YASKAWA

V7N Drive with DeviceNet Installation Guide

Models: CIMR-V7NU Document Number: IG.V7N.01

WARNINGS, CAUTIONS, INSTRUCTIONS

⚠ 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 16. Failure to do so may result in equipment damage and/or personal injury.

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.

CONTENTS

Standard Specifications

SECTION A. Model No. Related Specifications										
230V Class										
Model	CIMR-V7NU ☐	20P1	20P2	20P4	20P7	21P5	22P2	23P7	25P5	27P5
Output Characteristics	Max. applicable motor output HP (kW) *(1)*	1/8 (0.1)	1/4 (0.2)	1/2 (0.4)	3/4 & 1 (0.7)	2 (1.5)	3 (2.2)	5 (3.7)	7.5 (5.5)	10 (7.5)
	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
	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)	self	self	self	fan	fan	fan	fan	fan(2)	fan(2)
460V Class										
Model	CIMR-V7NU ☐	- -	40P2	40P4	40P7	41P5	42P2	43P7	45P5	47P5
Output Characteristics	Max. applicable motor output HP (kW) *(1)*	- -	1/2 (0.2)	3/4 (0.4)	1 & 2 (0.7)	3 (1.5)	3 (2.2)	5 (3.7)	7.5 & 10 (5.5)	10 (7.5)
	Drive capacity (kVA)	- -	0.9	1.4	2.6	3.7	4.2	7	11	14
	Rated Output Current (A)	- -	1.2	1.8	3.4	4.8	5.5	8.6	14.8	18
	Rated Input Current (A)	- -	1.6	2.4	4.7	7.0	8.1	12.0	19.6	23.8
	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)	- -	self	self	self	fan	fan	fan	fan(2)	fan(2)
	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)

Standard Specifications (Continued)

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: *(3)* 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, DeviceNet 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): *(4)* 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 DeviceNet communication
	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, DeviceNet communications, 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 *(5)*
	Enclosure		Nema Type 1
	Cooling method		Self-cooling/cooling fan
DeviceNet Specifications	Input Power		Voltage: 11 to 25VDC Current: 40mA
	DeviceNet Specification		Conformance level 16: Passed
	DeviceNet Profile		AC Drive Device Type 2
	Connector Type		5-pin open-style screw connector
	Physical Layer Type		Isolated Physical Layer CAN transceiver + photo coupler
	MAC ID Setting		2 Rotary-switches: MAC ID 0 to 63; Parameter setting available
	Baud Rate		A rotary-switch: 125/250/500 kbaud/Auto Baud; Parameter setting available
	Supported Message		Group 2 only server Explicit and Polled I/O messaging
	I/O Assembly Instance		Input: 5 types (4-8 bytes) Output: 5 types (4-8 bytes)
Environmental conditions	Ambient temperature		14 to 104°F (-10 to 40°C)
	Humidity		95% RH or less (non-condensing)
	Storage temperature *(6)*		-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) Four of these input signals are present on the control terminal, and three are controlled via DeviceNet communications.
(4) Two photo-coupler outputs are present on the control terminal, and one NO contact output is controlled via DeviceNet communications.
(5) Contact Yaskawa for wiring distances greater than 328 ft. (100 m).
(6) Temperature during shipping (for short periods of time).

Introduction

This document pertains to the V7N AC Drive. In this document, the word “Drive”, “AC Drive”, and “inverter” may be used interchangeably. The V7N is a general purpose sine-coded pulse width modulated AC motor Drive with embedded DeviceNet communications. It generates 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.

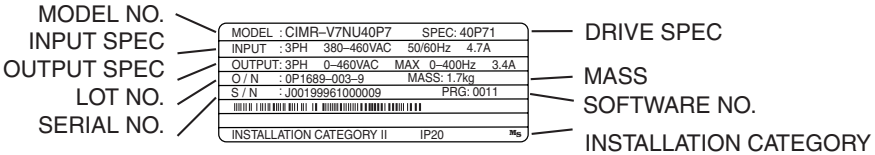
When properly installed, operated and maintained, the Drive will provide a lifetime of service. It is mandatory that the person who operates, inspects, or maintains this equipment thoroughly read and understand this manual before proceeding.

This installation guide details installation procedures and parameter setting ranges for the V7N Drive. For programming and DeviceNet Communication protocol requirements, refer to the V7N Drive with DeviceNet Technical Manual TM.V7N.01.

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.V7N.01.

Nameplate Structure



V7N Nameplate

Model No. C I M R - V 7 N U 2 0 P 1

DRIVE

V7 SERIES

No.	Applicable maximum motor output
0P1	0.13 HP
0P2	0.25 HP
0P4	0.5 HP
0P7	1 HP
1P5	2 HP
2P2	3 HP
3P0	4 HP
3P7	5 HP
5P5	7.5 HP
7P5	10 HP

N	Embedded DeviceNet Communications

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

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

Drive Spec 2 0 P 1 1

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

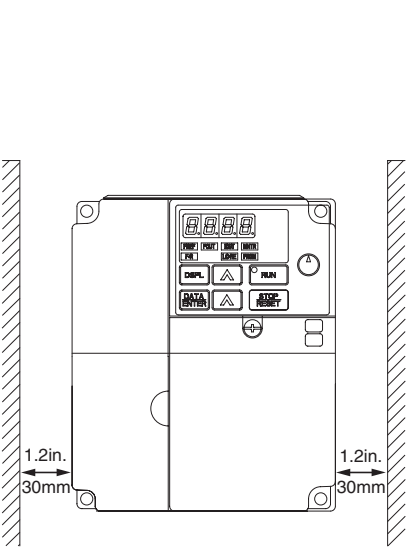
No.	Applicable maximum motor output
0P1	0.13 HP
0P2	0.25 HP
0P4	0.5 HP
0P7	1 HP
1P5	2 HP
2P2	3 HP
3P0	4 HP
3P7	5 HP
5P5	7.5 HP
7P5	10 HP

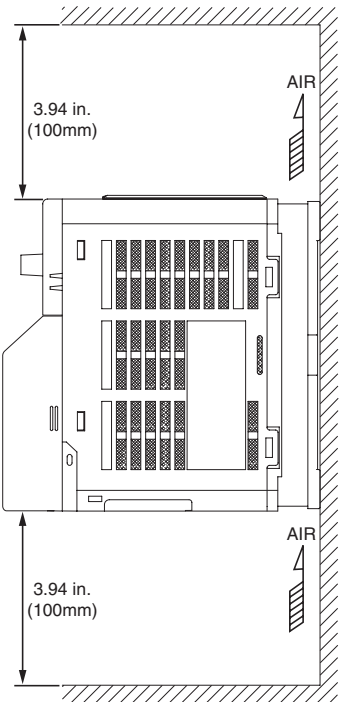
No.	Protective structure
0	Open chassis (IP20, IP00)
1	Enclosed wall-mounted (NEMA 1)

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 3.9 in. clearance above and below the Drive to allow air flow over the heat sink fins. A minimum 1.2 in. clearance is required on each side of the Drive.





Important: To use the CIMR-V7NU25P5, 45P5, and 47P5 Drives as an open chassis, remove top and bottom covers.

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.V7N.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

- 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.

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

- Signal Leads: Terminals S1-S4 & SC.
- Control Leads: Terminals P1, P2 & PC.
- 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.
- DeviceNet Leads: Black, Blue, Shield, White, Red.
- Use DeviceNet thick or thin cable specified by ODVA.
- 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.

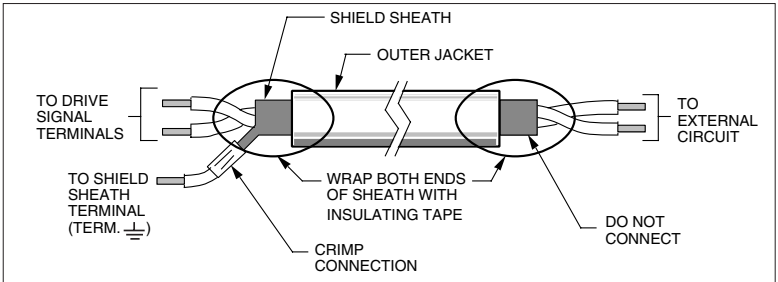


Figure 1-1. Shielded Sheath Termination

- 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 ⏚ .

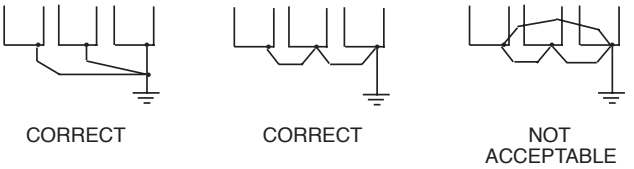


Figure 1-2. Correct Ground Connection

Table 1-1. Wire and Terminal Screw Sizes

Model CIMR-V7NU □	Terminal Symbol	Screw	Tightening Torque lb • in (N • m)	Wire				Type
				Applicable size		Recommended size		
				mm²	AWG	mm²	AWG	
20P1	L1(R), L2(S), L3(T) B1, B2 T1(U), T2(V), T3(W) -, +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		M3.5	7.1 to 8.88 (0.8 to 1.0)	0.75 to 2	18 to 14	2	14	
20P4		M3.5	7.1 to 8.88 (0.8 to 1.0)	0.75 to 2	18 to 10	2	14	
20P7		M3.5	7.1 to 8.88 (0.8 to 1.0)	0.75 to 2	18 to 14	2	14	
21P5		M4	10.65 to 13.31 (1.2 to 1.5)	2 to 5.5	14 to 10	2	14	
22P2		M4	10.65 to 13.31 (1.2 to 1.5)	2 to 5.5	14 to 10	3.5	12	
23P7		M4	10.65 to 13.31 (1.2 to 1.5)	2 to 5.5	14 to 10	5.5	10	
25P5		M5	22.19 (2.5)	5.5 to 8	10 to 8	8	8	
27P5		M5	22.19 (2.5)	5.5 to 8	10 to 8	8	8	
40P2	L1(R), L2(S), L3(T) B1, B2 T1(U), T2(V), T3(W) -, +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		M4	10.65 to 13.31 (1.2 to 1.5)	2 to 5.5	14 to 10	2	14	
40P7		M4	10.65 to 13.31 (1.2 to 1.5)	2 to 5.5	14 to 10	2	14	
41P5		M4	10.65 to 13.31 (1.2 to 1.5)	2 to 5.5	14 to 10	2	14	
42P2		M4	10.65 to 13.31 (1.2 to 1.5)	2 to 5.5	14 to 10	2	14	
43P7		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		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

Model	Terminal Symbol	Screw	Tightening Torque lb · in (N · m)	Wire					
				Applicable size		Recommended size		Type
				mm²	AWG	mm²	AWG	
Common to all models	S1 to S4, P1, P2, SC, PC	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	Shielded wire or equivalent
DeviceNet	DeviceNet Connector	M3	4.44 to 5.33 (0.5 to 0.6)	twisted wire 0.2 to 2.5	24 to 12	0.32/.2	22/24	Thin Cable

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)
SC	Sequence common for terminals S1-S4.		Common terminal for sequence inputs
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	0 V	
CN2 V	Frequency reference voltage input		0 to +10 / 100% (20K Ω)
CN2 I	Frequency reference current input		4 to 20 mA (250 Ω)
CN2 C	Frequency reference input common		0V

NOTES:

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

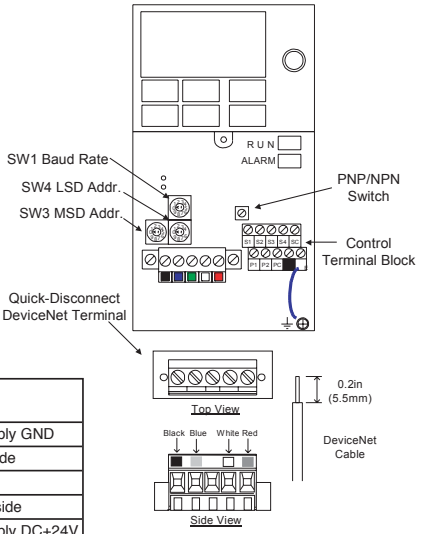
Table 1-3. Terminal Functions and Signals of DeviceNet

TERMINAL	NAME	FUNCTION
BLACK	V-	DeviceNet power supply ground
BLUE	CAN_L	DeviceNet data low
GREEN	Shield	Shield wire
WHITE	CAN_H	DeviceNet data high
RED	V+	DeviceNet power supply +24VDC

Remove power and wait for all LEDs to go out before making DeviceNet and control terminal connections. Use standard DeviceNet thin or thick cable when connecting to DeviceNet terminals.

Remove the front cover and connect the DeviceNet communication wires on the quick-disconnect screw terminal on the Drive (see page 11, Cable Installation).

Control wiring should be sized 16 to 20 AWG. Control wiring should be shielded, with the shield wire connected to the ground terminal ⏚, which is located towards the left side of the aluminum heat sink.



V7N Without Front Cover

Terminal Color	Name	Wiring Color	Content
Black	V-	Black	Communication power supply GND
Blue	CAN_L	Blue	Communication data low side
-	Shield	Bare	Shield wire
White	CAN_H	White	Communication data high side
Red	V+	Red	Communication power supply DC+24V

DeviceNet Thick Cable

Thick cable consists of two shielded pairs twisted on a common axis with a drain wire in the center covered with an overall braid shield and is commonly used as trunk line when length is important.

The thick cable specified for DeviceNet network connections consists of:

- One twisted signal pair (#18): blue/white
- One twisted power pair (#15): black/red
- Separate aluminized Mylar shields around power pair and signal pair
- Overall foil/braid shield with drain wire (#18): bare

DeviceNet Thin Cable

Thin Cable is smaller and more flexible than Thick Cable. It is commonly used for drop lines, but can also be used, for shorter distances, as trunk line.

The thin cable specified for DeviceNet network connections consists of:

- One twisted signal pair (#24): blue/white
- One twisted power pair (#22): black/red
- Separate aluminized Mylar shields around power pair and signal pair
- Overall foil/braid shield with drain wire (#22): bare

Cable Vendors

DeviceNet cables are available from various vendors. Two sources are listed below:

Belden Wire & Cable Company				
Belden Part #	**Pair**	**AWG**	**Insulation**	**Outer Jacket**
3082A thick	Data	18	Datalene	Lt. Gray PVC
	Power	15	PVC/Nylon	
3084A thin	Data	24	Datalene	Lt. Gray PVC
	Power	22	PVC/Nylon	
3083A thick	Data	18	Datalene	Yellow CPE
	Power	15	PVC/Nylon	
3085A thin	Data	24	Datalene	Yellow CPE
	Power	22	PVC/Nylon	

Berk-Tek				
Berk-Tek Part #	**Pair**	**AWG**	**Insulation**	**Outer Jacket**
210051 thick	Data	18	FPE/HDPE	Lt. Gray PVC
	Power	15	PVC/Nylon	
210144 thin	Data	24	FPE/HDPE	Lt. Gray PVC
	Power	22	PVC/Nylon	

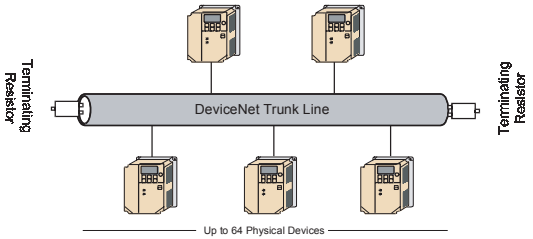
Cable Installation

Wire the DeviceNet communication cable to the terminal block according to the following procedures:
1) Loosen terminal screws using a slotted screwdriver.
2) Insert the DeviceNet wires into corresponding terminals.
3) Fasten wires by tightening terminal screws.
4) Secure the removable terminal by tightening down the terminal block screws.
(Tightening torque: 0.22~0.25 [N • m])

Note: The shield is daisy chained between devices and should be grounded at the 24 VDC power supply as specified by the Open DeviceNet Vendor Association (ODVA).

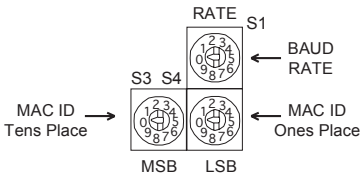
Terminating Resistors

Terminating resistors must be mounted on the first and last node in a DeviceNet network, at both furthest ends of the cable. The value of the terminating resistor is specified by the ODVA (Open DeviceNet Vendors Association) and is a value of 121 Ohms, 1% tolerance, and 1/4 watt. Terminating resistors can be found in the ODVA product catalogue.



Baud Rate and Address Configuration

The board is equipped with one rotary switch S1 for baud rate and two rotary switches S3 and S4 for node address set-up. The rotary switches are located next to the DeviceNet connector.



Baud Rate Setting Switch

The Drive's DeviceNet baud rate can be set in several ways.
The baud rate can be set using the rotary switch RATE (S1). Setting the switch to position 0, 1, or 2 enables the rotary switch to set the Drive's baud rate for 125kbps, 250kbps, or 500kbps, respectively. Setting the rotary switch to 3 enables Auto Baud detection. Setting the rotary switch to values 4 ... 9 sets the baud rate to parameter **n152**.

S1 Switch Setting	0	1	2	3	4-9	
Baud Rate	125 kbps	250 kbps	500 kbps	Auto Baud	Parameter **n152**	0: 125 kbps 1: 250 kbps 2: 500 kbps 3: Auto Baud

MAC ID Setting Switch

The Drive's MAC ID can be set in two different ways.

The MAC ID can be set using the rotary switches MSD (S3) and LSD (S4).

MAC ID = (MSD x 10) + LSD

Setting range of 0 to 63 on the rotary switches enables the rotary switches to set the Drive's MAC ID.

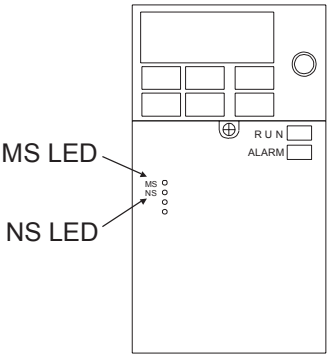
Setting range of 64 to 99 on the rotary switches activates parameter **n150** to set the Drive's MAC ID.

Setting the MAC ID to 63 in conjunction with ADR enabled allows for some vendor's "Faulted Node Recovery" and the setting of the MAC ID through DeviceNet.

S3 + S4 Switch Setting	0-63	64-99
MAC ID	MAC ID = (S3 x 10) + S4	Parameter **n150** Setting Range: 0 to 63

DeviceNet Indication LEDs

The V7N Embedded DeviceNet Drive has two ODVA standard DeviceNet LED's on the cover to indicate DeviceNet communications status.



V7N With Front Cover

The table below describes the function of DeviceNet specific LED's.

LED Name	Display Color	Display Status	Operation Status	Description
MS	Green	Lit	During Drive operation	The Drive is operating normally.
	Green	Flashing	During Drive initialization	Initial setting status or communication not ready.
	Red	Lit	Unrecoverable fault	An unrecoverable fault occurred in the Drive.
	Red	Flashing	Recoverable fault	A recoverable fault occurred, such as switch setting error.
	-	Not lit	Power OFF	Power not being supplied to the Drive.
NS	Green	Lit	DeviceNet communication taking	DeviceNet communicating normally. place
	Green	Flashing	DeviceNet communication not taking place	DeviceNet network normal, but not communicating with the master.
	Red	Lit	Communication fault	A fault that makes it impossible for the DeviceNet to communicate occurred. • Duplicate MAC ID • Bus-off detection
	Red	Flashing	Communication timeout	Communication timeout with master occurred. Data length sent by the PLC matches the data length expected by the Drive.
	-	Not lit	Offline, Power OFF	DeviceNet not set to Online. Power not being supplied to the interface card. Mismatch of baud rate.

Note: The LED's will flash red once (100ms) during power up initialization. This is used in the internal testing process to verify that the red LED is working properly.

Set the drive parameters to their appropriate values.

	Data	Text
n003	0	Digital Operator
	1	Terminal
	2	Serial Communications
	3	**Option Card (DeviceNet CM013)**
n004	0	Digital Operator Pot
	1	Digital Operator
	2	Voltage Reference (0 ~ 10vdc)
	3	Current Reference (4 ~ 20ma)
	4	Current reference (0 ~ 20ma)
	5	Pulse Train Reference
	6	Serial Communications
	7	Multi-Function Analog Input (0 ~ 10vdc)
	8	Multi-Function Analog Input (4 ~ 20ma)
	9	**Option Card (DeviceNet CM013)**
n035	0	0.01Hz
	1	0.1%
	2-39	**Number of motor poles for RPM (set for DeviceNet)**
	40-3999	User scaled
n148		DeviceNet PPA 46h (70): Basic Speed Control (Output Instances)47h (71): Extended Speed Control 96h (150): Modbus I/O Control 97h (151): Standard Drive Control 98h (152): Acc/Dec Time Control 9Bh (155): Expanded I/O Modbus Control 9Ch (156): General Purpose DI/DO Control
n149		DeviceNet PCA14h (20): Basic Speed Control (Input Instsnces) 15h (21): Extended Speed Control 64h (100): Modbus I/O Control 65h (101): Standard Drive Control 66h (102): Acc/Dec Time Conrtrol 69h (105): Expanded I/O Modbus Control 6Ah (106): General Purpose DI/DO Control
n150	0 … 63	MAC ID (valid only when rotary switches 3 and 4 are set to 64 … 99)
n152	0	125kb Baud Rate (only valid when rotary switch 1 is set to 4 … 9)
	1	250kb Baud Rate (only valid when rotary switch 1 is set to 4 … 9)
	2	500kb Baud Rate (only valid when rotary switch 1 is set to 4 … 9)
	3	Auto Baud (only valid when rotary switch 1 is set to 4 … 9)

The EDS file can be obtained from the CD that was included with the drive or downloaded from www.Yaskawa.com. It is recommended that the EDS file be downloaded from www.Yaskawa.com to be sure that the latest version is used. Install the EDS file into the DeviceNet configuration tool (i.e. RSNetworx for DeviceNet or DeviceNet Manager). There is a separate EDS file for each drive model. Verify that the correct EDS file has been installed for the drive model configured. Refer to the documentation that came with the DeviceNet master configuration tool for information on installing EDS files and configuring a DeviceNet node.

Note: The EDS files located on the CD or downloaded from www.Yaskawa.com will be in "zip" format and will need to be un-zipped to a temporary directory prior to installation.

Model CIMR-V7NU □	Drive Description	EDS File Names	Drive Capacity V7N Parameter n210 Modbus Register No. 1D2H	Product Code Class 01 Instance 01 Attribute 03
20P1	3 Phase 230V, 0.13HP, 0.8A	V7NU20P1_DNET_V1_04.EDS	00 (00h)	12288 (3000h)
20P2	3 Phase 230V, 0.25HP, 1.6A	V7NU20P2_DNET_V1_04.EDS	01 (01h)	12289 (3001h)
20P4	3 Phase 230V, 0.5HP, 3A	V7NU20P4_DNET_V1_04.EDS	02 (02h)	12290 (3002h)
20P7	3 Phase 230V, 0.75&1HP, 5A	V7NU20P7_DNET_V1_04.EDS	03 (03h)	12291 (3003h)
21P5	3 Phase 230V, 2HP, 8A	V7NU21P5_DNET_V1_04.EDS	04 (04h)	12292 (3004h)
22P2	3 Phase 230V, 3HP, 11A	V7NU22P2_DNET_V1_04.EDS	05 (05h)	12293 (3005h)
23P7	3 Phase 230V, 5HP, 17.5A	V7NU23P7_DNET_V1_04.EDS	07 (07h)	12295 (3007h)
24P0	3 Phase 230V, 5HP, 17.5A	V7NU24P0_DNET_V1_04.EDS	08 (08h)	12296 (3008h)
25P5	3 Phase 230V, 7.5HP, 25A	V7NU25P5_DNET_V1_04.EDS	09 (09h)	12297 (3009h)
27P5	3 Phase 230V, 10HP, 33A	V7NU27P5_DNET_V1_04.EDS	10 (0Ah)	12298 (300Ah)
40P1	3 Phase 460V, 0.25HP, 1.2A	V7NU40P1_DNET_V1_04.EDS	40 (28h)	12329 (3029h)
40P2	3 Phase 460V, 0.5HP, 1.2A	V7NU40P2_DNET_V1_04.EDS	41 (29h)	12230 (302Ah)
40P4	3 Phase 460V, .75HP, 1.8A	V7NU40P4_DNET_V1_04.EDS	42 (2Ah)	12231 (302Bh)
40P7	3 Phase 460V, 1&2HP, 3.4A	V7NU40P7_DNET_V1_04.EDS	43 (2Bh)	12232(302Ch)
41P5	3 Phase 460V, 3HP, 4.8A	V7NU41P5_DNET_V1_04.EDS	44 (2Ch)	12233 (302Dh)
42P2	3 Phase 460V, 3HP, 5.5A	V7NU42P2_DNET_V1_04.EDS	45 (2Dh)	12234 (302Eh)
43P0	3 Phase 460V, 4HP, 7.2A	V7NU43P0_DNET_V1_04.EDS	46 (2Eh)	12235 (302Fh)
43P7	3 Phase 460V, 5HP, 8.6A	V7NU43P7_DNET_V1_04.EDS	47 (2Fh)	12236 (3030h)
44P0	3 Phase 460V, 5.3HP, 9.2A	V7NU44P0_DNET_V1_04.EDS	48 (30h)	12237 (3031h)
45P5	3 Phase 460V, 7.5&10HP, 14.8A	V7NU45P5_DNET_V1_04.EDS	49 (31h)	12238 (3032h)
47P5	3 Phase 460V, 10HP, 18A	V7NU47P5_DNET_V1_04.EDS	50 (32h)	12239 (3033h)
B0P1	1 Phase 230V, 0.13HP, 0.8A	V7NUB0P1_DNET_V1_04.EDS	20 (14h)	12308 (3014h)
B0P2	1 Phase 230V, 0.25HP, 1.6A	V7NUB0P2_DNET_V1_04.EDS	21 (15h)	12309 (3015h)
B0P4	1 Phase 230V, 0.5HP, 3A	V7NUB0P4_DNET_V1_04.EDS	22 (16h)	12310 (3016h)
B0P7	1 Phase 230V, 1HP, 5A	V7NUB0P7_DNET_V1_04.EDS	23 (17h)	12311 (3017h)
B1P5	1 Phase 230V, 2HP, 8A	V7NUB1P5_DNET_V1_04.EDS	24 (18h)	12312 (3018h)
B2P2	1 Phase 230V, 3HP, 11A	V7NUB2P2_DNET_V1_04.EDS	25 (19h)	12313 (3019h)
B3P7	1 Phase 230V, 5HP, 17.5A	V7NUB3P7_DNET_V1_04.EDS	27 (1Bh)	12315 (301Bh)
B4P0	1 Phase 230V, 5HP, 17.5A	V7NUB4P0_DNET_V1_04.EDS	28 (1Ch)	12316 (301Ch)

Note: All of the EDS files are in one zip file, so you must un-zip the file before installing in the configuration tool.

Supported Input Instances

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
20 (14h) Basic Speed Control	**0**						Fault Reset		Run FWD
	1								
	2	Speed Reference Scaled by Parameter n035)							
	3								

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
21 (15h) Extended Speed Control	**0**		Net Ref	Net Ctrl			Fault Reset	Run REV	Run FWD
	1								
	2	Speed Reference (Scaled by Parameter n035)							
	3								

Supported Input Instances

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
70 (46h) Basic Speed Control	0						@FWD Run		@Fault
	1								
	2	Speed Actual (Scaled by Parameter n035)							
	3								

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
71 (47h) Extended Speed Control	**0**	@ Speed	@Ref from Net*	@Ctrl from Net*	@Ready	@REV Run	@FWD Run	@Alarm	@Fault
	1								
	2	Speed Actual (Scaled by Parameter n035)							
	3								

Yaskawa Supported Input Instances

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
100 (64h) MODBUS Message	0	Function Code (Only MODBUS functions register read (03h) and register write (10h) are supported)							
	1	Register Number							
	2								
	3	Data							
	4								
Note:	Refer to output assembly instance 150 (96h) for response								

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
101 (65h) Standard Control	0		Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3	Run REV	Run FWD
	1	Terminal P2	Terminal P1	Terminal MA				Fault Reset	External Fault
	2	Speed Reference (Scaled by Parameter n035)							
	3								
	4	Reserved							
	5								
	6	Reserved							
	7								
Note	* Terminals S5, S6, S7 and MA are only available through DeviceNet								

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
102(66h) Acc/Dec Time Control	0		Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3	Run REV	Run FWD
	1	Terminal P2	Terminal P1	Terminal MA				Fault Reset	External Fault
	2	Speed Reference (Scaled by Parameter n035)							
	3								
	4	Acc Time 1							
	5								
	6	Dec Time 1							
	7								
Note	* Terminals S5, S6, S7 and MA are only available through DeviceNet								

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0105(69h) Standard DI/DO Control	0		Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3	Run REV	Run FWD
	1	Terminal P2	Terminal P1	Terminal MA		Function Code 2	Function Code 1	Fault Reset	External Fault
	2	Speed Reference (Scaled by Parameter n035)							
	3								
	4	Register Address							
	5								
	6	Register Data							
	7								

	Code 1	Code 2	Description
Func Code	0	0	Invalid
	0	1	Write Modbus Data
	1	0	Read Modbus Data
	1	1	Invalid
Note	Refer to output assembly instance 155 (9Bh) for response		
	* Terminals S5, S6, S7 and MA are only available through DeviceNet		

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
106 (6Ah) Standard Control	0		Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3	Run REV	Run FWD
	1	Terminal P2	Terminal P1	Terminal MA				Fault Reset	External Fault
	2	Speed Reference (Scaled by Parameter n035)							
	3								
	4	Reserved							
	5								
	6	Reserved							
	7								
Note	* Terminals S5, S6, S7 and MA are only available through DeviceNet								

Yaskawa Supported Output Instances

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
150(96h) MODBUS Message	0	Function Code*							
	1	Register Number							
	2								
	3	Data							
	4								
Note:	Refer to Input Instance 100 (64Refer to Input Instance 100 (64h)								
	* A Modbus message error is returned if the function code has the MSB (bit 80h) set								

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
151(97h) Standard Control	0	@Fault	@Alarm	@Ready	@ Speed Agree	@Fault Reset	@REV Run	@ Zero Speed	@FWD Run
	1			@Terminal P2	@Terminal P1	@Terminal MA	@Local Mode	@ UV	@OPE
	2	Output Frequency (Scaled by Parameter n035)							
	3								
	4	Reserved							
	5								
	6	Output Current (0.01A or 0.1A Based on Drive Capacity)							
	7								
Note	* Terminal MA is only available through DeviceNet								

/Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
152(98h) Enhanced Control/ MODBUS Message	0	@Fault	@Alarm	@Ready	@ Speed Agree	@Fault Reset	@REV Run	@ Zero Speed	@FWD Run
	1			@Terminal P2	@Terminal P1	@Terminal MA	@Local Mode	@ UV	@OPE
	2	Output Frequency (Scaled by Parameter n035)							
	3								
	4	Speed Reference (Scaled by Parameter n035)							
	5								
	6	Output Current							
	7								
Note	* Terminal MA is only available through DeviceNet								

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
155(9Bh) Standard DI/DO Control	0	@Fault	@Alarm	@Ready	@ Speed Agree	@Fault Reset	@REV Run	@ Zero Speed	@FWD Run
	1	@Terminal P2	@Terminal P1	@Terminal MA	@Local Mode	Function Bit 2	Function Bit 1	@UV	@OPE
	2	Speed Actual (Scaled by Parameter n035)							
	3								
	4	Register Address							
	5								
	6	Register Data							
	7								

Func Code	Code 1	Code 2	Description
	0	0	Invalid
	0	1	During Modbus Command Execution
	1	0	Error
	1	1	Execution Complete

Note	Refer to input assembly instance 105 (69h)
	* Terminal MA is only available through DeviceNet

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
156(9Ch) Standard DI/DO Control	0	@Fault	@Alarm	@Ready	@ Speed Agree	@Fault Reset	@REV Run	@ Zero Speed	@FWD Run
	1			@Terminal P2	@Terminal P1	@Terminal MA	@Local Mode	@ UV	@OPE
	2	Speed Actual Frequency (Scaled by Parameter n035)							
	3								
	4	Reserved							
	5								
	6	Output Current							
	7								
Note	* Terminal MA is only available through DeviceNet								

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-V7NU ☐	20P1	20P2	20P4	20P7	21P5	22P2	23P7	25P5	27P5
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	10.0	17.5	20.0	25.0	45.0	60.0
Max. Non-Time Delay Fuse Rating (A)(2)	3.0	5.0	10.0	20.0	30.0	45.0	45.0	70.0	80.0
Max. MCCB Rating (A)	15.0	15.0	15.0	15.0	20.0	30.0	40.0	50.0	60.0

460V 3-Phase

Model CIMR-V7NU ☐	40P2	40P4	40P7	41P5	42P2	43P7	45P5	47P5
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
Rated input current (A)	1.6	2.4	4.7	7.0	8.1	12.0	19.6	23.8
Max. Time Delay Fuse Rating (A)(1)	2.8	4.0	8.0	12.0	12.0	20.0	35.0	45.0
Max. Non-Time Delay Fuse Rating (A)(2)	5.0	7.0	12.0	20.0	20.0	35.0	60.0	70.0
Max. MCCB Rating (A)	15.0	15.0	15.0	15.0	15.0	20.0	30.0	40.0

Notes:

(1) Apply UL designated Class RK5 fuses.

(2) Apply UL designated Class CC or T non-time delay fuses.

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.

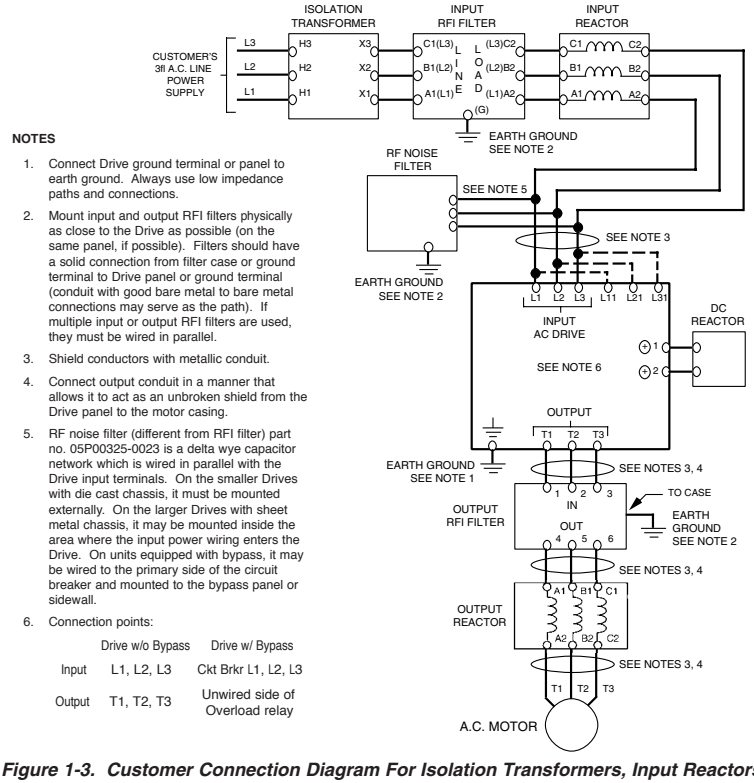
Auxiliary Input and Output Power Option Devices

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.

For a more detailed explanation, refer to the manufacturer document EZZ006543, “Installation Guidelines For EMC Directive using AC Drive Products.”

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.

Table 1-4. Line Filters for EMC Standards

Model	Line Filter					
CIMR-V7NU ☐	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	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						
20P4						
20P7						
21P5	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						
23P7	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	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						
40P2	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						
40P7	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						
42P2						
43P7	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	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.

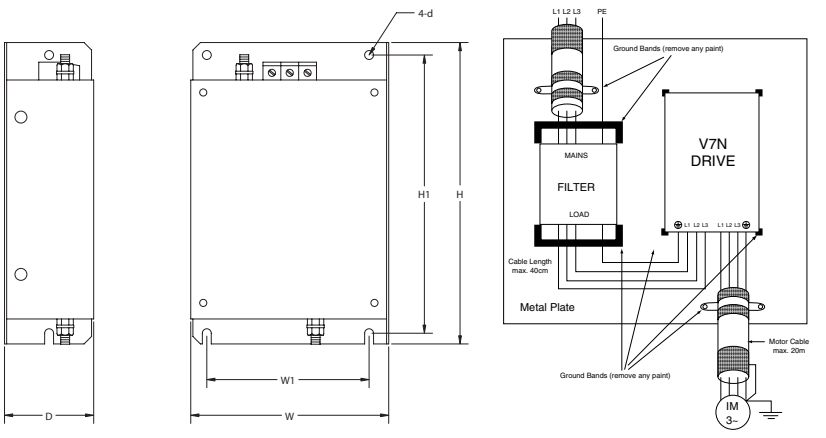


Figure 1-4. Installation of Line Filter and V7N Drive

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. 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.
3. Customer to connect terminal ⏚ to earth ground.
4. For installation of Braking Resistor or Braking Resistor unit, refer to Appendix 6, "Dynamic Braking Option." See TM.V7N.01.
5. An optional DC reactor may be added for harmonic attenuation, if needed. See separate instruction sheet for wiring.
6. 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.
7. Terminals S5-S7, MA and MC are not physical terminals, but they are multi-function inputs and outputs that are controlled via DeviceNet communications.

⚠ WARNING

8. **Input fuses are required for proper branch short circuit protection for all Drives. Failure to use recommended fuses (see page 16) 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).

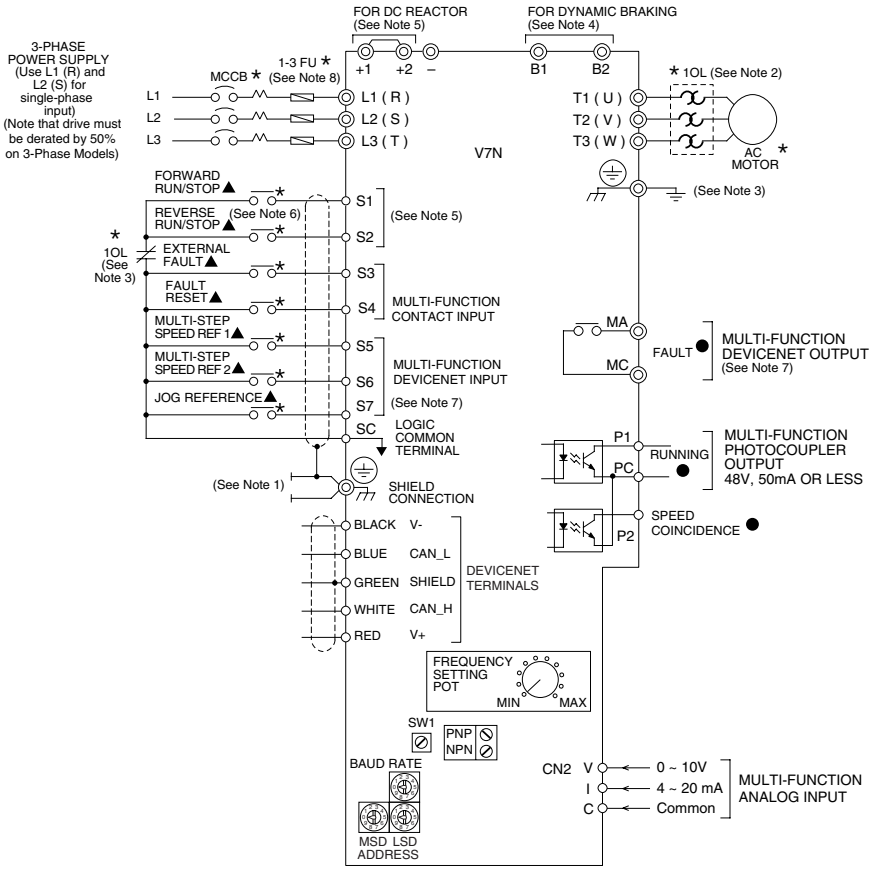


Figure 1-5. Standard Connections (2-Wire Control)
(Parameter n001 set to "10")

⚠ 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.**

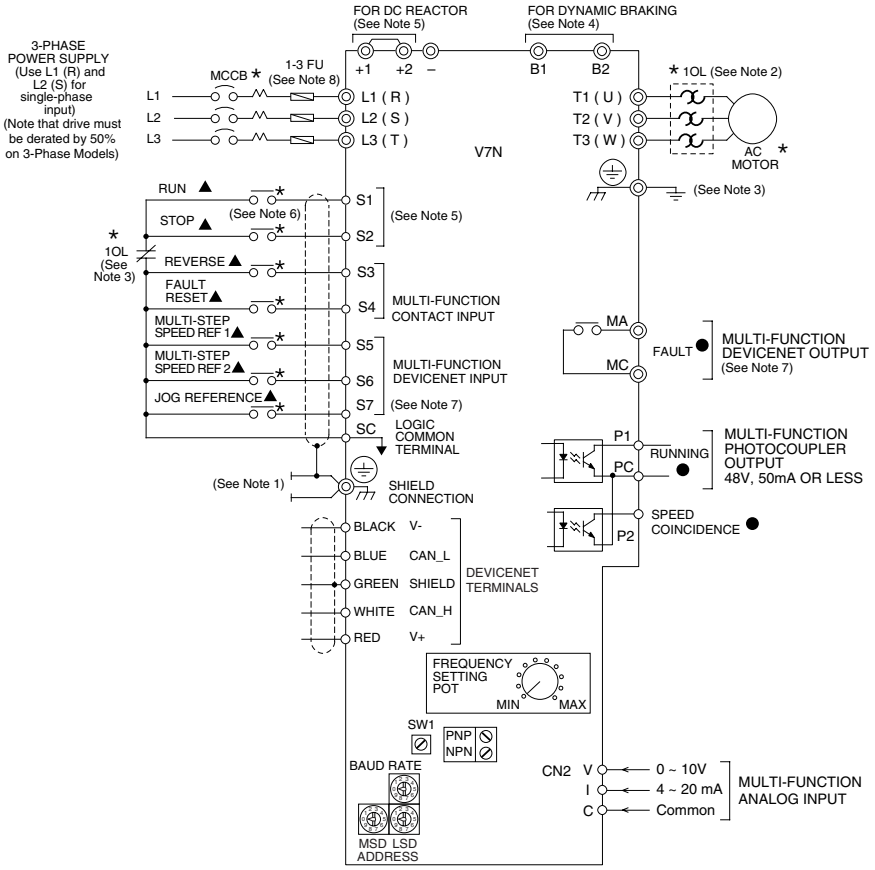


Figure 1-6. Standard Connections (3-Wire Control)
(Parameter n001 set to "11")

⚠ 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.V7N.01, Section 4).

Drive Parameters

PARA-METER	ADDR	CLASS 100 INST. 01	NAME	DATA	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING
n001	101h	01h	Parameter Selection / Initialization	0 1 2 3 4 5 6 7 8 9 10 11	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
n002	102h	02h	Control Method Selection	0 1	0: V/f Control 1: Open Loop Vector	1	0
n003	103h	03h	Operation Method Selection	0 1 2 3	0: Digital Operator 1: Terminal 2: Not Used 3: DeviceNet	1	3
n004	104h	04h	Reference Selection	0 1 2 3 4 5 6 7 8 9	0: Digital Operator Pot 1: Frequency Reference 1 (n024) 2: Not Used 3: Not Used 4: Not Used 5: Not Used 6: Not Used 7: Multi-Function Analog Input (0 to 10V) (CN2) 8: Multi-Function Analog Input (4 to 20 mA) (CN2) 9: DeviceNet	1	9
n005	105h	05h	Stop Method	0 1	0: Ramp to stop 1: Coast to stop	1	0
n006	106h	06h	Reverse Prohibit	0 1	0: Reverse Run enabled 1: Reverse Run disabled	1	0
n007	107h	07h	**STOP** Key Function	0 1	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
n008	108h	08h	Reference Selection - Digital Operator	0 1	0: Frequency Reference from digital operator pot 1: Frequency Reference from **n024**	1	0
n009	109h	09h	Frequency Reference Setting Method From Digital Operator	0 1	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
n010	10Ah	0Ah	Operation Selection When Digital Operator is Disconnected	0 1	0: Disabled (operation continues) 1: Enabled (motor coasts to a stop and fault is displayed)	1	0
n011	10Bh	0Bh	Frequency - Max.	-	50.0 to 400.0	0.1 (Hz)	60.0
n012	10Ch	0Ch	Voltage - Max.	-	0.1 to 255.0 (230V Drive) 0.2 to 510.0 (460V Drive)	0.1 (V)	230.0 460.0
n013	10Dh	0Dh	Frequency - Max. Voltage Point	-	0.2 to 400.0	0.1 (Hz)	60.0
n014	10Eh	0Eh	Frequency - Midpoint	-	0.1 to 399.9	0.1 (Hz)	(Note 2)
n015	10Fh	0Fh	Voltage - Midpoint	-	0.1 to 255.0 (230V Drive) 0.2 to 510.0 (460V Drive)	0.1 (V)	(Note 2)
n016	110h	10h	Frequency - Min.	-	0.1 to 10.0	0.1 (Hz)	(Note 2)
n017	111h	11h	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	ADDR	CLASS 100 INST. 01	NAME	DATA	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING
n018	112h	12h	Accel/Decel Time Setting Unit	0 1	0: 0.1 1: 0.01	1 (sec)	0
n019	113h	13h	Acceleration Time 1 (Note 4)	-	0.00 to 600.0 or 0.0 to 6000 (Dependent on **n018** setting)	0.01 (sec) or 0.1 (sec)	10.0
n020	114h	14h	Deceleration Time 1 (Note 4)				
n021	115h	15h	Acceleration Time 2 (Note 4)				
n022	116h	16h	Deceleration Time 2 (Note 4)				
n023	117h	17h	S-curve Selection	0 1 2 3	0: No S-curve 1: 0.2 second 2: 0.5 second 3: 1.0 second	1	0
n024	118h	18h	Freq. Reference 1 (Note 4)	-	0.00 to 400.00	0.01 (Hz) (< 100 Hz) or 0.1 (Hz) (>= 100 Hz)	6.00
n025	119h	19h	Freq. Reference 2 (Note 4)				0.00
n026	11Ah	1Ah	Freq. Reference 3 (Note 4)				0.00
n027	11Bh	1Bh	Freq. Reference 4 (Note 4)				0.00
n028	11Ch	1Ch	Freq. Reference 5 (Note 4)				0.00
n029	11Dh	1Dh	Freq. Reference 6 (Note 4)				0.00
n030	11Eh	1Eh	Freq. Reference 7 (Note 4)				0.00
n031	11Fh	1Fh	Freq. Reference 8 (Note 4)				0.00
n032	120h	20h	Jog Freq. Reference (Note 4)				6.00
n033	121h	21h	Frequency Reference Upper Limit	-	0. to 110	1(%)	100
n034	122h	22h	Frequency Reference Lower Limit	-	0. to 110	1(%)	0
n035	123h	23h	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
n036	124h	24h	Motor Rated Current	-	0.1 to 49.5 Amps (Up to 150% of Drive rated current)	0.1 (A)	(Note 1)
n037	125h	25h	Electronic Thermal Overload Protection (for OL1 fault)	0 1 2	0: Short term rating 1: Standard rating 2: Disabled	1	0
n038	126h	26h	Electronic Thermal Overload Protection Time Constant	-	1 to 60	1 (min)	8
n039	127h	27h	Cooling Fan Operation Selection	0 1	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	128h	28h	Motor Rotation	0 1	0: Rotate C.C.W. 1: Rotate C.W. (or opposite direction)	1	0
n041	129h	29h	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	12Ah	2Ah	Deceleration Time 3 (Note 4)				
n043	12Bh	2Bh	Acceleration Time 4 (Note 4)				
n044	12Ch	2Ch	Deceleration Time 4 (Note 4)				
n050	132h	32h	Multi-function Input Selection 1 (Terminal S1)	0 1 2 3 4 5 6 7 8	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)
n051	133h	33h	Multi-function Input Selection 2 (Terminal S2)			1	2 (2)
n052	134h	34h	Multi-function Input Selection 3 (Terminal S3)			1	3 (0)

Drive Parameters - Continued

PARA-METER	ADDR	CLASS 100 INST. 01	NAME	DATA	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING
n053	135h	35h	Multi-function Input Selection 4 (Terminal S4)	9 Ah Bh Ch Dh Eh Fh 10h 11h 12h 13h 14h 15h 16h 17h 18h 19h 1Ah 1Bh 1Ch 22	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: Communication / control circuit terminal 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 28: Data input from DeviceNet communications 34: Up/Down Function	1	5 (5)
n054	136h	36h	Multi-function Input Selection 5 (DeviceNet Input S5)			1	6 (6)
n055	137h	37h	Multi-function Input Selection 6 (DeviceNet Input S6)			1	7 (7)
n056	138h	38h	Multi-function Input Selection 7 (DeviceNet Input S7)			1	10 (10)
n057	139h	39h	Multi-Function Output Selection 1 (DeviceNet Output MA)	0 1 2 3 4 5 6 7 8 9 Ah Bh Ch Dh Eh Fh 10h 11h 12h 13h 14h 15h	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 14: During auto restart 15: During undervoltage 16: During reverse run 17: During speed search 18: Comm. Controlled 19: PID feedback loss 20: Frequency Reference Loss Detect (N.O.) 21: Overheat Pre-alarm OH3 (N.O.)	1	0
n058	13Ah	3Ah	Multi-Function Output Selection 2 (Terminals P1 & PC)			1	1
n059	13Bh	3Bh	Multi-Function Output Selection 3 (Terminals P2 & PC)			1	2
n064	140h	40h	Frequency Reference Loss Detection	0 1	0: No Detection 1: Continue to run at 80% of max. frequency	1	0
n068	144h	44h	Analog Frequency Reference Gain (CN2, Voltage Ref Input)	-	-255 to 255	1%	100
n069	145h	45h	Analog Frequency Reference Bias (CN2, Voltage Ref Input)	-	-100 to 100	1%	0

Drive Parameters - Continued

PARA-METER	ADDR	CLASS 100 INST. 01	NAME	DATA	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING
n070	146h	46h	Analog Frequency Reference Filter Time Constant (CN2, Voltage Ref Input)	-	0.00 to 2.00	0.01 s	0.10
n071	147h	47h	Analog Frequency Reference Gain (CN2, Current Ref Input)	-	-255 to 255	1%	100
n072	148h	48h	Analog Frequency Reference Bias (CN2, Current Ref Input)	-	-100 to 100	1%	0
n073	149h	49h	Analog Frequency Reference Filter Time Constant (CN2, Current Ref Input)	-	0.00 to 2.00	0.01 s	0.10
n077	14Dh	4Dh	Multi-Function Analog Input CN2 Selection	0 1 2 3 4	0: Multi-Function analog input disabled 1: Aux. Frequency reference 2: Frequency gain 3: Frequency bias 4: Voltage bias	1	0
n078	14Eh	4Eh	Multi-Function Analog Input Signal Selection	0 1	0: 0 - 10V 1: 4 - 20 mA	1	0
n079	14Fh	4Fh	Multi-Function Digital Input Scan Rate Selection	0 1	0: Scans twice with 8 msec scan rate 1: Scans twice with 2 msec scan rate	1	0
n080	150h	50h	Carrier Frequency	-	1 to 4 (x 2.5 kHz) 7 to 9 (synchronous)	1	3
n081	151h	51h	Momentary Power Loss Ride-through Method	0 1 2	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
n082	152h	52h	Number of auto restarts attempts	-	0 to 10	1	0
n083	153h	53h	Prohibit Frequency 1	-	0.00 to 400.0	0.01 (Hz) or 0.1 (Hz)	0.00
n084	154h	54h	Prohibit Frequency 2	-	0.00 to 400.0	0.01 (Hz) or 0.1 (Hz)	0.00
n085	155h	55h	Prohibit Frequency 3	-	0.00 to 400.0	0.01 (Hz) or 0.1 (Hz)	0.00
n086	156h	56h	Prohibit Frequency Deadband	-	0.00 to 25.50	0.01 (Hz)	0.00
n087	157h	57h	Elapsed Time Function Selection[5]	0 1	0: Time elapses when power is On 1: Time elapses when Drive is running	0	
n088	158h	58h	Elapsed Operation Time (Initial Value)[5]	-	0 to 9999 hours	0	
n089	159h	59h	DC Injection Current	-	0 to 100	1 (%)	50
n090	15Ah	5Ah	DC Injection Time at stop	-	0.0 to 25.5	0.1 (sec)	0.0
n091	15Bh	5Bh	DC Injection Time at start	-	0.0 to 25.5	0.1 (sec)	0.0
n092	15Ch	5Ch	Stall Prevention During Deceleration	0 1	0: Enabled 1: Disabled	1	0
n093	15Dh	5Dh	Stall Prevention During Acceleration	-	30 to 200	1 (%)	170
n094	15Eh	5Eh	Stall Prevention Level During Running	-	30 to 200	1 (%)	160
n095	15Fh	5Fh	Frequency Detection Level	-	0.00 to 400.0	0.01 (Hz) or 0.1 (Hz)	0.00

Drive Parameters - Continued

PARA-METER	ADDR	CLASS 100 INST. 01	NAME	DATA	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING
n096	160h	60h	Overtorque Detection (OL3)	0 1 2 3 4	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
n097	161h	61h	Overtorque Detection Selection (OL3) (Note 5)	0 1	0: Detected by output torque 1: Detected by output current	1	0
n098	162h	62h	Overtorque Detection Level (OL3)	-	30 to 200	1 (%)	160
n099	163h	63h	Overtorque Detection Delay Time (OL3)	-	0.1 to 10.0	0.1 (sec)	0.1
n100	164h	64h	Up/Down Hold Memory	0 1	0: Disabled 1: Enabled	1	0
n101	165h	65h	Speed Search Deceleration Time	-	0.0 to 10.0	0.1 (sec)	2
n102	166h	66h	Speed Search Operation Level	-	0 to 200%	1 (%)	150
n103	167h	67h	Torque Compensation Gain (Note 4)	-	0.0 to 2.5	0.1	1.0
n104	168h	68h	Torque Compensation Time Constant	-	0.0 to 25.5	0.1 (sec)	(Note 2)
n105	169h	69h	Torque Compensation Iron Loss	-	0.0 to 6550	0.1 (W) or 1 (W)	(Note 1)
n106	16Ah	6Ah	Motor Rated Slip (Note 4)	-	0.0 to 20.0	0.1 (Hz)	(Note 1)
n107	16Bh	6Bh	Motor Line-to-line Resistance	-	0.000 to 65.50	0.001 (ohm)	(Note 1)
n108	16Ch	6Ch	Motor Leakage Inductance (Note 1)	-	0.00 to 655.0	0.01 (mH) or 0.1 (mH)	(Note 1)
n109	16Dh	6Dh	Torque Compensation Limit (Note 1)	-	0 to 250	1 (%)	150
n110	16Eh	6Eh	Motor No-load Current	-	0 to 99	1 (%)	(Note 1)
n111	16Fh	6Fh	Slip Compensation Gain (Note 4)	-	0.0 to 2.5	0.1	(Note 2)
n112	170h	70h	Slip Compensation Primary Delay Time	-	0.0 to 25.5	0.1 (sec)	(Note 2)
n113	171h	71h	Slip Compensation Selection During Regeneration (Note 1)	0 1	0: Disabled 1: Enabled	1	0
n115	173h	73h	Stall Prevention Above Base Speed During Run	0 1	0: Disabled (level is based on setting of **n094**) 1: Enabled (level at Fmax is **n094** x 0.4)	1	0
n116	174h	74h	Stall Prevention During Run, Accel/Decel Time Select	0 1	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	175h	75h	Undertorque Detection Select (UL3)	0 1 2 3 4	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
n118	176h	76h	Undertorque Detection Level (detection by torque);	-	0 to 200% Inverter rated current = 100%; if n097 = 0 motor rated torque becomes 100%	1(%)	10
n119	177h	77h	Undertorque Detection Time	-	0.1 to 10.0	0.1 (sec)	0.1
n120	178h	78h	Frequency Reference 9 (Note 4)				
n121	179h	79h	Frequency Reference 10 (Note 4)				
n122	17Ah	7Ah	Frequency Reference 11 (Note 4)				
n123	17Bh	7Bh	Frequency Reference 12 (Note 4)				
n124	17Ch	7Ch	Frequency Reference 13 (Note 4)	-	0.00 to 400.00	0.01 (Hz) (< 100 Hz) or 0.1 (Hz) (>= 100 Hz)	0.00
n125	17Dh	7Dh	Frequency Reference 14 (Note 4)				
n126	17Eh	7Eh	Frequency Reference 15 (Note 4)				
n127	17Fh	7Fh	Frequency Reference 16 (Note 4)				

Drive Parameters - Continued

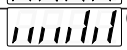
PARA-METER	ADDR	CLASS 100 INST. 01	NAME	DATA	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING
n128	180h	D3h	PID Control Selection	0 1 2 3 4 5 6 7 8	0: PID control disabled 1: D = Feed Forward 2: D = Feedback 3: Reference + PID (D = Feed Forward) 4: Reference + PID (D = Feedback) 5: Inverse 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	181h	D4h	PID Feedback Gain (Note 4)	-	0.00 to 10.00	0.01	1.00
n130	182h	82h	PID Proportional Gain (Note 4)	-	0.00 to 25.00	0.1	1.0
n131	183h	83h	PID Integral Time (Note 4)	-	0.00 to 360.00	0.1 s	1.0
n132	184h	84h	PID Derivative Time (Note 4)	-	0.00 to 2.50	0.01	0.00
n133	185h	85h	PID Offset Adjustment (Note 4)	-	-100 to 100	1%	0
n134	186h	86h	Integral Value Limit (Note 4)	-	-100 to 100	1%	100
n135	187h	87h	PID Output Lag Filter Time (Note 4)	-	0.0 to 10.0	0.1 s	0.0
n136	188h	88h	Feedback Loss Detection Selection	0 1 2	0: Disabled 1: Enabled - Alarm (operation continues) 2: Enabled Fault (coast to stop)	1	0
n137	189h	89h	Feedback Loss Detection Level	-	0 to 100	1%	0
n138	18Ah	8Ah	Feedback Loss Detection Time	-	0.0 to 25.5	0.1 s	1.0
n139	18Bh	8Bh	Energy Saving Selection (Note 5) (Energy Saving)	0 1	0: Energy saving disabled 1: Energy saving enabled Note: Energy saving becomes enabled by V/f control mode	1	0
n140	18Ch	8Ch	Energy Saving Gain K2 (Energy Saving)	-	0.00 to 6550	0.1 or 1	(Note 1)
n141	18Dh	8Dh	Energy Saving Voltage Lower Limit at 60 Hz (Energy Saving)	-	0 to 120	1%	50
n142	18Eh	8Eh	Energy Saving Voltage Lower Limit at 6 Hz (Energy Saving)	-	0 to 25	1%	12
n143	18Fh	8Fh	Time of Average kW (Energy Saving)	-	1 to 200	1 (x 24 ms)	1 (24 ms)
n144	190h	90h	Voltage Limit of Tuning (Energy Saving)	-	1 to 100	1%	0
n145	191h	91h	Step Voltage of Tuning to 100% Output Voltage (Energy Saving)	-	0.1 to 10.0	0.1%	0.5
n146	192h	92h	Step Voltage of Tuning to 5% Output Voltage (Energy Saving)	-	0.1 to 10.0	0.1%	0.2
n148	194h	94h	DeviceNet I/O Polled Producing Attribute	46h 47h 96h 97h 98h 9Bh 9Ch	70: Basic Speed Control Output Instance 71: Extended Speed Control Output Instance 150: V7N Modbus I/O Control Output Instance 151: V7N Standard Drive Control Output Instance 152: V7N Accel/Decel Time Control Output Instance 155: Expanded I/O Modbus Output Instance 156: V7N General Purpose DI/DO Output Instance	70, 71, 150, 151, 152, 155, 156	71
n149	195h	95h	DeviceNet I/O Polled Consuming Attribute	14h 15h 64h 65h 66h 69h 6Ah	20: Basic Speed Control Input Instance 21: Extended Speed Control Input Instance 100: V7N Modbus I/O Control Input Instance 101: V7N Standard Drive Control Input Instance 102: V7N Accel/Decel Time Control Input Instance 105: Expanded I/O Modbus Input Instance 106: V7N General Purpose DI/DO Input Instance	20, 21, 100, 101, 102, 105, 106	21
n150	196h	96h	DeviceNet MAC ID	-	0 to 63	1	0
n151	197h	97h	DeviceNet Timeover Detection Selection	0 1 2 3 4	0: Coast to stop 1: Decel to stop using Decel Time 1 (n020) 2: Decel to stop using Decel Time 2 (n022) 3: Operation continues with Alarm 4: Disabled	1	0
n152	198h	98h	DeviceNet Baud Rate Selection	0 1 2 3	0: 125 kbps 1: 250 kbps 2: 500 kbps 3: Auto Baud	1	2
n153	199h	99h	DeviceNet Speed Scale	-	-15 to 15	1	0
n154	19Ah	9Ah	DeviceNet Current Scale	-	-15 to 15	1	0
n155	19Bh	9Bh	DeviceNet Electric Power Scale	-	-15 to 15	1	0
n156	19Ch	9Ch	DeviceNet Voltage Scale	-	-15 to 15	1	0
n157	19Dh	9Dh	DeviceNet Time Scale	-	-15 to 15	1	0

Drive Parameters - Continued

PARA-METER	ADDR	CLASS 100 INST. 01	NAME	DATA	SETTING RANGE (AND UNITS)	SETTING INCREMENT	FACTORY SETTING
n158	19Eh	9Eh	Motor Code (Energy Saving)	-	0 to 70	1	Note 1
n159	19Fh	9Fh	Energy Saving Voltage Upper Limit At 60 Hz (Energy Saving)	-	0 to 120	1%	120
n160	1A0h	A0h	Energy Saving Voltage Upper Limit At 6 Hz (Energy Saving)	-	0 to 25	1%	16
n161	1A1h	A1h	Power Supply Detection Hold Width (Energy Saving)	-	0 to 100	1%	10
n162	1A2h	A2h	Power Supply Detection Filter Time Constant	-	0 to 255	1 (x 4 ms)	5 (20 ms)
n163	1A3h	A3h	PID Output Gain	-	0.0 to 25.0	0.1	1.0
n164	1A4h	A4h	PID Feedback Selection	0 1 2 3 4 5	0: Not Used 1: Not Used 2: Not Used 3: Multi-Function Analog Input (Voltage 0 - 10V) (CN2) 4: Multi-Function Analog Input (Current 4 - 20mA) (CN2) 5: Not Used	1	0
n166	1A6h	A6h	Input Phase Loss Detection Level	-	0 to 100 (%)	1%	0
n167	1A7h	A7h	Input Phase Loss Detection Time	-	0 to 255 (sec)	1 sec	0
n168	1A8h	A8h	Output Phase Loss Detection Level	-	0 to 100 (%)	1%	0
n169	1A9h	A9h	Output Phase Loss Detection Time	-	0.0 to 2.0 (sec)	0.1 sec	0
n170	1AAh	AAh	Modbus Frequency Unit Selection	0 1 2 3	0: 0.1 Hz 1: 0.01 Hz 2: 30,000/100% 3: 0.1%	1	0
n173	1ADh	ADh	DC Injection P Gain	-	1 to 999	1 (0.001)	83 (0.083)
n174	1AEh	AEh	DC Injection I Time	-	1 to 250	1 (4ms)	25 (100ms)
n175	1B0h	B0h	Reduce Carrier at low speed selection	0 1	0: Disabled 1: Carrier Frequency reduced to 2.5kHz when Fout <= 5Hz & Iout >= 110%	1	0
n176	1B1h	B1h	Digital Operator Parameter Copy Function Selection	Rdy rEd CPy vFy vA Sno	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
n177	1B2h	B2h	Digital Operator Parameter copy Access Selection	0 1	0: Read prohibited 1: Read allowed	1	0
n178	1B3h	B3h	Fault History	-	(Note 3)	N/A	N/A
n179	1B4h	B4h	Software Number	-	(Note 3) (Note 6)	N/A	N/A

Note 1: Factory setting differs depending on V7N capacity.
Note 2: Factory setting differs depending on control method selected (**n002**).
Note 3: **n178** and **n179** are display only parameters
Note 4: Parameter can be changed while V7N is operating.
Note 5: Available only in CIMR-V7NU25P5, 27P5, 45P5, and 47P5 Drives.
Note 6: Software number should be 3005 or higher for ADR functionality

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.

Monitor	Contents	Display Example	MEMOBUS Address (hex)
U-01	Frequency reference (Hz)	60.0	23
U-02	Output frequency (Hz)	60.0	24
U-03	Output current (A)	12.5	3B
U-04	AC output voltage (V)	230	28
U-05	DC Bus voltage (VPN)	325	31
U-06	Multi-function input terminal and DeviceNet input status	 (1)	2B
U-07	Multi-function output terminal and DeviceNet output status	 (1)	2D
U-08	Motor torque (%) (Open loop vector only)	72	32
U-09	Fault history (last 4 faults)(1)	1.bUS	1B2
U-10	Software number XXXX	0010	1B3
U-11	Output power (KW)	99.9	37
U-12	Reserve (Not displayed)	-	-
U-13(2)	Elapse time (0-6550 (x 10hour))	1234	35
U-14	Reserve (N/A)	-	-
U-15	Reserve (N/A)	-	-
U-16	PID feedback (%)	35.0	38
U-17	PID input (%)	100	39
U-18	PID output (%)	75.5	3A
U-19	Reserve (Not displayed)	-	-
U-60	DeviceNet Polled Producing Attribute (PPA)	70: Basic speed control 71: Extended Speed Control 150: V7N Memobus I/O Control 151: V7N Standard Drive Control 152: V7N Accel/Decel Time Control 155: V7N Extended I/O MEMOBUS Instance 156: V7N General Purpose DI/DO Instance	- (Readable via DeviceNet Object Class 5, Instance 2, Attribute 10)
U-61	DeviceNet Polled Consuming Attribute (PCA)	20: Basic speed control 21: Extended Speed Control 100: V7N Memobus I/O Control 101: V7N Standard Drive Control 102: V7N Accel/Decel Time Control 105: V7N Extended I/O MEMOBUS Instance 106: V7N General Purpose DI/DO Instance	- (Readable via DeviceNet Object Class 5, Instance 2, Attribute 10)
U-62	DeviceNet MAC ID switch setting (S3 x 10 + S4)	17	-
U-63	DeviceNet MAC ID set	17	- (Readable via DeviceNet Object Class 3, Instance 1, Attribute 1)
U-64	DeviceNet Baud Rate switch setting (S1)	1	-
U-65	DeviceNet Baud Rate set (when in Auto Baud)	125: 125 kbps 250: 250 kbps 500: 500 kbps	- (Readable via DeviceNet Object Class 3, Instance 1, Attribute 2)
U-66	DeviceNet connection status	 (1)	- (Readable via DeviceNet Object Class 5, Instance 1 and 2, Attribute 1)

(1) Refer to TM.V7N.01 for Monitor details

(2) Available only in CIMR-V7NU25P5, 27P5, 45P5, and 47P5 Drives

Fig. 1

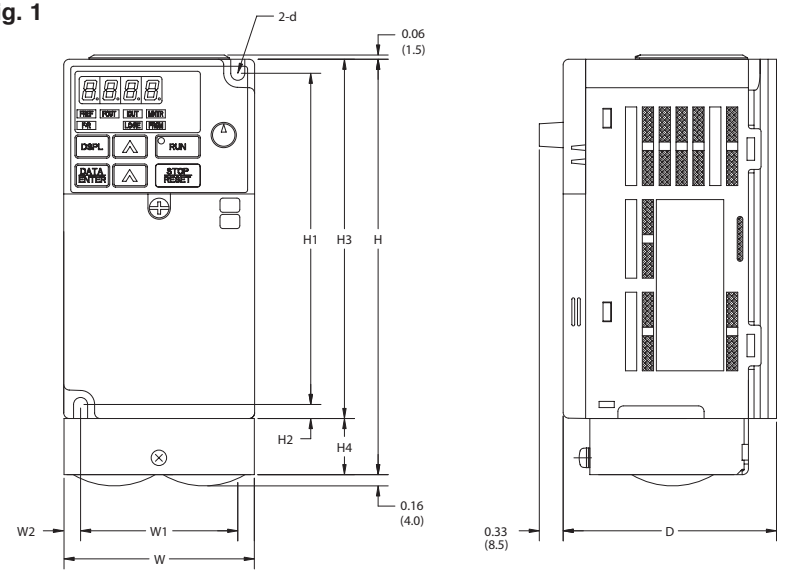
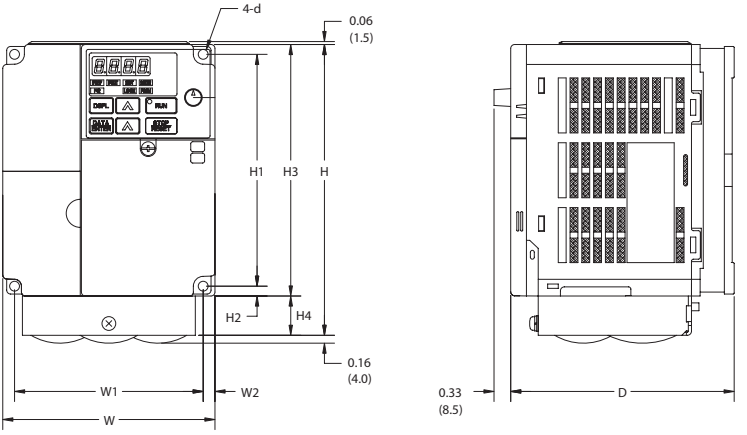


Fig. 2



V7N Enclosed wall mounted type

V7N Enclosed wall mounted type

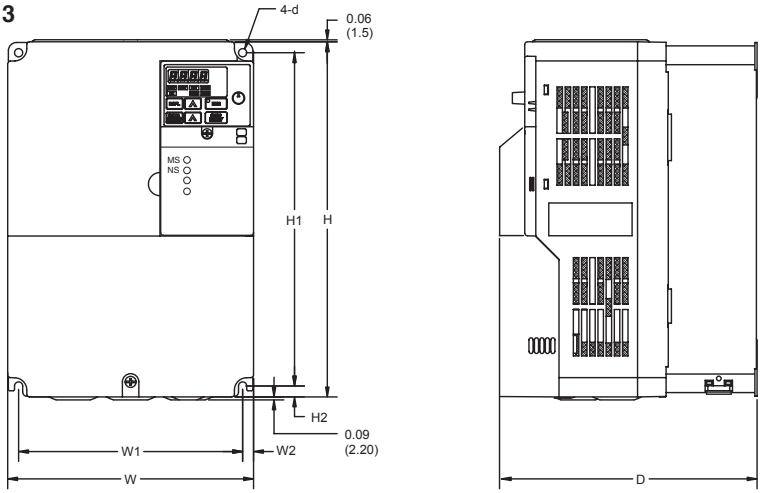
Voltage Class	Model CIMR-V7NU ☐	Size HP	Dimensions in inches (mm) W	H	D	W1	H1	H2	W2	H3	H4	d	Weight (kg)	Heat Loss (W) Heat-sink	Internal	Total	Fig.
230V 3-phase	20P1	1/8	2.68	5.83 (68)	3.58 (148)	2.20 (91)	4.65 (56)	0.20 (118)	0.24 (5)	5.04 (6)	0.79 (128)	M4 (20)	1.55	3.7 (0.7)	9.3	13.0	1
	20P2	1/4	2.68	5.83 (68)	3.58 (148)	2.20 (91)	4.65 (56)	0.20 (118)	0.24 (5)	5.04 (6)	0.79 (128)	M4 (20)	1.55	7.7 (0.7)	10.3	18.0	1
	20P4	1/2	2.68	5.83 (68)	4.84 (148)	2.20 (123)	4.65 (56)	0.20 (118)	0.24 (5)	5.04 (6)	0.79 (128)	M4 (20)	2.20	15.8 (1.0)	12.3	28.1	1
	20P7	3/4 & 1	2.68	5.83 (68)	5.63 (148)	2.20 (143)	4.65 (56)	0.20 (118)	0.24 (5)	5.04 (6)	0.79 (128)	M4 (20)	2.65	28.4 (1.2)	16.7	45.1	1
230V 3-phase	21P5	2	4.25 (108)	5.83 (148)	5.75 (146)	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	3	4.25 (108)	5.83 (148)	6.10 (155)	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	5	5.51 (140)	5.83 (148)	6.22 (158)	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	1/2	4.25 (108)	5.83 (148)	4.21 (107)	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	3/4	4.25 (108)	5.83 (148)	4.92 (125)	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	1 & 2	4.25 (108)	5.83 (148)	6.10 (155)	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	3	4.25 (108)	5.83 (148)	6.73 (171)	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)	6.73 (171)	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	5	5.51 (140)	5.83 (148)	6.22 (158)	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

V7N Enclosed wall mounted type

Drives represented in Fig. 3 can be used as "IP00" type enclosures if the top and bottom covers are removed.

Voltage Class	Model CIMR-V7NU ☐	Size HP	Dimensions in inches (mm) W	H	D	W1	H1	H2	W2	H3	H4	d	Weight (kg)	Heat Loss (W) Heat-sink	Internal	Total	Fig.
230V 3-phase	25P5	7.5	7.09 (180)	10.24 (260)	7.28 (185)	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	10	7.09 (180)	10.24 (260)	7.28 (185)	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	7.5 & 10	7.09 (180)	10.24 (260)	7.28 (185)	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	10	7.09 (180)	10.24 (260)	7.28 (185)	6.46 (164)	9.61 (244)	0.31 (8)	0.31 (8)	–	–	M5	10.58 (4.8)	209.6	99.3	308.9	3

Fig. 3



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