

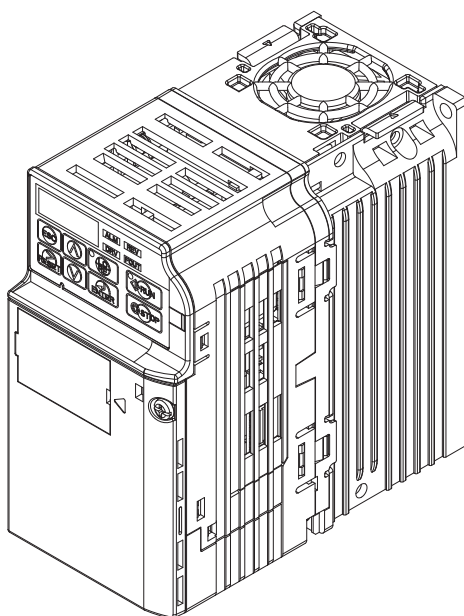
## YASKAWA AC Drive-J1000

### Compact V/f Control Drive

## Technical Manual

Type: CIMR-JU

Models: 200 V Class, Three-Phase Input: 0.1 to 5.5 kW  
200 V Class, Single-Phase Input: 0.1 to 2.2 kW  
400 V Class, Three-Phase Input: 0.2 to 5.5 kW



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## 1.2 Model Number and Nameplate Check

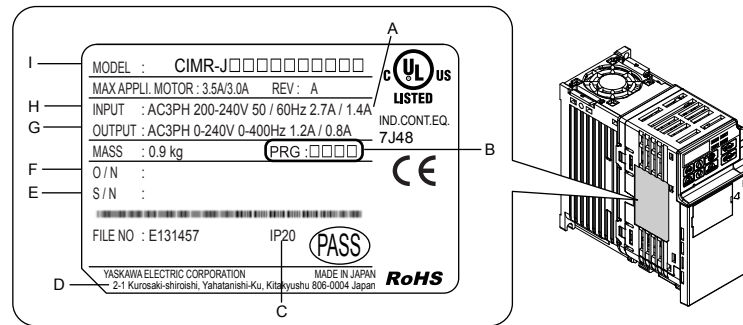
Please perform the following tasks after receiving the drive:

- Inspect the drive for damage.

If the drive appears damaged upon receipt, contact the shipper immediately.

- Verify receipt of the correct model by checking the information on the nameplate.
- If you have received the wrong model or the drive does not function properly, contact your supplier.

### ◆ Nameplate



**A – Normal Duty Amps / Heavy Duty Amps**

**B – Software version**

**C – Enclosure type**

**D – Address <1>**

**E – Serial number**

**F – Lot number**

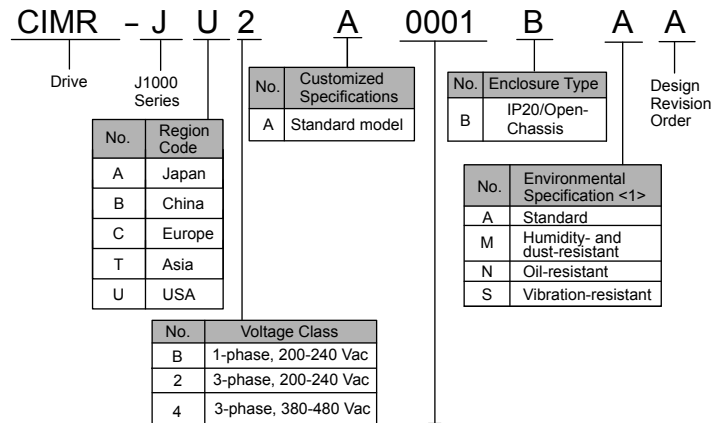
**G – Output specifications**

**H – Input specifications**

**I – AC drive model**

Figure 1.1 Nameplate Information Example

<1> The address of the head office of Yaskawa Electric Corporation (responsible for product liability) is shown on the nameplate.



Refer to the tables below.

### ■ Single-Phase 200 V

| Normal Duty |                        |                        | Heavy Duty |                        |                        |
|-------------|------------------------|------------------------|------------|------------------------|------------------------|
| No.         | Max. Motor Capacity kW | Rated Output Current A | No.        | Max. Motor Capacity kW | Rated Output Current A |
| 0001        | 0.2                    | 1.2                    | 0001       | 0.1                    | 0.8                    |
| 0002        | 0.4                    | 1.9                    | 0002       | 0.2                    | 1.6                    |
| 0003        | 0.75                   | 3.3                    | 0003       | 0.4                    | 3.0                    |
| 0006        | 1.1                    | 6.0                    | 0006       | 0.75                   | 5.0                    |
| 0010        | 2.2                    | 9.6                    | 0010       | 1.5                    | 8.0                    |

## 1.2 Model Number and Nameplate Check

### ■ Three-Phase 200 V

| Normal Duty |                          |                           | Heavy Duty |                          |                           |
|-------------|--------------------------|---------------------------|------------|--------------------------|---------------------------|
| No.         | Max Motor Capacity<br>kW | Rated Output<br>Current A | No.        | Max Motor Capacity<br>kW | Rated Output<br>Current A |
| 0001        | 0.2                      | 1.2                       | 0001       | 0.1                      | 0.8                       |
| 0002        | 0.4                      | 1.9                       | 0002       | 0.2                      | 1.6                       |
| 0004        | 0.75                     | 3.5                       | 0004       | 0.4                      | 3.5                       |
| 0006        | 1.1                      | 6.0                       | 0006       | 0.75                     | 6.0                       |
| 0010        | 2.2                      | 9.6                       | 0010       | 1.5                      | 9.6                       |
| 0012        | 3.0                      | 12.0                      | 0012       | 2.2                      | 12.0                      |
| 0020        | 5.5                      | 19.6                      | 0020       | 3.7                      | 17.5                      |

### ■ Three-Phase 400 V

| Normal Duty |                           |                           | Heavy Duty |                           |                           |
|-------------|---------------------------|---------------------------|------------|---------------------------|---------------------------|
| No.         | Max. Motor Capacity<br>kW | Rated Output<br>Current A | No.        | Max. Motor Capacity<br>kW | Rated Output<br>Current A |
| 0001        | 0.4                       | 1.2                       | 0001       | 0.2                       | 1.2                       |
| 0002        | 0.75                      | 2.1                       | 0002       | 0.4                       | 1.8                       |
| 0004        | 1.5                       | 4.1                       | 0004       | 0.75                      | 3.4                       |
| 0005        | 2.2                       | 5.4                       | 0005       | 1.5                       | 4.8                       |
| 0007        | 3.0                       | 6.9                       | 0007       | 2.2                       | 5.5                       |
| 0009        | 3.7                       | 8.8                       | 0009       | 3.0                       | 7.2                       |
| 0011        | 5.5                       | 11.1                      | 0011       | 3.7                       | 9.2                       |

## 1.3 Component Names

This section illustrates drive components in the IP20/Open-Chassis models.

*Refer to NEMA Type 1 Kit on page 174* for information on using the NEMA Type 1 Kit option to create a NEMA Type 1 rating.

### ◆ IP20/Open-Chassis

- Single-Phase AC 200 V BA0001B to BA0003B
- Three-Phase AC 200 V 2A0001B to 2A0006B

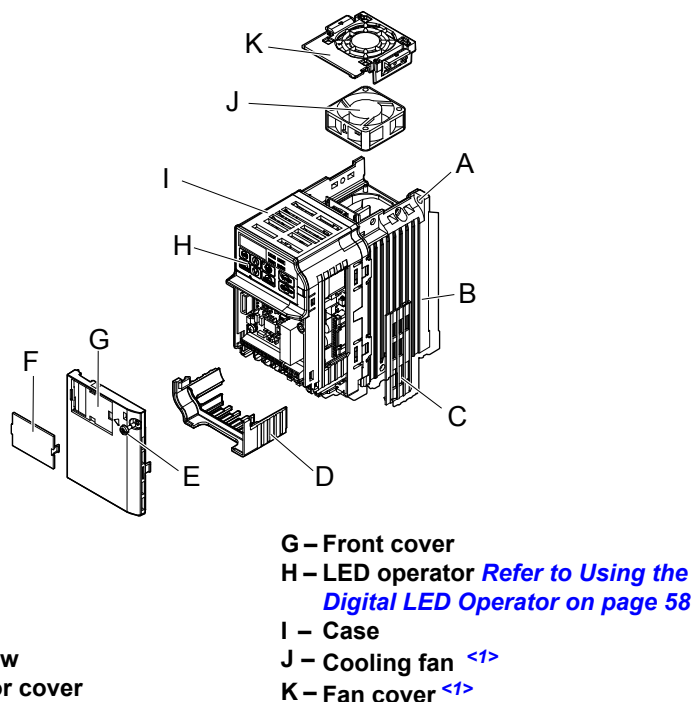


Figure 1.2 Exploded View of IP20/Open-Chassis Type Components  
(Model 2A0006B)

<1> Models BA0001B to BA0003B and 2A0001B to 2A0004B do not have a cooling fan or a cooling fan cover.

## A.4 Drive Specifications

**Note:** For optimum performance life of the drive, install the drive in an environment that meets the environmental conditions.

| Item                    |                                         | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control Characteristics | Control Method                          | V/f Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                         | Frequency Control Range                 | 0.01 to 400 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                         | Frequency Accuracy                      | Digital input: within $\pm 0.01\%$ of the max output frequency ( $-10$ to $+50$ °C)<br>Analog input: within $\pm 0.5\%$ of the max output frequency ( $25$ °C $\pm 10$ °C)                                                                                                                                                                                                                                                                                                                                                                                      |
|                         | Frequency Setting Resolution            | Digital inputs: 0.01 Hz<br>Analog inputs: 1/1000 of maximum output frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                         | Output Frequency Calculation Resolution | $1/2^{20}$ x Maximum output frequency (E1-04)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                         | Frequency Setting Signal                | Main frequency reference: 0 to +10 Vdc (20 k $\Omega$ ), 4 to 20 mA (250 $\Omega$ ), 0 to 20 mA (250 $\Omega$ )                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                         | Starting Torque                         | 150%/3 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                         | Speed Control Range                     | 1: 20~40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                         | Accel/Decel Time                        | 0.00 to 6000.0 s (allows four separate settings for accel and decel)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                         | Braking Torque                          | Instantaneous Average Decel Torque $\angle \triangleright$ : 0.1/0.2 kW: over 150%, 0.4/0.75 kW: over 100%, 1.5 kW: over 50%, 2.2 kW and above: over 20%<br>Continuous Regen Torque: 20%, 125% with a Braking Resistor Unit $\angle \triangleright$ : (10% ED) 10 s with an internal braking resistor.                                                                                                                                                                                                                                                          |
|                         | V/f Characteristics                     | User-set, programmable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Protection Functions    | Functions                               | <ul style="list-style-type: none"> <li>• Momentary Power Loss Ride-Thru</li> <li>• Speed Search</li> <li>• Multi-Step Speed (9 steps max)</li> <li>• Accel/Decel Time Switch</li> <li>• S-Curve Accel/Decel</li> <li>• 2-Wire/3-Wire Sequence</li> <li>• Cooling Fan ON/OFF</li> <li>• Slip Compensation</li> <li>• Torque Compensation</li> <li>• Jump Frequencies (reference dead band)</li> <li>• Frequency Reference Upper/Lower Limit</li> <li>• DC Injection Braking (start and stop)</li> <li>• Overexcitation Braking</li> <li>• Fault Reset</li> </ul> |
|                         | Motor Protection                        | Motor overheat protection via output current sensor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                         | Overcurrent Protection                  | Drives stops when output exceeds 200% of the rated current (Heavy Duty)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                         | Overload Protection                     | A stop command will be entered after operating at 150% for 60 s (Heavy Duty) $\angle \triangleright$                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                         | Overvoltage Specification               | 200 V class: Stops when DC bus voltage exceeds approximately 410 V<br>400 V class: Stops when DC bus voltage exceeds approximately 820 V                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                         | Low Voltage Protection                  | Drive stops when DC bus voltage falls below the levels indicated:<br>190 V (3-phase 200 V), 160 V (single-phase 200 V), 380 V (3-phase 400 V), 350 V (3-phase 380 V)                                                                                                                                                                                                                                                                                                                                                                                            |
|                         | Momentary Power Loss Ride-Thru          | Stops after 15 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                         | Heatsink Overheat Protection            | Protected by thermistor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                         | Braking Resistor Overheat Protection    | Overheat input signal for braking resistor (Optional ERF-type, 3% ED)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                         | Stall Prevention                        | During acceleration and during run: Separate settings for each type of stall prevention determine the current level at which stall prevention is triggered.<br>During deceleration: Select, enable/disable.                                                                                                                                                                                                                                                                                                                                                     |
|                         | Cooling Fan Failure Protection          | Circuit protection ("fan-lock" sensor)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                         | Ground Fault Protection                 | Electronic circuit protection $\angle \triangleright$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                         | DC Bus Charge LED                       | Remains lit until DC bus voltage falls below 50 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## A.4 Drive Specifications

| Item                 |                           | Specification                                                                                                                                                                                                                                                                                                                                        |
|----------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environment          | Storage/Installation Area | Indoors                                                                                                                                                                                                                                                                                                                                              |
|                      | Ambient Temperature       | IP20/NEMA Type 1 enclosure: -10 °C to +40 °C (14 °F to 104 °F)<br>IP20/IP00 Open-Chassis enclosure: -10 °C to +50 °C (14 °F to 122 °F)<br>Finless Type: IP20 enclosure: -10 °C to +50 °C (14 °F to 122 °F)                                                                                                                                           |
|                      | Humidity                  | 95% RH or less with no condensation                                                                                                                                                                                                                                                                                                                  |
|                      | Storage Temperature       | -20 to +60 °C (-4 to +140 °F) allowed for short-term transport of the product                                                                                                                                                                                                                                                                        |
|                      | Altitude                  | Up to 1000 meters without derating; up to 3000 meters with output current and voltage derating. <a href="#">Refer to Altitude Derating on page 188</a> for details.                                                                                                                                                                                  |
|                      | Shock, Impact             | 10 to 20 Hz: 9.8 m/s <sup>2</sup><br>20 to 55 Hz: 5.9 m/s <sup>2</sup>                                                                                                                                                                                                                                                                               |
|                      | Surrounding Area          | Install the drive in an area free from: <ul style="list-style-type: none"> <li>oil mist and dust</li> <li>metal shavings, oil, water or other foreign materials</li> <li>radioactive materials</li> <li>combustible materials</li> <li>harmful gases and liquids</li> <li>excessive vibration</li> <li>chlorides</li> <li>direct sunlight</li> </ul> |
|                      | Orientation               | Install the drive vertically to maintain maximum cooling effects                                                                                                                                                                                                                                                                                     |
| Standards            |                           | <ul style="list-style-type: none"> <li>UL508C</li> <li>EN 61800-3:2004/A1:2012, IEC/EN 61800-5-1</li> </ul>                                                                                                                                                                                                                                          |
| Protective Enclosure |                           | IP20/Open-Chassis<br>IP20/NEMA Type 1 <sup>&lt;5&gt;</sup>                                                                                                                                                                                                                                                                                           |
| Cooling Method       |                           | BA0001 to BA0006: self-cooled<br>BA0010: cooling fan<br>2A0001 to 2A0004: self-cooled<br>2A0006 to 2A0020: cooling fan<br>4A0001 to 4A0004: self-cooled<br>4A0005 to 4A0011: cooling fan                                                                                                                                                             |

- <1> Instantaneous average deceleration torque refers to the torque required to decelerate the motor (uncoupled from the load) from the rated motor speed down to zero in the shortest time.
- <2> Ensure that Stall Prevention Selection during Deceleration is disabled (L3-04 = 0) or set to 3 when using a braking resistor or the Braking Resistor Unit. The default setting for the stall prevention function will interfere with the braking resistor.
- <3> Overload protection may be triggered when operating with 150% of the rated output current if the output frequency is less than 6 Hz.
- <4> Ground protection cannot be provided under the following circumstances when a ground fault is likely in the motor windings during run: Low ground resistance for the motor cable and terminal block; low ground resistance for the motor cable and terminal block; or the drive is powered up from a ground short.
- <5> All models have an IP20/Open-Chassis enclosure as standard. Use the NEMA Type 1 Kit option to convert drives to an IP20/NEMA Type 1 enclosure rating.