YASKAWA

V7 and V74X Drives
Installation Guide

Models: MV and CIMR-V7* **Document Number: IG.V7.01**

⚠ WARNING

YASKAWA manufactures component parts that can be used in a wide variety of industrial applications. The selection and application of YASKAWA products remain the responsibility of the equipment designer or end user. YASKAWA accepts no responsibility for the way its products are incorporated into the final system design. Under no circumstances should any YASKAWA product be incorporated into any product or design as the exclusive or sole safety control. Without exception, all controls should be designed to detect faults dynamically and fail safely under all circumstances. All products designed to incorporate a component part manufactured by YASKAWA must be supplied to the end user with appropriate warnings and instructions as to that part's safe use and operation. Any warnings provided by YASKAWA must be promptly provided to the end user. YASKAWA offers an express warranty only as to the quality of its products in conforming to standards and specifications published in the YASKAWA manual. NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS OFFERED. YASKAWA assumes no liability for any personal injury, property damage, losses, or claims arising from misapplication of its products.

⚠ WARNING

- Do not connect or disconnect wiring while the power is on. Do not remove covers or touch circuit boards while the power is on.
- Before servicing, disconnect all power to the equipment. The internal capacitor remains charged even after the power supply is turned OFF. Status indicator LEDs and Digital Operator display will be extinguished when the DC bus voltage is below 50 VDC. To prevent electric shock, wait at least 5 minutes after all indicators are OFF.
- Do not perform a withstand voltage test on any part of the unit. This equipment uses sensitive devices and may be damaged by high voltage.
- The drive is not suitable for circuits capable of delivering more than 18,000 RMS symmetrical amperes at 250V maximum or 480V maximum. Install adequate branch short circuit protection. Refer to page 13. Failure to do so may result in equipment damage and/or personal injury.
- Input Fuses are required for proper branch short circuit protection for all NEMA type 4X/12 drives. Failure to use recommended fuses (See Appendix 4) may result in damage to the drive and/or personal injury.

For Enclosed wall-mounted type (NEMA type 1)

When mounting units in an enclosure, remove the top, bottom and terminal covers. Install a cooling fan or some other means to maintain the air entering the enclosure below 113°F (45°C).

For Water and dust tight type (NEMA type 4X/12)

Never submerge this model in water. For the cable lead-in section, use a waterproof cable gland. After completion of wiring, mount the front cover and bottom cover with care so as not to damage the gasket. The front cover mounting screws and bottom cover mounting screws are made of stainless. Replacements must be of stainless steel and the same length.

IMPORTANT

- Wiring should be performed only by qualified personnel.
- Verify that the rated voltage of the Drive matches the voltage of the incoming power.
- Some drawings in this manual are shown with the protective covers and shields removed, in order to describe detail with more clarity. Make sure all covers and shields are replaced before operating this product.
- This manual may be modified when necessary because of product improvement, modification, or changes in specifications.
- YASKAWA is not responsible for any modification of the product made by the user, doing so will void the warranty.

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CONTENTS

SECTION A. Model No. Related Specifications

230V Class											
Model		CIMR-V7* ☐	20P1	20P2	20P4	20P7	21P5	22P2	23P7	25P5	27P5
		MV ☐	A001	A002	A003	A005	A008	A011	A017	A025	A033
Output Characteristics	Max. applicable motor output HP*(1)*		1/8	1/4	1/2	3/4 and 1	2	3	5	7.5	10
	Drive capacity (kVA)		0.3	0.6	1.1	1.9	3.0	4.2	6.7	9.5	13
	Rated Output Current (A)		0.8	1.6	3.0	5.0	8.0	11.0	17.5	25	33 (5)
	Rated Input Current (A)		1.1	1.8	3.9	6.4	11.0	15.1	24.0	33.0	39.6
	Max. Output Voltage (V)		200 to 230V (proportional to input voltage)								
	Max. Output Frequency (Hz)		400 Hz (programmable)								
Power Supply	Rated Input Voltage and Frequency		3-phase. 200 to 230 V, 50/60 Hz								
	Allowable voltage fluctuation		-15% to +10%								
	Allowable frequency fluctuation		±5%								
Physical Characteristics	Cooling Method (QTY)	NEMA 1	self	self	self	fan	fan	fan	fan	fan(2)	fan(2)
		NEMA 4	self	self	self	self	fan	fan	fan	self	self
460V Class											
Model		CIMR-V7* ☐	- -	40P2	40P4	40P7	41P5	42P2	43P7	45P5	47P5
		MV ☐	- -	B001	B002	B003	B005	- -	B009	B015	- -
Output Characteristics	Max. applicable motor output HP*(1)*		- -	1/2	3/4	1&2	3	3	5	7.5 & 10	15 (6)
	Drive capacity (kVA)		- -	0.9	1.4	2.6	3.7	4.2	7	11	16 (6)
	Rated Output Current (A)		- -	1.2	1.8	3.4	4.8	5.5	8.6	14.8	21 (6)
	Rated Input Current (A)		- -	1.6	2.4	4.7	7.0	8.1	12.0	19.6	27.8 (6)
	Max. Output Voltage (V)		380 to 460V (proportional to input voltage)								
	Max. Output Frequency (Hz)		400 Hz (programmable)								
Power Supply	Rated Input Voltage and Frequency		3-phase. 380 to 460 V, 50/60 Hz								
	Allowable voltage fluctuation		-15% to +10%								
	Allowable frequency fluctuation		±5%								
Physical Characteristics	Cooling Method (QTY)	NEMA 1	- -	self	self	self	fan	- -	fan	fan(2)	fan(2)
		NEMA 4	- -	self	self	self	fan	- -	fan	self	self

	SECTION B. All Drives	
Control Characteristics	Control method	Sine wave PWM (V/f Control or Open Loop Vector)
	Frequency control range	0.1 to 400 Hz
	Frequency accuracy (temperature change)	Digital command: ±0.01% (14 to 122°F, -10 to +50°C)
		Analog command: ±0.5% (77°F ± 18°F, 25°C ± 10°C)
	Speed Regulation	Open Loop Vector: ±0.2%
		V/Hz Mode: ±0.5% – 1% with Slip Compensation
	Frequency setting resolution	Digital Operator reference: 0.01 Hz (< 100Hz) 0.1 Hz (100Hz or more)
		Analog reference: 0.06Hz/60Hz (1/1000)
	Output frequency resolution	0.01 Hz
	Overload capacity	150% of rated output current for 1 minute
	Frequency Reference Signal	0 to 10VDC (20kΩ), 4 to 20mA (250Ω), 0 to 20mA (250Ω) pulse train input, Digital Operator Pot
	Accel/Decel Time	0.01 to 6000 sec. (accel/decel time are independently programmed)
	Braking Torque	Short-term average deceleration torque (2) 0.2kW: 150% 0.75kW: 100% 1.5kW: 50% 2.2kW or more: 20% Continuous regenerative torque: Approx. 20% (150% with optional braking resistor, braking transistor built-in)
	V/f characteristics	Custom V/f pattern

See notes at end of table

(table continued on next page)

SECTION B. All Drives (Continued)			
Protective Functions	Motor overload protection		Electronic thermal overload relay
	Instantaneous overcurrent		Motor coasts to stop at approx. 250% of drive current
	Overload		Motor coasts to stop after 1 min. at 150% of drive rated current (7)
	Overvoltage		Motor coasts to stop if DC bus voltage exceeds 410VDC (230V), 820VDC (460V)
	Undervoltage		Motor coasts to stop when DC bus voltage is 210VDC or less (230V), 400VDC or less (460V)
	Momentary Power Loss		The following operations are selectable: • Not provided (stops if power loss is 15 ms or longer) • Automatic restart at recovery from 0.5 sec. power loss • Automatic restart
	Heatsink overheat		Protected by electronic circuit
	Stall prevention level		Independently programmable during accel and constant-speed running. Selectable during decel.
	Ground fault		Protected by electronic circuit (overcurrent level)
	Power charge indication		ON until the DC bus voltage becomes 50V or less. RUN lamp says ON or digital operator LED stays ON. (Charge LED is Provided for 400V)
	Cooling Fan Fault		Protected by electronic circuit
Other Functions	Input signals	Run/stop input	2-Wire or 3-Wire
		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 (NO/NC contact input, speed search command, accel/decel hold command, LOCAL/REMOTE selection, communication/control circuit terminal selection, emergency stop fault emergency stop alarm
	Output signals	Multi-function output	Following output signals are selectable (1 NO/NC contact output, 2 photo-coupler outputs): Fault, running, zero speed, at frequency, frequency detection (output frequency or set value), during overtorque detection, during undervoltage detection, minor error, during baseblock, operation mode, inverter run ready, during fault retry, during UV, during speed search, data output through communication
		Analog monitor	0 to +10VDC output, programmable for output frequency or output current

			SECTION B. All Drives (Continued)
Other Functions	Standard functions		Open Loop Vector Control, full-range automatic torque boost, auto restart, upper/lower frequency limit, DC injection braking current/time at start/stop, frequency reference gain/bias, prohibited frequencies, analog meter calibrating gain, S-curve accel/decel, slip compensation, MODBUS communications (RS485/422, Max. 19.2K bps), frequency reference from digital operator pot
	Display	Status indicator LEDs	RUN and ALARM LEDs provided as standard
		Digital Operator	Monitors frequency reference, output frequency, output current, FWD/REF selection
	Terminals		Screw terminals for both main circuit and control circuit
	Wiring distance between drive and motor		328 ft (100 m) or less *(3)*
	Enclosure		Open Type/NEMA type 1/NEMA type 4X/12
	Cooling method		Self-cooling/cooling fan
Environmental conditions	Ambient temperature		14 to 104°F (-10 to 40°C)
	Humidity		95% RH or less (non-condensing)
	Storage temperature *(4)*		-4 to 140°F (-20 to 60°C)
	Location		Indoor (free from corrosive gases or dust)
	Elevation		3,280 feet (1,000 m) or less
	Vibration		Up to 1G, at less than 20 Hz; up to 0.2G, at 20 to 50 Hz

NOTES:

(1) Based on an N.E.C. standard 4-pole motor for max. applicable motor output.
(2) Shows deceleration torque for an uncoupled motor decelerating from 60 Hz in 0.1 seconds.
(3) Contact Yaskawa for wiring distances greater than 328 ft. (100 m).
(4) Temperature during shipping (for short periods of time).
(5) On NEMA type 4X/12 model only, maximum continuous rating of 30.8 A is 40 degrees C maximum ambient. For 33.0 A maximum continuous rating, maximum ambient is 32 degrees C.
(6) Applies to NEMA type 4X/12 model only.
(7) On Model 47P5 NEMA type 4X/12 (21A), overload is 120% for 1 minute.

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Introduction

This document pertains to the V7 ac drive. This document is equally applicable to drives identified as GPD315, GPD315/V7, GPD315/V74X, and V74X. Additionally, in this document, the word “drive”, “ac drive”, and “inverter” may be used interchangeably. The V7 (NEMA type1) and V74X (NEMA type 4X/12), hereafter referred to as the "Drive," are general purpose sine-coded pulse width modulated AC motor drives which generate an adjustable voltage/frequency three phase output for complete speed control of most conventional squirrel cage induction motors. Automatic stall prevention and voltage boost prevent nuisance tripping during load or line side transient conditions. The Drive will not induce any voltage line notching distortion back to the utility line, and it maintains a displacement power factor of not less than 0.98 throughout its speed range.

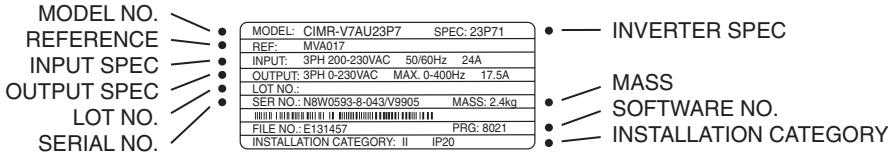
When properly installed, operated and maintained, the Drive will provide a lifetime of service. It is mandatory that the person who operates, inspects, or maintains this equipment thoroughly read and understand this manual before proceeding.

This installation guide details installation procedures and parameter setting ranges. For programming, refer to the Technical Manual TM.V7.01 on the CD-ROM included with the Drive.

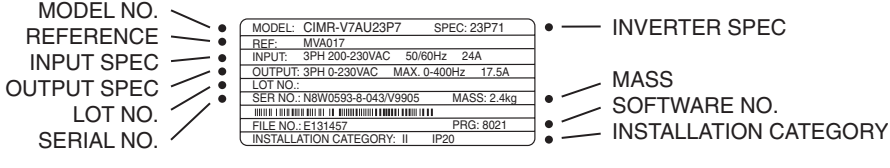
Receiving

Check nameplate - Be certain your input voltage source, motor and Drive nameplates are all marked either 230V or 460V. Other voltages can be used, but require additional programming; see TM.V7.01.

Nameplate Structure



V7 [NEMA type 1]



V74X [NEMA type 4X/12]

Model Number Structure

No.	Type
A	With digital operator
B	Without digital operator
C	With digital operator
R	Finless

Note: Contact your YASKAWA representative for finless type drives.

No.	Applicable maximum motor output	
	230V	**460V**
0P1	1/8 HP	---
0P2	1/4 HP	1/2 HP
0P4	1/2 HP	3/4 HP
0P7	3/4 & 1 HP	1 & 2 HP
1P5	2 HP	3 HP
2P2	3 HP	3 HP
3P7	5 HP	5 HP
5P5	7.5 HP	7.5 & 10 HP
7P5	10 HP	15[1]

No.	Voltage Class	
B	Single-phase	230VAC
2	Three-phase	230VAC
4	Three-phase	460VAC

No.	Specifications
U or M	UL Specification (U.S.) Specification)

[1] Applies to NEMA type 4X12 model only

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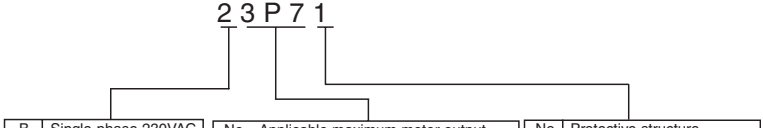
Drive Spec Structure



B	Single-phase 230VAC
2	Three-phase 230VAC
4	Three-phase 460VAC

No.	Applicable maximum motor output	
	230 V	**460 V**
0P1	1/8 HP	---
0P2	1/4 HP	1/2 HP
0P4	1/2 HP	3/4 HP
0P7	3/4 & 1 HP	1 & 2 HP
1P5	2 HP	3 HP
2P2	3 HP	3 HP
3P7	5 HP	5 HP
5P5	7.5	7.5 & 10 HP
7P5	10 HP	10/15[1] HP

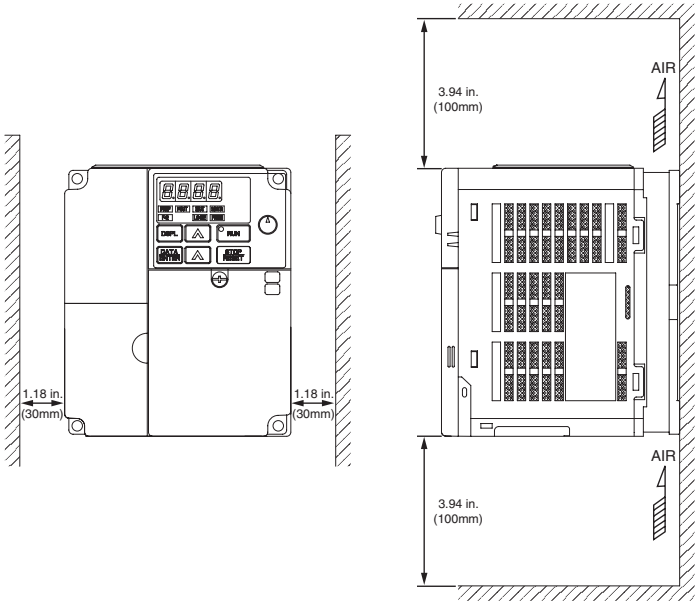
No.	Protective structure
0	Open chassis (IP20, IP00)
1	Enclosed wall-mounted (NEMA 1)
4	Water and dust tight (NEMA 4/IP66)
7	Open chassis (IP20) Top-closed type

Note: Model Number and Drive Spec Number are required to fully define a drive.
[1] Applies to NEMA type 4X/12 model only.

Location of the Drive is important to achieve proper performance and normal operating life. The unit should be installed in an area where it will be protected from:

- Extreme cold and heat. Use only within the ambient temperature range (for open chassis type): 14 to 122°F (-10 to +50°C) (for enclosed wall mount type): 14 to 104°F (10 to +40°C)
- Rain, moisture
- Oil sprays, splashes
- Salt spray
- Direct sunlight. (Avoid using outdoors)
- Corrosive gases (e.g. sulfurized gas) or liquids
- Dust or metallic particles in the air
- Physical shock, vibration
- Magnetic noise (Example: welding machines, power devices, etc.)
- High humidity
- Radioactive substances
- Combustibles: thinner, solvents, etc.

When preparing to mount the Drive, lift it by its base, never by the front cover. For effective cooling, as well as proper maintenance, the Drive must be installed on a flat, non-flammable vertical surface (wall or panel) using recommended mounting screws. There MUST be a MINIMUM 3.94 in. clearance above and below the Drive to allow air flow over the heat sink fins. A minimum 1.18 in. clearance is required on each side of the Drive.



Important: To use the CIMR-V7*U25P5, 27P5, 45P5, and 47P5 Drives as an open chassis, remove top and bottom covers and allow 1.97 in. (50mm) clearance on each side of the drive.

Main Circuit Input /Output Wiring

- Use 600V vinyl-sheathed wire or equivalent. Wire size and type should be determined by local electrical codes.
- Avoid routing power wiring near equipment sensitive to electrical noise.
- Avoid running input and output wiring in the same conduit.
- NEVER connect AC main power to output terminals T1(U), T2(V), and T3(W).
- NEVER allow wire leads to contact metal surfaces. Short-circuit may result.
- NEVER connect power factor correction capacitors to the Drive output. Consult Yaskawa when connecting noise filters to the Drive output.
- WIRE SIZING MUST BE SUITABLE FOR CLASS I CIRCUITS.
- When connecting motor to Drive's output terminals, include a separate ground wire. Attach ground wire solidly to motor frame and to Drive's ground terminal ⏚.
- When using armored or shielded cable for connection between Drive and motor, solidly connect armor or shield to motor frame, and to Drive's ground terminal ⏚.
- Motor lead length should NOT EXCEED 164 feet (50 meters), and motor wiring should be run in a separate conduit from the power wiring. If lead length must exceed this distance, reduce carrier frequency (see TM.V7.01, paragraph 5.8) and consult factory for proper installation procedures.
- Use UL listed closed loop connectors or CSA certified ring connectors sized for the selected wire gauge. Install connectors using the correct crimp tool recommended by the connector manufacturer.

Control Circuit

All basic control circuit (signal) interconnections are shown in the appropriate diagram:

- Interconnections for external two-wire control in combination with the Digital Operator are shown in Figure 1-5.
- Interconnections for external three-wire control in combination with the Digital Operator are shown in Figure 1-6.

Make wire connections according to Figures 1-5 and 1-6 and Table 1-2; observe the following:

- Signal Leads: Terminals S1-S7 & SC; RP, FS, FR & FC; R+, R-, S+, S-; & AM & AC.
- Control Leads: Terminals P1, P2 & PC; MA, MB & MC.
- Use twisted shielded or twisted-pair shielded wire (20-16 AWG [0.5 – 1.25mm2]) for control and signal circuit leads. The shield sheath MUST be connected at the drive end ONLY (terminal ⏚). The other end should be dressed neatly and left unconnected (floating). See Figure 1-1.

- Signal leads and feedback leads (PG) must be separated from control leads main circuit leads, and any other power cables, to prevent erroneous operation caused by electrical noise.
- Lead length should NOT EXCEED 164 feet (50 meters). Wire sizes should be determined considering the voltage drop.
- All AC relays, contactors and solenoids should have RC surge supressors installed across their coils.
- All DC relays, contactors and solenoids should have diodes installed across their coils.

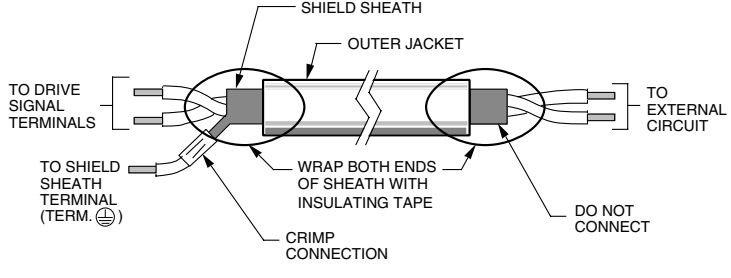


Figure 1-1. Shielded Sheath Termination

- The Drive must be solidly grounded using the main circuit ground terminal ⏚.
- If Drive is installed in a cabinet with other equipment, ground leads for all equipment should be connected to a common low-impedance ground point within the cabinet.
- The supply neutral should be connected to the ground point within the cabinet.
- Select appropriate ground wire size from Table 1-1.
- Make all ground wires as short as practical.
- NEVER ground the Drive in common with welding machines, or other high power electrical equipment.
- Where several Drives are used, ground each directly to the ground point (see Figure 1-2). DO NOT FORM A LOOP WITH THE GROUND LEADS.
- When connecting a motor to the Drive's output terminals, include a separate ground wire. Attach ground wire solidly to motor frame and to Drive's ground terminal ⏚.
- When using armored or shielded cable for connection between Drive and motor, solidly connect armor or shield to motor frame, and to the Drive's ground terminal ⏚.

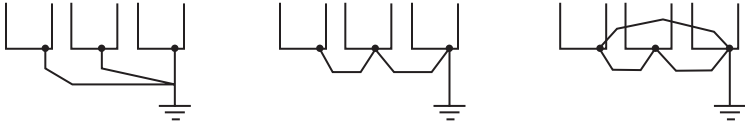


Figure 1-2. Correct Ground Connection

Table 1.1 Wire and Terminal Screw Sizes

230V 3-phase Input

Model		Terminal Symbol	Screw	Tightening Torque lb • in (N • m)	Wire				Type
					Applicable size		Recommended size		
CIMR-V7* ☐	MV ☐				mm²	AWG	mm²	AWG	
20P1	A001	R/L1, S/L2, T/L3 B1, B2 U/T1, V/T2, W/T3 -, +1,+2 ⏚	M3.5	7.1 to 8.88 (0.8 to 1.0)	0.75 to 2	18 to 14	2	14	600V vinyl-sheathed wire or equivalent
20P2	A002		M3.5	7.1 to 8.88 (0.8 to 1.0)	0.75 to 2	18 to 14	2	14	
20P4	A003		M3.5	7.1 to 8.88 (0.8 to 1.0)	0.75 to 2	18 to 10	2	14	
20P7	A005		M3.5	7.1 to 8.88 (0.8 to 1.0)	0.75 to 2	18 to 14	2	14	
21P5	A008		M4	10.65 to 13.31 (1.2 to 1.5)	2 to 5.5	14 to 10	2	14	
22P2	A011		M4	10.65 to 13.31 (1.2 to 1.5)	2 to 5.5	14 to 10	3.5	12	
23P7	A017		M4	10.65 to 13.31 (1.2 to 1.5)	2 to 5.5	14 to 10	5.5	10	
25P5	A025		M5	22.19 (2.5)	5.5 to 8	10 to 8	8	8	
27P5	A033		M5	22.19 (2.5)	5.5 to 8	10 to 8	8	8	

460V 3-phase Input

Model		Terminal Symbol	Screw	Tightening Torque lb • in (N • m)	Wire				Type
					Applicable size		Recommended size		
CIMR-V7* ☐	MV ☐				mm²	AWG	mm²	AWG	
40P2	B001	R/L1, S/L2, T/L3 B1, B2 U/T1, V/T2, W/T3 -, +1,+2 ⏚ x 1	M4	10.65 to 13.31 (1.2 to 1.5)	2 to 5.5	14 to 10	2	14	600V vinyl-sheathed wire or equivalent
40P4	B002		M4	10.65 to 13.31 (1.2 to 1.5)	2 to 5.5	14 to 10	2	14	
40P7	B003		M4	10.65 to 13.31 (1.2 to 1.5)	2 to 5.5	14 to 10	2	14	
41P5	B005		M4	10.65 to 13.31 (1.2 to 1.5)	2 to 5.5	14 to 10	2	14	
42P2	—								
43P7	B009		M4	10.65 to 13.31 (1.2 to 1.5)	2 to 5.5	14 to 10	2 3.5 x 1	14 12 x 1	
45P5	B015		M4	12.43 (1.4)	3.5 to 5.5	12 to 10	5.5	10	
47P5	—		M5	22.19 (2.5)	5.5 to 8	12 to 10	5.5	10	

Note: The wire size is set for copper wires at 160°F (75°C)

Table 1-1. Wire and Terminal Screw Sizes - continued

Control Circuit

Model	Terminal Symbol	Screw	Tightening Torque lb • in (N • m)	Wire				Type
				Applicable size		Recommended size		
				mm²	AWG	mm²	AWG	
Common to all models	MA, MB, MC	M3	4.44 to 5.33 (0.5 to 0.6)	twisted wire 0.5 to 1.25 single 0.5 to 1.25	20 to 16 20 to 16	0.75	18	Shielded wire or equivalent
	S1 to S7, P1, P2, SC, PC, R+, R-, S+, S-, FS, FR, FC, AM, AC, RP	M2	1.94 to 2.21 (0.22 to 0.25)	twisted wire 0.5 to 0.75 single 0.5 to 1.25	20 to 18 20 to 16	0.75	18	

Table 1-2. Terminal Functions and Voltages

TERMINAL	FUNCTION	VOLTAGE / SIGNAL LEVEL
L1 (R) L2 (S) L3 (T)	Main circuit input power supply	230V Drive: 200 / 208 / 220 / 230V at 50/60 Hz 460V Drive: 380 / 400 / 440 / 460 / 480V at 50/60 Hz
T1 (U) T2 (V) T3 (W)	Main circuit output	230V Drive: 0 - 200 / 208 / 220 / 230V 460V Drive: 0 - 400 / 440 / 460 / 480V
B1 B2	For connection of braking resistor (option)	
+1 +2	DC Reactor terminals	
–	DC Bus terminals (+1 & –)	
⏚	Ground terminal (100 ohms or less)	– – – –
S1	Multi-Function-Input 1	Factory setting is " ***Forward Run/Stop*** " (1). (Forward run when closed, stop when open)
S2	Multi-Function-Input 2	Factory setting is " ***Reverse Run/Stop*** " (1). (Reverse Run when closed, stop when open)
S3	Multi-Function-Input 3	Factory setting is " ***External Fault (NO contact) input*** " (1)
S4	Multi-Function-Input 4	Factory setting is " ***Fault Reset*** " (1)

(table continued on next page)

Table 1-2. Terminal Functions and Voltages - continued

TERMINAL	FUNCTION		VOLTAGE / SIGNAL LEVEL
S5	Multi-Function-Input 5		Factory setting is " ***Multi-step Speed Reference 1*** " (1)
S6	Multi-Function-Input 6		Factory setting is " ***Multi-step Speed Reference 2*** " (1)
S7	Multi-Function-Input 7		Factory setting is " ***Jog Reference*** " (1)
SC	Sequence common for terminals S1-S7.		Common terminal for sequence inputs
FS	Frequency reference power supply		+12 VDC
FR	Frequency reference input		0 to +10V/100% (20K ohms) or 4-20 mA (250 Ω)
RP	Frequency reference –Pulse Train input		30 KHz maximum pulse input
FC	Frequency reference input common		0 V
MA	Multi-function contact output – NO contact	Factory	Contact capacity:
MB	Multi-function contact output – NC contact	Setting	250 Vac at 1A or below
MC	Multi-function contact output – Common	is " **Fault** "	30 Vdc at 1A or below
AM	Multi-function analog monitor (+)	Factory setting is " ***Output frequency*** " 0-10V = 0-100%	Monitor output: 0 to +10V; 2 mA maximum.
AC	Analog monitor common	0 V	
P1	Multi-Function Open Collector Output 1	Factory setting is " ***Drive Running*** "	Photocoupler output: 48 VDC; 50 mA or less.
P2	Multi-Function Open Collector Output 2	Factory setting is " ***Speed Agree*** "	
PC	Multi-Function Open Collector Output common	0V	
R+	Receive input (+)	MODBUS communication RS-485 or RS-422.	RS-485/422 MODBUS protocol, 19.2 kps max.
R–	Receive input (–)		
S+	Send output (+)		
S–	Send output (–)		

NOTES:

(1) These inputs have factory settings based on 2-wire reset. For 3-wire reset definitions, see Figure 1-6.

The following peripheral devices may be required to be mounted between the AC main circuit power supply and the Drive input terminals L1 (R), L2 (S) and L3 (T).

⚠ CAUTION

Never connect a general LC/RC noise filter to the Drive output circuit.

Never connect a phase-advancing capacitor to the input/output sides or a surge suppressor to the output side of the Drive.

When a magnetic contactor is installed between the Drive and the motor, never turn it on or off during operation.

Note: For more details on peripheral devices, contact your manufacturer.

Recommended Branch Short Circuit Protection Peripheral Devices

All models have UL evaluated motor overload protection built in. Motor overload protection is also provided in accordance with the NEC and CEC. Additional branch circuit overload protection is not required.

230V 3-Phase

Model	CIMR-V7* □	20P1	20P2	20P4	20P7	21P5	22P2	23P7	25P5	27P5
	MV □	A001	A002	A003	A005	A008	A011	A017	A025	A033
Capacity (kVA)		0.3	0.6	1.1	1.9	3.0	4.2	6.7	9.5	13.0
Rated output current (A)		0.8	1.6	3.0	5.0	8.0	11.0	17.5	25.0	33.0
Rated input current (A)		1.1	1.8	3.9	6.4	11.0	15.1	24.0	33.0	39.6
Max. Time Delay Fuse Rating (A) (1)		1.8	3.2	6.25	10	17.5	20	25	45	60
Max. Non-Time Delay Fuse Rating (A) (2)		3	5	10	20	30	45	45	70	80
Max. MCCB Rating (A)		15	15	15	15	20	30	40	50	60

460V 3-Phase

Model	CIMR-V7* ☐	40P2	40P4	40P7	41P5	42P2	43P7	45P5	47P5[3]
	MV ☐	B001	B002	B003	B005	---	B009	B015	B018
Capacity (kVA)		0.9	1.4	2.6	3.7	4.2	7.0	11.0	14.0
Rated output current (A)		1.2	1.8	3.4	4.8	5.5	9.2	14.8	18/21
Rated input current (A)		1.6	2.4	4.7	7.0	8.1	12.0	19.6	23.8 / 27.8
Max. Time Delay Fuse Rating (A) [1]		2.8	4	8	12	15	20	35	45
Max. Non-Time Delay Fuse Rating (A) [2]		5	7	12	20	25	35	60	70
Max. MCCB Rating (A)		15	15	15	15	20	20	30	40

Notes:

[1] *Apply UL designated Class RK5 fuses.*

[2] *Apply UL designated Class CC or T non-time delay fuses.*

[3] *Model 47P5 rated 21A is only applicable to the NEMA type 4X/12 version.*

Input fuse sizes are determined by NEC guidelines, and should not exceed the ratings shown in the table.
Fuse Ratings are based upon 250V fuses for 230V Drives, and 600V for 460V Drives
Fuse Manufacturer's Designators: Class CC: KTK, FNQ or equivalent
Class RK5: FRN, FRS or equivalent
Class T: JJS, JJN or equivalent

Magnetic Contactor

Mount a surge protector on the coil. When using a magnetic contactor to start and stop the Drive, do not exceed one start per hour.

Ground Fault Interrupter

Select a ground fault interrupter not affected by high frequencies. To prevent malfunctions, the current should be 200mA or more and the operating time 0.1 second or more.

AC and DC Reactor

Install a reactor to connect to a power supply transformer of large capacity (600 kVA or more) or to improve the power factor on the power supply side.

Noise Filter

Use a noise filter exclusively for the Drive if radio noise generated from the Drive causes other control devices to malfunction.

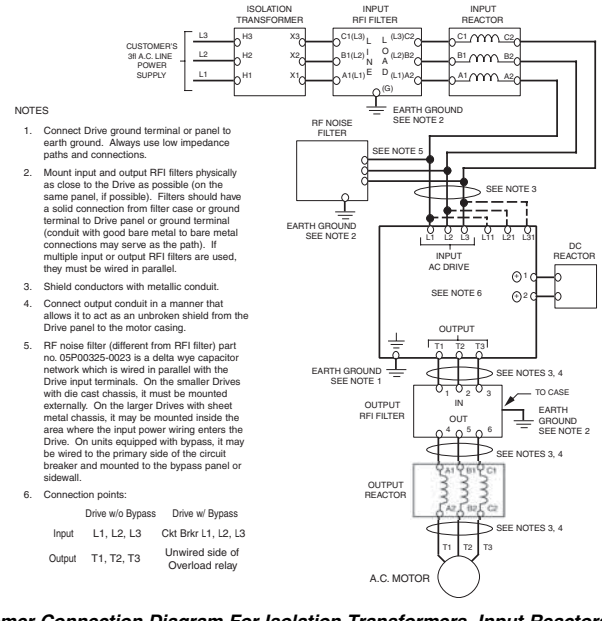
Auxiliary Input and Output Power Option Devices

A disconnect device (circuit breaker, contactor, disconnect switch, etc.) should NOT be used as a means of starting and stopping the Drive or motor.

A disconnect device can be installed for emergency stop purposes, but when that disconnect device is opened, there may be loss of electrical braking.

Figure 1-3 is a factory guideline for proper wiring practices and relative locations within the electrical path from the line to the load. It does not imply what devices are needed for a particular application, nor does it show what devices were shipped with a particular order. Therefore, disregard those items in the diagram which are not being used in your installation. However, it is recommended that an input or DC reactor be used with all Drive ratings when wired to a source of 600 kVA or greater. Mount all optional power devices close to the Drive, and keep electrical connections as short as possible.

Note: DO NOT run input and output wiring in the same conduit.



NOTES

1. Connect Drive ground terminal or panel to earth ground. Always use low impedance paths and connections.
2. Mount input and output RFI filters physically as close to the Drive as possible (on the same panel, if possible). Filters should have a solid connection from filter case or ground terminal to Drive panel or ground terminal (conduit with good bare metal to bare metal connections may serve as the path). If multiple input or output RFI filters are used, they must be wired in parallel.
3. Shield conductors with metallic conduit.
4. Connect output conduit in a manner that allows it to act as an unbroken shield from the Drive panel to the motor casing.
5. RF noise filter (different from RFI filter) part no. 05P00325-0023 is a delta wye capacitor network which is wired in parallel with the Drive input terminals. On the smaller Drives with die cast chassis, it must be mounted externally. On the larger Drives with sheet metal chassis, it may be mounted inside the area where the input power wiring enters the Drive. On units equipped with bypass, it may be wired to the primary side of the circuit breaker and mounted to the bypass panel or sidewall.
6. Connection points:

	Drive w/o Bypass	Drive w/ Bypass
Input	L1, L2, L3	Ckt Brkr L1, L2, L3
Output	T1, T2, T3	Unwired side of Overload relay

Figure 1-3. Customer Connection Diagram For Isolation Transformers, Input Reactors, Input RFI Filters, DC Reactors, Output Reactors and Output RFI Filters

In order to conform to EMC standards, the following methods are required for line filter application, cable shielding and Drive installation.

The line filter and Drive must be mounted on the same metal plate. The filter should be mounted as close to the Drive as practical. The cable must be kept as short as possible and the metal plate should be securely grounded. The ground of the line filter and the Drive must be bonded to the metal plate with as much bare-metal contact as possible.

For main circuit input cables, a screened cable is recommended within the panel and is also suggested for external connections. The screen of the cable should be connected to a solid ground. For the motor cables, a screened cable (max. 20 m) must be used and the screen of the motor cable should be connected to ground at both ends by a short connection, again using as much bare-metal contact as practical.

Table 1-4 and Figure 1-4 show the line filter list for EMC standards and the installation/wiring of the Drive and line filter. For a more detailed explanation, refer to document “Installation Guidelines for EMC Directive Using AC Drive Products.”

Table 1-4. Line Filters for EMC Standards

Model		Line Filter					
CIMR-V7* ☐	MV☐	Part Number FIL00 ☐	Rated Current (A)	Weight lbs. (kg)	Dimensions in in. (mm) H x W x D (1)	Mounting Dim. in in. (mm) H1 x W1	Screw Size
20P1	A001	1083	10	1.8 (0.8)	7.6 x 3.2 x 2.0 (194 x 82 x 50)	7.1 x 2.4 (181 x 62)	M5
20P2	A002						
20P4	A003						
20P7	A005						
21P5	A008	1084	16	2.2 (1.0)	6.7 x 4.4 x 2.0 (169 x 111 x 50)	6.1 x 3.6 (156 x 91)	M5
22P2	A011						
23P7	A017	1085	26	2.4 (1.1)	6.9 x 5.7 x 2.0 (174 x 144 x 50)	6.3 x 4.7 (161 x 120)	M5
25P5	A025	1100	50	5.1 (2.3)	12.0 x 7.2 x 2.2 (304 x 184 x 56)	11.3 x 5.9 (288 x 150)	M6
27P5	A033						
40P2	B001	1086	5	2.2 (1.0)	6.7 x 4.4 x 1.8 (169 x 111 x 45)	6.1 x 3.6 (156 x 91)	M5
40P4	B002						
40P7	B003	1087	10	2.2 (1.0)	6.7 x 4.4 x 1.8 (169 x 111 x 45)	6.1 x 3.6 (156 x 91)	M5
41P5	B005						
42P2	—						
43P7	B009	1088	15	2.4 (1.1)	6.9 x 5.7 x 2.0 (174 x 144 x 50)	6.3 x 4.7 (161 x 120)	M5
45P5	B015	1101	30	5.1 (2.3)	12.0 x 7.2 x 2.2 (304 x 184 x 56)	11.3 x 5.9 (288 x 150)	M6
47P5	—						

(1) D is the distance the filter will extend outward from the surface of the metal plate.

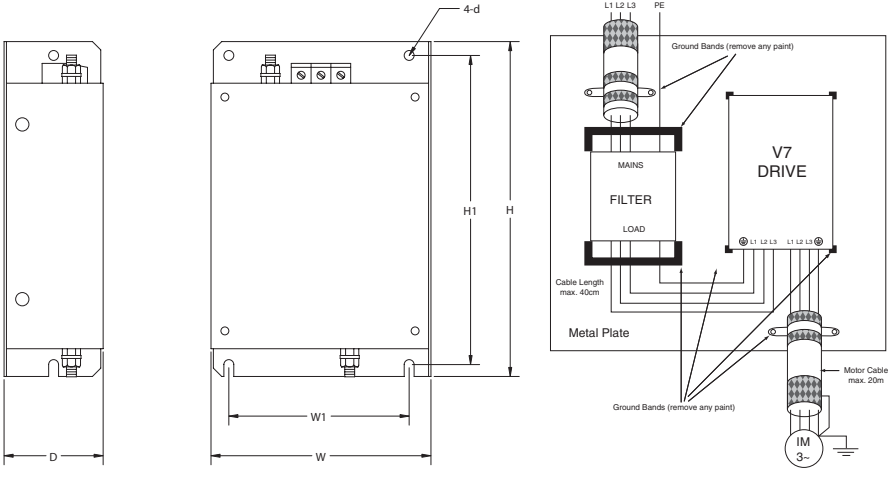


Figure 1-4. Installation of Line Filter and V7N Drive

Notes for Figure 1-5 (2-Wire Control) and Figure 1-6 (3-Wire Control)

✱ – Indicates components not supplied.

– Main circuit terminal.

– Indicates control circuit terminal.

( ) – Indicates alternate terminal marking, i.e., (R) and L1.

▲ – Function labels shown for these terminals are determined by factory settings of ***n050*** through ***n056***. (see TM.V7N.01)

● – Function labels shown for these terminals are determined by factory settings of ***n057*** through ***n059***. (see TM.V7N.01)

1. Insulated twisted shielded wire is required.
   2-conductor #18 GA. (Belden #8760 or equivalent).
   3-conductor #18 GA. (Belden #8770 of equivalent).
   Connect shield ONLY AT the Drive END (ground terminal ⏚). Stub and isolate other end.
2. +12V voltage output current capacity of control terminal FS is 20mA max.
3. The Drive's Electronic Thermal Overload function (n036, n037) meets standards set by UL and CUL for motor thermal overload protection. If local code requires a separate mechanical overload protection, an overload relay should be installed, interlocked with the Drive as shown. It should be the manual reset type to prevent automatic restart following a motor fault and subsequent contact reclosure after cool down.
4. Customer to connect terminal ⏚ to earth ground.
5. If the Digital Operator is used, remote operators, which duplicate functions of its command keys may not be required. See Figure 4-1.
6. For installation of Braking Resistor or Braking Resistor unit, refer to Appendix 6, "Dynamic Braking Option."

7. An optional DC reactor may be added for harmonic attenuation, if needed. See separate instruction sheet for wiring.
8. If application does not allow reverse operation, parameter **n006**, Reverse Run Prohibit Selection, should be set to " 1 " (Reverse Run Disabled), and the Reverse Run/Stop input can be eliminated.

⚠ WARNING

9. Input fuses are required for proper branch circuit short circuit protection for all NEMA Type 4 drives. Failure to use recommended fuses (see appendix 4) may result in damage to the drive and/or personal injury.

⚠ CAUTION

The Drive leaves the factory with parameters initialized for 2-Wire control (when using external Run/Stop signals). Before using the initialization function of constant **n001**, know your control wiring configuration:
10 = Factory 2-Wire Control Initialization (Maintained RUN Contact)
11 = Factory 3-Wire Control Initialization (Momentary START/STOP Contact)

Entering either Initialization code resets all parameters to factory settings, and automatically returns parameter **n001** setting to " 1 ". If the Drive is connected for 3-Wire control and this parameter is set to " 10 " (2-Wire Control Initialization), the motor may run in reverse direction WITHOUT A RUN COMMAND APPLIED. Equipment damage or personal injury may result.

Parameter **n012** must be set to proper motor voltage.

Always ground the Drive using the ground terminal provided.
Never connect main circuit output terminals T1 (U), T2 (V) & T3 (W) to AC main circuit power supply.

When programmed for auto-restart (**n082** = " 1 " thru " 10 "), the motor may restart unexpectedly — personal injury may result.

For Enclosed wall-mounted type (NEMA type 1)

When mounting units in an enclosure, remove the top, bottom and terminal covers. Install a cooling fan or some other means to maintain the air entering the enclosure below 113°F (45°C).

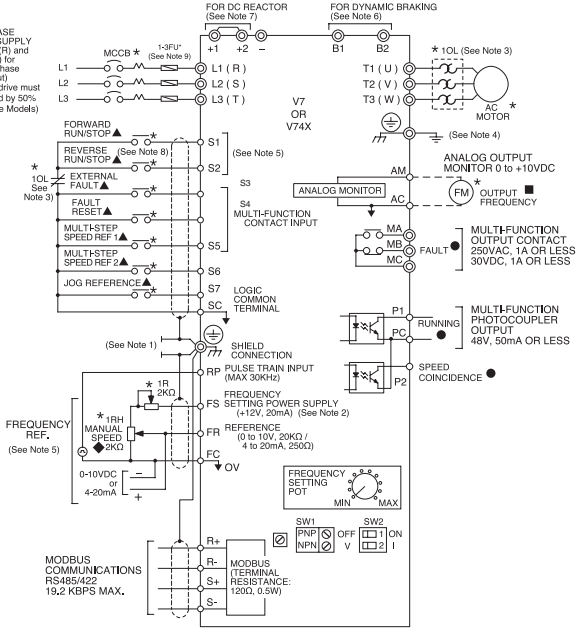


Figure 1-5. Standard Connections (2-Wire Control)
(Parameter n001 set to "10")

⚠ CAUTION

- **After wiring is complete, verify that all wiring is correctly installed, excess screws and wire clippings are removed from inside of unit, screws are securely tightened, and exposed wire does not contact other wiring or terminals.**
- **The Drive leaves the factory with all parameters set for 2-wire external control/ reference control. To use the Drive in a 3-wire application, Drive parameters n001, n003 and n004 must be reprogrammed and Figure 1-6 used for all external connections.**
- **If a FWD or REV run command is given from the control circuit terminal when the operation method selection function (n003) is set to " 1 " and the "LO/RE" selection is set to "RE", the motor will start automatically as soon as power is applied to the main circuit.**

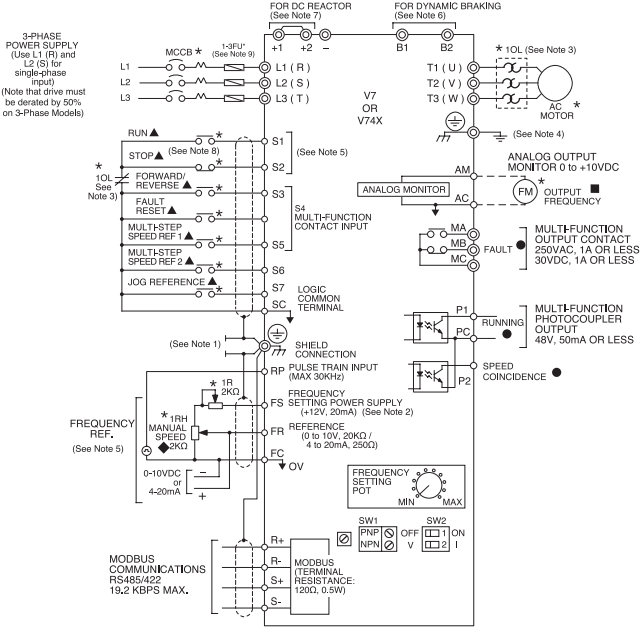


Figure 1-6. Standard Connections (3-Wire Control)
(Parameter n001 set to "11")

⚠ CAUTION

- **After wiring is complete, verify that all wiring is correctly installed, excess screws and wire clippings are removed from inside of unit, screws are securely tightened, and exposed wire does not contact other wiring or terminals.**
- **The Drive leaves the factory with all parameters set for 2-wire external control/ reference control. To use the Drive in a 3-wire application, Drive parameters n001, n003 and n004 must be reprogrammed and Figure 1-6 used for all external connections.**
- **If a FWD or REV run command is given from the control circuit terminal when the operation method selection function (n003) is set to " 1 " and the "LO/RE" selection is set to "RE", the motor will start automatically as soon as power is applied to the main circuit.**

The Drive control circuits use various parameters to select functions and characteristics of the Drive. Changing of parameter settings must be done in the Program mode, or by use of the Function LEDs, if available (see TM.V7.01, Section 4).

The following table lists all parameters in numerical order. For each parameter, reference paragraph(s) in TM.V7.01, Section 5 are listed (if applicable) where the features of the Drive affected by that parameter are described.

V7 Parameters

PARA-METER	NAME	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING	USER SETTING	PARA. REF.
n001	Parameter Selection / Initialization	0: **n001** can be read and set; **n002 - n179** read only 1: **n001 - n039** can be read and set 2: **n001 - n079** can be read and set 3: **n001 - n119** can be read and set 4: **n001 - n179** can be read and set 5: **n001 - n179** can be read and set Run command accepted during Program mode 6: Clear Fault History Only 7: Not Used 8: 2-wire Initialization (Japan Spec.) 9: 3-wire Initialization (Japan Spec.) 10: 2 wire initialization (USA Spec) 11: 3 wire initialization (USA Spec.)	1	1		5.21
n002	Control Method Selection	0: V/f Control 1: Open Loop Vector	1	0		2.2
n003	Operation Method Selection	0: Digital Operator 1: Terminal 2: Serial Communication (Modbus) 3: Option Card	1	1		5.13
n004	Reference Selection	0: Digital Operator Pot 1: Digital Operator 2: Voltage Reference (0 to 10V) 3: Current Reference (4 to 20 mA) 4: Current Reference (0 to 20 mA) 5: Pulse Train Reference 6: Serial Communications (Modbus) 7: Multi-Function Analog Input (0 to 10V) 8: Multi-Function Analog Input (4 to 20 mA) 9: Option Card	1	2		5.11, 5.13

V7 Parameters - Continued

PARA-METER	NAME	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING	USER SETTING	PARA. REF.
n005	Stop Method	0: Ramp to stop 1: Coast to stop	1	0		5.24
n006	Reverse Prohibit	0: Reverse Run enabled 1: Reverse Run disabled	1	0		
n007	**STOP** Key Function	0: **STOP** key is effective regardless of programming of n003 1: **STOP** key is effective only when sequence command (per n003) is from Digital Operator	1	0		5.13
n008	Reference Selection - Digital Operator	0: Frequency Reference from digital operator pot 1: Frequency Reference from **n024**	1	0		5.13
n009	Frequency Reference Setting Method From Digital Operator	0: **ENTER** key must be pressed to write-in new value 1: **ENTER** key does not have to be pressed to write-in new value	1	0		5.13
n010	Operation Selection When Digital Operator is Disconnected	0: Disabled (operation continues) 1: Enabled (motor coasts to a stop and fault is displayed)	1	0		5.15
n011	Frequency - Max.	50.0 to 400.0	0.1 (Hz)	60.0		5.27
n012	Voltage - Max.	0.1 to 255.0 (230V drive) 0.2 to 510.0 (460V drive)	0.1 (V)	230.0 460.0		
n013	Frequency - Max. Voltage Point	0.2 to 400.0	0.1 (Hz)	60.0		
n014	Frequency - Midpoint	0.1 to 399.9	0.1 (Hz)	(Note 2)		
n015	Voltage - Midpoint	0.1 to 255.0 (230V drive) 0.2 to 510.0 (460V drive)	0.1 (V)	(Note 2)		
n016	Frequency - Min.	0.1 to 10.0	0.1 (Hz)	(Note 2)		
n017	Voltage - Min.	0.1 to 50.0 (230V drive) 0.2 to 100.0 (460V drive)	0.1 (V)	(Note 2)		

Drive Parameters - Continued

PARA-METER	NAME	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING	USER SETTING	PARA. REF.
n018	Accel/Decel Time Setting Unit	0: 0.1 1: 0.01	1 (sec)	0		.2
n019	Acceleration Time 1 (Note 4)	0.00 to 600.0	0.01 sec			
n020	Deceleration Time 1 (Note 4)	or	or	10.0		5.2
n021	Acceleration Time 2 (Note 4)	0.0 to 6000	0.1 (sec)			
n022	Deceleration Time 2 (Note 4)	(Dependent on **n018** setting)				
n023	S-curve Selection	0: No S-curve 1: 0.2 second 2: 0.5 second 3: 1.0 second	1	0		5.3
n024	Frequency Reference 1 (Note 4)			6.00		
n025	Frequency Reference 2 (Note 4)			0.00		
n026	Frequency Reference 3 (Note 4)		0.01 (Hz)	0.00		
n027	Frequency Reference 4 (Note 4)	0.00 to 400.00	(< 100 Hz)	0.00		
n028	Frequency Reference 5 (Note 4)		or	0.00		5.11
n029	Frequency Reference 6 (Note 4)		0.1 (Hz)	0.00		
n030	Frequency Reference 7 (Note 4)		(>= 100 Hz)	0.00		
n031	Frequency Reference 8 (Note 4)			0.00		
n032	Jog Frequency Reference (Note 4)		6.00		5.12	
n033	Frequency Reference Upper Limit	0. to 110	1(%)	100		5.9
n034	Frequency Reference Lower Limit	0. to 110	1(%)	0		
n035	Digital Operator Display Mode	0: 0.01 Hz (less than 100 Hz) / 0.1 Hz 1: 0.1% 2 - 39: rpm 40 - 3999: custom	1	0		5.30

Drive Parameters - Continued

PARA-METER	NAME	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING	USER SETTING	PARA. REF.
n036	Motor Rated Current	0.1 to 49.5 (Up to 150% of drive rated current)	0.1 (A)	(Note 1)		5.25
n037	Electronic Thermal Overload Protection (for OL1 fault)	0: Short term rating 1: Standard rating 2: Disabled	1	0		5.25
n038	Electronic Thermal Overload Protection Time Constant	1 to 60	1 (min)	8		
n039	Cooling Fan Operation Selection	0: Operates only when drive is running (continues operation for 1 minute after drive is stopped) 1: Operates with power applied to drive	1	0		
n040	Motor Rotation	0: Rotate C.C.W. 1: Rotate C.W. (or opposite direction)	1	0		5.2
n041	Acceleration Time 3 (Note 4)	0.00 to 600.00 or 0.0 to 6000.0 (Dependent on **n018** setting)	0.01 (sec) or 0.1 (sec)	10.0		
n042	Deceleration Time 3 (Note 4)					
n043	Acceleration Time 4 (Note 4)					
n044	Deceleration Time 4 (Note 4)					
n050	Multi-function Input Selection 1 (Terminal S1)	0: Fwd / Rev command (3 wire control) **[can only be set in n052]** 1: Forward run (2 wire control) 2: Reverse run (2 wire control) 3: External Fault (N.O.) 4: External Fault (N.C.) 5: Fault Reset 6: Multi-step speed ref. cmd. A 7: Multi-step speed ref. cmd. B 8: Multi-step speed ref. cmd. C	1	1 (1)		5.18
n051	Multi-function Input Selection 2 (Terminal S2)		1	2 (2)		
n052	Multi-function Input Selection 3 (Terminal S3)		1	3 (0)		

Drive Parameters - Continued

PARA-METER	NAME	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING	USER SETTING	PARA. REF.
n053	Multi-function Input Selection 4 (Terminal S4)	9: Multi-step speed ref. cmd. D 10: JOG Selection 11: Accel/Decel time change cmd. 12: External Base Block (N.O.) 13: External Base Block (N.C.) 14: Speed search from max. freq. 15: Speed search from set freq. 16: Accel/Decel hold command 17: Remote/Local selection 18: Serial Communication / control ckt. selection 19: Fast Stop - Fault (N.O.) 20: Fast Stop - Alarm (N.O.) 21: Fast Stop - Fault (N.C.) 22: Fast Stop - Alarm (N.C.) 23: PID control off 24: I value reset (PID) 25: I value hold (PID) 26: Over Heat Pre-alarm OH3 27: Accel/Decel Time Select 2 34: Up	1	5 (5)		5.18
n054	Multi-function Input Selection 5 (Terminal S5)		1	6 (6)		
n055	Multi-function Input Selection 6 (Terminal S6)		1	7 (7)		
n056	Multi-function Input Selection 7 (Terminal S7)		1	10 (10)		
n057	Multi-Function Output Selection 1 (Terminals MA, MB & MC)	0: Fault 1: During running 2: Speed Agree 3: Zero Speed 4: Frequency detection 1 5: Frequency detection 2 6: Overtorque detection (N.O.) 7: Overtorque detection (N.C.) 8: Undertorque Detection (N.O.) 9: Undertorque Detection (N.C.) 10: Minor Fault 11: During Base Block 12: Local / Remote 13: Ready	1	0		5.19
n058	Multi-Function Output Selection 2 (Terminals P1 & PC)		1	1		

Drive Parameters - Continued

PARA-METER	NAME	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING	USER SETTING	PARA. REF.
n059	Multi-Function Output Selection 3 (Terminals P2 & PC)	14: During auto restart 15: During undervoltage 16: During reverse run 17: During speed search 18: Serial Comm. Controlled 19: PID feedback loss 20: Frequency Reference Loss Detect (N.O.) 21: Overheat Pre-alarm OH3 (N.O.)	1	2		
n060	Analog Frequency Reference Gain (term. FR to FC) (Note 4)	0 to 255	1 (%)	100		5.8
n061	Analog Frequency Reference Bias (term. FR to FC) (Note 4)	-100 to 100	1 (%)	0		
n062	Analog frequency reference filter time constant (term. FR to FC) (Note 4)	0.00 to 2.00	0.01 (sec)	0.10		
n064	Frequency Reference Loss Detection	0: No Detection 1: Continue to run at 80% of max. frequency	1	0		5.33
n065	Monitor Output Selection	0: Analog monitor output 1: Pulse monitor output	1	0		5.17
n066	Multi-function Analog Output (Terminals AM & AC)	0: Output frequency (10V = 100% Fmax) 1: Output Current (10V = 100% drive rated current) 2: DC Bus Voltage (10V = 400 VDC [800 VDC]) 3: Motor Torque (10V = Motor rated torque) 4: Output Power (10V = Drive Capacity kW) 5: Output Voltage 10V = ***n012*** (voltage max) 6: Frequency Reference	1	0		5.17
n067	Analog Monitor Gain (Note 4)	0.00 to 2.00	0.01	1.00		
n068	Analog Frequency Reference Gain (CN2, Voltage Ref Input)	-255 to 255	1%	100		5.32
n069	Analog Frequency Reference Bias (CN2, Voltage Ref Input)	-100 to 100	1%	0		

Drive Parameters - Continued

PARA-METER	NAME	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING	USER SETTING	PARA. REF.
n070	Analog Frequency Reference Filter Time Constant (CN2, Voltage Ref Input)	0.00 to 2.00	0.01 s	0.10		5.32
n071	Analog Frequency Reference Gain (CN2, Current Ref Input)	-255 to 255	1%	100		
n072	Analog Frequency Reference Bias (CN2, Current Ref Input)	-100 to 100	1%	0		
n073	Analog Frequency Reference Filter Time Constant (CN2, Current Ref Input)	0.00 to 2.00	0.01 s	0.10		
n074	Pulse Train Frequency Reference Gain	-255 to 255	1%	100		5.11
n075	Pulse Train Frequency Reference Bias	-100 to 100	1%	0		
n076	Pulse Train Frequency Reference Filter Time Constant	0.00 to 2.00	0.01 s	0.10		
n077	Multi-Function Analog Input Selection	0: Multi-Function analog input disabled 1: Aux. Frequency reference 2: Frequency gain 3: Frequency bias 4: Voltage bias	1	0		5.32
n078	Multi-Function Analog Input Signal Selection	0: 0 - 10V 1: 4 - 20 mA	1	0		
n079	Multi-Function Analog Input Bias Setting	0 to 50	1%	10		

Drive Parameters - Continued

PARA-METER	NAME	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING	USER SETTING	PARA. REF.
n080	Carrier Frequency	1 to 4 (x 2.5 kHz) 7 to 9 (synchronous)	1	3		5.5
n081	Momentary Power Loss Ride-through Method	0: Not Provided 1: Continuous operation after power recovery within 2 sec. 2: Continuous operation after power recovery within control logic time (no fault output)	1	0		5.16
n082	Number of auto restarts attempts	0 to 10	1	0		5.4
n083	Prohibit Frequency 1	0.00 to 400.0	0.01 (Hz) or 0.1 (Hz)	0.00		5.6
n084	Prohibit Frequency 2	0.00 to 400.0	0.01 (Hz) or 0.1 (Hz)	0.00		
n085	Prohibit Frequency 3	0.00 to 400.0	0.01 (Hz) or 0.1 (Hz)	0.00		
n086	Prohibit Frequency Deadband	0.00 to 25.50	0.01 (Hz)	0.00		
n089	DC Injection Current	0 to 100	1 (%)	50		5.7
n090	DC Injection Time at stop	0.0 to 25.5	0.1 (sec)	0.0		
n091	DC Injection Time at start	0.0 to 25.5	0.1 (sec)	0.0		
n092	Stall Prevention During Deceleration	0: Enabled 1: Disabled	1	0		5.23
n093	Stall Prevention During Acceleration	30 to 200	1 (%)	170		
n094	Stall Prevention Level During Running	30 to 200	1 (%)	160		
n095	Frequency Detection Level	0.00 to 400.0	0.01 (Hz)	0.00		5.19

Drive Parameters - Continued

PARA-METER	NAME	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING	USER SETTING	PARA. REF.
n096	Overtorque Detection (OL3)	0: Detection Disabled 1: Detect only at set frequency; operation continues 2: Detect only at set frequency; coast to stop 3: Detect during all frequency conditions; operation continues 4: Detect during all frequency conditions; coast to stop	1	0		5.20
n097	Overtorque Detection Selection (OL3) (Note 5)	0: Detected by output torque 1: Detected by output current	1	0		
n098	Overtorque Detection Level (OL3)	30 to 200	1 (%)	160		
n099	Overtorque Detection Delay Time (OL3)	0.1 to 10.0	0.1 (sec)	0.1		
n100	Up/Down Hold Memory	0: Disabled 1: Enabled	1	0		5.10
n101	Speed Search Deceleration Time	0.0 to 10.0	0.1 (sec)	2		5.18
n102	Speed Search Operation Level	0 to 200%	1 (%)	150		5.18
n103	Torque Compensation Gain (Note 4)	0.0 to 2.5	0.1	1.0		5.26
n104	Torque Compensation Time Constant	0.0 to 25.5	0.1 (sec)	(Note 2)		
n105	Torque Compensation Iron Loss	0.0 to 6550	0.1 (W) or 1 (W)	(Note 1)		
n106	Motor Rated Slip (Note 4)	0.0 to 20.0	0.1 (Hz)	(Note 1)		2.2, 5.22
n107	Motor Line-to-line Resistance	0.000 to 65.50	0.001 (ohm)	(Note 1)		
n108	Motor Leakage Inductance (Note 1)	0.00 to 655.0	0.01 (mH) or 0.1 (mH)	(Note 1)		
n109	Torque Compensation Limit (Note 5)	0 to 250	1 (%)	150		5.26

Drive Parameters - Continued

PARA-METER	NAME	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING	USER SETTING	PARA. REF.
n110	Motor No-load Current	0 to 99	1 (%)	(Note 1)		2.2
n111	Slip Compensation Gain (Note 4)	0.0 to 2.5	0.1	(Note 2)		5.22
n112	Slip Compensation Primary Delay Time	0.0 to 25.5	0.1 (sec)	(Note 2)		
n113	Slip Compensation Selection During Regeneration	0: Disabled 1: Enabled	1	0		
n115	Stall Prevention Above Base Speed During Run	0: Disabled (level is based on setting of **n094**) 1: Enabled (level at Fmax is **n094** x 0.4)	1	0		5.23
n116	Stall Prevention During Run, Accel/Decel Time Select	0: Follows acc/dec #1 (**n019, n020**) or acc/dec #2 (**n021, n022**) Note: Multi-Function input selectable 1: Follows acc/dec #2 (**n021, n022**) always	1	0		
n117	Undertorque Detection Select (UL3)	0: Undertorque detection disabled 1: Detected during constant speed running. Operation continues after detection 2: Detected during constant speed running. Operation stops during detection 3: Detected during all frequency conditions. Operation continues 4: Detected during all frequency conditions. coast to stop	1	0		5.34
n118	Undertorque Detection Level (UL3)	0 to 200% Inverter rated current = 100%; if n097 = 0 (detection by torque); motor rated torque becomes 100%	1(%)	0		
n119	Undertorque Detection Time (UL3)	0.1 to 10.0	0.1 (sec)	.1		
n120	Frequency Reference 9 (Note 4)			0.00		
n121	Frequency Reference 10 (Note 4)		0.01 (Hz)	0.00		5.11
n122	Frequency Reference 11 (Note 4)		(< 100 Hz)	0.00		
n123	Frequency Reference 12 (Note 4)	0.00 to 400.00	or	0.00		
n124	Frequency Reference 13 (Note 4)		0.1 (Hz)	0.00		
n125	Frequency Reference 14 (Note 4)		(>= 100 Hz)	0.00		
n126	Frequency Reference 15 (Note 4)			0.00		
n127	Frequency Reference 16 (Note 4)			0.00		

Drive Parameters - Continued

PARA-METER	NAME	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING	USER SETTING	PARA. REF.
n128	PID Control Selection	0: PID control disabled 1: D = Feed Forward 2: D = Feedback 3: Reference + PID (D = Feed Forward) 4: Reference + PID (D = Feedback) 5: Inverse PID - D = Feed Forward 6: Inverse PID - D = Feedback 7: Inverse PID - Reference + PID (D = Feed Forward) 8: Inverse PID - Reference + PID (D = Feedback)	1	0		
n129	PID Feedback Gain (Note 4)	0.00 to 10.00	0.01	1.00		
n130	PID Proportional Gain (Note 4)	0.00 to 25.00	0.1	1.0		
n131	PID Integral Time (Note 4)	0.00 to 360.00	0.1 s	1.0		5.28
n132	PID Derivative Time (Note 4)	0.00 to 2.50	0.01	0.00		
n133	PID Offset Adjustment (Note 4)	-100 to 100	1%	0		
n134	Integral Value Limit (Note 4)	-100 to 100	1%	100		
n135	PID Output Lag Filter Time (Note 4)	0.0 to 10.0				
n136	Feedback Loss Detection Selection	0: Disabled 1: Enabled - Alarm (operation continues) 2: Enabled Fault (coast to stop)	1	0		
n137	Feedback Loss Detection Level	0 to 100	1%	0		
n138	Feedback Loss Detection Time	0.0 to 25.5	0.1 s	1.0		
n139	Energy Saving Selection (Note 2) (Energy Saving)	0: Energy saving disabled 1: Energy saving enabled Note: Energy saving becomes enabled by V/f control mode	1	0		5.31
n140	Energy Saving Gain K2 (Energy Saving)	0.00 to 6550	0.1 or 1	(Note 1)		

Drive Parameters - Continued

PARA-METER	NAME	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING	USER SETTING	PARA. REF.
n141	Energy Saving Voltage Lower Limit at 60 Hz (Energy Saving)	0 to 120	1%	50		5.31
n142	Energy Saving Voltage Lower Limit at 6 Hz (Energy Saving)	0 to 25	1%	12		
n143	Time of Average kW (Energy Saving)	1 to 200	1 (x 24 ms)	1 (24 ms)		
n144	Voltage Limit of Tuning (Energy Saving)	1 to 100	1%	0		
n145	Step Voltage of Tuning to 100% Output Voltage (Energy Saving)	0.1 to 10.0	0.1%	0.5		
n146	Step Voltage of Tuning to 5% Output Voltage (Energy Saving)	0.1 to 10.0	0.1%	0.2		
n149	Pulse Train Input Scaling	100 to 3300	1 (x 10 Hz)	3072 (30,720 Hz)		5.11
n150	Pulse Monitor Output Frequency Selection	Output Frequency Monitor: 0: 1440 Hz / Max. output frequency 1: 1f output 6: 6f output 12: 12f output 24: 24f output 36: 36f output Frequency Reference Monitor: 40: 1440Hz / Max. output frequency 41: Frequency reference * 1 42: Frequency reference * 6 43: Frequency reference * 12 44: Frequency reference * 24 45: Frequency reference * 36	0, 1, 6, 12, 24, 36, 40, 41, 42, 43, 44, 45	0		5.17
n151	Modbus Time Out Detection	0: Fault - Coast to stop 1: Fault - Ramp to stop (**n020**) 2: Fault - Ramp to stop (**n022**) 3: Alarm - operation continues 4: Disabled	1	0		5.14

Drive Parameters - Continued

PARA-METER	NAME	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING	USER SETTING	PARA. REF.
n152	Modbus Frequency Reference Unit	0: 0.1 Hz 1: 0.01 Hz 2: 30000/100% 3: 0.1 %	1	0		5.14
n153	Modbus Slave Address	0 to 32	1	0		
n154	Modbus Baud Rate	0: 2400 bps 1: 4800 bps 2: 9600 bps 3: 19200 bps	1	2		
n155	Modbus Parity Selection	0: even parity 1: odd parity 2: no parity	1	2		
n156	Modbus Send Waiting Time	10 to 65	1 (msec)	10		
n157	Modbus RTS control	0: RTS control enabled 1: RTS control disabled (RS-422A 1 to 1 communication)	1	0		
n158	Motor Code	0 to 70	1	(Note 1)		
n159	Energy Saving Voltage Upper Limit At 60 Hz (Energy Saving)	0 to 120	1%	120		5.31
n160	Energy Saving Voltage Upper Limit At 6 Hz (Energy Saving)	0 to 25	1%	16		
n161	Power Supply Detection Hold Width (Energy Saving)	0 to 100	1%	10		
n162	Power Supply Detection Filter Time Constant	0 to 255	1 (x 4 ms)	5 (20 ms)		
n163	PID Output Gain	0.0 to 25.0	0.1	1.0		5.28

Drive Parameters - Continued

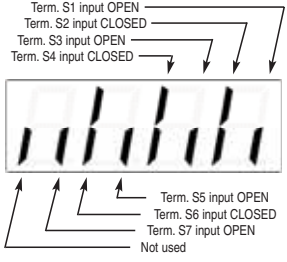
PARA-METER	NAME	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING	USER SETTING	PARA. REF.
n164	PID Feedback Selection	0: Terminal FR (Voltage 0 - 10V) 1: Terminal FR (Current 4 - 20mA) 2: Terminal FR (Current 0 - 20mA) 3: Multi-Function Analog Input (Voltage 0 - 10V) 4: Multi-Function Analog Input (Current 4 - 20mA) 5: Pulse input	1	0		5.28
n166	Input Phase Loss Detection Level	0 to 100 (%)	1%	0		
n167	Input Phase Loss Detection Time	0 to 255 (sec)	1 sec	0		
n168	Output Phase Loss Detection Level	0 to 100 (%)	1%	0		
n169	Output Phase Loss Detection Time	0.0 to 2.0 (sec)	0.1 sec	0		
n173	DC Injection P Gain	1 to 999	1 (0.001)	83 (0.083)		
n174	DC Injection I Time	1 to 250	1 (4ms)	25 (100ms)		
n175	Reduce Carrier at low speed selection	0: Disabled 1: Carrier Frequency reduced to 2.5kHz when Fout <= 5Hz & Iout >= 110%	1	0		5.5
n176	Digital Operator Parameter Copy Function Selection	rdy : READY status rEd: READ executes Cpy: COPY executes vFy: VERIFY executes vA: Inverter capacity display Sno: Software No. display	rdy rEd Cpy vFy vA Sno	rdy		5.29
n177	Digital Operator Parameter copy Access Selection	0: Read disabled 1: Read allowed	1	0		5.29
n178	Fault History	(Note 3)	N/A	N/A		6.2
n179	Software Number	(Note 3)	N/A	N/A		4.4

Note 1: Factory setting differs depending on V7 capacity. See Appendix 3-1.
Note 2: Factory setting differs depending on control method selected (**n002**). See Appendix 3-1.
Note 3: **n178** and **n179** are display only parameters
Note 4: Parameter can be changed while V7 is operating.

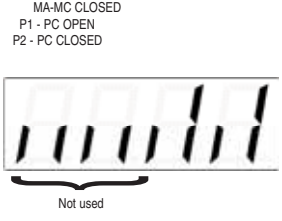
When using the **Monitor** Function, a variety of information will appear on the Digital Operator display when each of the U-XX (display only) parameters is selected.

PARAMETER **U -**	MONITORED ITEM	DISPLAY EXAMPLE
01	Frequency reference (Hz)	***60.0***
02	Output frequency (Hz)	***60.0***
03	Output current (A)	***12.5***
04	AC output voltage (V)	***230***
05	DC Bus voltage (VPN)	***325***
06	Input terminal status	 (1)
07	Output Terminal status	 (2)
08	Motor Torque (%) (Open loop vector only)	***72***
09	Fault record (last 4 faults) (3)	***oC***
10	Software number XXXX	***0024***
11	Output Power (KW)	***99.9***
15	Data reception error	 (4)
16	PID Feedback (%)	***35.0***
17	PID Input (%)	***100***
18	PID Output (%)	***75.5***

(1) Actual display appearance:



(2) Actual display appearance:



(3) See TM.V7.01, Section 6 for viewing of fault log contents.

(4) Actual display appearance:

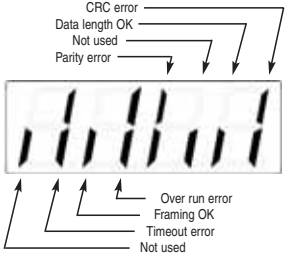
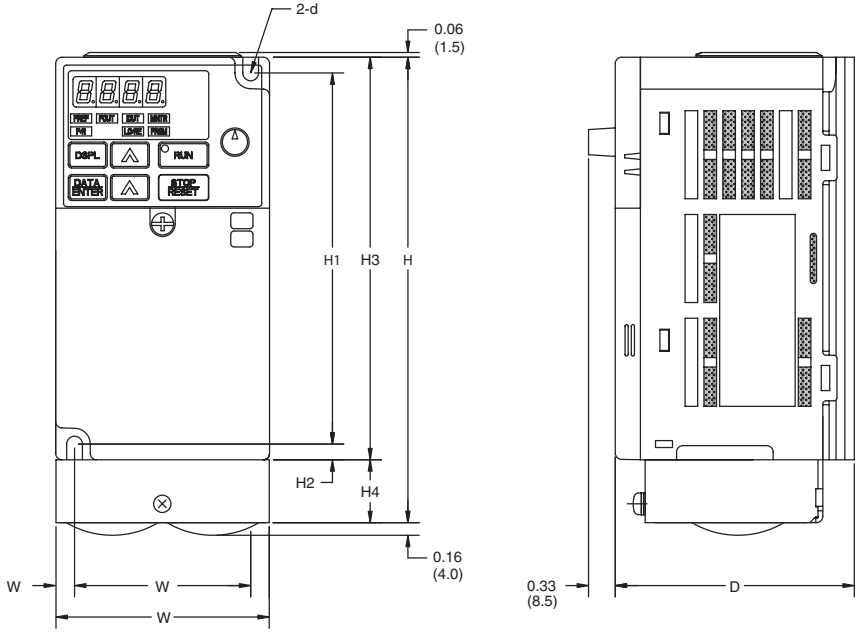


Fig. 1

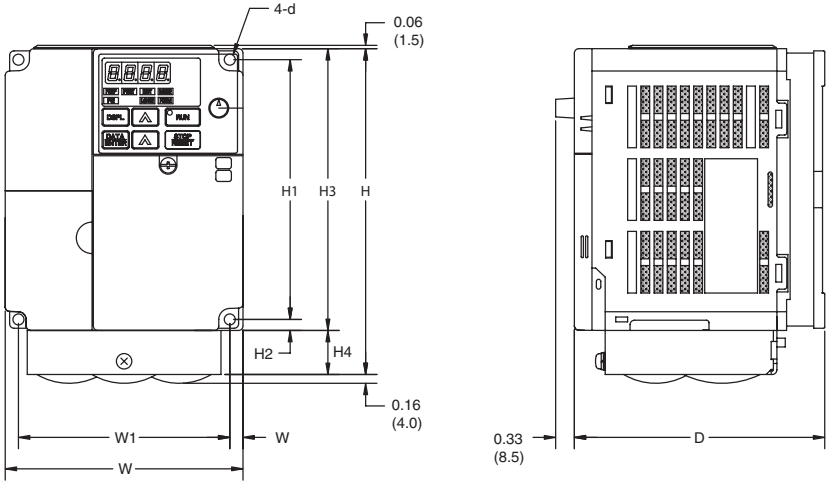

2-d
0.06
(1.5)
H1
H3
H
H2
H4
0.16
(4.0)
W
W
W
0.33
(8.5)
D
DSPL
RUN
DATA
ENTER
STOP
RESET

V7 Enclosed wall mounted type (NEMA type 1)

Voltage Class	Model		Size	Dimensions in inches (mm)										Weight Lbs. (kg)	Heat Loss (W)			Fig.
	CIMR-V7* ☐	MV ☐	HP	W	H	D	W1	H1	H2	W2	H3	H4	d		Heat-sink	Internal	Total	
230V 3-phase	20P1	A001	1/8	2.68 (68)	5.83 (148)	2.99 (76)	2.20 (56)	4.65 (118)	0.20 (5)	0.24 (6)	5.04 (128)	0.79 (20)	M4	1.55 (0.7)	3.7	9.3	13.0	1
	20P2	A002	1/4	2.68 (68)	5.83 (148)	2.99 (76)	2.20 (56)	4.65 (118)	0.20 (5)	0.24 (6)	5.04 (128)	0.79 (20)	M4	1.55 (0.7)	7.7	10.3	18.0	1
	20P4	A003	1/2	2.68 (68)	5.83 (148)	4.25 (108)	2.20 (56)	4.65 (118)	0.20 (5)	0.24 (6)	5.04 (128)	0.79 (20)	M4	2.20 (1.0)	15.8	12.3	28.1	1
	20P7	A005	3/4 & 1	2.68 (68)	5.83 (148)	5.04 (128)	2.20 (56)	4.65 (118)	0.20 (5)	0.24 (6)	5.04 (128)	0.79 (20)	M4	2.65 (1.2)	28.4	16.7	45.1	1

(1) When drives include network communications option board, add 1.5" to drive depth.

Fig. 2

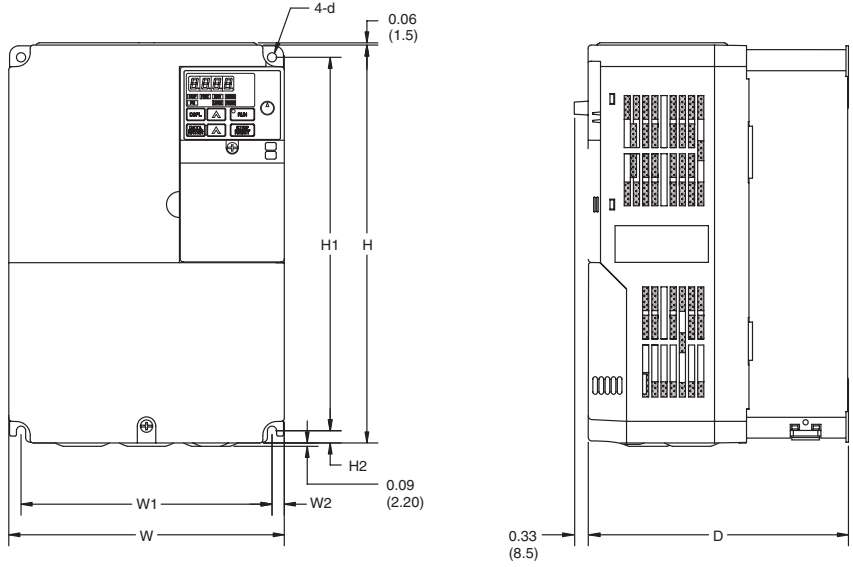


V7 Enclosed wall mounted type (NEMA type 1)

Voltage Class	Model		Size	Dimensions in inches (mm)										Weight Lbs. (kg)	Heat Loss (W)			Fig.
	CIMR-V7☐	MV☐	HP	W	H	D	W1	H1	H2	W2	H3	H4	d		Heat-sink	Internal	Total	
230V 3-phase	21P5	A008	2	4.25 (108)	5.83 (148)	5.16 (131)	3.78 (96)	4.65 (118)	0.20 (5)	0.24 (6)	5.04 (128)	0.79 (20)	M4	3.53 (1.6)	53.7	19.1	72.8	2
	22P2	A011	3	4.25 (108)	5.83 (148)	5.51 (140)	3.78 (96)	4.65 (118)	0.20 (5)	0.24 (6)	5.04 (128)	0.79 (20)	M4	3.75 (1.7)	60.4	34.4	94.8	2
	23P7	A017	5	5.51 (140)	5.83 (148)	5.63 (143)	5.04 (128)	4.65 (118)	0.20 (5)	0.24 (6)	5.04 (128)	0.79 (20)	M4	5.30 (2.4)	96.7	52.4	149.1	2
460V 3-phase	40P2	B001	1/2	4.25 (108)	5.83 (148)	3.62 (92)	3.78 (96)	4.65 (118)	0.20 (5)	0.24 (6)	5.04 (128)	0.79 (20)	M4	2.65 (1.2)	9.4	13.7	23.1	2
	40P4	B002	3/4	4.25 (108)	5.83 (148)	4.43 (110)	3.78 (96)	4.65 (118)	0.20 (5)	0.24 (6)	5.04 (128)	0.79 (20)	M4	2.65 (1.2)	15.1	15.0	30.1	2
	40P7	B003	1& 2	4.25 (108)	5.83 (148)	5.51 (140)	3.78 (96)	4.65 (118)	0.20 (5)	0.24 (6)	5.04 (128)	0.79 (20)	M4	3.75 (1.7)	30.3	24.6	54.9	2
	41P5	B005	3	4.25 (108)	5.83 (148)	6.14 (156)	3.78 (96)	4.65 (118)	0.20 (5)	0.24 (6)	5.04 (128)	0.79 (20)	M4	3.75 (1.7)	45.8	29.9	75.7	2
	42P2	—	3	4.25 (108)	5.83 (148)	6.14 (156)	3.78 (96)	4.65 (118)	0.20 (5)	0.24 (6)	5.04 (128)	0.79 (20)	M4	3.75 (1.7)	50.5	32.5	83.0	2
	43P7	B009	5	5.51 (140)	5.83 (148)	5.63 (143)	5.04 (128)	4.65 (118)	0.20 (5)	0.24 (6)	5.04 (128)	0.79 (20)	M4	5.30 (2.4)	73.4	44.5	117.9	2

(1) When drives include network communications option board, add 1.5" to drive depth.

Fig. 3



V7 Enclosed wall mounted type (NEMA type 1)

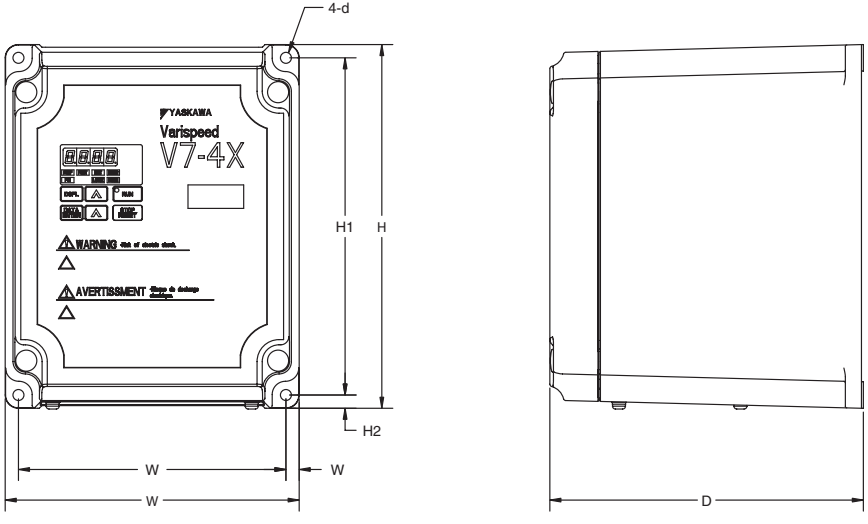
Voltage Class	Model		Size	Dimensions in inches (mm)										Weight Lbs. (kg)	Heat Loss (W)			Fig.
	CIMR-V7* ☐	MV ☐	HP	W	H	D	W1	H1	H2	W2	H3	H4	d		Heat-sink	Internal	Total	
230V 3-phase	25P5	A025	7.5	7.09 (180)	10.24 (260)	6.70 (170)	6.46 (164)	9.61 (244)	0.31 (8)	0.31 (8)	–	–	M5	11.45 (5.2)	170.4	79.4	249.8	3
	27P5	A033	10	7.09 (180)	10.24 (260)	6.70 (170)	6.46 (164)	9.61 (244)	0.31 (8)	0.31 (8)	–	–	M5	11.89 (5.4)	219.2	98.9	318.1	3
460V 3-phase	45P5	B015	10	7.09 (180)	10.24 (260)	6.70 (170)	6.46 (164)	9.61 (244)	0.31 (8)	0.31 (8)	–	–	M5	10.14 (4.6)	168.8	87.7	256.5	3
	47P5	–	15 [3]	7.09 (180)	10.24 (260)	6.70 (170)	6.46 (164)	9.61 (244)	0.31 (8)	0.31 (8)	–	–	M5	10.58 (4.8)	209.6	99.3	308.9	3

[1] When drives include network communications option board, add 1.5" to drive depth.

[2] 230 and 460V drives represented in Figure 3 can be used as “IP00” type enclosures if the top and bottom covers are removed.

[3] Horsepower rating of 15 only available as V74X drive.

Fig. 4


4-d
YASKAWA
Varispeed
V7-4X
WARNING
AVERTISSMENT
H1
H
H2
W
W
W
D

V74X Enclosed wall mounted type (NEMA 4)

Voltage Class	Model CIMR-V7CU ☐	Size HP	Dimensions in inches (mm) W	H	D	W1	H1	H2	W2	d	Weight Lbs. (kg)	Fig.
230V 3-Phase	20P24	0.25	6.10 (155)	7.56 (192)	6.50 (165)	5.55 (141)	7.01 (178)	0.28 (7)	0.28 (7)	0.20 (5)	7.8 (3.52)	4
	20P44	0.5	6.10 (155)	7.56 (192)	6.50 (165)	5.55 (141)	7.01 (178)	0.28 (7)	0.28 (7)	0.20 (5)	8.0 (3.62)	4
	20P74	1	6.10 (155)	7.56 (192)	6.50 (165)	5.55 (141)	7.01 (178)	0.28 (7)	0.28 (7)	0.20 (5)	8.2 (3.72)	4
	21P54	2	6.69 (170)	10.0 (254)	7.48 (190)	6.22 (158)	9.41 (239)	0.24 (6)	0.24 (6)	0.20 (5)	13.0 (5.90)	4
	22P24	3	6.69 (170)	10.0 (254)	7.48 (190)	6.22 (158)	9.41 (239)	0.24 (6)	0.24 (6)	0.20 (5)	13.3 (6.00)	4
	23P74	5	6.69 (170)	10.0 (254)	7.48 (190)	6.22 (158)	9.41 (239)	0.24 (6)	0.24 (6)	0.20 (5)	13.7 (6.20)	4
	25P54	7.5	11.41 (290)	15.98 (406)	11.34 (288)	10.63 (270)	14.17 (360)	0.91 (23)	0.39 (10)	0.28 (7)	41.5 (18.6)	4
	27P54	10	11.41 (290)	15.98 (406)	11.34 (288)	10.63 (270)	14.17 (360)	0.91 (23)	0.39 (10)	0.28 (7)	41.5 (18.8)	4
460V 3-Phase	40P24	1/2	6.10 (155)	7.56 (192)	6.50 (165)	5.55 (141)	7.01 (178)	0.28 (7)	0.28 (7)	0.20 (5)	8.4 (3.82)	4
	40P44	3/4	6.10 (155)	7.56 (192)	6.50 (165)	5.55 (141)	7.01 (178)	0.28 (7)	0.28 (7)	0.20 (5)	8.4 (3.82)	4
	40P74	1 & 2	6.10 (155)	7.56 (192)	6.50 (165)	5.55 (141)	7.01 (178)	0.28 (7)	0.28 (7)	0.20 (5)	8.7 (3.92)	4
	41P54	3	6.69 (170)	10.0 (254)	7.48 (190)	6.22 (158)	9.41 (239)	0.24 (6)	0.24 (6)	0.20 (5)	13.3 (6.00)	4
	42P24	3	6.69 (170)	10.0 (254)	7.48 (190)	6.22 (158)	9.41 (239)	0.24 (6)	0.24 (6)	0.20 (5)	13.3 (6.00)	4
	43P74	5	6.69 (170)	10.0 (254)	7.48 (190)	6.22 (158)	9.41 (239)	0.24 (6)	0.24 (6)	0.20 (5)	13.7 (6.20)	4
	45P54	7.5 & 10	11.41 (290)	15.74 (400)	11.42 (290)	10.63 (270)	14.17 (360)	0.79 (20)	0.39 (10)	0.28 (7)	41.5 (18.8)	4
	47P54	15[1]	11.41 (290)	15.74 (400)	11.42 (290)	10.63 (270)	14.17 (360)	0.79 (20)	0.39 (10)	0.28 (7)	41.5 (18.8)	4

When drives include network communications option board, add 2.0" to drive depth.

[1] Applicable to the V74X Model only.

Notes

V7 and V74X Drives

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