

V7 INVERTER

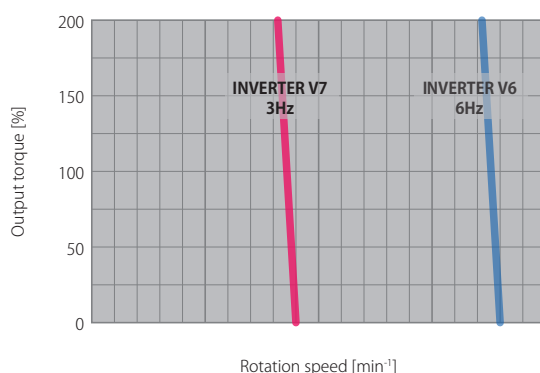
Compact and Powerful

Featuring the one of the fastest available CPUs, the new V7 inverters offer twice the calculating power of the current V6 models, giving them outstanding performance in this class of inverters. Miki Pulley's original dynamic torque vector control system is also used to ensure stable operation at low speeds. These models also retain the ease of use typical of the rest of the series, and are fully compatible with respect to external dimensions, installation dimensions, number and location of terminals, etc. In response to popular demand, they also include an RS-485 communications port. These are compact yet powerful, fully featured inverters.



Dynamic torque vector control

Low frequencies characteristics



Uses dynamic torque vector control

Stable torque at low speeds makes these models ideal for a wide range of conveying machines and other high inertia applications that require a high initial torque.

Slip compensation control for short stabilization times

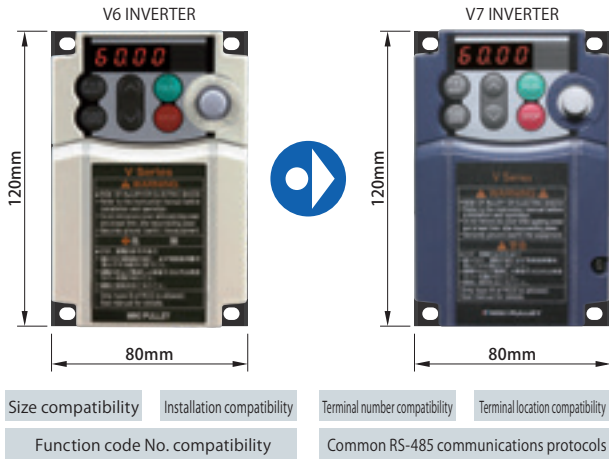
Slip compensation control and voltage tuning provide improved speed control accuracy at low speeds.

The creep speed is also stable for improved stopping precision in applications such as conveying machines.

One of the fastest CPUs in its class

Calculation speeds doubled. Helps to ensure stable control.

Designed to assure backward-compatibility



Retained ease of operation

Retains the operability of the V6 series. Frequency volume provided.

Improvement of maintenance

Fault simulation function	Select this function to generate simulated alarms.
Startup count	Enables you to count the total number of startups/shutdowns.
Total motor operation time	Allows you to monitor the motor operation time.
Cumulative power	Set this function to measure total power consumption.
Trip history	Save and display up to 4 past trips.

Energy saving measures



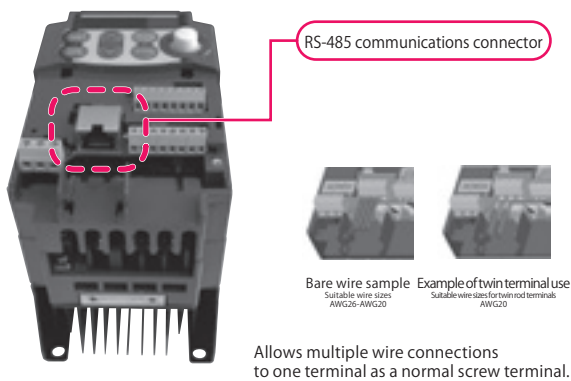
PID control function

The operating temperature, pressure and flow rates can be controlled without external regulators such as temperature controllers.

Cooling fan ON/OFF control function

The inverter cooling fan can be stopped while the fan and pump are inoperative, reducing noise and saving energy.

RS-485 communications port as standard...



Compatible with user applications

V/F (3-step polygonal lines)	Dual motor switching (switching control for 2 motors)
Brake signals (brake release signal)	Rotation direction restrictor (prevents normal/reverse rotation)

Global compatibility

EC directives (CE markings)	UL and Canadian standards (c-UL certification)
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V7 Model

Specifications

Type	V7-01-4	V7-02-4	V7-04-4	V7-07-4	V7-15-4	V7-22-4	V7-37-4
Standard applied motor output [kW]	0.1	0.2	0.4	0.75	1.5	2.2	3.7
Rated capacity [kVA]	0.3	0.57	1.1	1.9	3.0	4.2	6.5
Voltage [V]	Three-phase, 200 to 240 V (with AVR function)						
Rated current [A]	0.8 (0.7)	1.5 (1.4)	3.0 (2.5)	5.0 (4.2)	8.0 (7.0)	11.0 (10.0)	17.0 (16.5)
Rated overload current	150%-1 min or 200%-0.5 s of the rated output current						
Rated frequency [Hz]	50 • 60						
Number of phases, voltage, frequency	Three-phase, 200 to 240 V, 50/60 Hz						
Allowable variations of voltage and frequency	Voltage: +10 to -15% (unbalance between phases: within 2% (* 10)) Frequency: +5 to -5%						
Rated input current (with DCR) [A]	0.57	0.93	1.6	3.0	5.7	8.3	14.0
Rated input current (without DCR) [A]	1.1	1.8	3.1	5.3	9.5	13.2	22.2
Required power supply capacity [kVA]	0.2	0.3	0.6	1.1	2.0	2.9	4.9
Braking torque [%]	150	150	100	100	50	30	30
DC braking	Braking start frequency: 0.0 to 60.0 Hz, braking time: 0.0 to 30.0 s, braking level: 0 to 100%						
Braking transistor	Built-in						
Applicable safety standard	UL508C IEC 61800-5-1:2007						
Protection structure (IEC60529)	IP20 enclosure UL open type						
Cooling method	Self-cooling Fan cooling						
Operating atmosphere	Indoor with no exposure to corrosive gases, dust, oil mist (pollution degree 2 (IEC 60664-1:2007)) or direct sunlight						
Ambient temperature [°C]	Open -10 to 50						
Ambient humidity	5 to 95%RH						
Altitude	1,000 m or below: No power reduction; 1001 to 1500 m: 0.97, 1501 to 2000 m: 0.95; 2001 to 2500 m: 0.91; 2501 to 3000 m: 0.88						
Vibration	3 mm: 2 to 9 Hz or less; 9.8 m/s ² : 9 to 20 Hz or less; 2 m/s ² : 20 to 55 Hz or less; 1 m/s ² : 55 to 200 Hz or less						
Storage temperature [°C]	-25 to 70						
Storage humidity	5 to 95%RH						
Mass [kg]	0.6	0.6	0.7	0.8	1.7	1.7	2.5

* The rated output current shown is for a carrier frequency (function code **F28**) set to 3 kHz or less. Use the current shown in parentheses or less if the carrier frequency is set to 4 kHz or more or if the operating ambient temperature is more than 40°C.

LED monitor

Displays the speed monitor (output frequency), etc.

RUN key

Used to start operation.

Program (PRG) key/Reset (RESET) key

Used to toggle between modes and reset a tripped stop state in Alarm mode

Function (FUNC) key/Data toggle (DATA) key

Used to toggle the LED monitor display and confirm entered function codes, etc.

Up/Down keys

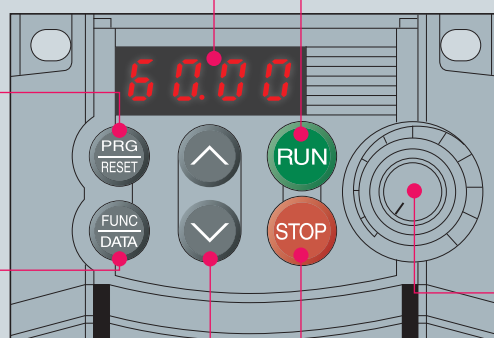
Used to increase and decrease the frequency and speed settings

Volume knob

Used to set the frequency and other settings

STOP key

Used to stop operation.

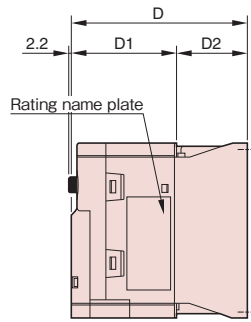
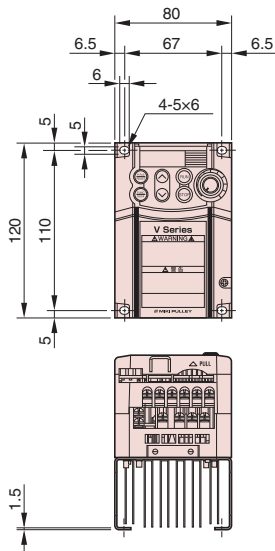


How to Place an Order

V7-01-4

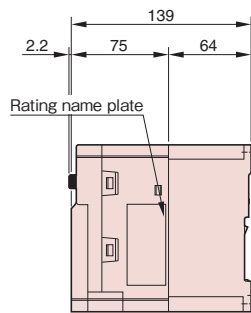
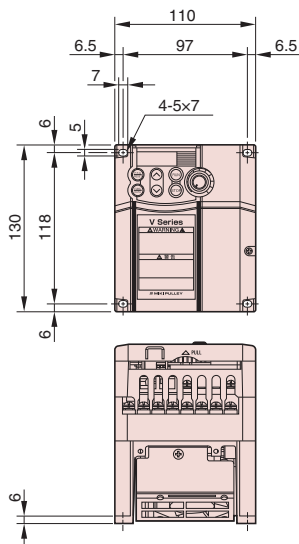
Size
Standard applicable nominal motor output

Dimensions



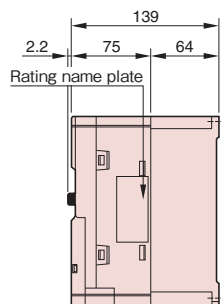
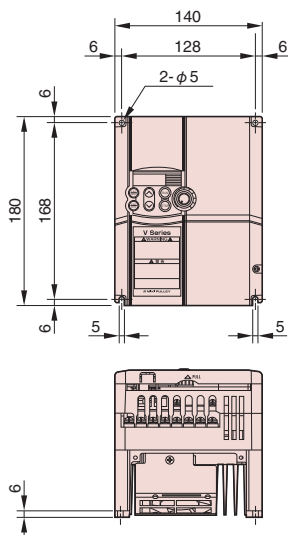
Unit [mm]

Motor for power supply	Type	D [mm]	D1 [mm]	D2 [mm]
Three-phase, 200 V, 0.1 kW	V7-01-4	80	70	10
Three-phase, 200 V, 0.2 kW	V7-02-4	80	70	10
Three-phase, 200 V, 0.4 kW	V7-04-4	95	70	25
Three-phase, 200 V, 0.75 kW	V7-07-4	120	70	50



Unit [mm]

Motor for power supply	Type
Three-phase, 200 V, 1.5 kW	V7-15-4
Three-phase, 200 V, 2.2 kW	V7-22-4



Unit [mm]

Motor for power supply	Type
Three-phase, 200 V, 3.7 kW	V7-37-4

MODELS

V7

Common Specifications

Common Specifications

Item		Specifications	Remark
Output frequency	Max. output frequency	25.0 to 400.0 Hz variable setting	
	Base frequency	25.0 to 400.0 Hz variable setting	
	Starting frequency	0.1 to 60.0 Hz variable setting	
	Carrier frequency	0.75 to 16 kHz variable setting * (*1) Depending on the ambient temperature and output conditions, carrier frequencies of 6 kHz or more maybe automatically lowered to protect the inverter (automatic reduction stop function)	
	Carrier modulation	: Disperses the carrier frequency to reduce noise	
	Accuracy	Analog setting : $\pm 2\%$ or less of absolute accuracy (at 25°C), temperature drift of $\pm 0.2\%$ (25 $\pm 10^\circ\text{C}$)	
		Touch panel setting : $\pm 0.01\%$ or less of absolute accuracy (at 25°C), temperature drift of $\pm 0.01\%$ (25 $\pm 10^\circ\text{C}$)	
	Setting resolution	Analog setting : 1/1000 of the highest output frequency	
		Touch panel setting : 0.01 Hz (99.99 Hz or less), 0.1 Hz (100.0 Hz to 400.0 Hz)	
		Link setting : 1/20000 of the highest output frequency or 0.01 Hz (fixed)	
Control	Control method	Induction motor drive : V/f control, slip compensation, auto torque boost, dynamic torque vector control, automatic energy saving control Synchronized motor drive : Magnetic position sensor-less (speed control range: 10% or less of base frequency)	
	Voltage and frequency	Can be set to between 80 and 240 V for the base and maximum output frequencies respectively	
		ON or OFF can be selected for AVR control (*1)	
		Polygonal line V/f (*1) setting (2 settings): Any voltage (0 to 500 V) and frequency (0 to 400 Hz) can be set	
	Torque boost (*1)	Auto torque boost (for constant torque load)	
		Manual torque boost: Any torque boost value (0.0% to 20.0%) can be set	
		The applicable load can be selected (constant torque load or squared reduction torque load)	
	Starting torque (*1)	150% or more/1 Hz set frequency for operation with slip compensation or auto torque boost	
	Run and stop	Key operation : Run or stop using the  and  keys (standard touch panel or optional remote touch panel)	
		External signals (digital input) : Normal (reverse) rotation run/stop commands (3-wire operation available), free run command, external alarms, abnormal reset	
		Link operation : Operation possible using RS-485 communication	
	Frequency setting	Run command switching : Switches to run commands issued via data communications	
		Key operation : Can be set using the  and  keys (with data protection function) Can be set and data can be copied via function codes (communication only)	
		Set using the built-in volume control knob	
		Analog input : 0 to 10 V DC/0 to 100% (terminal 12)	
		: 4 to 20 mA DC/0 to 100%, 0 to 20 mA DC/0 to 100% (terminal C1)	
		Multi-step frequency setting : Up to 16 steps (0 to 15 step) can be selected.	
		UP/DOWN operation : Increases or decreases the frequency while the digital input signal is ON	
		Link operation : Sets the frequency using RS-485 communication	
		Frequency setting switching : Two types of frequency setting can be selected via external signals (digital input) Frequency setting and multi-step frequency setting can be switched via communications	
		Frequency supplemental setting : Selectable as incremental input using the built-in volume knob, terminal 12 or terminal C1	
	Acceleration/deceleration time	Reverse operation : Switchable between 0 to 10 V DC/0 to 100% and 10 to 0 V DC/0 to 100% via external input	
		: Switchable between 4 to 20 mA DC (0 to 20 mA DC)/0 to 100% and 20 to 4 mA DC (20 to 0 mA DC)/0 to 100% via external input	
		Can be set from 0.00 to 3600 s. Two types of acceleration and deceleration time settings can be set and selected independently (switchable during operation) Curve : Choose from linear acceleration/deceleration, S-shaped acceleration/deceleration (slow or rapid) and curved acceleration/deceleration (fixed-output max. capacity acceleration) Free-run acceleration available with the OFF run command Acceleration/deceleration can be set for jogging operation (settings between 0.00 and 3600 s.)	
	Frequency limiter (Upper limit and lower limit frequencies)	Minimum and maximum frequencies can be set in Hz (0 to 400 Hz)	
	Bias	Bias can be independently set between 0% and $\pm 100\%$ for frequency settings and PID commands	
	Gain	Analog input gain is set variably between 0% and 200%	
	Jump frequency	Operating points (6) and a common jump width (0 to 30 Hz) can be set	
	Timer operation	Operation stops and starts at the times set on the touch panel (1 operation cycle)	
	Jogging operation (*1)	Run by pressing the  key (standard touch panel or optional remote touch panel) or by digital contact input (dedicated common setting for the acceleration/deceleration time)	
	Restart in the event of an instantaneous power failure (*1)	Power failure trip : Tripped instantaneously when power fails	
		Power restoration trip : Runs freely when power fails and is tripped after power is restored	
		Speed reduction stop : Operation slows to a stop when power fails, and is tripped when the power fails.	
		Startup at pre-momentary-failure frequency : Runs freely when power fails and starts up at the frequency used when the power failed after power is restored	
	Current limitation (hardware current limitation) (*1)	Startup at startup frequency : Runs freely when power fails and starts up at the startup frequency after power is restored	
		To prevent overcurrent trips caused by a momentary power failure or marked load fluctuations that cannot be handled by software current limitation, hardware current limitation is used (can be canceled)	
	Slip compensation control (*1)	Compensates for speed reductions in response to load so as to ensure safe operation	
	Current limitation	Operation in which the current is kept to within a preset limit	
	PID control	Process PID regulator control	
		PID commands : Touch panel, analog input (terminal 12/C1), RS-485 communication	
		Feedback value : Analog input (terminal 12/C1)	
	Regeneration avoidance control	Low flow stop function, selectable normal/reverse operation, integrated reset/hold function	
		When the torque value reaches or exceeds a set level, the output frequency is automatically regulated, restricting the regenerated energy in the inverter and avoiding an overcurrent trip (*1).	
	Speed reduction characteristics (braking capacity improvement)	When the DC intermediate voltage reaches or exceeds the overvoltage restriction level during deceleration, the deceleration time is extended threefold to try to avoid an  trip. During deceleration, the motor loss is increased so as to reduce the regenerated energy in the inverter and avoid an overvoltage trip.	

* (*1): Only valid for induction motor drive

Common Specifications

Item	Specifications	Remark
Control	Auto energy-saving (*1)	Controls the output voltage to ensure that total motor loss and inverter loss is minimized during constant speed operation
	Regeneration avoidance control	Lowens the frequency to avoid overload when the ambient temperature or IGBT junction temperature rises due to overload
	Off-line tuning (*1)	Carries out tuning of $r1$, $X\sigma$, exciting current and rated slip frequency
	Cooling fan on/off control	Monitors the internal inverter temperature and stops the cooling fan when the temperature is low
	2nd motor setting	Allows 2 motors to be used alternately with 1 inverter (motors cannot be switched during operation)
		Only an induction motor can be set as the 2nd motor. Data that can be set includes the base frequency, rated current, torque boost, electronic thermal and slip compensation. Constants for the 2nd motor can be set internally (auto tuning can be used).
Display	Rotation direction restrictor	Reverse operation prevention or normal operation prevention can be selected
	When running/stopped	Speed monitor, output current (A), output voltage (A), power consumption (kW), PIC command value, PID feedback value, PID output, timer setting (s), total amount of power The following can be selected and displayed on the speed monitor: Output frequency (before slip compensation) (Hz), output frequency (after slip compensation) (Hz), setting frequency (Hz), load rotation speed (min-1), line speed (m/min), constant feed time (min)
	End-of-life prediction	End-of-life prediction can be displayed for the main circuit capacitor, PCB capacitor and cooling fan, and predicted end-of-life data can be exported
	Total operation time	Total motor operation time can be displayed along with the total operation time and total amount of power for the inverter
	I/O check	Shows the I/O status for control circuit terminals
	Energy-saving monitor	Power consumption, power consumption x coefficient
	When a trip occurs	Displays the cause of a trip
		• OC1 : Overcurrent (during acceleration) • OC2 : Overcurrent (during deceleration)
		• OC3 : Overcurrent (during constant speed operation) • LO : Input open phase • LU : Undervoltage
		• OPL : Output open phase • OU1 : Overvoltage (during acceleration) • OU2 : Overvoltage (during deceleration)
		• OU3 : Overvoltage (during constant speed operation) • OH1 : Cooling fin overheating • OH2 : External alarm
		• OH4 : Motor protection (PTC thermistor) • dbH : DB resistance thermal • CoF : PID feedback disconnect detection
		• OL1 : Motor 1 overload • OL2 : Motor 2 overload • OLU : Inverter overload
		• Er1 : Memory error • Er2 : Touch panel communications error • Er3 : CPU error
		• Er6 : Operation error • Er7 : Tuning error • Er8 : RS485 comm. error
		• ErF : Data saving error during undervol. cond. • Er d : Step out detection (for synchronized motor drive) • Err : Simulated fault
Protection functions	During operation or when a trip occurs	Trip history: Up to 4 past trip factors (codes) can be saved and displayed, and details can be saved and displayed for up to 4 trips.
	Overcurrent protection	Protect against overcurrent caused by overload and stop the inverter. OC1 OC2 OC3
	Short-circuit protection	Protect against overcurrent caused by a short circuit in the output circuit and stop the inverter. OC1 OC2 OC3
	Ground fault protection	Protects against overcurrent caused by a ground fault in the output circuit (initial ground fault only) and stops the inverter OC1 OC2 OC3
	Overvoltage protection	Detects excessive DC link circuit voltage (400 V DC) and stops the inverter. Cannot provide protection where an unusually large input voltage is applied OU1 OU2 OU3
	Undervoltage protection	Detects decreases in DC link circuit voltage (200 V DC) and stops the inverter. No alarm is output if "Restart following momentary power outage" is selected. LU
	Input open phase protection	Protects or stops the inverter against open phase in the input voltage. Input open phase may not be detected if the connected load is light when the input open phase occurs or when the DC reactor is connected. LO
	Output open phase protection	Detect breaking of an output wire at startup and in operation and stop the inverter output. OPL
	Overheat protection	Detects the temperature of the inverter coolant fin in the event of a cooling fan failure and overload, and stops the inverter. OH1
	Overload protection	Uses the setting in the electronic thermal for the braking resistor to protect against braking resistor overheating dbH
	External alarm input	Stops the inverter based on the inverter coolant temperature and the switching element temperature calculated using the output current OLU
	Motor protection	Uses digital input (THR) to output and alarm and stop the inverter OH2
		Electronic thermal
		Uses the electronic thermal function setting to stop the inverter, protect the motor and protect the general-purpose motor and inverter motor across the entire the frequency range. The 2nd motor can also be protected (operating level and heat constant (0.5-75.0 min) can be set) OL1 OL2
	PTC thermistor	A PTC thermistor is used to detect the motor temperature and output an alarm and stop the inverter to protect the motor. Connect the PCT thermistor between terminals C1 and 11, connect a resistor between terminals 13 and C1 and set the function code. OH4
	Overload notification	Outputs a notification signal at a preset level before stopping the inverter using the electronic thermal function
	Memory error	Checks data at power-on and when writing data, and stops the inverter if a memory error is detected Er1
	Touch panel communication error	Detects a communication error between the touch panel and inverter main unit and stops the inverter during command-based operation from a remote touch panel. Er2
	CPU error	Detects CPU errors such as those caused by noise and stops the inverter Er3
	Run operation error	The  key has priority. Pressing the  key on the touch panel forcibly stops operation even if the run command is issued via the terminal block or communication. (Er6 is displayed after the stop.)
		Start check
	Tuning error	Prohibits operation and displays Er6 on the LED monitor if a run command is input during the following status changes: At power-on; when an alarm is canceled; when the run command method is switched via link operation Er6
		Stops the inverter if tuning fails or is interrupted during motor constant tuning or if an error is detected in the tuning results Er7
	RS485 communication error	Detects a communication error in RS-485 communication with the inverter main unit and stops the inverter. Er8
	Data save error during undervoltage	Displays an error if data could not be saved normally when undervoltage protection was running ErF
	Step out detection	Detects step out in synchronized motors and stops the inverter Er d
	PID feedback disconnect detection	Assigns a current input for PID feedback (terminal C1) and stops the inverter if a wire is judged to be broken (can be enabled/disabled) CoF
	Stalling protection	Reduces the frequency to avoid an overcurrent trip when the output current exceeds a set limit during acceleration/deceleration or constant speed operation.
	Batch alarm output	Outputs a relay signal when the inverter is stopped by an alarm Cancels the alarm stop state caused by a  or digital input signal (RST)
	Retry	If the inverter is stopped by a trip, it can be reset and restarted automatically. (The number of retries and the wait time until reset can be set.)
	Surge protection	Protects the inverter against surge voltage intruding between the main circuit power line and the ground.
	Momentary power failure protection	The protection function operates (stops the inverter) if a momentary power failure lasting 15 ms or more occurs
	Simulation fault	If "Restart following momentary power outage" is selected, the inverter is restarted for voltage recovery within the set time
		Simulated alarms can be output to check a fault sequence. Err

* (*1): Only valid for induction motor drive

COUPLINGS

ETP BUSHINGS

ELECTROMAGNETIC
CLUTCHES & BRAKESSPEED CHANGERS
& REDUCERS

INVERTERS

LINEAR SHAFT DRIVES

TORQUE LIMITERS

ROSTA

MODELS

V7

V7 Model

Terminal Functions

Terminal Functions

	Terminal symbol	Terminal name	Function	Remark	
Main circuit	L1/R, L2/S, L3/T	Main power supply input	Connect a three-phase power supply.		
	U, V, W	Inverter output	Connect a three-phase motor.		
	P (+), P1	For connecting a DC reactor	Connect a DC reactor (DCR).		
	P (+), N (—)	For connecting a DC bus line	Used for connecting a DC bus line.		
	P (+), DB	For connecting a braking resistor	Connects an external braking resistor	0.4 kW or more only. Cannot be used at 0.2 kW or below.	
	Ⓜ G (terminal 2)	For grounding the inverter	Terminal for grounding the inverter		
Frequency settings	13	Power supply for a variable resistor	Used as a power supply for a frequency setter (variable resistor: 1 to 5 kΩ)	DC10V	
	12	Analog setting voltage input	Used as the frequency setting voltage input, 0 to +10 V DC/0 to 100%		
		(Reverse operation)	+10 to 0 V DC/0 to 100%		
		(For PID control)	Used as a setting signal (PID process command value) or PID feedback signal		
	C1	(Frequency supplemental setting)	Used as a supplemental setting to be added to various frequency settings		
		Analog setting current input	Used as the frequency setting voltage input, 4 to 20 mA (0 to 20 mA DC)/0 to 100%		
		(Reverse operation)	20 to 4 mA (20 to 0 mA DC)/0 to 100%		
(For PID control)		Used as a setting signal (PID process command value) or PID feedback signal			
	(Frequency supplemental setting)	Used as a supplemental setting to be added to various frequency settings			
	For connecting a PTC thermistor	Connects a PTC thermistor for motor protection			
	11 (terminal 2)	Analog input common	Common terminals for frequency setting signals (12, 13, C1, FMA)	Isolated from terminals CM and Y1E	
Digital input	X1	Digital input 1	The function terminals X1-X3 below can be set to FWD or REV		
	X2	Digital input 2	(Common functions)		
	X3	Digital input 3	Sink/source can be switched by switching the jumper switch built into the main unit.		
	FWD	Normal rotation run/stop command	“ON for short circuit” or “ON for open” can be set for terminals X1 to CM		
	REV	Reverse rotation run/stop command	* The same settings can be used between terminals X2, X3, FWD and REV to CM		
	(FWD)	Normal rotation run/stop command	Normal rotation operation when (FWD) is ON, and deceleration and stop when (FWD) is OFF.	Functions can only be assigned to terminals FWD and REV, 'Short circuit ON' only	
	(REV)	Reverse rotation run/stop command	Reverse rotation operation when (REV) is ON, and deceleration and stop when (REV) is OFF.	Functions can only be assigned to terminals FWD and REV, 'Short circuit ON' only	
	(SS1) (SS2) (SS4) (SS8)	Multi-step frequency setting	Enables 16-step operation using ON/OFF signals for SS1 to SS8		
			Digital input	0123456789101112131415	
			(SS1)	— ON — ON — ON — ON — ON — ON — ON — ON — ON — ON — ON — ON	
			(SS2)	— — ON ON — — ON ON — — ON ON — — ON ON	
			(SS4)	— — — — ON ON ON ON — — — — ON ON ON ON	
		(SS8)	— — — — — — — — ON ON ON ON ON ON ON ON		
	(RT1)	Acceleration/deceleration time selection	When (RT1) is OFF (ON), acceleration/deceleration time setting 1 (2) is enabled		
	(HLD)	Self-hold selection	Used as a self-hold signal during 3-wire operation		
			Setting (HLD) to ON self-holds the (FWD) or (REV) signal. OFF releases the signal		
	(BX)	Free-run command	Setting (BX) to ON immediately blocks inverter output and the motor runs freely (no alarm output)		
	(RST)	Alarm (error) reset	Releases the alarm hold state when (RST) is ON	For input signals of 0.1 s or longer	
	(THR)	External alarm	Setting (THR) to OFF immediately blocks inverter output and the motor runs freely (alarm output: OH2)		
	(JOG)	Jogging operation	Setting (JOG) to ON switches to jogging mode and switches the frequency and acceleration/deceleration time settings to the jogging frequency and jogging operation time respectively, enabling jogging operation	(※ 1)	
(Hz2/Hz1)	Frequency setting 2/frequency setting 1	When (Hz2/Hz1) is ON, frequency setting 2 is selected			
(M2/M1)	Motor 2/motor 1	When (M2/M1) is OFF (ON) the motor setting 1 (2) settings are enabled			
(DCBRK)	DC braking command	Setting (DCBRK) to ON starts DC control operation			
(WE-KP)	Edit permission command (Data can be changed)	Function code data can only be changed from the touch panel when (WE-KP) is ON			
(UP)	UP command	The output frequency increases while (UP) is ON			
(DOWN)	DOWN command	The output frequency decreases while (DOWN) is ON			
(Hz/PID)	PID control cancellation	When (Hz/PID) is ON, PID control is canceled (multi-step frequency, touch panel and analog input operate at the selected frequency)			
(IVS)	Normal operation/reverse operation switching	Allows the operation mode (normal/reverse operation) for analog frequency setting or PID control output signals (frequency setting) to be switched. Setting (IVS) to ON selects reverse operation.			
(LE)	Link operation selection	When (LE) is ON, operation conforms to commands issued via RS-485			
(PID-RST)	PID integration/differentiation reset	Setting (PID-RST) to ON resets the PID integration and differentiation values			
(PID-HLD)	PID integration hold	Setting (PID-HLD) to ON holds PID integration			
PLC	PLC signal power supply	Connects a PLC output signal power supply and can be used for a 24 V power supply	+24 V (22 to 27 V), max. 50 mA		
CM (terminal 2)	Digital input common	Common terminal for digital input signals	Isolated from terminals 11 and Y1E		
Transistor output	(PLC)	Transistor output power supply	Power supply for the transistor output load (24 V DC, 50 mA DC max.) * Note: Same terminal as the digital input PLC terminal	Used to short-circuit terminals CM and Y1E	
	Y1	Transistor output	Outputs the signal selected from the following: Select either “Short circuit for ON signal output” or “Open circuit for ON signal output”	Max. voltage 27 V DC Max. current 50 mA DC, leakage current 0.1 mA or less ON voltage: 2 V or less (for 50 mA)	
			(RUN)	Running	Outputs an ON signal when the inverter is running at a the starting frequency or above

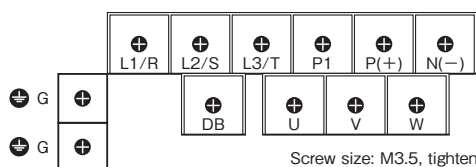
* (※1): Only valid for induction motor drive

Terminal Functions

	Terminal symbol	Terminal name	Function	Remark
Transistor output	(FAR)	Frequency attainment	Outputs an ON signal when the difference between the output frequency and the set frequency is at or below the frequency attainment detection width (function code E30)	
	(FDT)	Frequency detection	Outputs an ON signal when the output frequency is at or above the operating level (function code E31). OFF when the output level (function code E31) is at or below the hysteresis width (function code E32)	
	(LU)	Undervoltage stopped	Outputs an ON signal when there is a run command and operation is stopped due to undervoltage	
	(IOL)	Inverter limiting output	Outputs an ON signal when the inverter is limiting current, running regeneration avoidance or limiting torque	
	(IPF)	Instantaneous power failure recovery	Outputs an ON signal from the time the inverter blocks output due to a momentary power failure until restart is completed	
	(OL)	Overload notification (motor)	Outputs an ON signal when the calculated electronic thermal value is at or above the preset detection value	
	(SWM2)	Switch to motor 2	Outputs an ON signal when motor 2 is selected in the input signal for the motor switching signal (M2/M1)	
	(TRY)	Retrying	Outputs an ON signal during retrying	
	(LIFE)	End-of-life notification	Outputs a notification signal in accordance with the inverter's internal end-of-life criterion	
	(PID-CTL)	Controlling PID	Outputs an ON signal while PID control is enabled	
	(PID-STP)	PID low flow stopping	Outputs an ON signal while low flow stop is running in PID control * Stops operation even when a run command is entered	
	(RUN2)	Inverter outputting	Outputs an ON signal when the inverter is running at the starting frequency or above and DC braking is running * Outputs an ON signal when the inverter main circuit (gate) is set to ON	
	(OLP)	Overload avoidance control is running	Outputs an ON signal during while overload avoidance control is running	
	(ID2)	Current detection 2	Outputs an ON signal when the set current detection level (for ID2) is exceeded and the elapsed time exceeds the timer time	
	(THM)	Thermistor detection	Outputs an ON signal when motor overheating is detected by the PTC/NTC thermistor	(*1)
	(BRKS)	Brake signal	Outputs a brake application/release signal	(*1)
	(MNT)	Maintenance timer	Outputs a notification or warning when the preset maintenance time or number of restarts is exceeded	
	(FARFDT)	Frequency attainment/detection	Outputs an ON signal when both (FAR) and (FDT) are ON	
	(C1OFF)	C1 terminal breakage detection	Outputs an ON signal when terminal C1 input is 2 mA or less and it is determined that there is a wire breakage	
	(ID)	Current detection	Outputs an ON signal when the set current detection level is exceeded and the elapsed time exceeds the timer time	
	(IDL)	Low current detection	Outputs an ON signal when the current is at or below the set low current detection level and the elapsed time exceeds the timer time	
	(ALM)	Batch alarm	Outputs a batch alarm signal as a transistor output signal	
Contact output	Y1E	Transistor output common	Transistor output common terminal	Isolated from terminals 11 and CM
	30A, 30B, 30C	Batch alarm output	Outputs a no-voltage contact signal (1c) when the inverter is stopped by an alarm The same signal as the Y1 signal can be selected as multi-purpose relay output * Can be switched between excited operation alarm output and non-excited (spring-actuated) operation alarm output	Contact capacity: 250 V AC, 0.3 A, cos dia.: 0.3 48 V DC, 0.5 A
Analog output	FMA	Analog monitor	Output mode: DC voltage (0 to 10 V) One item selected from the following can be output in the selected analog state: Output frequency 1 (before slip compensation), output frequency 2 (after slip compensation), output current, output voltage, power consumption, PID feedback value, DC link circuit voltage, analog output test, PID command, PID output	Gain adjustment range: 0 to 300%
		Built-in RJ-45 connector RS-485 communication	Any of the following protocols can be selected: Dedicated touch panel protocol, Modbus RTU, dedicated Fuji inverter protocol, SX protocol for PC loaders	Power supply to touch panel Terminating resistance with ON/OFF switch The save location for data set via communication can be selected

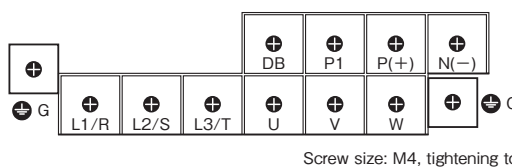
* (*1): Only valid for induction motor drive

Main circuit terminals



Screw size: M3.5, tightening torque: 1.2 N·m

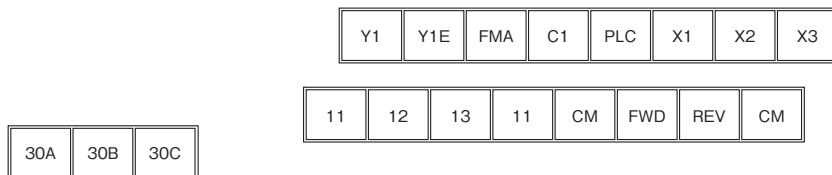
0.1 to 0.75 kW : V7-01 / V7-02 / V7-04 / V7-07



Screw size: M4, tightening torque: 1.8 N·m

1.5 to 3.7 kW : V7-15 / V7-22 / V7-37

Control circuit terminals



Screw size: M2.5, tightening torque: 0.4 N·m

Screw size: M2, tightening torque: 0.2 N·m

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Connection Diagram

Connection Diagram

* This is just reference information. Please be sure to refer to the instruction manual when you really make connections.

When running/stopping and setting frequency from the touch panel

■ Wiring procedure

(1) Wire only the main circuit section. The function codes are preset at the factory.

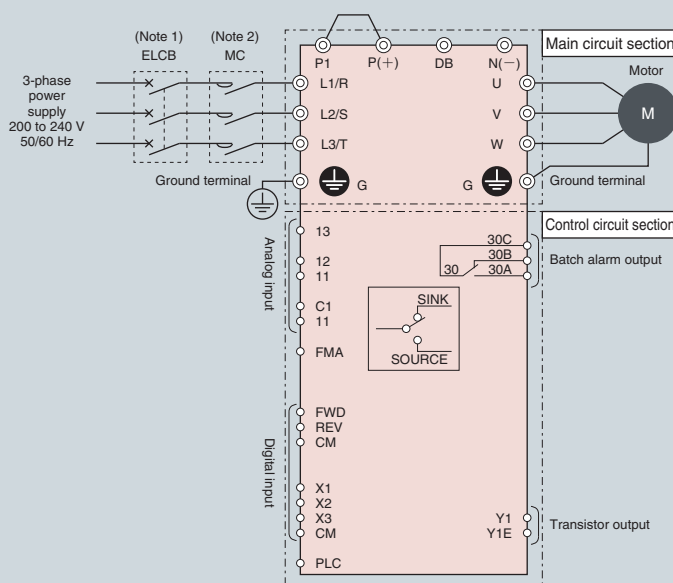
■ Operation method

(1) Run/stop: Run and stop with key operation ( ,  keys) on the touch panel.

(2) Frequency setting: The frequency can be set using a knob.

(Note 1) Install the recommended molded case circuit breaker (MCCB) or earth leakage circuit breaker (ELCB) (with overcurrent protection function) on the input side (primary side) of the inverter for wiring protection.
Do not use a circuit breaker with a capacity greater than the recommended capacity.

(Note 2) Since this is used to isolate the inverter from the power supply separate from MCCB or ELCB, install the recommended electromagnetic contactor (MC) for each inverter as needed.
Note that if coils such as an MC and solenoid are installed near the inverter, connect a surge absorber in parallel.



When running/stopping and setting frequency using external signals

■ Wiring procedure

(1) Wire the main circuit section and control circuit section.

(2) Assign function code **F02** to **I** (external signal). Next, assign function code **F01** to **I** (voltage input (terminal 12) (0 to +10 VDC), **2** (current input (terminal C1) (+4 to +20 mADC)), etc.

■ Operation method

(1) Run / stop: Run when terminals FWD and CM are short circuited and stop when they are open circuited.

(2) Frequency setting: Voltage input (0 to +10 VDC), current input (+4 to +20 mADC)

(Note 1) When you connect a DC reactor (option), first remove the short circuit bar between terminals P1 and P (+) and then connect it.

(Note 2) Install the recommended molded case circuit breaker (MCCB) or earth leakage circuit breaker (ELCB) (with overcurrent protection function) on the input side (primary side) of the inverter for wiring protection.
Do not use a circuit breaker with a capacity greater than the recommended capacity.

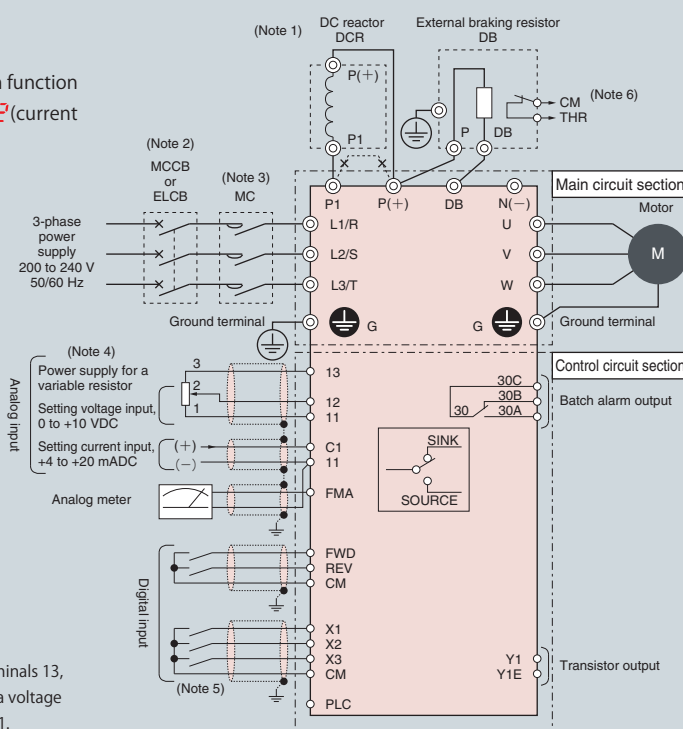
(Note 3) Since this is used to isolate the inverter from the power supply separate from MCCB or ELCB, install the recommended electromagnetic contactor (MC) for each inverter as needed.
Note that if coils such as an MC and solenoid are installed near the inverter, connect a surge absorber in parallel.

(Note 4) You can connect a frequency setter (external knob) between terminals 13, 12, and 11 and assign the setting frequency instead of inputting a voltage signal (0 to +10 VDC or 0 to +5 VDC) between terminals 12 and 11.

(Note 5) Use a twisted wire or shielded wire for the control signal wire.
Ground the shielded wire.

Place the control signal wire so that it is as far away as possible from the main circuit wire, and never put them in the same duct to prevent malfunction caused by noise. (A distance of 10 cm or more is recommended.) If the wires cross each other, place them so that they are at right angles to each other.

(Note 6) The (THR) function can be used by assigning code **9** (external alarm) to any of terminals X1 to X3, FWD, or REV (function codes: **E01** to **E03**, **E98** or **E99**).



Function Selection List

Basic Functions: F Codes

Function code	Name	Available range	Increments	Unit	Factory default setting values
F00	Data protection	0: Without data protection , without digital settings protection 1: With data protection , without digital settings protection 2: Without data protection , with digital settings protection 3: With data protection , with digital settings protection	—	—	0
F01	Frequency setting 1	0: Touch panel key operation ( /  keys) 1: Analog voltage input (terminal 12) (0 to 10 V DC) 2: Analog current input (terminal C1) (4 to 20 mA DC) 3: Analog voltage input (terminal 12) + analog current input (terminal C1) 4: Main unit volume knob 7: UP/DOWN control	—	—	4
F02	Run/operation	0: Touch panel operation (rotation direction input: terminal block) 1: External operation (digital input) 2: Touch panel operation (normal rotation) 3: Touch panel operation (reverse rotation)	—	—	2
F03	Max. output frequency 1	25.0 to 400.0 Hz	0.1	Hz	60.0
F04	Base frequency 1	25.0 to 400.0 Hz	0.1	Hz	60.0
F05	Base frequency voltage 1	0 V: Outputs a voltage proportional to the power supply voltage; 80 to 240 V: AVR operation	1	V	0
F06	Max. output voltage 1	80 to 240 V: AVR operation	1	V	200
F07	Acceleration time 1	0.00 to 3600 s * 0.00 cancels the acceleration time (when externally performing a soft start and stop)	0.01	s	6.00
F08	Deceleration 1	0.00 to 3600 s * 0.00 cancels the deceleration time (when externally performing a soft start and stop)	0.01	s	6.00
F09	Torque boost 1	0.0 to 20.0% (F05 : Percent value (%) against the base frequency voltage 1)	0.1	%	Motor's rated current
F10	Electronic thermal 1 (For motor protection)	1: Operation (self-cooling fan: for general-purpose motor/standard synchronized motors)	—	—	1
	(Characteristic function)	2: Operation (for separately excited fan/inverter (FV) motor)			
F11	(Operation level)	0.00 (no operation), 0.01 to 100.0 A Current value of 1 to 135% of inverter's rated current	0.01	A	Motor's rated current
F12	(Thermal time constant)	0.5 to 75.0 min	0.1	min	5.0
F14	Instantaneous power failure restart (Operation selection)	0: No operation (immediate trip without restart) 1: No operation (trip at recovery without restart) 2: Trip after deceleration stop 4: Operation (restart from frequency at power failure, for ordinary loads) 5: Operation (restart from startup frequency)	—	—	1
F15	Frequency limiter (Upper limit)	0.0 to 400.0 Hz	0.1	Hz	70.0
F16	(Lower limit)	0.0 to 400.0 Hz	0.1	Hz	0.0
F18	Bias (for frequency setting 1)	-100.00 to 100.00%	0.01	%	0.00
F20	DC braking 1 (Start frequency)	0.0 to 60.0 Hz	0.1	Hz	0.0
F21	(Operation level)	0 to 100% (inverter's rated current standard)	1	%	0
F22	(Time)	0.00: (No operation) 0.01 to 30.00 s	0.01	s	0.00
F23	Starting frequency 1	0.1 to 60.0 Hz	0.1	Hz	1.0
F24	(Continuation time)	0.00 to 10.00 s	0.01	s	0.00
F25	Stopping frequency	0.1 to 60.0 Hz	0.1	Hz	0.2
F26	Motor operating noise (Carrier frequency)	0.75 to 16 kHz	1	kHz	2
F27	(Tone)	0: Level 0 (No operation) 1: Level 1 2: Level 2 3: Level 3	—	—	0
F30	Terminal FMA (Output gain)	0 to 300%	1	%	100
F31	(Function selection)	For the following items, functions are set using the given codes. 0: Output frequency 1 (before slip compensation) 1: Output frequency 2 (after slip compensation) 2: Output current 3: Output voltage 6: Power consumption 7: PID feedback amount 9: DC link circuit voltage 14: Analog output test (+) 15: PID command (SV) 16: PID output (MV)	—	—	0
F37	Load selection/auto torque boost/ auto energy-saving operation 1	0: Square reduction torque load 1: Constant torque load 2: Auto torque boost 3: Auto energy-saving operation (square reduction torque load) 4: Auto energy-saving operation (constant torque load) 5: Auto energy-saving operation (auto torque boost)	—	—	1
F39	Stop frequency (Continuation time)	0.00 to 10.00 s	0.01	s	0.00

* The available setting range may be limited by signs and the number of digits.

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Function Selection List

Basic Functions: F codes

Function code	Name	Available range	Increments	Unit	Factory default setting values
F42	Control method selection 1	0: V/f control (without slip compensation) 1: Dynamic torque vector control 2: V/f control (with slip compensation) 11: V/f control (synchronized motor)	—	—	0
F43	Current limitation (Operation selection)	0: No operation 1: At constant speed (does not operate during acceleration/deceleration) 2: During acceleration and at constant speed (does not operate during deceleration)	—	—	2
F44	(Operation level)	20 to 200% (inverter's rated current standard)	1	%	180
F50	Electronic thermal 1 (Discharge withstand current rating) (For braking resistor protection)	1 to 900 kW, OFF (cancel)	1	kWs	OFF
F51	(Allowable average loss)	0.001 to 50.00 kW	0.001	kW	0.001

* The available setting range may be limited by signs and the number of digits.

Terminal Functions: E Codes

Function code	Name	Available range	Increments	Unit	Factory default setting values
E01	Terminal X1 (Function selection)		—	—	0
E02	Terminal X2 (Function selection)		—	—	7
E03	Terminal X3 (Function selection)	For the following items, functions are set using the code values 0: (1000) Multi-step frequency selection (0 to 1 step) [SS1] 1: (1001) Multi-step frequency selection (0 to 3 steps) [SS2] 2: (1002) Multi-step frequency selection (0 to 7 steps) [SS4] 3: (1003) Multi-step frequency selection (0 to 15 steps) [SS8] 4: (1004) Acceleration/deceleration selection (2 steps) [RT1] 6: (1006) Self-hold selection [HLD] 7: (1007) Free-run command [BX] 8: (1008) Alarm (error) reset [RST] 9: (1009) External alarm [THR] 10: (1010) Jogging operation [JOG] 11: (1011) Frequency setting 2/frequency setting 1 [Hz 2/Hz 1] 12: (1012) Motor 2/motor 1 [M2/M1] 13: DC braking command [DCBRK] 17: (1017) UP command [UP] 18: (1018) DOWN command [DOWN] 19: (1019) Edit permission command (data can be changed) [WE-KP] 20: (1020) PID control cancellation [Hz/PID] 21: (1021) Normal operation/reverse operation switching [IVS] 24: (1024) Link operation selection (RS485 communication <option>) [LE] 33: (1033) PID integration/differentiation reset [PID-RST] 34: (1034) PID integration hold [PID-HLD] * 4 digit numbers in parentheses (10nn) are logic inversion signals. (OFF when active.) Note that for (THR), 9: Active OFF; 1009: Active ON. Note also that logic inversion cannot be used for signals with no defined values in parentheses.	—	—	8
E10	Acceleration time 2	0.00 to 3600 s. *0.00 cancels the acceleration time (for an external soft start/stop)	0.01	s	6.00
E11	Deceleration time 2	0.00 to 3600 s. *0.00 cancels the deceleration time (for an external soft start/stop)	0.01	s	6.00

* The available setting range may be limited by signs and the number of digits.

Terminal Functions: E Codes

Function code	Name	Available range	Increments	Unit	Factory default setting values
E20	Terminal Y1 (Function selection)		—	—	0
E27	Terminal 30A/B/C (Relay output)		—	—	99
		For the following items, functions are set using the code values			
		0 : (1000)		[RUN]	
		1 : (1001)		[FAR]	
		2 : (1002)		[FDT]	
		3 : (1003)		[LU]	
		5 : (1005)		[IOL]	
		6 : (1006)		[IPF]	
		7 : (1007)		[OL]	
		26 : (1026)		[TRY]	
		30 : (1030)		[LIFE]	
		35 : (1035)		[RUN2]	
		36 : (1036)		[OLP]	
		37 : (1037)		[ID]	
		38 : (1038)		[ID2]	
		41 : (1041)		[IDL]	
		43 : (1043)		[PID-CTL]	
		44 : (1044)		[PID-STP]	
		49 : (1049)		[SWM2]	
		56 : (1056)		[THM]	
		57 : (1057)		[BRKS]	
		59 : (1059)		[C10FF]	
		84 : (1084)		[MNT]	
		87 : (1087)		[FARFDT]	
		99 : (1099)		[ALM]	
		* 4 digit numbers in parentheses (10nn) are logic inversion signals. (OFF when active.)			
E30	Frequency attainment detection width (Detection width)	0.0 to 10.0 Hz	0.1	Hz	2.5
E31	Frequency detection (Operation level)	0.0 to 400.0 Hz	0.1	Hz	60.0
E32	(Hysteresis width)	0.0 to 400.0 Hz	0.1	Hz	1.0
E34	Overload notification/current (Operation level)	0.00 (no operation), 0.01 to 100.0 A 1 to 200% of inverter's rated current	0.01	A	Motor's rated current
E35	detection/low current detection (Timer)	0.01 to 600.00 s	0.01	s	10.00
E37	Current detection 2 (Operation level)	0.00 (no operation), 0.01 to 100.0 A 1 to 200% of inverter's rated current	0.01	A	Motor's rated current
E38	(Timer)	0.01 to 600.00 s	0.01	s	10.00
E39	Constant feeding time coefficient	0.000 to 9.999	0.001	—	0.000
E40	PID display coefficient A	—999 to 0.00 to 9990	0.01	—	100
E41	PID display coefficient B	—999 to 0.00 to 9990	0.01	—	0.00
E42	Display filter	0.0 to 5.0 s	0.1	s	0.5
E43	LED monitor (Display selection)	0: Speed monitor (selected in E48) 3: Output current 4: Output voltage 9: Power consumption 10: PID command value 12: PID feedback value 13: Timer value (timer operation) 14: PID output 25: Total amount of power	—	—	0
E45	Displayed, but cannot be used with this inverter.				
E46					
E47					
E48	LED monitor details (Speed monitor selection)	0: Output frequency (before slip compensation) 1: Output frequency (after slip compensation) 2: Setting frequency 4: Load rotation speed 5: Line speed 6: Constant feeding time	—	—	0
E50	Speed display coefficient	0.01 to 200.00	0.01	—	30.00
E51	Total power data display coefficient	0.000 (cancel and reset), 0.001 to 9999	0.001	—	0.010
E52	Touch panel menu selection	0: Function code data setting mode (Menu No. 1) 1: Function code data confirmation mode (Menu No. 2) 2: Full menu mode	—	—	0

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Function Selection List

Terminal Functions: E Codes

Function code	Name	Available range	Increments	Unit	Factory default setting values
E60	Main unit knob (Function selection)	0: Function selection not available 1: Frequency supplemental setting 1 2: Frequency supplemental setting 2 3: PID process command 1	1	—	0
E61	Terminal 12 (Extended function selection)	The function is set using the code of the following items. 0: Function selection not available 1: Frequency supplemental setting 1 2: Frequency supplemental setting 2 3: PID process command 1 5: PID feedback value	—	—	0
E62	Terminal C1 (Extended function selection)		—	—	0
E98	Terminal FWD (Function selection)		—	—	98
E99	Terminal REV (Function selection)	The function is set using the code of the following items. 0: (1000) Multi-step frequency selection (0 to 1 step) [SS1] 1: (1001) Multi-step frequency selection (0 to 3 steps) [SS2] 2: (1002) Multi-step frequency selection (0 to 7 steps) [SS4] 3: (1003) Multi-step frequency selection (0 to 15 steps) [SS8] 4: (1004) Acceleration/deceleration selection (2 steps) [RT1] 6: (1006) Self-hold selection [HLD] 7: (1007) Free-run command [BX] 8: (1008) Alarm (error) reset [RST] 9: (1009) External alarm [THR] 10: (1010) Jogging operation [JOG] 11: (1011) Frequency setting 2/frequency setting 1 [Hz 2/Hz 1] 12: (1012) Motor 2/motor 1 [M2/M1] 13: DC braking command [DCBRK] 17: (1017) UP command [UP] 18: (1018) DOWN command [DOWN] 19: (1019) Edit permission command (data can be changed) [WE-KP] 20: (1020) PID control cancellation [Hz/PID] 21: (1021) Normal operation/reverse operation switching [IVS] 24: (1024) Link operation selection (RS485 communication <option>) [LE] 33: (1033) PID integration/differentiation reset [PID-RST] 34: (1034) PID integration hold [PID-HLD] 98: Normal rotation run/stop command [FWD] 99: Reverse rotation run/stop command [REV] * 4 digit numbers in parentheses (10nn) are logic inversion signals. (OFF when active.) Note that for (THR), 9: Active OFF; 1009: Active ON. Note also that logic inversion cannot be used for signals with no defined values in parentheses.	—	—	99

* The available setting range may be limited by signs and the number of digits.

Control Functions: C Codes

Function code	Name	Available range	Increments	Unit	Factory default setting values
C01	Jump frequency	1 0.0 to 400.0 Hz	0.1	Hz	0.0
C02					0.0
C03					0.0
C04	(Width)	0.0 to 30.0 Hz	0.1	Hz	3.0
C05	Multi-step frequency	1 0.00 to 400.00 Hz	0.01	Hz	0.00
C06					0.00
C07					0.00
C08					0.00
C09					0.00
C10					0.00
C11					0.00
C12					0.00
C13					0.00
C14					0.00
C15					0.00
C16					0.00
C17					0.00
C18					0.00
C19					0.00
C20	Jogging frequency	0.0 to 400.00 Hz	0.01	Hz	0.00
C21	Timer operation (Operation selection)	0: No operation	—	—	0
		1: Operation			
C30	Frequency setting 2	0: Touch panel key operation (▲ / ▼ keys)	—	—	2
		1: Analog voltage input (terminal 12) (0 to +10 VDC)			
		2: Analog current input (terminal C1) (4 to 20 mADC)			
		3: Analog voltage input (terminal 12) + analog current input (terminal C1)			
		4: Main unit knob			
		7: UP/DOWN control			
C32	Analog input adjustment (Terminal 12) (Gain)	0.00 to 200.00%	0.01	%	100.0
C33	(Filter)	0.00 to 5.00 s	0.01	s	0.05
C34	(Gain Reference point)	0.00 to 100.00%	0.01	%	100.00
C37	Analog input adjustment (Terminal C1) (Gain)	0.00 to 200.00%	0.01	%	100.00
C38	(Filter)	0.00 to 5.00 s	0.01	s	0.05
C39	(Gain Reference point)	0.00 to 100.00%	0.01	%	100.00
C40	Terminal C1 range selection	0 : 4 to 20 mA	—	—	0
		1 : 0 to 20 mA			
C50	Bias (frequency setting 1) (Bias Reference point)	0.00 to 100.00%	0.01	%	0.00
C51	Bias (PID command 1) (Bias value)	— 100.0 to 100.0%	0.01	%	0.00
C52		(Bias Reference point)	0.01	%	0.00
C94	Jump frequency	4 0.0 to 400.0 Hz	0.1	Hz	0.0
C95					0.0
C96					0.0
C99	Digital setting frequency	0.00 to 400.00 Hz	0.01	Hz	0.00

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Function Selection List

Motor 1 Parameters: P Codes

Function code	Name	Available range	Increments	Unit	Factory default setting values
P02	Motor 1 (Capacity)	0.01 to 30.00 kW (P99 : when 0, 3, 4, 20 or 21 is selected)	0.01	kW	Applicable motor rating
P03	(Rated current)	0.01 to 30.00 HP (P99 : when 1 is selected)	0.01	HP	Applicable motor rating
P04	(Auto tuning)	0: No operation	—	—	0
		1: Stop tuning (%R1, %X)			
		2: Rotation tuning for V/f control (%R1, %X, no-load current, slip frequency)			
P06	(No-load current)	0.00 to 50.00 A	0.01	A	Applicable motor rating
P07	(%R1)	0.00 to 50.00%	0.01	%	Applicable motor rating
P08	(%X)	0.00 to 50.00%	0.01	%	Applicable motor rating
P09	(Slip compensation gain (drive))	0.0 to 200.0%	0.1	%	100.0
P10	(Slip compensation response time)	0.01 to 10.00 s	0.01	s	1.00
P11	(Slip compensation gain (braking))	0.0 to 200.0%	0.1	%	100.0
P12	(Rated slip)	0.00 to 15.00 Hz	0.01	Hz	Applicable motor rating
P60	Synchronized motor (Armature resistance)	0.00 (synchronized motor not operating), 0.01 to 50.00 Ω	0.01	Ω	0.00
P61	(d-axis inductance)	0.00 (high-efficiency control not operating), 0.01 to 500.0 mH	0.01	mH	0.00
P62	(q-axis inductance)	0.00 (synchronized motor not operating), 0.01 to 500.0 mH	0.01	mH	0.00
P63	(Induced voltage)	0 (synchronized motor not operating), 80 to 240 V	1	V	0
P74	(Starting current level)	10 to 200%	1	%	80
P89	(Control switching level)	10 to 100%	1	%	10
P90	(Overcurrent protection level)	0.00 (no operation), 0.01 to 300.0 A	0.01	A	0.00
P91	(Damping control d-axis compensation gain)	0.00 to 25.00, 999 (table value)	0.01	—	999
P92	(Damping control q-axis compensation gain)	0.00 to 25.00, 999 (table value)	0.01	—	999
P93	(Current detection level for step-out detection)	0 to 100, 999 (table value)	1	%	999
P99	Motor 1 selection	0 : Motor characteristic 0 (standard applicable motor) 1 : Motor characteristic 1 (HP representative motor, typical model) 3 : Motor characteristic 3 (not used) 4 : Other (induction motor) 20: Other (synchronized motor) 21: Sensor-less standard rating	—	—	0

* The available setting range may be limited by signs and the number of digits.

High Level Functions: H Codes

Function code	Name	Available range	Increments	Unit	Factory default setting values
H03	Data initialization	0: Manual setting value 1: Initial value (factory default setting) 2: Motor 1 constant initialization 3: Motor 2 constant initialization	—	—	0
H04	Retry (Number of times)	0: No operation, 1 to 10 times	1	Times	0
H05	(Waiting time)	0.5 to 20.0 s	0.1	s	5.0
H06	Cooling fan on/off control	0: No operation (fan always ON) 1: Operation (ON/OFF control enabled)	—	—	0
H07	Curve acceleration/deceleration	0: No operation (linear acceleration/deceleration) 1: S-shaped acceleration/deceleration (slow) 2: S-shaped acceleration/deceleration (rapid) 3: Curve acceleration/deceleration	—	—	0
H08	Rotation direction restrictor	0: No operation 1: Operation (reverse rotation prevented) 2: Operation (normal rotation prevented)	—	—	0
H11	Deceleration mode	0: Normal deceleration 1: Free run	—	—	0
H12	Instantaneous overcurrent limitation (Operation selection)	0: No operation 1: Operation	—	—	1
H13	Momentary power failure restart (Wait time)	0.1 to 10.0 s	0.1	s	0.5
H14	(Rate of frequency decrease)	0.00: Selected deceleration time, 0.01 to 100.00 Hz/s, 999 (by current limitation)	0.01	Hz/s	999
H15	(Operation continuance level)	200 to 300 V	1	V	235
H26	Thermistor (for motor) (Operation selection)	0: No operation 1: PTC: Trips at OH4, inverter stops 2: PTC: Outputs signal (THM), operation continues	—	—	0
H27	(Operation level)	0.0 to 5.00 V	0.01	V	0.16

* The available setting range may be limited by signs and the number of digits.

High Level Functions: H Codes

Function code	Name	Available range	Increments	Unit	Factory default setting values
H30	Link function (Operation selection)	Frequency command Run command 0: F01/C30 F02 1: RS-485 communication F02 2: F01/C30 RS-485 communication 3: RS-485 communication RS-485 communication	—	—	0
H42	Main circuit capacitor measurement	For adjustment during replacement (0000 to FFFF (hexadecimal))	1	—	—
H43	Total cooling fan operation time	For adjustment during replacement (0000 to 9999 (10-hour units))	1	10h	—
H44	Startup count 1	For adjustment during replacement (0000 to FFFF (hexadecimal))	—	—	—
H45	Simulated fault	0: No operation 1: Simulated fault occurrence	—	—	0
H47	Initial main circuit capacitor value	For adjustment during replacement (0000 to FFFF (hexadecimal))	1	—	—
H48	Total PCB capacitor operation time	For adjustment during replacement (0000 to 9999 (10-hour units))	1	10h	—
H50	Polygonal line V/f1 (Frequency)	0.0 (cancel), 0.1 to 400.0 Hz	0.1	Hz	0.0
H51	(Voltage)	0 to 240 V: AVR operation	1	V	0
H52	Polygonal line V/f2 (Frequency)	0.0 (cancel), 0.1 to 400.0 Hz	0.1	Hz	0.0
H53	(Voltage)	0 to 240 V: AVR operation	1	V	0
H54	Acceleration/deceleration time (Jogging operation)	0.00 to 3600 s	0.01	s	6.00
H61	Initial UP/DOWN control value selection	0: Initial value is 0.00 Hz 1: Initial value is the frequency set by the UP/DOWN command just before the run command expired	—	—	1
H63	Lower limit limiter (Operation selection)	0: Lower limit is restricted by the F16 frequency limiter (minimum), operation continues 1: When the lower limit no longer meets the F16 frequency limiter (minimum), deceleration stops	—	—	0
H64	(Minimum frequency during limitation operation)	0.0 (F16: Dependent on the frequency limiter (minimum)), 0.1 to 60.0 Hz	0.1	Hz	2.0
H69	Regeneration avoidance control (Operation selection)	0: No operation 1: Operation (3 times the deceleration time during voltage limitation (V6 model compatibility operation)) 2: Operation (torque limitation: cancel enabled when 3 times the deceleration time has elapsed) 4: Operation (torque limitation: forcible stop process disabled)	—	—	0
H70	Overload avoidance control	0.00 (conforms to the selected deceleration time), 0.01 to 100.00 Hz/s, 999 (cancel)	0.01	Hz/s	999
H71	Deceleration characteristics	0: No operation 1: Operation	—	—	0
H76	Regeneration avoidance (increased frequency limiter)	0.0 to 400.0 Hz	0.1	Hz	5.0
H78	Maintenance setting time	0: No operation, 1 to 9999 (10-hour units)	1	—	8760
H79	Maintenance setting start time	0000: No operation, 0001 to FFFF (hexadecimals)	1	—	0000
H80	Current vibration suppression gain 1	0.00 to 0.40	0.01	—	0.20
H89	Electronic thermal (Motor protection) (Data retention)	For the following items, code values are set 0: No operation 1: Operation	—	—	1
H91	PID feedback disconnect detection (Terminal C1)	0.0: Alarm does not operate, 0.1 to 60.0 s: Alarm issued after set time	0.1	s	0.0
H92	Operation continues (P)	0.000 to 10.000 times, 999: Standard value	0.001	Times	999
H93	(I)	0.000 to 10.000 s, 999: Standard value	0.001	s	999
H94	Total motor operation time 1	0 to 9999 (10-hour units)	—	—	—
H95	DC braking (Characteristic selection)	0: Slow response 1: Quick response	—	—	0
H96	STOP key priority/Start check function	0: STOP key priority function disabled, start check function disabled 1: STOP key priority function enabled, start check function disabled 2: STOP key priority function disabled, start check function enabled 3: STOP key priority function enabled, start check function enabled	—	—	0
H97	Alarm data clear	0: No operation 1: Alarm clear	—	—	0
H98	Protection and maintenance function (Operation selection)	Bit 0: Automatic carrier frequency decrease function (0: disabled; 1: enabled) Bit 1: Input open phase protection operation (0: disabled; 1: enabled) Bit 2: Output open phase protection operation (0: disabled; 1: enabled) Bit 3: Main circuit capacitor end-of-life judgment selection (0: factory default setting; 1: user 0 setting) Bit 4: Main circuit capacitor end-of-life judgment (0: disabled; 1: enabled)	—	—	19

* The available setting range may be limited by signs and the number of digits.

* Where a V6 model is replaced by a V7 model, the V6 model **H71** function code may be set to "1". However, because there is no function with the **H71** function code on V6 models, there is no need to set the **H71** function code to "1" on the V7 model.

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V7 Model

Function Selection List

Motor 2 Parameters: A Codes

Function code	Name	Available range	Increments	Unit	Factory default setting values
A01	Max. output frequency 2	25.0 to 400.0 Hz	0.1	Hz	60.0
A02	Base frequency 2	25.0 to 400.0 Hz	0.1	Hz	60.0
A03	Base frequency voltage 2	0V: Output a voltage proportional to the power supply voltage. 80 to 240 V: AVR operation	1	V	0
A04	Max. output voltage 2	80 to 240 V: AVR operation	1	V	200
A05	Torque boost 2	0.0 to 20.0% (A03: % value for base frequency voltage 2)	0.1	%	Applicable motor rating
A06	Electronic thermal (Characteristic selection) (For motor protection)	1: Operation (self-cooling fan/general-purpose motor) 2: Operation (for separately excited fan/inverter (FV) motor)	—	—	1
A07	(Operation level)	0.00 (no operation), current value of 1 to 135% compared to the inverter's rated current	0.01	A	Applicable motor rating
A08	(Thermal time constant)	0.5 to 75.0 min	0.1	min	5.0
A09	DC braking 2 (Start frequency)	0.0 to 60.0 Hz	0.1	Hz	0.0
A10	(Operation level)	0 to 100% (inverter's rated current standard)	1	%	0
A11	(Time)	0.00: (No operation) 0.01 to 30.00 s	0.01	s	0.00
A12	Starting frequency 2	0.1 to 60.0 Hz	0.1	Hz	1.0
A13	Load selection/auto torque boost/ auto energy-saving operation 2	0: Square reduction torque load 1: Constant torque load 2: Auto torque boost 3: Auto energy-saving operation (square reduction torque load) 4: Auto energy-saving operation (constant torque load) 5: Auto energy-saving operation (auto torque boost)	—	—	1
A14	Control method selection 2	0: V/f control (without slip compensation) 1: Dynamic torque vector control 2: V/f control (with slip compensation)	—	—	0
A15	Motor 2 (Capacity)	0.01 to 30.00 kW (A39 : when 0, 3 or 4 is selected) 0.01 to 30.00 HP (A39 : when 1 is selected)	0.01	kW	Applicable motor rating
A17	(Rated current)	0.00 to 100.0 A	0.01	HP	Applicable motor rating
A18	(Auto tuning)	0: No operation 1: Stop tuning (%R1, %X) 2: Rotation tuning for V/f control (%R1, %X, no-load current, slip frequency)	—	A	Applicable motor rating
A20	(No-load current)	0.00 to 50.0 A	0.01	—	0
A21	(%R1)	0.00 to 50.0%	0.01	%	Applicable motor rating
A22	(%X)	0.00 to 50.0%	0.01	%	Applicable motor rating
A23	(Slip compensation gain (drive))	0.0 to 200.0%	0.1	%	100.0
A24	(Slip compensation response time)	0.01 to 10.00 s	0.01	s	1.00
A25	(Slip compensation gain (braking))	0.0 to 200.0%	0.1	%	100.0
A26	(Rated slip)	0.00 to 15.00 Hz	0.01	Hz	Applicable motor rating
A39	Motor 2 selection	0: Motor characteristic 0 (standard applicable motor) 1: Motor characteristic 1 (HP representative motor) 3: Motor characteristic 3 (not used) 4: Other	—	—	0
A41	Current vibration suppression gain 2	0.00 to 0.40	0.01	—	0.20
A51	Total motor operation time 2	0 to 9999 (10-hour units)	—	—	—
A52	Startup count 2	For adjustment during replacement (0000 to FFFF (hexadecimal))	—	—	—

* The available setting range may be limited by signs and the number of digits.

Application Functions: J Codes

Function code	Name	Available range	Increments	Unit	Factory default setting values
J01	PID control (Operation selection)	0: No operation 1: For process (normal operation) 2: For process (reverse operation)	—	—	0
J02	(Remote command)	0: Touch panel key operation (⏮ / ⏭ keys) 1: PID process command 1 (analog input terminal 12/C1) 3: UP/DOWN 4: Communication	—	—	0
J03	P (gain)	0.000 to 30.000 times	0.001	Times	0.100
J04	I (integration time)	0.0 to 3600.0 s	0.1	s	0.0
J05	D (differentiation time)	0.00 to 600.00 s	0.01	s	0.00
J06	(Feedback filter)	0.0 to 900.0 s	0.1	s	0.5
J15	(Low flow stop operation frequency level)	0.0 (no operation), 1.0 to 400.0 Hz	0.1	Hz	0.0
J16	(Low flow stop elapsed time)	0 to 3600 s	1	s	30
J17	(Starting frequency)	0.0 to 400 Hz	0.1	Hz	0.0
J23	(Low flow stop activation deviation level)	0.0 to 100.0%	0.1	%	0.0
J24	(Startup wait time for low flow stop)	0 to 3600 s	1	s	0
J68	Brake signal (Release current)	0 to 200%	1	%	100
J69	(Release frequency)	0.0 to 25.0 Hz	0.1	Hz	1.0
J70	(Release timer)	0.0 to 5.0 s	0.1	s	1.0
J71	(Insertion frequency)	0.0 to 25.0 Hz	0.1	Hz	1.0
J72	(Insertion timer)	0.0 to 5.0 s	0.1	s	1.0

* The available setting range may be limited by signs and the number of digits.

Link Functions: y Codes

Function code	Name	Available range	Increments	Unit	Factory default setting values
y01	RS485 communication setting 1 (Station address)	1 to 255	1	—	1
y02	(Operation selection in the event of errors)	0: ⚡ trip immediately 1: ⚡ trip after the timer time expires 2: Performs a communication retry while the timer is running, and triggers a ⚡ trip if communication is not restored. If communication is restored, operation continues 3: Operation continuation	—	—	0
y03	(Timer time)	0.0 to 60.0 s	0.1	s	2.0
y04	(Transmission rate)	0: 2400 bps 1: 4800 bps 2: 9600 bps 3: 19200 bps 4: 38400 bps	—	—	3
y05	(Data length selection)	0: 8 bits 1: 7 bits	—	—	0
y06	(Parity bit selection)	0: None (for RTU, stop bit is 2 bits) 1: Even parity (for RTU, stop bit is 1 bit) 2: Odd parity (for RTU, stop bit is 1 bit) 3: None (for RTU, stop bit is 1 bit)	—	—	0
y07	(Stop bit selection)	0: 2 bits 1: 1 bit	—	—	0
y08	(Communication disconnection detection time)	0: No detection, 1 to 60 s	1	s	0
y09	(Response interval time)	0.00 to 1.00 s	0.01	s	0.01
y10	(Protocol selection)	0: Modbus RTU protocol 1: SX protocol (loader protocol) 2: V7 series inverter protocol	—	—	1
y97	Communication data save method selection	0: Store in non-volatile memory (limit on number of times) 1: Store in temporary storage (no limit on number of times) 2: Save all from temporary storage to non-volatile memory (reverts to data 1 after execution)	—	—	0
y99	Link function for assistance (Operation selection)	Frequency command Run command 0: Using H30 Using H30 1: Command from loader Using H30 2: Using H30 Command from loader 3: Command from loader Command from loader	—	—	0

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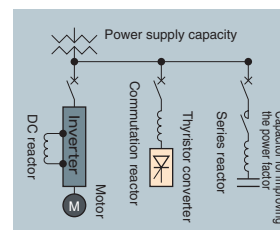
V7

V7 Model

Options

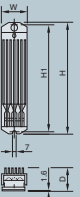
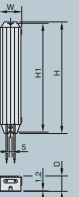
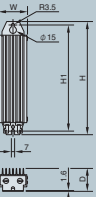
Option Guide

Power supply		Name	Main application/use
		Surge absorber	Absorb surge and noise intruding from outside to prevent malfunction of devices such as an electromagnetic contactor, control relay, and timer.
		Arrestor	Used to absorb induced lightning surge from the power supply to protect all the devices connected to the power supply.
		Surge killer	Applied to absorb surge and noise intruding from outside to prevent malfunction of electronic devices used on the board.
		Frequency setter	Used as an external knob to set the frequency.
		Frequency indicator	Indicate the frequency using an output signal from the inverter.
		AC reactor (ACR)	Used as a reactor for improving the power factor and coordinating the power supply. However, the use of a more effective and smaller and lighter DC reactor is recommended. Use a DC reactor (DCR) to prevent harmonics. Use it for applications that particularly require stable power supply, such as DC bus connection operation (PN connection operation)
		Zero-phase reactor for reducing radio noise	Used to reduce radio noise. It is recommended to insert it on the power supply side if the wiring distance between the motor and inverter is short (about 20 m or less), and insert it on the output side if the distance is longer than 20 m.
		Filter capacitor for reducing radio noise	Used to reduce noise. Noise can be effectively reduced in the AM radio frequency band (1 MHz or less) Never connect it to the output side of the inverter.
		DC reactor (DCR)	[For coordinating the power supply] (1) Use this if the power-supply transformer capacity is 500 kVA or more and is more than 10 times the inverter rated capacity. (2) Use this if a thyristor converter is connected as a load of the same transformer. Note that if a commutation reactor is not used in the thyristor converter, an AC reactor is required on the input side of the inverter. (3) If a CU trip occurs with the inverter due to opening/closing the phase advance capacitor in the power supply system, connect this to prevent the trip. (4) Use this if there is 2% or more unbalance between phases in the power supply voltage. $\text{Unbalance between phases [\%]} = \frac{\text{Max. voltage [V]} - \text{min. voltage [V]}}{\text{Three-phase average voltage [V]}} \times 67$ (as per IEC61800-3 (5.2.3)) [For improving the Input power factor and reducing harmonics] Used to reduce the input harmonic current (improve the power factor). * For the reduction effect, refer to the document attached to the guidelines, etc.
		Braking resistor	Used to increase braking capability for applications involving frequent starting/stopping and a large moment of inertia.
		Filter for output circuit	Connect this to the output side of the inverter for use for the following purposes. (1) Vibration suppression of motor terminal voltage Prevent damage to the motor insulation caused by a surge voltage in the inverter. (2) Suppression of output side wiring leakage current Reduce leakage current in parallel operation of multiple motors and long-distance wiring. (3) Suppression of radiation noise and induced noise from the output side wiring Effective in reducing noise if long-distance wiring is used in plants, etc.
		Extension cable for remote operation	Used to connect to devices such as the remote touch panel via RS-485 communication.
		Remote touch panel	Used to remotely operate the inverter.
		Inverter assistance loader software	Inverter assistance loader for Windows to facilitate the setting of function code

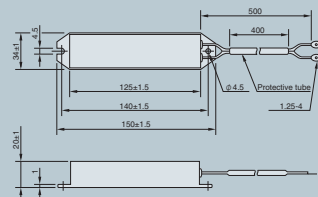


Braking resistor

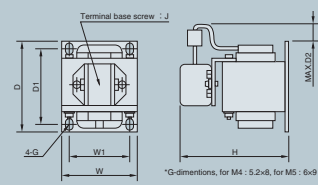
Exterior	Braking resistor types	Inverter type	Braking resistor model	Resistance [Ω]	Max. braking torque			Continuous braking (100% torque conversion value)		Repeated braking (frequency 100 [s] or less)	
					[%]	50 Hz [N · m]	60 Hz [N · m]	Discharge withstand current rating [kWs]	Braking time [s]	Allowable average loss [kW]	Utilization rate [%ED]
	Standard	V7-04-4	DB0.75-2	100	150	4.02	3.32	9	45	0.044	22
		V7-07-4	DB0.75-2	100	150	7.57	6.25	17	45	0.068	18
		V7-15-4	DB2.2-2	40	150	15.0	12.4	34	45	0.075	10
		V7-22-4	DB2.2-2	40	150	22.0	18.2	33	30	0.077	7
		V7-37-4	DB3.7-2	33	150	37.1	30.5	37	20	0.093	5
	10%ED	V7-04-4	DB0.75-2C	100	150	4.02	3.32	50	250	0.075	37
		V7-07-4	DB0.75-2C	100	150	7.57	6.25	50	133	0.075	20
		V7-15-4	DB2.2-2C	40	150	15.0	12.4	55	73	0.110	14
		V7-22-4	DB2.2-2C	40	150	22.0	18.2	55	50	0.110	10
		V7-37-4	DB3.7-2C	33	150	37.1	30.5	140	75	0.185	10

Figure A	Figure B	Figure C	Types	Model	Figure	W [mm]	H [mm]	H1 [mm]	D [mm]	Mass [kg]
			Standard	DB0.75-2	A	68	310	295	67	1.3
				DB2.2-2	A	80	345	332	94	2.0
				DB3.7-2	A	80	345	332	94	2.0
			10%ED	DB0.75-2C	B	43	221	215	30.5	0.4
				DB2.2-2C	C	67	188	172	55	0.8
				DB3.7-2C	C	67	328	312	55	1.4

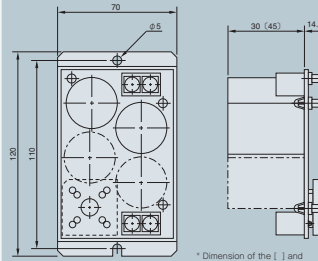
Braking resistor [Small type]

		Model	Resistance		Applied inverter model	Average braking torque [%]	Allowable braking characteristic		Braking unit
			Capacity [kW]	Resistance [Ω]			Allowable braking frequency [%]	Allowable continuous braking time [s]	
		TK80W120Ω	0.08	120	V7-04-4	150	15	15	No need
					V7-07-4	150	5	15	No need
					V7-15-4	150	5	10	No need
					V7-22-4	65	5	10	No need
					V7-37-4	45	5	10	No need

DC reactor (DCR)

		Applied inverter model	Reactor model	W [mm]	W1 [mm]	D [mm]	D1 [mm]	D2 [mm]	G [mm]	H [mm]	J [mm]	Mass [kg]
									(Nominal dia.)		(Nominal dia.)	
		V7-01-4	DCR2-0.2	66	56	90	72	5	M4	94	M4	0.8
		V7-02-4	DCR2-0.2	66	56	90	72	5	M4	94	M4	0.8
		V7-04-4	DCR2-0.4	66	56	90	72	15	M4	94	M4	1.0
		V7-07-4	DCR2-0.75	66	56	90	72	20	M4	94	M4	1.4
		V7-15-4	DCR2-1.5	66	56	90	72	20	M4	94	M4	1.6
		V7-22-4	DCR2-2.2	86	71	100	80	10	M5	110	M4	1.8
		V7-37-4	DCR2-3.7	86	71	100	80	20	M5	110	M4	2.6

Voltage Doubler Unit

		By using this voltage doubler unit, 0.75 kW or lower models (3-phase 200 V input) can be used in with a single-phase 100 V power supply. The driving motor is three-phase 200 V. *Rated input AC voltage: Single-phase 100 to 115 V, 50/60 Hz *Rated output voltage: 255 to 280 VDC		
		Applied inverter model	Voltage doubler unit model	Rated capacity [kVA]
		V7-01-4	CAPA6-0.2	0.5
		V7-02-4	CAPA6-0.2	0.5
		V7-04-4	CAPA6-0.4	1.1
		V7-07-4	CAPA6-0.75	1.8

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V7 Model

Options

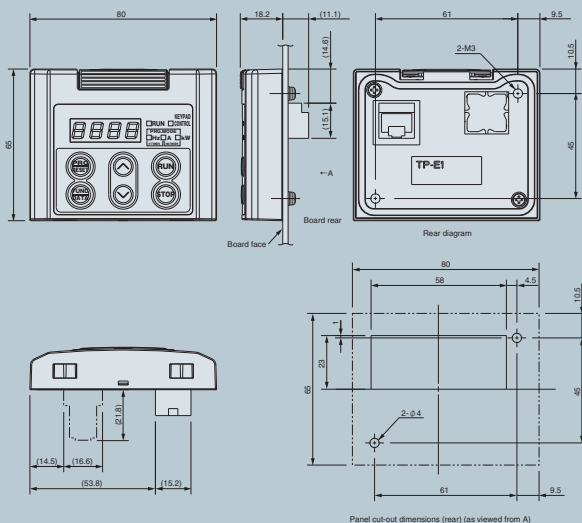
Remote Touch Panel (TP-E1)



The remote touch panel allows you to remotely operate and display data for the V series

(with copy function).

* Requires a separate extension cable for remote operation.

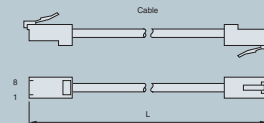


Extension Cable for Remote Operation



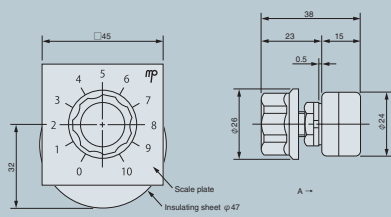
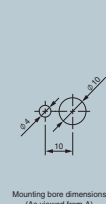
Cable for connecting the remote touch panel via RS-485 communication.

Straight cable is available in 3 lengths: 1, 3, and 5 m



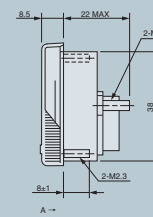
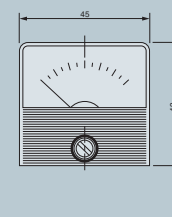
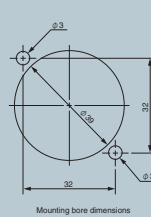
Model	Length L [m]
CB-1S	1
CB-3S	3
CB-5S	5

Frequency Setter <for VR Set 24 (B5K Ohm)> | Frequency Meter (TRM-45-V6)



Resistance 5 kΩ, Characteristics B

The output frequency can be measured by connecting the frequency meter to control circuit terminals FMA and 11 on the inverter.



10 VDC, 1 mA

Wiring Applied Devices

Inverter type	Standard applied motor [kW]	Molded case circuit breaker (MCCB)		Earth leakage circuit breaker (ELCB)		Electromagnetic contactor (MC)			Recommended wire size [mm ²]				
		Rated current [A]		Rated current [A]		Input circuit		Output circuit	Input circuits [L1/R, L2/S, L3/T]		Output circuit (U, V, W)	DC link circuit [P1, P(+)]	Braking circuit [P(+), DB, P(-)]
		With DCR	No reactor	With DCR	No reactor	With DCR	No reactor		With DCR	No reactor			
V7-01-4	0.1	5	5	SC-05	SC-05	SC-05	SC-05	SC-05	2.0	2.0	2.0	2.0	—
V7-02-4	0.2	5	5	SC-05	SC-05	SC-05	SC-05	SC-05	2.0	2.0	2.0	2.0	—
V7-04-4	0.4	5	5	SC-05	SC-05	SC-05	SC-05	SC-05	2.0	2.0	2.0	2.0	2.0
V7-07-4	0.75	5	10	SC-05	SC-05	SC-05	SC-05	SC-05	2.0	2.0	2.0	2.0	2.0
V7-15-4	1.5	10	15	SC-05	SC-05	SC-05	SC-05	SC-05	2.0	2.0	2.0	2.0	2.0
V7-22-4	2.2	10	20	SC-05	SC-05	SC-05	SC-05	SC-05	2.0	2.0	2.0	2.0	2.0
V7-37-4	3.7	20	30	SC-05	SC-4-0	SC-05	SC-05	SC-05	2.0	5.5	3.5	3.5	2.0

* The model frame and series for the molded case circuit breaker (MCCB) and earth leakage circuit breaker (ELCB) differ depending on the capacity of the transformer provided. Choose a model based on the information in the breaker catalog and the technical data. * The rated sensed current for the earth leakage circuit breaker (ELCB) should also be selected based on the technical data. The rated currents for the MCCB and ELCB in this table are for an SA□B/□ or SA□R/□. * The magnetic contactor (MC) model shown is manufactured by Fuji Electric FA Components & Systems Co., Ltd.

• The recommended wire size is under the board temperature condition of 50°C or less.

• The type of wire is for a 600 V, HIV-insulated single wire (at 75°C).

• The actual values may differ from those in the table above depending on conditions such as the ambient temperature and power supply voltage.

Items Checked for Design Purposes

Motor operation

■ Torque characteristics and temperature rise

If a general-purpose motor is operated with an inverter, the temperature rises slightly higher than when operating using commercially available batteries. Reduce the output torque as the cooling effect decreases at low speeds. If you need to perform constant torque operation at low speeds, use an "inverter motor" or a motor with "separately-driven draft fan."

■ Vibrations

If a motor operated with an inverter is mounted in a machine, resonance may occur due to the natural frequency of the machine system, etc.

If a 2-pole motor is operated at 60 Hz or more, abnormal vibrations may occur.

* Consider using our CENTAFLEX coupling or anti-vibration rubber.

* Use the "jump frequency" function of the inverter to avoid the resonance point.

■ Noise

If a general-purpose motor is operated with an inverter, noise may be slightly louder than when operating using commercially available batteries. Set the carrier frequency of the inverter higher to reduce the noise. If high-speed operation is performed at 60 Hz or more, wind noise may be louder.

Application of special motors

■ High-speed motor

If you set the frequency of the inverter to 120 Hz or more to operate a high-speed motor, carry out a compatibility test with the motor beforehand to ensure operation can be performed safely.

■ Explosion-proof motor

If you drive an explosion-proof motor with an inverter, you need to use an inverter and motor whose compatibility has been tested and verified.

■ Submersible motor/Submersible pump

The rated current of a submersible motor and pump is generally greater than that of a general-purpose motor. Select an inverter with a rated output current greater than the rated current of the motor. Set the "thermal time constant" for the electronic thermal function to a smaller value according to the motor you use as the thermal characteristics differ among motors.

■ Brake motor

For a motor with a parallel brake, be sure to connect the brake power supply to the input side (primary side) of the inverter. If connected to the output side (secondary side) of the inverter, power cannot be supplied to the brake so the brake may not work. It is not recommended to drive a motor with a serial brake using an inverter.

■ Geared motor

If you use an oil lubricated gearbox or speed changer/reducer as the power transmission mechanism, continuous operation at low speeds only results in a decrease in the effect of oil lubrication. Do not perform continuous operation at low speeds only.

■ Synchronized motor

Special support according to the type of motor is required. Please contact Miki Pulley individually.

■ Single-phase motor

A single-phase motor is not suitable for variable operation using an inverter. Use a three-phase motor as the inverter produces a three-phase output even in a single-phase power supply.

Ambient environment

■ Installation location

Use the inverter within the "allowable operating temperature (-10 to +50°C)." Install the inverter on an inflammable (e.g. metallic) surface as the "cooling fin" and "braking resistor" in the inverter may rise in temperature under some operation conditions of the inverter. Install the inverter in a location that meets the "environmental conditions" of the inverter.

Connecting peripheral devices

■ Installing the Molded case circuit breaker

Install the recommended molded case circuit breaker (MCCB) or earth leakage circuit breaker (ELCB) (with overcurrent protection function) on the input side (primary side) of the inverter for wiring protection. Do not use devices with a capacity greater than the recommended capacity.

■ Output side (secondary side) electromagnetic contactor

If an electromagnetic contactor is to be installed on the output side (secondary side) of the inverter for switching to a commercially

available power supply or other purposes, perform the switch while both the inverter and motor are stopped. Remove the surge killer integrated into the electromagnetic contactor.

■ Input side (primary side) electromagnetic contactor

Make sure the open/close operation is not performed using the electromagnetic contactor on the input side (primary side) frequently (more than once per hour). It may cause an inverter failure. If running and stopping is required frequently, do it using signals of the control circuit terminals FWD and REV.

■ Motor protection

The motor can be protected using "the electronic thermal" function of the inverter.

Set the "operation level" and the type of motor (general-purpose motor or inverter motor). For a high-speed motor and water-cooling motor, set the "thermal time constant" lower, and separately protect the motor in combination with the "cooling system disconnection" detection. If you use a motor thermal relay, a trip may occur if the current is less than the set value for the thermal relay, due to the influence of harmonic current flowing through the floating capacitance of wiring if the wiring distance to the motor is long. In such a case, lower the carrier frequency or use an output circuit filter (OFL)

■ Not using a capacitor for improving power factor

Do not install a capacitor for improving the power factor on the primary side of the inverter as it does not produce any effect. Use a "DC reactor" to improve the power factor of the inverter. Furthermore, do not install the capacitor for improving the power factor on the secondary side of the inverter. Doing so may cause an "overcurrent trip" to stop the inverter.

■ Not using a surge killer

Do not install a surge killer on the secondary side of the inverter.

■ Anti-noise measures

The EMC Directive must generally be met, and it is recommended to connect a filter and use shielded wiring.

■ Anti-surge measures

If an "OH trip" occurs while the inverter is stopped or during light-load operation, the open/close surge of the advance phase capacitor in the power supply system is considered to be the cause. Application of a "DC reactor" is recommended as a measure on the inverter side.

■ Megger test

When you carry out a megger test of the inverter main unit, use a 500 V megger and carry out the test in accordance with the instructions in the instruction manual.

Wiring

■ Control circuit wiring distance

When you perform remote operation, make sure the wiring distance between the inverter and operation box is 20 m or less, and use a twisted shielded wire for wiring.

■ Wiring distance between inverter and motor

If the wiring distance between the inverter and motor is great, the inverter may overheat or an overcurrent trip may occur due to the influence of harmonic current flowing through the floating capacitance between the wires of different phases. Make sure the distance is about 50 m or less. If the distance is greater than 50 m, lower the carrier frequency or use an output circuit filter (OFL).

■ Wire size

Select a large enough wire by reference to the current value and recommended wire size.

■ Type of wire

Do not use a multi-core cable for connecting multiple inverters and multiple motors.

■ Ground wiring

Be sure to ground the inverter using the ground terminal.

Capacity selection

■ General-purpose motor drive

Generally select the capacity for the "standard applied motor" in the inverter list. If you need a large starting torque or acceleration/deceleration in a short period of time, select an inverter capacity that is larger by one than the nominal one.

■ Special motor drive

Generally select the capacity under the condition "the inverter rated current is larger than motor rated current."

Transportation/storage

When you transport and store the inverter, select the method and location that meet the environmental conditions in the inverter specifications column.