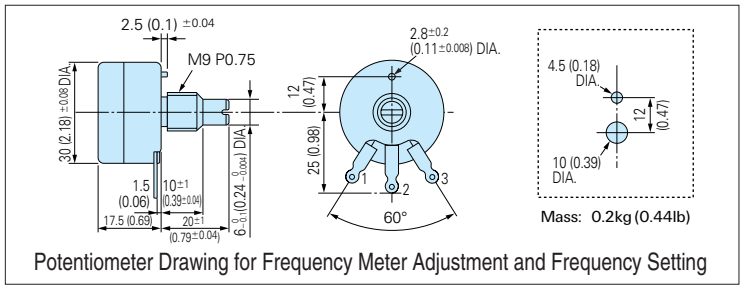
Frequency Meter Adjusting Potentiometer

MODEL RV30YN 20S, 2kΩ: Corrects frequency meter reading.
(Parts code no.: RH000850)

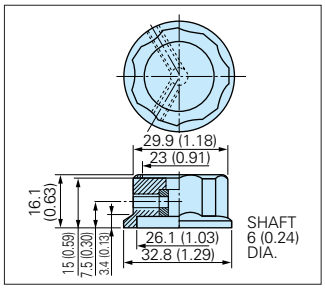
Frequency Setting Knob (Model CM-3S)

Used to adjust potentiometer frequency setting.


688-81



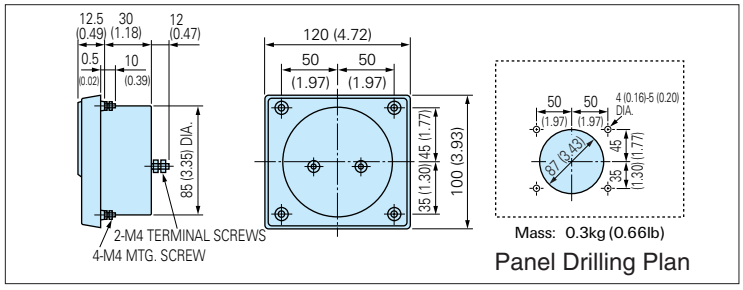
Potentiometer Drawing for Frequency Meter Adjustment and Frequency Setting



Output Voltmeter (Model SCF-12NH Rectification Type Class 2.5)

200V Class: 300V full-scale (Parts code no.: VM000481)
400V Class: 600V full-scale (Parts code no.: Output voltmeter: VM000502,
Transformer for instrument: PT000084)

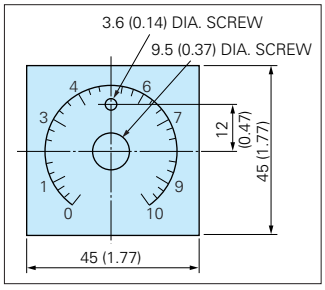

690-166



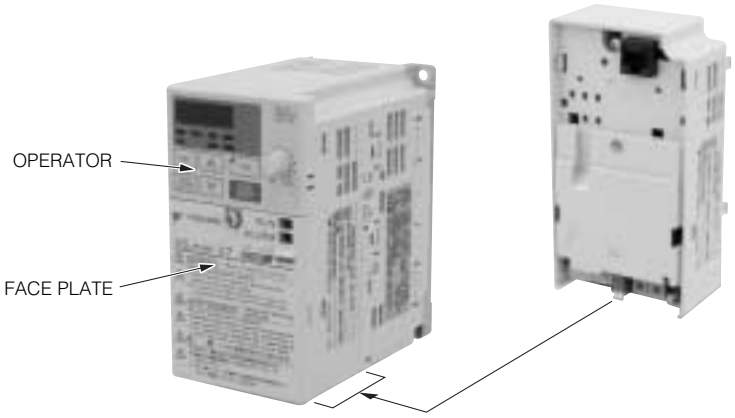
Panel Drilling Plan

Scale Plate

(Parts code no.: NPJT41561-1)



Communication Interface Unit



Interface Unit attached to Inverter

MECHATROLINK Communication Interface Unit (SI-T/V7)

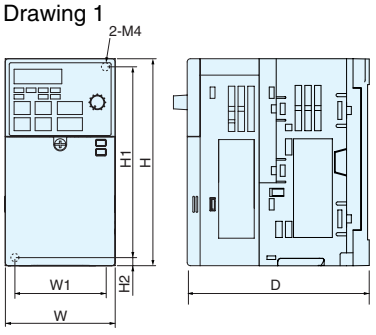
Profibus-DP Communication Interface Unit (SI-P1/V7)

CC-Link Communication Interface Unit (SI-C/V7)

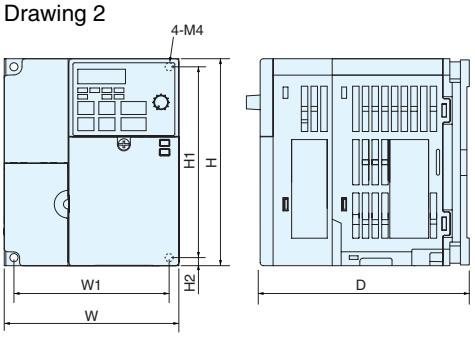
Dimensions in mm

Note: Optional communication units are shown as attached in drawings.

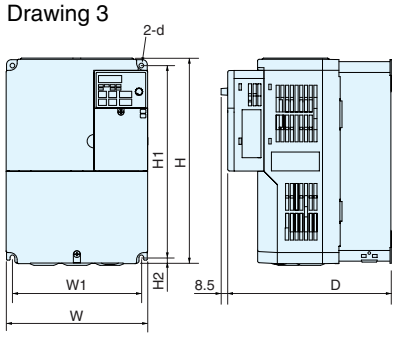
Drawing 1



Drawing 2



Drawing 3

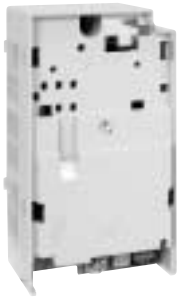


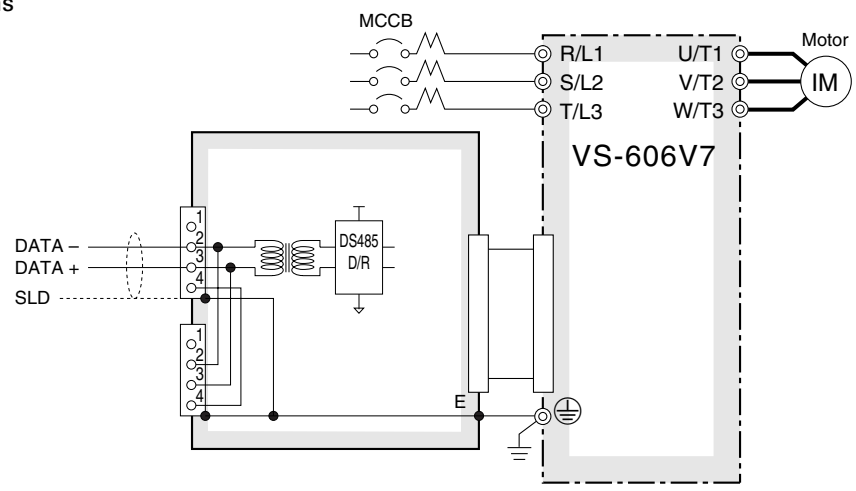
Voltage Class	Max. Applicable Motor Output kW	Inverter Model CIMR-V7A* ☐☐☐☐	DWG	Open-chassis Type (IP00) in mm						Approx. Mass kg
				W	H	D	W1	H1	H2	
200V Class (Three-phase)	0.1	20P1	1	68	128	114	56	118	5	1.1
	0.2	20P2								
	0.4	20P4				146				1.4
	0.75	20P7				166				1.6
	1.5	21P5	2	108		169	96			1.9
	2.2	22P2				178				2.0
	3.7	23P7		140		181	128			2.6
	5.5	25P5	3	180	260	208	164	244	8	5.1
	7.5	27P5								5.3
200V Class (Single-phase)	0.1	B0P1	1	68	128	114	56	118	5	1.1
	0.2	B0P2								1.2
	0.4	B0P4				169				1.5
	0.75	B0P7	2	108		178	96			2.0
	1.5	B1P5				194				
	2.2	B2P2		140		201	128			2.7
	3.7	B3P7		170		218	158			3.4
400V Class (Three-phase)	0.2	40P2	2	108	128	130	96	118	5	1.5
	0.4	40P4				148				1.6
	0.75	40P7				178				2.0
	1.5	41P5				194				
	2.2	42P2								
	3.0	43P0		140		181	128			2.6
	3.7	43P7								
	5.5	45P5	3	180	260	208	164	244	8	5.3
	7.5	47P5								

*: Model differs if a digital operator is used or not.
Note: Optional communication units are included in the dimensions of the enclosed NEMA1 inverters of 5.5 kW and 7.5 kW.

Connection Diagrams

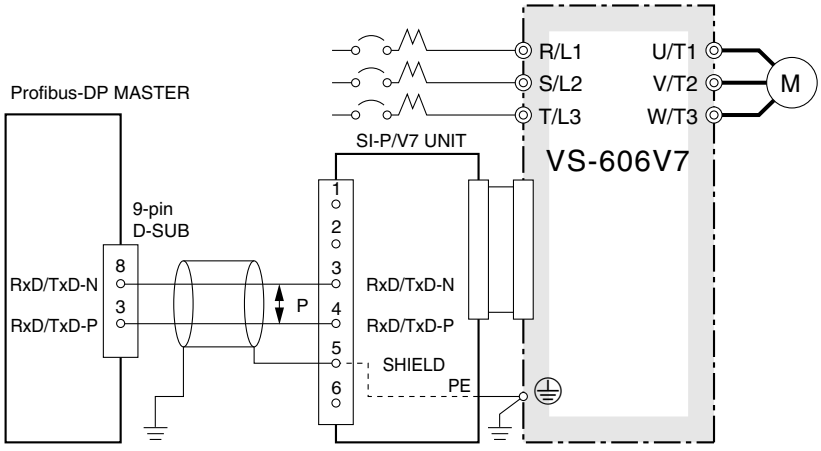
MECHATROLINK communications
SI-T/V7



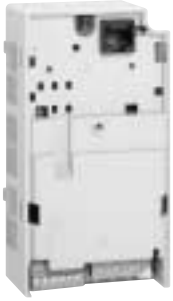


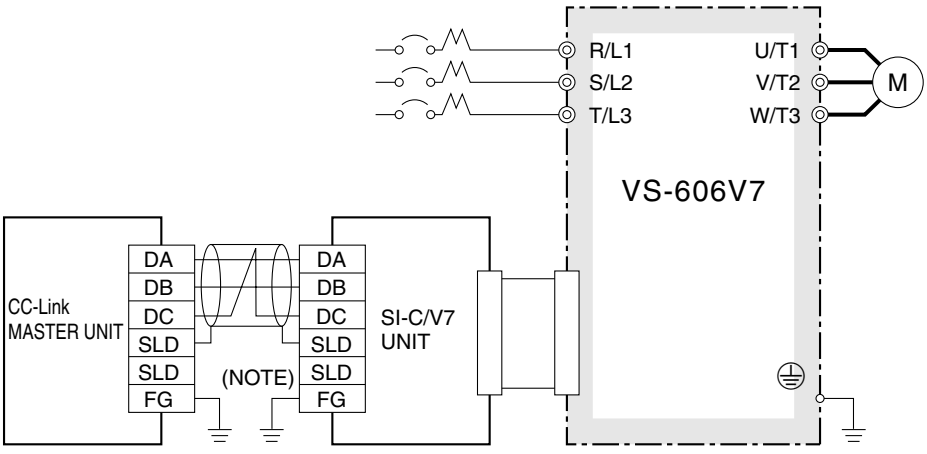
Note: Models of 3.7 kW or lower are currently available for MECHATROLINK communications.
Requires the exclusive software for the SI-T/V7 installed in the inverter.

Profibus-DP communications
SI-P1/V7



CC-Link communications
SI-C/V7





Note: Ground only when communications error occurs due to noise.

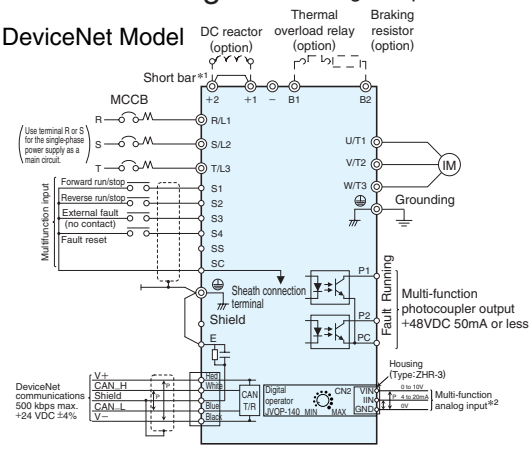
Varispeed V7 with Communications Support

DeviceNet Model

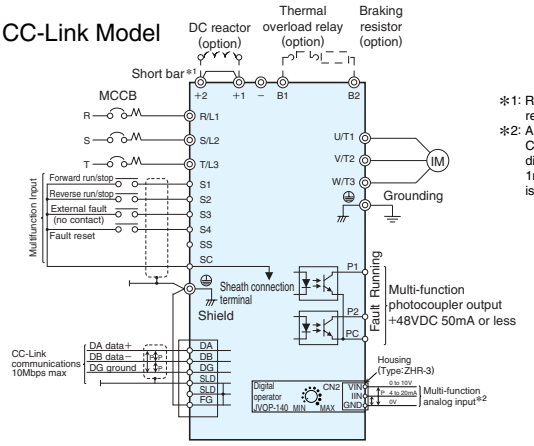
CC-Link Model

Connection Diagram with Digital Operator

DeviceNet Model



CC-Link Model

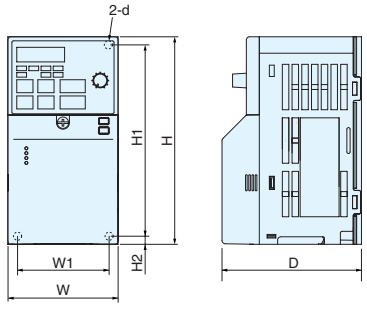


*1: Remove the short bar if connecting a DC reactor.
*2: A housing is required when using the CN2 terminal on the back side of the digital operator.
1m analog input cable (code no. WV201) is available for housing on request.

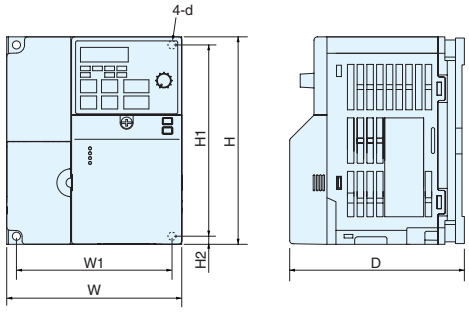
: Shielded twisted-pair wire
: Shielded wire

Dimensions in mm

Drawing 1



Drawing 2



Voltage Class	Max. Applicable Motor Output kW	Inverter Model CIMR-V7A*1A	DWG	Open-chassis Type (IP00) in mm							Approx. Mass kg
				W	H	D	W1	H1	H2	d	
200V Class (Three-phase)	0.1	20P1	1	68	128	91	56	118	5	M4	0.6
	0.2	20P2									
	0.4	20P4				123					0.9
	0.75	20P7				143					1.1
	1.5	21P5	2	108		146	96				1.4
	2.2	22P2				155					1.5
	3.7	23P7		140		158	128				2.1
	5.5 *2	25P5		180	260	185	164	244	8	M5	4.6
	7.5 *2	27P5									4.8
200V Class (Single-phase)	0.1	B0P1	1	68	128	91	56	118	5	M4	0.6
	0.2	B0P2									0.7
	0.4	B0P4				146					1.0
	0.75	B0P7	2	108		155	96				1.5
	1.5	B1P5				171					
	2.2	B2P2		140		178	128				2.2
	3.7	B3P7		170		195	158				2.9
400V Class (Three-phase)	0.2	40P2	2	108	128	107	96	118	5	M4	1.0
	0.4	40P4				125					1.1
	0.75	40P7				155					1.5
	1.5	41P5				171					
	2.2	42P2									
	3.0	43P0		140		158	128				2.1
	3.7	43P7									
	5.5 *2	45P5		180	260	185	164	244	8	M5	4.8
	7.5 *2	47P5									

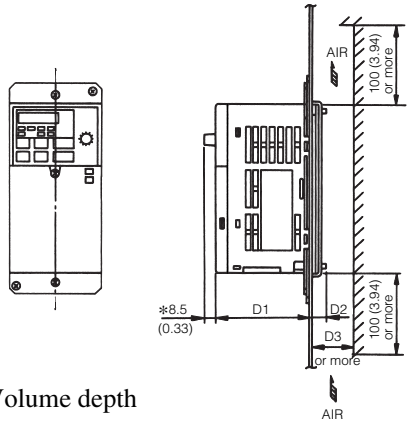
*1 : Model differs if a digital operator is used or not and with the type of communications.
*2 : No models currently available for CC-Link.
Note : If using an open-chassis inverter of 5.5 kW or 7.5 kW in the 200V or 400V class, remove the top and the bottom covers.

Attachment

■ Attachment for Mounting External Cooling-fan

When mounting an external cooling-fan to the VS-606V7, this attachment is required.

Note: Cannot be mounted with NEMA1 kit.
The protective structure is open chassis type.



∗ Volume depth

(Fig. 1 Example of 200V 0.1kW model)

VS-606V7	Attachment Order Code	Dimensions in mm		
		D1	D2	D3
CIMR-V7AA20P1 CIMR-V7AA20P2	EZZ08136A	69.2	12	30
CIMR-V7AA20P4	EZZ08136B	69.2	42	50
CIMR-V7AA20P7	EZZ08136C	69.2	62	70
CIMR-V7AA21P5	EZZ08136D	73	58	70
CIMR-V7AA22P2		98	58	70
CIMR-V7AA23P7	EZZ08136F	78.6	64.4	70
CIMR-V7AA25P5 CIMR-V7AA27P5	EZZ08136H	113.8	56.2	60
CIMR-V7AAB0P1 CIMR-V7AAB0P2	EZZ08136A	69.2	12	30
CIMR-V7AAB0P4	EZZ08136B	92.2	42	50
CIMR-V7AAB0P7	EZZ08136D	82	58	70
CIMR-V7AAB1P5		98	58	70
CIMR-V7AAB2P2	EZZ08136F	98.6	64.4	70
CIMR-V7AAB3P7	EZZ08136G	115.6	64.4	70
CIMR-V7AA40P2	EZZ08136E	82	13.2	30
CIMR-V7AA40P4	EZZ08136D	82	28	40
CIMR-V7AA40P7		82	58	70
CIMR-V7AA41P5 CIMR-V7AA42P2		98	58	70
CIMR-V7AA43P0 CIMR-V7AA43P7	EZZ08136F	78.6	64.4	70
CIMR-V7AA45P5 CIMR-V7AA47P5	EZZ08136H	113.8	56.2	60

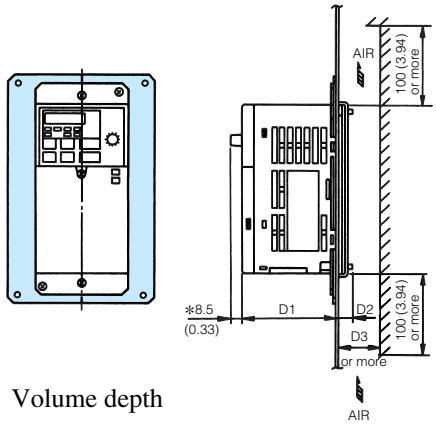
■ Attachment for Replacing PC3 Series (Normal Mounting)

- When replacing the VS-606PC3 with a VS-606V7, this attachment is required.
- 7.5 mm (0.30 in) is added to dimension D of the standard VS-606V7 for the attachment.

VS-606PC3 Model	VS-606V7 Model	Attachment Order Code
CIMR-PC□20P1 CIMR-PC□20P2 CIMR-PC□20P4	CIMR-V7A□20P1 CIMR-V7A□20P2 CIMR-V7A□20P4	EZZ08114A
CIMR-PC□20P7 CIMR-PC□21P5	CIMR-V7A□20P7 CIMR-V7A□21P5	EZZ08114B
CIMR-PC□22P2	CIMR-V7A□22P2	EZZ08114C
CIMR-PC□23P7	CIMR-V7A□23P7	EZZ08114D
CIMR-PC□B0P1 CIMR-PC□B0P2 CIMR-PC□B0P4	CIMR-V7A□B0P1 CIMR-V7A□B0P2 CIMR-V7A□B0P4	EZZ08114B
CIMR-PC□B0P7 CIMR-PC□B1P5 CIMR-PC□B2P2	CIMR-V7A□B0P7 CIMR-V7A□B1P5 CIMR-V7A□B2P2	EZZ08114C
CIMR-PC□B3P7	CIMR-V7A□B3P7	EZZ08114E
CIMR-PC□40P2 CIMR-PC□40P4 CIMR-PC□40P7 CIMR-PC□41P5 CIMR-PC□42P2 CIMR-PC□43P7	CIMR-V7A□40P2 CIMR-V7A□40P4 CIMR-V7A□40P7 CIMR-V7A□41P5 CIMR-V7A□42P2 CIMR-V7A□43P7	EZZ08114C

■ Attachment for Replacing PC3 Series (Mounting External Cooling-fan)

- When replacing the external cooling-fan type VS-606PC3, this attachment is required to fit the panel cutout.
- Dimension D is changed as Fig. 2.
- The protective structure is open chassis type.



∗ Volume depth

(Fig. 2 Example of 200V 0.1kW model)

VS-606PC3 Model	VS-606V7 Model	Attachment Order Code	Dimensions in mm (inches)		
			D1	D2	D3
CIMR-PC□20P1 CIMR-PC□20P2	CIMR-V7A□20P1 CIMR-V7A□20P2	EZZ08116A	69.2 (2.72)	122 (4.80)	30 (1.18)
CIMR-PC□20P4	CIMR-V7A□20P4	EZZ08116B	69.2 (2.72)	42 (1.65)	50 (1.97)
CIMR-PC□20P7	CIMR-V7A□20P7	EZZ08116C	69.2 (2.72)	62 (2.44)	70 (2.76)
CIMR-PC□21P5	CIMR-V7A□21P5	EZZ08116D	74.6 (2.94)	56.4 (2.22)	70 (2.76)
CIMR-PC□22P2	CIMR-V7A□22P2	EZZ08116G	83.6 (3.29)	56.4 (2.22)	70 (2.76)
CIMR-PC□23P7	CIMR-V7A□23P7	EZZ08116K	80.2 (3.16)	62.8 (2.47)	70 (2.76)
CIMR-PC□B0P1 CIMR-PC□B0P2	CIMR-V7A□B0P1 CIMR-V7A□B0P2	EZZ08116E	69.2 (2.72)	12 (0.47)	30 (1.18)
CIMR-PC□B0P4	CIMR-V7A□B0P4	EZZ08116F	92.2 (3.63)	42 (1.65)	50 (1.97)
CIMR-PC□B0P7 CIMR-PC□B1P5	CIMR-V7A□B0P7 CIMR-V7A□B1P5	EZZ08116G	83.6 (3.29) 99.6 (3.92)	56.4 (2.22) 56.4 (2.22)	70 (2.76) 70 (2.76)
CIMR-PC□B2P2	CIMR-V7A□B2P2	EZZ08116L	100.2 (3.94)	62.8 (2.47)	70 (2.76)
CIMR-PC□B3P7	CIMR-V7A□B3P7	EZZ08116M	117.2 (4.61)	62.8 (2.47)	70 (2.76)
CIMR-PC□40P2	CIMR-V7A□40P2	EZZ08116H	83.6 (3.29)	11.6 (0.46)	30 (1.18)
CIMR-PC□40P4	CIMR-V7A□40P4	EZZ08116G	83.6 (3.29)	26.4 (1.04)	40 (1.57)
CIMR-PC□40P7	CIMR-V7A□40P7		83.6 (3.29)	56.4 (2.22)	70 (2.76)
CIMR-PC□41P5	CIMR-V7A□41P5		99.6 (3.92)	56.4 (2.22)	70 (2.76)
CIMR-PC□42P2	CIMR-V7A□42P2	EZZ08116J	99.6 (3.92)	56.4 (2.22)	70 (2.76)
CIMR-PC□43P7	CIMR-V7A□43P7	EZZ08116L	80.2 (3.16)	62.8 (2.47)	70 (2.76)

SERVICE NETWORK

VS-606V7

Region	Service Area	Service Location	Service Agency	Telephone/Fax
North America	U.S.A	Chicago(HQ) Los Angeles New Jersey Boston San Francisco, Ohio North Carolina	❶ YASKAWA ELECTRIC AMERICA INC.	Headquarters ☎ +1-847-887-7303 FAX +1-847-887-7070
	Mexico	Mexico City	❷ PILLAR MEXICANA. S.A. DE C.V.	☎ +52-5593-28-69 FAX +52-5651-55-73
South America	South America	Sao Pãulo	❸ YASKAWA ELÉCTRICO DO BRASIL COMÉRCIO LTD.A.	☎ +55-11-5071-2552 FAX +55-11-5581-8795
	Colombia	Santafe De Bogota	❹ VARIADORES LTD. A.	☎ +57-91-635-7460 FAX +57-91-611-3872
Europe	All of Europe and South Africa	Frankfurt	❺ YASKAWA Electric EUROPE GmbH	Headquarters ☎ +49-6196-569-300 FAX +49-6196-569-398
Asia	South Korea	Seoul	❻ YASKAWA ELECTRIC KOREA Co.	☎ +82-2-784-7844 FAX +82-2-784-8495
			❼ YASKAWA ENGINEERING KOREA Co.	☎ +82-2-3775-0337 FAX +82-2-3775-0338
			❽ SAMSUNG Electronics Co.,Ltd.	☎ +82-331-200-2981 FAX +82-331-200-2970
	China	Beijing, Guangzhou, Shanghai	❾ YASKAWA ELECTRIC (SHANGHAI) Co., Ltd.	☎ +86-21-5385-2200 FAX +86-21-5385-3299
			❿ Shanghai Yaskawa-Tongji M&E Co.,Ltd.	☎ +86-21-6553-6060 FAX +86-21-5588-1190
	Taiwan	Taipei	⓫ YASKAWA ELECTRIC TAIWAN Co.	☎ +886-2-2502-5003 FAX +886-2-2505-1280
	Singapore	Singapore	⓬ YASKAWA ELECTRIC (SINGAPORE) Pte. Ltd.	☎ +65-6282-3003 FAX +65-6289-3003
			⓭ YASKAWA ENGINEERING ASIA-PACIFIC Pte. Ltd.	☎ +65-6282-1601 FAX +65-6282-3668
	Thailand	Bangkok	⓮ YASKAWA ELECTRIC (THAILAND) Co.,Ltd.	☎ +66-2-693-2200 FAX +66-2-693-2204
	India	Mumbai	⓯ LARSEN & TOUBRO LIMITED	Headquarters ☎ +91-22-7683511(662) FAX +91-22-7683525
Oceania	Australia	Sydney(HQ) Melbourne	⓰ ROBOTIC AUTOMATION Pty. Ltd.	Headquarters ☎ +61-2-9748-3788 FAX +61-2-9748-3817

VARISPEED-606V7

IRUMA BUSINESS CENTER (SOLUTION CENTER)
480, Kamifujisawa, Iruma, Saitama 358-8555, Japan
Phone 81-4-2962-5696 Fax 81-4-2962-6138

YASKAWA ELECTRIC AMERICA, INC.
2121 Norman Drive South, Waukegan, IL 60085, U.S.A.
Phone 1-847-887-7000 Fax 1-847-887-7370

YASKAWA ELÉTRICO DO BRASIL COMÉRCIO LTD.A.
Avenida Fagundes Filho, 620 Bairro Saude-Sao Pãulo-SP, Brazil CEP: 04304-000
Phone 55-11-5071-2552 Fax 55-11-5581-8795

YASKAWA ELECTRIC EUROPE GmbH
Am Kronberger Hang 2, 65824 Schwalbach, Germany
Phone 49-6196-569-300 Fax 49-6196-569-312

YASKAWA ELECTRIC UK LTD.
1 Hunt Hill Orchardton Woods Cumbernauld, G68 9LF, United Kingdom
Phone 44-1236-735000 Fax 44-1236-458182

YASKAWA ELECTRIC KOREA CORPORATION
7F, Doore Bldg. 24, Yeoido-dong, Youngdungpo-Ku, Seoul 150-877, Korea
Phone 82-2-784-7844 Fax 82-2-784-8495

YASKAWA ELECTRIC (SINGAPORE) PTE. LTD.
151 Lorong Chuan, #04-01, New Tech Park 556741, Singapore
Phone 65-6282-3003 Fax 65-6289-3003

YASKAWA ELECTRIC (SHANGHAI) CO., LTD.
No.18 Xizang Zhong Road. Room 1702-1707, Harbour Ring Plaza Shanghai 200001, China
Phone 86-21-5385-2200 Fax 86-21-5385-3299

YASKAWA ELECTRIC (SHANGHAI) CO., LTD. BEIJING OFFICE
Room 1011A, Tower W3 Oriental Plaza, No.1 East Chang An Ave.,
Dong Cheng District, Beijing 100738, China
Phone 86-10-8518-4086 Fax 86-10-8518-4082

YASKAWA ELECTRIC TAIWAN CORPORATION
9F, 16, Nanking E. Rd., Sec. 3, Taipei, Taiwan
Phone 886-2-2502-5003 Fax 886-2-2505-1280

YASKAWA ELECTRIC CORPORATION

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