





## Common Specifications

Item	Specifications		
Control Characteristics	Control Method	V/f Control, V/f Control with PG, Open Loop Vector Control, Closed Loop Vector Control, Open Loop Vector Control for PM, Advanced Open Loop Vector Control for PM, Closed Loop Vector Control for PM	
	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 +40°C) Analog reference: within $\pm 0.1\%$ of the max. output frequency (25 $\pm$ 10°C)	
	Frequency Setting Resolution	Digital reference: 0.01 Hz, Analog reference: 0.03 Hz / 60 Hz (11 bit)	
	Output Frequency Resolution	0.001 Hz	
	Frequency Setting Resolution	Main frequency reference: -10 to +10 Vdc, 0 to 10 Vdc (20 k $\Omega$ ), 4 to 20 mA (250 $\Omega$ ), 0 to 20 mA (250 $\Omega$ ) Main speed reference: Pulse train input (max. 32 kHz)	
	Starting Torque	V/f Control 150%/3 Hz V/f Control with PG 150%/3 Hz Open Loop Vector Control 200%/0.3 Hz* <sup>1</sup> Closed Loop Vector Control 200%/0 min <sup>-1</sup> * <sup>1</sup> Open Loop Vector Control for PM 100%/5% Speed Advanced Open Loop Vector Control for PM 200%/0 min <sup>-1</sup> * <sup>1</sup> Closed Loop Vector Control for PM 200%/0 min <sup>-1</sup> * <sup>1</sup>	
	Speed Control Range	V/f Control 1: 40 V/f Control with PG 1: 40 Open Loop Vector Control 1: 200 Closed Loop Vector Control 1: 1500 Open Loop Vector Control for PM 1: 20 Advanced Open Loop Vector Control for PM 1: 100 Closed Loop Vector Control for PM 1: 1500	
	Speed Control Accuracy	$\pm 0.2\%$ in Open Loop Vector Control (25 $\pm$ 10°C), $\pm 0.02\%$ in Closed Loop Vector Control (25 $\pm$ 10°C)* <sup>2</sup>	
	Speed Response	10 Hz in Open Loop Vector Control (25 $\pm$ 10°C), 250 Hz in Closed Loop Vector Control (25 $\pm$ 10°C)* <sup>3</sup> (excludes temperature fluctuation when performing Rotational Auto-Tuning)	
	Torque Limit	Parameters setting allow separate limits in four quadrants (available in OLV, CLV, AOLV/PM, CLV/PM)	
	Accel/Decel Time	0.00 to 6000.0 s (4 selectable combinations of independent acceleration and deceleration settings)	
	Braking Torque	Same value as overload tolerance	
	V/f Characteristics	User-selected programs and V/f preset patterns possible	
Protection Function	Main Control Functions	Torque Control, Droop Control, Speed/Torque Control switch, Feed Forward Control, Zero Servo Control, Momentary Power Loss Ride-Thru, Speed Search, Synchronous Transfer with Commercial Power Supply, Overtorque detection, torque limit, 17 Step Speed (max.), accel/dec time switch, S-curve accel/dec, 3-wire sequence, Auto-Tuning (rotational, stationary), 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, 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 functions), Removable Terminal Block with Parameter Backup, Online Tuning, Overexcitation Deceleration, Inertia (ASR) Tuning, High Frequency Injection, etc.	
	Power Supply Regeneration	Available	
	Motor Protection	Motor overheat protection based on output current	
	Momentary Overcurrent Protection	Stops over 200% rated output current (Heavy Duty)	
	Overload Protection	Drive stops after 60 s at 150% of rated output current (when set for Heavy Duty performance)* <sup>4</sup>	
	Input Power Overvoltage Protection	200 V class: Stops when input voltage exceeds approx. 315 V, 400 V class: Stops when input voltage exceeds approx. 630 V	
	Input Power Undervoltage Protection	200 V class: Stops when input voltage falls below approx. 150 V, 400 V class: Stops when input voltage falls below approx. 300 V	
	Momentary Power Loss Ride-Thru	Immediately stop after 2 ms or longer power loss.* <sup>5</sup> Continuous operation during power up to 2 s (standard).* <sup>6</sup>	
	Heatsink Overheat Protection	Thermistor	
	Stall Prevention	Stall prevention during acceleration/deceleration and constant speed operation	
	Ground Fault Protection	Protection by electronic circuit* <sup>7</sup>	
	Charge LCD	Charge LED remains lit until DC bus has fallen below approx. 50 V	
	Environment	Area of Use	Indoors
		Ambient Temperature	-10 to +50°C (open-chassis), -10 to +40°C (NEMA Type 1)
Humidity		95% RH or less (no condensation)	
Storage Temperature		-20 to +60°C (short-term temperature during transportation)	
Altitude		Up to 1000 meters* <sup>8</sup>	
Shock		10 Hz to 20 Hz, 9.8 m/s <sup>2</sup> 20 Hz to 55 Hz, CIMR-UA□A0034 to 2A0077, 4A0011 to 4A0077: 5.9 m/s <sup>2</sup> 20 Hz to 55 Hz, CIMR-UA□A0096 to 2A0216, 4A0096 to 4A0414: 2.0 m/s <sup>2</sup>	
Standards Compliance	•UL508C •IEC/EN61800-3, IEC/EN61800-5-1 •Two Safe Disable inputs and 1EDM output according to ISO/EN13849-1 Cat.3 Plc, IEC/EN61508 SIL3		
Protection Design	IP00 open-chassis, IP20 NEMA Type 1 enclosure* <sup>9</sup>		

\*1 : Current derating is required.

\*2 : Speed control accuracy may vary slightly depending on installation conditions or motor used. Contact Yaskawa for consultation.

\*3 : When the Speed Response Selection (C5-29) is set to 1.

\*4 : Overload protection may be triggered when operating with 150% of the rated output current if the output frequency is less than 6 Hz.

\*5 : May be shorter due to load conditions and motor speed.

\*6 : A separate Momentary Power Loss Ride-Thru Unit is required for the drives if the application needs to continue running during a momentary power loss up to 2 s.

\*7 : Protection may not be provided under the following conditions as the motor windings are grounded internally during run:

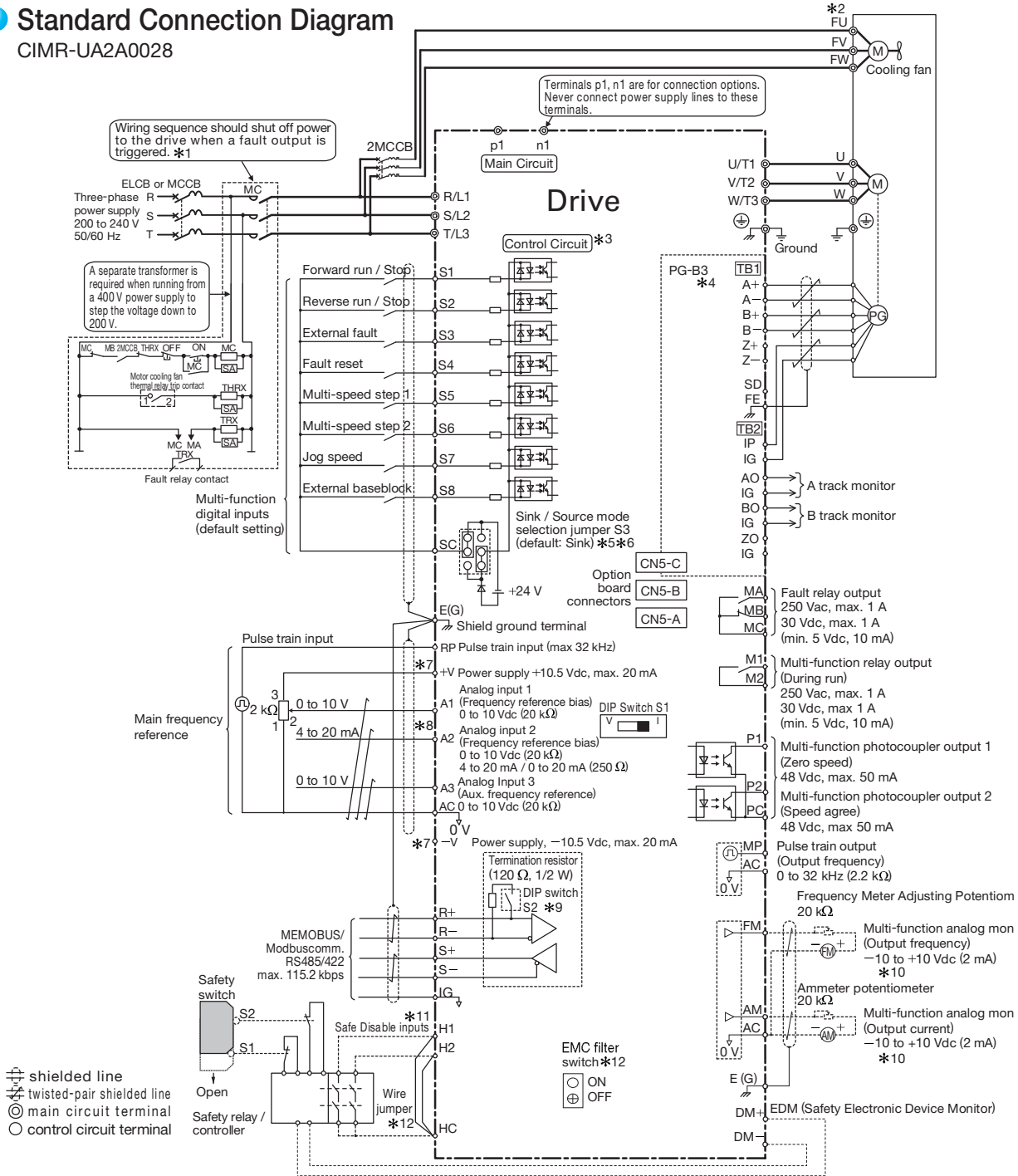
-Low resistance to ground from the motor cable or terminal block.

-Drive already has a short-circuit when the power is turned on.

\*8 : Up to 3000 m with output current and voltage derating. Refer to Technical Manual for details.

\*9 : Removing the cover of changes the drive's NEMA Type 1 rating to IP20.

## Standard Connection Diagram CIMR-UA2A0028



- \* 1 : Note that if the drive is set to trigger a fault output whenever the fault restart function is activated (L5-02 = 1), then a pulse sequence to interrupt power when a fault occurs will result in shutting off the power to the drive as the drive attempts to restart itself. The default setting for L5-02 is 0 (fault output not active during restart attempt).
- \* 2 : Self-cooling motors do not require wiring that would be necessary with motors using a cooling fan.
- \* 3 : For control modes that do not use a motor speed feedback signal, PG option card wiring is not necessary.
- \* 4 : This figure shows an example of a sequence input to S1 through S8 using a non-powered relay or an NPN transistor.  
Use jumper S3 to select the sink mode for the use of an internal power supply or the source mode for the use of an external power supply.
- \* 5 : An external power supply cannot be used in sink mode (+24 V common) and an internal power supply cannot be used in source mode. Refer to Technical Manual for details.
- \* 6 : The maximum output current capacity for the +V and -V terminals on the control circuit is 20 mA. Never short terminals +V, -V, and AC, as this can cause erroneous operation or damage the drive.
- \* 7 : Set DIP switch S1 to select between a voltage or current input signal to terminal A2. The default setting is for current input.
- \* 8 : Enable the termination resistor in the last drive in a MEMOBUS/Modbus network by setting DIP switch S2 to the ON position.
- \* 9 : Monitor outputs work with devices such as analog frequency meters, ammeters, voltmeters, and wattmeters. Do not use these outputs in a feedback loop.
- \* 10 : The sink/source setting for the Safe Disable input is the same as with the sequence input. Jumper S3 has the drive set for an external power supply.  
When not using the Safe Disable input feature, remove the jumper shorting the input and connect an external power supply.
- \* 11 : Disconnect the wire jumper between H1 - HC and H2 - HC when utilizing the Safe Disable input.
- \* 12 : Models CIMR-U...E...W... have EMC filter switches.



## Terminal Functions

### Main Circuit Terminals

Max. Applicable Motor Capacity indicates Heavy Duty

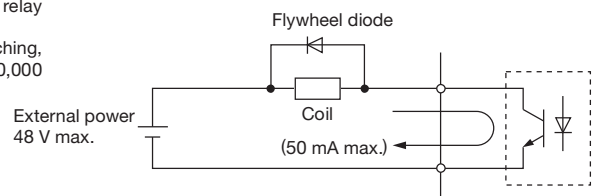
Voltage	200 V	400 V
Model CIMR-UA	2A0028 to 2A0248	4A0011 to 4A0930
R/L1, S/L2, T/L3	Main circuit input power supply	
U/T1, V/T2, W/T3	Drive output	
p1, n1	Momentary power loss recovery unit input	
⊕	Ground terminal (100 Ω or less)	Ground terminal (10 Ω or less)

### Control Circuit Input Terminals (200 V/400 V Class)

Terminal Type	Terminal	Signal Function	Description	Signal Level
Multi-Function Digital Input	S1	Multi-function input selection 1	Closed: Forward run (default) Open: Stop (default)	Photocoupler 24 Vdc, 8 mA
	S2	Multi-function input selection 2	Closed: Reverse run (default) Open: Stop (default)	
	S3	Multi-function input selection 3	External fault, N.O. (default)	
	S4	Multi-function input selection 4	Fault reset (default)	
	S5	Multi-function input selection 5	Multi-step speed reference 1 (default)	
	S6	Multi-function input selection 6	Multi-step speed reference 2 (default)	
	S7	Multi-function input selection 7	Jog frequency (default)	
	S8	Multi-function input selection 8	Closed: External baseblock	
	SC	Multi-function input selection common	Multi-function input selection common	
Main Frequency Reference Input	RP	Multi-function pulse train input	Frequency reference (default) (H6-01 = 0)	0 to 32 kHz (3 kΩ)
	+V	Setting power supply	+10.5 V power supply for analog reference (20 mA max.)	
	-V	Setting power supply	-10.5 V power supply for analog reference (20 mA max.)	
	A1	Multi-function analog input 1	-10 to +10 Vdc for -100 to +100%, 0 to 10 Vdc for 0 to 100% (impedance 20 kΩ), Main frequency reference (default)	
	A2	Multi-function analog input 2	DIP switch S1 sets the terminal for a voltage or current input signal -10 to +10 Vdc for -100 to +100%, 0 to 10 Vdc for 0 to 100% (impedance 20 kΩ) 4 to 20 mA for 0 to 100%, 0 to 20 mA for 0 to 100% (impedance 250 Ω) Added to the reference value of the analog frequency for the main frequency reference (default)	
	A3	Multi-function analog input 3	-10 to +10 Vdc for -100 to +100%, 0 to 10 Vdc for 0 to 100% (impedance 20 kΩ) Auxiliary frequency reference (default)	
	AC	Frequency reference common	0 V	
	E(G)	Connection to wire shielding and option card ground wire	-	
Multi-Function Photocoupler Output	P1	Multi-function photocoupler output (1)	Zero speed (default)	48 Vdc or less, 2 to 50 mA Photocoupler output*1
	P2	Multi-function photocoupler output (2)	Speed agree (default)	
	PC	Photocoupler output common	-	
Fault Relay Output	MA	N.O. output	Closed: Fault	Relay output 250 Vac or less, 10 mA to 1 A, 30 Vdc or less, 10 mA to 1 A Minimum load: 5 Vdc, 10 mA
	MB	N.C. output	Open: Fault	
	MC	Digital output common	-	
Multi-Function Digital Output*2	M1	Multi-function digital output	During run (default)	Minimum load: 5 Vdc, 10 mA
	M2		Closed: During run	
Monitor Output	MP	Pulse train input	Output frequency (default) (H6-06 = 102)	0 to 32 kHz (2.2 kΩ)
	FM	Multi-function analog monitor (1)	Output frequency (default)	0 to 10 Vdc for 0 to 100%
	AM	Multi-function analog monitor (2)	Output current (default)	-10 to +10 Vdc for -100 to +100%
	AC	Analog common	0 V	Resolution: 1/1000
Safety Input	H1	Safety input 1	24 Vdc 8 mA. One or both open: Output disabled. Both closed: Normal operation. Internal impedance 3.3 kΩ, switching time at least 1 ms.	
	H2	Safety input 2		
	HC	Safety input common	Safety input common	
Safety Monitor Output	DM+	Safety monitor output	Outputs status of Safe Disable function.	48 Vdc or less, 50 mA or less
	DM-	Safety monitor output common	Closed when both Safe Disable channels are closed.	

\*1 : Connect a flywheel diode as shown below when driving a reactive load such as a relay coil. Diode must be rated higher than the circuit voltage.

\*2 : Refrain from assigning functions to terminals M1 and M2 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).



### Serial Communication Terminals (200 V/400 V Class)

Classification	Terminal	Signal Function	Description	Signal Level
RS-485/RS-422 Communication	R+	Communications input (+)	MEMOBUS/Modbus communications: Use a RS-485 or RS-422 cable to connect the drive.	RS-422/RS-485 MEMOBUS/Modbus communications protocol 115.2 kbps (max.)
	R-	Communications input (-)		
	S+	Communications output (+)		
	S-	Communications output (-)		
	IG	Shield ground		