

Standard Specifications

Parameter C6-01 sets the drive for Normal Duty or Heavy Duty performance.

200 V Class (Three-Phase/Single-Phase)

Value in brackets is for a single-phase drive.

Model	Three-Phase CIMR-VA2A	0001	0002	0004	0006	0008*10	0010	0012	0018*10	0020	0030	0040	0056	0069			
	Single-Phase*2 CIMR-VABA	0001	0002	0003	0006	-	0010	0012	-	0018*1	-	-	-	-			
Max. Applicable Motor Capacity*3	kW	Normal Duty	0.2	0.4	0.75	1.1	1.5	2.2	3.0	3.7	5.5	7.5	11.0	15.0	18.5		
		Heavy Duty	0.1	0.2	0.4	0.75	1.1	1.5	2.2	3.0	3.7	5.5	7.5	11.0	15.0		
Input	Rated Input Current*4	A	Three-phase	Normal Duty	1.1	1.9	3.9	7.3	8.8	10.8	13.9	18.5	24.0	37.0	52.0	80.0	
			Heavy Duty	0.7	1.5	2.9	5.8	7.0	7.5	11.0	15.6	18.9	24.0	37.0	52.0	68.0	
	Single-phase	Normal Duty	2.0	3.6	7.3	13.8	-	20.2	24.0	-	-	-	-	-	-		
		Heavy Duty	1.4	2.8	5.5	11.0	-	14.1	20.6	-	35.0	-	-	-	-		
Output	Rated Output Capacity*5	kVA	Normal Duty*6	0.5	0.7	1.3	2.3	3.0	3.7	4.6	6.7	7.5	11.4	15.2	21.3	26.3	
			Heavy Duty	0.3*7	0.6*7	1.1*7	1.9*7	2.6*8	3.0*8	4.2*8	5.3*8	6.7*8	9.5*8	12.6*8	17.9*8	22.9*8	
	Rated Output Current	A	Normal Duty*6	1.2	1.9	3.5(3.3)	6.0	8.0	9.6	12.0	17.5	19.6	30.0	40.0	56.0	69.0	
			Heavy Duty	0.8*7	1.6*7	3.0*7	5.0*7	6.9*8	8.0*8	11.0*8	14.0*8	17.5*8	25.0*8	33.0*8	47.0*8	60.0*8	
	Overload Tolerance	Normal Duty Rating: 120% of rated output current for 60 s. Heavy Duty Rating: 150% of rated output current for 60 s. (Derating may be required for repetitive loads)															
	Carrier Frequency	2 kHz (user-set, 2 to 15 kHz possible)															
	Max. Output Voltage	Three-phase power supply: three-phase 200 to 240 V (relative to input voltage) Single-phase power supply: three-phase 200 to 240 V (relative to input voltage)															
	Max. Output Frequency	400 Hz (user-set)															
	Rated Voltage/Rated Frequency	Three-phase AC power supply: three-phase 200 to 240 V 50/60 Hz DC power supply: 270 to 340 V*9 Single-phase AC power supply: single-phase 200 to 240 V 50/60 Hz															
	Allowable Voltage Fluctuation	-15 to +10%															
Allowable Frequency Fluctuation	±5%																
Power	Power Supply	kVA	Three-phase	Normal Duty	0.5	0.9	1.8	3.3	4.0	4.9	6.4	8.5	11.0	17.0	24.0	31.0	37.0
			Heavy Duty	0.3	0.7	1.3	2.7	3.2	3.4	5.0	7.1	8.6	11.0	17.0	24.0	31.0	
		Single-phase	Normal Duty	0.5	1.0	1.9	3.6	-	5.3	6.3	-	-	-	-	-	-	
			Heavy Duty	0.4	0.7	1.5	2.9	-	3.7	5.4	-	9.2	-	-	-	-	

*1: Heavy Duty (3.7 kW) only.

*2: Drives with a single-phase power supply input have three-phase output. Single-phase motors cannot be used.

*3: The motor capacity (kW) refers to a Yaskawa 4-pole, 60 Hz, 200 V motor. The rated output current of the drive output amps should be equal to or greater than the motor rated current.

*4: Value displayed is for the input current when operating Yaskawa standard motors of max. applicable capacity with the rated load at the rated motor speed. This value may fluctuate based on the power supply side impedance, as well as the power supply transformer, input side reactor, and wiring conditions.

*5: Rated output capacity is calculated with a rated output voltage of 220 V.

*6: This value assumes a carrier frequency of 2 kHz. Increasing the carrier frequency requires a reduction in current.

*7: This value assumes a carrier frequency of 10 kHz. Increasing the carrier frequency requires a reduction in current.

*8: This value assumes a carrier frequency of 8 kHz. Increasing the carrier frequency requires a reduction in current.

*9: Not compliant with UL or CE standards when using a DC power supply.

*10: These models are available in Japan only.

400 V Class (Three-phase)

Model	CIMR-VA4A	0001	0002	0004	0005	0007	0009	0011	0018	0023	0031	0038		
Max. Applicable Motor Capacity*1	kW	Normal Duty	0.4	0.75	1.5	2.2	3.0	3.7	5.5	7.5	11.0	15.0	18.5	
		Heavy Duty	0.2	0.4	0.75	1.5	2.2	3.0	3.7	5.5	7.5	11.0	15.0	
Input	Rated Input Current*2	A	Normal Duty	1.2	2.1	4.3	5.9	8.1	9.4	14.0	20.0	24.0	38.0	44.0
			Heavy Duty	1.2	1.8	3.2	4.4	6.0	8.2	10.4	15.0	20.0	29.0	39.0
Output	Rated Output Capacity*3	kVA	Normal Duty*4	0.9	1.6	3.1	4.1	5.3	6.7	8.5	13.3	17.5	23.6	29.0
			Heavy Duty*5	0.9	1.4	2.6	3.7	4.2	5.5	7.0	11.3	13.7	18.3	23.6
	Rated Output Current	A	Normal Duty*4	1.2	2.1	4.1	5.4	6.9	8.8	11.1	17.5	23.0	31.0	38.0
			Heavy Duty*5	1.2	1.8	3.4	4.8	5.5	7.2	9.2	14.8	18.0	24.0	31.0
Overload Tolerance	Normal Duty Rating: 120% of rated output current for 60 s. Heavy Duty Rating: 150% of rated output current for 60 s. (Derating may be required for repetitive loads)													
Carrier Frequency	2 kHz (user-set, 2 to 15 kHz possible)													
Max. Output Voltage	Three-phase 380 to 480 V (relative to input voltage)													
Max. Output Frequency	400 Hz (user-set)													
Rated Voltage/Rated Frequency	Three-phase AC power supply 380 to 480 V 50/60 Hz DC power supply: 510 to 680 V*6													
Allowable Voltage Fluctuation	-15 to +10%													
Allowable Frequency Fluctuation	±5%													
Power	Power Supply	kVA	Normal Duty	1.1	1.9	3.9	5.4	7.4	8.6	13.0	18.0	22.0	35.0	40.0
			Heavy Duty	1.1	1.6	2.9	4.0	5.5	7.5	9.5	14.0	18.0	27.0	36.0

*1: The motor capacity (kW) refers to a Yaskawa 4-pole, 60 Hz, 400 V motor. The rated output current of the drive output amps should be equal to or greater than the motor rated current.

*2: Value displayed is for the input current when operating Yaskawa standard motors of max. applicable capacity with the rated load at the rated motor speed. This value may fluctuate based on the power supply side impedance, as well as the power supply transformer, input side reactor, and wiring conditions.

*3: Rated output capacity is calculated with a rated output voltage of 440 V.

*4: This value assumes a carrier frequency of 2 kHz. Increasing the carrier frequency requires a reduction in current.

*5: This value assumes a carrier frequency of 8 kHz. Increasing the carrier frequency requires a reduction in current.

*6: Not compliant with UL or CE standards when using a DC power supply.

Common Specifications

Rotational Auto-Tuning must be performed to achieve the performance described with Open Loop Vector Control.

	Item	Specifications
Control Characteristics	Control Method	Open Loop Vector Control (Current Vector), V/f Control, PM Open Loop Vector Control (for SPM and IPM motors)
	Frequency Control Range	0.01 to 400 Hz
	Frequency Accuracy (Temperature Fluctuation)	Digital reference: within $\pm 0.01\%$ of the max. output frequency (-10 to $+50^\circ\text{C}$)
		Analog reference: within $\pm 0.1\%$ of the max. output frequency ($25 \pm 10^\circ\text{C}$)
	Frequency Setting Resolution	Digital reference: 0.01 Hz
		Analog reference: 1/1000 of max. frequency
	Output Frequency Resolution	20 bit of maximum output frequency (parameter E1-04 setting)
	Frequency Setting Resolution	Main frequency reference: 0 to 10 Vdc (20 $\text{k}\Omega$), 4 to 20 mA (250 Ω), 0 to 20 mA (250 Ω) Main speed reference : Pulse Train Input (max. 32 kHz)
	Starting Torque	200% / 0.5 Hz (assumes Heavy Duty rating IM of 3.7 kW or less using Open Loop Vector Control), 50% / 6 Hz (assumes PM Open Loop Vector Control)
	Speed Control Range	1:100 (Open Loop Vector Control), 1:20 to 40 (V/f Control), 1:10 (PM Open Loop Vector Control)
	Speed Control Accuracy	$\pm 0.2\%$ in Open Loop Vector Control ($25 \pm 10^\circ\text{C}$) *1
	Speed Response	5 Hz in Open Loop Vector ($25 \pm 10^\circ\text{C}$) (excludes temperature fluctuation when performing Rotational Auto-Tuning)
	Torque Limit	Open Loop Vector Control allows separate settings in four quadrants
	Accel/Decel Time	0.0 to 6000.0 s (4 selectable combinations of independent acceleration and deceleration settings)
Protection Function	Braking Torque	① Short-time decel torque*2: over 150% for 0.1/0.2 kW motors, over 100% for 0.4/ 0.75 kW motors, over 50% for 1.5 kW motors, and over 20% for 2.2 kW and above motors (overexcitation braking/High-Slip Braking: approx. 40%) ② Continuous regen. torque: approx. 20% (approx. 125% with dynamic braking resistor option*3: 10% ED, 10 s, internal braking transistor)
	V/f Characteristics	User-selected programs, V/f preset patterns possible
	Main Control Functions	Momentary power loss ride-thru, Speed search, Overtorque detection, Torque limit, 17-step speed (max), Accel/decel time switch, S-curve accel/decel, 3-wire sequence, Auto-tuning (rotational, stationary tuning for resistance between lines), Dwell, Cooling fan on/off switch, Slip compensation, Torque compensation, Frequency jump, Upper/lower limits for frequency reference, DC injection braking at start and stop, Overexcitation braking, High slip braking, PID control (with sleep function), Energy saving control, MEMOBUS comm. (RS-485/422 max, 115.2 kbps), Fault restart, Application presets, DriveWorksEZ (customized function), Removable terminal block with parameter backup function...
Protection Function	Motor Protection	Motor overheat protection based on output current
	Momentary Overcurrent Protection	Drive stops when output current exceeds 200% of Heavy Duty Rating
	Overload Protection	Drive stops after 60 s at 150% of rated output current (Heavy Duty Rating)*4
	Overvoltage Protection	200 V class: Stops when DC bus exceeds approx. 410 V
		400 V class: Stops when DC bus exceeds approx. 820 V (approx. 740 V when power supply voltage is less than 400 V)
	Undervoltage Protection	Three-phase 200 V class: Stops when DC bus falls below approx. 190 V
		Single-phase 200 V class: Stops when DC bus falls below approx. 160 V
		Three-phase 400 V class: Stops when DC bus falls below approx. 380 V (approx. 350 V when the power supply voltage is less than 400 V)
	Momentary Power Loss Ride-Thru	Stops after approx. 15 ms (default). Parameter settings allow the drive to continue running if power loss lasts for up to approx. 2 s *5
	Heatsink Overheat Protection	Protection by thermistor
Braking Resistance Overheat Protection	Overheat sensor for braking resistor (optional ERF-type, 3% ED)	
Stall Prevention	Separate settings allowed during acceleration, and during run. Enable/disable only during deceleration.	
Ground Fault Protection	Protection by electronic circuit *6	
Charge LED	Charge LED remains lit until DC bus has fallen below approx. 50 V	
Operating Environment	Area of Use	Indoors
	Ambient Temperature	-10 to $+50^\circ\text{C}$ (open chassis), -10 to $+40^\circ\text{C}$ (NEMA Type 1)
	Humidity	95 RH% or less (no condensation)
	Storage Temperature	-20 to $+60^\circ\text{C}$ (short-term temperature during transportation)
	Altitude	Up to 1000 meters
Shock	10 to less than 20 Hz (9.8 m/s^2) max., 20 to 55 Hz (5.9 m/s^2) max.	
Standards Compliance	<ul style="list-style-type: none"> •UL508C •EN61800-3, EN61800-5-1 •ISO13849-1 Cat.3 PLd, IEC61508 SIL2 	
Protection Design	IP20 open-chassis, NEMA Type 1 enclosure	

*1: Speed control accuracy may vary slightly depending on installation conditions or motor used.

*2: Momentary average deceleration torque refers to the deceleration torque from 60Hz down to 0 Hz. This may vary depending on the motor.

*3: Disable Stall Prevention during deceleration by setting L3-04 (Stall Prevention Selection during Deceleration) to 0 (disabled) or 3 (stall prevention with braking resistor) when using a Braking Resistor or Braking Resistor Unit. The motor may not stop within the deceleration time if this setting is not changed.

*4: Overload protection may be triggered at lower levels if output frequency is below 6 Hz.

*5: Varies by drive capacity. Drives smaller than 7.5 kW (CIMR-VA2A0040/ CIMR-VA4A0023) require a separate Momentary Power Loss Recovery Unit to continue operating during a momentary power loss of 2 s.

*6: Protection may not be provided under the following conditions as the motor windings are grounded internally during run:

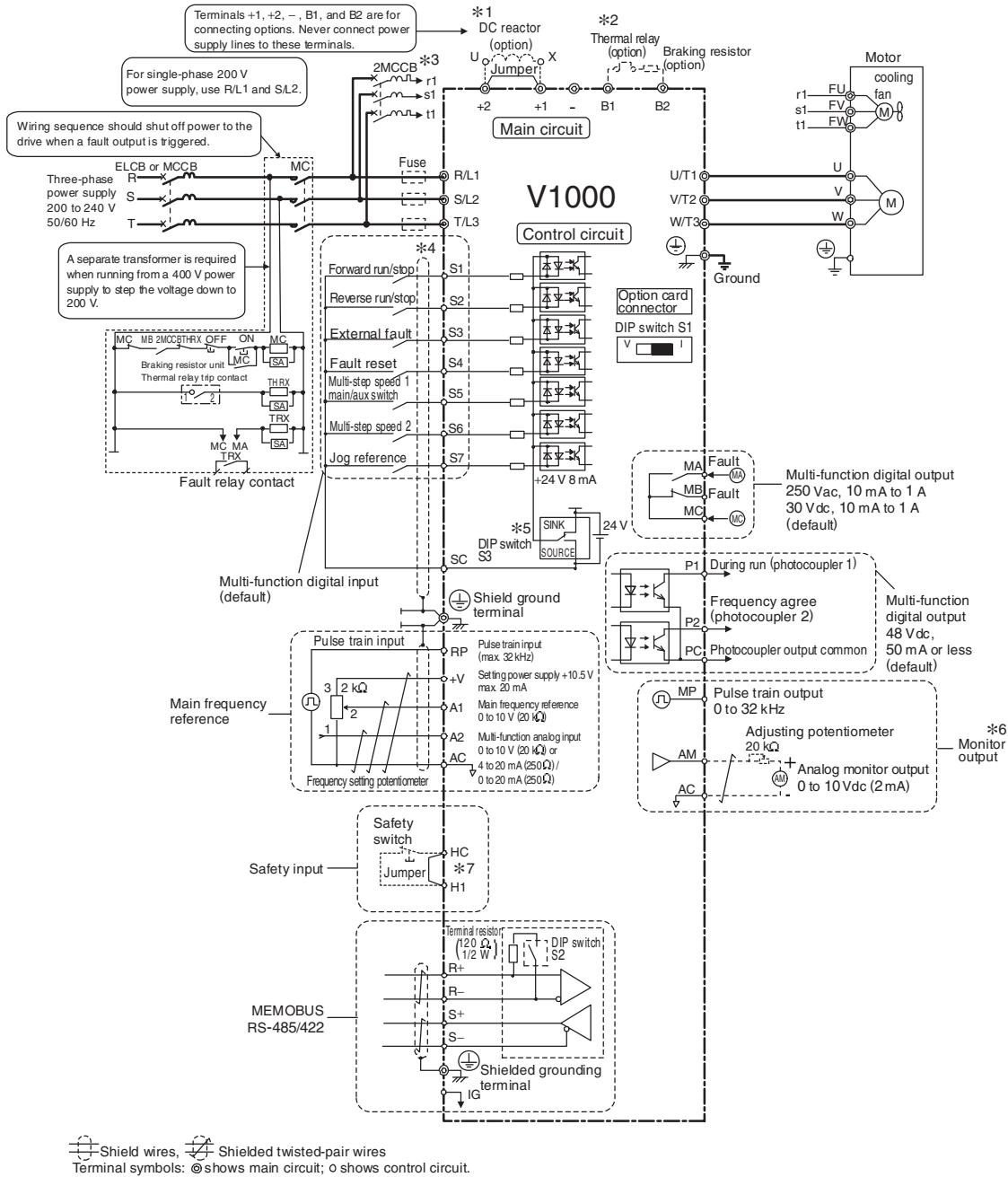
- Low resistance to ground from the motor cable or terminal block.
- Drive already has a short-circuit when the power is turned on.



Standard Connection Diagram

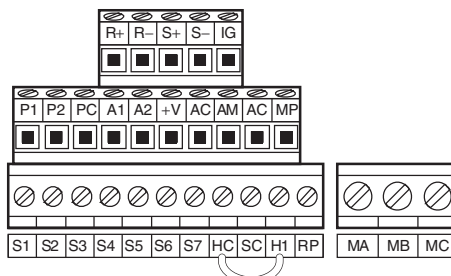
Standard Connection Diagram

Example: 200 V Class



- *1: Remove the jumper between terminals +1 and +2 when installing an optional DC reactor.
 - *2: The MC on the input side of the main circuit should open when the thermal relay is triggered.
 - *3: Self-cooled motors do not require separate cooling fan motor wiring.
 - *4: Connected using sequence (0 V com/sink mode) input signal (S1 to S7) from NPN transistor (default).
 - *5: Sinking mode requires an internal 24 V power supply. Source mode requires an external power supply.
 - *6: Monitor outputs work with devices such as analog frequency meters, current meters, voltmeters and watt meters. They cannot be used in a control system requiring feedback.
 - *7: When using an external switch to stop the drive as a safety precaution, make sure the jumper creating the short circuit has been removed. Output is interrupted within 1 ms after the safety input is triggered. Make sure safety input wiring does not exceed 30 m.
- Note: Input terminal functions may change when Application Presets are used.

Control Circuit and Terminal Layout



Terminal Functions

Main Circuit Terminals

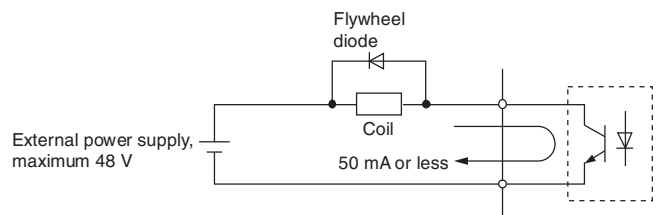
Terminal	Terminal Name	Function (Signal Level)
R/L1	Main circuit power supply input	Connects line power to the drive. Drives with single-phase 200 V input power use terminals R/L1 and S/L2 only (do not use T/L3).
S/L2		
T/L3		
U/T1	Drive output	Connects to the motor.
V/T2		
W/T3		
B1	Braking resistor / Braking resistor unit	Available for connecting a braking resistor or braking resistor unit.
B2		
+1	DC reactor connection	These terminals are shorted for shipment. Remove the jumper creating the short to install a DC choke.
+2		
+1		
–	DC power supply input	For connecting a DC power supply. DC power supply input terminals (+1, –) are not UL/cUL and CE certified.
⊕ Two terminals		
Ground		Grounding terminal Grounding resistance for 200 V class: 100 Ω or less Grounding resistance for 400 V class: 10 Ω or less

Control Circuit Input Terminals

Terminal	No.	Terminal Name	Function (Signal Level)
Multi-function digital input	S1	Multi-function input 1	Photocoupler 24 Vdc, 8 mA Note: Drive preset to sinking mode. When using source mode, set DIP switch S3 to allow for a 24 Vdc (±10%) external power supply.
	S2	Multi-function input 2	
	S3	Multi-function input 3	
	S4	Multi-function input 4	
	S5	Multi-function input 5	
	S6	Multi-function input 6	
	S7	Multi-function input 7	
	SC	Multi-function input common (Control common)	
Main frequency reference input	RP	Multi-function pulse train input	Input frequency: 0.5 to 32 kHz (Duty cycle: 30 to 70%) (High level voltage: 3.5 to 13.2 V) (Low level voltage: 0.0 to 0.8 V) (Input impedance: 3 kΩ)
	+V	Analog input power supply	+10.5 V (max. allowable current 20 mA)
	A1	Main frequency reference	Input voltage 0 to 10 Vdc (20 kΩ) resolution: 1/1000
	A2	Multi-function analog input	DIP switch S1 sets the terminal for a voltage or current input signal 0 to 10 Vdc (20 kΩ) resolution: 1/1000 4 to 20 mA or 0 to 20 mA (250 Ω) resolution: 1/500
	AC	Frequency reference common	0 V
Hardware baseblock	HC	Power supply for hardware baseblock command	+24 Vdc (max. 10 mA allowed)
	H1	Safety Input	Open: Hardware baseblock Closed: Normal operation Note: Remove the jumper when an external safety switch is installed to stop the drive. Output is interrupted within 1 ms after the safety input is triggered. Make sure safety input wiring does not exceed 30 m.
Multi-function digital output*1	MA	N.O. output	Digital output 30 Vdc (or less), 10 mA to 1 A 250 Vac (or less), 10 mA to 1 A
	MB	N.C. output	
	MC	Digital output common	
Multi-function photocoupler output	P1	Photocoupler output 1	Photocoupler output *2 48 Vdc (or less), 50 mA (or less)
	P2	Photocoupler output 2	
	PC	Photocoupler output common	
Monitor output	MP	Pulse train output	32 kHz (max.)
	AM	Analog monitor output	0 to 10 Vdc (2 mA or less) Resolution: 1/1000
	AC	Monitor common	0 V

*1: Refrain from assigning functions to terminals MA and MB that involve frequent switching, as doing so may shorten relay performance life. Switching life is estimated at 200,000 times (assumes 1 A, resistive load).

*2: Connect a flywheel diode as shown in the figure on the right when driving a reactive load such as a relay coil. Make sure the diode rating is greater than the circuit voltage.



Serial Communication Terminals

Type	No.	Terminal Name	Function (Signal Level)
MEMOBUS communication	R+	Communications input (+)	MEMOBUS communication: • Use a RS-485 or RS-422 cable to connect the drive. • RS-485/422 MEMOBUS communication protocol 115.2 kbps (max.)
	R–	Communications input (–)	
	S+	Communications output (+)	
	S–	Communications output (–)	
	IG	Shielded ground	