MV-4X AC Inverter

Meets NEMA-4X requirements for tough washdown or dust-tight environments

Solve it with the problem solvers.

OMRON IDM CONTROLS, INC.

Advanced speed control in a compact, water-resistant package

New AC Inverter With NEMA 4X Washdown Protection

The compact MV-Series inverter gives you the performance and reliability of larger inverters at a fraction of the size and cost. The new MV-4X provides the water and dust protection required for use in food and beverage processing, machine tools and wood working equipment, and printing machinery. Use this inverter in applications where plant floor equipment gets washed down with liquid, or is exposed to large amounts of dust or corrosives.

Keeping the Bad Stuff Out

We have taken the popular MV-Series AC Inverter and encased it in the best protection against water wash down on the market. It's UL tested to Type 4X/12 for indoor use and meets IP66. The specially-designed enclosure lets you operate the front panel quick-start keypad and view the LED display for easy setup and programming. Inside, there's no place for water, humidity or dust to sneak in. The drive directly fastens to the enclosure's built-in heat sink for efficient heat transfer. No fins or fans open the enclosure to the environment. The inverter is less expensive and more effective than packaging a drive into a separate enclosure.

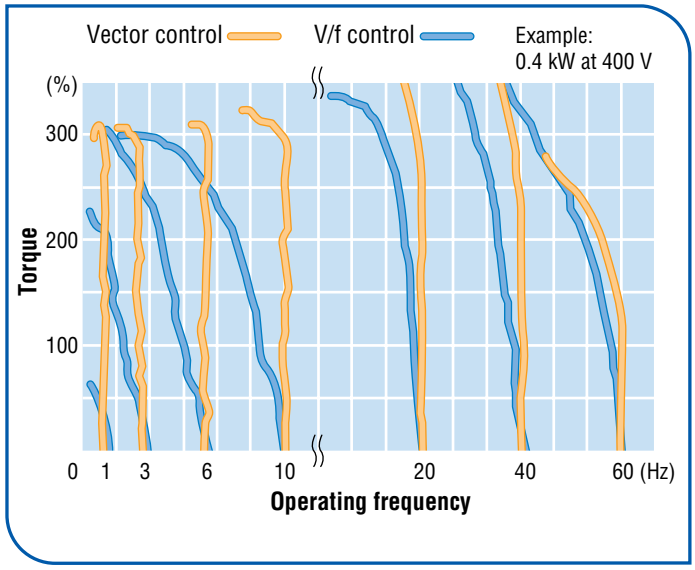
Outstanding Functionality

- Pulse train input, ideal for master/slave speed following, used in material handling and web line applications
- 179 user-configurable parameters customize inverter operation to your specific application; default settings match typical use applications for fast start-up
- Ready for open communications: An on-board RS-485 Modbus RTU (up to 32 nodes) is standard; optional cards are available for DeviceNet, Profibus and Interbus-S
- Ground fault protection, built in
- PID control
- UL-listed electronic thermal overload built in; eliminates external overload
- Program and monitor MV-4X inverter with SYSDRIVE Configurator software
- ¼ to 15 HP models, 230 VAC and 460 VAC three-phase versions

Sensorless Vector Control

Open Loop Vector (OLV) control provides better speed regulation than Volts/Hz control, and provides high torque at low speeds (150% torque at 1 Hz). The Volts/Hz speed control selection provides easier setup.

Comparison of Torque Characteristics



Global Construction Meets international UL, cUL and CE standards. (Separate input filter is required to meet CE EMC directive.)

Wide Range of Inputs and Outputs

- 2 analog inputs
- 1 analog output
- 7 multi-function digital inputs
- 1 multi-function Form C output
- 2 programmable open collector outputs
- DC link reactor connection
- Dynamic braking resistor connection

Serial Communications with No Setup

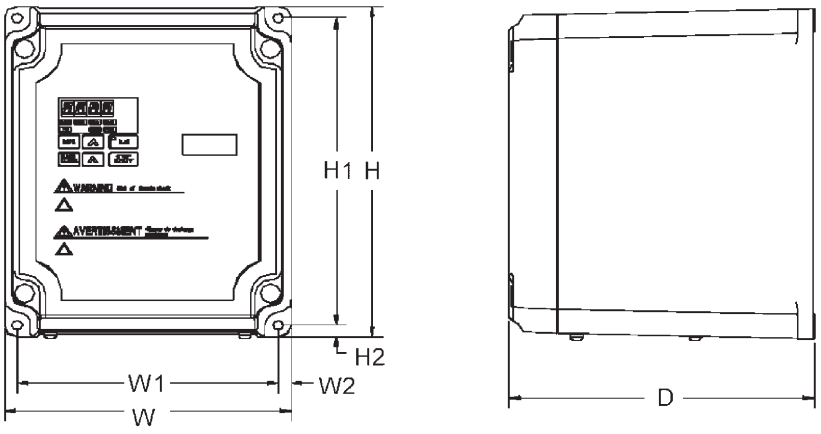
A time saving advantage of combining the MV-4X Inverter with Omron's programmable controllers is instant serial communications that requires no setup. The inverter has RS-485 Modbus RTU on-board. A library of macros in Omron PLCs includes drivers already written so the inverter can communicate automatically with the controller without having to do any additional programming. The "protocol macro function" is available on CS1, CJ1, CQM1H and C200H Alpha controller platforms. Use the communications for remote monitoring and changing of settings.

Specifications

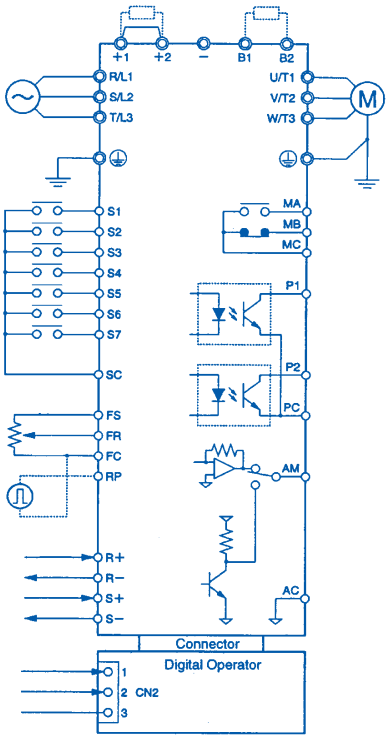
Voltage Class			230 VAC three-phase NEMA-4X								460 VAC three-phase NEMA-4X							
Part Number **V7CU-_ _ _ _ -N4**			20P2	20P4	20P7	21P5	22P2	23P7	25P5	27P5	40P2	40P4	40P7	41P5	42P2	43P7	45P5	47P5
		Max. Applicable Motor Output*1 HP (kW)	0.25 (0.2)	0.75 (0.4)	1 (0.75)	2 (1.5)	3 (2.2)	5 (3.7)	7.5 (5.5)	10 (7.5)	0.5 (0.2)	1 (0.4)	2 (0.75)	3 (1.5)	3.5 (2.2)	5 (3.7)	10 (5.5)	15 (7.5)
Output		Rated Output Current (A)	1.6	3	5	8	11	17.5	25	33	1.4	1.8	3.4	4.8	5.5	8.6	14.8	21
		Max. Output Voltage (V)	200 to 230 V (proportional to input voltage)								380 to 460 V (proportional to input voltage)							
		Max. Output Frequency (Hz)	400 Hz - Programmable (800 Hz available, please consult sales representative)															
Power Supply		Rated Input Voltage and Frequency	200 to 230 V, 50/60Hz								380 to 460 V, 50/60Hz							
		Allowable Voltage Fluctuation	-15% to +10%															
		Allowable Frequency Fluctuation	±5%															
Control Characteristics		Control Method	Sine wave PWM (V/f control/voltage vector control selectable)															
		Output Frequency Resolution	0.01 Hz															
		Overload Capacity	150% rated output current for one minute*4															
		Frequency Reference Signal Accel/Decel Time	0 to 10 VDC (20 kW), 4 to 20 mA (250 W), 0 to 20 mA (250 W) pulse train input frequency setting potentiometer (Selectable) 0.00 to 6000 sec. (accel/decel time are independently programmed 4 types)															
		Braking Torque	Short-term average deceleration torque*2; 0.1, 0.25 kW (0.13 HP, 0.25 HP): 150%; 0.55, 1.1 kW (0.5 HP, 1 HP): 100% 1.5 kW (2 HP): 50%; 2.2 kW (3 HP) or more: 20% Continuous regenerative torque: Approx. 20% (150% with optional braking resistor, braking transistor built-in)															
Protective Functions		Motor Overload Protection	Electronic thermal overload relay															
		Instantaneous Overcurrent	Motor coasts to a stop at approx. 250% of inverter rated current															
		Overload	Motor coasts to a stop after 1 minute at 150% of inverter rated output current*4															
		Overvoltage	Motor coasts to a stop if DC bus voltage exceeds 410 V								Motor coasts to a stop if DC bus voltage exceeds 820 V							
		Momentary Power Loss	Stops for 15ms or more. By setting inverter, operation can be continued if power is restored within approx. 0.5s															
		Inverter Overheat	Protected by electronic circuit															
		Stall Prevention Level	Can be set individually during accel/decel, provided/not provided available during coast to a stop															
		Ground Fault	Protected by electronic circuit (overcurrent level)															
		Power Charge Indication	ON until the DC bus voltage becomes 50V or less. RUN lamp stays ON or digital operator LED stays ON.															
Environmental Conditions		Ambient Temperature	NEMA 4X/IP66: -10 to +40˚C (14 to 114˚F)															
		Humidity	95% RH or less (non-condensing)															
		Storage Temperature*3	-4 to 140˚F (-20 to +60˚C)															
		Location	Indoor; Outdoor (not in direct sunlight)															
		Elevation	3280 ft (1000 m) or less															
		Vibration	Up to 9.8 m/S2 (1 G) at less than 20 Hz, up to 2 m/S2 (0.2 G) at less than 20 to 50 Hz															
Wiring Distance			328 ft (100 m) or less between Inverter and Motor															
Other Functions	Input Signals	Multi-function Input	Seven of the following input signals are selectable: Forward/reverse run (3-wire sequence), fault reset, external fault (NO/NC contact input), multi-step speed operation, Jog command, accel/decel time select, external baseblock (NO/NC contact input), speed search command, UP/DOWN command, accel/decel hold command, LOCAL/REMOTE selection, communication/control circuit terminal selection, emergency stop fault, emergency stop alarm, self test, PID control cancel, PID integral reset/hold															
	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, PID feedback loss detection															
		Standard Functions	Voltage vector control, full-range automatic torque boost, slip compensation, DC injection braking current/time at start/stop frequency reference bias/gain, MEMOBUS communications (RS-485/422, max. 19.2 K bps), PID control, energy-saving control, parameter copy, frequency reference with built-in potentiometer															

*1: Based on a standard 4-pole motor for max. applicable motor output. Select the inverter model within the allowable motor rated current
*2: Shows deceleration torque for uncoupled motor decelerating from 60 Hz with the shortest possible deceleration time
*3: Temperature during shipping (for short period)
*4: Overload capacity for V7CU-47P5-N4 is 140% rated current for one minute

Dimensions



Voltage Class	Model Number	inches (mm) W	H	D	W1	H1	H2	W2	Weight lbs. (kg)
230V 3-Phase	V7CU-20P2-N4	6.1 (155)	7.56 (192)	6.5 (165)	5.55 (141)	7.01 (178)	0.28 (7)	0.28 (7)	7.77 (3.52)
	V7CU-20P4-N4	6.1 (155)	7.56 (192)	6.5 (165)	5.55 (141)	7.01 (178)	0.28 (7)	0.28 (7)	7.99 (3.62)
	V7CU-20P7-N4	6.1 (155)	7.56 (192)	6.5 (165)	5.55 (141)	7.01 (178)	0.28 (7)	0.28 (7)	8.21 (3.72)
	V7CU-21P5-N4	6.69 (170)	10 (254)	7.48 (190)	6.22 (158)	9.41 (239)	0.24 (6)	0.24 (6)	13.03 (5.9)
	V7CU-22P2-N4	6.69 (170)	10 (254)	7.48 (190)	6.22 (158)	9.41 (239)	0.24 (6)	0.24 (6)	13.25 (6)
	V7CU-23P7-N4	6.69 (170)	10 (254)	7.48 (190)	6.22 (158)	9.41 (239)	0.24 (6)	0.24 (6)	13.69 (6.2)
	V7CU-25P5-N4	11.41 (290)	15.78 (400)	11.32 (287.6)	10.6 (270)	14.17 (360)	0.79 (20)	0.39 (10)	41.01 (18.6)
	V7CU-27P5-N4	11.41 (290)	15.78 (400)	11.32 (287.6)	10.6 (270)	14.17 (360)	0.79 (20)	0.39 (10)	41.45 (18.8)
460V 3-Phase	V7CU-40P2-N4	6.1 (155)	7.56 (192)	6.5 (165)	5.55 (141)	7.01 (178)	0.28 (7)	0.28 (7)	8.43 (3.82)
	V7CU-40P4-N4	6.1 (155)	7.56 (192)	6.5 (165)	5.55 (141)	7.01 (178)	0.28 (7)	0.28 (7)	8.43 (3.82)
	V7CU-40P7-N4	6.1 (155)	7.56 (192)	6.5 (165)	5.55 (141)	7.01 (178)	0.28 (7)	0.28 (7)	8.65 (3.92)
	V7CU-41P5-N4	6.69 (170)	10 (254)	7.48 (190)	6.22 (158)	9.41 (239)	0.24 (6)	0.24 (6)	13.25 (6)
	V7CU-42P2-N4	6.69 (170)	10 (254)	7.48 (190)	6.22 (158)	9.41 (239)	0.24 (6)	0.24 (6)	13.25 (6)
	V7CU-43P7-N4	6.69 (170)	10 (254)	7.48 (190)	6.22 (158)	9.41 (239)	0.24 (6)	0.24 (6)	13.7 (6.2)
	V7CU-45P5-N4	11.41 (290)	15.78 (400)	11.32 (287.6)	10.6 (270)	14.17 (360)	0.79 (20)	0.39 (10)	41.45 (18.8)
	V7CU-47P5-N4	11.41 (290)	15.78 (400)	11.32 (287.6)	10.6 (270)	14.17 (360)	0.79 (20)	0.39 (10)	41.45 (18.8)



Wiring Diagram

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SB MV4X-1 3/02/15M

Printed in the U.S.A.

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