

# JX

Compact and complete

Model: 3G3JX

200 V Class Three-Phase Input 0.2 to 7.5 kW

200 V Class Single-Phase Input 0.2 to 2.2 kW

400 V Class Three-Phase Input 0.4 to 7.5 kW

## QUICK START GUIDE



OMRON

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The following conventions are used to indicate and classify precautions in this manual. Always heed the information provided with them. Failure to heed precautions can result in injury to people or damage to property.

## ***OMRON Product References***

All OMRON products are capitalized in this manual. The word “Unit” is also capitalized when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product.

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# JX Quick Start Guide

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# JX Quick Start Guide

## 1 SPECIFICATIONS

### 1.1 Upon receipt

Please perform the following task after receiving the drive:

- Inspect the driver for damage. If the drive appear damage upon receipt, contact your supplier.
- Verify the receipt of the correct model by checking the information on the nameplate. If you have received the wrong model contact your supplier.
- Refer to the User's Manual for detailed information about the product and functions.

### Basic specifications and optional EMC filter

| Voltage   | Type   | Max Motor (KW) | Rated output current (A) | EMC filter    |
|-----------|--------|----------------|--------------------------|---------------|
|           | 3G3JX- |                |                          |               |
| 1 x 200 V | AB002  | 0.2            | 1.4                      | AX-FIJ1006-RE |
|           | AB004  | 0.4            | 2.6                      |               |
|           | AB007  | 0.75           | 4.0                      |               |
|           | AB015  | 1.5            | 7.1                      | AX-FIJ1026-RE |
|           | AB022  | 2.2            | 10.0                     |               |
| 3 x 200 V | A2002  | 0.2            | 1.4                      | AX-FIJ2006-RE |
|           | A2004  | 0.4            | 2.6                      |               |
|           | A2007  | 0.75           | 4.0                      |               |
|           | A2015  | 1.5            | 7.1                      | AX-FIJ2020-RE |
|           | A2022  | 2.2            | 10.0                     |               |
|           | A2037  | 3.7            | 15.9                     |               |
|           | A2055  | 5.5            | 24.0                     | AX-FIJ2040-RE |
|           | A2075  | 7.5            | 32.0                     |               |
| 3 x 400 V | A4004  | 0.4            | 1.5                      | AX-FIJ3005-RE |
|           | A4007  | 0.75           | 2.5                      |               |
|           | A4015  | 1.5            | 3.8                      |               |
|           | A4022  | 2.2            | 5.5                      | AX-FIJ3011-RE |
|           | A4040  | 4.0            | 8.6                      |               |
|           | A4055  | 5.5            | 13.0                     | AX-FIJ3020-RE |
|           | A4075  | 7.5            | 16.0                     |               |

### 1.2 Power ratings

| Single-phase 200 V: 3G3JX- |                                                     |       | AB002                                                                   | AB004 | AB007 | AB015                                    | AB022              | -     | -           | -     |
|----------------------------|-----------------------------------------------------|-------|-------------------------------------------------------------------------|-------|-------|------------------------------------------|--------------------|-------|-------------|-------|
| Three-phase 200 V: 3G3JX-  |                                                     |       | A2002                                                                   | A2004 | A2007 | A2015                                    | A2022              | A2037 | A2055       | A2075 |
| Motor (kW)                 | Applicable motor capacity                           |       | 0.2                                                                     | 0.4   | 0.75  | 1.5                                      | 2.2                | 3.7   | 5.5         | 7.5   |
| Output characteristics     | Inverter capacity (KVA)                             | 200 V | 0.4                                                                     | 0.9   | 1.3   | 2.4                                      | 3.4                | 5.5   | 8.3         | 11.0  |
|                            |                                                     | 240 V | 0.5                                                                     | 1.0   | 1.6   | 2.9                                      | 4.1                | 6.6   | 9.9         | 13.3  |
|                            | Rated output current (A)                            |       | 1.4                                                                     | 2.6   | 4.0   | 7.1                                      | 10.0               | 15.9  | 24.0        | 32.0  |
|                            | Max. output voltage                                 |       | Proportional to input voltage: 0 to 240 V                               |       |       |                                          |                    |       |             |       |
|                            | Max. output frequency                               |       | 400 Hz                                                                  |       |       |                                          |                    |       |             |       |
| Power supply               | Rated input voltage and frequency                   |       | Single-phase 200 to 240 V 50/60 Hz<br>Three-phase 200 to 240 V 50/60 Hz |       |       |                                          |                    |       |             |       |
|                            | Rated input current (A) single-phase 200 V          |       | 3.1                                                                     | 5.8   | 9.0   | 16.0                                     | 22.5               | -     | -           | -     |
|                            | Rated input current (A) three-phase 200 V           |       | 1.8                                                                     | 3.4   | 5.2   | 9.3                                      | 13.0               | 20.0  | 30.0        | 40.0  |
|                            | Allowable voltage fluctuation                       |       | -15% to +10%                                                            |       |       |                                          |                    |       |             |       |
|                            | Allowable frequency fluctuation                     |       | +5%                                                                     |       |       |                                          |                    |       |             |       |
| Built-in filter            |                                                     |       | EMC filter (C1 single phase)                                            |       |       |                                          |                    |       |             |       |
| Braking torque             | At short-time deceleration<br>At capacitor feedback |       | Approx. 50%                                                             |       |       | 50% for 3-phase<br>20 to 40% for 1-phase | Approx. 20% to 40% |       | Approx. 20% |       |
| Cooling method             |                                                     |       | Self cooling                                                            |       |       | Forced-air-cooling                       |                    |       |             |       |

## SPECIFICATIONS

| Three-phase 400 V: 3G3JX- |                                   |       | A4004                                     | A4007 | A4015              | A4022 | A4040 | A4055       | A4075 |
|---------------------------|-----------------------------------|-------|-------------------------------------------|-------|--------------------|-------|-------|-------------|-------|
| Motor (kW)                | Applicable motor capacity         |       | 0.4                                       | 0.75  | 1.5                | 2.2   | 4.0   | 5.5         | 7.5   |
| Output characteristics    | Inverter capacity (KVA)           | 380 V | 0.9                                       | 1.6   | 2.5                | 3.6   | 5.6   | 8.5         | 10.5  |
|                           |                                   | 480 V | 1.2                                       | 2.0   | 3.1                | 4.5   | 7.1   | 10.8        | 13.3  |
|                           | Rated output current (A)          |       | 1.5                                       | 2.5   | 3.8                | 5.5   | 8.6   | 13.0        | 16.0  |
|                           | Max. output voltage               |       | Proportional to input voltage: 0 to 480 V |       |                    |       |       |             |       |
|                           | Max. output frequency             |       | 400 Hz                                    |       |                    |       |       |             |       |
| Power supply              | Rated input voltage and frequency |       | 3-phase 380 to 480 V 50/60 Hz             |       |                    |       |       |             |       |
|                           | Rated input current (A)           |       | 2.0                                       | 3.3   | 5.0                | 7.0   | 11.0  | 16.5        | 20.0  |
|                           | Allowable voltage fluctuation     |       | -15% to +10%                              |       |                    |       |       |             |       |
|                           | Allowable frequency fluctuation   |       | +5%                                       |       |                    |       |       |             |       |
| Built-in filter           |                                   |       | EMC filter C2 class                       |       |                    |       |       |             |       |
| Braking torque            | At short-time deceleration        |       | Approx. 50%                               |       | Approx. 20% to 40% |       |       | Approx. 20% |       |
|                           | At capacitor feedback             |       |                                           |       |                    |       |       |             |       |
| Cooling method            |                                   |       | Self cooling                              |       | Forced-air-cooling |       |       |             |       |

## 1.3 Technical specifications

| Model number 3G3JX-  |                                   | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control functions    | Control methods                   | Phase-to-phase sinusoidal modulation PWM (V/F)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                      | Output frequency range            | 0.5 to 400 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                      | Frequency precision               | Digital set value: $\pm 0.01\%$ of the max. frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                      |                                   | Analogue set value: $\pm 0.4\%$ of the max. frequency (25 $\pm 10$ °C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                      | Resolution of frequency set value | Digital set value: 0.1 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                      |                                   | Analogue set value: 1/1000 of maximum frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                      | Resolution of output frequency    | 0.1Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                      | Overload capability               | 150% rated output current for one minute                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Functionality        | Frequency set value               | 0 to 10 VDC (10 k $\Omega$ ), 4 to 20 mA (250 $\Omega$ ), frequency setting volume (selectable), RS485 Modbus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                      | V/f characteristics               | Constant/reduced torque                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                      | Input signals                     | FW (forward), RW (reverse), CF1 to CF4 (multi-step speed), JG (jogging), DB (external DC injection braking), SET (2nd function), 2CH (2-step acceleration/deceleration), FRS (free run), EXT (external trip), USP (USP function), SFT (soft lock), AT (analog current input function selection), RS (reset), PTC (thermistor input), STA (3-wire startup), STP (3-wire stop), F/R (3-wire forward/reverse), PID (PID selection), PIDC (PID integral reset), UP (UP of UP/DWN function), DWN (DWN of UP/DWN function), UDC (data clear of UP/DWN function), OPE (forced OPE mode), ADD (frequency addition), F-TM (forced terminal block), RDY (operation ready), SP-SET (special setting), EMR (emergency shutoff) |
|                      |                                   | RUN (signal during operation), FA1 (frequency arrival signal 1), FA2 (frequency arrival signal 2), OL (overload warning signal), OD (PID excess deviation signal), AL (alarm signal), DC (analog input disconnection detection signal), FBV (PID FB status output), NDc (network error), LOG (logical operation result), ODc (communication option disconnected), LOC (light load signal)                                                                                                                                                                                                                                                                                                                          |
|                      | Standard functions                | AVR function, V/F characteristics selection, upper/lower limit, 16-step speeds, starting frequency adjustment, jogging operation, carrier frequency adjustment, PID control, frequency jump, analog gain/bias adjustment, S-shape acceleration/deceleration, electronic thermal characteristics/level adjustment, retry function, simplified torque boost, trip monitor, soft lock function, frequency conversion display, USP function, 2nd control function, motor rotation speed UP/DWN, overcurrent suppression function.                                                                                                                                                                                      |
|                      | Analogue inputs                   | 2 analogue inputs 0 to 10 V (20 k $\Omega$ ), 4 to 20 mA (250 $\Omega$ )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                      | Accel/Decel times                 | 0.01 to 3600.0 s (line/curve selection), 2nd accel/decel setting available                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                      | Display                           | Status indicator LED's Run, Program, Power, Alarm, Hz, Amps, Volume Led indicator<br>Digital operator: Available to monitor frequency reference, output current, output frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Protection functions | Motor overload protection         | Electronic Thermal overload relay and PTC thermistor input                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                      | Instantaneous overcurrent         | 180% of rated current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                      | Overload                          | 150% for 1 minute                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                      | Overvoltage                       | 790 V for 400 V type and 395 V for 200 V type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                      | Momentary power loss              | Following items are selectable: alarm, 0 Hz start, frequency output at interruption, maximum frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                      | Cooling fin overheat              | Temperature monitor and error detection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                      | Stall prevention level            | Selectable level applicable only at constant speed or during acceleration and constant speed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                      | Ground fault                      | Detected at power-on                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Ambient conditions   | Power charge indication           | On when power is supplied to the control part                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                      | Degree of protection              | IP20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                      | Ambient humidity                  | 90% RH or less (without condensation)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                      | Storage temperature               | -20°C to +65°C (short-term temperature during transportation)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                      | Ambient temperature               | -10°C to 50°C (both the carrier frequency and output current need to be reduced at over 40°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                      | Installation                      | Indoor (no corrosive gas, dust, etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                      | Installation height               | Max. 1000 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                      | Vibration                         | 5.9 m/s <sup>2</sup> (0.6 G), 10 to 55 Hz (complies with the test method specified in JIS C0040 (1999).)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## 2 INSTALLATION

### 2.1 Wiring sizes and protection

| Motor output (kW) | Inverter model 3G3JX- | Wiring                         | Applicable device           |                                 |
|-------------------|-----------------------|--------------------------------|-----------------------------|---------------------------------|
|                   |                       | Power cable (mm <sup>2</sup> ) | Earth leakage breaker (ELB) | Fuse size (class J) Rated 600 V |
| 0.2               | A2002                 | 1.25                           | 5 A                         | 10 A                            |
| 0.4               | A2004                 | 1.25                           | 5 A                         | 10 A                            |
|                   | A4004                 |                                |                             | 3 A                             |
| 0.75              | A2007                 | 2.0                            | 10 A                        | 15 A                            |
|                   | A4007                 | 1.25                           | 5 A                         | 6 A                             |
| 1.5               | A2015                 | 2.0                            | 15 A                        | 15 A                            |
|                   | A4015                 | 2.0                            | 10 A                        | 10 A                            |
| 2.2               | A2022                 | 2.0                            | 20 A                        | 20 A                            |
|                   | A4022                 | 2.0                            | 10 A                        | 10 A                            |
| 3.7               | A2037                 | 3.5                            | 30 A                        | 30 A                            |
|                   | A4040                 | 2.0                            | 15 A                        | 15 A                            |
| 5.5               | A2055                 | 5.5                            | 50 A                        | 40 A                            |
|                   | A4055                 | 3.5                            | 30 A                        | 20 A                            |
| 7.5               | A2075                 | 8.0                            | 60 A                        | 50 A                            |
|                   | A4075                 | 3.5                            | 30 A                        | 25 A                            |
| 0.2               | AB002                 | 2.0                            | 5 A                         | 14 A                            |
| 0.4               | AB004                 | 2.0                            | 5 A                         | —                               |
| 0.75              | AB007                 | 2.0                            | 10 A                        | —                               |
| 1.5               | AB015                 | 5.5                            | 15 A                        | —                               |
| 2.2               | AB022                 | 5.5                            | 20 A                        | —                               |

### 2.2 Installation dimensions

Figure 1

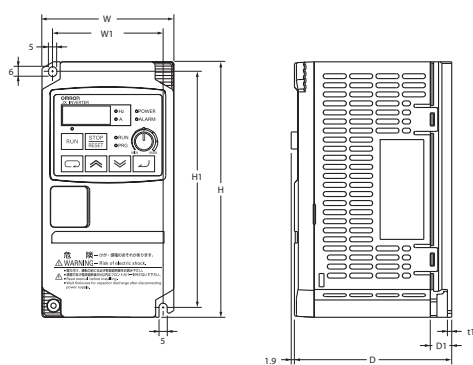
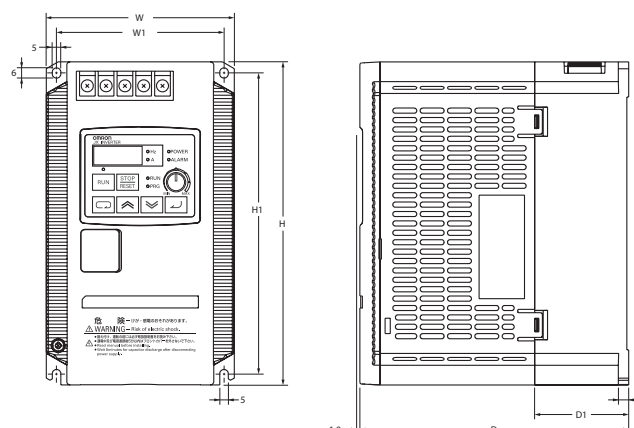


Figure 2



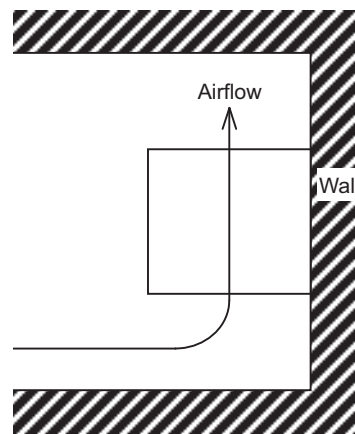
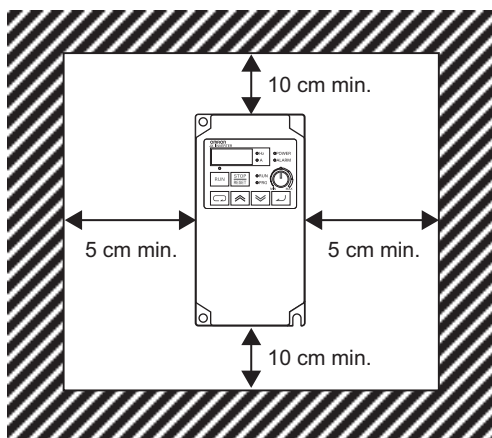
| Voltage class         | Max. applicable motor output kW | Inverter model 3G3JX- | Figure | Dimensions in mm |     |     |     |       |     |      |             |
|-----------------------|---------------------------------|-----------------------|--------|------------------|-----|-----|-----|-------|-----|------|-------------|
|                       |                                 |                       |        | W1               | H1  | W   | H   | D     | t1  | D1   | Weight (kg) |
| Single-phase<br>200 V | 0.2                             | AB002                 | 1      | 67               | 143 | 80  | 155 | 95.5  | 2.6 | 13   | 0.8         |
|                       | 0.4                             | AB004                 |        |                  |     |     |     | 109.5 |     | 27   | 0.9         |
|                       | 0.75                            | AB007                 | 2      | 98               | 176 | 110 | 189 | 130.5 | 6   | 28   | 1.5         |
|                       | 1.5                             | AB015                 |        |                  |     |     |     | 157.5 |     | 55   | 2.3         |
|                       | 2.2                             | AB022                 |        |                  |     |     |     | 157.5 |     | 55   | 2.4         |
| Three-phase<br>200 V  | 0.2                             | A2002                 | 1      | 67               | 143 | 80  | 155 | 95.5  | 2.6 | 13   | 0.8         |
|                       | 0.4                             | A2004                 |        |                  |     |     |     | 109.5 |     | 27   | 0.9         |
|                       | 0.75                            | A2007                 |        |                  |     |     |     | 132.5 |     | 50   | 1.1         |
|                       | 1.5                             | A2015                 | 2      | 98               | 176 | 110 | 189 | 157.5 | 6   | 55   | 2.2         |
|                       | 2.2                             | A2022                 |        |                  |     |     |     | 157.5 |     | 55   | 2.4         |
|                       | 3.7                             | A2037                 |        |                  |     |     |     | 157.5 |     | 55   | 2.4         |
|                       | 5.5                             | A2055                 |        |                  |     |     |     | 157.5 |     | 55   | 2.4         |
|                       | 7.5                             | A2075                 |        |                  |     |     |     | 157.5 |     | 55   | 2.4         |
|                       |                                 |                       |        | 164              | 235 | 180 | 250 | 167.5 | 1.6 | 77.5 | 4.2         |

**INSTALLATION**

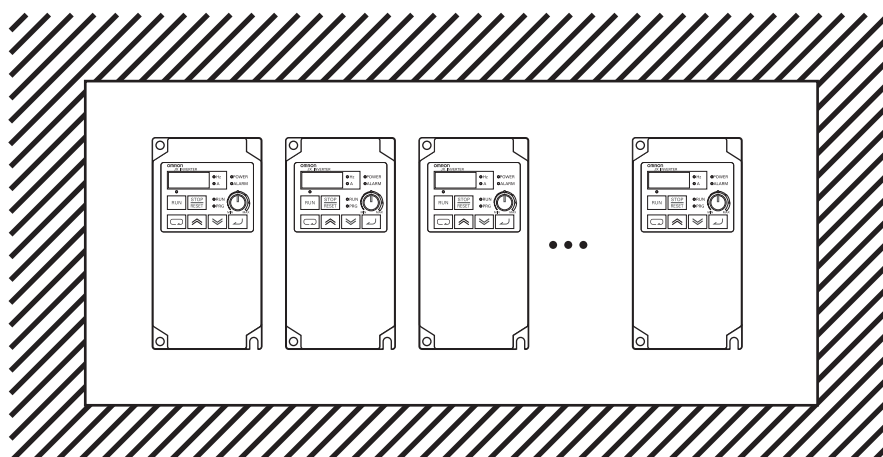
| Voltage class        | Max. applicable motor output kW | Inverter model 3G3JX- | Figure | Dimensions in mm |     |     |     |       |     |      |             |     |
|----------------------|---------------------------------|-----------------------|--------|------------------|-----|-----|-----|-------|-----|------|-------------|-----|
|                      |                                 |                       |        | W1               | H1  | W   | H   | D     | t1  | D1   | Weight (kg) |     |
| Three-phase<br>400 V | 0.4                             | A4004                 | 2      | 98               | 176 | 110 | 189 | 130.5 | 2.6 | 28   | 1.5         |     |
|                      | 0.75                            | A4007                 |        |                  |     |     |     | 157.5 | 6   | 55   | 2.3         |     |
|                      | 1.5                             | A4015                 |        |                  |     |     |     |       |     |      | 2.4         |     |
|                      | 2.2                             | A4022                 |        | 164              | 235 | 180 | 250 | 167.5 | 1.6 | 77.5 |             | 4.2 |
|                      | 4.0                             | A4040                 |        |                  |     |     |     |       |     |      |             |     |
|                      | 5.5                             | A4055                 |        |                  |     |     |     |       |     |      |             |     |
|                      | 7.5                             | A4075                 |        |                  |     |     |     |       |     |      |             |     |

### 2.3 Installation environment

- Increased ambient temperature will shorten the life of the inverter.
- Keep the inverter away from heating elements (such as a braking resistor, DC reactor, etc.). If the inverter is installed in a control panel, keep the ambient temperature within the range of the specifications, taking dimensions and ventilation into consideration.

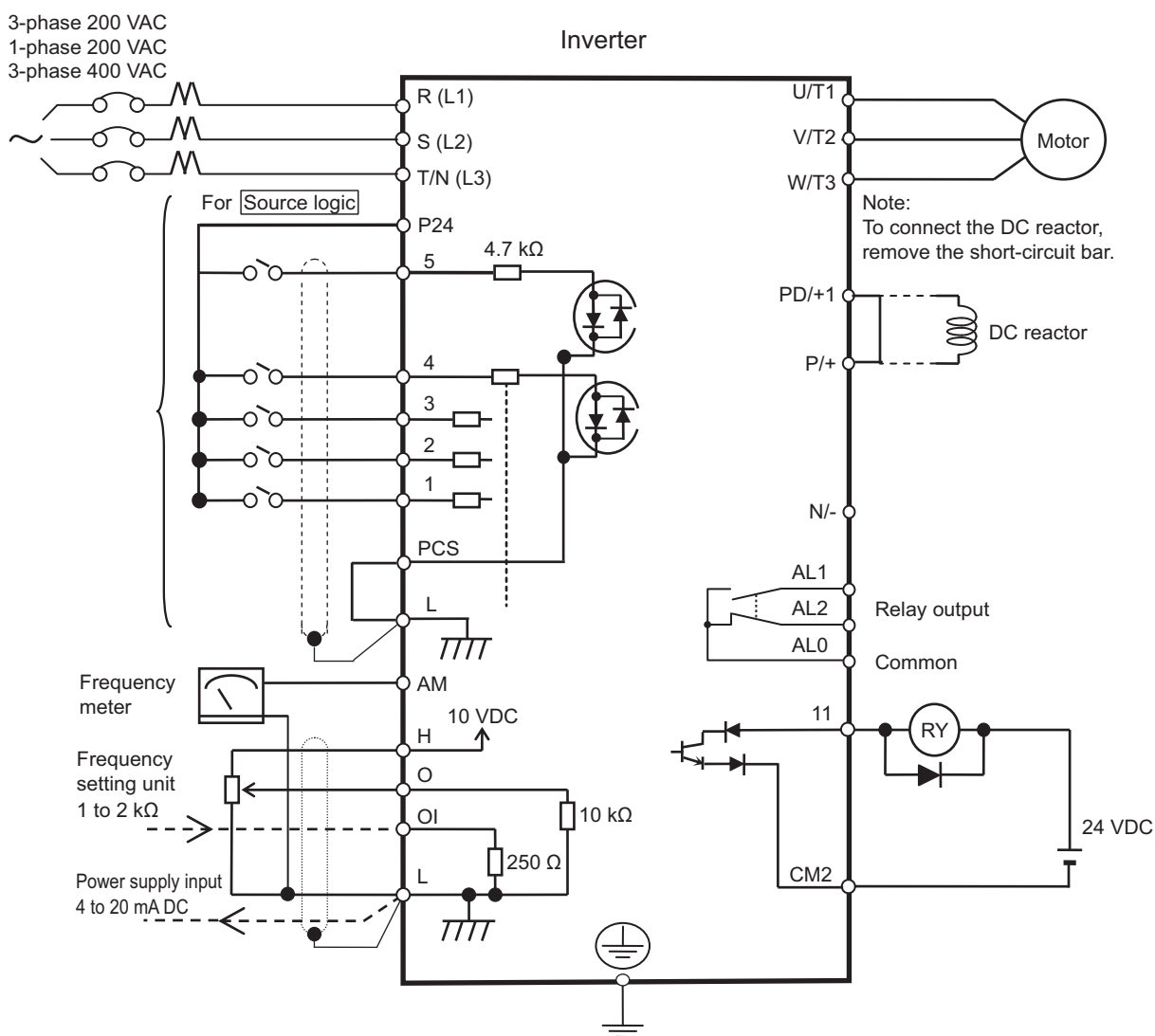


- You can install multiple 3G3JX inverters side by side in the control panel (side-by-side installation). Again, keep the ambient temperature within the specified range (40°C or below).



- If the ambient temperature is from 40°C through to 50°C, the carrier frequency should be reduced and the inverter capacity should be increased.

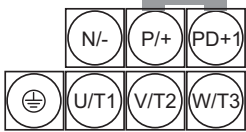
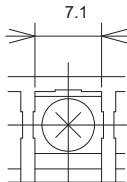
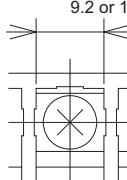
## 2.4 Wiring overview



## 2.5 Power wiring

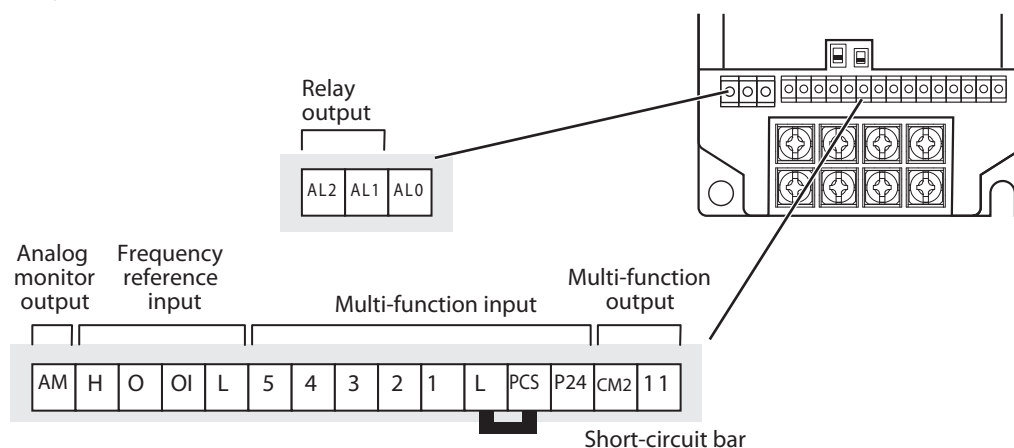
| Terminal name      | Purpose                                       | Details                                                                                                                                                                    |
|--------------------|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| R/L1, S/L2, T/N/L3 | Main circuit power supply unit                | Used to connect line power to the drive<br>Drives with single-phase 200 V input power use only terminals R/L1 and N (T/L3), terminal S/L2 is not available for these units |
| U/T1, V/T2, W/T3   | Inverter output                               | Used to connect the motor                                                                                                                                                  |
| PD/+1, P/+         | External DC reactor terminal                  | Normally connected by the short-circuit bar. Remove the short-circuit bar between +1 and P/+2 when a DC reactor is connected                                               |
| P/+, N/-           | Regenerative braking unit connection terminal | Connect optional regenerative braking units (if a braking torque is required)                                                                                              |
| ⏏                  | Grounding                                     | For grounding (grounding should conform to the local grounding code)                                                                                                       |

# INSTALLATION

| Main circuit terminal block                                                                                                                                                                                                     | Model (3G3JX-)                                                                                          | Screw size | W (mm) |                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------------|--------|------------------------------------------------------------------------------------------------------------------------|
| <p>Upper side of the body</p>  <p>Lower side of the body</p>  | <p>AB002 to AB004<br/>A2002 to A2007 *1</p>                                                             | M3.5       | 7.1    |  <p>Main Circuit Terminal Block</p> |
| <p>Upper side of the body</p>  <p>Lower side of the body</p>  | <p>A2015 to A2037<br/>A4004 to A4040<br/>AB007 to AB022 *1</p> <p>A2055 to A2075<br/>A4055 to A4075</p> | M4         | 9.2    |  <p>Main Circuit Terminal Block</p> |
|                                                                                                                                                                                                                                 |                                                                                                         | M5         | 13     |                                                                                                                        |

\*1. For 3G3JX-AB, R/L1 corresponds to L1 and T/L3 to N, terminal S/L2 is not available. Connect a single-phase 200 VAC input to terminals L1 and N.

## 2.6 Control wiring

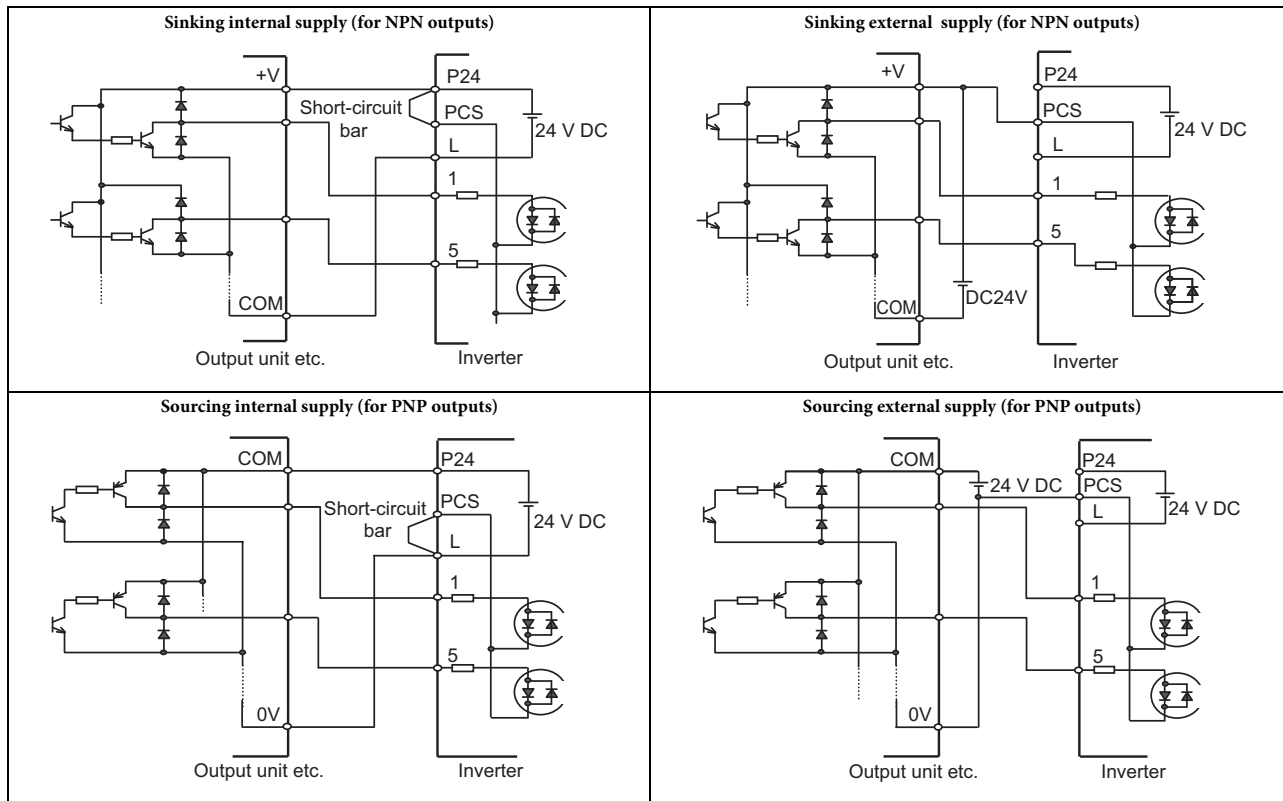


| Type                  | No. | Signal name                           | Function                                                                                                                                                             | Signal level                                                                                           |
|-----------------------|-----|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Digital input signals | PCS | Input power supply                    | External power supply terminal for input signal (input)<br>...At sink logic<br>Internal power supply output terminal for input signal (output)<br>...At source logic | 24 VDC ±10%                                                                                            |
|                       | P24 | Internal 24 VDC                       | 24 VDC internal power supply                                                                                                                                         | 24 VDC ±10%, 100 mA                                                                                    |
|                       | 1   | Multi-function input selection 1      | Factory setting: Forward/Stop                                                                                                                                        | 27 VAC max<br>ON voltage: 18 V min<br>OFF voltage: 3 V max<br>Load current: 5 mA<br>Min ON time: 12 ms |
|                       | 2   | Multi-function input selection 2      | Factory setting: Reverse/Stop                                                                                                                                        |                                                                                                        |
|                       | 3   | Multi-function input selection 3      | Factory setting: Fault reset                                                                                                                                         |                                                                                                        |
|                       | 4   | Multi-function input selection 4      | Factory setting: Emergency stop fault                                                                                                                                |                                                                                                        |
|                       | 5   | Multi-function input selection 5      | Factory setting: Multi-step speed reference 1                                                                                                                        |                                                                                                        |
|                       | L   | Multi-function input selection common | —                                                                                                                                                                    | —                                                                                                      |
| Analog input signals  | H   | Frequency reference power supply      | 10 VDC 10 mA max                                                                                                                                                     |                                                                                                        |
|                       | O   | Voltage frequency reference signal    | 0 to 10 VDC (10 kΩ)                                                                                                                                                  |                                                                                                        |
|                       | OI  | Current frequency reference signal    | 4 to 20 mA (250 Ω)                                                                                                                                                   |                                                                                                        |
|                       | L   | Frequency reference common            | —                                                                                                                                                                    | —                                                                                                      |

# INSTALLATION

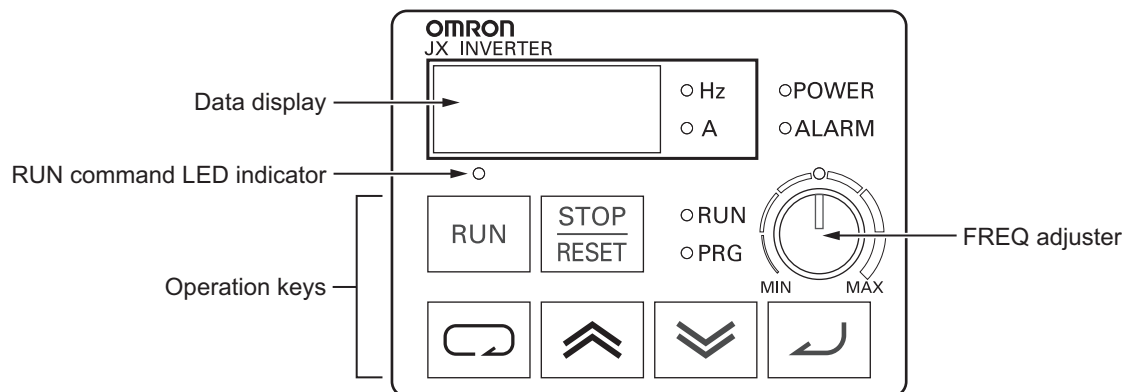
|                        |     |                                                        |                                                                                                                    |                                              |
|------------------------|-----|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Digital output signals | AL2 | NC output                                              | Factory default relay settings<br>Under normal operation: AL2-AL0 closed<br>Under abnormal operation: AL1-AL0 open | 250 VAC 2.5 A<br>30 VDC 3 A                  |
|                        | AL1 | NO output                                              |                                                                                                                    | 250 VAC 1 A<br>30 VDC 1 A<br>5 V, 100 mA min |
|                        | AL0 | Relay output common                                    |                                                                                                                    |                                              |
|                        | 11  | Multi-function output terminal                         | Factory setting: Frequency arrival signal at a constant speed                                                      | 27 VDC<br>50 mA max                          |
|                        | CM2 | Output signal common                                   | –                                                                                                                  |                                              |
| Monitor signal         | AM  | Analog frequency monitor/Analog output current monitor | Factory setting: Analog frequency monitor                                                                          | 0 to 10 VDC, 1 mA                            |

## 2.7 Digital inputs SINK/SOURCE (NPN/PNP) settings



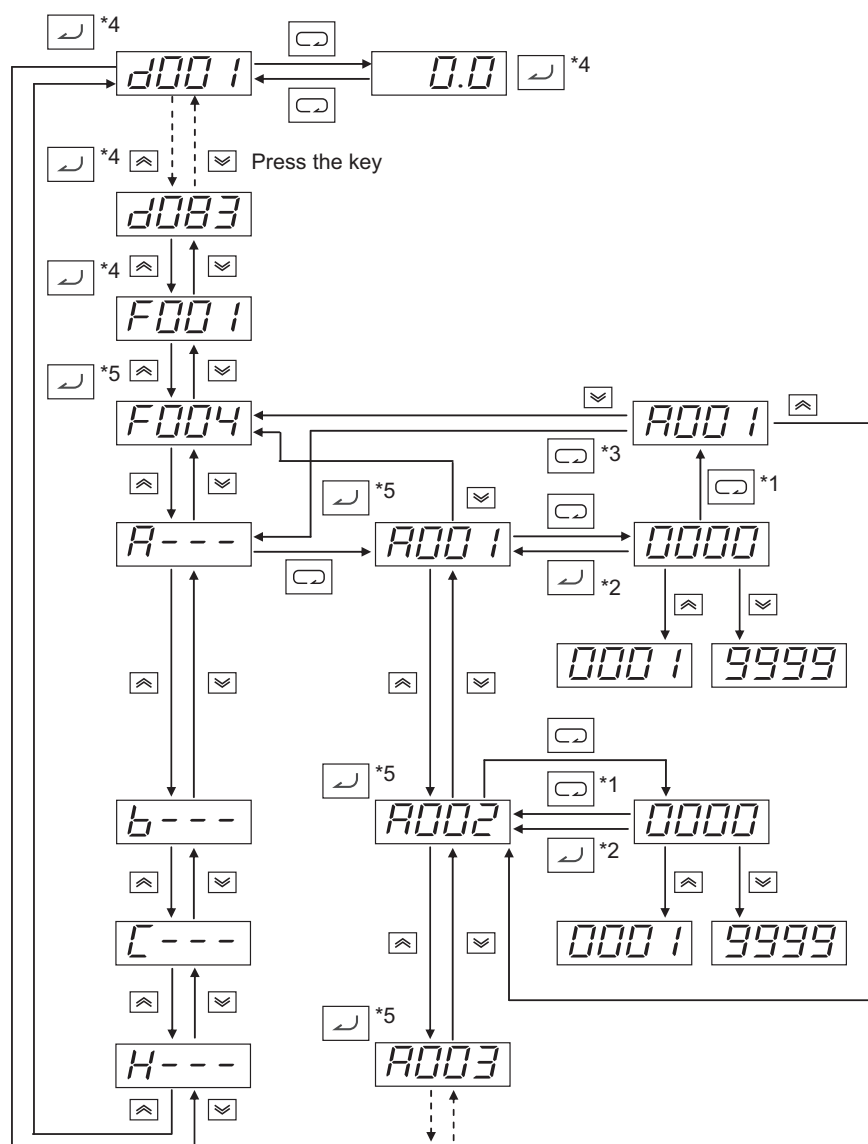
## 3 PROGRAMMING JX

### 3.1 Digital operator



| Item        | Name                           | Description                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ○POWER      | POWER LED indicator            | Lit when the power is supplied to the control circuit.                                                                                                                                                                                                                                                                                                                                         |
| ○ALARM      | ALARM LED indicator            | Lit when an inverter error occurs.                                                                                                                                                                                                                                                                                                                                                             |
| ○RUN        | RUN (during RUN) LED indicator | Lit when the inverter is running.                                                                                                                                                                                                                                                                                                                                                              |
| ○PRG        | PROGRAM LED indicator          | Lit when the set value of each function is indicated on the data display.<br>Blinks during warning (when the set value is incorrect).                                                                                                                                                                                                                                                          |
|             | Data display                   | Displays relevant data, such as frequency reference, output current and set values.                                                                                                                                                                                                                                                                                                            |
| ○ Hz<br>○ A | Data display LED indicator     | Lit according to the indication on the data display.<br>Hz: Frequency<br>A: Current                                                                                                                                                                                                                                                                                                            |
|             | Volume LED indicator           | Lit when the frequency reference source is set to the FREQ adjuster.                                                                                                                                                                                                                                                                                                                           |
|             | FREQ adjuster                  | Sets a frequency. Available only when the frequency reference source is set to the FREQ adjuster. (Check that the Volume LED indicator is lit.)                                                                                                                                                                                                                                                |
| ○           | RUN command LED indicator      | Lit when the RUN command is set to the Digital operator. (The RUN key on the Digital operator is available for operation.)                                                                                                                                                                                                                                                                     |
|             | RUN key                        | Activates the inverter. Available only when operation via the Digital operator is selected. (Check that the RUN command LED indicator is lit.)<br>Forward/Reverse rotation depends on "F004" setting.                                                                                                                                                                                          |
|             | STOP/RESET key                 | Decelerates and stops the inverter. Functions as a reset key if an inverter error occurs.                                                                                                                                                                                                                                                                                                      |
|             | Mode key                       | Switches between: the monitor mode (d□□□), the basic function mode (F□□□), and the extended function mode (A□□□, b□□□, C□□□, H□□□).<br>With this key, you can always change the display as follows.<br>[Supplemental information]<br>To jump to "d001" from any function mode, hold down the Mode key for 3 seconds.<br><br><b>Note:</b> Always press the Enter key to store any changed data. |
|             | Enter key                      | Enters and stores changed data.<br>(To change the set value, be sure to press the Enter key.)<br>Do not press the Enter key if you don't want to store any changes, for example, if you have changed the data inadvertently.                                                                                                                                                                   |
|             | Increment key                  | Changes the mode.<br>Also, increases the set value of each function.                                                                                                                                                                                                                                                                                                                           |
|             | Decrement key                  | Changes the mode.<br>Also, decreases the set value of each function.                                                                                                                                                                                                                                                                                                                           |

### 3.2 Keypad navigation



\*1. Data is not stored by pressing the Mode key.

\*2. Press the Enter key to store the data.

\*3. When you press the Mode key after you return to the parameter number display without storing data in the extended function mode, the mode selection function is selected.

\*4. When you press the Enter key with d000 or F001 displayed, the monitor value is stored as the initial display that appears when the power is turned on.

\*5. When you press the Enter key, the first digit of each parameter setting is stored as the initial display that appears when the power is turned on.

(Example: F002, R---, etc.)

\* To display a specific monitor when the power is turned on, press the Enter key with that monitor displayed. If a parameter for an extended function code is stored after pressing the Enter key, however, that code (A000, b000, C000, d000 or H000) appears at the next power-on. To prevent this, always press the Enter key again with the desired monitor displayed after storing a parameter.

### 3.3 Parameter initialization

- Initialize the parameters using the following procedure.
- To initialize the parameters, set parameter b084 to “02”.

| Key sequence | Display example | Description                                                                                                                                                                                 |
|--------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|              |                 | Power On                                                                                                                                                                                    |
|              |                 | Press the Mode key once, and then press the Decrement key three times to display “b---”.                                                                                                    |
|              |                 | Press the Mode key.<br>“b001” is displayed.                                                                                                                                                 |
|              |                 | Use the Increment or Decrement key to display “b084”.                                                                                                                                       |
|              |                 | Press the Mode key. The set value in “b084” is displayed.                                                                                                                                   |
|              |                 | Use the Increment or Decrement key to display “02”.                                                                                                                                         |
|              |                 | Press the Enter key. The set value is entered and “b084” is displayed.                                                                                                                      |
|              |                 | Press the STOP/RESET key while holding down the Mode and Decrement keys simultaneously.<br>When the display blinks, release the STOP/RESET key first, and then the Mode and Decrement keys. |
|              |                 | Displays initialization.                                                                                                                                                                    |
| (In 1 s)     |                 | The parameter number is displayed again in approximately 1 s.                                                                                                                               |

### 3.4 Basic settings

After selecting the inverter mode follow next steps for a basic operation of the inverter

- Select frequency reference source on parameter A001

| Parameter | Parameter name                    | Details                                                                                   |
|-----------|-----------------------------------|-------------------------------------------------------------------------------------------|
| A001      | Frequency reference selection     | 00: Digital operator (FREQ adjuster)<br>01: Terminal                                      |
| A201      | 2nd frequency reference selection | 02: Digital operator (F001)<br>03: ModBus communication<br>10: Frequency operation result |

- Select Run command source on parameter A002

| Parameter | Parameter name            | Details                                          |
|-----------|---------------------------|--------------------------------------------------|
| A002      | RUN command selection     | 01: Terminal                                     |
| A202      | 2nd RUN command selection | 02: Digital operator<br>03: ModBus communication |

- Adjust the stopping method by b091 and the acceleration/deceleration ramps on parameters F002 and F003

| Parameter | Parameter name          | Details                                       |
|-----------|-------------------------|-----------------------------------------------|
| b091      | Stop selection          | 00: Deceleration to stop<br>01: Free-run stop |
| F002      | Acceleration time 1     | 0.01 to 3000. s                               |
| F202      | 2nd acceleration time 1 |                                               |
| F003      | Deceleration time 1     | 0.01 to 3000. s                               |
| F203      | 2nd deceleration time 1 |                                               |

- Set the motor base frequency and AVR voltage of the motors in parameters A003 and A082

| Parameter | Parameter name        | Details                                                                      |
|-----------|-----------------------|------------------------------------------------------------------------------|
| A003      | Base frequency        | 30. to Max. frequency [A004]                                                 |
| A203      | 2nd base frequency    | 30. to Max. frequency [A204]                                                 |
| A082      | AVR voltage selection | 200-V class: 200/215/220/230/240 V<br>400-V class: 380/400/415/440/460/480 V |

- Set the motor data: rated current (b012), rated power (H003) and number of poles (H004)

| Parameter | Parameter name                  | Details                                                                                          |
|-----------|---------------------------------|--------------------------------------------------------------------------------------------------|
| b012      | Electronic thermal level        | 0.2 x Rated current to 1.0 x Rated current                                                       |
| b212      | 2nd electronic thermal level    |                                                                                                  |
| H003      | Motor capacity selection        | 200-V class: 0.2/0.4/0.75/1.5/2.2/3.7/5.5/7.5 kW<br>400-V class: 0.4/0.75/1.5/2.2/3.7/5.5/7.5 kW |
| H203      | 2nd motor capacity selection    |                                                                                                  |
| H004      | Motor pole number selection     | 2/4/6/8 poles                                                                                    |
| H204      | 2nd motor pole number selection |                                                                                                  |

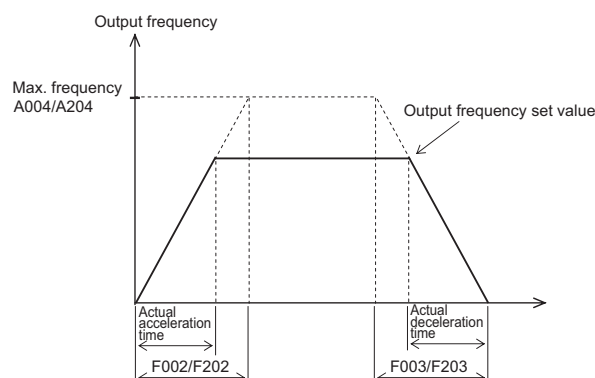
At this point the inverter is ready to run the motor for the first time, but first review this check-list:

- Verify the power LED is ON. If not, check the power connections.
- Make sure the motor is disconnected from any mechanical load.
- Make sure that you have a frequency reference checking the content of F001.
- Now give the RUN command from the selected source. The RUN LED will turn ON.
- The motor should start turning.
- Remove the RUN command or press the STOP key to stop the motor rotation.

### 3.5 Ramps adjustment

The basic frequency (speed) profile is defined by parameters contained in the “F” Group as shown to the right. The set running frequency is in Hz, but acceleration and deceleration are specified in the time duration of the ramp (from zero to maximum frequency, or from maximum frequency to zero).

Acceleration 1 and Deceleration 1 are the standard default accel and decel values for the main profile. Accel and decel values for an alternative profile are specified by using parameters A092 through A093.



| Parameter | Parameter name                   | Description                                     |
|-----------|----------------------------------|-------------------------------------------------|
| A004      | Maximum frequency                | 30. to 400. Hz                                  |
| A204      | 2nd maximum frequency            |                                                 |
| b082      | Starting frequency               | 0.5 to 9.9 Hz                                   |
| F001      | Output frequency setting/monitor | Starting frequency to 1st or 2nd max. frequency |
| F002      | Acceleration time 1              | 0.01 to 3000. s                                 |
| F202      | 2nd acceleration time 1          |                                                 |

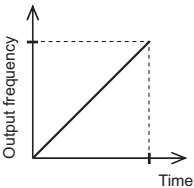
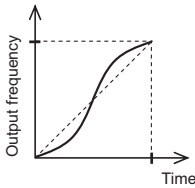
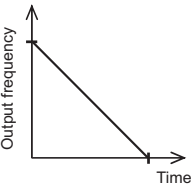
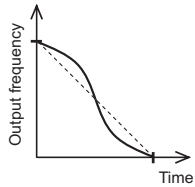
|      |                         |                 |
|------|-------------------------|-----------------|
| F003 | Deceleration time 1     | 0.01 to 3000. s |
| F203 | 2nd deceleration time 1 |                 |

Standard acceleration and deceleration is linear. The inverter CPU can also calculate an S-curve acceleration or deceleration curve as shown. Even if the shape of the ramps change the time keeps being the same one set in F002/F003.

Curve settings for acceleration and deceleration are independently selected. To enable the S-curve, use function **A097** (acceleration) and **A098** (deceleration).

| Parameter | Parameter name                 | Description       |
|-----------|--------------------------------|-------------------|
| A097      | Acceleration pattern selection | 00: Line          |
| A098      | Deceleration pattern selection | 01: S-shape curve |

This table shows the different acceleration shapes:

| Parameter no.          | Set value                                                                          |                                                                                      |
|------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|                        | 00                                                                                 | 01                                                                                   |
|                        | Line                                                                               | S-shape curve                                                                        |
| A097<br>(Acceleration) |   |   |
| A098<br>(Deceleration) |  |  |
| Description            | Accelerates/decelerates linearly before reaching the set output frequency value.   | Helps prevent the collapse of cargo on the elevating machine or conveyor.            |

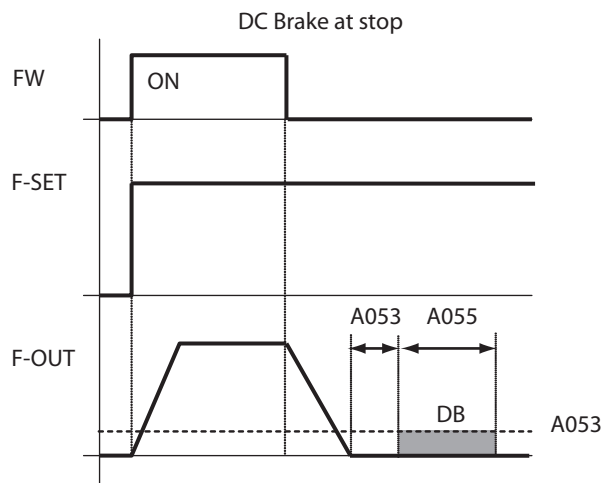
### 3.6 DC injection braking

The DC injection braking feature can provide additional stopping torque during deceleration or before acceleration and is particularly useful at low speeds when normal deceleration torque is minimal. This function injects a DC voltage into the motor windings which generates a DC current that force the motor to stop.

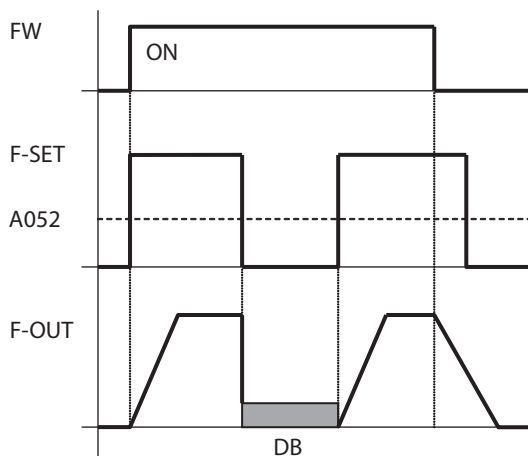
There are several modes available depending on the application requirements:

- Normal DC injection braking is used when A051 is set to “01” (Enable during stop) and the RUN command (FW/RV) is turned OFF, at the moment that deceleration stops the DC injection brake starts with a settable power (A054) and duration (A055). Additionally is possible to specify a wait time between the end of the ramp and the DC injection braking on parame-

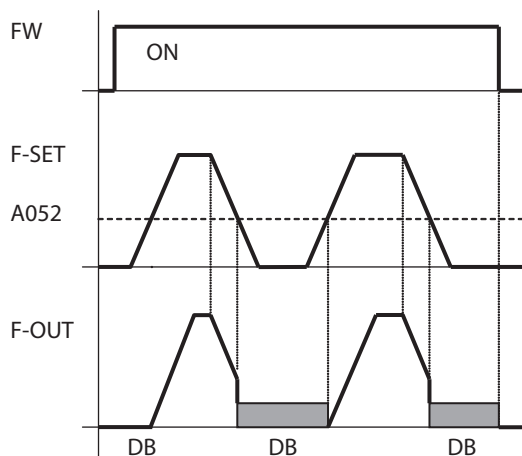
ter A053, during which the motor will free run. If free-run is selected as stopping method the DC injection braking will start just when the Run commands turns OFF.



- DC injection braking by frequency detection can be selected setting A051 to “02” (Frequency control). In this case DC injection braking operates when the output frequency comes down to the one you specified in A052 while the RUN command is still active. External DB and internal DC injection braking are invalid during the frequency detection mode.

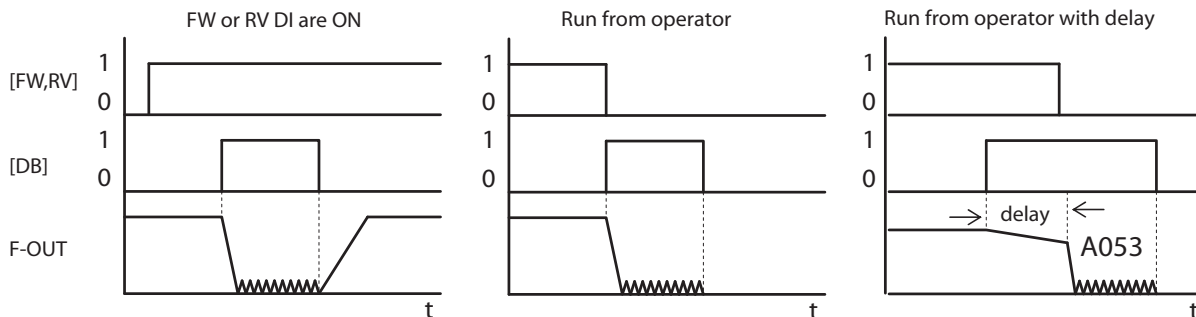


Example 1: Step change in F-SET



Example 2: Analog change in F-SET

- Last option is to trigger the DC injection by a digital input when the terminal (DB) is turned ON. Set parameters A053 and A054 to setup this function. There are several cases depending on the motor rotation and Run command status.



| Parameter | Parameter name                 | Description                                                           |
|-----------|--------------------------------|-----------------------------------------------------------------------|
| A051      | DC injection braking selection | 00: Disabled<br>01: Enabled<br>02: Frequency control [A052 set value] |
| A052      | DC injection braking frequency | 0.0 to 60.0 Hz                                                        |

| Parameter | Parameter name                        | Description                                                                                                                        |
|-----------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| A053      | DC injection braking delay time       | The delay from the end of controlled deceleration to start of DC braking (motor free runs until DC braking begins)<br>0.0 to 5.0 s |
| A054      | DC injection braking power            | 0. to 100.0%                                                                                                                       |
| A055      | DC injection braking time             | Sets the duration for DC braking<br>0.0 to 60.0 s                                                                                  |
| A056      | DC injection braking method selection | 00: Edge operation<br>01: Level operation                                                                                          |

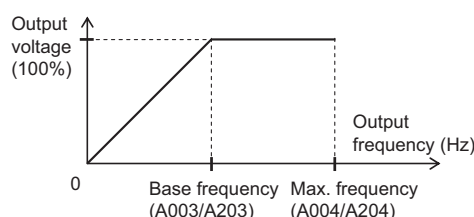
Be careful to avoid specifying too long braking time or too high carrier frequency that can cause motor overheating. If you use DC injection braking is recommended to use motors with a built-in thermistor and wire it to inverter's thermistor input.

### 3.7 V/F curve

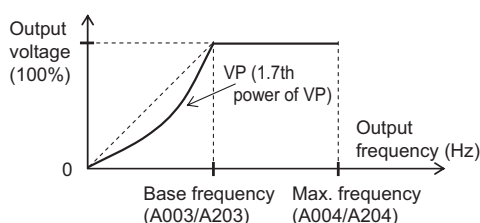
The inverter generates the motor output according to the V/F algorithm selected on parameter A044. The factory default is Constant torque ("00"). Review following descriptions to help you choose the best torque control algorithm for your application:

| Parameter | Parameter name                    | Description                                                                                     |
|-----------|-----------------------------------|-------------------------------------------------------------------------------------------------|
| A044      | V/F characteristics selection     | 00: Constant torque characteristics (VC)<br>01: Reduced torque characteristics (VP 1.7th power) |
| A244      | 2nd V/F characteristics selection | 06: Special reduced torque characteristics (Special VP)                                         |

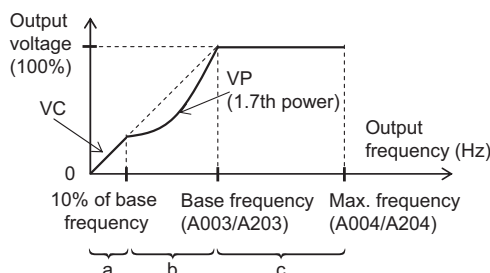
- **Constant torque characteristics (VC)** - Output voltage is proportional to output frequency. While proportional from 0 Hz to base frequency, the output voltage is constant from base to maximum frequencies regardless of the frequency.



- **Reduced torque characteristics (VP 1.7th power)** - Suitable for a fan or pump that does not require large torque in a low speed range. These provide high efficiency, reduced noise and vibration, owing to reduced output voltage in a low speed range.



- **Special reduced torque characteristics (Special VP)** - Suitable for a fan or pump that requires torque in a low speed range using VC characteristics at this area.



**Period a:** Provides constant torque characteristics (VC) within a range from 0 Hz to 10% of base frequency. (Example) If the base frequency is 50 Hz, the inverter provides constant torque characteristics within a range from 0 to 5 Hz.

**Period b:** Provides reduced torque characteristics within a range from 10% to 100% of the base frequency. The inverter outputs voltage based on a curve of the 1.7th power of the frequency.

**Period c:** Provides constant voltage within a range from the base frequency to the maximum frequency.

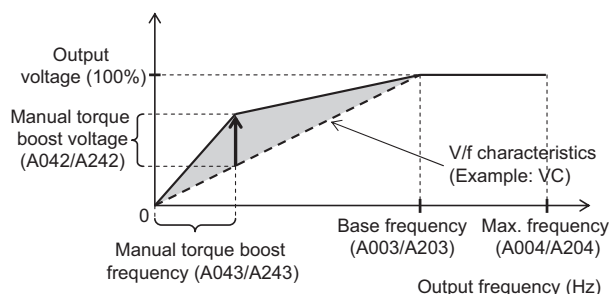
### 3.8 Torque boost function

This function helps to compensate insufficient motor torque in a low speed range.

- Compensates the voltage drop caused by the primary resistance of the motor or wiring increasing the torque in a low speed range.
- To select the simple torque boost in the torque boost selection (A041/A241), set the motor capacity selection (H003/H203) and motor pole number selection (H004/H204) according to your motor.

### Manual torque boost (A042/A242, A043/A243)

- Adds the voltage set in A042/A242 and A043/A243 to the V/F characteristics, and outputs the resulting voltage. The addition value is set in percentage terms based on the AVR voltage selection (A082) as 100%.
- The manual torque boost frequency (A043/A243) is set in percentage terms based on the base frequency as 100%.
- If you raise the set value of the manual torque boost (A042/A242) be careful about motor overexcitation. Otherwise the motor may burn out.



### Simple torque boost (A041/A241)

- If simple torque boost is selected in the torque boost selection (A041/A241: 01), it operates to adjust the output voltage depending on the load level.
- To select simple torque boost in the torque boost selection (A041/A241), set the motor capacity selection (H003/H203) and motor pole number selection (H004/H204) according to your motor.
- You may avoid a possible overcurrent trip during deceleration by always setting the AVR selection to ON (A081: 00).
- Sufficient characteristics may not be obtained if you select two or more lower rank motor size than specified.

| Parameter | Parameter name                    | Description                                                                        |
|-----------|-----------------------------------|------------------------------------------------------------------------------------|
| A041      | Torque boost selection            | 00: Manual torque boost only                                                       |
| A241      | 2nd torque boost selection        | 01: Automatic (simple) torque boost                                                |
| A042      | Manual torque boost voltage       | Can boost starting torque between 0 and 20% above normal V/f curve<br>0.0 to 20.0% |
| A242      | 2nd manual torque boost voltage   |                                                                                    |
| A043      | Manual torque boost frequency     | Sets the frequency of the V/f breakpoint for torque boost<br>0.0 to 50.0%          |
| A243      | 2nd manual torque boost frequency |                                                                                    |

## 3.9 Digital inputs

The function codes in the following table let you assign between a wide range of functions to any of the five logic inputs for the 3G3JX inverter. The functions C001 through C005 configure the terminals [1] through [5] respectively. The “value” of these particular parameters is not a scalar value, but it is a discrete number that selects one option from many available options.

| Input function summary table |                 |                                   |             |                                                                                          |
|------------------------------|-----------------|-----------------------------------|-------------|------------------------------------------------------------------------------------------|
| Option code                  | Terminal symbol | Function name                     | Description |                                                                                          |
| 00                           | FW              | Forward command                   | ON          | Inverter is in Run Mode, motor runs forward                                              |
|                              |                 |                                   | OFF         | Inverter is in Stop Mode, motor stops                                                    |
| 01                           | RV              | Reverse command                   | ON          | Inverter is in Run Mode, motor runs reverse                                              |
|                              |                 |                                   | OFF         | Inverter is in Stop Mode, motor stops                                                    |
| 02                           | CF1             | Multi-step speed setting binary 1 | OFF         | Binary encoded speed selection bit 3 to bit 0                                            |
| 03                           | CF2             | Multi-step speed setting binary 2 |             |                                                                                          |
| 04                           | CF3             | Multi-step speed setting binary 3 |             |                                                                                          |
| 05                           | CF4             | Multi-step speed setting binary 4 |             |                                                                                          |
| 06                           | JG              | Jogging                           | ON          | Inverter is in Run Mode, output to motor runs at jog parameter frequency                 |
| 07                           | DB              | External DC injection braking     | ON          | DC injection braking will be applied during deceleration                                 |
| 08                           | SET             | 2nd control selection             | ON          | The inverter uses 2nd motor parameters for generating frequency output to motor          |
|                              |                 |                                   | OFF         | The inverter uses 1st (main) motor parameters for generating frequency output to motor   |
| 09                           | 2CH             | 2-step acceleration/deceleration  | ON          | Frequency output uses 2nd-stage acceleration and deceleration values                     |
|                              |                 |                                   | OFF         | Frequency output uses standard acceleration and deceleration values                      |
| 11                           | FRS             | Free-run stop                     | ON          | Causes output to turn OFF, allowing motor to free run (coast) to stop                    |
| 12                           | EXT             | External trip                     | ON          | When assigned input transitions OFF to ON, inverter latches trip event and displays E 12 |
|                              |                 |                                   | OFF         | No trip event for ON to OFF, any recorded trip events remain in history until reset      |
| 13                           | USP             | Power recovery restart protection | ON          | The inverter will not resume a Run command                                               |
|                              |                 |                                   | OFF         | The inverter will resume a Run command that was active before power loss                 |
| 15                           | SFT             | Soft lock                         | ON          | The keypad and remote programming devices are prevented from changing parameters         |
|                              |                 |                                   | OFF         | The parameters may be edited and stored                                                  |
| 16                           | AT              | Analog input switching            | ON          | Refer to Analog Input selection                                                          |
|                              |                 |                                   | OFF         |                                                                                          |

| Input function summary table |                 |                                |             |                                                                                                                                                               |
|------------------------------|-----------------|--------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Option code                  | Terminal symbol | Function name                  | Description |                                                                                                                                                               |
| 18                           | RS              | Reset                          | ON          | The trip condition is reset, the motor output is turned OFF, and powerup reset is asserted                                                                    |
|                              |                 |                                | OFF         | Normal power-ON operation                                                                                                                                     |
| 19                           | PTC             | Thermistor input               | ON          | The inverter can detect motor temperature and, if the temperature exceeds the specified level, trips to shut off the output (E35). The level is fixed.        |
|                              |                 |                                | OFF         | If the thermistor is not connected, the inverter trips (E35) to shut off the output                                                                           |
| 20                           | STA             | 3-wire start                   | ON          | Starts the motor rotation                                                                                                                                     |
| 21                           | STP             | 3-wire stop                    | ON          | Stops the motor rotation                                                                                                                                      |
| 22                           | F/R             | 3-wire forward/reverse         | ON          | Selects the direction of motor rotation: ON = FWD. While the motor is rotating, a change of F/R will start a deceleration, followed by a change in direction  |
|                              |                 |                                | OFF         | Selects the direction of motor rotation: OFF = REV. While the motor is rotating, a change of F/R will start a deceleration, followed by a change in direction |
| 23                           | PID             | PID enabled/disabled           | ON          | Temporarily disables PID loop control. Inverter output turns OFF as long as PID Enable is active (A071=01)                                                    |
|                              |                 |                                | OFF         | Has no effect on PID loop operation, operates normally if PID Enable is active (A071=01)                                                                      |
| 24                           | PIDC            | PID integral reset             | ON          | Resets the PID loop controller. Main consequence is that integrator sum is forced to zero                                                                     |
| 27                           | UP              | UP/DWN function accelerated    | ON          | Accelerates (increases output frequency) motor from current frequency                                                                                         |
| 28                           | DWN             | UP/DWN function decelerated    | ON          | Decelerates (decreases output frequency) motor from current frequency                                                                                         |
| 29                           | UDC             | UP/DWN function data clear     | ON          | Clears the UP/DWN frequency memory by forcing it to equal the set frequency parameter F001.                                                                   |
| 31                           | OPE             | Forced operator                | ON          | Forces the source of the output frequency setting A001 and the source of the Run command A002 to be from the digital operator                                 |
|                              |                 |                                | OFF         | Source of output frequency set by A001 and source of Run command set by A002 is used                                                                          |
| 50                           | ADD             | Frequency addition             | ON          | Adds the A145 (add frequency) value to the output frequency                                                                                                   |
|                              |                 |                                | OFF         | Does not add the A145 value to the output frequency                                                                                                           |
| 51                           | F-TM            | Forced terminal block          | ON          | Force inverter to use input terminals for output frequency and Run command sources                                                                            |
|                              |                 |                                | OFF         | Source of output frequency set by A001 and source of Run command set by A002 is used                                                                          |
| 52                           | RDY             | Ready function                 | ON          | The inverter is ready                                                                                                                                         |
|                              |                 |                                | OFF         | Normal stop status                                                                                                                                            |
| 53                           | SP-SET          | Special 2nd function selection | ON          | Enables the parameter for the special 2nd motor                                                                                                               |
|                              |                 |                                | OFF         | Disables the parameter for the special 2nd motor                                                                                                              |
| 64                           | EMR             | Emergency shutoff              | ON          | Emergency shutoff is ON                                                                                                                                       |
| 255                          | no              | No function                    | -           | Digital input not used                                                                                                                                        |

All this functions could be assigned to any of the multi-function inputs on parameters C001 to C005, select if the input will be normally open or normally close and the response time of the input.

| Parameter | Parameter name                             | Description                                        |
|-----------|--------------------------------------------|----------------------------------------------------|
| C001      | Multi-function input 1 selection           | Refer to upper table for available settings        |
| C201      | 2nd multi-function input 1 selection       |                                                    |
| C002      | Multi-function input 2 selection           |                                                    |
| C202      | 2nd multi-function input 2 selection       |                                                    |
| C003      | Multi-function input 3 selection           |                                                    |
| C203      | 2nd multi-function input 3 selection       |                                                    |
| C004      | Multi-function input 4 selection           |                                                    |
| C204      | 2nd multi-function input 4 selection       |                                                    |
| C005      | Multi-function input 5 selection           |                                                    |
| C205      | 2nd multi-function input 5 selection       |                                                    |
| C011      | Multi-function input 1 operation selection | 00: NO (normally open)<br>01: NC (normally closed) |
| C012      | Multi-function input 2 operation selection |                                                    |
| C013      | Multi-function input 3 operation selection |                                                    |
| C014      | Multi-function input 4 operation selection |                                                    |
| C015      | Multi-function input 5 operation selection |                                                    |

An input terminal configured for option code 18 ([RS] Reset command) cannot be configured for normally closed operation.

### 3.10 Digital outputs

Function codes in the following table let you assign different options into logical outputs (terminal [11] and [AL]) on parameters C021 and C026.

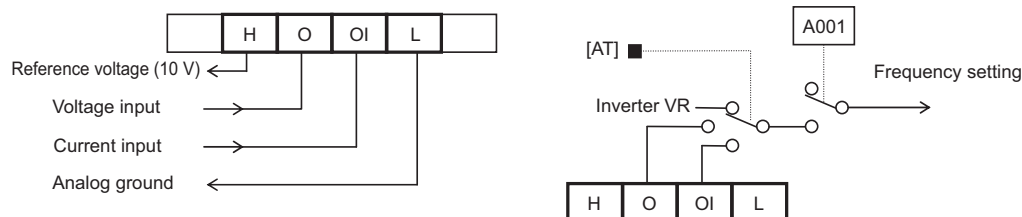
| Input function summary table |                 |                                   |             |                                                                                                                    |
|------------------------------|-----------------|-----------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------|
| Option code                  | Terminal symbol | Function name                     | Description |                                                                                                                    |
| 00                           | RUN             | Signal during RUN                 | ON          | When the inverter is in Run Mode                                                                                   |
| 01                           | FA1             | Constant speed arrival signal     | ON          | When output to motor is at the set frequency                                                                       |
|                              |                 |                                   | OFF         | When output to motor is OFF, or in any acceleration or deceleration ramp                                           |
| 02                           | FA2             | Over set frequency arrival signal | ON          | When output to motor is at or above the set frequency, even if in acceleration (C042) or deceleration (C043) ramps |
|                              |                 |                                   | OFF         | When output to motor is OFF, or at a level below the set frequency                                                 |
| 03                           | OL              | Overload warning                  | ON          | When output current is more than the set threshold (C041) for the overload signal                                  |
| 04                           | OD              | Excessive PID deviation           | ON          | When PID error is more than the set threshold for the deviation signal                                             |
| 05                           | AL              | Alarm output                      | ON          | When an alarm signal has occurred and has not been cleared                                                         |
| 06                           | Dc              | Disconnection detection           | ON          | When the inverter is in trip status                                                                                |
| 07                           | FBV             | PID FB status output              | ON          | Shifts output when exceeding the upper limit or falling below the lower limit                                      |
| 08                           | NDc             | Network error                     | ON          | The communication watchdog timer times out                                                                         |
| 09                           | LOG             | Logic operation output            | ON          | This function outputs a logic operation result of combination of two functions                                     |
| 10                           | ODc             | Not used                          | -           | -                                                                                                                  |
| 43                           | LOC             | Light load detection signal       | ON          | Motor current is less than the specified value (C039)                                                              |

In the same way of that the digital inputs is possible to choose between normally close and normally open and even is possible to use some On and Off delay for each of the outputs.

| Parameter | Parameter name                                      | Description                                                                          |
|-----------|-----------------------------------------------------|--------------------------------------------------------------------------------------|
| C021      | Multi-function output terminal 11 selection         | Refer to upper table for available settings                                          |
| C026      | Relay output (AL2, AL1) function selection          |                                                                                      |
| C031      | Multi-function output terminal 11 contact selection | 00: NO contact at AL2; NC contact at AL1<br>01: NC contact at AL2; NO contact at AL1 |
| C036      | Relay output (AL2, AL1) contact selection           |                                                                                      |

### 3.11 Analog inputs

Two types of external analog inputs are available for frequency reference plus the built-in VR. For voltage input, you can set a frequency from 0 to maximum by applying a voltage from 0 to 10 V between inputs O and L. For current input, apply 4 to 20 mA between inputs OI and L. Note that voltage and current cannot be input simultaneously. Also, do not connect the signal lines for inputs O and OI simultaneously.



Switching between the inputs could be done by a digital input setting parameter A005.

| Parameter          | Parameter name | Data                                                                                                                                                                                                | Default setting | Unit |
|--------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------|
| A005               | O/OI selection | 00: Switches between O/OI via terminal AT<br>02: Switches between O/FREQ adjuster via terminal AT<br>03: Switches between OI/FREQ adjuster via terminal AT<br>04: O input only<br>05: OI input only | 02              | -    |
| Related parameters |                | A011 to A016, A101 to A105, A151 to A155, C001 to C005, C081, C082                                                                                                                                  |                 |      |
| Required settings  |                | A001= 01                                                                                                                                                                                            |                 |      |

Allocate AT (16) to any of the multi-function inputs with the frequency reference set to the terminal block (A001 or A201 = 01).

| Data               | Symbol | Function name          | Status | Description                                                            |
|--------------------|--------|------------------------|--------|------------------------------------------------------------------------|
| 16                 | AT     | Analog input switching | ON     | Depends on the combination with the A005 setting (see the below table) |
|                    |        |                        | OFF    | Same as above                                                          |
| Related parameters |        | C001 to C005           |        |                                                                        |

The settings are as follows. (VR: FREQ adjuster). If AT is not allocated to any of the multi-function input, this means the AT input = OFF in the above table.

| A005 set value           | 00  |      | 02  |    | 03   |    | 04  |    | 05   |    |
|--------------------------|-----|------|-----|----|------|----|-----|----|------|----|
| AT terminal input status | OFF | ON   | OFF | ON | OFF  | ON | OFF | ON | OFF  | ON |
| Analog input enabled     | O-L | OI-L | O-L | VR | OI-L | VR | O-L |    | OI-L |    |

### 3.12 Analog output AM terminal

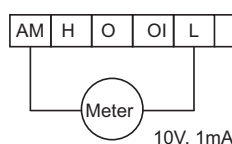
This function allows you to monitor the output frequency and current from the AM terminal on the control terminal block. Analog voltage output from 0 to 10 V.

#### AM selection

Select a signal to output from the following table:

| Parameter | Parameter name | Description                                |
|-----------|----------------|--------------------------------------------|
| C028      | AM selection   | 00: Output frequency<br>01: Output current |

- **Output frequency** - Outputs the voltage according to the output frequency, with the maximum frequency being full scale. This is intended for display indication and cannot be used as a line speed signal. Through the accuracy is  $\pm 5\%$ , this could be exceeded depending on your meter. Outputs a frequency obtained by multiplying the output frequency by the conversion coefficient [b086], with the maximum frequency being full scale.



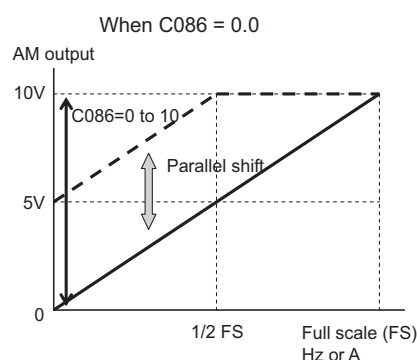
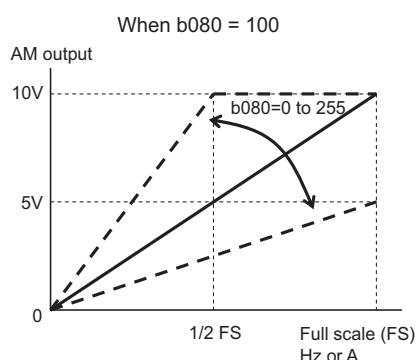
- **Output current** - Outputs a current value with 200% of the inverter rated voltage being full scale. The output method is the same as the output frequency. Monitor accuracy is  $\pm 10\%$  at the halfway point of base frequency.

#### AM adjustment

You can adjust the calibration of the analog voltage (0 to 10 VDC) from the AM terminal on the control terminal block by using the inverter setting.

| Parameter          | Parameter name       | Data                               | Default setting | Unit |
|--------------------|----------------------|------------------------------------|-----------------|------|
| b080               | AM adjustment        | 0. to 255. (adjust to the scale)   | 100.            | -    |
| C086               | AM offset adjustment | 0.0 to 10.0 (see the figure below) | 0.0             | V    |
| Related parameters |                      | A011 to A015, A101 to A105         |                 |      |

**Note:** If the offset (C086) is changed, the point to reach 10 V changes accordingly because of parallel movement. To avoid this, adjust the offset (C086) before the gain (b080).



### 3.13 Electronic thermal function

This function electronically protects the motor from overheating.

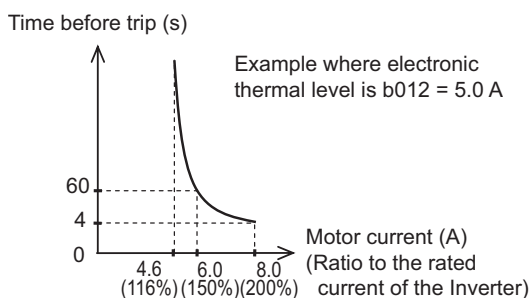
- Causes an overload trip (E05) to protect the motor from overheating by setting according to the motor rated current.
- Provides the most appropriate protection characteristics, taking into account the decline of a standard motor cooling capability at a low speed.
- To set a value over the rated current of the motor, be careful of any temperature rise of the motor.

| Parameter          | Parameter name                                   | Description                                |
|--------------------|--------------------------------------------------|--------------------------------------------|
| b012               | Electronic thermal level                         | 0.2 x Rated current to 1.0 x Rated current |
| b212*              | 2nd electronic thermal level                     |                                            |
| b013               | Electronic thermal characteristics selection     | 00: Reduced torque characteristics 1       |
| b213*              | 2nd electronic thermal characteristics selection | 01: Constant torque characteristics        |
|                    |                                                  | 02: Reduced torque characteristics 2       |
| Related parameters |                                                  | C021                                       |

\* To switch to the 2nd control, allocate 08 (SET) to the multi-function input terminal and then turn it on.

#### Electronic thermal level (motor protection level)

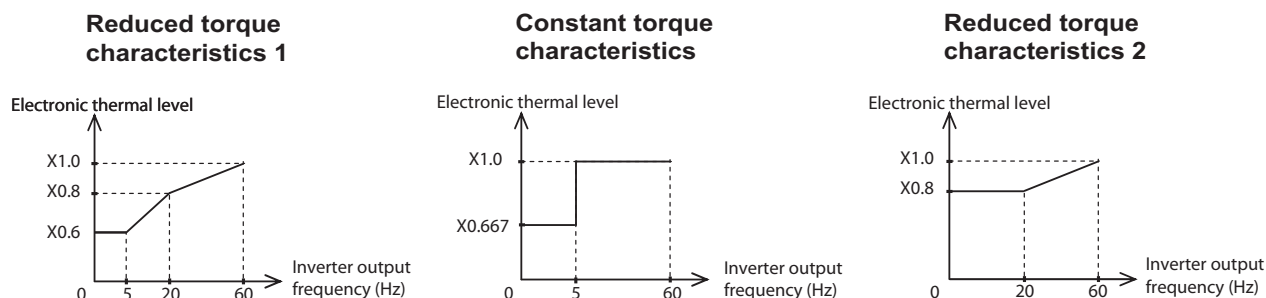
(Example) 3G3JX-AB007, rated current: 4.0 A, setting range: 0.8 to 4.0 A.



#### Electronic thermal characteristics

Frequency characteristics are multiplied by the b012/212 set value above. The lower the output frequency is, the lower the cooling capability of the standard motor's self-cooling fan.

- **Reduced torque characteristics 1** - Multiplied by the time limit characteristics set in b012/212 for each frequency.
- **Constant torque characteristics** - Do not skip this setting when using a constant torque motor. Multiplied by the time limit characteristics set in b012/212 for each frequency.
- **Reduced torque characteristics 2** - Multiplied by the limit characteristics set in b012/212 for each frequency.



### 3.14 Carrier frequency

You can change the PWM waveform carrier frequency output from the inverter.

| Parameter | Parameter name    | Data        | Default setting | Unit |
|-----------|-------------------|-------------|-----------------|------|
| b083      | Carrier frequency | 2.0 to 12.0 | 3.0             | kHz  |

- With the carrier frequency set high, you can reduce metallic noise from the motor. However, this may increase electrical noise or leakage current from the inverter.
- Carrier frequency adjustment also helps avoid mechanical or motor resonance.
- To raise the carrier frequency, reduce the output current (or derate the rated current). Check user's manual for details.

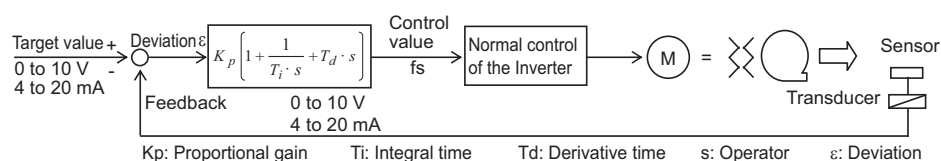
### 3.15 PID function

This function enables process control such elements as flow rate, air volume, and pressure.

| Parameter          | Parameter name                | Data                                                                                                      | Default setting | Unit |
|--------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------|------|
| A071               | PID selection                 | 00: Disabled<br>01: Enabled                                                                               | 00              | -    |
| A072               | PID P gain                    | 0.2 to 5.0                                                                                                | 1.0             | -    |
| A073               | PID I gain                    | 0.0 to 150.0                                                                                              | 1.0             | s    |
| A074               | PID D gain                    | 0.00 to 100.0                                                                                             | 0.0             | s    |
| A075               | PID scale                     | 0.01 to 99.99                                                                                             | 1.00            | Time |
| A076               | PID feedback selection        | 00: OI<br>01: O<br>02: RS485 communication<br>10: Operation function output                               | 00              | -    |
| A077               | Reverse PID function          | 00: OFF (Deviation = Target value - Feedback value)<br>01: ON (Deviation = Feedback value - Target value) | 00              | -    |
| A078               | PID output limit function     | 0.0 to 100.0                                                                                              | 0.0             | %    |
| C044               | PID deviation excessive level | 0.0 to 100.0                                                                                              | 3.0             | %    |
| C052               | PID FB upper limit            | 0.0 to 100.0                                                                                              | 100.0           | %    |
| C053               | PID FB lower limit            |                                                                                                           | 0.0             |      |
| Related parameters |                               | d004, A001, A005, C001 to C005, C021, C026                                                                |                 |      |

- To use this function, set A071 to 01.
- To switch between enable/disable via the terminal block (external signal), allocate 23 (PID enable/disable) to the desired multi-function input. Select OFF for enable and ON for disable.

#### Basic structure of PID control (example)



#### • PID enable/disable

| Data               | Symbol | Function name        | Status | Description                      |
|--------------------|--------|----------------------|--------|----------------------------------|
| 23                 | PID    | PID enabled/disabled | ON     | Disables the PID function        |
|                    |        |                      | OFF    | Does not affect the PID function |
| Related parameters |        | C001 to C005         |        |                                  |

#### • Excessive deviation/output

| Data                       | Symbol | Function name                | Status | Description                                          |
|----------------------------|--------|------------------------------|--------|------------------------------------------------------|
| 04                         | OD     | Excessive PID deviation      | ON     | The PID deviation has exceeded the C044 set value    |
|                            |        |                              | OFF    | The PID deviation has not reached the C044 set value |
| Available output terminals |        | I1-CM2, AL2-AL0 (or AL1-AL0) |        |                                                      |
| Requires settings          |        | C021, C026, C044             |        |                                                      |

- **PID feedback (FB) upper/lower limit**

| Data                       | Symbol | Function name                | Status | Description                                                                   |
|----------------------------|--------|------------------------------|--------|-------------------------------------------------------------------------------|
| 07                         | FBV    | PID FB status output         | ON     | Shifts output when exceeding the upper limit or falling below the lower limit |
|                            |        |                              | OFF    |                                                                               |
| Available output terminals |        | 11-CM2, AL2-AL0 (or AL1-AL0) |        |                                                                               |
| Requires settings          |        | C021, C026, C052, C053       |        |                                                                               |

- **PID integral reset**

| Data               | Symbol | Function name      | Status | Description                                  |
|--------------------|--------|--------------------|--------|----------------------------------------------|
| 24                 | PIDC   | PID integral reset | ON     | Forcibly sets the PID integral value to zero |
|                    |        |                    | OFF    | Does not affect the PID function             |
| Related parameters |        | C001 to C005       |        |                                              |

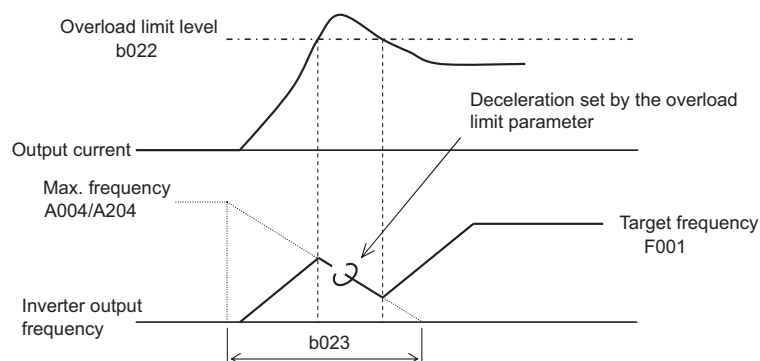
### 3.16 Overload limit/warning

This function helps prevent an overcurrent trip due to rapid load fluctuation in acceleration or constant speed operation.

| Parameter          | Parameter name                      | Data                                                                                            | Default setting     | Unit |
|--------------------|-------------------------------------|-------------------------------------------------------------------------------------------------|---------------------|------|
| b021               | Overload limit selection            | 00: Disabled                                                                                    | 01                  | -    |
| b221*              | 2nd overload limit selection        | 01: Enabled in acceleration/constant speed operation<br>02: Enabled in constant speed operation |                     |      |
| b022               | Overload limit level                | 0.1 x Rated current to 1.5 x Rated current                                                      |                     |      |
| b222*              | 2nd overload limit level            |                                                                                                 | 1.5 x Rated current | A    |
| b023               | Overload limit parameter            | 0.1 to 3000.0                                                                                   | 1.0                 | s    |
| b223*              | 2nd overload limit parameter        |                                                                                                 |                     |      |
| b028               | Overload limit source selection     | 00: b022, b222 set values                                                                       | 00                  | -    |
| b228*              | 2nd overload limit source selection | 01: Input terminal O                                                                            |                     |      |
| C041               | Overload warning level              | 0.0: Does not operate                                                                           | Rated current       | A    |
| C241*              | 2nd overload warning level          | 0.1 x Rated current to 2.0 x Rated current                                                      |                     |      |
| Related parameters |                                     | C021, C026                                                                                      |                     |      |

\* To switch to the 2nd control, allocate 08 (SET) to the multi-function input terminal and then turn it on.

- The inverter monitors the motor current during acceleration or constant speed operation. If it reaches the overload limit level, the output frequency is lowered automatically according to the overload limit parameter.



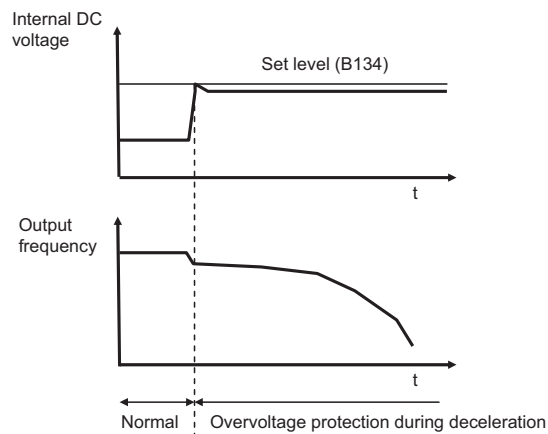
- For more detailed information please check the user's manual.

### 3.17 Overvoltage control function

This function helps avoid an overvoltage trip during deceleration. Note that the actual deceleration time may be longer than the set value. This function automatically keeps DC voltage at the set level during deceleration. The aim of this function is the same as the overvoltage LAD stop function, described in b130 and b131. However, these functions have different deceleration characteristics and you can select either function according to your system.

| Parameter | Parameter name                                               | Data         | Default setting | Unit |
|-----------|--------------------------------------------------------------|--------------|-----------------|------|
| b055      | Overvoltage protection proportional gain during deceleration | 0.2 to 5.0   | 0.2             | -    |
| b056      | Overvoltage protection integral time during deceleration     | 0.0 to 150.0 | 0.2             | s    |

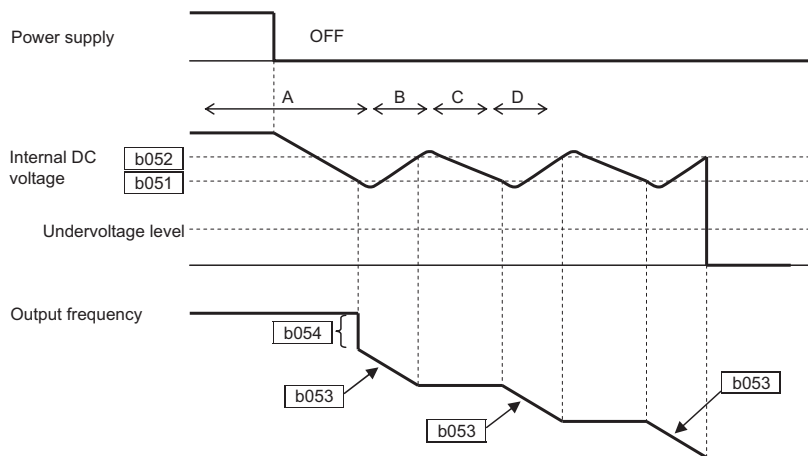
| Parameter | Parameter name                                                | Data                                                   | Default setting | Unit |
|-----------|---------------------------------------------------------------|--------------------------------------------------------|-----------------|------|
| b130      | Overvoltage LAD stop function                                 | 00: Disabled<br>01: Enabled                            | 00              | -    |
| b131      | Overvoltage LAD stop function level setting                   | 200-V class: 330. to 395.<br>400-V class: 660. to 790. | 380/760         | V    |
| b133      | Overvoltage protection function selection during deceleration | 00: Disabled<br>01: Enabled                            | 00              | -    |
| b134      | Overvoltage protection level setting during deceleration      | 200-V class: 330. to 395.<br>400-V class: 660. to 790. | 380/760         | V    |



### 3.18 Controlled stop at power loss

This function decelerates the inverter by a controlled stop to avoid a trip or free running in case of power supply disconnection or momentary power interruption during operation.

| Parameter | Parameter name                                                                   | Data                                                        | Default setting | Unit |
|-----------|----------------------------------------------------------------------------------|-------------------------------------------------------------|-----------------|------|
| b050      | Selection of non-stop function at momentary power interruption                   | 00: Disabled<br>01: Enabled (stop)<br>02: Enabled (restart) | 00              | -    |
| b051      | Starting voltage of non-stop function at momentary power interruption            | 0.0 to 1000.                                                | 0.0             | V    |
| b052      | Stop deceleration level of non-stop function at momentary power interruption     | 0.0 to 1000.                                                | 0.0             | V    |
| b053      | Deceleration time of non-stop function at momentary power interruption           | 0.01 to 3000.                                               | 1.0             | s    |
| b054      | Deceleration starting width of non-stop function at momentary power interruption | 0.0 to 10.0                                                 | 0.0             | Hz   |

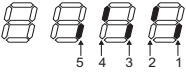
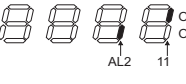


PARAMETER LIST

## 4 PARAMETER LIST

The PDU (Process Data Unit) register number are addressed starting at zero. Therefore register numbered “0012h” addressed as “0011h”. Register address value (transmitted on Modbus line) is 1 less than the Register number of the table

### 4.1 Parameter group D: Monitors

| Parameter No. | Function name                               | Monitoring or data range (digital operator)                                                                                         | Default setting | Changes during operation | Unit | Modbus address (hex)      |
|---------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------|------|---------------------------|
| d001          | Output frequency monitor                    | 0.0 to 400.0                                                                                                                        | -               | -                        | Hz   | 1002                      |
| d002          | Output current monitor                      | 0.0 to 999.0                                                                                                                        | -               | -                        | A    | 1003                      |
| d003          | Rotation direction monitor                  | F: Forward<br>o: Stop<br>r: Reverse                                                                                                 | -               | -                        | -    | 1004                      |
| d004          | PID feedback value monitor                  | 0.00 to 9999.<br>(Enabled when the PID function is enabled)                                                                         | -               | -                        | -    | 1005 (high)<br>1006 (low) |
| d005          | Multi-function input monitor                |  ON Terminal 4, 2: ON<br>OFF Terminal 5, 3, 1: OFF | -               | -                        | -    | 1007                      |
| d006          | Multi-function output monitor               |  ON Terminal 11: ON<br>OFF Terminal AL2: OFF       | -               | -                        | -    | 1008                      |
| d007          | Output frequency monitor (after conversion) | 0.00 to 39960<br>(Output frequency x Conversion factor of b086)                                                                     | -               | -                        | -    | 1009 (high)<br>100A (low) |
| d013          | Output voltage monitor                      | 0. to 600.                                                                                                                          | -               | -                        | V    | 100C                      |
| d016          | Total RUN time                              | 0. to 99990 hours                                                                                                                   | -               | -                        | h    | 100E (high)<br>100F (low) |
| d017          | Power ON time monitor                       | 0. to 99990 hours                                                                                                                   | -               | -                        | h    | 1010 (high)<br>1011 (low) |
| d018          | Fin temperature monitor                     | 0.0 to 200.0                                                                                                                        | -               | -                        | °C   | 116A                      |
| d080          | Fault frequency monitor                     | 0. to 9999.                                                                                                                         | -               | -                        | -    | 0011                      |
| d081          | Fault monitor 1 (Latest)                    | Error code (condition of occurrence)                                                                                                | -               | -                        | -    | 0012 to 001B              |
| d082          | Fault monitor 2                             | Output frequency [Hz]<br>Output current [A]<br>Internal DC voltage [V]                                                              | -               | -                        | -    | 001C to 0025              |
| d083          | Fault monitor 3                             | RUN time [h]<br>ON time [h]                                                                                                         | -               | -                        | -    | 0026 to 002F              |
| d102          | DC voltage monitor                          | 0.0 to 999.9                                                                                                                        | -               | -                        | V    | 116C                      |
| d104          | Electronic thermal monitor                  | 0.0 to 100.0                                                                                                                        | -               | -                        | %    | 116D                      |

### 4.2 Parameter group A

| Parameter No. | Function name                     | Monitoring or data range (digital operator)                                                                                                                                                         | Default setting | Changes during operation | Unit | Modbus address (hex) |
|---------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------|------|----------------------|
| A001          | Frequency reference selection     | 00: Digital operator (FREQ adjuster)<br>01: Terminal                                                                                                                                                | 00              | No                       | -    | 1019                 |
| A201          | 2nd frequency reference selection | 02: Digital operator (F001)<br>03: Modbus communication<br>10: Frequency operation result                                                                                                           |                 |                          |      | -                    |
| A002          | RUN command selection             | 01: Terminal                                                                                                                                                                                        | 02              | No                       | -    | 101A                 |
| A202          | 2nd RUN command selection         | 02: Digital operator (F001)<br>03: Modbus communication                                                                                                                                             |                 |                          |      | -                    |
| A003          | Base frequency                    | 30 to maximum frequency [A004]                                                                                                                                                                      | 50              | No                       | Hz   | 101B                 |
| A203          | 2nd base frequency                | 30 to 2nd maximum frequency [A204]                                                                                                                                                                  |                 |                          |      | 150C                 |
| A004          | Maximum frequency                 | 30. to 400.                                                                                                                                                                                         | 50              | No                       | Hz   | 101C                 |
| A204          | 2nd maximum frequency             |                                                                                                                                                                                                     |                 |                          |      | 150D                 |
| A005          | O/OI selection                    | 00: Switches between O/OI via terminal AT<br>02: Switches between O/FREQ adjuster via terminal AT<br>03: Switches between FI/FREQ adjuster via terminal AT<br>04: O input only<br>05: OI input only | 02              | No                       | -    | 101D                 |
| A011          | O start frequency                 | 0.0 to Max. frequency                                                                                                                                                                               | 0.0             | No                       | Hz   | 1020                 |
| A012          | O end frequency                   |                                                                                                                                                                                                     |                 |                          |      | 1022                 |
| A013          | O start ratio                     | 0. to 100.                                                                                                                                                                                          | 0.              | No                       | %    | 1023                 |
| A014          | O end ratio                       |                                                                                                                                                                                                     | 100.            |                          |      | 1024                 |
| A015          | O start selection                 | 00: External start frequency (A011 set value)<br>01: 0 Hz                                                                                                                                           | 01              | No                       | -    | 1025                 |
| A016          | O, OI sampling                    | 1. to 17.                                                                                                                                                                                           | 8.              | No                       | -    | 1026                 |
| A020          | Multi-step speed reference 0      | 0.0/starting frequency to max. frequency                                                                                                                                                            | 6.0             | Yes                      | Hz   | 1029                 |
| A220          | 2nd multi-step speed reference 0  | 0.0/starting frequency to 2nd max. frequency                                                                                                                                                        |                 |                          |      | 150F                 |

PARAMETER LIST

| Parameter No. | Function name                              | Monitoring or data range (digital operator)                                                                                                                | Default setting | Changes during operation | Unit | Modbus address (hex) |  |  |  |  |
|---------------|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------|------|----------------------|--|--|--|--|
| A021          | Multi-step speed reference 1               | 0.0/starting frequency to max frequency                                                                                                                    | 0.0             | Yes                      | Hz   | 102B                 |  |  |  |  |
| A022          | Multi-step speed reference 2               |                                                                                                                                                            |                 |                          |      | 102D                 |  |  |  |  |
| A023          | Multi-step speed reference 3               |                                                                                                                                                            |                 |                          |      | 102F                 |  |  |  |  |
| A024          | Multi-step speed reference 4               |                                                                                                                                                            |                 |                          |      | 1031                 |  |  |  |  |
| A025          | Multi-step speed reference 5               |                                                                                                                                                            |                 |                          |      | 1033                 |  |  |  |  |
| A026          | Multi-step speed reference 6               |                                                                                                                                                            |                 |                          |      | 1035                 |  |  |  |  |
| A027          | Multi-step speed reference 7               |                                                                                                                                                            |                 |                          |      | 1037                 |  |  |  |  |
| A028          | Multi-step speed reference 8               |                                                                                                                                                            |                 |                          |      | 1039                 |  |  |  |  |
| A029          | Multi-step speed reference 9               |                                                                                                                                                            |                 |                          |      | 103B                 |  |  |  |  |
| A030          | Multi-step speed reference 10              |                                                                                                                                                            |                 |                          |      | 103D                 |  |  |  |  |
| A031          | Multi-step speed reference 11              |                                                                                                                                                            |                 |                          |      | 103F                 |  |  |  |  |
| A032          | Multi-step speed reference 12              |                                                                                                                                                            |                 |                          |      | 1041                 |  |  |  |  |
| A033          | Multi-step speed reference 13              |                                                                                                                                                            |                 |                          |      | 1043                 |  |  |  |  |
| A034          | Multi-step speed reference 14              |                                                                                                                                                            |                 |                          |      | 1045                 |  |  |  |  |
| A035          | Multi-step speed reference 15              |                                                                                                                                                            |                 |                          |      | 1047                 |  |  |  |  |
| A038          | Jogging frequency                          | 0.00/starting frequency to 9.99                                                                                                                            | 6.00            | Yes                      | Hz   | 1048                 |  |  |  |  |
| A039          | Jogging stop selection                     | 00: Free-run stop<br>01: Deceleration stop<br>02: DC injection braking stop                                                                                | 00              | No                       | -    | 1049                 |  |  |  |  |
| A041          | Torque boost selection                     | 00: Manual torque boost only<br>01: Automatic (simple) torque boost                                                                                        | 00              | No                       | –    | 104A                 |  |  |  |  |
| A241          | 2nd torque boost selection                 | 0.0 to 20.0                                                                                                                                                | 5.0             | Yes                      | %    | 1510                 |  |  |  |  |
| A042          | Manual torque boost voltage                |                                                                                                                                                            |                 |                          |      | 104B                 |  |  |  |  |
| A242          | 2nd manual torque boost voltage            | 0.0                                                                                                                                                        | 0.0             | Yes                      | %    | 1511                 |  |  |  |  |
| A043          | Manual torque boost frequency              | 0.0 to 50.0                                                                                                                                                | 2.5             |                          |      | 104C                 |  |  |  |  |
| A243          | 2nd manual torque boost frequency          | 0.0                                                                                                                                                        | 0.0             | 1512                     |      |                      |  |  |  |  |
| A044          | V/F characteristics selection              | 00: Constant torque characteristics (VC)<br>01: Reduced torque characteristics (VP 1.7th power)<br>06: Special reduced torque characteristics (Special VP) | 00              | No                       | –    | 104D                 |  |  |  |  |
| A244          | 2nd V/F characteristics selection          | 20. to 100.                                                                                                                                                | 100.            | Yes                      | %    | 1513                 |  |  |  |  |
| A045          | Output voltage gain                        |                                                                                                                                                            |                 |                          |      | 104E                 |  |  |  |  |
| A245          | 2nd output voltage gain                    | 00: Disabled<br>01: Enabled<br>02: Frequency control [A052 set value]                                                                                      | 00              | No                       | –    | 1514                 |  |  |  |  |
| A051          | DC injection braking selection             |                                                                                                                                                            |                 |                          |      | 1051                 |  |  |  |  |
| A052          | DC injection braking frequency             | 0.0 to 60.0                                                                                                                                                | 0.5             | No                       | Hz   | 1052                 |  |  |  |  |
| A053          | DC injection braking delay time            | 0.0 to 5.0                                                                                                                                                 | 0.0             | No                       | s    | 1053                 |  |  |  |  |
| A054          | DC injection braking power                 | 0. to 100.                                                                                                                                                 | 50              | No                       | %    | 1054                 |  |  |  |  |
| A055          | DC injection braking time                  | 0.0 to 60.0                                                                                                                                                | 0.5             | No                       | s    | 1055                 |  |  |  |  |
| A056          | DC injection braking method selection      | 00: Edge operation<br>01: Level operation                                                                                                                  | 01              | No                       | –    | 1056                 |  |  |  |  |
| A061          | Frequency upper limit                      | 0.0/frequency lower limit to max frequency                                                                                                                 | 0.0             | No                       | Hz   | 105A                 |  |  |  |  |
| A261          | 2nd frequency upper limit                  | 0.0/2nd frequency lower limit to 2nd max frequency                                                                                                         |                 |                          |      | 1517                 |  |  |  |  |
| A062          | Frequency lower limit                      | 0.0/starting frequency to frequency upper limit                                                                                                            | 0.0             | No                       | Hz   | 105B                 |  |  |  |  |
| A262          | 2nd frequency lower limit                  | 0.0/starting frequency to 2nd frequency upper limit                                                                                                        |                 |                          |      | 1518                 |  |  |  |  |
| A063          | Jump frequency 1                           | Jump frequency: 0.0 to 400.0                                                                                                                               | 0.0             | No                       | Hz   | 105D                 |  |  |  |  |
| A064          | Jump frequency width 1                     | Jump frequency width: 0.0 to 1.0                                                                                                                           | 0.5             |                          |      | 105E                 |  |  |  |  |
| A065          | Jump frequency 2                           |                                                                                                                                                            | 0.0             |                          |      | 1060                 |  |  |  |  |
| A066          | Jump frequency width 2                     |                                                                                                                                                            | 0.5             |                          |      | 1061                 |  |  |  |  |
| A067          | Jump frequency 3                           |                                                                                                                                                            | 0.0             |                          |      | 1063                 |  |  |  |  |
| A068          | Jump frequency width 3                     |                                                                                                                                                            | 0.5             |                          |      | 1064                 |  |  |  |  |
| A071          | PID selection                              | 00: Disabled<br>01: Enabled                                                                                                                                | 00              | No                       | –    | 1068                 |  |  |  |  |
| A072          | PID P gain                                 | 0.2 to 5.0                                                                                                                                                 | 1.0             | Yes                      | –    | 1069                 |  |  |  |  |
| A073          | PID I gain                                 | 0.0 to 150.0                                                                                                                                               | 1.0             | Yes                      | s    | 106A                 |  |  |  |  |
| A074          | PID D gain                                 | 0.0 to 100.0                                                                                                                                               | 0.0             | Yes                      | s    | 106B                 |  |  |  |  |
| A075          | PID scale                                  | 0.01 to 99.99                                                                                                                                              | 1.00            | No                       | Time | 106C                 |  |  |  |  |
| A076          | PID feedback selection                     | 00: OI<br>01: O<br>02: RS485 communication<br>10: Operation function result                                                                                | 00              | No                       | –    | 106D                 |  |  |  |  |
| A077          | Reverse PID function                       | 00: OFF (Deviation = Target value - Feedback value)<br>01: ON (Deviation = Feedback value - Target value)                                                  | 00              | No                       | –    | 106E                 |  |  |  |  |
| A078          | PID output limit function                  | 0.0 to 100.0                                                                                                                                               | 0.0             | No                       | %    | 106F                 |  |  |  |  |
| A081          | AVR selection                              | 00: Always ON<br>01: Always OFF<br>02: OFF during deceleration                                                                                             | 02              | No                       | –    | 1070                 |  |  |  |  |
| A082          | AVR voltage selection                      | 200-V class: 200/215/220/230/240<br>400-V class: 380/400/415/440/460/480                                                                                   | 200/400         | No                       | V    | 1071                 |  |  |  |  |
| A085          | RUN mode selection                         | 00: Normal operation<br>01: Energy-saving operation                                                                                                        | 00              | No                       | –    | 1072                 |  |  |  |  |
| A086          | Energy-saving response/accuracy adjustment | 0 to 100                                                                                                                                                   | 50              | No                       | %    | 1073                 |  |  |  |  |
| A092          | Acceleration time 2                        | 0.01 to 3000.                                                                                                                                              | 15.00           | Yes                      | s    | 1074 (high)          |  |  |  |  |
| A292          | 2nd acceleration time 2                    |                                                                                                                                                            |                 |                          |      | 1075 (low)           |  |  |  |  |
|               |                                            |                                                                                                                                                            |                 |                          |      | 1519 (high)          |  |  |  |  |
|               |                                            |                                                                                                                                                            |                 |                          |      | 151A (low)           |  |  |  |  |

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| Parameter No. | Function name                       | Monitoring or data range (digital operator)                                              | Default setting | Changes during operation | Unit | Modbus address (hex) |
|---------------|-------------------------------------|------------------------------------------------------------------------------------------|-----------------|--------------------------|------|----------------------|
| A093          | Deceleration time 2                 | 0.01 to 3000.                                                                            | 15.00           | Yes                      | s    | 1076 (high)          |
| A293          | 2nd deceleration time 2             |                                                                                          |                 |                          |      | 1077 (low)           |
|               |                                     |                                                                                          |                 |                          |      | 151B (high)          |
|               |                                     |                                                                                          |                 |                          |      | 151C (low)           |
| A094          | 2-step accel/decel selection        | 00: Switched via multi-function input 09 (2CH)                                           | 00              | No                       | –    | 1078                 |
| A294          | 2nd 2-step accel/decel selection    | 01: Switched by setting                                                                  |                 |                          |      | 151D                 |
| A095          | 2-step acceleration frequency       | 0.0 to 400.0                                                                             | 0.0             | No                       | Hz   | 107A                 |
| A295          | 2nd 2-step acceleration frequency   |                                                                                          |                 |                          |      | 151F                 |
| A096          | 2-step deceleration frequency       | 0.0 to 400.0                                                                             | 0.0             | No                       | Hz   | 107C                 |
| A296          | 2nd 2-step deceleration frequency   |                                                                                          |                 |                          |      | 1521                 |
| A097          | Acceleration pattern selection      | 00: Line                                                                                 | 00              | No                       | –    | 107D                 |
| A098          | Deceleration pattern setting        | 01: S-shape curve                                                                        |                 |                          |      | 107E                 |
| A101          | OI start frequency                  | 0.0 to 400.0                                                                             | 0.0             | No                       | Hz   | 1080                 |
| A102          | OI end frequency                    |                                                                                          |                 |                          |      | 1082                 |
| A103          | OI start ratio                      | 0. to 100.                                                                               | 0.              | No                       | %    | 1083                 |
| A104          | OI end ratio                        |                                                                                          | 100.            |                          |      | 1084                 |
| A105          | OI start selection                  | 00: Use OI start frequency [A101]<br>01: 0 Hz start                                      | 01              | No                       | –    | 1085                 |
| A141          | Operation frequency input A setting | 00: Digital operator (F001)<br>01: Digital operator (FREQ adjuster)                      | 01              | No                       | –    | 108E                 |
| A142          | Operation frequency input B setting | 02: Input O<br>03: Input OI<br>04: RS485 communication                                   | 02              |                          |      | 108F                 |
| A143          | Operator selection                  | 00: Addition (A + B)<br>01: Subtraction (A - B)<br>03: Multiplication (A x B)            | 00              | No                       | –    | 1090                 |
| A145          | Frequency addition amount           | 0.0 to 400.0                                                                             | 0.0             | Yes                      | Hz   | 1091                 |
| A146          | Frequency addition direction        | 00: Adds A145 value to output frequency<br>01: Subtract A145 value from output frequency | 00              | No                       | –    | 1093                 |
| A151          | VR start frequency                  | 0.0 to 400.0                                                                             | 0.0             | No                       | Hz   | 1095                 |
| A152          | VR end frequency                    |                                                                                          |                 |                          |      | 1097                 |
| A153          | VR start ratio                      |                                                                                          |                 |                          |      | 1098                 |
| A154          | VR end ratio                        |                                                                                          |                 |                          |      | 1099                 |
| A155          | VR start selection                  | 00: Use VR start frequency [A151]<br>01: 0 Hz start                                      | 01              | No                       | –    | 109A                 |

4.3 Parameter group B

| Parameter No. | Function name                                                         | Monitoring or data range (digital operator)                                                                        | Default setting     | Changes during operation | Unit | Modbus address (hex) |
|---------------|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------|--------------------------|------|----------------------|
| b001          | Retry selection                                                       | 00: Alarm<br>01: 0 Hz start<br>02: Frequency matching start<br>03: Trip after frequency matching deceleration stop | 00                  | No                       | –    | 10A5                 |
| b002          | Allowable momentary power interruption time                           | 0.3 to 25.0                                                                                                        | 1.0                 | No                       | s    | 10A6                 |
| b003          | Retry wait time                                                       | 0.3 to 100.0                                                                                                       | 1.0                 | No                       | s    | 10A7                 |
| b004          | Momentary power interruption/undervoltage trip during stop selection  | 00: Disabled<br>01: Enabled                                                                                        | 00                  | No                       | –    | 10A8                 |
| b005          | Momentary power interruption retry time selection                     | 00: 16 times<br>01: No limit                                                                                       | 00                  | No                       | –    | 10A9                 |
| b011          | Starting frequency at active frequency matching restart               | 00: Frequency at interruption<br>01: Max. frequency<br>02: Set frequency                                           | 00                  | No                       | –    | 1170                 |
| b012          | Electronic thermal level                                              | 0.2 x Rated current to 1.0 x Rated current                                                                         | Rated current       | No                       | A    | 10AD                 |
| b212          | 2nd electronic thermal level                                          |                                                                                                                    |                     |                          |      | 1527                 |
| b013          | Electronic thermal characteristics selection                          | 00: Reduced torque characteristics 1                                                                               | 00                  | No                       | –    | 10AE                 |
| b213          | 2nd electronic thermal characteristics selection                      | 01: Constant torque characteristics<br>02: Reduced torque characteristics 2                                        |                     |                          |      | 1528                 |
| b021          | Overload limit selection                                              | 00: Disabled                                                                                                       | 01                  | No                       | –    | 10B5                 |
| b221          | 2nd overload limit selection                                          | 01: Enabled in acceleration/constant speed operation<br>02: Enabled in constant speed operation                    |                     |                          |      | 1529                 |
| b022          | Overload limit level                                                  | 0.1 x Rated current to 1.5 x Rated current                                                                         | 1.5 x Rated current | No                       | A    | 10B6                 |
| b222          | 2nd overload limit level                                              |                                                                                                                    |                     |                          |      | 152A                 |
| b023          | Overload limit parameter                                              | 0.1 to 3000.0                                                                                                      | 1.0                 | No                       | s    | 10B7                 |
| b223          | 2nd overload limit parameter                                          |                                                                                                                    |                     |                          |      | 152B                 |
| b028          | Overload limit source selection                                       | 00: b022, b222 set values                                                                                          | 00                  | No                       | –    | 10BB                 |
| b228          | 2nd overload limit source selection                                   | 01: Input terminal O                                                                                               |                     |                          |      | 152C                 |
| b029          | Deceleration rate constant at active frequency matching restart level | 0.1 to 3000.0                                                                                                      | 0.5                 | No                       | s    | 1171                 |
| b030          | Active frequency matching restart level                               | 0.2 x Rated current to 2.0 x Rated current                                                                         | Rated current       | No                       | A    | 1172                 |

**PARAMETER LIST**

| Parameter No. | Function name                                                                    | Monitoring or data range (digital operator)                                                                                                                                                                                                                                                                                                                                                      | Default setting | Changes during operation | Unit | Modbus address (hex) |
|---------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------|------|----------------------|
| b031          | Soft lock selection                                                              | 00: Data other than b031 cannot be changed when terminal SFT is ON<br>01: Data other than b031 and the specified frequency parameter cannot be changed when terminal SFT is ON<br>02: Data other than b031 cannot be changed<br>03: Data other than b031 and the specified frequency parameter cannot be changed<br>10: Data other than parameters changeable during operation cannot be changed | 01              | No                       | –    | 10BC                 |
| b050          | Selection of non-stop function at momentary power interruption                   | 00: Disabled<br>01: Enabled (Stop)<br>02: Enabled (Restart)                                                                                                                                                                                                                                                                                                                                      | 00              | No                       | –    | 10C9                 |
| b051          | Starting voltage of non-stop function at momentary power interruption            | 0.0 to 1000.                                                                                                                                                                                                                                                                                                                                                                                     | 0.0             | No                       | V    | 10CA                 |
| b052          | Stop deceleration level of non-stop function at momentary power interruption     |                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                          |      | 10CB                 |
| b053          | Deceleration time of non-stop function at momentary power interruption           | 0.01 to 3000                                                                                                                                                                                                                                                                                                                                                                                     | 1.0             | No                       | s    | 10CC                 |
| b054          | Deceleration starting width of non-stop function at momentary power interruption | 0.0 to 10.0                                                                                                                                                                                                                                                                                                                                                                                      | 0.0             | No                       | Hz   | 10CE                 |
| b055          | Overvoltage protection proportional gain during deceleration                     | 0.2 to 5.0                                                                                                                                                                                                                                                                                                                                                                                       | 0.2             | Yes                      | –    | 1173                 |
| b056          | Overvoltage protection integral time during deceleration                         | 0.0 to 150.0                                                                                                                                                                                                                                                                                                                                                                                     | 0.2             | Yes                      | s    | 1174                 |
| b080          | AM adjustment                                                                    | 0. to 255.<br>(Shared with C086 for AM offset adjustment)                                                                                                                                                                                                                                                                                                                                        | 100.            | Yes                      | –    | 10CF                 |
| b082          | Starting frequency                                                               | 0.5 to 9.99                                                                                                                                                                                                                                                                                                                                                                                      | 1.5             | No                       | Hz   | 10D1                 |
| b083          | Carrier frequency                                                                | 2.0 to 12.0                                                                                                                                                                                                                                                                                                                                                                                      | 3.0             | No                       | kHz  | 10D2                 |
| b084          | Initialization selection                                                         | 00: Clears the trip monitor<br>01: Initializes data<br>02: Clears the trip monitor and initializes data                                                                                                                                                                                                                                                                                          | 00              | No                       | –    | 10D3                 |
| b085          | Initialization parameter selection                                               | 00 (Do not change)                                                                                                                                                                                                                                                                                                                                                                               | 00              | No                       | –    | 10D4                 |
| b086          | Frequency conversion coefficient                                                 | 0.1 to 99.9                                                                                                                                                                                                                                                                                                                                                                                      | 1.0             | Yes                      | –    | 10D5                 |
| b087          | STOP key selection                                                               | 00: Enabled<br>01: Disabled                                                                                                                                                                                                                                                                                                                                                                      | 00              | No                       | –    | 10D6                 |
| b088          | Free-run stop selection                                                          | 00: 0 Hz start<br>01: Active frequency matching restart                                                                                                                                                                                                                                                                                                                                          | 00              | No                       | –    | 10D7                 |
| b089          | Monitor display selection                                                        | 01: Output frequency monitor<br>02: Output current monitor<br>03: Rotation direction monitor<br>04: PID feedback value monitor<br>05: Multi-function input monitor<br>06: Multi-function output monitor<br>07: Frequency conversion monitor                                                                                                                                                      | 01              | Yes                      | –    | 10D8                 |
| b091          | Stop selection                                                                   | 00: Decel-Stop<br>01: Free-RUN                                                                                                                                                                                                                                                                                                                                                                   | 00              | No                       | –    | 10DA                 |
| b092          | Cooling fan control                                                              | 00: Always ON<br>01: ON during RUN<br>02: Depends on the fin temperature                                                                                                                                                                                                                                                                                                                         | 01              | No                       | –    | 10DB                 |
| b130          | Overvoltage LAD stop function                                                    | 00: Disabled<br>01: Enabled                                                                                                                                                                                                                                                                                                                                                                      | 00              | No                       | –    | 10F5                 |
| b131          | Overvoltage LAD stop function level setting                                      | 200-V class: 330. to 395.<br>400-V class: 660. to 790.                                                                                                                                                                                                                                                                                                                                           | 380/760         | Yes                      | V    | 10F6                 |
| b133          | Overvoltage protection function selection during deceleration                    | 00: Disabled<br>01: Enabled                                                                                                                                                                                                                                                                                                                                                                      | 00              | No                       | –    | 1176                 |
| b134          | Overvoltage protection level setting during deceleration                         | 200-V class: 330. to 395.<br>400-V class: 660. to 790.                                                                                                                                                                                                                                                                                                                                           | 380/760         | No                       | V    | 1177                 |
| b140          | Overcurrent suppression function                                                 | 00: Disabled<br>01: Enabled                                                                                                                                                                                                                                                                                                                                                                      | 01              | No                       | –    | 10F7                 |
| b150          | Automatic carrier reduction                                                      | 00: Disabled<br>01: Enabled                                                                                                                                                                                                                                                                                                                                                                      | 00              | No                       | –    | 10F8                 |
| b151          | Ready function selection                                                         | 00: Disabled<br>01: Enabled                                                                                                                                                                                                                                                                                                                                                                      | 00              | No                       | –    | 10F9                 |

## PARAMETER LIST

## 4.4 Parameter group C

| Parameter No. | Function name                                       | Monitoring or data range (digital operator)                                                                                                                                                                                                          | Default setting | Changes during operation | Unit | Modbus address (hex) |
|---------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------|------|----------------------|
| C001          | Multi-function input 1 selection                    | 00: FW (forward)<br>01: RV (reverse)<br>02: CF1 (multi-step speed setting binary 1)                                                                                                                                                                  | 00              | No                       | –    | 1103                 |
| C201          | 2nd multi-function input 1 selection                | 03: CF2 (multi-step speed setting binary 2)<br>04: CF3 (multi-step speed setting binary 3)<br>05: CF4 (multi-step speed setting binary 4)<br>06: JG (jogging)                                                                                        | 00              |                          |      | 1532                 |
| C002          | Multi-function input 2 selection                    | 07: DB (external DC injection braking)<br>08: SET (2nd control)<br>09: 2CH (2-step acceleration/deceleration)                                                                                                                                        | 01              |                          |      | 1104                 |
| C202          | 2nd multi-function input 2 selection                | 11: FRS (free-run stop)<br>12: EXT (external trip)<br>13: USP (USP function)<br>15: SFT (soft lock)                                                                                                                                                  | 01              |                          |      | 1533                 |
| C003          | Multi-function input 3 selection                    | 16: AT (analog input switching)<br>18: RS (reset)<br>19: PTC (thermistor input)                                                                                                                                                                      | 18              |                          |      | 1105                 |
| C203          | 2nd multi-function input 3 selection                | 20: STA (3-wire start)<br>21: STP (3-wire stop)<br>22: F/R (3-wire forward/reverse)<br>23: PID (PID enabled/disabled)                                                                                                                                | 18              |                          |      | 1534                 |
| C004          | Multi-function input 4 selection                    | 24: PIDC (PID integral reset)<br>27: UP (UP/DWN function accelerated)<br>28: DWN (UP/DWN function decelerated)                                                                                                                                       | 12              |                          |      | 1106                 |
| C204          | 2nd multi-function input 4 selection                | 29: UDC (UP/DWN function data clear)<br>31: OPE (forced operator)<br>50: ADD (frequency addition)<br>51: F-TM (forced terminal block)<br>52: RDY (ready function)<br>53: SP-SET (special 2nd function)<br>64: EMR (emergency shutoff <sup>*1</sup> ) | 12              |                          |      | 1535                 |
| C005          | Multi-function input 5 selection                    | 255: No function                                                                                                                                                                                                                                     | 02              |                          |      | 1107                 |
| C205          | 2nd multi-function input 5 selection                |                                                                                                                                                                                                                                                      | 02              |                          |      | 1536                 |
|               |                                                     | *1. The EMR is set forcibly with switch S8, not with parameters.                                                                                                                                                                                     |                 |                          |      |                      |
| C011          | Multi-function input 1 operation selection          | 00: NO                                                                                                                                                                                                                                               | 00              | No                       | –    | 110B                 |
| C012          | Multi-function input 2 operation selection          | 01: NC                                                                                                                                                                                                                                               |                 |                          |      | 110C                 |
| C013          | Multi-function input 3 operation selection          |                                                                                                                                                                                                                                                      |                 |                          |      | 110D                 |
| C014          | Multi-function input 4 operation selection          |                                                                                                                                                                                                                                                      |                 |                          |      | 110E                 |
| C015          | Multi-function input 5 operation selection          |                                                                                                                                                                                                                                                      |                 |                          |      | 110F                 |
| C021          | Multi-function output terminal 11 selection         | 00: RUN (signal during RUN)<br>01: FA1 (constant speed arrival signal)<br>02: FA2 (over set frequency arrival signal)<br>03: OL (overload warning)<br>04: OD (excessive PID deviation)<br>05: AL (alarm output)                                      | 00              | No                       | –    | 1114                 |
| C026          | Relay output (AL2, AL1) function selection          | 06: Dc (disconnection detection)<br>07: FBV (PID FB status output)<br>08: NDc (network error)<br>09: LOG (logic operation output)<br>10: ODc (do not use)<br>43: LOC (light load detection signal)                                                   | 05              |                          |      | 1119                 |
| C028          | AM selection                                        | 00: Output frequency<br>01: Output current                                                                                                                                                                                                           | 00              | No                       | –    | 111B                 |
| C031          | Multi-function output terminal 11 contact selection | 00: NO contact at AL2, NC contact at AL1<br>01: NC contact at AL2, NO contact at AL1                                                                                                                                                                 | 00              | No                       | –    | 111D                 |
| C036          | Relay output (AL2, AL1) contact selection           |                                                                                                                                                                                                                                                      | 01              |                          |      | 1122                 |
| C038          | Light load signal output mode                       | 00: Enabled during acceleration/deceleration/constant speed<br>01: Enabled only during constant speed                                                                                                                                                | 01              | No                       | –    | 1178                 |
| C039          | Light load detection level                          | 0.0 to 2.0 x Rated current (0.0 setting: function disable)                                                                                                                                                                                           | Rated current   | No                       | –    | 1179                 |
| C041          | Overload warning level                              | 0.0: Does not operate                                                                                                                                                                                                                                | Rated current   | No                       | A    | 1124                 |
| C241          | 2nd overload warning level                          | 0.1 x Rated current to 2.0 x Rated current                                                                                                                                                                                                           |                 |                          |      | 153A                 |
| C042          | Arrival frequency during acceleration               | 0.0 to 400.0                                                                                                                                                                                                                                         | 0.0             | No                       | Hz   | 1126                 |
| C043          | Arrival frequency during deceleration               |                                                                                                                                                                                                                                                      |                 |                          |      | 1128                 |
| C044          | PID deviation excessive level                       | 0.0 to 100.0                                                                                                                                                                                                                                         | 3.0             | No                       | %    | 1129                 |
| C052          | PID FB upper limit                                  | 0.0 to 100.0                                                                                                                                                                                                                                         | 100.0           | No                       | %    | 112E                 |
| C053          | PID FB lower limit                                  |                                                                                                                                                                                                                                                      | 0.0             |                          |      | 112F                 |
| C070          | Operator/Modbus selection                           | 02: Digital Operator<br>03: Modbus                                                                                                                                                                                                                   | 02              | No                       | –    | 1137                 |
| C071          | Communication speed selection (Baud rate selection) | 04: 4800 bps<br>05: 9600 bps<br>06: 19200 bps                                                                                                                                                                                                        | 04              | No                       | –    | 1137                 |
| C072          | Communication station No. selection                 | 1. to 32.                                                                                                                                                                                                                                            | 1.              | No                       | –    | 1139                 |

## PARAMETER LIST

| Parameter No. | Function name                    | Monitoring or data range (digital operator)                                                                                                                                            | Default setting | Changes during operation | Unit | Modbus address (hex) |
|---------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------|------|----------------------|
| C074          | Communication parity selection   | 00: No parity<br>01: Even<br>02: Odd                                                                                                                                                   | 00              | No                       | –    | 113B                 |
| C075          | Communication stop bit selection | 1: 1-bit<br>2: 2-bit                                                                                                                                                                   | 1               | No                       | –    | 113C                 |
| C076          | Communication error selection    | 00: Trip<br>01: Trip after deceleration stop<br>02: Ignore<br>03: Free run<br>04: Deceleration Stop                                                                                    | 02              | No                       | –    | 113D                 |
| C077          | Communication error timeout      | 0.00 to 99.99                                                                                                                                                                          | 0.00            | No                       | s    | 113E                 |
| C078          | Communication wait time          | 0. to 1000.                                                                                                                                                                            | 0.              | No                       | ms   | 113F                 |
| C081          | O adjustment                     | 0.0 to 200.0                                                                                                                                                                           | 100.0           | Yes                      | %    | 1141                 |
| C082          | OI adjustment                    |                                                                                                                                                                                        |                 |                          |      | 1142                 |
| C086          | AM offset adjustment             | 0.0 to 10.0                                                                                                                                                                            | 0.0             | Yes                      | V    | 1145                 |
| C091          | Not used                         | Use “00” (Do not change)                                                                                                                                                               | 00              | –                        | –    | –                    |
| C101          | UP/DWN selection                 | 00: Do not store the frequency data<br>01: Store the frequency data                                                                                                                    | 00              | No                       | –    | 1149                 |
| C102          | Reset selection                  | 00: Trip reset at rising edge of RS input<br>01: Trip reset at falling edge of RS input<br>02: Enabled only during trip (Reset at rising edge of RS input)                             | 00              | No                       | –    | 114A                 |
| C141          | Logic operation function A input | 00: RUN (signal during RUN)<br>01: FA1 (constant speed arrival signal)<br>02: FA2 (over set frequency arrival signal)<br>03: OL (overload warning)<br>04: OD (excessive PID deviation) | 00              | No                       | –    | 1150                 |
| C142          | Logic operation function B input | 05: AL (alarm output)<br>06: Dc (disconnection detected)<br>07: FBV (PID FB status output)<br>08: NDc (network error)<br>10: ODc (do not use)<br>43: LOC (light load detection signal) | 01              |                          |      | 1151                 |
| C143          | Logic operator selection         | 00: AND<br>01: OR<br>02: XOR                                                                                                                                                           | 00              | No                       | –    | 1152                 |
| C144          | Output terminal 11 ON delay      | 0.0 to 100.0                                                                                                                                                                           | 0.0             | No                       | s    | 1153                 |
| C145          | Output terminal 11 OFF delay     |                                                                                                                                                                                        |                 |                          |      | 1154                 |
| C148          | Relay output ON delay            | 0.0 to 100.0                                                                                                                                                                           | 0.0             | No                       | s    | 1157                 |
| C149          | Relay output OFF delay           |                                                                                                                                                                                        |                 |                          |      | 1158                 |

## 4.5 Parameter group H

| Parameter No. | Function name                   | Monitoring or data range (digital operator)   | Default setting | Changes during operation | Unit | Modbus address (hex) |
|---------------|---------------------------------|-----------------------------------------------|-----------------|--------------------------|------|----------------------|
| H003          | Motor capacity selection        | 200-V class: 0.2/0.4/0.75/1.5/2.2/3.7/5.5/7.5 | Factory default | No                       | kW   | 1165                 |
| H203          | 2nd motor capacity selection    | 400-V class: 0.4/0.75/1.5/2.2/3.7/5.5/7.5     |                 |                          |      | 1541                 |
| H004          | Motor pole number selection     | 2/4/6/8                                       | 4               | No                       | Pole | 1166                 |
| H204          | 2nd motor pole number selection |                                               |                 |                          |      | 1542                 |
| H006          | Stabilization parameter         | 0. to 255.                                    | 100             | Yes                      | %    | 1168                 |
| H206          | 2nd stabilization parameter     |                                               |                 |                          |      | 1544                 |

## 4.6 Parameter group F

| Parameter No. | Function name                         | Monitoring or data range (digital operator)     | Default setting | Changes during operation | Unit | Modbus address (hex) |
|---------------|---------------------------------------|-------------------------------------------------|-----------------|--------------------------|------|----------------------|
| F001          | Output frequency setting/monitor      | Starting frequency to 1st or 2nd max. frequency | –               | Yes                      | Hz   | –                    |
| F002          | Acceleration time 1                   | 0.01 to 3000.                                   | 10.0            | Yes                      | s    | 1014 (high)          |
|               |                                       |                                                 |                 |                          |      | 1015 (low)           |
| F202          | 2nd acceleration time 1               |                                                 |                 |                          |      | 1501 (high)          |
|               |                                       |                                                 |                 |                          |      | 1502 (low)           |
| F003          | Deceleration time 1                   | 0.01 to 3000.                                   | 10.0            | Yes                      | s    | 1016 (high)          |
|               |                                       |                                                 |                 |                          |      | 1017 (low)           |
| F203          | 2nd deceleration time 1               |                                                 |                 |                          |      | 1503 (high)          |
|               |                                       |                                                 |                 |                          |      | 1504 (low)           |
| F004          | Operator rotation direction selection | 00: Forward<br>01: Reverse                      | 00              | No                       | –    | 1018                 |



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Note: Specifications subject to change without notice.  
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