# CYTB6000 Series Frequency Inverter

# USER'S MANUAL

English Version V1.1

# TABLE OF CONTENT

# 1. PRELUDE

Thank you for using CYTB6000 series frequency inverter  manufactured by CEAYEA Electrical & Technology （shanghai） Co., Ltd. CYTB6000 series frequency inverter , independently developed by our company, is a universal vector control one that owns high quality, multiple functions and low noise.

This User's Manual offers complete introduction of installation and use of the frequency inverter , setting of function parameters, fault treatment and maintenance etc for CYTB6000 series frequency inverter .. Please carefully read this manual before use in order to guarantee correct installation and use of the frequency inverter .

This manual is an accessory along with the machine. Please keep it properly for the future use for repair and maintenance.

## 1.1.Labels concerned with safety.

The following symbols are applied with regard to the content related to safety in this manual. The description with

| ⚠ DANGER |
| --- |
| •Wrong operation may result in death or severe injury. |

safety symbol is of great importance and should be complied with.

| ⚠ WARNING |
| --- |
| •Wrong operation may result in death or severe injury. |

| ⚠ CAUTION |
| --- |
| •Wrong operation may result in slight injury or damage to equipment. |

## 1.2.Notice for package opening and check

| ⚠ CAUTION |
| --- |
| DO NOT try to install frequency inverter damaged or lacking components, otherwise there is risk of fire or casualty. |
| When opening the packing box, please carefully check and confirm: |
| •Whether there is damage to the product. |
| •Whether the product model conforms to the requirement of your order. Please refer to the MODEL column in the nameplate at the side of the frequency inverter for the model. |
| If you find there is problem in the product or the product does comply with your order, please instantly contact the distributor or QIROD   sales departments for solution. |

# 2. TYPE AND SPECIFICATIONS

## 2.1. Nameplate
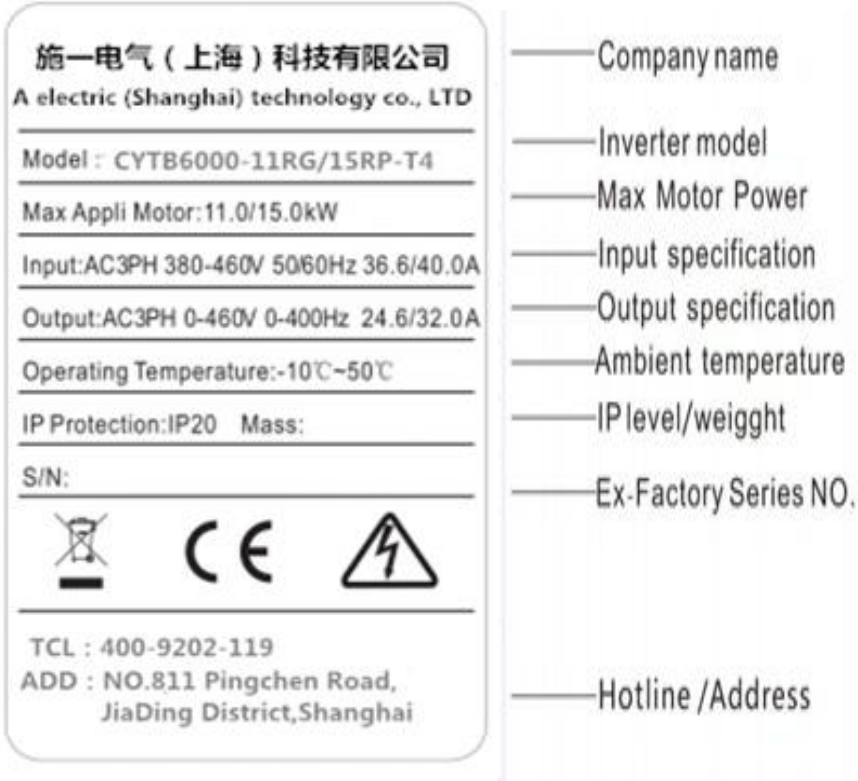


Figure 2.1  Nameplate example

## 2.2. Type description of frequency inverter
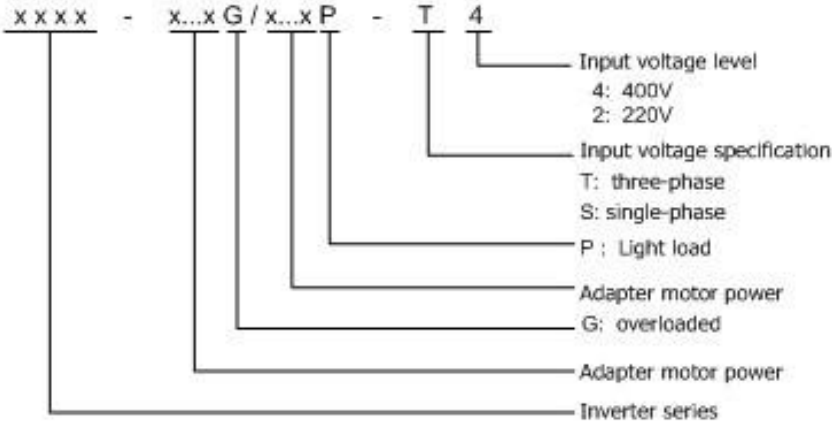


Figure 2.2  Type description of frequency inverter

## 2.3. Type of frequency inverter

Table 2.1  Type of CYTB6000 series frequency inverter  （Single-phase 200V class）

| Type | Motor power | | line current (A) | output current (A) | Maximum transient current for 60s (A) |
|------|------|------|------|------|------|
| | kW | HP | | | |
| CYTB6000-0R4G-S2 | 0.37 | 0.5 | 5.9 | 2.4 | 3.6 |
| CYTB6000-0R75G-S2 | 0.75 | 1 | 10.2 | 4.2 | 6.3 |
| CYTB6000-1R5G-S2 | 1.5 | 2 | 17.7 | 7.5 | 11.3 |
| CYTB6000-2R2G-S2 | 2.2 | 3 | 23.9 | 10 | 15 |

Table 2.2  Type of CYTB6000 series frequency inverter  （Three-phase 400V class）

| Type | G type (overloaded) | | | P type (light load) | | |
|------|------|------|------|------|------|------|
| | Line current (A) | Rated output current (A) | Motor power (kW) | Line current (A) | Rated output current (A) | Motor power (kW) |
| CYTB6000-0R75G/1R5P-T4 | 3.6 | 2.3 | 0.75 | 6.4 | 4.1 | 1.5 |
| CYTB6000-1R5G/2R2P-T4 | 6.4 | 4.1 | 1.5 | 8.7 | 5.5 | 2.2 |
| CYTB6000-2R2G/3RP-T4 | 8.7 | 5.5 | 2.2 | 10.9 | 6.9 | 3 |
| CYTB6000-4RG/5R5P-T4 | 14 | 9.4 | 4 | 20.7 | 12.6 | 5.5 |
| CYTB6000-5R5G/7R5P-T4 | 20.7 | 12.6 | 5.5 | 26.5 | 17 | 7.5 |
| CYTB6000-7R5G/11RP-T4 | 26.5 | 17 | 7.5 | 36.6 | 24.6 | 11 |
| CYTB6000-11RG/15RP-T4 | 36.6 | 24.6 | 11 | 40 | 32 | 15 |
| CYTB6000-15RG/18R5P-T4 | 40 | 32 | 15 | 47 | 38 | 18.5 |
| CYTB6000-18R5G/22RP-T4 | 47 | 38 | 18.5 | 56 | 45 | 22 |
| CYTB6000-22RG/30RP-T4 | 56 | 45 | 22 | 70 | 60 | 30 |
| CYTB6000-30RG/37RP-T4 | 70 | 60 | 30 | 80 | 75 | 37 |
| CYTB6000-37RG/45RP-T4 | 80 | 75 | 37 | 94 | 92 | 45 |
| CYTB6000-45RG/55RP-T4 | 94 | 92 | 45 | 128 | 115 | 55 |
| CYTB6000-55RG/75RP-T4 | 128 | 115 | 55 | 160 | 150 | 75 |
| CYTB6000-75RG/90RP-T4 | 160 | 150 | 75 | 190 | 180 | 90 |
| CYTB6000-90RG/110RP-T4 | 190 | 180 | 90 | 225 | 215 | 110 |
| CYTB6000-110RG/132RP-T4 | 225 | 215 | 110 | 265 | 260 | 132 |
| CYTB6000-132RG/160RP-T4 | 265 | 260 | 132 | 310 | 305 | 160 |
| CYTB6000-160RG/185RP-T4 | 310 | 305 | 160 | 355 | 350 | 185 |
| CYTB6000-185RG/200RP-T4 | 355 | 350 | 185 | 385 | 380 | 200 |
| CYTB6000-200RG/220RP-T4 | 385 | 380 | 200 | 430 | 425 | 220 |
| CYTB6000-220RG/250RP-T4 | 430 | 425 | 220 | 485 | 480 | 250 |
| CYTB6000-250RG/280RP-T4 | 485 | 480 | 250 | 545 | 530 | 280 |
| CYTB6000-280RG/315RP-T4 | 545 | 530 | 280 | 610 | 600 | 315 |
| CYTB6000-315RG/350RP-T4 | 610 | 600 | 315 | 665 | 650 | 350 |
| CYTB6000-350RG-T4 | 665 | 650 | 350 | 665 | 650 | 350 |

| CYTB6000-400RG-T4 | 785 | 725 | 400 | 785 | 725 | 400 |
| CYTB6000-500RG-T4 | 885 | 860 | 500 | 885 | 860 | 500 |
| CYTB6000-560RG-T4 | 950 | 950 | 560 | 950 | 950 | 560 |
| CYTB6000-630RG-T4 | 1100 | 1100 | 630 | 1100 | 1100 | 630 |

## 2.4. Technical specifications

Table 2.3: Technical Parameters of CYTB6000 Series frequency inverter

| ITEM | | SPECIFICATIONS |
|---|---|---|
| **Main Input** | Rated voltage and frequency | Single-phase 200V class: 200V-240V,50Hz/60Hz |
| | | 3-phase 400V class: 380V-480V , 50Hz/60Hz |
| | Allowable value of change | Voltage: 380V-15% ~ 480V+10%; Frequency: ±15% |
| **Main output** | Output voltage | Maximum output voltage equals to input voltage |
| | Output frequency | 0.5 Hz to 400 Hz |
| | Overload capacity | 150% of rated output current for 60s, 200% of rated output current for 2s |
| **Control performance** | Modulation mode | 3-phase PWM, 2-phase PWM |
| | Control mode | V/f control for constant torque, V/f control for quadratic load, vector control without PG (open loop control),Energy-saving |
| | Setting method of run command | Outer terminal, keyboard panel or serial communication |
| | Setting method of speed command | Analog setting, keyboard, serial communication, UP/DOWN speed setting from external terminal |
| | Speed setting resolution | Keyboard: 0.1 Hz |
| | | Analog setting: 0.05/50Hz (10bit) |
| | Speed control precision | V/f control:±2% |
| | | vector control without PG (open loop control): ±0.2% |
| | Speed control range | V/f control 1:40 |
| | | vector control without PG (open loop control) 1:200 |
| | Acceleration and Deceleration Time | 0-3200.0s |
| | switching frequency | 1.5 kHz ~ 12 kHz, according to junction temperature automatically reduce the switching frequency |
| **Analog input** | Number | 2 ways: AI1、AI2 |
| | Type | DC voltage or DC current |
| | Maximum input range | AI1: 0 to 5VDC, 0 to 10VDC, 0/4 to 20mA DC receivable |
| | | AI2: 0 to 10VDC or PTC probe input receivable |
| **Analog output** | Number | 2 way: AO1，AO2 |
| | Type | DC voltage or DC current |
| | Maximum input range | Voltage output: 0 to 10V, Current output: 0/4 to 20mA |

| | | |
|---|---|---|
| **logic input** | Number | 0.75kW-500kW:LI,LI2,LI3,LI4,LI5,LI6,LI7,LI8 |
| | Type | Source or Sink |
| | Maximum input range | 0-24VDC |

| ITEM | | SPECIFICATIONS |
|---|---|---|
| **logic output** | Number | 0.75kW-11kW: pulse signal output1、2 （LO1-CLO1、LO2-CLO2）, relay output1、2 （T1A-T1B-T1C、T2A-T2B-T2C）<br><br>15kW-500kW:pulse signal output （LO-CLO）, relay output 1、2 （T1A-T1B-T1C、T2A-T2B-T2C） |
| | pulse signal output | OC,output frequency、current output、act other function |
| | relay output | RA-RB-RC, including a NO contact and a NC contact<br>Maximum switch capacity:<br>T1A-TIC/T2A-T2C: 5A @ 250VAC, or 5A@ 30VDC<br>T1B-T1C/T2B-T2C: 3A @ 250VAC or 3A @ 30VDC |
| **Serial communication interface** | | RS485 interface supports Modbus protocol. |
| **Display** | 4-digit LED digital display | For display of frequency setting, output frequency, fault code and parameter setting etc. |
| **Environment** | Standard | Development of CYTB6000 series frequency inverter follows strict international standards and relevant recommended IEC and EN standards for control devices, especially IEC/EN61800-5-1 and IEC/EN61800-3. |
| | Altitude | Dreading unnecessary when altitude is 1000m or below (Dreading necessary at altitude higher than 1000m) |
| | Ambient environment | 0.75kW-11kW: Reliable operation at -10 ~ 50°C without debating. When top protective cover is taken off, the environment temperature can be as high as +50 °C. Above +50 °C, the current drops by 2.2% for each rise of 1 °C in temperature. 15kW-500kW: Reliable operation at -10 ~ 40°C without dreading.<br><br>Storage: -25 ~ 70°C |
| | Humidity | No condensed water or drip at 5 ~ 95%, In accordance with IEC60068-2-3 |
| | Impact strength | 15gn for continuous 11ms, In accordance with IEC/EN60068-2-27 |
| | Maximum antipollution capacity | Class 2, in accordance with IEC/EN61800-5-1 |
| **Structure** | Protection level | Top: IP41 (without removing the protective top cover). Other parts: IP20 |
| | Cooling Method | Forced Air cooling |
| **Installation method** | | Wall mounted |

# 2.5. External dimensions and other parameters

2.5,1 Description of components in the frequency inverter
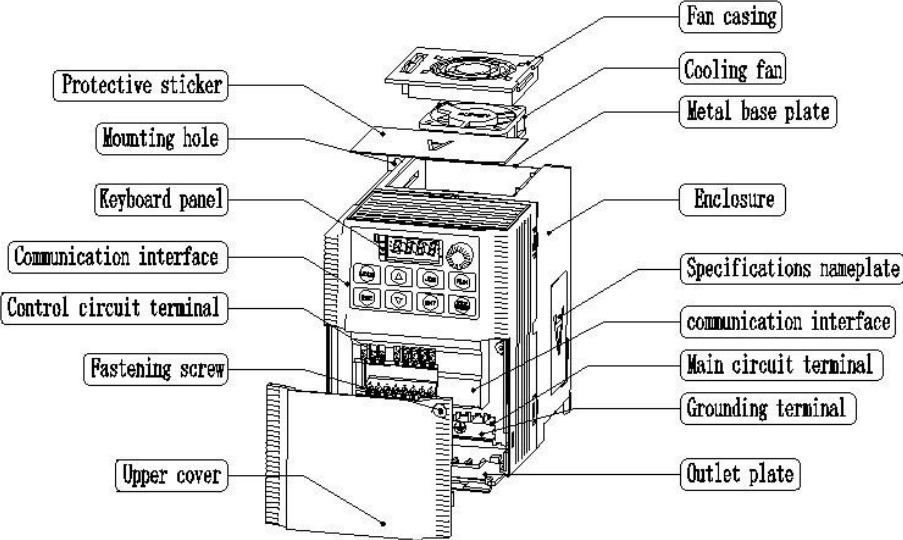


（a） Components of the frequency inverter （three-phase11kW and below)）
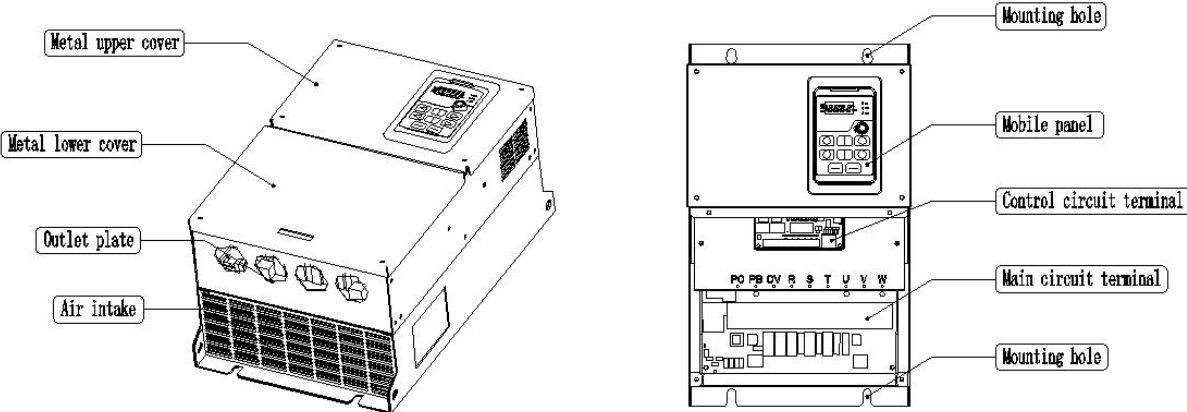


（b） Components of the frequency inverter （three-phase 15kW and above)
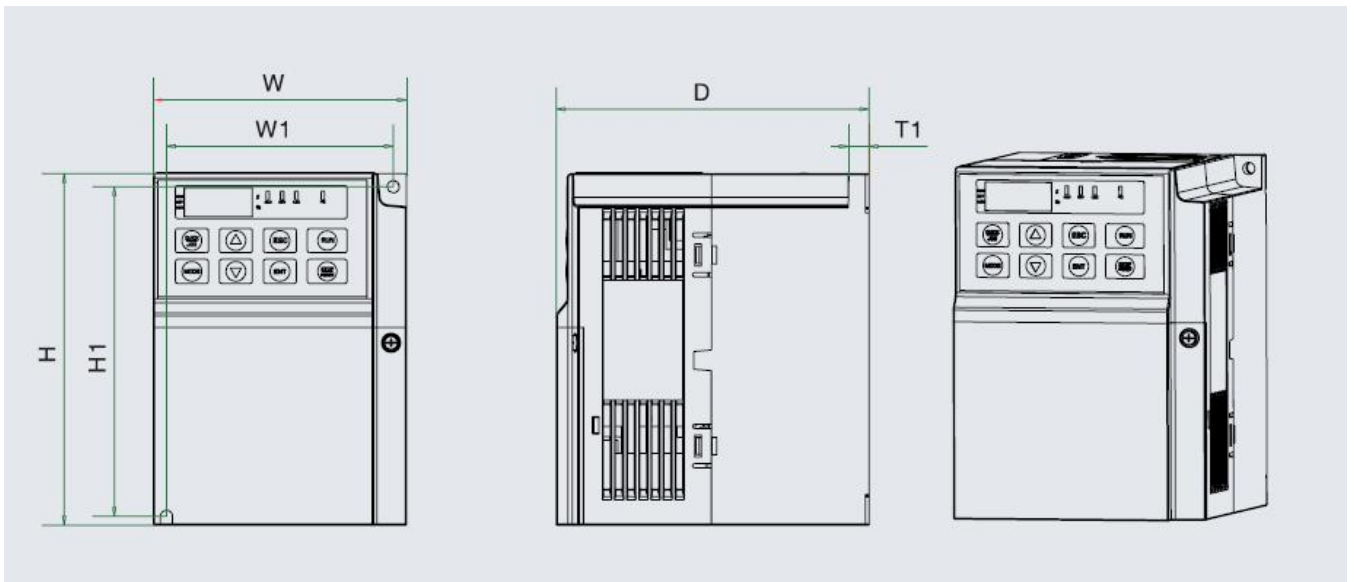
Figure 2.4 External and mounting dimensions(Single phase、three-phase11kW and below)

Table 2.4 External and mounting dimensions(Single phase、three-phase11kW and below)

| Model | Outline Dimensions（mm） | | | Installation Dimensions（mm） | | |
|---|---|---|---|---|---|---|
| | H | W | D | H1 | W1 | Aperture |
| CYTB6000-0R4G-S2 | 145 | 107 | 144 | 135 | 95 | Φ5 |
| CYTB6000-0R75G-S2 | | | | | | |
| CYTB6000-0R75G/1R5P -T4 | | | | | | |
| CYTB6000-1R5G/2R2P -T4 | | | | | | |
| CYTB6000-2R2G/3RP -T4 | | | | | | |
| CYTB6000-1R5G-S2 | 200 | 138 | 134 | 188 | 124 | Φ5 |
| CYTB6000-2R2G-S2 | | | | | | |
| CYTB6000-4RG/5R5P -T4 | | | | | | |
| CYTB6000-5R5G/7R5P -T4 | | | | | | |
| CYTB6000-7R5G/11RP -T4 | 232 | 153 | 164 | 220 | 139 | Φ5 |
| CYTB6000-11RG/15RP -T4 | | | | | | |
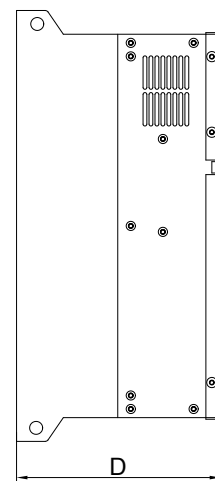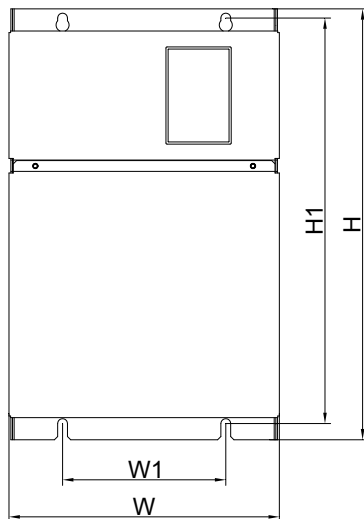
Figure 2.5   External and mounting dimensions (three-phase 15kW and above)

| Model | Outline Dimensions（mm） | | | Installation Dimensions（mm） | | |
|---|---|---|---|---|---|---|
| | H | W | D | H1 | W1 | Aperture |
| CYTB6000-15RG/18R5P -T4 | 399 | 249 | 188 | 376 | 150 | Φ9 |
| CYTB6000-18R5G/22RP -T4 | | | | | | |
| CYTB6000-22RG/30RP -T4 | 449 | 276 | 212 | 426 | 170 | Φ9 |
| CYTB6000-30RG/37RP -T4 | | | | | | |
| CYTB6000-37RG/45RP -T4 | 550 | 290 | 260 | 530 | 180 | Φ11 |
| CYTB6000-45RG/55RP -T4 | 580 | 318 | 295 | 557 | 180 | Φ11 |
| CYTB6000-55RG/75RP -T4 | | | | | | |

| Model | Outline Dimensions（mm） | | | Installation Dimensions（mm） | | |
|---|---|---|---|---|---|---|
| | H | W | D | H1 | W1 | Aperture |
| CYTB6000-75RG/90RP -T4 | 700 | 378 | 295 | 676 | 180 | Φ11 |
| CYTB6000-90RG/110RP -T4 | | | | | | |
| CYTB6000-110RG/132RP -T4 | | | | | | |
| CYTB6000-132RG/160RP -T4 [1] | 800 | 430 | 390 | 753 | 220 | Φ19 |
| CYTB6000-160RG/185RP -T4 [1] | | | | | | |
| CYTB6000-185RG/200RP-T4 [1] | 1060 | 580 | 390 | 1013 | 350 | Φ19 |
| CYTB6000-200RG/220RP -T4 [1] | | | | | | |
| CYTB6000-220RG -T4 [1] | | | | | | |
| CYTB6000-250RG/280RP -T4[2] | 1200 | 720 | 406 | 1152 | 350 | Φ19 |
| CYTB6000-280RG/315RP -T4[2] | | | | | | |
| CYTB6000-315RG/355RP -T4[2] | | | | | | |
| CYTB6000-350RG -T4 | 1900 | 1000 | 500 | - | - | - |
| CYTB6000-400RG -T4 | | | | | | |
| CYTB6000-500RG -T4 | | | | | | |

[1] & [2]: These frequency inverters could install the base to the same width of the device to be the cabinet. Based height is 200mm for [1] and 300mm for [2]. If you and your customer request this base, please do the note when you place the order.

## 2.6.DAILY INSPECTION AND MAINTENANCE

Electronic equipment cannot be used permanently. Even in the normal working environment, characteristic change or abnormal action will occur if it exceeds service life. In order to prevent the fault problem and safety problem resulted from component aging due to environmental factors, such as temperature, oil mist, dust, vibration and moisture etc, it is necessary to carry out such preventive maintenance as daily inspection, periodic check and component replacement etc.

The frequency inverter consists of IGBT, IC and other semiconductor components, capacitor, resistor and other electronic components, plus fan, relay and many other components. If all of these components cannot work

properly, it is impossible to bring the functions of the product into full play.

Note: Only qualified electric professional personnel can perform installation, wiring, dis-assembly and maintenance.

| ⚠ DANGER |
|---|
| ●Designated personnel should maintain according to specified method. <br><br> ●Before starting inspection and maintenance of the frequency inverter , switch off power supply of all devices, and begin to maintain after waiting 10 minutes. <br><br> ●Except designated personnel, no other person can perform maintenance, inspection or component replacement. Otherwise there is risk of electric shock. <br><br> ●Perform all plug devices only when the power supply is completely switched off. Otherwise there is risk of electric shock. <br><br> ●Take off watch, ring or other metal articles before performing check, maintenance, and component replacement etc. Try not to wear loose clothing, but to wear eye protection glasses. <br><br> ●Only designated personnel familiar with installation, commissioning and repair can perform installation, wiring, repair, check and component replacement. |

| ⚠ CAUTION |
|---|
| ●Please fasten the terminal screw with specified torque. If the connection of the main circuit wires becomes loose, fire may occur due to the overheat at the connection of the wire. <br><br> ●Do not apply wrong voltage to the main circuit power supply. Otherwise there is risk of electric shock. <br><br> ●Do not make combustible in close contact with the frequency inverter or attach combustible to the frequency inverter . Otherwise there is risk of fire. Please install the frequency inverter on metal or other flame retardant objects. |

| ⚠ WARNING |
|---|
| ●When using PCB, be sure to follow processes specified by the electrostatic protection measures (ESD). Otherwise internal circuit may be damaged due to static electricity.<br><br>●Please follow the instruction of this manual to correctly replace the cooling fan. If the installation direction is wrong, the cooling function can not be brought into play and it may result in damage of the frequency inverter . When installing the cooling fan to the frequency inverter , be sure to make the side with label upward.<br><br>●For the frequency inverter with 2 cooling fans, be sure to replace them together in order to extend the service life of the product to the maximum extent.<br><br>●Never disassemble or install the motor when the frequency inverter outputs voltage. Otherwise the frequency inverter may be damaged.<br><br>●When wiring the control circuit, do not use cables other than shielded wire.  Otherwise it may result in abnormal action of the frequency inverter . Please use shielded and double-stranded wire and connect its shielded layer to the grounding terminal PE of the frequency inverter .<br><br>●Nonprofessional shall not perform wiring in case damaging the frequency inverter .<br><br>●Please do not attempt to change the circuit of the loop. Otherwise it may damage the frequency inverter . The required repair does not belong to the guarantee scope of our company.<br><br>●QIROD   bears no responsibility if your company or the end user makes reconstruction to the product.<br><br>●After the wiring of the frequency inverter with other machine is finished, make sure that all wiring is correctly performed. Otherwise it may damage the frequency inverter .<br><br>●Please make the wiring according to correct phase sequence. Inconsistency of the phase sequence may result in reverse rotation of the motor.<br><br>●Connect the output terminals U, V and W of the frequency inverter to the input terminals U, V and W of the motor respectively. At this time make sure that the phase sequences of the motor terminals and frequency inverter terminals are in consistency.<br><br>●In consideration of the service life of internal relay contact and the electrolytic capacitor, make sure that the maximum frequency for powering on and off does not exceed once every 30 minutes.<br><br>●Try best to perform running and stop of the motor according to the running/stop operation of the frequency inverter .<br><br>●Do not try to operate damaged machine in case of acceleration of the damage. If the frequency inverter has obvious damage or some component is lost, do not connect it or operate it. |

## 2.6.1Daily inspection

### 2.6.1.1.Routine inspection

Content of routine inspection:

●Whether screws of the control terminals are loose. Use screwdriver of proper size to fasten them.

●Whether there is poor contact at the main circuit terminals, and whether there is overheat trace at connection of cables or the copper bar and at the screws.

●Whether there is damage on the power cables and the control cables, especially if there is trace of crack and cut on the external insulation layers.

● Whether the joint of power cable and cold-compression terminals is loose, and whethe(tape) at the joint is aging or falling.

● Thoroughly clean the dust at the PCBs and the wind duct. Make sure to take anti-static measures when perform cleaning.

● Before conducting insulation test to the frequency inverter , be sure to firstly disassemble all connection wires between the frequency inverter and the power supply and between the frequency inverter and the motor, reliably short connect all input and output terminals of main circuit with conducting wire, then conduct earth test.

● Use qualified 500 V megger (or corresponding voltage shift position of insulation test instrument) to perform insulation test. Do not use faulty instrument; It is strictly prohibited to perform earth insulation test by connecting only one single main circuit terminal, otherwise there is risk of damaging the frequency inverter .

● Never perform insulation test to control terminals. Otherwise it may damage the frequency inverter . After the test BE SURE TO disassemble all the conducting wires that short connect all main circuit terminals.

● Before conducting insulation test to the motor, be sure to disconnect all conducting wires between the motor and the frequency inverter , then individually perform test to the motor. Otherwise there is risk of damaging the frequency inverter .

● r the insulation binder  Daily inspection

The routine inspection items of QIROD  's frequency inverter are shown in table 2.6. To avoid deterioration of the frequency inverter 's function and damage to the product, please make the confirmation of the following items every day.

Table 2.6 Table of items of daily inspection

| Inspection object | Main points of inspection | | | Judgment standard |
|---|---|---|---|---|
| | Content of inspection | Period | Inspection means | |
| Operation environment | Temperature and humidity | Any time | Point thermometer and hygrometer | The environment temperature is lower than 55°C. Otherwise the frequency inverter should be derated. Humidity complies with requirement of the environment. |
| | Dust, vapor and dripping leak | | Observation | No dust, trace of water leakage or dewdrop |
| | Gas | | Observation and sniffing | No abnormal color or smell |
| frequency inverter | vibration | Any time | Synthetic observation | Smooth operation without vibration |
| | Heat radiation and heat generation | | Point thermometer and synthetic observation | Fan operates normally with normal wind speed and air volume, and without abnormal heat generation. |
| | Noise | | Listening | No abnormal noise |
| Motor | Vibration | Any time | Synthetic observation and listening | No abnormal vibration and noise |
| | Heat generation | | Point thermometer | No abnormal heat generation |
| | Noise | | Listening | No abnormal noise |

| Inspection object | Main points of inspection | | | Judgment standard |
|---|---|---|---|---|
| | Content of inspection | Period | Inspection means | |
| Running status parameter | Power supply input voltage | Any time | Voltmeter | In accordance with requirement of the specifications |
| | frequency inverter output voltage | | Rectifier type voltmeter | In accordance with requirement of the specifications |
| | frequency inverter output current | | Amperemeter | In accordance with requirement of the specifications |
| | Internal temperature | | Point thermometer | Temperature rise < 40°C |

## 2.6.2 Periodic inspection

The periodic inspection items of QIROD 's frequency inverter are shown in table 2.7. Normally it is better to make a periodic inspection every 3 or 6 months. In practice, please determine actual inspection frequency in combination with application condition of the frequency inverter and working environment. Periodic inspection helps to prevent deterioration of performance and damage of the product.

Table 2.7 Table of items of periodic inspection

| Inspection items | Content of inspection | Measures to fault |
|---|---|---|
| Main circuit | | |
| Whole body | Make inspection with megameter (between the main circuit terminals and the grounding terminals). | Take proper measures (fastening etc) |
| | Whether there is component decolored due to overheat or aging. | Replace the damaged component. |
| | Whether there is damage or deformation to component | If there is damaged place impossible to be repaired or replaced, replace the whole frequency inverter . |
| | Whether there is dirt, rubbish or dust. | Confirm the door of the control cabinet contains the frequency inverter is firmly closed. If it is difficult to make cleaning, please replace the seriously dirty part. |
| | | Clean with dry air. (Pressure: $39.2 \times 10^4 \sim 58.8 \times 10^4$ Pa) |
| Conductor and wire | Whether wires and connection are decolored, damaged, or aged due to overheat. | Replace damaged wire. |
| | Whether there is breakage, crack or decoloring on the wire sheath. | |
| Terminal block | Whether there is fray, damage or loosening in the connecting terminals. | If screw or terminal is damaged when fastened, replace it. |

| Inspection items | Content of inspection | Measures to fault |
|---|---|---|
| Electromagnetic contactor and relay | Whether there is abnormal noise when it works. | Confirm the coil voltage respectively under two situations: the voltage exceeds or does not exceed the reference value. |
| | Whether there is aging or crack on the wire sheath of the coil due to overheat. | Replace damaged electromagnetic contactor, relay or PCB. |
| Braking resistor (optional) | Whether the insulator is decolored due to overheat. | Slight decoloring is not abnormal. |
| | | When decoloring is detected, confirm whether there is bad wiring. |
| Electrolytic capacitor | Whether there is liquid leak, decoloring or crack. | If there is damaged place impossible to be repaired or replaced, replace the whole frequency inverter . |
| | Whether the safety valve is exposed and whether the capacitor swells or cracks, or there is liquid leak. | |
| Diode and IGBT | Whether there is rubbish or dust. | Clean with dry air. (Pressure: $39.2 \times 10^4 \sim 58.8 \times 10^4$ Pa) |
| Motor | | |
| Action inspection | Whether vibration and operation noise is acutely abnormal. | Stop the motor and contact specialized service personnel. |
| Control circuit | | |
| Whole body | Whether there is fray, damage or improper connection at the connecting terminals. | If screw or terminal is damaged when fastened, replace it. |
| | Whether the screw is loose. | If it is impossible to repair or replace the terminals of the PCB, replace the frequency inverter . |
| PCB | Whether there is abnormal smell, decoloring, severe rust, whether the connectors are correctly installed and whether there is dust and oil mist. | Re-install connectors. |
| | | If the PCB can not be cleaned with anti-static cloth or dust cleaner, replace it. |
| | | Do not apply solvent to the PCB. |
| | | Clean rubbish and dust with dry air. (Pressure: $39.2 \times 10^4 \sim 58.8 \times 10^4$ Pa) |
| | | If there is damaged place impossible to be repaired or replaced, replace the whole frequency inverter . |

| Inspection items | Content of inspection | Measures to fault |
|---|---|---|
| Cooling system | | |
| Cooling fan | Whether there is abnormal noise and vibration in the motor of the cooling fan. | Sweep or replace the cooling fan. |
| | Whether there is damaged or missing blade. | |
| Cooling fin | Whether there is rubbish and dust or dirt. | Clean rubbish and dust with dry air. (Pressure: $39.2 \times 10^4 \sim 58.8 \times 10^4$ Pa) |
| Ventilation vent | Whether air inlet and outlet are blocked or there is foreign body attached. | Clear obstacle and dust. |
| Indicator | | |
| Keyboard panel | Whether LED indication is correct. | If there is bad situation in LED or the operation keys, contact QIROD 's distributors or sales offices. |
| | Whether the operation part is polluted. | Clean it. |

## 2.6.3. Maintenance

### 2.6.3.1. Standard for replacement of component

To ensure reliable running of the frequency inverter , besides periodic maintenance, replace the following internal components periodically: components withstanding long-term mechanical wear, all cooling fans and main circuit filter capacitor used for energy storage and exchange. For normal continuous application, make the replacement according to the following table. Please also consider the concrete situation such as application environment, load situation and frequency inverter status etc.

Table 2.8  Service life reference of main components of the frequency inverter

| Name of component | Service time |
|---|---|
| Fan | 30,000~40,000 hours |
| Electrolytic capacitor | 40,000~50,000 hours |
| Relays RA-RB-RC | Approx. 100,000 times |

### 2.6.3.2. Storage and safekeeping

After purchase of the frequency inverter if it is not put into use immediately and has to be kept for a short time or stored for a long time, follow the following instructions:

●Store the frequency inverter at places with temperature range specified by the standard, with no moisture, dust and metal powder but with good ventilation.

●If the frequency inverter has not been used more than 1 year, perform charging experiment to it so as to restore the characteristics of main circuit filter capacitor inside the frequency inverter . During charging, slowly raise the input voltage with a voltage regulator until to the rated input voltage. The switching on time should be more than 1-2 hours. The above experiment should be done at least one time a year.

●Do not perform voltage withstanding test at will. Otherwise it will reduce the service time of the frequency inverter . For the insulation test, it is suggested to make measurement with 500 V megameter before the test. The insulation resistance should not be lower than 4MΩ.

Table 2.9  Storage environment

| Environment characteristics | Requirement | Note | |
|---|---|---|---|
| Ambient temperature | -25°C ~+70°C | The temperature is < 30°C for long time storage in case of deterioration of the capacitor. | Avoid dewing and freezing environment resulted from drastic change of temperature. |
| Relative humidity | 5~95% without condensation or dripping water | Adopt plastic film for sealing and desiccant etc. | |
| Storage environment | There is no direct sunshine, dust, corrosive gas, flammable gas, oil, vapor, gas, dripping water and vibration, and there is less salt. | | |

## 2.8. Measurement and judgment

When using ordinary current clamp meter to measure current, there is imbalance of current at the input side. Discrepancy within 50% is normal. If the discrepancy is 70%, notify the manufacturer for replacing the rectifier bridge, or check if the discrepancy of 3-phase voltage exceeds 5 V.

Normally avometer is used to measure 3-phase voltage. Due to the interference of carrier frequency, the readings are not accurate and can be used only for reference. The output voltage should not be higher than the valid value of voltage at the input side. If the voltage exceeds the value, it shows that the avometer is interfered and the output is not abnormal.

# 3. INSTALLATION AND WIRING

## 3.1. Installation of frequency inverter

| ⚠ DANGER |
|---|
| ●Please install the frequency inverter on metal or other incombustible. Otherwise there is danger of fire. |
| ●Do not place combustible nearby in case of danger of fire. |
| ●Do not install the frequency inverter in the environment with explosive gas. Otherwise there is danger of explosion. |

| ⚠ CAUTION |
|---|
| ●Please hold the bottom of the frequency inverter during transportation. Otherwise there is danger of personal injury or damage to the frequency inverter if the main body falls. |
| ●The load carrying capacity of the platform should be taken into consideration during installation. Otherwise there is danger of injury or damage to the frequency inverter if the main body falls. |
| ●Please install the frequency inverter in the safe place with less vibration, direct sunshine, no water splashing. |
| ●Please guarantee the heat sink performance when doing the installation for two or more frequency inverters in one cabinet. |
| ●Do not allow outside small parts, such as screw, washer or metal rod to fall inside the frequency inverter . Otherwise there is risk of fire and damage of the frequency inverter . |

## 3.2. Installation Environment

The installation environment is very important for bringing the performance of the frequency inverter  into full play and maintaining its functions for a long time. Please install the frequency inverter in the environment shown in the following table.

Table 3.1  Installation environment of the frequency inverter

| ENVIRONMENT | CONDITION |
|---|---|
| Installation site | Indoors |
| Ambient temperature | -11kW and below: -10°C ~ +50°C<br><br>15kW and above:  -10°C ~ +40°C<br><br>●To raise the reliability of the machine, please use the inveter at the place where there is no drastic change of temperature.<br><br>●When the inveter is employed in such enclosed space as control cabinet etc, please use fan or air conditioner for cooling in case the inside temperature surpasses the ambient temperature.<br><br>●Avoid freezing in the inveter. |
| Humidity | Below 95%RH<br>Avoid dew in the frequency inverter |
| Storage temperature | -25°C ~ +70°C |
| Environment | The frequency inverter should be mounted at the following sites, where:<br><br>●There is no oil mist, corrosive gas, flammable gas or dust;<br><br>●It is not easy for metal powder, oil, water or other foreign substance to get inside the frequency inverter (DO NOT mount the frequency inverter on wood or other flammable body);<br><br>●There is no redioactive material and flammable object;<br><br>There is no harmful gas and liquid;<br><br>●There is little salt corrosion;<br><br>●There is no direct exposure to sunshine. |
| Altitude | 1000m or below |
| Vibration resistance | ≤5.9m/s² |
| Installation direction | BE SURE TO install the frequency inverter in vertical direction so as not to reduce the cooling effect of the frequency inverter . |

## Instruction of frequency inverter installation position

BE SURE TO install the frequency inverter in vertical direction as shown in the following Figure 3.1 so as not to reduce the cooling effect of the frequency inverter .

A         B         C
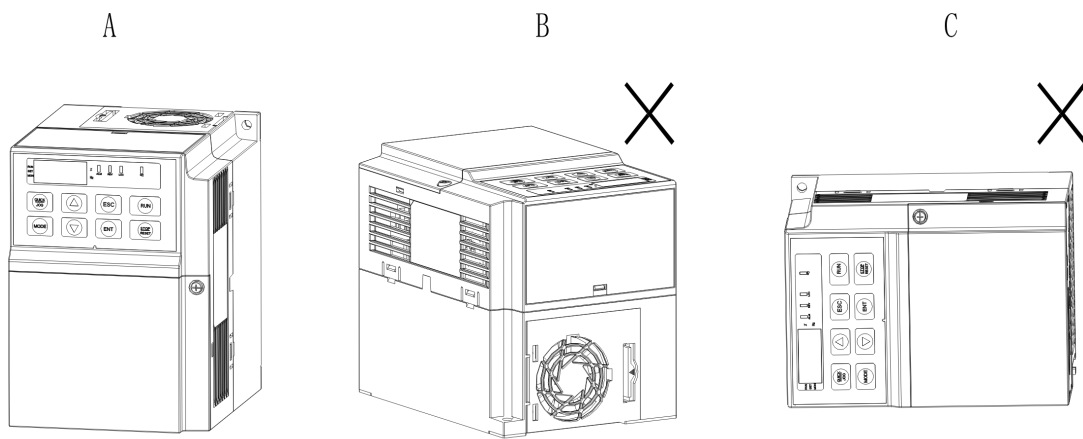
A — Vertical installation   B — Horizontal installation  C — Transverse installation
Correct installation     Wrong installation      Wrong installation

Figure 3.1  frequency inverter installation direction

When installing an individual frequency inverter , be sure to follow the installation instruction shown in Figure 3.2 in order to insure ventication and wiring space necessary for the frequency inverter . Please keep the back of the frequency inverter close to the wall and mount the frequency inverter . In this way the cooling air around the radiation fins moves freely to ensure cooling effect.

Installation space of the frequency inverter  (individual frequency inverter )

Horizontal (left to right) space      Vertical (up to down) space
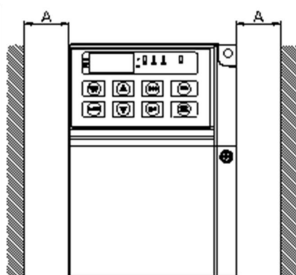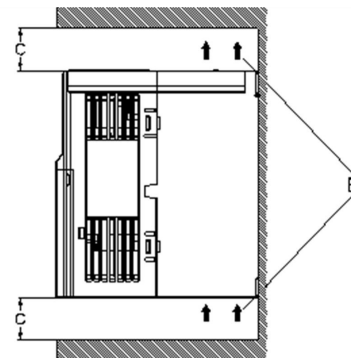
A — Distance over 30mm   B — Ventilation direction   C — Distance over 100mm

Figure 3.2  Installation interval and distance for individual frequency inverter

For installation of more than one frequency inverter  inside the control cabinet, side-by-side installation is normally adopted. The cabinet is equipped with air inlet, air outlet and special cooling fan. See Figure 3.3.

For vertical installation, airflow guidance separators should be installed among the frequency inverter  to achieve better heat dissipation effect.

Installation space of the frequency inverter  (side-by-side)

Horizontal (left to right) space        Vertical (up to down) space
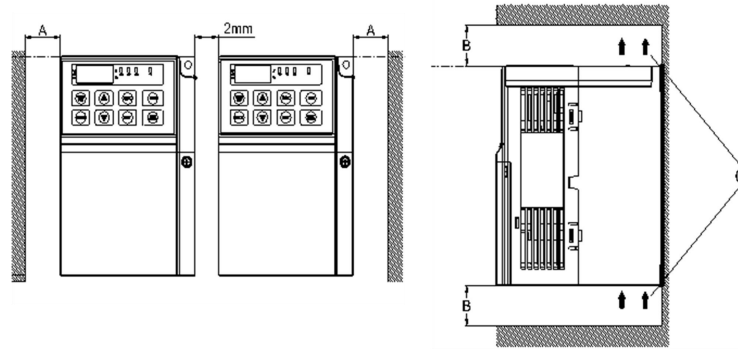
A — Distance over 30mm   B — Distance over 100mm   C — Ventilation direction

Figure 3.3  Installation interval and distance of multiple frequency inverter

### 3.2.1.  Installation method of frequency inverter

●Refer to Figure 3.4 for confirmation of mounting holes on the frequency inverter .

●Fix the upper screws of the frequency inverter . Take care not to fasten them firmly, but to leave a space of several millimeters for the convenience of fixing the lower screws.

●Fix the lower screws and secure all the screws.
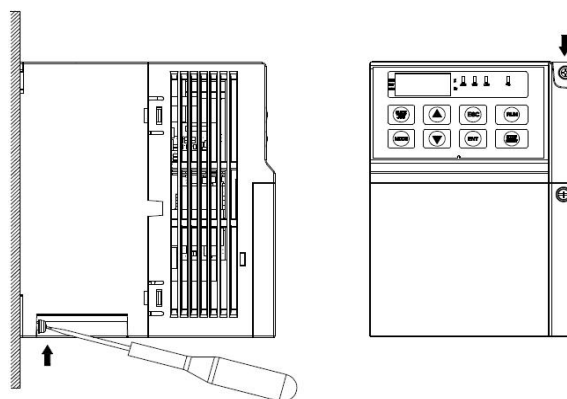


Figure 3.4  Installation method of frequency inverter

### 3.2.2.  Dis-assembly/installation of the cover

Dis-assembly of the frequency inverter cover: Loosen screws of the cover to disassemble it. Take off the outlet board and install the input power supply and motor wire bundle as shown in Figure 3.5.
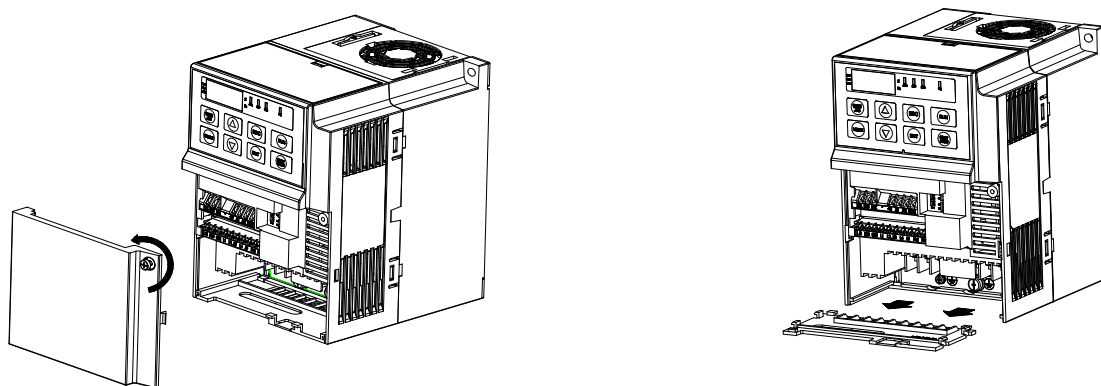


a) Dis-assembly of the cover              b) Dis-assembly of the outlet board

Figure 3.5   Dis-assembly of the frequency inverter cover

Installation of the frequency inverter cover: After finishing the wiring and confirming correct connection of all wires, put the outlet board back to its original position, close the cover and fasten the screws.

## 3.3. Wiring of the frequency inverter

| ⚠ WARNING |
|---|
| ●Before wiring the frequency inverter , please confirm that input power supply is completely disconnected. Otherwise there is risk of electric shock. |
| ●Only professional engineering personnel can perform the wiring in case of the risk of electric shock. |
| ●The earthing terminal PE must be properly grounded in case of the risk of electric shock. |
| ●Do not touch directly the wiring terminals with hand and never allow the output wire to contact the enclosure of the frequency inverter . Otherwise there is risk of electric shock. |
| ●Do not connect power supply to the output terminals U, V and W in case of damage to the frequency inverter . |

| ⚠ CAUTION |
|---|
| ●Please confirm the voltage of the AC main circuit power supply is in conformity with the rated voltage of the frequency inverter . Otherwise there is risk of fire and personal injury. |
| ●Please correctly select proper cable way in according to power level or it possibly will cause the accident. |
| ●Don't connect input power supply to output terminal U, V, W of the frequency inverter or it will destroy the drive. |
| ●Please notice motor rotating direction when connecting output terminal U, V, W. |
| ●Please be sure to follow safety standard and EMC standard when wiring or it will cause the accident. |
| ●Please correctly connect the braking resistances according to the diagram. Otherwise there is risk of fire. |
| ●Don't connect AC 220 signal for the other control terminal except T1A-T1B-T1C or T2A-T2B-T2C or it will cause damage. |

### 3.3.1.  Basic operation wiring diagram

Please refer to Figure 3.6 for wiring of the frequency inverter . Make only wiring of the main circuit to start the motor when the frequency inverter  is operated with keyboard panel.

A short jumper

(a) Basic wiring diagram of 15kW and above
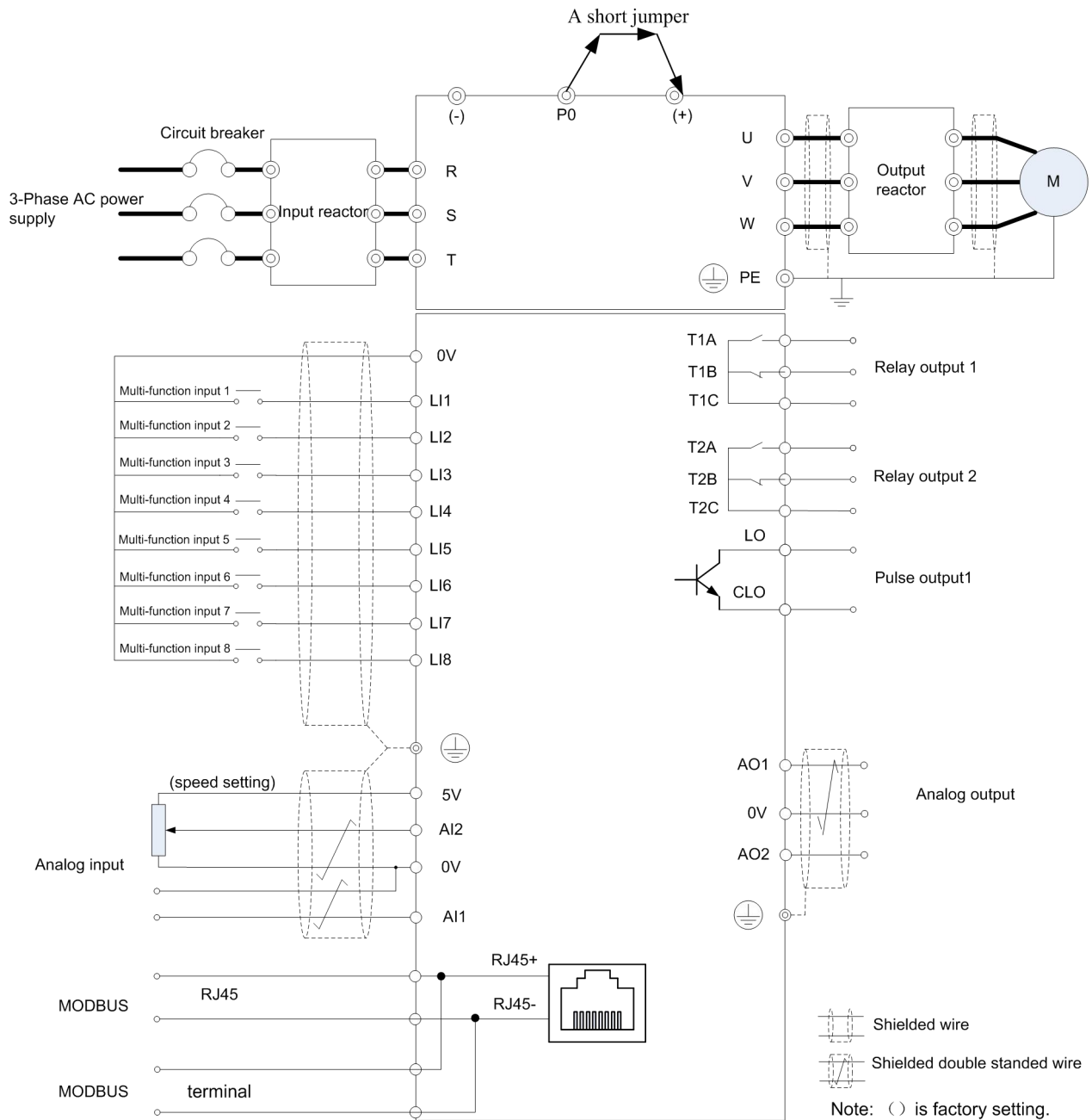
<1> 15-30kw inverter has no P0 terminal;
For the frequency inverter of 37kW (including), when installing DC reactor (optional), please remove the short jumper that between P0 and (+) short.
<2> 15-18.5kW inverter has PB terminals, which can be connected to the brake resistance between PB and (+).
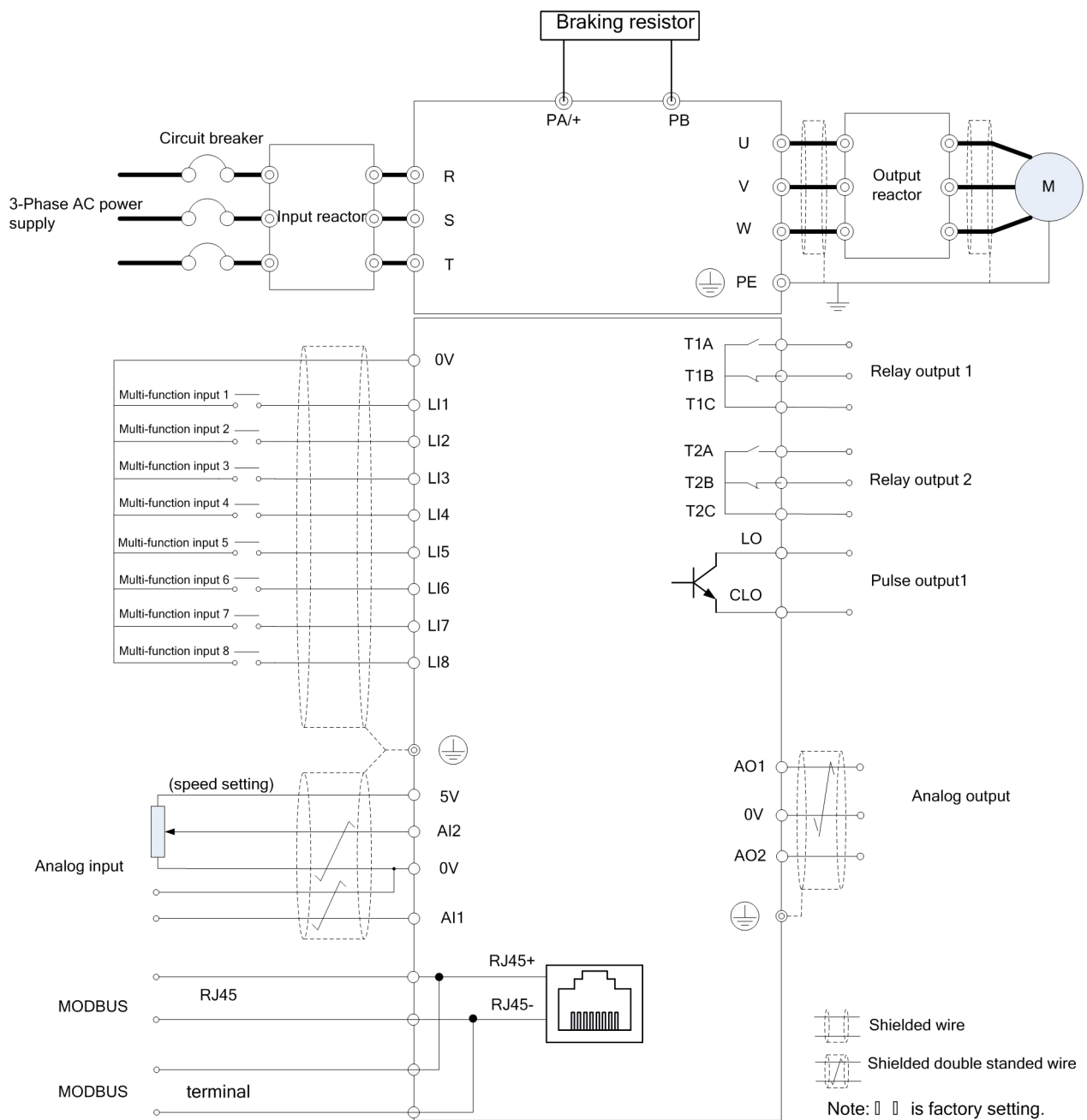
(b) Basic wiring diagram of 11kW and below

Figure 3.6 Basic wiring diagram of the frequency inverter

1. Input voltage signal or current signal can be selected with AI1. The type of input signal can be set by the dial switch S3 on the control board.

2. Correct connection must be followed when external braking resistor is required.

3. In the diagram, "◎" means main circuit terminal, and "○" means control terminal.

Wiring of the main circuit

The arrangement of the main circuit terminals is shown in Figure 3.7.
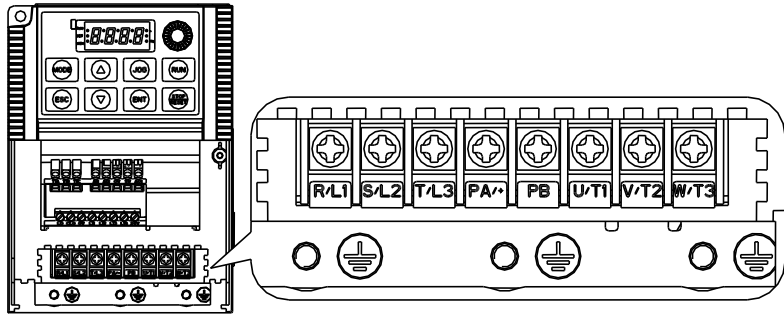
(a) the main circuit terminals(11kW and below)
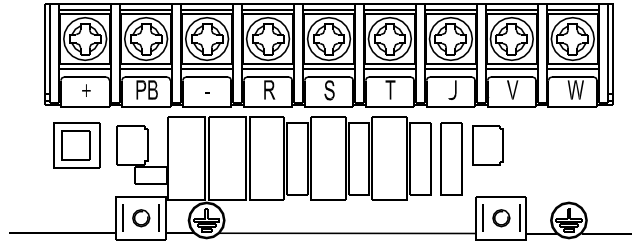


(b) the main circuit terminals(15kW and 18.5kW)
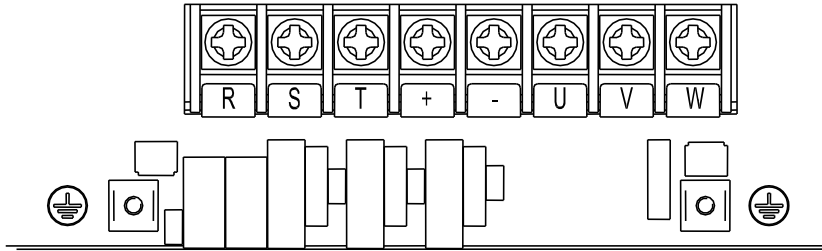


(c) the main circuit terminals(20kW and 30kW)
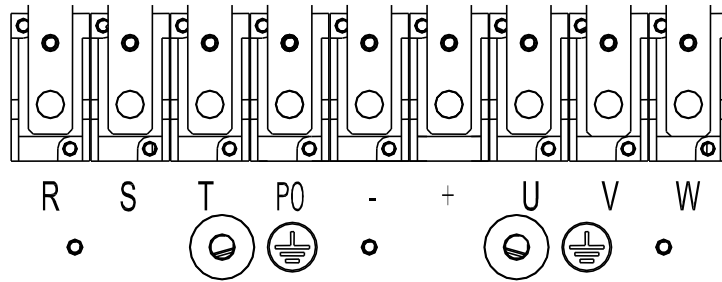


(d) the main circuit terminals(37-55kW)
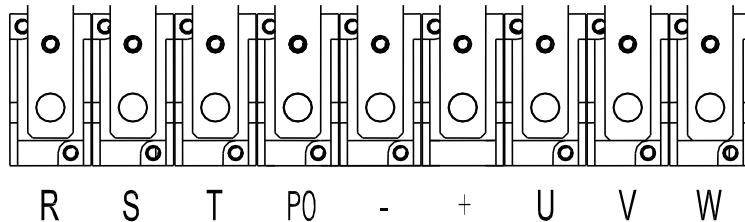


(e) the main circuit terminals(75-110kW)

(f) the main circuit terminals(132-315kW)



(g) the main circuit terminals(350-500kW)



(h) the main circuit terminals(560-630kW)
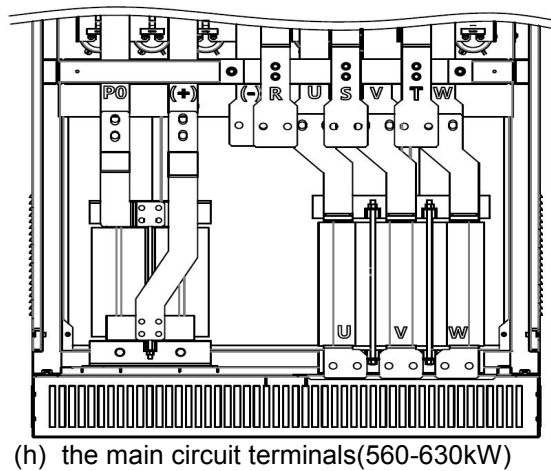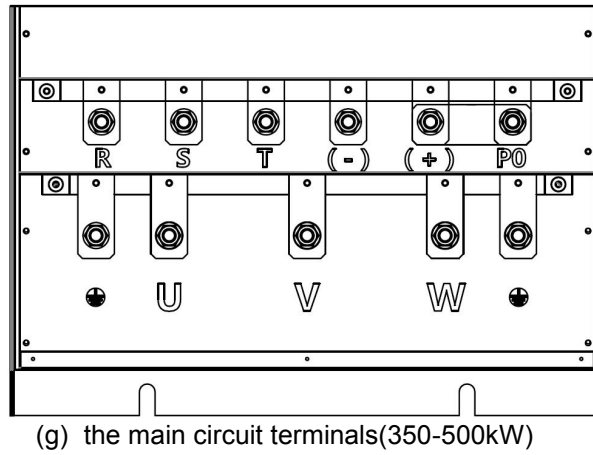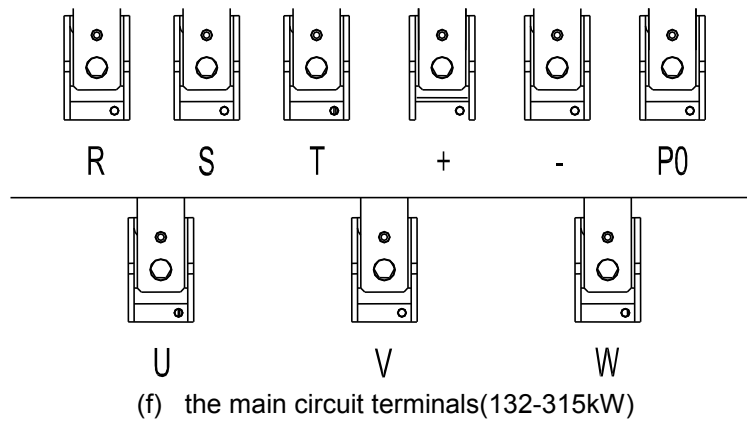
Figure 3.7  Diagram of the main circuit terminals of the frequency inverter

Table 3.2   Description of main circuit terminals

| Code of terminal | Terminal | Function |
|---|---|---|
| R/L1 | Power input for main circuit | 3-phase, AC power input terminal, 380V, 50Hz/60Hz |
| S/L2 | | |
| T/L3 | | |
| U | Output of frequency inverter | Terminal for connection to motor |
| V | | |
| W | | |

| Code of terminal | Terminal | Function |
|---|---|---|
| +、- | DC bus terminal | DC bus terminal, connect to braking unit etc<br>"+" is the positive terminal of DC bus, "-" is the negative terminal |
| PA/+ | Connection of braking resistor | Terminal for connection to braking resistor |
| PB | | |
| PA/+、+ | DC power input | PA (+) is the positive terminal of DC power input, PC is the negative terminal |
| ⏚ | Grounding | Terminal for grounding |
| | | 400V level: grounding resistance is 4Ω or below. |

## 3.3.2. Wiring of the control circuit
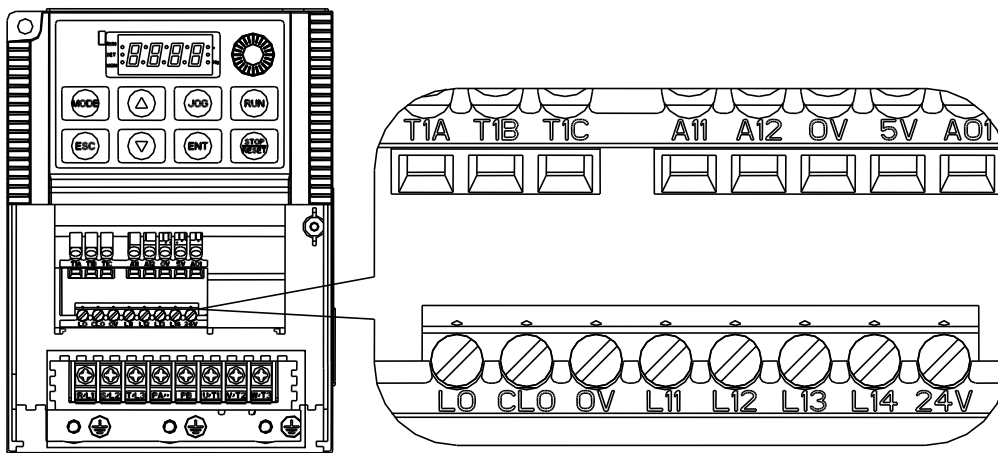


(a) the control circuit terminals(11kW and below)
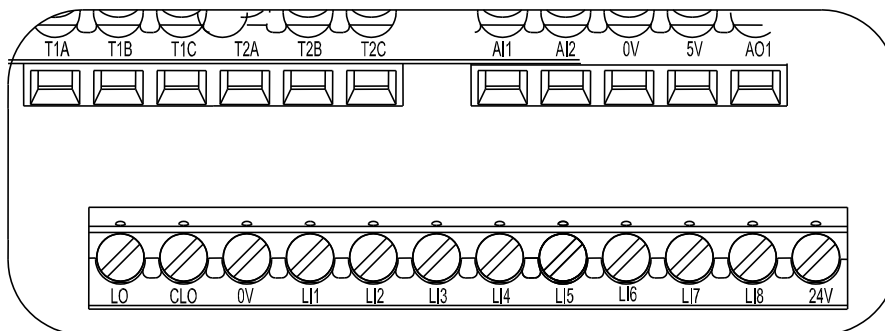


(b) the control circuit terminals(15kW and above)

Figure 3.8　Diagram of the control circuit terminals of the frequency inverter

Table 3.3 Description of Control terminals function

| Symbol | Item | Function |
|---|---|---|
| 0V | public terminal of the control circuit | |
| 5V | 5V output voltage | Commonly used as working voltage of the external potentiometer<br><br>Maximum current:10mA<br><br>accuracy:±5% |
| 24V | 24V output voltage | Commonly used as working voltage of the logic input terminal<br><br>Maximum current:100mA<br><br>accuracy:±20% |
| AI1 | Voltage/Current Analog input<br><br>Or<br><br>programmable logic input | Multifunction programmable analog input:<br><br>accuracy:10 bit<br><br>Analog voltage input:0 ~ +5 V or 0 ~ +10 V<br><br>Analog current inputt:20 mA |
| | | changing parameter setting, the AL1 can also be used as a programmable logic input terminal. If that, a resistor（43 kΩ）should be added between 24v-AL1; And move the VIA dip switch to the 10V position. Showed as Figure3.8 |
| AI2 | Voltage Analog input<br><br>Or<br><br>programmable logic input | Analogy voltage input:<br><br>accuracy:10 bit<br><br>Maximum range: 0 ~ +10 V |
| | | changing parameter setting, the AL2 can also be used as a programmable logic input terminal. If that, a resistor（43 kΩ）should be added between 24v-AL2 ; And move the VIA dip switch to the 10V position. connection method refers to AL1. |
| LI1～LI8 | programmable logic input | +24 V  Power supply |
| | | Positive Logic(source):port voltage< 5 V, input invalid (OFF),<br><br>port voltage > 11 V,input invalid (ON);<br><br>Negitive Logic (sink): port voltage > 16 Vinous invalid OFF,<br><br>port voltage < 10 Vinous invalid ON; |
| | | Logic input connection diagram refers to Figure 3.9. |
| AO1 | Voltage/Current Analog Output1 | Ana log voltage output:0 ~ +10 V<br><br>Analog voltage output:x ~ 20 mA |
| AO2 | Voltage/Current Analog Output2 | Ana log voltage output:0 ~ +10 V<br><br>Analog voltage output:x ~ 20 mA |

| Symbol | Item | Function |
|---|---|---|
| LO1 | Pulse output collector1 | Maximum current:100mA  Maximum voltage:30V |
| CLO1 | Pulse output emitter1 | |
| LO2 | Pulse output collector2 | Maximum current:100mA  Maximum voltage:30V |
| CLO2 | Pulse output emitter2 | |
| T1A | Relay 1 Normally open(NO) contact | Largest switching capacity:  T1A-T1C:5A @ 250VAC,5A @ 30VDC  T1B-T1C:3A @ 250VAC,3A @ 30VDC |
| T1B | Relay 1 Normally closed (NC)contact | |
| T1C | Relay 1  Public contacts | |
| T2A | Relay 2 Normally open(NO) contact | Largest switching capacity:  T2A-T2C:5A @ 250VAC,5A @ 30VDC  T2B-T2C:3A @ 250VAC,3A @ 30VDC |
| T2B | Relay 2 Normally closed (NC)contact | |
| T2C | Relay 2  Public contacts | |
| T5 | RS485 communication port | 4nd feet is positive port of RS485 differential signa, 5nd feet is the negative port of RS difference signal. |



（a）Positive Logic – source （b）Negitive Logic – sink （c）Positive Logic – source （d）Negitive Logic – sink
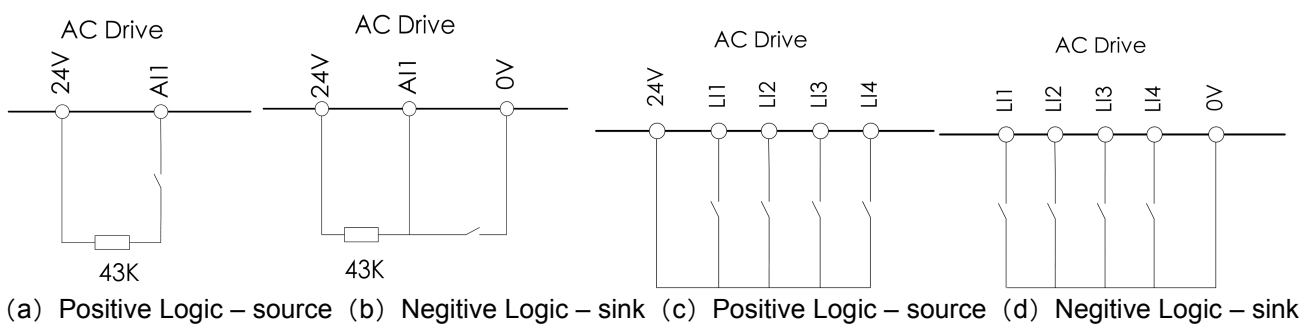
Figure 3.8 Wiring diagram when AI1is logic input terminal

# 4. BASIC OPERATION AND TRIAL RUNNING

## 4.1. Appearance of Keyboard panel

User of this series frequency inverter can perform different operations through keyboard panel, including run/stop, display of different data, parameter value setting, fault display and reset etc. The following is description of the keyboard panel.
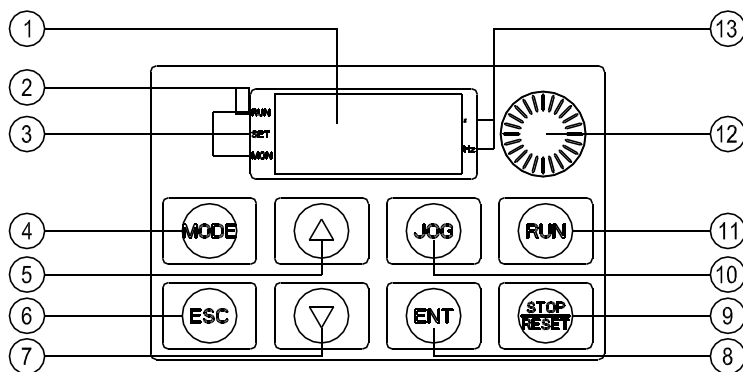


Figure 4.1  Each part of the keyboard panel

Table 4.1  Description and function of each part of the keyboard panel

| No. | Item | Symbol | Function |
|---|---|---|---|
| 1 | Numeric display | — | To display frequency or parameter etc using LED. |
| 2 | Charging indication lamp | CHARGE | On – there is residual voltage in the frequency inverter DC bus |
| | | | Off – there is no residual voltage in the frequency inverter DC bus |
| 3 | Mode indication lamp | RUN | On – frequency inverter 's operation demands and frequency instructions are all effective |
| | | | Flashing – frequency inverter 's operation demands are effective, but frequency instructions are ineffective |
| | | | Off – there are no operation demands in frequency inverter |
| | | SET | On – parameter setting mode |
| | | | Flashing – parameter setting mode, or shortcut menu. |
| | | | Off – parameter setting mode, or other modes except parameter verification mode |
| | | MON | On – state monitoring mode |
| | | | Flashing – in the process of fault record retrieving |
| | | | Off – non state monitoring mode |
| 4 | MODE key | MODE | To select keyboard display mode or return to MODE from submenu |
| 5 | UP key | ▲ | To increase parameter number or parameter set value |
| 6 | ESCAPE key | ESC | To return to the previous state before the pressing of the ENT key |
| 7 | DOWN key | ▼ | To reduce parameter number or parameter set value |

| No. | Item | Symbol | Function |
|---|---|---|---|
| 8 | ENTER key | ENT | Press the key to display or confirm different modes, parameters or set values |
| 9 | STOP key | STOP | Press the key to stop the frequency inverter . The key becomes a RESET key when fault is discovered |
| 10 | JOG key | JOG | Press this key to enter into jog (inching) function under the invert's start model |
| 11 | RUN key | RUN | To run the frequency inverter |
| 12 | Speed control knob | ------- | To adjust speed |
| 13 | UNIT indication lamp | % | On – Unit of the displayed number is percentage |
|  |  | Hz | On – unit of the displayed number is Hz |

## 4.2. Basic operation of panel

### 4.2.1. Running model selection

CYTB6000 frequency inverter include four running models: Powering-on default mode、Parameter setting mode、Status monitoring mode and Parameter verifying mode. Any mode can be realized by the MODE Key, showed as Figure 4.2:
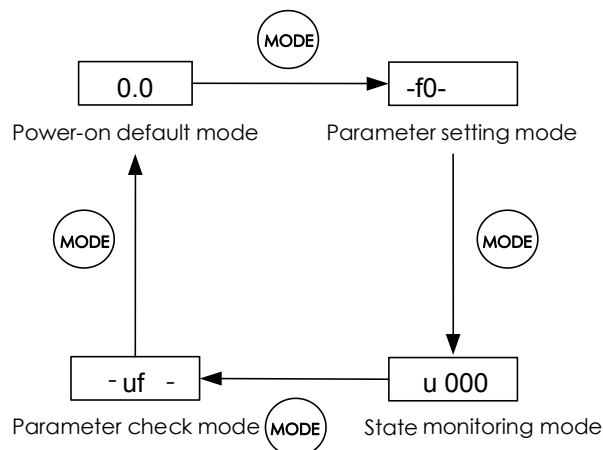


Figure 4.2 Structure of frequency inverter Mode switch
<1>: when F618=1, show parameter setting mode

### 4.2.2. Powering-on default mode

The display data is the current output frequency under Powering-on default mode, so directly use ▲or▼ key to modify the digital frequency setting, then press the ENT key to save the modified data and return Powering-on default mode, or press the ESC key to give up the modification and return the Powering-on default mode.As showed as Figure 4.3
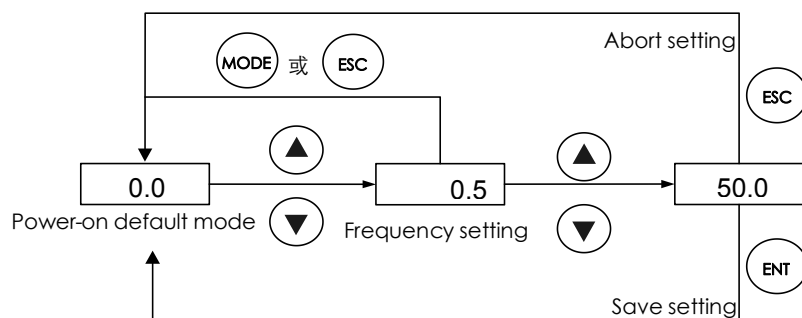


Figure 4.3 Powering-on default mode Navigation

Here the display data type can be set freely under the Powering-on default mode, showed in the parameter f610

## 4.2.3. Parameter Setting Mode

There are 10 groups function parameters fromf0 group to f9 group, each group includes different numbers function parameter. The Parameter setting value can be modified by ▲or ▼key and ENT key, or give up the modification by ESC key, as showed as Figure 4.4
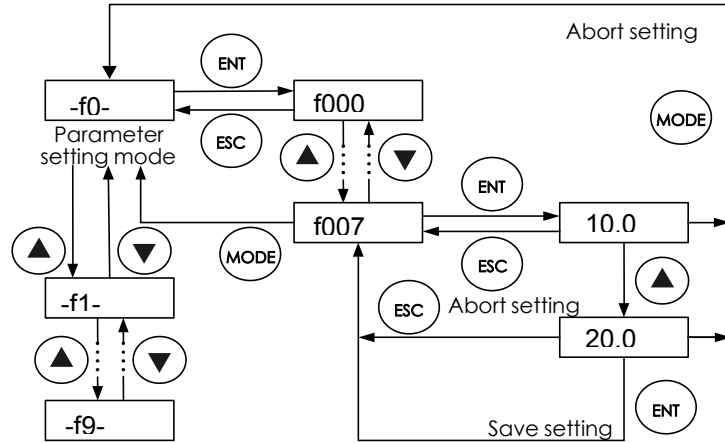


Figure 4.4 Parameter Setting Mode navigation

## 4.2.4. Status monitoring mode

The status monitoring mode can be used to monitor the current running status of frequency inverter , or check the fault record, the operation shows as the Figure 4.5
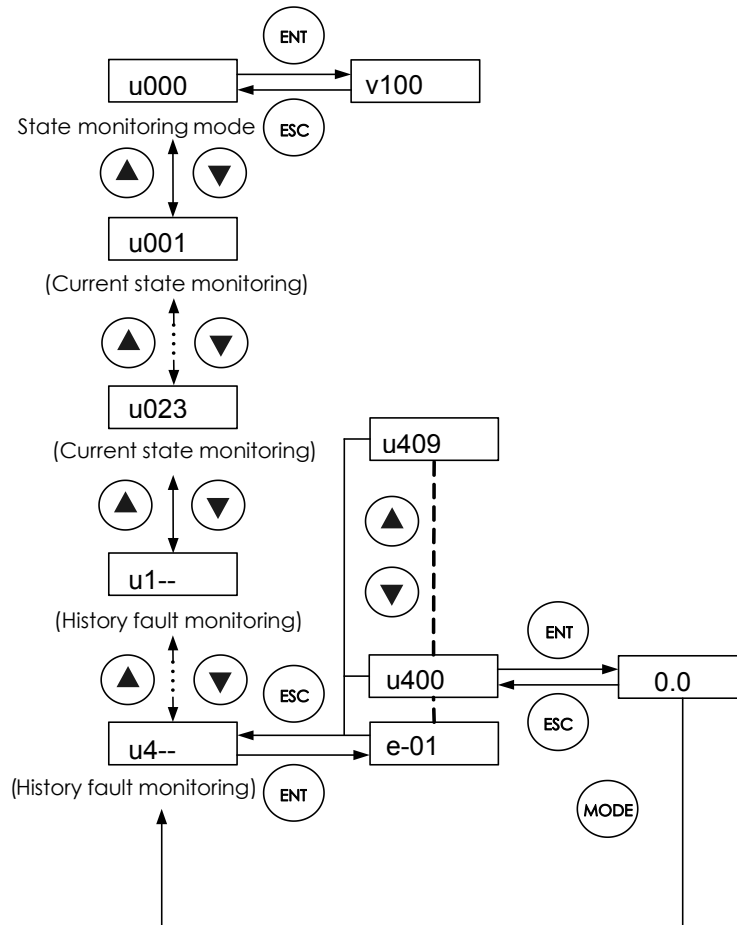


Figure 4.5.  State monitoring mode navigation

Here: Monitoring parameter only can be used to check, cannot be modified or set.

### 4.2.5. Parameter verifying mode

When f618=1, use MODE key to switch to parameter calibration mode. Under this mode, we can see all different parameters from the default value. The setup method for these parameters is the same to other parameter setup way. Please see figure 4.6.

Remarks: no other display only "-uf-" when pressing the ENT key without change to any parameter
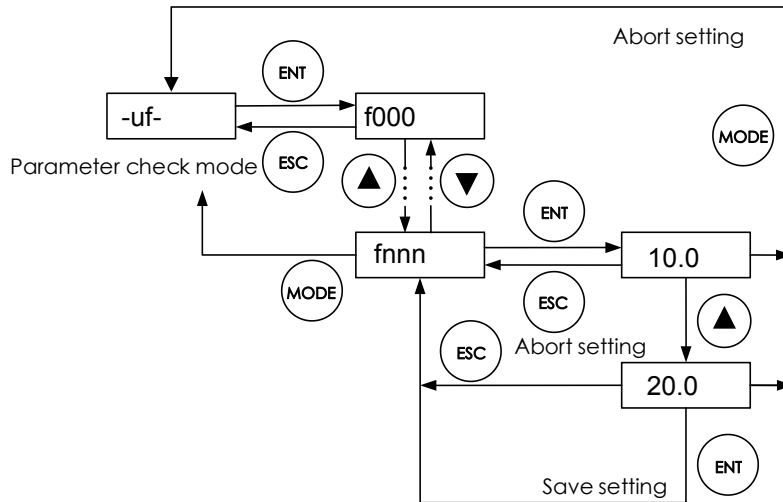


Figure 4.6 Parameter verifying mode navigation

### 4.2.6. JOG

Under the powering-on mode, when f700=1, press the Jog key then enter the Jog state. Jog represents forward jog and –jog represents reverse jog. Switch between forward/reverse jog can be realized through UP/DOWN keys on the keyboard panel.

## 4.3. Power on and confirmation of display status

Before switching on the frequency inverter , please do confirm the following items.

Table 4.2 Items to be confirmed prior to switching on the frequency inverter

| Item | Description |
|---|---|
| Confirmation of input power supply voltage | Please confirm if the power suppy is correctly connected (3-phase, 380VAC ~ 480VAC, 50/60 Hz)<br><br>Please confirm if the power supply input terminals R/L1, S/L2 and T/L3 are properly connected.<br><br>Please confirm whether the frequency inverter and the motor are correctly grounded. |
| Confirmation of connection of frequency inverter main circuit output terminals with motor | Please confirm the output terminals of the frequency inverter U, V and W are reliably connected with the 3-phase input terminals of the motor. |
| Confirmation of the connection of the frequency inverter control circuit terminals | Please confirm the control circuit terminals of the frequency inverter are reliably connected with other control devices. |

| Confirmation of the state of the frequency inverter control terminals | Please confirm that all control circuit terminals are in the state OFF (The frequency inverter does not run when powered on). |
|---|---|
| Confirmation of the state of the load | Please confirm the condition of the motor load (namely the status of connection with mechanical system). |

After the frequency inverter is switched on, the keyboard panel enters into Powering-on mode. The displayed value type at Powering-on mode is determined by the setting value of parameter f610.

## 4.3.1. Local control mode

CYTB6000 series frequency inverter  provide two control modes: local and remote. The mode is set with parameter f601.

At local control mode, both the command source and frequency setting source of the frequency inverter are set through the keyboard panel:

1.  Command source is given through RUN and STOP keys in order to run or stop the motor.

2.  Frequency is given by UP and DOWN keys. Under Powering-on mode, directly press UP key to increase given frequency or DOWN key to reduce given frequency.

Motor rotation direction: Press down the ENT key, then press UP key to set the motor rotation direction as FORWARD; Press down the ENT key, then press DOWN key to set the motor rotation direction as REVERSE. Paremeter  f522 is used to limit the ability of the motor to rotate only in a single direction.

Fault reset: When fault occurs in the frequency inverter , the keyboard panel displays the fault code under Powering-on mode. At this time press the STOP key and the keyboard panel displays a-00.  Then press the STOP key again to finish fault reset function. Please see parameter f600.

Note 1: During the reverse rotation of the motor or when there is instruction of reverse rotation, the function indication lamp REV on the keyboard panel is on.

Note 2: Under local control mode, the function indication lamp LOC on the keyboard panel is on.

## 4.3.2 Remote control mode

Under remote control mode, the command source and frequency setting source of the frequency inverter are set through parameters f002 and f003 respectively. The command source and frequency setting source can be combined in any way. For example, when f002= 1, f003= 3, the control effect of the inveter is the same as under the local control mode.

**Example 1: Two-wire control running**
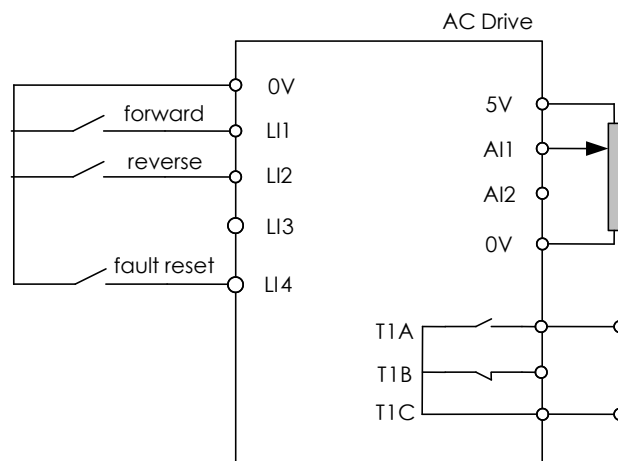


Figure 4.7 Example of wiring for two-wire control running

Table 4.3 Parameter configuration of two-wire control running

| Code | Parameter | Setpoint | Setpoint |
|------|-----------|----------|----------|
| f002 | Selection of run command | 0 | 0 |
| f003 | Selection of frequency command selection | 1 | 1 |
| f300 | AI1 input function (analog or logic selection) | 0 | 0 |
| f301 | L1 logic input function | 2 | 62 |
| f302 | L2 logic input function | 3 | 63 |
| f303 | L3 logic input function | 30 | 10 |
| f305 | Logic input mode setting | 0 | 0 |
| f306 | Logic input type selection | 1 | 1 |
| f309 | Forced- effective Logic input function selection | 1 | 0 |
| f310 | Forced- effective Logic input function selection 2 | 0 | 0 |
| f522 | Prohibit motor reverse | 0 | 0 |

Note: When two-wire control is applied, logic input function 30 must be disabled.

**Example 2: Three-wire control running(Negative logic, decelerates to stop)**
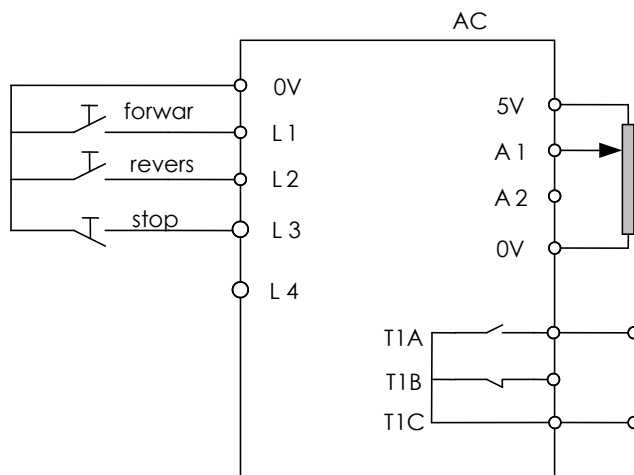


Figure 4.8 Example of wiring for three-wire control running

Table 4.4   Parameter configuration of 3-wire control running

| Code | Parameter | Setvalue |
|------|-----------|----------|
| f002 | Selection of run command | 0 |
| f003 | Selection of frequency command selection | 1 |
| f300 | AI1 input function (analog or logic selection) | 0 |

| Code | Parameter | Setvalue |
|------|-----------|----------|
| f301 | L1 logic input function | 2 |
| f302 | L2 logic input function | 3 |
| f303 | L3 logic input function | 30 |
| f305 | Logic input mode setting | 0 |
| f306 | Logic input type selection | 1 |
| f309 | Forced- effective Logic input function selection | 1 |
| f310 | Forced- effective Logic input function selection 2 | 0 |
| f522 | Prohibit motor reverse | 0 |

**Example 3: Three-wire control running(Negative logic, motor stops freely)**
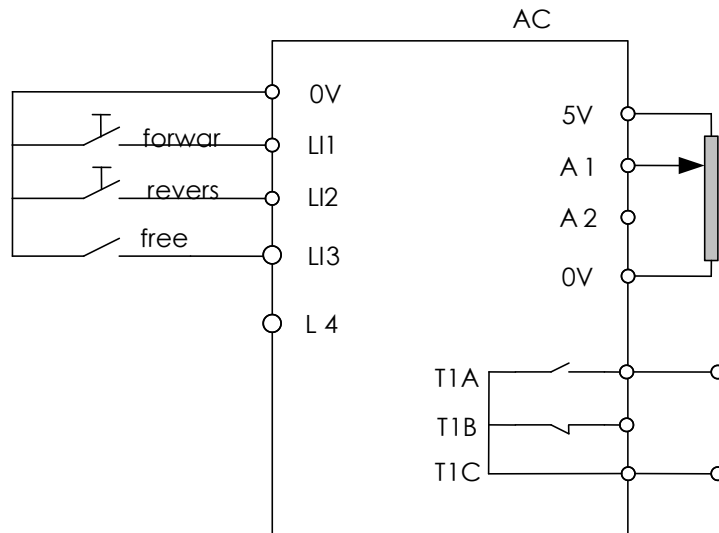


Figure 4.9 Example of wiring for 4-20mA control running

Table 4.5  Parameter configuration of Three-wire control running(Negative logic, Free stop)

| Code | Parameter | Setvalue |
|------|-----------|----------|
| f002 | Selection of run command | 0 |
| f003 | Selection of frequency command selection | 1 |
| f300 | AI1 input function (analog or logic selection) | 0 |
| f301 | L1 logic input function | 2 |
| f302 | L2 logic input function | 3 |
| f303 | L3 logic input function | 34 |
| f305 | Logic input mode setting | 0 |

| Code | Parameter | Setvalue |
|------|-----------|----------|
| f306 | Logic input type selection | 1 |
| f309 | Forced- effective Logic input function selection | 1 |
| f310 | Forced- effective Logic input function selection 2 | 30 |
| f522 | Prohibit motor reverse | 0 |

**Example 4: UP/DOWN acceleration and deceleration(Negative logic)**
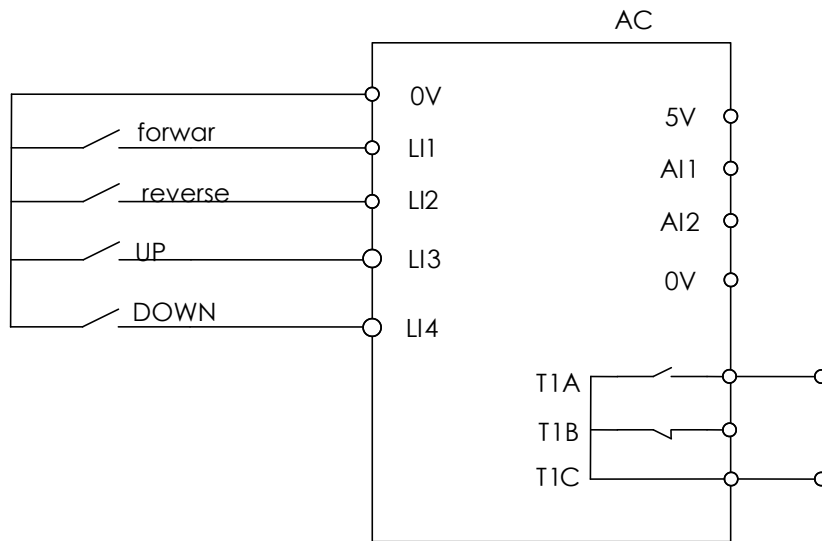


Figure 4.10 Example of wiring for three-wire control running

Table 4.6　Parameter configuration of UP/DOWN acceleration and deceleration(Negative logic)

| Code | Parameter | Setvalue |
|------|-----------|----------|
| f002 | Selection of run command | 0 |
| f003 | Selection of frequency command selection | 5 |
| f301 | L1 logic input function | 2 |
| f302 | L2 logic input function | 3 |
| f303 | L3 logic input function | 23 |
| f304 | L4 logic input function | 24 |
| f306 | Logic input type selection | 1 |
| f309 | Forced- effective Logic input function selection | 1 |
| f310 | Forced- effective Logic input function selection 2 | 0 |
| f522 | Prohibit motor reverse | 0 |

**Example 5: Multistep speed control running(Negative logic)**
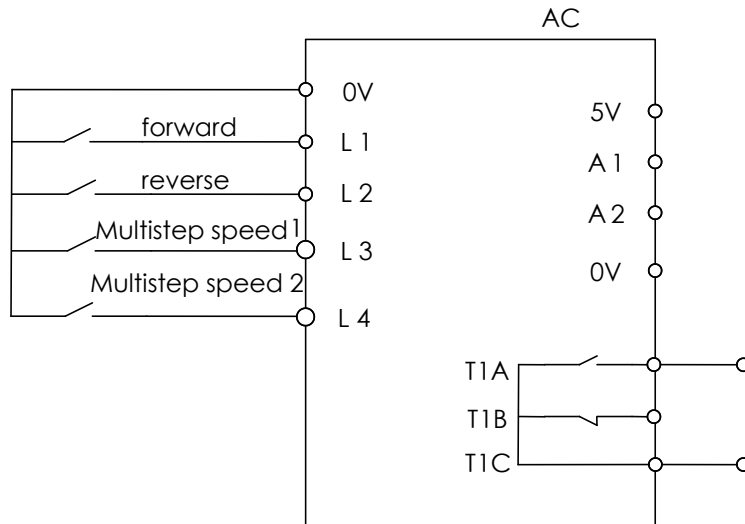


Figure 4.11 Example of wiring for multistep speed control running

Table 4.7 Parameter configuration of multistep speed control running

| Code | Parameter | Set value |
|------|-----------|-----------|
| f002 | Selection of run command | 0 |
| f003 | Selection of frequency command selection | 5 |
| f301 | L1 logic input function | 2 |
| f302 | L2 logic input function | 3 |
| f303 | L3 logic input function | 23 |
| f304 | L4 logic input function | 24 |
| f306 | Logic input type selection | 1 |
| f309 | Forced- effective Logic input function selection | 1 |
| f310 | Forced- effective Logic input function selection 2 | 0 |
| f522 | Prohibit motor reverse | 0 |
| f000 | frequency inverter frequency digital setting | Equal to multistep speed 0 |
| f716 | Multistep speed 1 | Multistep speed 1 |
| f717 | Multistep speed 2 | Multistep speed 2 |
| f718 | Multistep speed 3 | Multistep speed 3 |

Remarks: f000 setup method-power on to display 0.0 and then directly press up&down key to f000. Then press ENT to save the set.

**Example 6: JOG control**
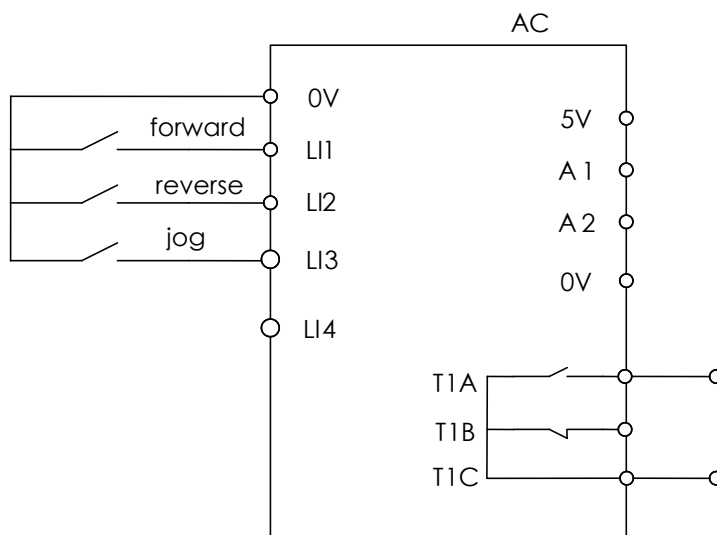


Figure 4.12 Example of wiring for JOG control

Table 4.8  Parameter configuration of JOG control(Negative logic)

| Code | Parameter | Setvalue |
|------|-----------|----------|
| f002 | Selection of run command | 0 |
| f301 | L1 logic input function | 2 |
| f302 | L2 logic input function | 3 |
| f303 | L3 logic input function | 4 |
| f306 | Logic input type selection | 1 |
| f309 | Forced- effective Logic input function selection | 1 |
| f310 | Forced- effective Logic input function selection 2 | 0 |
| f522 | Prohibit motor reverse | 0 |
| f701 | Jog frequency | Set by yourself |
| f702 | Jogging stop mode | Set by yourself |

# 5. DETAILED PARAMETER DESCRIPTION

## 5.1. Basic parameter group

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f000 | Operation frequency of keypad | f009~f008 | 0.0 |

When power on, the frequency inverter displays the operation frequency(when operation stopped, "0.0" is displayed, see f610. Then press the ▲ key or the ▼ key to change the operation frequency (even during operation).

Press ▲ move the frequency up. Press ▼ move the frequency down, Press the ENT key to save the operation frequency f000, and the set frequency are displayed alternately.
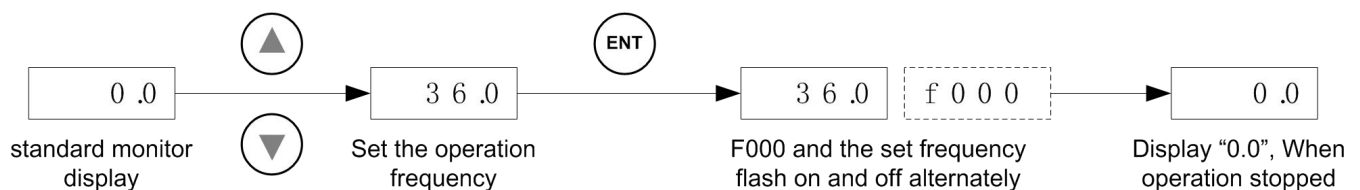


Figure 5.1  Procedure of setting f000

Note1: when set f003=3, f000 is effective as the frequency command.

Note2: Pressing the ▲key or the ▼ key will change the operation frequency even during operation.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f001 | V/F control mode selection | 0~3 | 0 |

0: V/F constant.  When one single frequency inverter is required to drive more than one motor, please select V/f control mode if motor automatic tuning can not be correctly performed or there is no other access to acquire parameters of controlled motor. To increase the torque further, increase the setting value of the manual torque boost.

1: Variable torque.  This is appropriate for load characteristics of such things as fans, pumps and blowers in which the torque in relation to load rotation speed is proportional to its square.

2: Sensor-less vector control.  Using sensor-less vector control with a standard motor will provide the highest torque at the low speed ranges.
(1) Provides large starting torque.
(2) Effective when stable operation is required to move smoothly up from the low speeds.
(3) Effective in elimination of load fluctuations caused by motor slippage.

3: Energy saving mode.  Energy can be saved in all speed areas by detecting load current and flowing the optimum current that fits the load.

Note: To use vector control and automatic energy saving, motor constant setting (motor tuning) is required.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f002 | Command mode selection 1 | 0~2 | 1 |

0: Terminal board.  ON and OFF of an external signal Runs and stops operation.

1: Keypad.   Press the <RUN> and <STOP> keys on the keypad to start and stop.

2: Serial communication.　Run and stop through serial communication.

Note: When under local control (f601=0), f002 setting is ignored, Keypad is always effective.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f003 | Frequency setting mode selection 1 | 0~7 | 3 |

0: Built-in potention meter.

1: AI1 input.　Frequency command is set by means of a signal from an external input device (AI1 terminal: 0-5V, 0-10Vdc or 4-20mAdc).

2: AI2 input.　An external signal (AI2 terminal: 0-10Vdc) is used to specify a frequency command.

3: Keypad (f000).　Press the <▲> key or the <▼> key on either the keypad or the expansion panel (optional) to set frequency.

4: Serial communication.　Frequency command is set by commands from an external control unit.

5: UP/DOWN setting from external contact.　Terminals are used to specify an up/down frequency command.

6: AI1+AI2.

7: PID setting of keypad.

8: Simple PLC running option

Note 1: When under local control(f601=0), f003 setting is ignored, and f000 is always effective.
Note 2: In the case when there is no valid frequency command (e.g, frequency command is under starting frequency setting f503), the motor does not run even if the frequency inverter receives the run command. At this time the RUN led on the keypad blinks.

Note 3: When f003 = 7, use f830 or f916 as the main PID setting.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f004 | Command mode selection 2 | 0~2 | 0 |

Setting method is the same as f002.

Note: Switching operation between f002and f004 can be set input terminal function 67 (or 68) beforehand to an input contact terminal. When switching the terminal operation mode to panel operation mode:

If f502 = 1, the motor will keep the running status before switch operation.

If f502 = 0, the motor stops regardless the running status before the switch operation.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f005 | Frequency setting mode selection 2 | 0~7 | 2 |

Setting method is the same as f003.

Note: About switching between f003 and f005operation, see f006.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f006 | Frequency priority selection | 0~1 | 0 |

0: f003 is switchable to f005by the input terminal (Input terminal function 20).

1: f003.

Switching between the frequency commands specified with f003 and f005 can be made by entering a command from a input contact terminal. To do so, however, the frequency command forced switching function (input terminal function 20) needs to be set beforehand to an input contact terminal.

If OFF: The frequency command specified with f003 will be selected.

If ON: The frequency command specified with f005 will be selected.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f007 | Maximum frequency | 30.0 ~ 400.0 Hz | 50.0 |
| f008 | Upper limit frequency | 0.5 Hz ~f007 | 50.0 |
| f009 | Lower limit frequency | 0.0 Hz ~f008 | 0.0 |

f007 sets the range of frequencies output by the frequency inverter (maximum output values).  This frequency is used as the reference for acceleration/deceleration time.

f008 and f009 set the upper and lower limit frequency that determines motor rotation speed range.
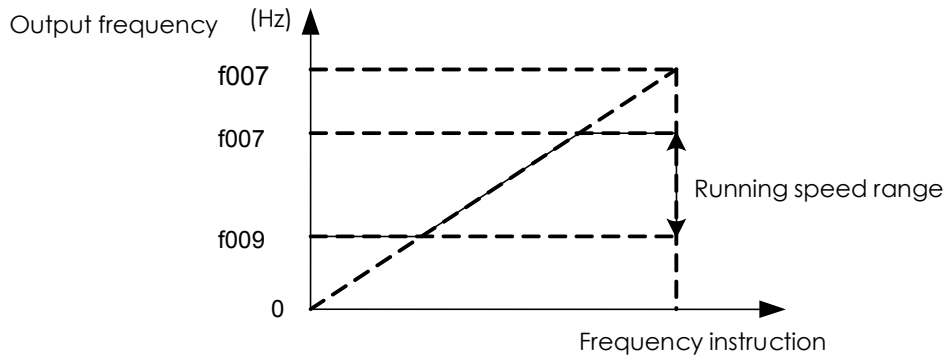


Figure 5.2  Relation of f007, f008, f009and running speed

Note1:Set f007、f008、f009 carefully. The motor output frequency is affected not only by these three parameters, but also by start frequency, DC braking initial frequency and skip frequency.

Note 2: The following condition must be true when setting up these parameters: f009≤ f008 ≤ f007.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f010 | Acceleration time 1 | 0.0 ~ 3200 s | varies by model |
| f011 | Deceleration time 1 | 0.0 ~ 3200 s | varies by model |

f010 sets the time that it takes for the frequency inverter output frequency to go from 0Hz to maximum frequency f007.

f011 programs the time that it takes for the frequency inverter output frequency to got from maximum frequency f007 to 0Hz.
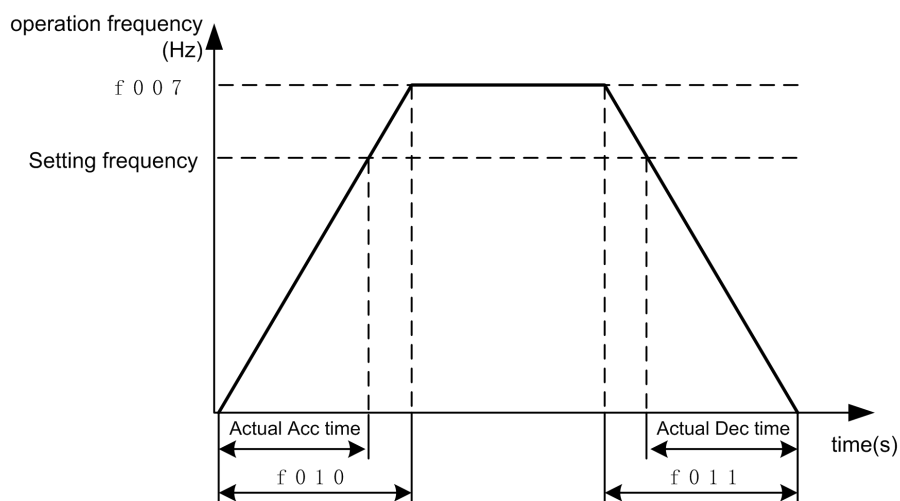


Figure 5.3  Definition of acceleration/deceleration time

When the acceleration/deceleration time is set at 0.0 seconds, the frequency inverter speed increases or reduces within 0.1 seconds.

If the programmed value is shorter than the optimum acceleration/deceleration time determined by load conditions, overcurrent stall or overvoltage stall function may make the acceleration/deceleration time longer than the programmed time. If an even shorter acceleration/deceleration time is setted, there may be an over current trip or overvoltage trip for frequency inverter protection.

Note: See f518, f520, f519 and f521.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f012 | PWM carrier frequency | 1.5 ~ 12.0 kHz | varies by model |

Increase of the switching frequency may reduce the magnetic noise of the motor. However, enhancement of switching frequency will increase heat dissipation. In the event of increase of switching frequency, the capacity of the frequency inverter may require corresponding derating. Normally it is unnecessary to change the parameter because we have done the reasonable setup when ex-factory.

| PWM carrier frequency | motor's magnetic noise | Leakage Current | Inverter heat dissipation |
|-----------------------|------------------------|-----------------|---------------------------|
| 2kHz | increase | decrease | decrease |
| 4kHz | ↕ | ↕ | ↕ |
| 12kHz | decrease | increase | increase |

Figure 5.4 Impact on frequency inverter performance by changing carrier frequency

Table 5.1 default carrier frequency value of different model capacity

| Model | Max. of F300（kHz） | Min. of F300（kHz） | default of F300（kHz） |
|-------|---------------------|---------------------|-------------------------|
| 0.4 ~ 11 kW | 12.0 | 1.5 | 4.0 |
| 15 ~ 30 kW | 8.0 | 1.5 | 4.0 |
| 37 ~ 500 kW | 4.0 | 1.5 | 4.0 |

Note: Although the electromagnetic noise level is reduced, the motor acoustic noise may be increased.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f013 | Carrier frequency control mode selection | 0~1 | 1 |

0: Carrier frequency not reduced automatically

1: Carrier frequency reduced automatically.

Reduction of rated current will be required if the PWM carrier frequency is set high.

When the PWM carrier frequency is set high, selecting "Carrier frequency not reduced automatically" may causes the frequency inverter to be tripped (overheat) more easily than selecting "Carrier frequency reduced automatically".

Switching frequency level will be automatically controlled in case of overheat trip in the frequency inverter . If the frequency inverter detects upcoming overheat fault, it will lower the switching frequency to reduce the heat dissipation from the drive. With the temperature tending to normal, the switching frequency will return to the level selected by f012.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f014 | Random PWM mode | 0~1 | 0 |

0: Disable.

1: Enable.   The random mode reduces motor electromagnetic noise by changing the PWM pattern.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f015 | Automatic acceleration/deceleration | 0~2 | 0 |

0: Disabled (manual).

1: Automatic (at acceleration & deceleration)

2: Automatic (only at acceleration)

Adjusts the acceleration/deceleration time automatically within the range of 1/8 to 8 times as long as the time set with the (f010 or f011), depending on the current rating of the frequency inverter .

When automatically setting acceleration/deceleration time, always change the acceleration /deceleration time so that it conforms to the load. The acceleration/deceleration time changes constantly with load fluctuations. For frequency inverter  that requires a fixed acceleration/deceleration time, use the manual settings (f010 and f011), and set f015 = 0.

Setting acceleration/deceleration time (f010 and f011) in conformance with mean load allows optimum setting that conforms to further changes in load.

Use this parameter after actually connecting the motor.

When the frequency inverter is used with a load that fluctuates considerably, it may fail to adjust the acceleration or deceleration time in time, and therefore may be tripped.

Note: Manual acceleration and deceleration time may still be restrained by motor current amplitude limit (See f107) and overvoltage fault protection (See f415) and overvoltage fault operation level . function (See f416).

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f016 | Factory reserved | | |

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f017 | Parameter setting macor function | 0~3 | 0 |

0: Default value.

1: 2-wire control (Negative logic  mode, ramp stop).

2: 3-wire control (Negative logic  mode, ramp stop).

3: External input UP/DOWN setting (Negative logic mode, slowdown stop).


Note 1: All the setup is available only under remote control mode (f601=1) or it can not recover to the defaul value even you setup f017=0. After setting f601=1, f017 will recover to 0. If we request 2-wire control mode, we just set f017=1 and confirm the frequency inverter is under remote control mode.

Note 2: Negative logic means the common point of all input terminal is connected to "0V" terminal on frequency inverter , while positive logic mode connected to "24V" terminal, see f306.

Note 3: 1ST LED Display on the left is the value for f017 last setting

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f018 | Factory reserved | | |
| f020 | Factory reserved | | |

## 5.2 Motor and its protection parameter group

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f100 | Auto-tuning | 0~2 | 0 |

0: Auto-tuning disabled (use of internal parameters).

1: Application of individual settings of f203 (after execution: 0).

2: Auto-tuning enabled (after execution: 0).

When auto-tuing, set the following parameters at least, as specified on the nameplate of the motor: f101~f104.

Set f100 to 2 before the start of operation. Tuning is performed at the start of the motor then.

Check to be sure that the setting of the parameter f101 and that of the parameter f102 agree with the base frequency (rated rotational speed) and base frequency voltage (rated voltage) of the motor to be operated, respectively. If not, set the parameters correctly.

When using the frequency inverter to control the operation of a motor smaller in capacity by one grade or more, be sure to set the motor rated current setting parameter (f103) properly.

Vector control may not operate properly if the motor capacity differs from the applicable rated capacity of the frequency inverter by more than two grades.

If current waveforms oscillate during operation, increase the speed control stability factor (f208). This is effective in suppressing oscillation.

Precautions on auto-tuning:

(1) Conduct auto-tuning only after the motor has been connected and operation completely stopped. If auto-tuning is conducted immediately after operation stops, the presence of a residual voltage may result in abnormal tuning.

(2) Voltage is applied to the motor during tuning even though it barely rotates. During tuning, "tun1" is displayed on the keypad.

(3) Tuning is performed when the motor starts for the first time after f100 is set to 2.

Tuning is usually completed within three seconds. If it is aborted, the motor will trip with the display of e-46 and no constants will be set for that motor.

(4) High-speed motors, high-slip motors or other special motors cannot be auto-tuned.

(5) Provide cranes and hoists with sufficient circuit protection such as mechanical braking. Without sufficient circuit protection, the resulting insufficient motor torque during tuning could create a risk of machine stalling/falling.

(6) If auto-tuning is impossible or an "e-46" auto-tuning error is displayed.

(7) If the frequency inverter is tripped during auto-tuning because of an output phase failure (e-42), check if the frequency inverter is connected to the correctly. A check for output phase failures is made during auto-tuning, regardless of the setting of the output phase failure detection mode selection parameter (f406).

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f101 | Base frequency 1 | 25.0~400.0 Hz | 50.0 |
| f102 | Base frequency voltage1 | 50~660V | varies by model |
| f103 | Motor rated current | varies by model | varies by model |
| f104 | Motor rated speed | 100~15000 rpm | varies by model |

Set f101 ~f104, as specified on the nameplate of the motor

To use vector control, and automatic energy saving, motor constant setting (motor tuning) is required.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f105 | Motor no-load current | 10.0~100.0% | varies by model |

Set the ratio of the no-load current of the motor to the rated current. Enter the value in % that is obtained by dividing the no-load current by the rated current.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f106 | Motor electronic thermal protection level 1 | varies by model | varies by model |

Set the motor rated current specified on the namelate of the motor to f106. This parameter allows selection of the appropriate electronic thermal protection characteristics according to the particular rating and characteristics of the motor.

Note: If f603=1, f106 displays in amperes/volts. If f603=0, f106 displays in % term. The 100% standard value is the rated output current indicated on the nameplate.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f107 | stall prevention level 1 | varies by model | varies by model |

This parameter adjusts the output frequency by activating a current stall prevention function against a current exceeding the f107 specified level.

Note 1: Do not set f107 under the rated motor no-load current. Otherwise the frequency inverter will determine that it is performing motor braking and increase the frequency applied to the motor.

Note 2: If f603=1, f107 displays in amperes/volts. If f603=0, f107 displays in % term. The 100% standard value is the rated output current indicated on the nameplate.

Note 3: When frequency inverter current is exceeding the f107 specified level:

● Output frequency is adjusted current exceeding the f107 specified level.

● During an OC alarm status, (that is, when there is a current flow in excess of the stall prevention level), the output frequency changes. At the same time, "---c" is displayed flashing on and off.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f108 | Base frequency 2 | 25.0~400.0 Hz | 50.0 |
| f109 | Base frequency voltage 2 | 50~660 V | varies by model |
| f110 | Motor electronic-thermal protection level 2 | varies by model | varies by model |
| f111 | Stall prevention level 2 | varies by model | varies by model |

Setting method is the same as f101、f102、f106、f107.

Use the above parameters to switch the operation of two motors with a single frequency inverter and to select motor V/F characteristics (two types) according to the particular needs or operation mode.

The f001 (V/F control mode selection) parameter is enabled only for motor1.If motor 2 is selected, V/F control will be given constant torque characteristics.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f112 | Factory reserved | | |
| f113 | Factory reserved | | |
| f114 | Factory reserved | | |
| f115 | Factory reserved | | |

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f120 | Default setting | 0~9 | 0 |

0: -

1: Standard default setting (Initialization)

2: Save user-defined parameters

3: Call user-defined parameters

4: Trip record clear

5: Cumulative operation time clear

6: Cumulative fan operation time record clear

7: Initialization of type information

8: P-type rating. (Nomal duty, for variable torque load characteristic like pumps and fans).

9: G-type rating. (Heavy duty, for constant torque load characteristic).

Note1: This function will be displayed as 0 during reading on the right. This previous setting is displayed on the left. Example: 1   0. f120 cannot be set during the frequency inverter operating. Always stop the frequency inverter first and then program.

Note 2: Even set f120=1, f300, f333, f334, f335, f336, f348, f349 will not be reset to their factory default settings.

Note 3: G-type and P-type: G-type refers to applications requiring constant torque output, while P-type applications with variable torque needs. The drive allows the user to select G-type or P-type ratings for the frequency inverter depending on the application. Fans, pumps, and blowers should use P-type (f120 = 8), and other applications generally use G-type (f120 = 9). Differences between G-type ratings and P -type ratings for the drive include rated input and output current, overload capacity, carrier frequency, and current limit.

| Duty types | Stall prevention level | overload tolerance | First digit of  u000 display |
|---|---|---|---|
| G-type (heavy duty) | 150% | 150% rated output current for 60 s | "g" (e.g. g100) |
| P-type(Normal duty) | 120% | 120% rated output current for 60 s | "p" (e.g. p100) |

Note 4:when set f120=1, the default setting is for G-type rating.

## 5.3 Motor control parameter group

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|

| f201 | Supply voltage correction (limitation of output voltage) | 0~3 | 3 |
|------|------|------|------|

0: Supply voltage uncorrected, output voltage limited.

1: Supply voltage corrected, output voltage limited.

2: Supply voltage uncorrected, output voltage unlimited.

3: Supply voltage corrected, output voltage unlimited.

If f201 is set to "0" or "2", the output voltage will change in proportion to the input voltage.

Even if the base frequency voltage (f102) is set above the input voltage, the output voltage will not exceed the input voltage.

The rate of voltage to frequency can be adjusted according to the rated motor capacity. For example, setting f201 to "0" or "1" prevents the output voltage from increasing, even if the input voltage changes when operation frequency exceeds the base frequency.

When the V/F control mode selection parameter (f001) is set to any number between 2 and 3, the supply voltage is corrected regardless of the setting of f201.



ｆ２０１ ＝０
Supply voltage uncorrected, output voltage limited.

ｆ２０１ ＝１
Supply voltage corrected, output voltage limited.

ｆ２０１ ＝２
Supply voltage uncorrected, output voltage unlimited.

ｆ２０１ ＝３
Supply voltage corrected, output voltage unlimited.
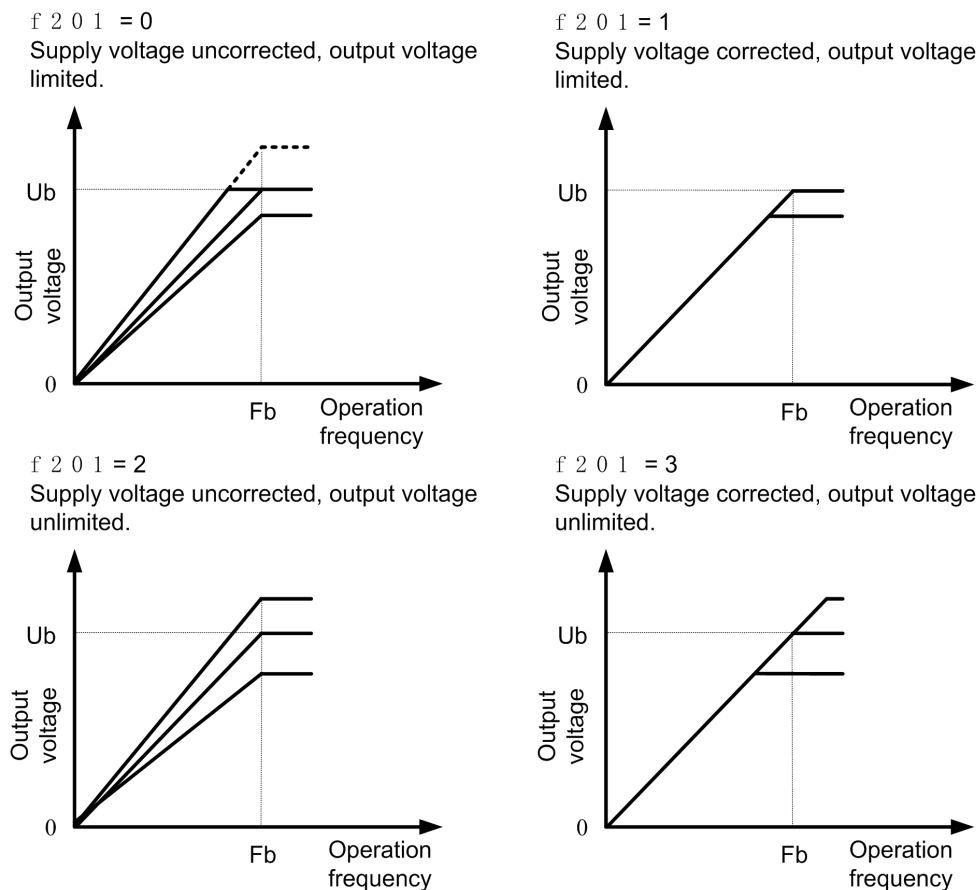
Figure 5.5 Description of voltage correct and voltage limit

| NO. | Parameter Name | Setting Range | Default |
|------|------|------|------|
| f202 | Voltage boost 1 | 0.0~30.0% | varies by model |
| f203 | Torque boost | 0.0~30.0% | varies by model |

If torque is inadequate at low speeds, increase torque by raising the torque boost rate with these two parameters. Perform adjustments according to the actual operation.
f202 is effective when f001 is set to 0 (V/F constant) or 1 (square reduction).

f203 is effective when f001 is set to 2 (SVC mode).

Note: Be careful not to increase the voltage boost or torque boost rate too much because it could cause an overcurrent trip or e-45 at startup.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f204 | Slip frequency gain | 0~150 % | 50 |

Set the compensation gain for the slipping of the motor. A higher slip frequency gain reduces motor slipping correspondingly.

Note1:.After setting f104, set f204 to adjust in detail.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f205 | Exciting current coefficient | 100~130 % | 100 |

f205 is used to fine adjust the magnetic field increase rate in low-speed range. To increase the torque in low-speed range, specify a larger value for f205.

Note: This parameter should be adjusted only when enough torque cannot be obtained, even though auto-tuning (f100 = 2) was made after the setting of the parameters f204 and f203. Note also that adjusting this parameter may cause an increase in the no-load current in low-speed range. If the no-load current exceeds the rated current, do not adjust this parameter.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f206 | Voltage boost 2 | 0~30 % | varies by model |

Setting method is the same as f202.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f207 | Speed control response coefficient | 1~150 | 40 |
| f208 | Speed control stability coefficient | 1~100 | 20 |

Use these two parameters to adjust the speed of response and stability to the frequency command.

How to make adjustments according to the moment of inertia of the load:

The moment of inertia of the load (including that of the motor shaft) was set at the factory on the assumption that it would be three times as large as that of the motor shaft. If this assumption does not hold, calculate the values to be entered in f207 and f208, using the following equations. f207 $= 40 \times \sqrt{a/3}$, f208 $= 20 \times \sqrt{a/3}$, Where 'a' is the times by which the moment of inertia of the load is larger than that of the motor. After the above adjustments, if necessary, make fine adjustments as described below.

• To increase(reduce) the response speed: Increase (reduce) the setting of f207.

• If overshooting or hunting occurs: Increase the setting of f208.

• If reduction gears or the like squeak: Increase the setting of f208.

• If an over-voltage trip occurs on completion of acceleration: Increase the setting of f208.

Note 1: When making the above adjustments, increase or decrease settings in steps of 10% or so while checking how things change.

Note 2: Depending on the settings of f207 and f208, the frequency may exceed the upper-limit frequency if the frequency inverter is set so as to accelerate the load in the shortest possible time.
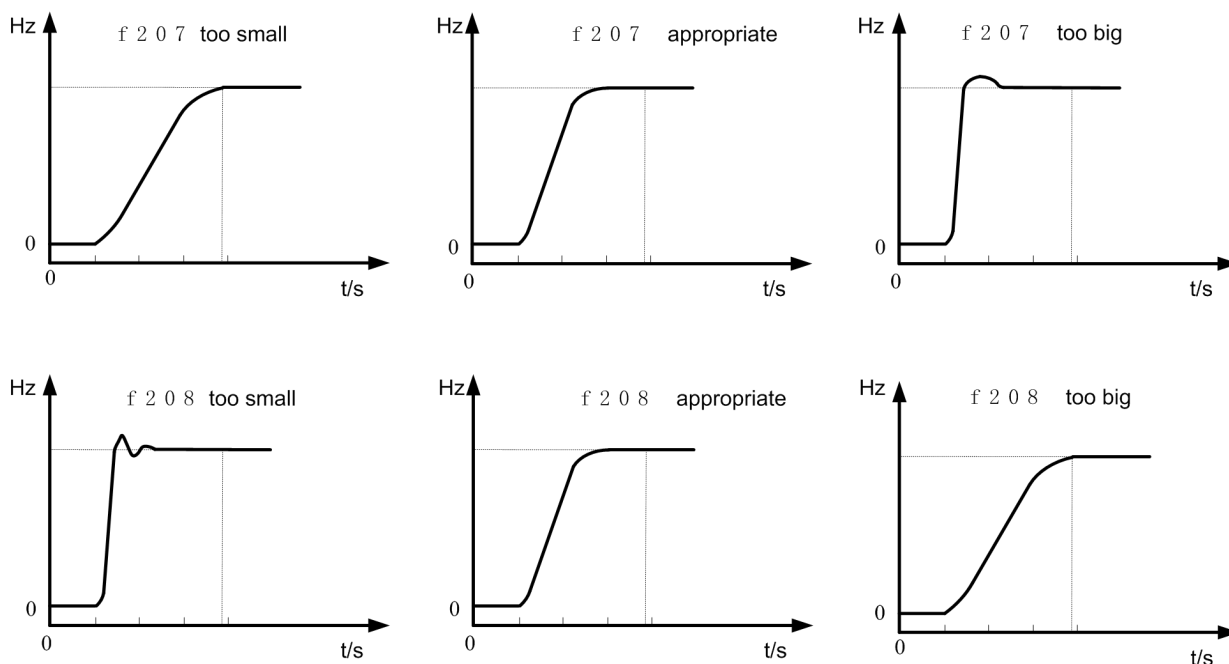
Figure 5. 6 Relations of speed response and f207 , f208

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f209 | Stall prevention control coefficient 1 | 10~250% | 100 |

Use this parameter along with f210 adjusts characteristics in a region in which the frequency is above the base frequency (region where the field is weak). If a heavy load is applied instantaneously (or transiently), the motor may stall before the load current reaches the current set with the stall prevention level 1 parameter (f107). In many cases, this kind of stall can be avoided by gradually reducing the setting of f209.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f210 | Stall prevention control coefficient 2 | 50~150% | 100 |

Using this parameter along with f209 adjusts characteristics in a region in which the frequency is above the base frequency (region where the field is weak).

* How to make adjustments in a region (region where magnetic field is weak) above the base frequency:

A drop in supply voltage may cause fluctuations of the load current or vibration of the motor. In some cases, such phenomena can be eliminated by changing the setting of f210 to between 80 and 90. However, this may cause an increase in load current, so that it is also necessary to adjust the setting of the electronic thermal protective level 1 parameter (f106) properly according to the motor capacity.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f211 | Maximam voltage adjustment coefficient | 90~120% | 104 |

Specify a larger value for f211 to secure as high an output voltage as possible in a region (region where magnetic field is weak) above the base frequency. Setting f211 to a larger value may cause the motor to vibrate or gears to squeak. If such a phenomenon occurs, do not adjust this parameter.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f212 | Waveform switching adjustment coefficient | 0.1~14.0kHz | 14.0 |

Specify a larger value for f212 if switching from a waveform to another resulting in a considerable increase in vibration and noise in middle-speed range (region between the start frequency and the base frequency). If no improvement can be made by specifying a larger value, do not adjust this parameter.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f213- f216 | factory reserved | | |

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f217 | multipoint profile V/F patter | 0~2 | 0 |

0: factory reserved.

1: factory reserved.

2: Enable multipoint profile V/F patter.

The drive utilizes a set V/f pattern (f217 = 2) to determine the appropriate output voltage level for each relative to the frequency reference.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f218 | point 1 output frequency（f1） | 0~f220 | 10.0 |
| f219 | point 1 output frequency voltage（V1） | 0~100% | 20.0 |
| f220 | point 2 output frequency（f2） | f218~f220 | 20.0 |
| f221 | point 2 output frequency voltage（V2） | 0~100% | 40.0 |
| f222 | point 3 output frequency（f3） | f220~f101 | 30.0 |
| f223 | point 3 output frequency voltage（V3） | 0~100% | 60.0 |

Set up the V/f pattern with f218~f223 as shown in according to the load characteristic.

Note 1: The following condition must be true when setting up the V/f pattern : V1<V2<V3, f1<f2<f3.

Note: Too high voltage output at low speed will cause a serious motor heat dissipation problem, or stall prevetion alarm, or over current trip.
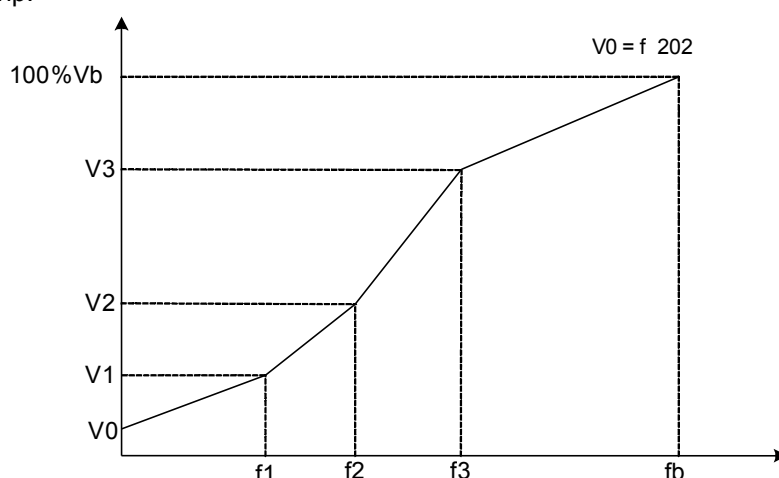


Figure 5.7 Multipoint profile V/F patter（f217 =2）

# 5.4 Process PID parameter group

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f300 | AI1 terminal function selection | 0~2 | 0 |

0: AI1 - analog input

1: AI1 - contact input (Sink mode)

2: AI1 - contact input (Source mode)

This parameter allows you to choose between analog signal input and contact signal input for the AI1 terminal.

When using the AI1 terminal as analog input, be sure f305 is configured right (0~5VDC, 0~10VDC, or 0~20mA).

When using the AI1 terminal as contact input terminals in sink logic connection, be sure to insert a resistor between the 24V terminal and the VIA terminal. (Recommended resistance: 4.7kΩ-1/2W).

Note1: Not valid when capacity rating is at 15kw or above.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f301 | Input terminal function for LI1 | 0~69 | 2 |
| f302 | Input terminal function for LI2 | 0~69 | 3 |
| f303 | Input terminal function for LI3 | 0~69 | 0 |
| f304 | Input terminal function for LI4 | 0~69 | 10 |

Use the above parameters to send signals from an external programmable controller to various control input terminals to operate and/or set the frequency inverter . The desired contact input terminal functions can be selected from table 5.2.

Tabel 5.2 Description of input terminal function

| Input terminal function NO. | Function name | Description |
|---|---|---|
| 0 | No function is assigned | Disabled |
| 1 | Standby terminal | ON: Ready for operation<br>OFF: Coast stop (gate off) |
| 2 | Forward run command | 2-wire operation   ON: Forward run<br>OFF: Slowdown stop<br>3-wire operation   OFF→ON: forward run. |
| 3 | Reverse run command | 2-wire operation   ON: Reverse run.<br>OFF: Slowdown stop<br>3-wire operation   OFF→ON: Reverse run. |
| 4 | Jog run mode | ON: Jog run<br>OFF: Jog run canceled |

| Input terminal function NO. | Function name | Description |
|---|---|---|
| 5 | Acceleration/deceleration 2 pattern selection | ON: Acceleration/deceleration 2<br><br>OFF: Acceleration/deceleration 1 or 3 |
| 6 | Preset-speed command 1 | Selection of 15-speed with LI1 to LI4 (4 bits) |
| 7 | Preset-speed command 2 | |
| 8 | Preset-speed command 3 | |
| 9 | Preset-speed command 4 | |
| 10 | Reset command | ON: Acceptance of reset command<br><br>ON → OFF: Trip reset |
| 11 | Trip stop command from external input device | OFF: No Trip<br><br>ON: e-43 Trip stop according to the stop mode set by f403 |
| 13 | DC braking command | OFF: No DC braking command<br><br>ON: DC braking started. DC braking current level and DC braking time is set by f507 and f508 respectively. |
| 14 | PID control disabling | OFF: PID control enabled.<br><br>ON: PID control disabled.<br><br>The input terminal function of PID control disabling is used for switching between PID control and open-loop control. Clearance of PID integral value function can also be used. |
| 15 | Permission of parameter editing | ON: Parameter editing permitted<br><br>OFF: Parameter editing prohibited (If f700 = 1) |
| 16 | Combination of standby and reset commands | ON: Simultaneous input from standby and reset commands |
| 17 | Frequency source switching to AI1 | ON: Frequency source switched to AI1<br><br>OFF: Frequency source as per f003 |
| 18 | Combination of forward run and jog run | ON: Forward jog operation |
| 19 | Combination of reverse run and jog run | ON: Reverse jog operation |
| 20 | Frequency setting source switching | ON: The frequency inverter follows the speed setting set by f005 (when f011= 1).<br><br>OFF: The frequency inverter follows the speed setting set by f003. |

| Input | Function name | Description |
|---|---|---|

| terminal function NO. | | |
|---|---|---|
| 21 | No.2 Switching of V/F setting | ON: No.2 V/F setting (f001=0、f108、f109、 f110、 f206)<br><br>OFF: No.1 V/F setting(f001、 f101、f102、 f106、 f202) |
| 22 | No.2 motor switching | ON: No.2 motor(f001=0、f108、f109、f110、f111、f206、f518、f519、 f511)<br><br>OFF: No.1 motor (f001、f010、f011、f101、f102、f106、f107、f202、f510) |
| 23 | Frequency UP signal input from external contacts | ON: Increase in frequency |
| 24 | Frequency DOWN signal input from external contacts | ON: Reduction in frequency |
| 25 | Frequency UP/DOWN cancellation signal input from external contacts | OFF→ON: Resetting of UP/DOWN frequency by means of external contacts |
| 26 | inversion of trip stop command from external device | OFF: e-43 Trip stop according to the stop mode set by f403 |
| 27 | Thermal trip stop signal input from external device | ON: e-25 Trip stop |
| 28 | inversion of thermal trip stop signal input from external device | OFF: e-25 Trip stop |
| 29 | Forced switching from remote to local control | Enabled when remote control is exercised<br><br>ON: Local control (setting of cmod, f002、f003 和 f005)<br>OFF: Remote control |
| 30 | Operation holding (stop of 3-wire operation) | ON: forward /reverse run held, 3-wire operation<br><br>OFF: Slowdown stop |
| 31 | Forced switching of command mode and terminal board command | ON: Terminal board operation<br>OFF: Setting of f002 |
| 32 | Display cancellation of the cumulative power amount (kWh) | ON: Monitor display cancellation of the cumulative power amount (kWh) |
| 33 | Fire-speed control seef419 | ON: Fire-speed operation (preset speed operation frequency f730)<br><br>OFF: Normal operation |
| 34 | Coast stop (gate off) | ON: Coast stop (gate off) |
| 35 | Inversion of Reset | ON: Acceptance of reset command<br><br>OFF→ ON: Trip reset |
| Input terminal function NO. | Function name | Description |

| | | |
|---|---|---|
| 36 | Forced switching of stall prevention level 2 | ON: Enabled at the value of f111<br><br>OFF: Enabled at the value of f107 |
| 37 | PID control integral value clear PID control integral value clear | ON: PID control integral value always zero<br><br>OFF: PID control permitted |
| 38 | inversion of PID error signal | ON: PI error input = feedback – setting<br><br>OFF: PI error input = setting – feedback |
| 39 | Forward running command<br><br>+ Acc&Dec curve 2 | ON: 电机正向运行，按加减速曲线 2 沿斜坡加速<br><br>ON: Motor forward running, follow acc&dec curve 2 to do the ramp acceleration |
| 40 | Reverse running command<br><br>+ Acc&Dec curve 2 | ON: Motor reverse running, follow acc&dec curve 2 to do the ramp acceleration |
| 41 | Forward running command<br><br>+ Multi-speed section 1 | ON: Motor forward running and activate multi-speed section 1 |
| 42 | Reverse running command<br><br>+ Multi-speed section 1 | ON: Motor reverse running and activate multi-speed section 1 |
| 43 | Forward running command<br><br>+ Multi-speed section 2 | ON: Motor forward running and activate multi-speed section 2 |
| 44 | Reverse running command<br><br>+ Multi-speed section 2 | ON: Motor reverse running and activate multi-speed section 2 |
| 45 | Forward running command<br><br>+ Multi-speed section3 | ON: Motor forward running and activate multi-speed section 3 |
| 46 | Reverse running command<br><br>+ Multi-speed section 3 | ON: Motor reverse running and activate multi-speed section 3 |
| 47 | Forward running command<br><br>+ Multi-speed section 4 | ON: Motor forward running and activate multi-speed section 4 |
| 48 | Reverse running command<br><br>+ Multi-speed section 4 | ON: Motor reverse running and activate multi-speed section 4 |
| 49 | Multi-speed section 1<br><br>+ Acc&Dec curve 2 | ON: activate Acc&Dec curve 2 and multi-speed section 1 at the same time |
| 50 | Multi-speed section 2<br><br>+ Acc&Dec curve 2 | ON: activate Acc&Dec curve 2 and multi-speed section 2 at the same time |
| 51 | Multi-speed section 3<br><br>+ Acc&Dec curve 2 | ON: activate Acc&Dec curve 2 and multi-speed section 3 at the same time |
| Input terminal function NO. | Function name | Description |

| 52 | Multi-speed section 4 + Acc&Dec curve 2 | ON: activate Acc&Dec curve 2 and multi-speed section 4 at the same time |
|----|------------------------------------------|-------------------------------------------------------------------------|
| 53 | Forward running command+Multi-speed section 1 + Acc&Dec curve 2 | ON: activate Acc&Dec curve 2, forward running command and multi-speed section 1 at the same time |
| 54 | Reverse running command+Multi-speed section 1 + Acc&Dec curve 2 | ON: activate Acc&Dec curve 2, reverse running command and multi-speed section 1 at the same time |
| 55 | Forward running command+Multi-speed section 2 + Acc&Dec curve 2 | ON: activate Acc&Dec curve 2, forward running command and multi-speed section 2 at the same time |
| 56 | Reverse running command+Multi-speed section 2 + Acc&Dec curve 2 | ON: activate Acc&Dec curve 2, reverse running command and multi-speed section 2 at the same time |
| 57 | Forward running command+Multi-speed section 3 + Acc&Dec curve 2 | ON: activate Acc&Dec curve 2, forward running command and multi-speed section 3 at the same time |
| 58 | Reverse running command+Multi-speed section 3 + Acc&Dec curve 2 | ON: activate Acc&Dec curve 2, reverse running command and multi-speed section 3 at the same time |
| 59 | Forward running command+Multi-speed section 4 + Acc&Dec curve 2 | ON: activate Acc&Dec curve 2, forward running command and multi-speed section 4 at the same time |
| 60 | Reverse running command+Multi-speed section 4 + Acc&Dec curve 2 | ON: activate Acc&Dec curve 2, reverse running command and multi-speed section 4 at the same time |
| 61 | UP/DOWN speed clean up+ fault reset | When it is OFF to ON，clean up UP/DOWN speed input setup frequency level |
| 62 | Running permission+ Forward running command (only 2-wire control) | ON: Activate running permission and forward running command at the same time. |
| 63 | Running permission+ reverse running command (only 2-wire control) | ON: Activate running permission and reverse running command at the same time. |
| 64 | Acc&dec curve 3 | ON: Motor follows acceleration curve 3 |
| 65 | Acce/Dece curve 3 + Forward running command | ON: Activate forward running and acce/dece curve 3 command at the same time. |
| 66 | Acce/Dece curve 3 + Reverse running command | ON: Activate reverse running and acce/dece curve 3 command at the same time. |
| 67 | Command source switch | OFF: command source press f002 ON: command source press f002 |

| Input terminal function NO. | Function name | Description |
|-----------------------------|---------------|-------------|

| 68 | Command source + frequency source switch | OFF: Command source press f002 and frequency source press f003 |
| | | ON: Command source press f004 and frequency source press f005 |
| 69 | Three-wire control stop reverse | OFF: Ready for running |
| | | ON: decelerate along the ramp until stop |
| 70 | Reset when simple PLC stops | ON: Clear up PLC status memory information to restart simple PLC process. |
| 71 | Simple PLC time out | ON: Run at current speed and recover PLC running after revocation the function. |

Note1: AI1 and AI2 could be used as contact input terminals (see f300, f308, f313 and f314).

Note 2: The difference between 2-wire control and 3-wire operation configuration lies in whether logic input function 30 (3-wire control shutdown input) is used.

| NO. | Parameter Name | Setting Range | Default |
| --- | --- | --- | --- |
| f305 | AI1 voltage-current input selection | 0~2 | 0 |

0:0～5V voltage signal input.

1:0～10V voltage signal input.

2: 0-20mA(4-20mA) current signal input.

Note: AI2 only accept 0~10VDC voltage signal input, setting value of f305 will not change the characteristic of AI2.

| NO. | Parameter Name | Setting Range | Default |
| --- | --- | --- | --- |
| f306 | sink/soruce mode selection | 0~1 | 1 |

0: Source (Positive) logic terminal mode.

1: Sink (Negative) logic terminal mode

| NO. | Parameter Name | Setting Range | Default |
| --- | --- | --- | --- |
| f307 | AO voltage-current output selection | 0~1 | 1 |

0: Current signal output.

1: Voltage signal output.

| NO. | Parameter Name | Setting Range | Default |
| --- | --- | --- | --- |
| f308 | Input terminal function of AI1 | 0~69 | 0 |

When f300 disabled, the set value of f308 cannot be read out.

When f300 set at 1or 2, AI1 is enabled, and can be used as a contact input terminal.

| NO. | Parameter Name | Setting Range | Default |
| --- | --- | --- | --- |
| f309 | Always-active terminal selection 1 | 0~69 | 1 |
| f310 | Always-active terminal selection 2 | 0~69 | 0 |

f309 and f310 specifies an input terminal function that is always to be kept active (ON).
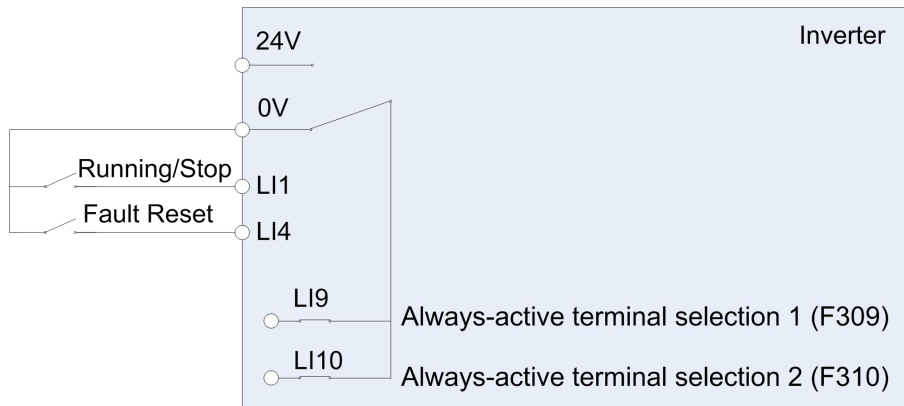
Figure 5.8 Always active terminal function

Note 1: Use f309 and f310 to assign input terminal function to LI9, LI10. LI9 and LI10 are virtual input contact terminal which are always activated. See Figure 5.8.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f311 | Output terminal function A of LO1-CLO1 | 0~255 | 4 |
| f312 | Output terminal function B of LO1-CLO1 | 0~255 | 255 |

The set method is same as f315.
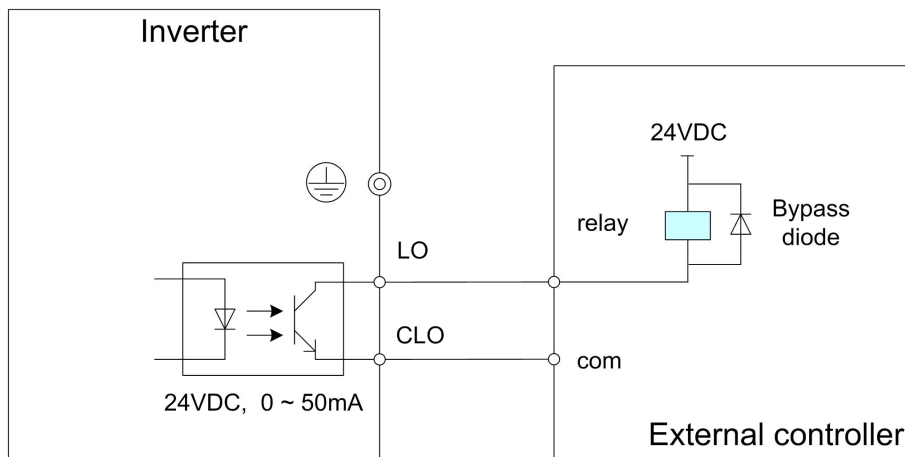


Figure 5.9 Output of LO-CLO wiring example

f312 could be used to remind of assisted status signal.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f313 | AI1 terminal function selection | 0 | 0 |

0: AI2 - analog input

1: AI2 - contact input (Sink)

2: AI2 - contact input (Source)

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f314 | Input terminal function of AI2 | 0~68 | 0 |

The set method is same as f301~f304.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f315 | Output terminal function A of T1 | 0~255 | 40 |
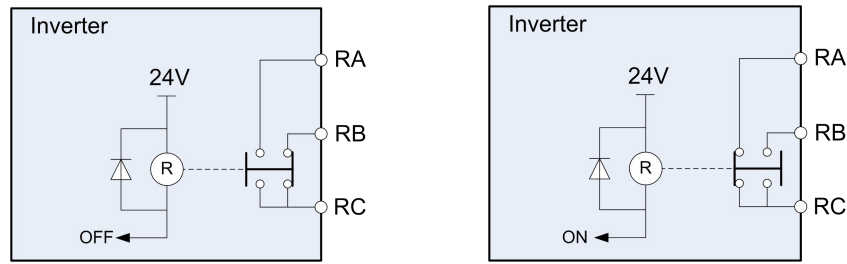
a) Relay in OFF status          b) Relay in ON status

Figure 5.10 Description of relay status

Table 5.3 Description of output terminal function

| Output terminal function NO. | Output Status | Description |
|---|---|---|
| 0 | OFF | Output frequency ≤ lower limit frequency setting of f009 |
| | ON | Output frequency > lower limit frequency setting of f009 |
| 2 | OFF | Output frequency < upper limit frequency setting of f008 |
| | ON | Output frequency = upper limit frequency setting of f008 |
| 4 | OFF | Output frequency < setting of f337 |
| | ON | Output frequency ≥setting of f337 |
| 6 | OFF | Output frequency > (set frequency + f339), or < (set frequency - f339) |
| | ON | (frequency - f339) < output frequency < (set frequency + f339) |
| 8 | OFF | Output frequency >(f338+f339), or < (f338-f339) |
| | ON | (f338-f339) < Output frequency < (f338+f339) |
| 10 | OFF | Output frequency ≤ f338-f339 |
| | ON | Output frequency ≥f338+f339 |
| 12 | OFF | Frequency commanded by f003or f005 ≠AI1 value |
| | ON | Frequency commanded by f003or f005= AI1 value |
| 14 | OFF | Frequency commanded by f003or f005 ≠AI2 value |
| | ON | Frequency commanded by f003or f005= AI2 value |
| 16 | OFF | AI1 value≤f340-f341 |
| | ON | AI1 value ≥f340+f341 |
| 18 | OFF | AI2 value ≤f342-f343 |
| | ON | AI2 value ≥f342+f343 |
| 20 | OFF | Terminal other than AI2 selected as frequency command |
| | ON | AI2 selected as frequency command |
| 22 | OFF | Operation stopped |
| | ON | When operation frequency is output or during (a-07) |

| Output terminal function NO. | Output Status | Description |
|---|---|---|
| 24 | OFF | Not for ready for operation |
| | ON | Ready for operation (Input function of standby and run are not ON) |
| 26 | OFF | forward run |
| | ON | reverse run |
| 28 | OFF | remote control mode |
| | ON | local control mode |
| 30 | OFF | When frequency inverter is not tripped |
| | ON | When frequency inverter is tripped or retries. |
| 32 | OFF | Torque current is equal to or less than f412 - f413 |
| | ON | Torque current is equal to or larger than f412 set value and longer than f414 set time. |
| 34 | OFF | The output current is equal to or larger than f408+f409 |
| | ON | The output current is equal to or less than f408 for f410 set time |
| 36 | OFF | When frequency inverter is not significant trip |
| | ON | When frequency inverter is significant trip |
| 38 | OFF | When frequency inverter is not insignificant trip |
| | ON | When frequency inverter is insignificant trip |
| 40 | OFF | When frequency inverter does not trip or retry |
| | ON | When frequency inverter trips or retries |
| 42 | OFF | alarm off |
| | ON | alarm on |
| 44 | OFF | calculated value of motor overload level < 50% |
| | ON | calculated value of motor overload level ≥ 50% |
| 46 | OFF | calculated value of brake resister overload level < 50% |
| | ON | calculated value of brake resister overload level ≥ 50% |
| 48 | OFF | Torque curren < （f412*70% - f413） |
| | ON | Torque curren ≥ f412*70% |
| 50 | OFF | Cumulative operation time ＜f428 setting |
| | ON | Cumulative operation time ≥f428 setting |
| 52 | OFF | Calculation for parts replacement time is shorter than the preset time (internally preset) |
| | ON | Calculation for parts replacement time is equal to or longer than the preset time (internally preset) |

| Output terminal function NO. | Output Status | Description |
|---|---|---|
| 54 | OFF | Nomal condition |
| | ON | PTC detected value ≥ 60% of protection level |
| 56 | OFF | Other than undervoltage detected |
| | ON | Undervoltage detected |
| 58 | OFF | Mechnical brake release |
| | ON | Mechnical brake not release |
| 60 | OFF | Motor is not in acceleration state |
| | ON | Motor is in acceleration state |
| 62 | OFF | Motor is not in deceleration state |
| | ON | Motor is in deceleration state |
| 64 | OFF | Motor is not in acceleration or deceleration state |
| | ON | Motor is in acceleration or deceleration state |
| 66 | OFF | Heat sink temperature still not reach alarm value |
| | ON | Heat sink temperature reaches alarm value |
| 68 | OFF | PLC recycle is under running |
| | ON | After completing one PLC recycle, then export one 0n-pulse |
| 70 | OFF | Under running at one PLC section |
| | ON | After completing one PLC section, then export one On-pulse |
| 72~253 | OFF | Not used |
| | ON | Not used |
| 254 | OFF | Relay Output always OFF |
| 255 | ON | Relay Output always ON |

Note 1: Inversion logic can be obtained by add 1 to the output terminal function mumber. Example: f315=3 is the invertion logic action of f315=2.

Note 2: Output terminal function is available for LO1-CLO1、LO2-CLO2 (f311、f312、f373、f374)和 T1, T2 (f315、f359、f360).

Note 3: Significant trip including follows: e-02, e-03, e-05, e-06, e-07, e-12, e-25, e-31, e-32, e-33, e-36, e-41, e-42, e-43, e-46. Insignificant trip including follows: e-01, e-11, e-21, e-22, e-24.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f316 | Output terminal logic selection of LO1-CLO1 | 0~1 | 0 |

0: f311 AND f312.  The logical product (AND) of f311 and f312 will be output to LO1-CLO1.

1: f311 OR f312.  The logical sum (OR) of f311 and f312 will be output to LO1-CLO1.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f317 | LO1-CLO1 output delay | 0~60.0 s | 0.0 |

f317 specified the time of LO1-CLO1 output delay.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f318 | T1 output delay | 0~60.0 s | 0.0 |

f318 specified the time of T1 output delay.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f319 | External contact input - UP response time | 0.0~10.0s | 0.1 |
| f320 | External contact input - UP frequency steps | 0.0 Hz ~f007 | 0.1 |
| f321 | External contact input - DOWN response time | 0.0~10.0s | 0.1 |
| f322 | External contact input - DOWN frequency steps | 0.0 Hz ~f007 | 0.1 |

These functions take effect when f003 or f005 is set to 5. Two input contact terminals are required to adjust the frequency command: one is used to increase the frequency command (see input terminal function 23), and the other is used to reduce the frequency command (see input terminal function 24). Use an input contact terminal to clear the frequency setting that accumulated by the UP/DOWN operation (see input terminal function 25).

Use f319~f322 set the frequency incremental/decremental gradient.

Frequency command incremental gradient = f320/f319 setting time

Frequency command decremental gradient = f322/f321 setting time

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f323 | Initial up/down frequency | 0.0 Hz ~f007 | 0.0 |

To adjust the frequency starting at a specified frequency other than 0.0 Hz (default initial frequency) after turning on the frequency inverter , specify the desired frequency using f323 (initial up/down frequency).

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f324 | Change of the initial up/down frequency | 0~1 | 1 |

0: Disabled.  Frequency reference is not memorizied at power off, reset and trip. f323 not changed.

1: Enabled.  Frequency reference is memoriziedat power off, reset and trip. f323 changed.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f325 | AI1 input point 1 setting | 0~100% | 0 |
| f326 | AI1 input point 1 frequency | 0.0~400.0 Hz | 0.0 |
| f327 | AI1 input point 2 setting | 0~100% | 100 |
| f328 | AI1 input point 2 frequency | 0.0~400.0 Hz | 50.0 |
| f329 | AI2 input point 1 setting | 0~100% | 0 |
| f330 | AI2 input point 1 frequency | 0.0~400.0 Hz | 0.0 |
| f331 | AI2 input point 2 setting | 0~100% | 100 |
| f332 | AI2 input point 2 frequency | 0.0~400.0 Hz | 50.0 |

These parameters adjust the output frequency according to the externally applied analog signal (0-5Vdc voltage, 0-10Vdc voltage, 4-20mAdc current) and the entered command for setting an external contact frequency, see figure 5.11.

Note 1: Do not set the same value to f325 and f327 (or f329 and f331), otherwise a-05 will alarmed.

Note 2: when adjust 4-20mAdc current input, set 20(%) to f325 (f327).

Note 3: analog input signal bias and slope could further adjust with the parameter between f333 and f336
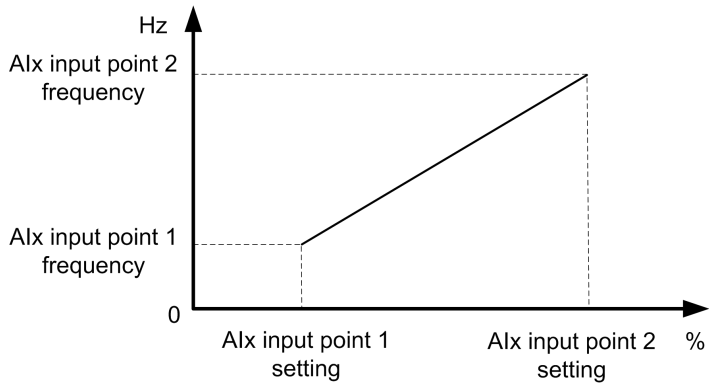


Figre 5.11 Relation between analog input and frequency setting

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f333 | AI1 input bias | 0~255 | varies by model |
| f334 | AI1 input gain | 0~255 | varies by model |
| f335 | AI2 input bias | 0~255 | varies by model |
| f336 | AI2 input gain | 0~255 | varies by model |

To fine adjust the frequency command characteristics for AI1/AI2 input, use the Parameters f333 to f336.
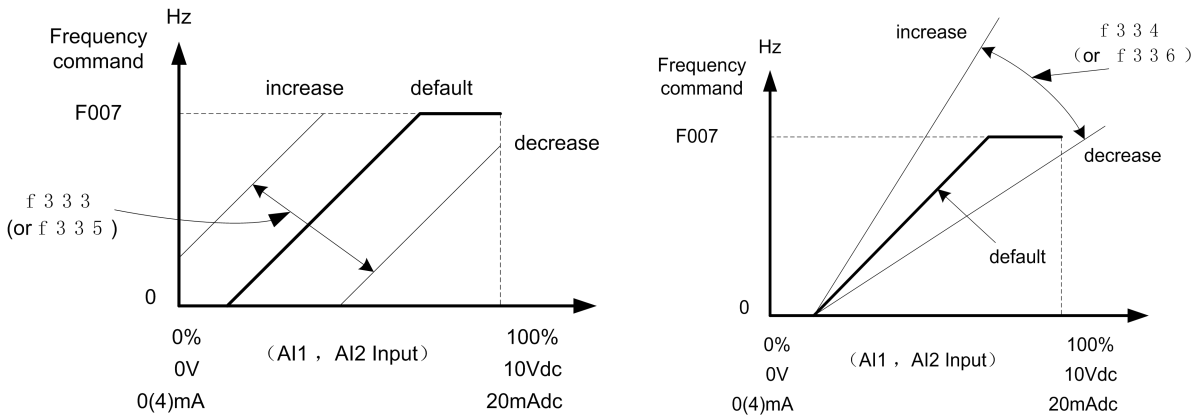


Figure 5.12 Calibration of analog input

Note 1: If you want to reduce the leeway, set f470 or f472 to a larger value. Note that specifying a too large value may cause an output frequency to be output, even though the operation frequency is 0 (zero) Hz.

Note 2: If you want to adjust the frequency inverter so that it will output the maximum frequency at the maximum voltage and current input, set f471 or f473 to a smaller value. Note that specifying a too small value may cause

the operation frequency not to reach the maximum frequency, even though the maximum voltage and current input are applied.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f337 | Low-speed signal output frequency | 0.0 Hz ~f007 | 0.0 |

When the output frequency exceeds the setting of f337, an ON signal will be generated. This signal can be used as an electromagnetic brake excitation/release signal.

This signal can also be used as an operation signal when f337 is set to 0.0Hz, because an ON signal is put out if the output frequency exceeds 0.0Hz.

If the frequency inverter is so set, the signal will be put out through the open collector OUT(LO-CLO) and RELAY output terminals.
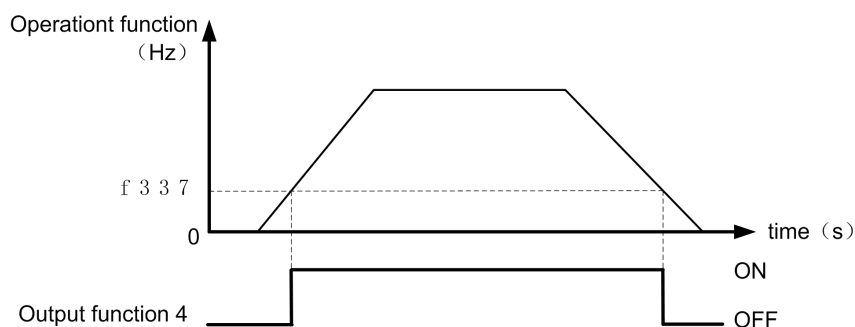


Figure 5.13 Description of Low-speed signal output frequency

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f338 | Speed reach detection output frequency | 0.0 Hz ~f007 | 0.0 |
| f339 | Speed reach detection band | 0.0 Hz ~f007 | 2.5 |
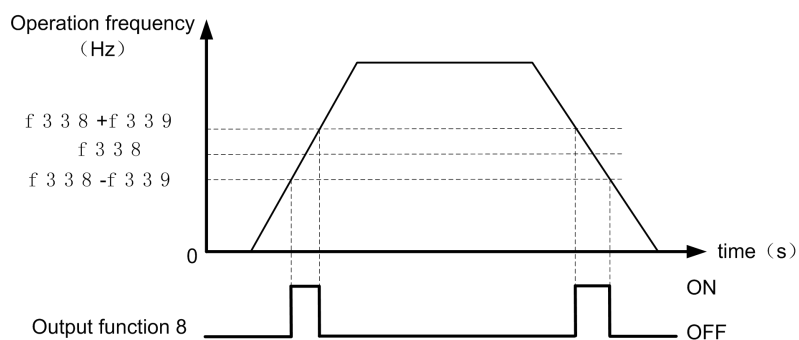


Figure 5.14 Description of Speed reach detection output frequency

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f340 | AI1 input reach detection level | 0~100 % | 0 |
| f341 | AI1 input reach detection band | 0~20 % | 3 |
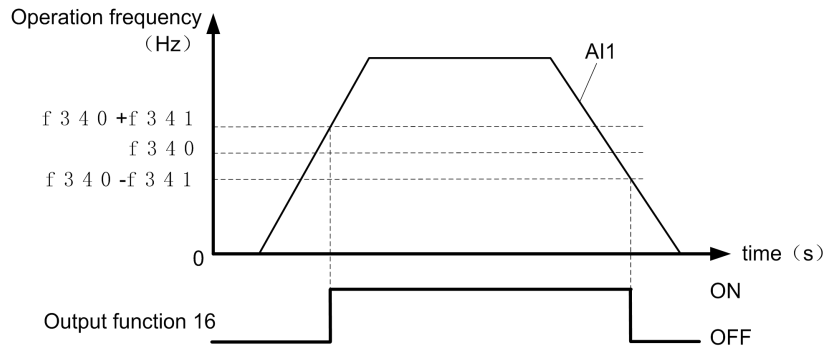
Figure 5.15 Description of AI1 input reach output

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f342 | AI2 input reach detection level | 0~100 % | 0 |
| f343 | AI2 input reach detection band | 0~20 % | 3 |
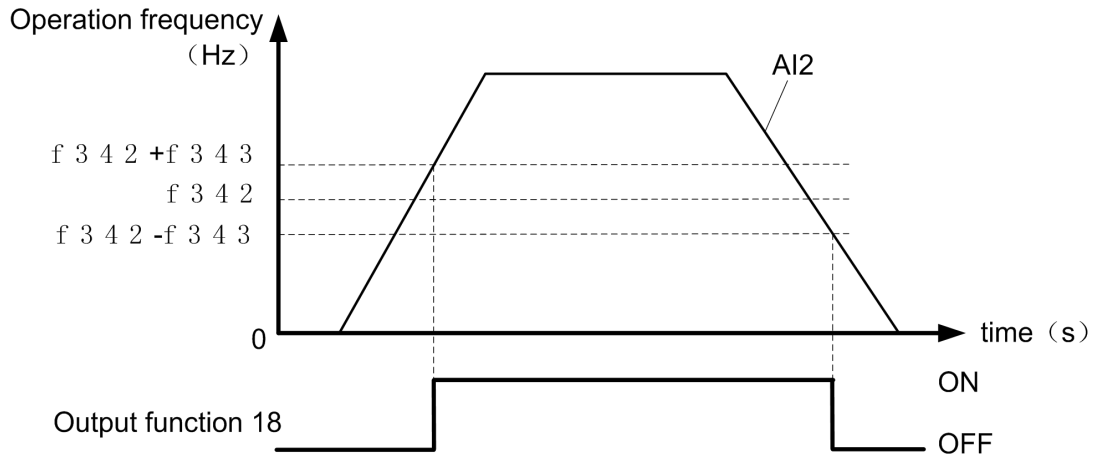


Figure 5.16 Description of AI2 input reach output

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f344 | Frequency command agreement detection range | 0.0 Hz ~f007 | 2.5 |
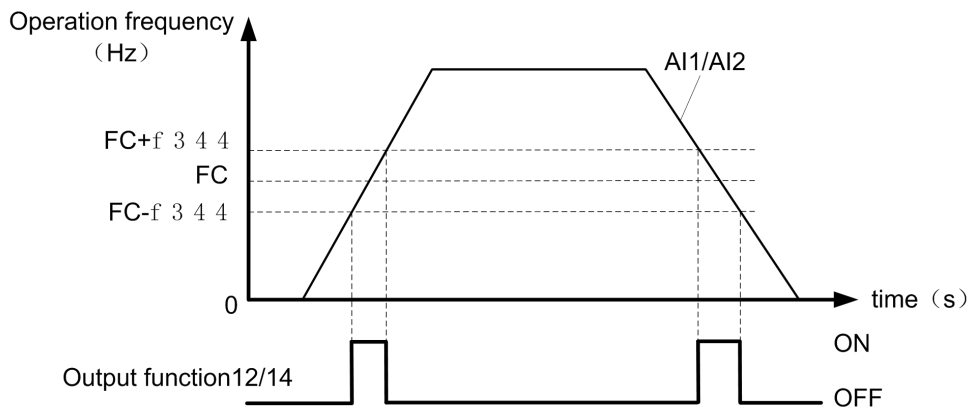


Figure 5.17 Description Frequency command agreement detection output

If the frequency command value specified using f003 (or f005) almost agrees with the frequency command value from the VA and VIB terminal with an accuracy of ± f344, an ON or OFF signal will be sent out.

Note: This function can be used, for example, to send out a signal indicating whether the amount of processing and the amount of feedback agree with each other when the PID function is in use. For an explanation of the PID function.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f345 | Logic output/pulse train output selection (LO1-CLO1) | 0~1 | 0 |

0: Logic output    1: Pulse train output

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f346 | Pulse train output function selection (LO1 –CLO1) | 0~14 | 0 |

Table5.4  Pulse train output function selection

| f346 | Description | Reference of max. value |
|---|---|---|
| 0 | Output frequency | f007 |
| 1 | Output current | 150% of frequency inverter rated current |
| 2 | Set frequency (Before PID) | f007 |
| 3 | Frequency setting value (After PID) | f007 |
| 4 | DC voltage | 150% of frequency inverter rated voltage |
| 5 | Output voltage command value | 150% of frequency inverter rated voltage |
| 6 | Input power | 185% of frequency inverter capacity |
| 7 | Output power | 185% of frequency inverter capacity |
| 8 | AI1 Input value | 5V /10V/20mA |
| 9 | AI2 Input value | 10V |
| 10 | Torque | 250% of motor rated torque |
| 11 | Torque current | 250% of motor rated torque current |
| 12 | Motor cumulative load factor | 100% |
| 13 | frequency inverter cumulative load factor | 100% |
| 14 | PBR (braking reactor) cumulative load factor | 100% |

Note : When item of f346 reachs "Reference of max. value", the number of pulse train set by f346 are sent to output terminals (LO1-CLO1).

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f347 | Maximum numbers of pulse train | 500~1600 | 800 |

Note: The ON pulse width is maintained constant. The ON pulse width is fixed at a width that causes the duty to reach 50% at the maximum pulse number set with f347. Therefore, the duty is variable. For example, the ON pulse width is approximately 0.6 ms when f347 = 800, approximately 0.5ms when f347=1000, or approximately 0.3 ms when f347 = 1600.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f348 | AO1 selection | 0~16 | 0 |

The signal of internal calculated value can output from the AO1 terminal. Analog voltage output signal is default. Switching to 0-20mAdc (4-20mAdc) output current can be made by setting f307 to 0.

Table 5.5 AO selection parameters

| f348 | description | maximum value |
|------|-------------|---------------|
| 0 | Output frequency | Maximum frequency f007 |
| 1 | Output current | 185% of invter rated current |
| 2 | Set frequency (betore PID) | Maximum frequency f007 |
| 3 | Frequency setting value (after PID) | Maximum frequency f007 |
| 4 | DC voltage | 150% of frequency inverter rated voltage |
| 5 | Output voltage command value | 150% of frequency inverter rated voltage |
| 6 | Input power | 185% of frequency inverter rated voltage |
| 7 | Output power | 185% of frequency inverter rated voltage |
| 8 | AI1 input | （1023） |
| 9 | AI2 input | （1023） |
| 10 | Torque | 250% of frequency inverter rated torque |
| 11 | Torque current | 250% of frequency inverter rated torque current |
| 12 | Motor cumulative load factor | 100% |
| 13 | frequency inverter cumulative load factor | 100% |
| 14 | brake resistor cumulative load factor | 100% |
| 15 | Serial communication data | —— |

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f349 | AO gain adjustment | 1~1280 | varies by model |
| f350 | Inclination characteristic of analog output | 0~1 | 1 |
| f351 | Bias of analog output | 0~100% | 0 |

The analog output charicteristic can be adjusted by using the parameter f349, f350 and f351, see figure 5.18.
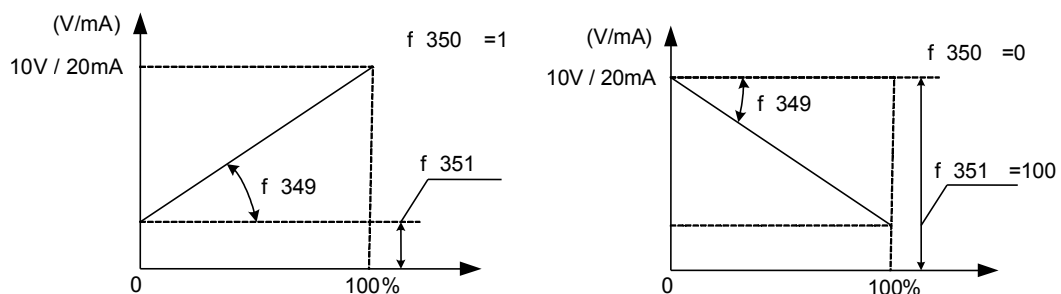


Figure 5.18 Description of f349, f350 and f351

Default output signals from AO1 terminals are analog voltage signals. Their standard setting range is from 0 to 10Vdc. Using these parameters, you can calibrate the output to 4-20mAdc or 20-4mAdc.

Note 1: To switch to 0-20mAdc (4-20mAdc) output, set f307 = 0.

Note 2: Only when f348 = 16, set value of f349 displays.

Note 3: When enters f349. operation frequency is displayed (f348 = 0), then press the ▲ key or the ▼ key to adjust f349. If a meter is connected to AO1, the meter reading will change at this time (f349 will change too) but be careful because there will be no change in the frequency inverter 's digital LED (monitor) indication.

| NO. | Parameter Name | Setting Range | Default |
|------|----------------|---------------|---------|
| f352 | output frequency when AO1 = 0V | 0 Hz ~f007 | 0.0 |
| f353 | output frequency when AO1 = 10V | 0 Hz ~f007 | 0.0 |
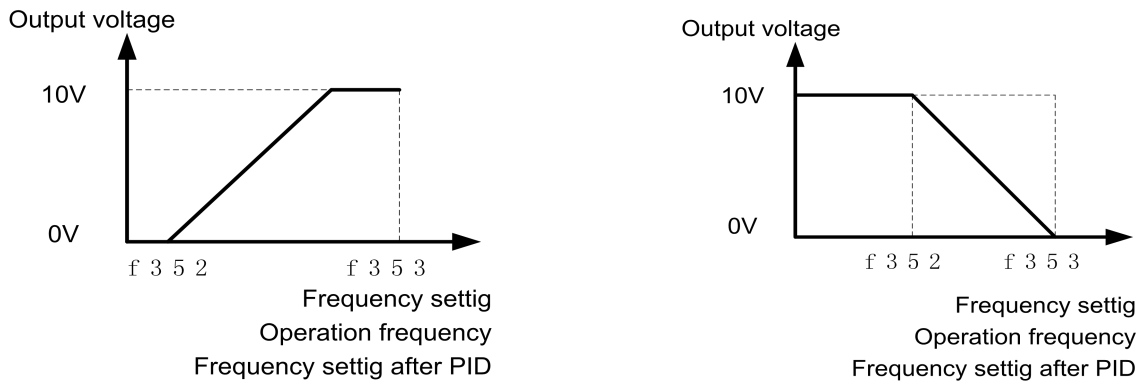


Figure 5.19 Description of f352andf353setting

Note: When f348 is set to 0 (or 2,3), if f352 or f353 are not set to 0 at same time, f350 和 f351 will not be effective..

| NO. | Parameter Name | Setting Range | Default |
|------|----------------|---------------|---------|
| f354 | AO1 bias | 0~255 | 128 |

This parameter is factory reserved, do not adjust it.
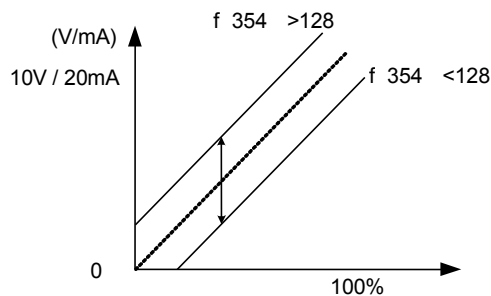


Figure 5.20 Description of f354

| NO. | Parameter Name | Setting Range | Default |
|------|----------------|---------------|---------|
| f355 | Input terminal function for LI5 | 0~69 | 0 |
| f356 | Input terminal function for LI6 | 0~69 | 0 |
| f357 | Input terminal function for LI7 | 0~69 | 0 |
| f358 | Input terminal function for LI8 | 0~69 | 0 |

The set method is same as f301~f304.

Note1: Only valid when capacity rating is at 15kw or above.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f359 | Output terminal function A of T2 | 0~255 | 0 |
| f360 | Output terminal function B of T2 | 0~255 | 0 |
| f361 | Output terminal logic selection of T2 | 0~1 | 0 |
| f362 | T2 output delay | 0~60.0s | 0.0 |

The set method is same as f315.

Note1: Only valid when capacity rating is at 15kw or above.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f363 | Input terminal active mode | 0~1 | 0 |

0: Input terminal function active when input terminal is OFF.

1: Input terminal function inactive when input terminal is ON.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f364 | Input terminal filter time | 0~200 | 0 |

1 is equelance about 2ms。

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f365 | Output terminal function B of T1 | 0~ 69 | 0 |

The set method is same as f315.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f366 | Output terminal logic selection of T1 | 0~1 | 0 |

The set method is same as f316.

0： With, f315 and f316 must satisfy the request at the same time, then relay one acts.

1： Or.f315 or 316 either satisfy the request, then relay one acts.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f367 | Terminal run detection selection at power on | 0~1 | 0 |

0： Disable, when power on， frequency inverter will not supply to the motor even if the input terminal (to which forward/reverse run function is assigned) is ON, Only open the input terminal and re-close it will start the motor.

1： Enable. when power on， frequency inverter will supply to the motor on the detection of the forward/reverse run terminal is ON.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f368 | AO2 voltage-current output selection | 0~1 | 0 |

0: Current signal output.

1: Voltage signal output.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f369 | AO2 selection | 0~16 | 0 |
| f370 | AO2 gain adjustment | 1~1280 | varies by model |
| f371 | Inclination characteristic of analog output | 0~1 | 1 |
| f372 | Bias of analog output | 0~100% | 0 |

Parameter setting for f369~f372 please refers to the related parameter f348, f349, f350, f351 of AO1.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f373 | Output terminal function A of LO2-CLO2 | 0~255 | 4 |
| f374 | Output terminal function B of LO2-CLO2 | 0~255 | 255 |

The set method is same as f315.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f375 | Output terminal logic selection of LO2-CLO2 | 0~1 | 0 |

0: f373 AND f374.  The logical product (AND) of f373 and f374 will be output to LO2-CLO2.

1: f373 OR f374.  The logical sum (OR) of f373 and f374 will be output to LO2-CLO2.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f376 | LO2-CLO2 output delay | 0~60.0 s | 0.0 |

f376 specified the time of LO2-CLO2 output delay.

## 5.5 Fault protection parameter group

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f400 | Retry selection (Selecting the number of times) | 0~10 | 0 |

 0: disabled

1~10 times.

This parameter resets the frequency inverter automatically when the frequency inverter gives an alarm. During the retry mode, the motor speed search function operated automatically as required and thus allows smooth motor restarting.

Protective operation detection relay signals (T1A-T1B-T1C or T2A-T2B-T2C terminal signals) are not sent during use of the retry function.

To allow a signal to be sent to the protective action detection relay (TxA, B and C terminals) even during the retry process, assign the output terminal function 36 or 37 to f315.

A virtual cooling time is provided for overload tripping (e-21, e-22). In this case, the retry function will operate after the virtual cooling time and retry time.

In the event of tripping caused by an overvoltage (e-11), the retry function will not be activated until the voltage in the DC section comes down to a normal level.

In the event of tripping caused by overheating (e-24), the retry function will not be activated until the temperature in the frequency inverter comes down low enough for it to restart operation.

Keep in mind that when f429 is set to 1 (trip retained), the retry function will not be performed, regardless of the setting of f400.

During retrying, the blinking display will alternate between a-08 and the monitor display specified by status monitor display mode selection parameter f610.

The number of retries will be cleared if the frequency inverter is not tripped for the specified period of time after a successful retry. "A successful retry" means that the frequency inverter output frequency reaches the command frequency without causing the frequency inverter to re-trip.

Retry available fault including overcurrent (e-01, e-04), overvoltage (e-11), overheat (e-24), over load(e-21, e-22), and momentary power failure.

The retry function will be canceled at once if tripping is caused by an unusual event other than the retry available fault. This function will also be canceled if retrying is not successful within the specified number of times. "Function be canceled" means frequency inverter will be tripped and stop supply to motor.

The interval time is proportional relation with retry times. The first retry is 1sec, the second retry is 2 sec and the 10th retry is 10sec.

| retry time | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| success time | 1s | 2s | 3s | 4s | 5s | 6s | 7s | 8s | 9s | 10s |

Before all fault reset attempts are finished:

The output terminal to which output terminal function 40 (or 41) is assigned will not indicate the fault.

The output terminal to which output terminal function 38 (or 39) is assigned can be used to indicate the appearance of automatically retry available fault.

The output terminal to which output terminal function 30 (or 31) is assigned can be used to indicate any type of the fault in the frequency inverter even if during the the period of retry.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f401 | Electronic-thermal protection characteristic selection | 0~7 | 2 |

Table 5.6  Description of f401

| f401 | motor type | overload tripped enable | overload stall |
|---|---|---|---|
| 0 | Standard motor | YES | NO |
| 1 | | YES | YES |
| 2 | | NO | NO |
| 3 | | NO | YES |
| 4 | Special motor<br>（forced cooling） | YES | NO |
| 5 | | YES | YES |
| 6 | | NO | NO |
| 7 | | NO | YES |

Overload stall: This is an optimum function for equipment such as fans, pumps and blowers with variable torque characteristics that the load current decreases as the operating speed decreases. When the frequency inverter detects an overload, this function automatically lowers the output frequency before the motor overload trip e-21 is

activated. This function operates a motor at frequencies that allow the load current to keep its balance so that the frequency inverter can continue operation without being tripped.

Note: Do not use the overload stall function with loads having constant torque characteristics (such as conveyor belts in which load current is fixed with no relation to speed).

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f402 | Motor 150%-overload time limit | 10~2400s | 300 |

Parameter f403 is used to set the time elapsed before the motor trips under a load of 150% (overload trip e-22) within a range of 10 to 2400 seconds.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f403 | Emergency stop selection | 0~2 | 0 |
| f404 | emergency braking time | 0~20.0 s | 1.0 |

0: Free stop   1: Ramp stop

2: Emergency DC braking

These parameters allow you to specify how to stop operation using an external control device when an external trip occurs. When operation stopped, the trip e-43 displayed. When setting f403 =2 (emergency DC braking), set also f507 (DC braking rate) and f404 (emergency braking time). Assigning the trip stop function (input terminal function 11 or 27) to the contact input terminal.

Note 1: Emergency stopping via the specified terminal is possible, even during panel operation.

Note 2) If DC braking is not needed to bring the motor to a stop under normal conditions, although f403 is set to 2 (emergency DC braking), set the DC braking starting frequency (f506) at 0.0 Hz.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f405 | Input phase failure detection | 0~1 | 0 |

0: Disabled, No tripping.

1: Enabled, Phase failure detection is enabled during operation.

This parameter detects frequency inverter input Phase failure. If the abnormal voltage status of main circuit capacitor persists for few minutes or more, the tripping function will be activated.

Therefore, input phase failures cannot always be detected. A trip information e-41 will be displayed. If the power capacity is larger than the frequency inverter capacity (more than 200kVA or more than 10 times), detection errors may occur. If this actually happens, install an AC or DC reactor.

Note1: Setting f405 = 0(input phase failure detection: disabled) may result in a breakage of the capacitor in the frequency inverter main circuit if operation is continued under a heavy load in spite of the occurrence of an input phase failure.

Note2: Parameter f405 is invalid for single-phase input model.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f406 | Output phase failure detection mode selection | 0~5 | 0 |

0: Disabled.

1: At start-up (Only one time after power is turned on).

2: At start-up (each time).

3: During operation.

4: At start-up and during operation.

5: Detection of cutoff on output side.

f406=0: No tripping.

f406=1: With the power on, the phase failure detection is enabled only at the start of the first operation. The frequency inverter will trip if the Phase failure status persists for one second or more.

f406=2: The frequency inverter checks for output phase failures each time it starts operation. The frequency inverter will trip if the Phase failure status persists for one second or more.

f406=3: The frequency inverter checks for output phase failures during operation. The frequency inverter will trip if the Phase failure status persists for one second or more.

f406=4: The frequency inverter checks for output phase failures at the start of and during operation. The frequency inverter will trip if the Phase failure status persists for one second or more.

f406=5: If it detects an all-phase failure, it will restart on completion of reconnection. The frequency inverter does not check for output phase failures when restarting after a momentary power failure.

Note1: A check for output phase failures is made during auto-tuning, regardless of the setting of this parameter.

Note2: Set f406=5 to open the motor-frequency inverter connection by switching commercial power operation to frequency inverter operation. Detection errors may occur for special motors such as high-speed motors.

| NO. | Parameter Name | Setting Range | Default |
| --- | --- | --- | --- |
| f407 | Small current trip/alarm selection | 0~1 | 0 |

0: Alarm only.   A small current alarm can be put out by setting the output terminal function selection parameter.

1: Tripping.   The frequency inverter will trip if a current below the current set with f408 flows for the period of time specified with f410. Trip information is displayed as "e-06".

| NO. | Parameter Name | Setting Range | Default |
| --- | --- | --- | --- |
| f408 | undercurrent detection current | 0~100% | 0.00 |
| f409 | under current detection current hysteresis | 1~20% | 10 |
| f410 | undercurrent detection time | 0~255s | 0 |

If a current smaller than the f408 specified value flows for more than the f410 specified time. When tripping is selected (see f407), enter the detection time to tripping. Trip information is displayed as "e-12". See figure 5.21.
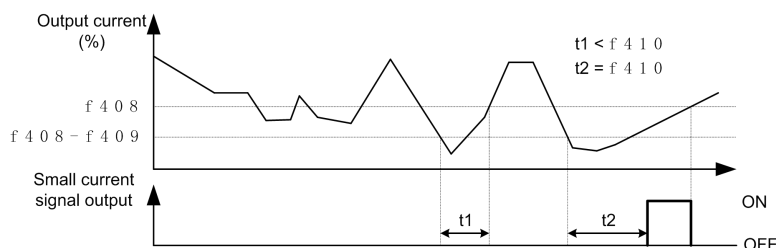


Figure 5.21 Description of small current

Note: The 100% standard value of f408 and f409 is the rated output current indicated on the motor nameplate.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f411 | Over-torque trip/alarm selection | 0~1 | 0 |

0: Alarm only.   A overtorque alarm can be put out by setting the output terminal function selection parameter.

1: Tripping.   The frequency inverter will trip if a torque currrent exceeding the f412 specified level flows for the period of time specified with f414. Trip information is displayed as "e-07".

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f412 | Over-torque detection level | 0~250% | 130 |
| f413 | Over-torque detection level hysteresis | 0~100% | 10 |
| f414 | Over-torque detection time | 0.0~10.0s | 0.5 |

Use the f411 parameter to trip the frequency inverter or to output the alarm if a torque currrent exceeding the f412-specified level flows for more than the f414-specified time. Trip information is displayed as "e-07".
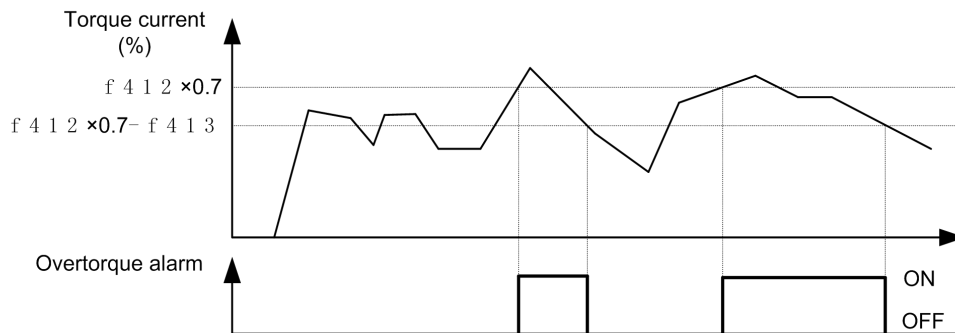


a) Over-torque detection alarm output
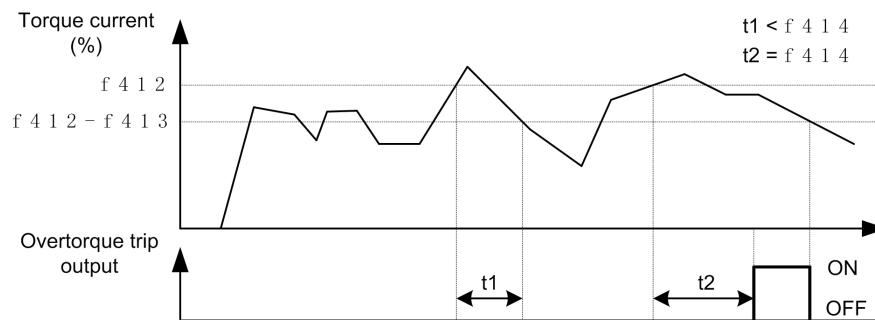


b) Over-torque detection trip output

Figure 5.22 Description of Over-torque detection

Note 1: Output over-torque detection alarm by assigning the output terminal function 48 to T1 (T2、LO1-CLO1 or LO2-CLO2). Output over-torque detection trip by assigning the output terminal function 32 to T1 (T2、LO1-CLO1 or LO2-CLO2).

Note 2: The 100% standard value of f412 and f413 is the rated output current indicated on the motor nameplate.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f415 | Overvoltage limit operation | 0~3 | 2 |

0: Enabled.   When the frequency inverter detects the upcoming overvoltage fault, it takes one of the following measures to avoid overvoltage: to increase deceleration time, to keep motor speed or raise motor speed.

1: Disabled

2: Enabled (Quick deceleration).  The frequency inverter will increase the voltage to the motor (over-excitation control) to increase the amount of energy consumed by the motor when the voltage reaches the overvoltage protection level, and therefore the motor can be decelerated more quickly than normal deceleration.

3: Enabled (Dynamic quick deceleration).  the frequency inverter will increase the voltage to the motor(over-excitation control) to increase the amount of energy consumed by the motor as soon as the motor begins to slow down, and therefore the motor can be decelerated still more quickly than quick deceleration.

Note: When motor speed falls, the frequency inverter absorbs regenerative energy from the load and the motor. This often brings DC bus overvoltage fault. If f415 is set to 3, this portion of engery will not be fed back to the frequency inverter , but converted to heat dissipation into the motor. In this case the motor intensely gives out heat.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f416 | Overvoltage limit operation level | 100~150% | 130 |

f416 specifies the Overvoltage limit operation level.
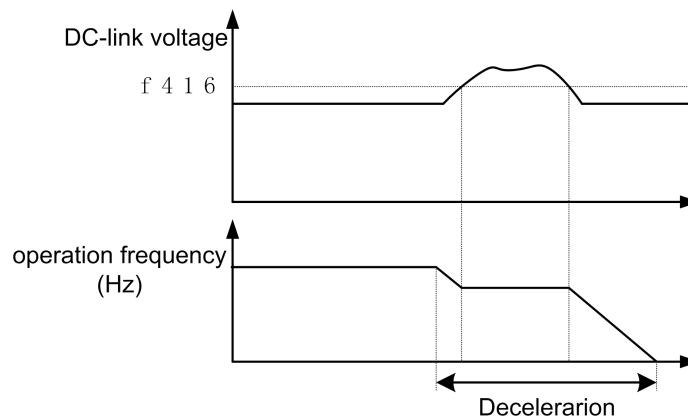


Figure5.23 Description of overvoltage limit operation level

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f417 | Undervoltage trip/alarm selection | 0~2 | 0 |

0: Alarm only (detection level below 60%),  The frequency inverter is stopped. However, it is not tripped.

1: Tripping (detection level below 60%).  frequency inverter is stopped. It is also tripped

2: Alarm only (detection level below 50%, input reactor needed)

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f418 | Instantaneous power failure coast stop selection | 0~2 | 0 |

0: disabled

1: factory reserved

2: Coast stop.

Coast stop in the event of momentary power failure: If a momentary power failure occurs during operation, the frequency inverter coast stops forcibly. When operation is stopped, the message "a-06" is displayed (alternately) on the keypad. After the forced coast stop, the frequency inverter remains static until you put off the operation command momentarily.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f419 | Forced fire-speed control function | 0~1 | 0 |

0: Disabled.

1: Enabled.

To enable forced speed mode, set f419 to 1,and allocate input terminal function 33 to a input contact terminal. If f419 is set to 1 and intput terminal function 33 is ON, the frequency inverter will run at the frequency set by f730. At this time,

Put OFF the input terminal function 33 will not stop the frequency inverter .

The following frequency inverter trip will not make it stop, but automatic restart is performed.: e-01 , e-04,  e-11 , e-21, e-22, e-23, e-24.

When the frequency inverter is under local running mode, the frequency inverter can only be stopped by powering off.

Note 1: The motor running direction is forward and the frequency inverter runs according to the frequency command of the setpoint of f730.

Note 2: The following operations will not make the frequency inverter or motor stop: disabling function 33, press STOP key or light trip occurs.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f420 | Detection of output short-circuit during start-up | 0~3 | 0 |

0: Each time (standard pulse)

1: Only one time after power is turned on (standard pulse)

2: Each time (short-time pulse)

3: Only one time after power is turned on (short-time pulse)

Note 1: when the phase resistor of the motor is small （motor capacity is large, short-time pulse is recommended.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f421 | Motor electric-thermal protection retention selection | 0~1 | 0 |

0: disabled.    If the frequency inverter is turned on and off, its motor thermal state memory (used for overload computation) will be cleared.

1: Enabled.    Even if the frequency  inverter is turned off, the motor thermal state memory of the frequency inverter is still retained. If motor overload fault e-22 occurs in the frequency inverter , the motor can be restarted only after a period of cooling time (computed by the frequency inverter ).

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f422 | AI1 input loss | 0~100% | 0 |

0: Disabled. The frequency inverter will not monitor the signal state on the analog input terminal AI1.

1~100: Fault detection level. If signal on AI1 drops below the selected fault detection level and this low signal level lasts 300 ms or more, fault occurs in the inverer. The keyboard panel will display fault code e-38.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f423 | Activation of the frequency inverter during 4-20mA signal loss | 0~4 | 0 |

0: No measures.

1: Coast stop.

2: switch to Fallback speed.　To switch to fallback speed f424. The duration is as long as the fault life time and the running command is still valid.

3: Speed maintaining.　To maintain the speed at the time when fault occurs in the frequency inverter . The duration is as long as the fault life time and the running command is still valid.

4: Slowdown stop.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f424 | Fallback speed | 0.0 Hz ~f004 | 0.0 |

See f423 = 2.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f425 | PTC thermal selection | 0~2 | 0 |

0: Disabled

1: Enabled (trip mode),　If the PTC probe triggers the signal of fault, the frequency inverter enters into fault state and displays "e-25".

2: Enabled (alarm mode),　if the PTC probe triggers the signal of fault, the frequency inverter will trigger fault signal and continues running.

This function is used to protect motor from overheating using the signal of PTC built-in motor.Setting f425 to 1 or 2 can convert control terminal AI2 to a PTC motor thermal probe input. The wiring is shown in the following figure.
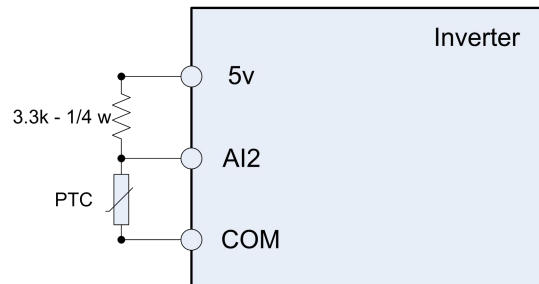


Figure 5.24 PTC wiring example

Note: PTC resistance must be connected in from AI2 terminal. One 3.3k-1/4 W resistance must be externally connected between 5 V and AI2.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f426 | Resistor value for PTC detection | 100~9999 Ω | 3000 |

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f428 | Cumulative operation time alarm setting | 0.0~999.9 | 610.0 |

This parameter allows you to set the frequency inverter so that it will put out an alarm signal (Output terminal function = 50) after a lapse of the cumulative operation time set with f428.

Note: 0.1=10h.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f429 | frequency inverter trip retention selection | 0~1 | 0 |

0: Clearing. The fault occurs and after the frequency inverter is turned off and on,

If the fault cause has been eliminated, the inveter will be reset and can be started.

The information of just eliminated fault will be transmitted to the fault history record.

If the fault cause has not been eliminated yet, the fault will be displayed again and the running information related to the fault will be transmitted to the fault history record.

The information of the 4th from last fault will be eliminated from the fault history record.

1: Maintaining. The fault occurs and after the frequency inverter is turned off and on,

If the fault cause has been eliminated, the inveter will be reset and can be started. The information of just eliminated fault will be transmitted to the fault history record.

If the fault cause has not been eliminated yet, original fault codes and all running data can be inquired as current fault under monitoring mode.

The information of the 4th from last fault will be reserved in the fault history record.

Automatic fault reset will be disabled.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f430 | Heat sink temperature reaches the alarm value | 0~100 ℃ | 60 |

When the heat sink temperature reaches the setting value of f430, the frequency inverter could output one alarm signal via logic output or relay output. Please refer to logic output function 66.

## 5.6 Fault protection parameter group

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f500 | Auto-restart control selection | 0~4 | 0 |

0: Disabled

1: At auto-restart after momentary stop

2: When turning standby (input terminal function =1) on or off

3: At auto-restart or when turning standby (input terminal function =1) on or off

4: At start-up

5~7：factory reserved

8：First DC braking and then start. DC braking current level and braking time follow f507 and f508

The f500 parameter detects the rotating speed and rotational direction of the motor during coasting ing the event of momentary power failure, and then after power has been restored, restarts the motor smoothly (motor speed search function).

This parameter also allows commercial power operation to be switched to frequency inverter operation without stopping the motor. During operation, "a-08" is displayed. During the retry mode see f400), the motor speed search function operated automatically as required and thus allows smooth motor restarting.

At restart, it takes about 300 ms for the frequency inverter to check to see the number of revolutions of the motor. For this reason, the start-up takes more time than usual. Use this function when operating a system with one motor connected to one frequency inverter . This function may not operate properly in a system configuration with multiple motors connected to one frequency inverter .

Setting f500 =1, (3): This function operates after power has been restored following detection of an undervoltage by the main circuits and control power.

Setting f500 =2, (3): This function operates after the standby terminal((input terminal function =1) connection has been opened first and then connected again.

Setting f500 =4, a motor speed search is performed each time operation is started.This function is useful especially when the motor is not operated by the frequency inverter but it is running because of external force.

Setting f500 = 0 (Disabled) and disabling the retry function (f400=0), when apply the frequency inverter to crane or hoist. Such machines may have its load moved downward during the above waiting time from input of the operation starting command to the restart of the motor.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f501 | auto-stop time limit for lower-limit frequency operation | 0.0~600.0s | 0.1 |

0: disabled（0.0）. None.

1: Enabled（0.1~600.0s）. If operation is carried out continuously at a frequency below the lower-limit frequency (f009) for the period of time set with f501, the frequency inverter will enter into sleep mod and automatically slow down the motor to a stop. At that time, "a-10" is displayed (alternately) on the keypad. This function will be canceled if a frequency command above the lower-limit frequency (f009) +0.2Hz.
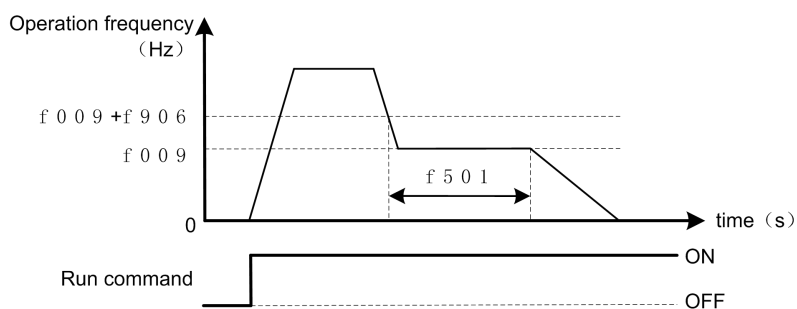


Figure 5.25  Description of sleep mode

Note: This function is enabled even at the start of operation and during switching between forward and reverse run.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f502 | Bumpless operation selection | 0~1 | 1 |

0: disabled.

1: enabled.

When switching from remote mode to local mode using f601, the status of start and stop, and operating frequency at remote mode are moved to local mode.By contraries, when switching from local mode to remote mode, they are not moved to remote mode.

Table 5.7 f502 desctiption

| f502 setting | switching between remote mode and local mode | description |
|---|---|---|
| 0 | Remote → Local | motor stops |
| | Local → Remote | run immediately with run command and frequency setting under remote control. |
| 1 | Remote → Local | motor runs continuesly with original run command and frequency setting under remote control. |
| | Local → Remote | run immediately with run command and frequency setting under remote control. |

E.g, when f601=1, the frequency inverter runs at 20 Hz of frequency setting under remote control mode. If switched to local mode (make f713=0), the frequency inverter continues to run at 20 Hz under local control mode.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f503 | Starting frequency setting | 0.5~10.0Hz | 0.5 |

The frequency set with f503 is put out as soon as operation is started. Use the f503 parameter when a delay in response of starting torque according to the acceleration/deceleration time is probably affecting operation. Setting the starting frequency to a value from 0.5 to 3Hz is recommended (f503 is usually set to the motor rated slip frequency ). The occurrence of an overcurrent can be suppressed by setting this frequency below the rated slippage of the motor.

Rated slip frequency can be calculated with the parameters written on the nameplate of the motor:

$$f_s = f_0 - \frac{n_N * P}{60}.$$

$P$ ——pole pairs.　　　　　$n_N$ ——motor rated speed（rpm）.

$f_0$ ——base frequency（Hz）.　　$f_s$ ——motor rated slip frequency（Hz）.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f504 | Operation starting frequency | 0.0 Hz ~f007 | 0.0 |
| f505 | Operation starting frequency hysteresis | 0.0 Hz ~f007 | 0.0 |

The Run/stop of operation can be controlled simply with these two parameters.The frequency inverter begins accelerating after the frequency setting signal has reached point B. Deceleration ends when the frequency setting signal decreases below point A.
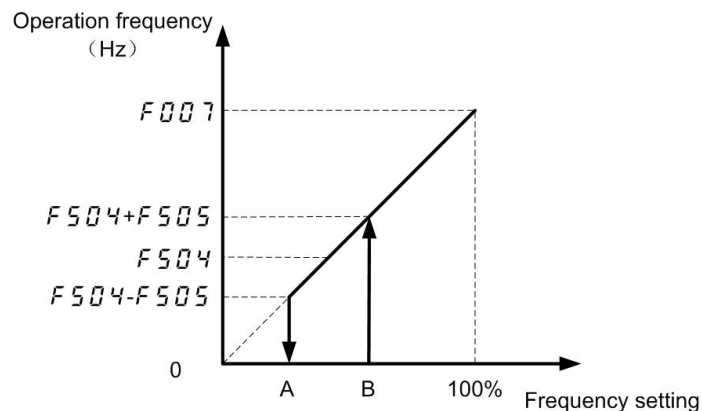
Figure 5.26 Description of Operation starting frequency

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f506 | DC braking starting frequency | 0.0 Hz ~f007 | 0.0 |
| f507 | DC braking current | varies by model | varies by model |
| f508 | DC braking time | 0.0~20.0 s | 1.0 |

A large braking torque can be obtained by applying a direct current to the motor. These parameters set the direct current to be applied to the motor, the application time and the starting frequency. During DC braking, a-07 displays.

DC braking can be activated by two methods as follows:
Auto matically DC braking: when operation frequency decreases below f506, DC braking is activated.
Input terminal signal: when the input terminal function 13 is ON, DC braking is activated.
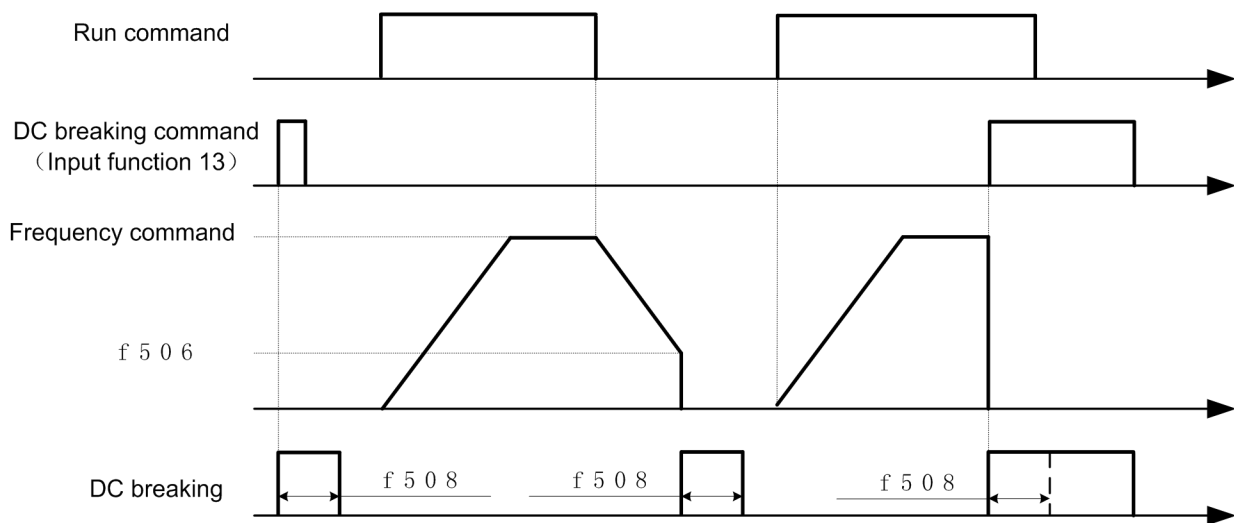


Figure 5.27 DC braking sequence

Note1: During DC braking, the overload protection sensitivity of the frequency inverter increases. The DC braking current may be adjusted automatically to prevent tripping.

Note 2: During DC braking, the carrier frequency is 6 kHz or less irrespective of the setting of parameter f012 (PWM carrier frequency).

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f510 | Acceleration/deceleration 1 pattern | 0~3 | 0 |

0: Linear, Linear, applied to most occasions.

1: S-type curve 1, for the need to minimize the slope time while minimizing the impact of the occasion.

2: S-curve 2, can be used for high-speed main Main axis where the acceleration needs to be reduced when the motor is running above its rated operating frequency (weak magnetic field, output electromagnetic torque decreases).

3: Elevator acceleration / deceleration curve.
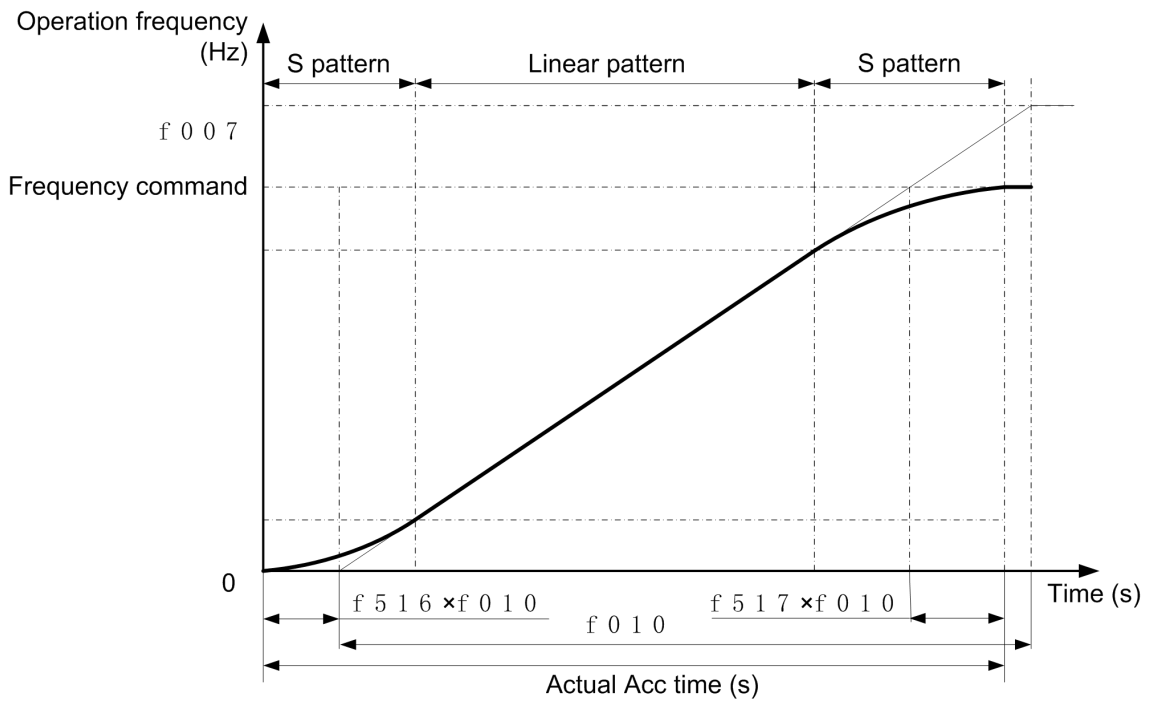
Figure 5.28  S-pattern acceleration/deceleration 1
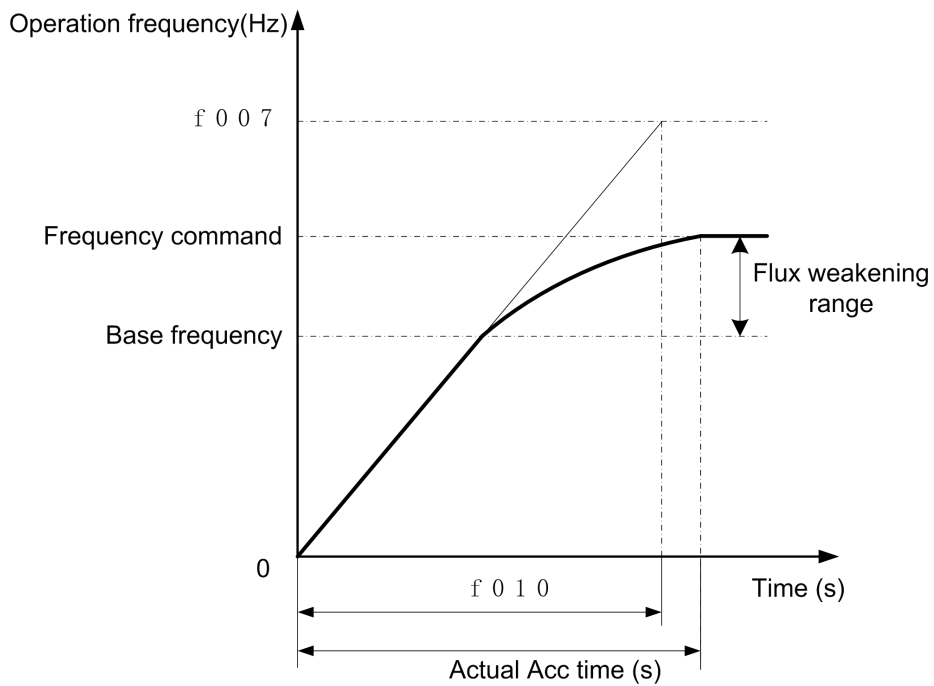


Figure 5.29 S-pattern acceleration/deceleration 2

| LI1 | LI4 | LI3 | LI2 | Reference speed(frequency)selected | Acceleration/deceleration times |
|-----|-----|-----|-----|-----|-----|
| OFF | OFF | OFF | OFF | Speed 0    0.00Hz | f518 |
| ON | OFF | OFF | OFF | Speed 1 (Run speed defined) defined by f003 | f518 |

| | | | | | |
|---|---|---|---|---|---|
| ON | OFF | OFF | ON | Speed 2 (Run speed defined) defined by f716 | f010 |
| ON | OFF | ON | OFF | Speed 3 (Maintenance speed ) defined by f717 | f010/f011 |
| ON | OFF | ON | ON | Speed 4 (Creep speed) defined by f718 | f011 |
| ON | ON | OFF | OFF | Speed 5 (Run speed defined) defined by f719 | f518 |
| ON | ON | OFF | ON | Speed 6 (Run speed defined) defined by f720 | f010 |
| ON | ON | ON | OFF | Speed 7 (Maintenance speed) defined by f721 | f010/f011 |
| ON | ON | ON | ON | Speed 8 (Creep speed) defined by f722 | f011 |

Figure 5.30  Speed selection table
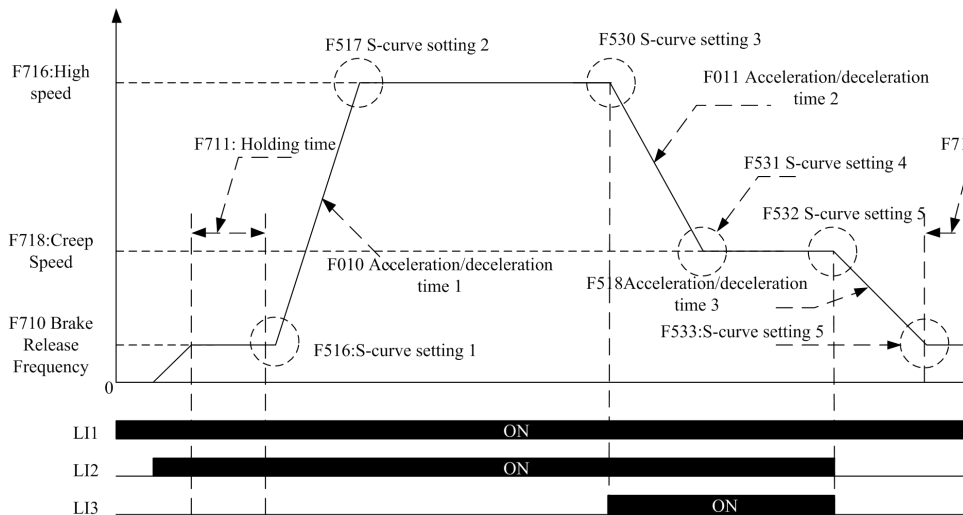


Figure 5.31  Elevator acceleration / deceleration curve

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f511 | Acceleration/deceleration 2 pattern | 0~2 | 0 |
| f512 | Acceleration/deceleration 3 pattern | 0~2 | 0 |

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f513 | Acceleration/deceleration 1 and 2 switching frequency | 0.0 Hz ~f008 | 0.0 |
| f514 | Acceleration/deceleration 2 and 3 switching frequency | 0.0 Hz ~f008 | 0.0 |
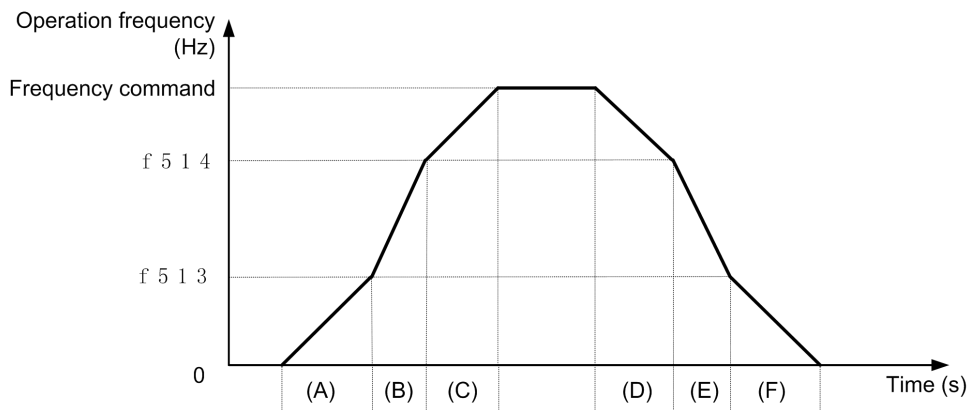
Figure 5.32 Acc/Dec parameters switching automatically

When set f513≠0 and the frequency inverter output frequency increases above (or decreases below) f513 setting, f518(or f519) is effective.

Note:

(A) and (F) according to Acc/Dec 1; (B) and (E) according to Acc/Dec 2; (C) and (D) according to Acc/Dec 3.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f515 | Selecting an acceleration/deceleration pattern | 1~3 | 1 |

1: Acc/Dec 1, f010 , f011 and f510 are valid.

2: Acc/Dec 2, f518 , f519 and f511  are valid.

3: Acc/Dec 3, f520 , f521 and f012  are valid.
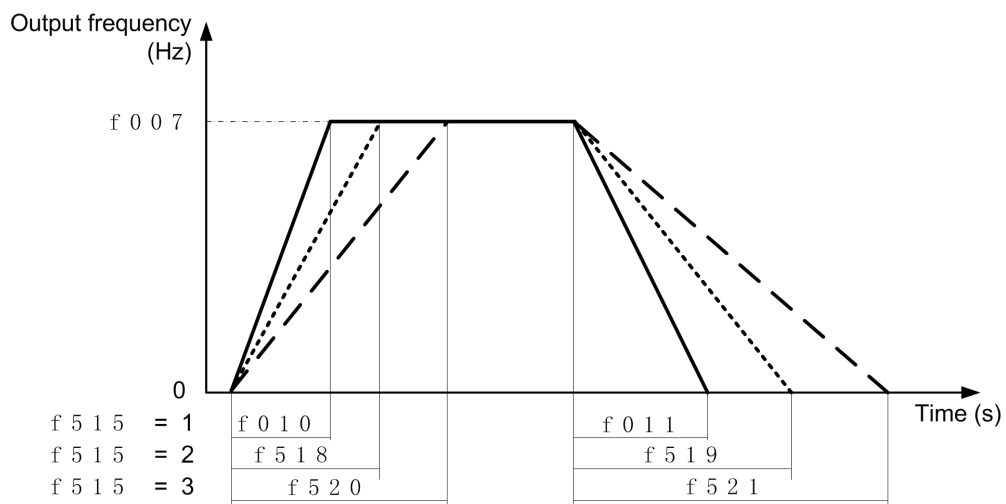


Figure 5.33 Acc/Dec parameters description

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f516 | S-pattern lower-limit adjustment amount | 0~50 % | 10 |
| f517 | S-pattern upper-limit adjustment amount | 0~50 % | 10 |

f516 and f517 are used to adjust the relative proportion of the upper arc and lower arc of the S curve against the complete acceleration/deceleration time.

| NO. | Parameter Name | Setting Range | Default |
|-----|---------------|---------------|---------|
| f518 | Acceleration time 2 | 0.0~3200s | 20.0 |
| f519 | Deceleration time 2 | 0.0~3200s | 20.0 |
| f520 | Acceleration time 3 | 0.0~3200s | 20.0 |
| f521 | Deceleration time 3 | 0.0~3200s | 20.0 |

Three acceleration times and three deceleration times can be specified individually. A method of selection or switching can be selected from among the following:

1) Selection by means of parameters, see f515

2) Switching by changing frequencies, see f513、f514

3) Switching by means of terminals, see input terminal function 5, 64.
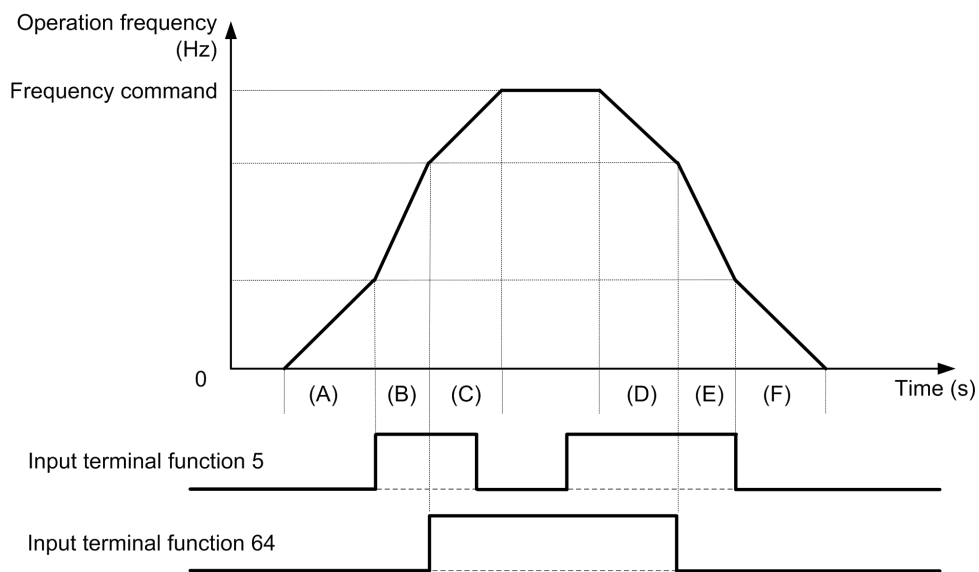


Figure 5.34 Using input contact terminal select Acc/Dec

Tabel 5.8 Using input contact terminal select Acc/Dec

| input terminal function 64 | input terminal function 5 | Acc/Dec selection |
|---|---|---|
| 0 | 0 | Acc/Dec1 |
| 0 | 1 | Acc/Dec 2 |
| 1 | 0 | Acc/Dec 3 |
| 1 | 1 | Acc/Dec 3 |

Tabel 5.9 Using input contact terminal and switching frequency select Acc/Dec

| Frequency command | Input terminal function 5 | Input terminal function 64 | Acc/Dec selection |
|---|---|---|---|
| Fc =< f513 | 0 | 0 | ACC1 |
| | 1 | 0 | ACC2 |
| | 0 | 1 | ACC1 |

| | | | ACC2 |
|---|---|---|---|
| | 0 | 0 | ACC2 |
| f513 < Fc =< f514 | 1 | 0 | ACC1 |
| | 0 | 1 | ACC2 |
| | 1 | 1 | ACC1 |
| | 0 | 0 | ACC3 |
| f514 < Fc | 1 | 0 | ACC3 |
| | 0 | 1 | ACC3 |
| | 1 | 1 | ACC3 |

Note:

(A) and (F) according to Acc/Dec 1；(B) and (E) according to Acc/Dec 2；(C) and (D) according to Acc/Dec 3.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f522 | Reverse-run prohibition | 0~2 | 0 |

0: Forward/reverse run permitted.

1: Reverse run prohibited.

2: Forward run prohibited.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f523 | stop pattern | 0~1 | 0 |

0: Panel slowdown stop.　when stop command is from panel.

1: Panel coast stop.　when stop command is from panel.

2: Terminal coast stop.　when stop command is from input terminal.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f526 | Prior for reverse running | 0~1 | 0 |

0：enable, activate the forward running terminal and direction running terminal at the same time, then the frequency inverter runs in the reverse direction;

1：Prohibit, activate the forward running terminal and direction running terminal at the same time, then the frequency inverter stops.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f527 | regenerative braking selection | 0~2 | 2 |

0: Disabled

1: Enabled (with resistor overload protection)

2: Enabled (without resistor overload protection)

Connect an external braking resistor in the following cases to enable dynamic braking function:

1) When decelerating the motor abruptly or if overvoltage tripping (e-11) occurs during deceleration stop.

2) When a continuous regenerative status occurs during downward movement of a lift or the winding-out operation of a tension control machine.

3) When the load fluctuates and a continuous regenerative status results even during constant speed operation of a machine such as a press.

Note 1: To connect a dynamic braking resistor, set the overvoltage limit operation parameter f415 = 1(Disabled).

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f528 | regenerative braking resistance | 1.0~1000.0 Ω | 20.0 |
| f529 | regenerative braking resistor capacity | 0.01~30.0 kw | 0.12 |

| NO. | Description | Range | Default |
|-----|-------------|-------|---------|
| f530 | Acceleration / deceleration S - curve lower limit 2 | 0~50 % | 10 |
| f531 | Acceleration / deceleration S - curve upper limit 2 | 0~50 % | 10 |
| f532 | Acceleration / deceleration S - curve lower limit 3 | 0~50 % | 10 |
| f533 | Acceleration / deceleration S - curve upper limit 3 | 0~50 % | 10 |

f530/f532, f531/f533 similar to f516 and f517 used to modifiy the relative proportions of upper and lower arcs of the S-curve to the entire acceleration / deceleration time.

# 5.7 Keyboard panel parameter group

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f600 | Prohibition of panel reset operation | 0~1 | 0 |

0: Permitted        1: Prohibited
This parameter can prohibited/ permitted the reset operation by <STOP> key.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f601 | Switching between remote control and Local control | 0~1 | 1 |

0: Local control mode, Start and stop, and frequency setting are effective only by keypad keys. f002~f005 is invalid.

1: remote control mode, Start and stop, and frequency setting follow the selection of f002 , f003.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f602 | Prohibition of change of parameter setting | 0~1 | 0 |

0: Permitted

1: Prohibited

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f603 | Current/voltage display mode | 0~1 | 1 |

0: %, display in percentage terms.        1: A (ampere)/V (volt), display in amperes/volts.

These parameters are used to change the unit of monitor display. Like current monitor and Voltage monitor display. (% ⇔ A (ampere)/V (volt) )

Note1: f603 converts the following parameter settings: Motor electronic-thermal protection level 1 and 2 (f106, f110), DC braking current (f507), Stall prevention level 1 and 2 (f107, f111), Small current detection current (f408).

Note2: Base frequency voltage 1 and 2（f102, f109）always displayed in the unit of V.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f604 | Frequency free unit magnification | 0.00~200.0 | 0.00 |

0.00: Free unit display disabled (display of frequency).

0.01-200.0: Value displayed = actual frequency [×] f604.

e.g., output frequency = 50Hz, if f604=30.0, Value displayed on the panel is 1500.

Note: This parameter displays the frequency inverter output frequency as the value obtained by multiplying it by a positive number. This does not mean that the actual motor speed or line speed is indicated with accuracy.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f605 | Factory reserved | 0~1 | 0 |

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f606 | Inclination characteristic of free unit display | 0~1 | 1 |

0: Negative inclination (downward slope)        1: Positive inclination (upward slope)

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f607 | Bias of free unit display | 0.00Hz ~f007 | 0.00 |
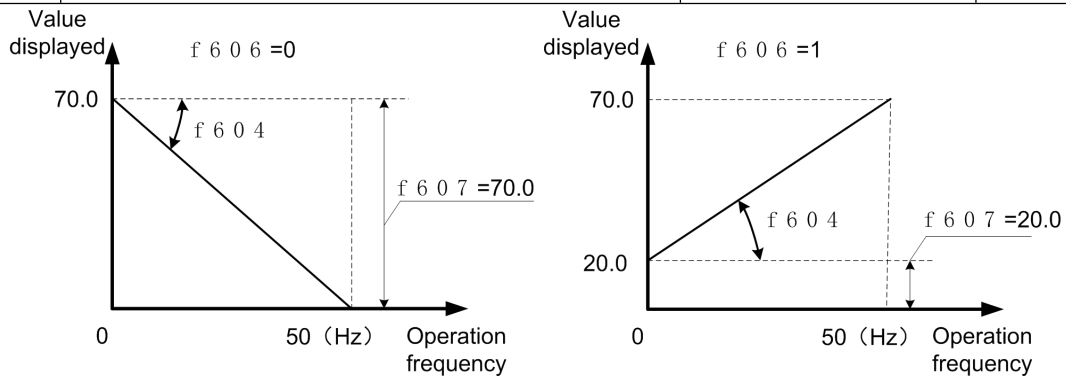


Figure 5.35 Description of freeunit

If f604 is not set as 0.00, value displayed is obtained as follows:

● When f606=0, value displayed =f604x (f607 – actual frequency value)

● When f606=1, value displayed =f604x (f607 + actual frequency value)

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f608 | Free step 1 (pressing a panel key once) | 0.00 Hz ~f007 | 0.00 |

0.00: disabled.

0.01~f007: enabled.

Under normal conditions, the frequency command value from the keypad increases in steps of 0.1 Hz each time you press the ▲ key.

If f608 is not 0.00, the frequency command value will increase by the value with f608 each time you press the ▲ key. Similarly, it will decrease by the value set with f608 each time you press the ▼ key. In this case, the output frequency displayed in standard monitor mode changes in steps of 0.1 Hz, as usual.

The frequency (f000) set on the keypad changes in steps of 10.0 Hz: 0.0 → 20.0 → ... 50.0 (Hz), each time you press the ▲ key. This function comes in very handy when operating the load at limited frequencies that change in steps of 1Hz, 5Hz, 10Hz, and so on

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f609 | Free step 2 (panel display) | 0~255 | 0 |

0: disabled.

1~255: enabled.

When f608 is not 0.00, and f609 is not 0 (disabled):

Output frequency displayed in standard monitor mode = Internal output frequency × f609÷f608.

Example: When f608 =1.00 (Hz), and f609 =1: Each time you press the ▲ key, the frequency setting changes in steps of 1Hz: 0→ 1 → 2 → ... → 50(Hz) and also the value displayed on the keypad changes in steps of 1. Use these settings to hide decimal fractions and also the value displayed on the keypad changes in steps of 1. Use these settings to hide decimal fractions.

The settings of f609 and f608 have no effect when the free unit selection (f604) is enabled.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f610 | Standard monitor display selection | 0~10 | 0 |

0: Output frequency(Hz(free))

1: Frequency command(Hz(free))

2:Output current(%/A)

3:frequency inverter rated current (A)

4:frequency inverter load (%)

5:Output power (kW)

6: Stator frequency (Hz (free))

7:communication data display

8: Output speed

9: Communication counter

10: Normal communication counter

Note: When the power is on, the standard monitor mode displays the operation frequency (default setting) in the format of "0.0". This format can be changed to any other monitor display format by setting f610.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f611 | Panel running order clear selection | 0~1 | 1 |

0: Clear（when standby terminal OFF）.

1: Keep（when standby terminal OFF）.

Note 1: When f611=0, Put OFF the standby terminal (see input function 1) will stop the motor..

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f612 | Panel operation prohibition (F000) | 0~1 | 0 |

0: Permitted

1: Prohibited

This parameter can prohibited/permitted set panel operation frequency(f000) by key ▲ and ▼.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f613 | Prohibition of panel operation (RUN/STOP keys) | 0~1 | 0 |

0: Permitted.

1: Prohibition.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f614 | Prohibition of panel emergency stop operation | 0~1 | 0 |

0: Permitted.

1: Prohibition.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f616 | Integral output power retention selection | 0~1 | 1 |

0: (clear), with the main power off, not retention of integral output power values.

1: (memory), with the main power off, retention of integral output power values.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f617 | Integral output power display unit selection | 0~3 | varies by model |

0: 1kWh.　　1: 10kWh.　　2: 100kWh.　　3: 1000kWh.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f618 | Search and resetting of changed parameters selection | 0~1 | 0 |

0: Disable.  Not display "-uf-" parameter group.

1: Enable.  Display "-uf-" parameter group.

Users can automatically searches for those parameters that are programmed with values different from the standard default setting and displays them in the "-uf-" parameter group. Parameter setting can also be changed within this group.

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f619 | Frequency converter internal temperature monitoring | | |
| f620 | Frequency converter internal temperature monitoring | | |
| f621 | Factory reserved | | |

| NO. | Parameter Name | | |
|------|----------------|---|---|
| f622 | Factory reserved | | |
| f623 | Factory reserved | | |

## 5.8 Additional function parameter group

| NO. | Parameter Name | Setting Range | Default |
|------|----------------|---------------|---------|
| f700 | Panel JOG mode selection | 0~1 | 0 |

0: disable JOG key.     1: enable JOG key.

This mode allows you to jog the motor by controlling the operation from the keypad. This mode is hidden by default.

When under the standard monitor mode, pressing the key JOG will move the frequency inverter to jog mode and displays jogor-jog. Press ▲ or ▼ to change jog direction.

| NO. | Parameter Name | Setting Range | Default |
|------|----------------|---------------|---------|
| f701 | jog run frequency | 0.0~20.0 | 5.0 |

| NO. | Parameter Name | Setting Range | Default |
|------|----------------|---------------|---------|
| f702 | Jog stopping pattern | 0~2 | 0 |

0: Slow down stop.     1: coast stop.     2: DC braking.

Use the jog run parameters to operate the motor in jog mode. Input of a jog run signal fenerates a jog run frequency output at once, irrespective of the designated acceleration time.

| NO. | Parameter Name | Setting Range | Default |
|------|----------------|---------------|---------|
| f703 | Jump frequency 1 | 0.0 Hz ~f007 | 0.0 |
| f704 | Jumping width 1 | 0.0~30.0 Hz | 0.0 |
| f705 | Jump frequency 2 | 0.0 Hz ~f007 | 0.0 |
| f706 | Jumping width 2 | 0.0~30.0 Hz | 0.0 |
| f707 | Jump frequency 3 | 0.0 Hz ~f007 | 0.0 |
| f708 | Jumping width 3 | 0.0~30.0 Hz | 0.0 |

Resonance due to the natural frequency of the mechanical system can be avoided by jumping the resonant frequency during operation. During jumping, hysteresis characteristics with respect to the jump frequency are given to the motor.

Do not set the jump parameters, if multiple jump frequency setting width overlapped.

During acceleration or deceleration, the jumping function is disabled for the operation frequency.
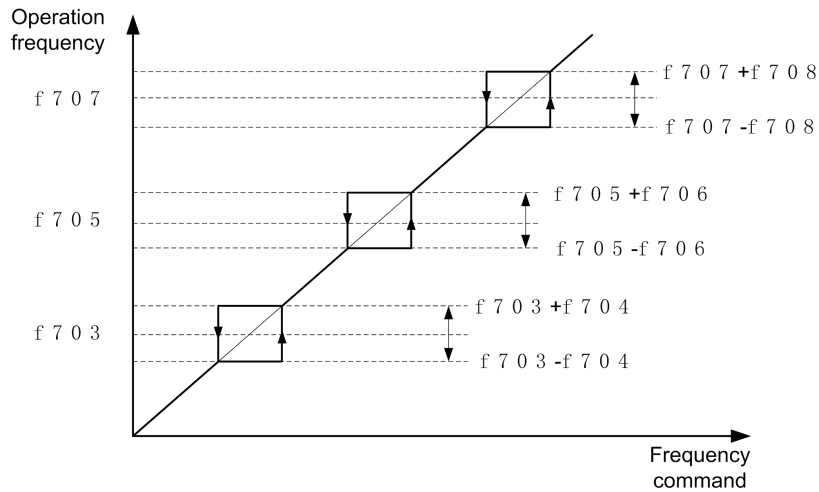
Figure 5.36 Description of jump frequency

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f709 | Braking mode selection | 0 ~3 | 0 |

0: OFF . 1: Forward direction.

2: Reverse direction.   3: Same set direction to f522.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f710 | Braking Release frequency | 0.0~20.0 Hz | 3.0 |
| f711 | Braking Release time | 0.0 ~25.0s | 0.5 |
| f712 | Braking Creeping frequency | 0.0~20.0 Hz | 3.0 |
| f713 | Braking Creeping time | 0.0 ~25.0s | 1.0 |
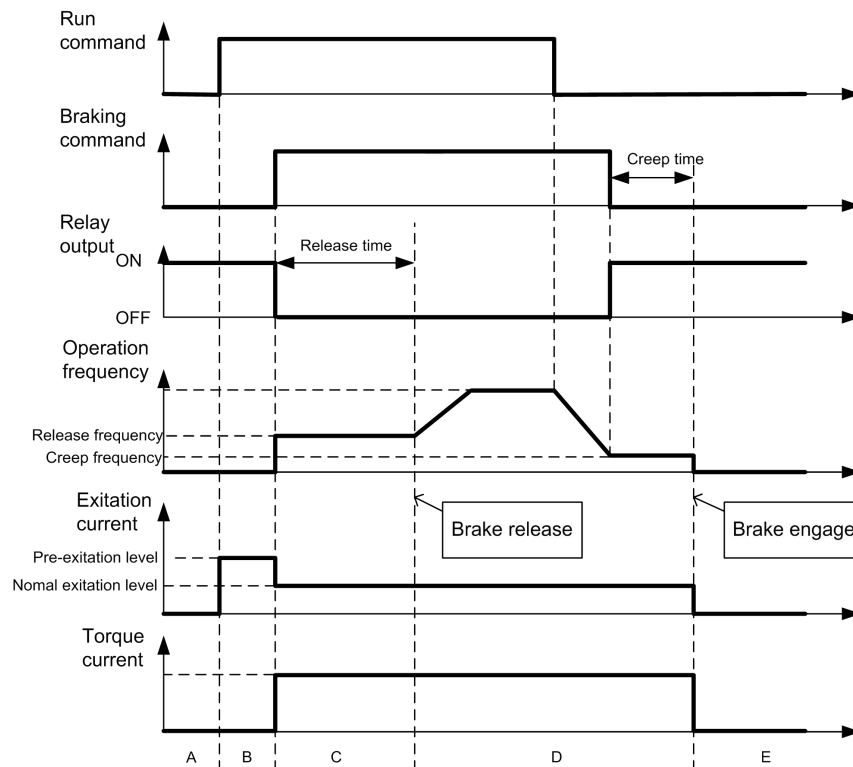


Figure 5.37 Description of braking mode sequence

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f714 | Droop control gain | 0~100% | 0 |
| f715 | Droop control insensitive torque band | 0~100% | 10 |

The droop control function refers to the function of operating the power-running motor at operating frequency f1 (Hz) that is lower than command frequency f0 (Hz) by droop frequency Δf (Hz) when the torque current is T1 (%).The droop frequency Δf can be calculated, using the following expression.

Droop frequency Δf (Hz)= f101 × f714× (Torque current T1 – f715)

When the torque current is above the specified droop insensitive torque band (f715), the frequency is reduced during power running or increased during regenerative braking.

The above figure shows an example of the operating frequency during power running. During regenerative braking, control is performed in such a way as to increase the frequency.

The droop function is activated above the torque current set with f715.

The amount of droop frequency Δf varies depending on the amount of torque current T1.

Note: If the base frequency exceeds 100Hz, count it as 100Hz. Control is exercised between the starting frequency (f503) and the maximum frequency (f007).

[An example of calculation]

Parameter setting:Base frequency f101=60 (Hz), droop gain f714=10 (%)

Droop insensitive torque band f715=30 (%)

Droop frequency Δf (Hz) and operating frequency f1 when command frequency f0 is 50 (Hz) and torque current T1 is 100 (%) are as follows.

Droop frequency Δf (Hz)=vl × f714 × (T1 – f715)

=60 (Hz) × 10 (%) × (100 (%) - 30 (%))

=4.2 (Hz)

Operation frequency f1 (Hz) = f0 - Δf = 50 (Hz) - 4.2 (Hz)=45.8 (Hz)

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f716 | Preset-speed 1 | f009~f008 | 3.0 |
| f717 | Preset-speed 2 | f009~f008 | 6.0 |
| f718 | Preset-speed 3 | f009~f008 | 9.0 |
| f719 | Preset-speed 4 | f009~f008 | 12.0 |
| f720 | Preset-speed 5 | f009~f008 | 15.0 |
| f721 | Preset-speed 6 | f009~f008 | 18.0 |
| f722 | Preset-speed 7 | f009~f008 | 21.0 |
| f723 | Preset-speed 8 | f009~f008 | 24.0 |
| f724 | Preset-speed 9 | f009~f008 | 27.0 |
| f725 | Preset-speed 10 | f009~f008 | 30.0 |
| f726 | Preset-speed 11 | f009~f008 | 33.0 |

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f727 | Preset-speed 12 | f009~f008 | 36.0 |
| f728 | Preset-speed 13 | f009~f008 | 39.0 |
| f729 | Preset-speed 14 | f009~f008 | 45.0 |
| f730 | Preset-speed 15 | f009~f008 | 50.0 |

A maximum of 15 speed steps can be selected just by switching an external contact signal. Multi-speed frequencies can be programmed anywhere from the lower limit frequency f009 to the upper limit frequency f008.

Use the input terminal function selection to allocate "Preset-speed command 1" to "Preset-speed command 4" terminal. For more information, see table 5.8.

<div align="center">Table 5.8 Relation between Preset-speed command and Preset-speed</div>

| Setting Frequency | Preset-speed command 4 | Preset-speed command 3 | Preset-speed command 2 | Preset-speed command 1 |
|-------------------|------------------------|------------------------|------------------------|------------------------|
| preset-speed commands are invalid | 0 | 0 | 0 | 0 |
| Preset-speed 1 | 0 | 0 | 0 | 1 |
| Preset-speed 2 | 0 | 0 | 1 | 0 |
| Preset-speed 3 | 0 | 0 | 1 | 1 |
| Preset-speed 4 | 0 | 1 | 0 | 0 |
| Preset-speed 5 | 0 | 1 | 0 | 1 |
| Preset-speed 6 | 0 | 1 | 1 | 0 |
| Preset-speed 7 | 0 | 1 | 1 | 1 |
| Preset-speed 8 | 1 | 0 | 0 | 0 |
| Preset-speed 9 | 1 | 0 | 0 | 1 |
| Preset-speed 10 | 1 | 0 | 1 | 0 |
| Preset-speed 11 | 1 | 0 | 1 | 1 |
| Preset-speed 12 | 1 | 1 | 0 | 0 |
| Preset-speed 13 | 1 | 1 | 0 | 1 |
| Preset-speed 14 | 1 | 1 | 1 | 0 |
| Preset-speed 15 | 1 | 1 | 1 | 1 |

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f731 | Factory reserved | | |
| f732 | Multi-speed 0 run time | 0~65000s(min) | 0.0 |
| f733 | Multi-speed 1 run time | 0~65000s(min) | 0.0 |
| f734 | Multi-speed 2 run time | 0~65000s(min) | 0.0 |
| f735 | Multi-speed 3 run time | 0~65000s(min) | 0.0 |
| NO. | Parameter Name | Setting Range | Default |

| f736 | Multi-speed 4 run time | 0~65000s(min) | 0.0 |
| f737 | Multi-speed 5 run time | 0~65000s(min) | 0.0 |
| f738 | Multi-speed 6 run time | 0~65000s(min) | 0.0 |
| f739 | Multi-speed 7 run time | 0~65000s(min) | 0.0 |
| f740 | Multi-speed 8 run time | 0~65000s(min) | 0.0 |
| f741 | Multi-speed 9 run time | 0~65000s(min) | 0.0 |
| f742 | Multi-speed 10 run time | 0~65000s(min) | 0.0 |
| f743 | Multi-speed 11 run time | 0~65000s(min) | 0.0 |
| f744 | Multi-speed 12 run time | 0~65000s(min) | 0.0 |
| f745 | Multi-speed 13 run time | 0~65000s(min) | 0.0 |
| f746 | Multi-speed 14 run time | 0~65000s(min) | 0.0 |
| f747 | Multi-speed 15 run time | 0~65000s(min) | 0.0 |

Multi-step speed 0 means F000 setup value. when PLC is running

| NO. | Name | Range | Default |
| --- | --- | --- | --- |
| f748 | PLC speed direction choice | 0 ~65535 | 0 |

Setup method: Running direction follows the parameter, i.e. Turn 16bit Binary number into decimal system value.
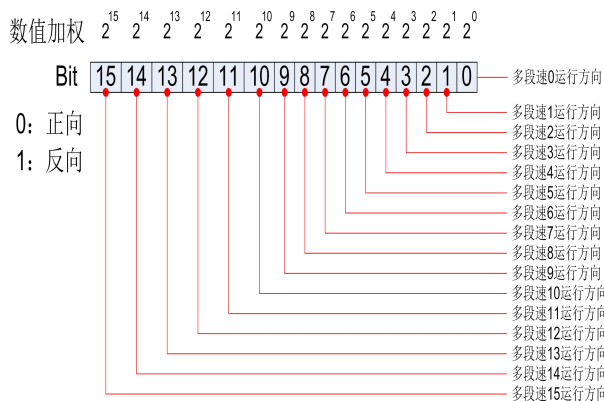


Setup instruction
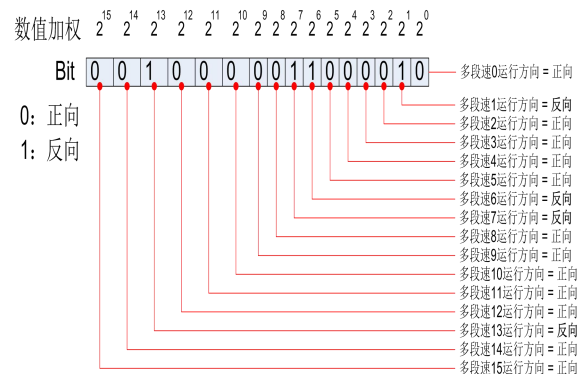


Setup Example

Parameter setup value

f748 = $Bit15 * 2^{15} + Bit14 * 2^{14} + ... + Bit1 * 2^1 + Bit0 * 2^0$

$= 0 * 2^{15} + 0 * 2^{14} + 1 * 2^{13} + ... + 1 * 2^7 + 1 * 2^6 + ... + 1 * 2^1 + 0 * 2^0$

= 8192 + 128 +64 +2 = 8386

Times square quick solution table

$2^{15} = 32768$, $2^{14} = 16384$, $2^{13} = 8192$, $2^{12} = 4096$, $2^{11} = 2048$, $2^{10} = 1024$, $2^9 = 512$, $2^8 = 256$,

$2^7 = 128$, $2^6 = 64$, $2^5 = 32$, $2^4 = 16$, $2^3 = 8$, $2^2 = 4$, $2^1 = 2$, $2^0 = 1$

| NO. | Name | Range | Default |
| --- | --- | --- | --- |

| f749 | Simple PLC running mode choice | 0 ~2 | 0 |
|------|-------------------------------|------|---|

0： Stop after one-time running. The drive completes one cycling running and then automatically stop. Need one more running command to restart.

1： Run one time and keep final value running. The drive automatically keeps the final running frequency and direction after one single cycling running.

2： Cycling running. The drive will automatically come into next cycling after fulfilling one cycle until there is stop command.

Logic output function.

| NO. | Name | Range | Default |
|-----|------|-------|---------|
| f750 | Simple PLC restart mode choice | 0 ~2 | 0 |

0： Start from the first part. Stop caused by stop command, fault or power off during running, then restart and run from the first part.

1： Start from the frequency when stopping recorded. The drive will automatically record the former running period time after stop during running caused by stop command, fault or power off. And then restart and enter into this period again with the frequency when stopping recorded.

| NO. | Name | Range | Default |
|-----|------|-------|---------|
| f751 | Simple PLC power-off memory choice | 0 ~1 | 0 |

0： Don't memorize power-off history.

1： Memorize power-off history.

PLC power-off memory means recording PLC running phase and running frequency before powering-off.

| NO. | Name | Range | Default |
|-----|------|-------|---------|
| f752 | Simple PLC running time unit choice | 0 ~1 | 0 |

0： Second (s)

1： Minute (min)

| NO. | Name | Range | Default |
|-----|------|-------|---------|
| f771 | Enable Reverse Jog frequency | 0.0~20.0Hz | 0.0 |

0： Forbid reverse jog frequency. No matter if it choose forward jog or reverse jog, jog frequency press f701, jog accelerating time is 0.1s which could not be changed. Decelerating time presses f011.

0.1~20.0： Enable reverse jog frequency. Press f701 for forward jog frequency . Its accelerating & decelerating time presses f518 and f519. Press f771 FOR reverse jog frequency.

## 5.9 Communication function parameter group

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f800 | Modbus baud rate | 0~1 | 1 |

0: 9600 bps.    1: 19200 bps.    2: 4800 bps.    3: 2400 bps.    4: 1200 bps.

Remarks: it only works after re-power on if we decide to modify f800.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f801 | Modbus parity | 0~2 | 1 |

0: NONE, datum format : < 8, N, 2 >.    1: EVEN, datum format :< 8, E, 2 >.    2: ODD, datum format :< 8, O, 2 >.

Remarks: it only works after re-power on if we decide to modify f801.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f802 | Modbus address | 0~247 | 1 |

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f803 | Modbus timeout | 0~100 | 0 |

0: timeout check disabled.

1-100: 1=1s.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f804 | Modbus transger waiting time | 0~2.00s | 0.00 |

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f805 | Modbus behaviour on communication fault | 0~4 | 4 |

0: frequency inverter stop, communication command, frequency mode open(by f002, f003)

1: None (continued operation)    2: Deceleration stop    3: Coast stop

4: Communication error (e-33 trip) or Network error (e-35 trip)

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f806 | Number of motor poles for communication | 1~8 | 2 |

The parameter setup will place the influence upon the display of u010.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f821 | Factory reserved | | |
| f822 | Factory reserved | | |
| f823 | Factory reserved | | |
| f824 | Factory reserved | | |
| f825 | Factory reserved | | |
| f826 | Factory reserved | | |
| f827 | Factory reserved | | |
| f828 | Factory reserved | | |
| f829 | Factory reserved | | |

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f830 | PID setting of keypad | 0~100% | 0.0 |

f830=100% can make the sensor output the maximum value.

The 100% standard value of f830 is the measurement range of sensor. If the measurement range of pressure sensor is 0.0~1.6Mpa for example, set f830 =100% means that pressure setting is 1.6Mpa.

Note 1: When f900=0, f830 is not effective.

Note 2: f830 is completely corresponded to f916. When one has changed, the other will automatically updated.

## 5.10 Process PID parameter group

PID control is a common used method in process control, such as flow, pressure and temperature control.
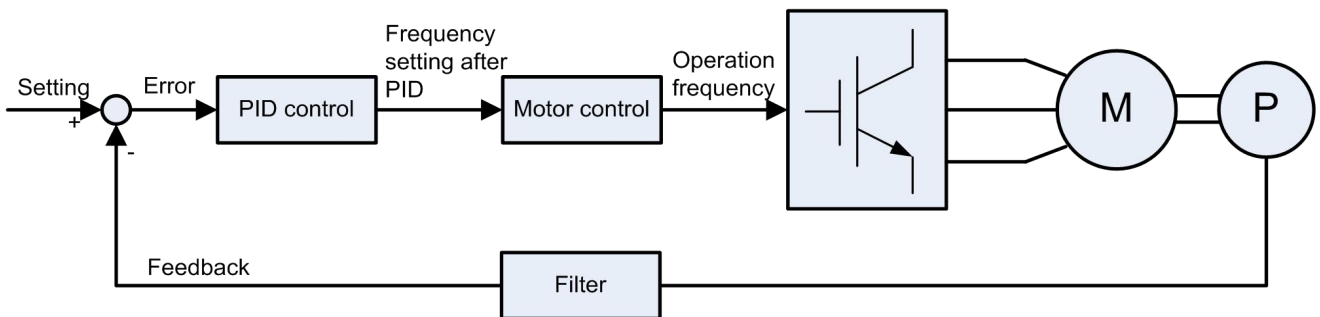


Figure 5.38 Block diagram of PID process control

f900~f916 define built-in process PID control function parameters of the frequency inverter . The block diagram of process PID control function is shown as below:
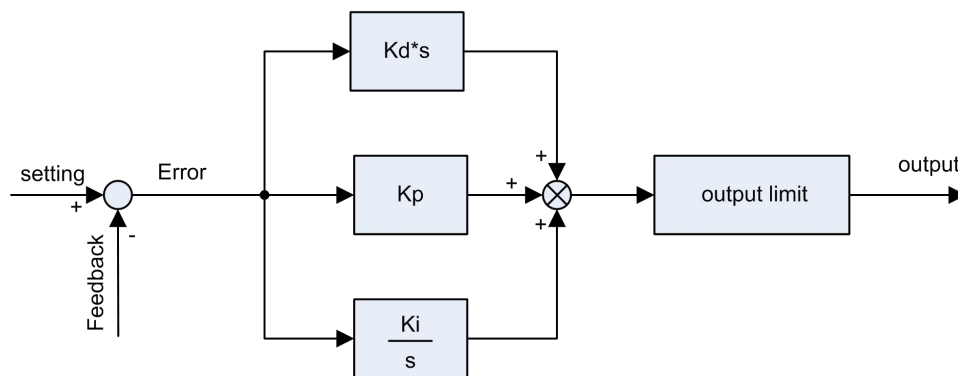


Figure 5.39  Block diagram of built-in PID controller

| NO. | Parameter Name | Setting Range | Default |
|-----|----------------|---------------|---------|
| f900 | PID control | 0~2 | 0 |

0: Disabled

1: Enabled (Feedback: AI1)

2: Enabled (Feedback: AI2)

Note: Do not set the same value to f003 and f900.
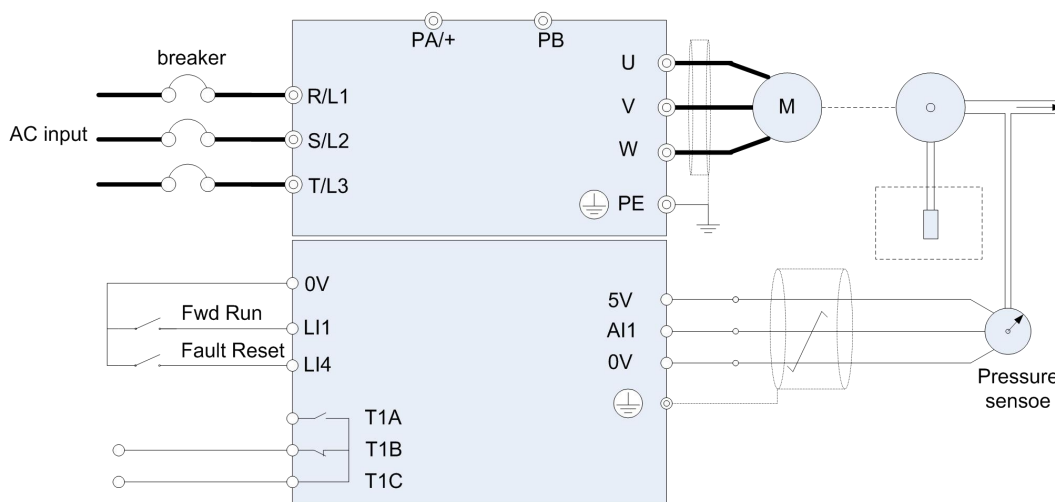
Figure 5.40 PID wiring example

Process quantity input data (frequency or percentage term) and feedback input data can be combined as follows for the PID control. See table 5.9.

Table 5.9 PID setting and PID feedback

| Process quantity input data | | Feedback input data |
|---|---|---|
| f003（f005）setting | setting method | f900 setting |
| 0 | built-in potentionmeter | f900=1:<br><br>AI1, 0~5VDC or 0~10V DC or 4~20mA DC.<br><br><br>f900=2:<br><br>AI2, 0~10V DC. |
| 1 | AI1 | |
| 2 | AI2 | |
| 3 | Keypad (frequency) | |
| 4 | Serial communication | |
| 5 | UP/DOWN from external contact | |
| 6 | - | |
| 7 | Keypad (percentage term) (see f830) | |
| -（when under remote control, f002=0） | Multistep speed setting | |

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f901 | Proportional gain | 0.01~100.0 | varies by model |
| f902 | Integral gain | 0.01~100.0 | varies by model |
| f903 | Differential gain | 0.00~2.55 | 0.00 |

The control effect of f901: The greater the setpoint is, the smaller the deviation between target value and feedback value after stability is. However, excessively large setpoint may arouse vibration in the controlled object and make it unstable. Furthermore, if the setpoint is small, the deviation between target value and feedback value after stability becomes greater.

The control effect of f902: Any residual deviation after proportional gain tuning can be cleared with time through integral gain function. Higher integral gain can realize rapid response to process deviation, but may result in unstability such as oscillation.

The control effect of f903: Differential gain will tune the response time of the frequency inverter according to the rapid change during the process. Unnecessary raise of of differential gain value may result in greater fluctuation of the motor speed and make the system unstable.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f904 | PID control waiting time | 0~2400s | 0 |

When f904 is set to value > 0 s, the frequency inverter will not enter into PID control immediately after started. During the time set by f904, the frequency inverter will ignore the feedback signal and accelerate the motor to the speed set by the input setting.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f905 | PID regulator diviation input signal negation | 0~1 | 0 |

0: Disabled.

1: Enabled.

Note: PID regulator negation is performed in two ways: Make f905=1, or define logic input function as 38 and the corresponding terminal is closed.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f906 | Sleep mode awakening hysteresis bandwidth | 0.0 Hz ~ f007 | 0.2 |

Under the sleeping mode, the frequency inverter will re-accelerate the motor to the given frequency once it detects frequency command > f009+f906. See f501.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f907 | Sleeping mode awakening threshold based on PI deviation | 0.0 Hz ~f007 | 0.0 |

Under the sleeping mode, the frequency inverter will re-accelerate the motor to the given frequency once it detects the error between PID setting and PID feedback > f907.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f908 | Sleeping mode awakening threshold based on PI feedback | 0.0 Hz ~f007 | 0.0 |

Under the sleeping mode, the frequency inverter will re-accelerate the motor to the given frequency once it detects the PID feedback > f908（when f905=0）.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f909 | sleeping mode action | 0~1 | 0 |

0: Motor slowdown to a stop.

1: Motor keep running at the speed setting by f009.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f910 | wake up delay | 0~600.0s | 0.0 |
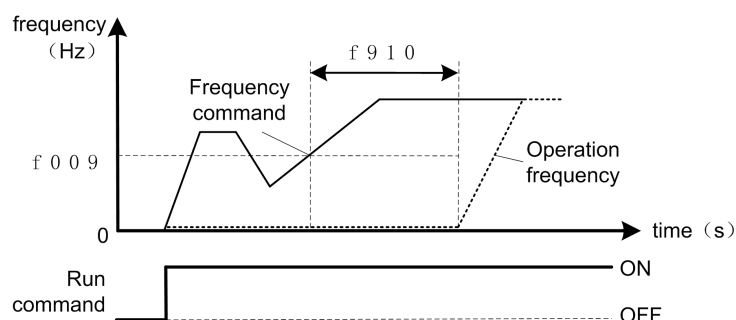
Figure 5.41 description of wake up from sleep mode

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f911 | Auto wake up level | 0~100.0% | 0.0 |

When feedback detected value is smaller than f911 setting, frequency inverter wake up from sleep mode.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f912 | Auto sleep level | 0~100% | 0.0 |

When feedback detected value is bigger than f912 setting, frequency inverter enter into sleep mode and stop the motor.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f913 | Upper limit of PID setting | 0~100% | 100 |
| f914 | Lower limit of PID setting | 0~100% | 0 |

f913 and f914 set the upper and lower limit frequency that determines PID setting.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f915 | auto-stop time limit for lower-limit frequency operation | 0~600.0 | 0.1 |

See f501. Note: f915 and f501 are the same parameter internally.

| NO. | Parameter Name | Setting Range | Default |
|---|---|---|---|
| f916 | PID setting of keypad | 0~100% | 0 |
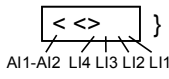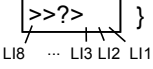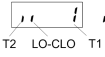
See f830.

Note: f916 and f830 are the same parameter internally.

## 5.11 Monitoring function parameter group

Table 5.10  Status monitor mode

| NO. | Parameter Name | Description |
|---|---|---|
| u000 | CPU1 Version | E.g: [ v 100 ], G-type, v= g; P-type, v= p ; |
| u001 | Operation frequency | Value is displayed in Hz/free unit. See f604. |
| u002 | Direction of rotation | [ 0 ] Forward run, [ 1 ] Reverse run. |
| u003 | frequency command value | Value is displayed in Hz/free unit. See f604. |

| NO. | Parameter Name | Description |
|---|---|---|
| u004 | load current | The frequency inverter output current (%/A) is displayed. |
| u005 | input voltage (AC RMS) | The frequency inverter input voltage (%/V) is displayed. |
| u006 | output voltage (AC RMS) | The frequency inverter output voltage command (%/V) is displayed. |
| u007 | Input terminal status indicated | 11kW or below:  } : OFF i : ON .  AI1-AI2 LI4 LI3 LI2 LI1 <br><br>15kW or above:  } : OFF i : ON .  LI8 ··· LI3 LI2 LI1 |
| u008 | Output terminal status indicated |  ı: OFF ı̇: ON , without T2 at 11kW or below  T2  LO-CLO  T1 |
| u009 | cumulative operation time | (0.01=1 hour, 1.00=100 hours) |
| u010 | Output speed | Displays the motor speed ( min-1) by calculating with output frequency and pole numbers. |
| u011 | Rated current | The rated current of the frequency inverter (A) is displayed. |
| u012 | Torque current | The torque current (%/A) is displayed. |
| u013 | Load current | The frequency inverter output current (load current) (%/A) is displayed. |
| u014 | Torque | The torque (%) is displayed. |
| u015 | Input power | The frequency inverter input power (kW) is displayed. |
| u016 | Output power | The frequency inverter output power (kW) is displayed. |
| u017 | PID feedback | The PID feedback value is displayed. (Hz/free unit) |
| u018 | Frequency command value (PID-computed) | The PID-computed frequency command value is displayed. (Hz/free unit) |
| u019 | Integral input power | The integrated amount of power (kWh) supplied to the frequency inverter is displayed. |
| u020 | Integral output power | The integrated amount of power (kWh) supplied from the frequency inverter is displayed. |
| u021 | Communication counter | Displays the counter numbers of communication through the network. |
| u022 | Normal state communication counter | Displays the counter numbers of communication only at normal state in the all communication through network. |
| u023 | Cpu2 version | v  1 0 |
| u024 | Parts replacement alarm information | ON: Needs to be replaced |
| u025 | Cpu1 revision | |
| u026 | PID setting | Displayed in % term. |
| u027 | PID feedback | Displayed in % term. |
| u1-- | Past trip 1 | Enter into the display of detailed information on past trip 1 |
| u2-- | Past trip 2 | Enter into the display of detailed information on past trip 2 |
| u3-- | Past trip 3 | Enter into the display of detailed information on past trip 3 |
| u4-- | Past trip 4 | Enter into the display of detailed information on past trip 4 |

Note 1: Items displayed can be changed by pressing ▲ or ▼ key in the monitor mode.

Note 2: You can switch between % and A (ampere)/V (volt), using the parameter f604 (current/voltage unit selection).
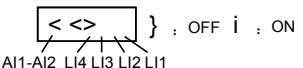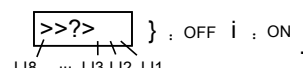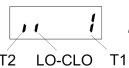
Note 3: The input/output voltage displayed is as large as the AC root-mean-squre input.

Note 4: The integrated amounts of input and output power will be reset to zero, if you press and hold down the ENT key for 3 seconds or more when power is off or when the input terminal function 32 is turned on or displayed.

Note 5: The cumulative operation time increments only when the machine is in operation.

Note 6: At the occurrence of a trip, maximum values are not always recorded and displayed for reasons of detecting time.

Table 5.11 Display of detailed information on past trip n (n=1,2,3,4)

| NO. | Parameter Name | Description |
|---|---|---|
| - | Cause of trip | E.g. e-01 |
| un00 | Continuous trips | The number of time the same trip occurred in succession is displayed. (Unit: times) |
| un01 | CPU1 Version | E.g: $\boxed{\text{v 100}}$, G-type, v= g; P-type, v= p; |
| un02 | Operation frequency | Value is displayed in Hz/free unit. See f604. |
| un03 | Direction of rotation | $\boxed{0}$ Forward run, $\boxed{1}$ Reverse run. |
| un04 | frequency command value | Value is displayed in Hz/free unit. See f604. |
| un05 | load current | The frequency inverter output current (%/A) is displayed. |
| un06 | input voltage (AC RMS) | The frequency inverter input voltage (%/V) is displayed. |
| un07 | output voltage (AC RMS) | The frequency inverter output voltage command (%/V) is displayed. |
| un08 | Input terminal status indicated | 11kW or below: $\boxed{<\ <>}$ } ﹕OFF ⎓ ﹕ON . AI1-AI2 LI4 LI3 LI2 LI1<br><br>15kW or above: $\boxed{>>?>}$ } ﹕OFF ⎓ ﹕ON . LI8 ⋯ LI3 LI2 LI1 |
| un09 | Output terminal status indicated | $\boxed{\prime\prime\ \ \prime}$ ﹕OFF ⎓ ﹕ON , without T2 at 11kW or below. T2 LO-CLO T1 |

Note 1: If no trip occurred in the past, the message "nerr" will be displayed. Detailed information for past trip is not accessed.

Note 2: Details on a past trip can be displayed, even after the frequency inverter is turned off or reset.

# 6. FAULT DIAGNOSIS AND MEASURES

## 6.1. Fault code, cause and measures

When fault (failure) occurs, the frequency inverter takes the following actions: The keyboard panel blinks to display the fault code, the frequency inverter stops output and the motor freely stops.

Table 6.1 Fault display and measures

| Code of fault | Type of fault | Possible cause | Measures (troubleshooting) |
|---|---|---|---|
| e-01 | Overcurrent protection | ● Acceleration time is too short.<br>● V/f parameter is wrongly set.<br>● When the frequency inverter starts, the load is still in rotation.<br>● frequency inverter is supplying power to low-impedance motor.<br>● Interphase short circuit or earthing failure.<br>● Abrupt fluctuation of the load | ● Increase acceleration parameter (f010 or f618) and the deceleration time (f011 or f519)<br>● Select the correct setpoint for V/f.<br>● Adopt forward/reverse speed tracking and restart function (STR function).<br>● Tune the switching frequency.<br>● Check wiring to see if there is Interphase short circuit or earthing failure.<br>● Reduce fluctuation of the load |
| e-02 | Interphase short circuit | ● Interphase output is short circuit.<br>● Motor impedance is too low. | ● Confirm the wiring and insulation status. |
| e-03 | Starting overcurrent | ● earthing failure<br>● IGBT unit damage | ● Confirm whether the wiring and device are earthing<br>● Connect with factory |
| e-04 | Earthing fault | ● earthing failure<br>● IGBT unit damage | ● Confirm whether the wiring and device are earthing<br>● Connect with factory |
| e-06 | Underload fault | ● frequency inverter 's output current is lower than low current detection threshold. | ● Check whether f407~f410 are correctly set. |
| e-07 | Overtorque fault | ● The motor estimates that the torque has reached the level set by f412. | ● Adjust the settings of f411~f414.<br>● Confirm the load status. |
| e-11 | Undervoltage fault | ● Abnormal fluctuation of input voltage; Power network capacity higher than 200 kVA; There is switchable capacitor to improve power factor on the power network; Machine that SCRs is connected to the power network.<br>● frequency inverter starts the load already in rotation. | ● Install input reactor or use braking resistance.<br>● Adopt forward/reverse speed tracking and restart function (STR function) (f500 = 1)<br>● Set f418 = 2. |
| Code of | Type of fault | Possible cause | Measures (troubleshooting) |

| fault | | | |
|---|---|---|---|
| e-11 | Undervoltage fault | ● There is possible phase failure.<br>● The deceleration time is too short. | ● Determine the cause of output phase failure (such as poor connection, open circuit of output or open circuit of motor winding) and correct it.<br>● Increase the deceleration time (f011 or f519)<br>● Enable overvoltage fault protection (f415). |
| e-12 | DC bus undervoltage fault | ● Input voltage is too low. | ● Check input voltage.<br>● Set f417 to select alarm or tripping.<br>● Adopt forward/reverse speed tracking and restart function (STR function) (f500 = 1)<br>● Set f418= 2. |
| e-21 | frequency inverter overload | ● Acceleration time is too short.<br>● DC braking current level is too high.<br>● V/f parameter is wrongly set.<br>● When the frequency inverter starts, the load is still in rotation.<br>● The load is too large. | ● Increase acceleration parameter f010 or f518).<br>Decrease the setting of f507 or f508.<br>● Correctly set V/f parameter.<br>● Set parameter f418 = 2.<br>● Adopt one frequency inverter with higher rated power. |
| e-22 | Motor overload | ● V/f parameter is wrongly set.<br>● The motor is blocked.<br>● The motor continues to run at low speed.<br>● The load applied to the motor is too large. | ● Correctly set V/f parameter.<br>● Check the load. |
| e-23 | Braking resistor overload | Improper specification selection for braking resistor | Select competent braking resistor.<br>Prohibit braking resistor overload protection f527=2 |
| e-24 | frequency inverter overheat fault | ● frequency inverter 's cooling fan does not work.<br>● Environment temperature is too high.<br>● Certain ventilation opening is blocked.<br>● There is heat source near the frequency inverter .<br>● | ● Reset the frequency inverter 's fault after cooling and restart the frequency inverter .<br>● Expand the free space around the frequency inverter ; Remove all heat sources near the frequency inverter to lower the environment temperature. |
| Code of fault | Type of fault | Possible cause | Measures (troubleshooting) |

| Code of fault | Type of fault | Possible cause | Measures (troubleshooting) |
|---|---|---|---|
| e-25 | Motor PTC overheating fault | ● External PTC embedded in the motor winding indicates existence of motor overheating. | ● Correct motor overheating.<br>● Check whether PTC is working properly.<br>● Check logic input functions 27 and 28. |
| e-31 | EEPROM fault | ● Data writing and read errors occur.<br>● The frequency inverter has power failure during parameter reset. | ● Power on the frequency inverter to eliminate the fault. If the fault can not be eliminated, contact QIROD or its distributor for maintenance or repair of the frequency inverter . |
| e-32 | Control board fault | ● Control board cannot work | ● Connect manufacturer to maintain |
| e-33 | Communication fault | ● Network communication error. | ● Check network control devices and cables.<br>● Check the setting of communication overtime parameter f803.<br>● Check remote keyboard panel cable. |
| e-34 | Current sensor fault | ● The current sensor is in abnormal status. | ● Replace the frequency inverter . |
| e-35 | Network fault | ● Network error | ● Check network control devices and cables. |
| e-36 | frequency inverter type error | ● frequency inverter hardware fault | ● f120=7<br>● If error is still, connect manufacturer to maintain |
| e-38 | AI1 signal Loss | ● AI1 analog signal level is lower than the level set by the parameter f422. | ● Check signal on AI1 to eliminate the cause of signal loss.<br>● Confirm whether f422 is correctly set. |
| e-39 | frequency inverter inside communication error | ● communication error between keyboard and control board CPU | ● Connect manufacturer to maintain |
| e-41 | Input phase failure | ● The input side of the main circuit is phase failure.<br>● The inside component of the frequency inverter is in abnormal state. | ● Determine the cause of input phase failure and correct it.<br>● Set f405 = 0. |
| **Code of fault** | **Type of fault** | **Possible cause** | **Measures (troubleshooting)** |

| e-42 | Output phase failure | ● The output side of the main circuit is phase failure. | ● Determine the cause of input phase failure (such as poor connection, open circuit of output or open circuit of motor winding) and correct it. <br> ● Set f406 = 0. |
|---|---|---|---|
| e-43 | Emergency stop fault | ● Use the keyboard panel to perform stop operation when the motor works under remote mode. | ● Perform fault reset. |
| e-45 | Torque boost is too large | ● Setting of torque boost parameter f203 is too high. <br> ● Motor impedance is too low. | ● Repeat self-tuning of the frequency inverter and downward tune parameter f203. |
| e-46 | Self-setting error | ● Confirm whether motor rated parameter settings are correct. <br> ● The motor capacity is far smaller than that of the frequency inverter . <br> ● Cable of the motor is too thin. <br> ● Motor is still in rotation when the self-setting starts. | ● Correctly set motor rated parameters. <br> ● Use frequency inverter with larger capacity. <br> ● Apply thicker cable of the motor. <br> ● Confirm the motor has stopped before the self-setting begins. |
| e-98 | Pull-out keypad communication fault | ● Communication fault between pull-out keypad and internal CPU | ● Please contact us |
| e-99 | Big power display communication fault | ● Communication fault for frequency inverter above 15kw(including) display keypad and internal CPU | ● Please contact us |

## 6.2. Description of alarm and indication code

Table 6.2  Alarm display and measures

| Code | Description | Cause | Measures |
|---|---|---|---|
| a-00 | Fault reset is acceptable. | Under fault code display state, press STOP key and a-00 is displayed. | Press the STOP key again and the fault is eliminated. |
| a-01 | Undervoltage indication | Insufficient input voltage | Check the 3-phase input power supply. If the power supply is normal, the frequency inverter has to be repaired. |
| 0.0 (flash) | "Running ready" is invalid | Under remote control mode the corresponding terminal to the logic input function 1 is not closed. | Configure one logic input function as 1, and close this terminal. |
| a-05 | Abnormal setting of frequency point | Frequency points at point 1 and point 2 are set too closely. | Do not set f325 and f327 too closely. Do not set f329 and f331 too closely. |
| a-06 | Free stop action during transient power failure. | f418 is set to 2 and transient power failure occurs. | Input running signal to the frequency inverter again or reset the frequency inverter . |
| a-07 | In DC braking | DC braking function is activated. | If the code disappears in several seconds, the frequency inverter comes back to normal. |
| a-08 | In running retrial | The frequency inverter is in the process of restart. Forward/reverse speed tracking and restart function (STR function) is activated. | The alarm code is momentarily displayed then disappears, and the frequency inverter restarts. |
| a-10 | In low speed sleep | See parameter f501. | Disabled This function or raise the frequency instrution to f006+f906. |
| a-11 | Key fault on the keyboad | Certain key on the keyboard panel is continously pressed more than 20 s or the panel is damaged. | If all keys are released but the alarm does not disappear, the frequency inverter has to be repaired. |
| a-12 | In the process of parameter initialization | See parameter f120. | If the alarm code is momentarily displayed and then disappears, the frequency inverter comes back to normal. |
| a-13 | Loss of analog signal | Analog input terminal detection level is lower than the setting level of f422. | Check analog input terminal |
| e1 | Exceeding displayed digit number by 1 digit | Displayed digit number exceeds 4 digits. | Try to reduce the setpoint of f422. |
| eun1 | In the process of self-setting | frequency inverter is performing self-setting. | If the alarm code is momentarily displayed and then disappears, the frequency inverter comes back to normal. |

Table 6.3  Display of early warning code

| Code | Type | Description |
|---|---|---|
| ---c | Overcurrent early warning | frequency inverter is in current amplitude limiting state. |

| | | See parameters f107 and f111. |
|---|---|---|
| --u- | Overvoltage early warning | frequency inverter approaches overvoltage fault. See parameters f415 and f416. |
| -l-- | Overload early warning | This code is displayed when the motor or frequency inverter overload counter exceeds 50%. |
| h--- | Overheat early warning | frequency inverter approaches overheat fault. |

Note: Early warning types can occur simultaneously. E.g, when overheat early warning and overcurrent early warning happen in the same time, the corresponding code is h--c.

## 6.3. Restart of the frequency inverter after fault occurs

After failure occurs in the frequency inverter , it can be restarted only when the cause of the failure has been eliminated. Please follow the undermentioned operations to realize fault reset of the frequency inverter .

1  When the command source of the frequency inverter is keyboard panel (under local control mode, or under remote mode and f002 = 1), press STOP key on the keyboard panel after the fault is eliminated. The keyboard will display a-00. Press the STOP key again, and the frequency inverter realizes fault reset. At this moment it is allowable toto re-supply power to the motor.

2  When the frequency inverter is under remote control mode and f002 = 0, set the input function configuration of any logic input terminal to 10. Then the frequency inverter can use this terminal to perform fault reset.

3 When the frequency inverter is under remote control mode and f002 = 2, fault reset is realized through remote communication devices. See *Appendix A: Serial communication*.

4 Switch off the frequency inverter and power it on again.

Note: When the fault is motor or frequency overload (e-21 or e-22), frequency inverter reset function can not be performed if computed cooling time is not up. The computed cooling time is specified as: e-21, 30 seconds after the fault occurs; e-22, 120 seconds after the the fault occurs.

# 7. APPENDIX A: SERIAL COMMUNICATION

Serial communication is the information exchange channel of the frequency inverter with upper computer. Through serial communication, users can use personal computer or industrial control equipment (such as PLC etc) as host to set frequency inverter (slave)'s running frequency or command, modify or read data, read working state and fault information etc and realize remote or centralized control of the frequency inverter .

CYTB6000 series frequency inverter  adopt RS-485 bus and Modbus protocol for serial communication.

## A1.  RS-485 bus

The hardware circuit of serial communication for CYTB6000 series frequency inverter  follows RS-485 standard and a RJ45 interface is provided. Here RS-485 two-wire wiring method is adopted. The array sequence of the corresponding pins of RJ45 interface is shown as below:
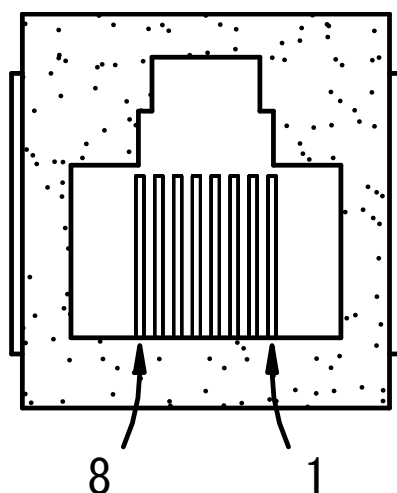


Figure A.1  RJ45 front view

Table A.1 Pin output signal allocation

| Pin | Signal description |
|---|---|
| 1 | Reserved |
| 2 | Common port (signal ground & power ground) |
| 3 | Reserved |
| 4 | A (RS-485) |
| 5 | B (RS-485) |
| 6 | Reserved |
| 7 | +24 V |
| 8 | Common port (signal ground & power ground) |

RS-485 two-wire wiring method is half-duplex serial communication.  At the same moment the host and slave can not simultaneously transmit or receive data. Only one transmits data and another receives them.

RS-485 two-wire wiring method supports bus-type topological structure. At most 32 nodes can be connected to the same bus. Normally master-slave communication method is adopted in the RS-485 communication network, namely, one master commands as many as 31 slaves.

Under the circumstance of multi-computer communication or long-distance communication, it is suggested to connect the signal ground of the master station with the common port of the frequency inverter to raise the ant-interference ability of communication.

# A2. Modbus protocol

Modbus is a master-slave communication protocol. The master governs the whole communication process. Only when the master sends command to the slave, the slave executes the actions or/and send feedback information to the master. Otherwise the slave performs no operation and the slave can not communicate with each other directly.

There are two kinds of dialogues between the master and slaves:

(1) Point-to-point: Master sends command individually to a certain slave which executes action or/and sends feedback information.

When the master command is correct, the slave executes corresponding actions and transmits feedback of result information to the master.

When the master command is false, the slave transmits feedback of error information to the master but executes no actions.

(2) Broadcast mode: The master sends command to all slaves which execute action but send no feedback information.

Modbus protocol has two kinds of transmission patterns: Modbus RTU and Modbus ASCII. QD series frequency inverter  supports Modbus RTU.

## A2.1  Description of Modbus-RTU message format

When the Modbus-RTU mode is used for communication, the communication information (message) is represented directly with hexadecimal code (1-9, A-F). Two hexadecimal codes form one byte. The message format is shown as below:
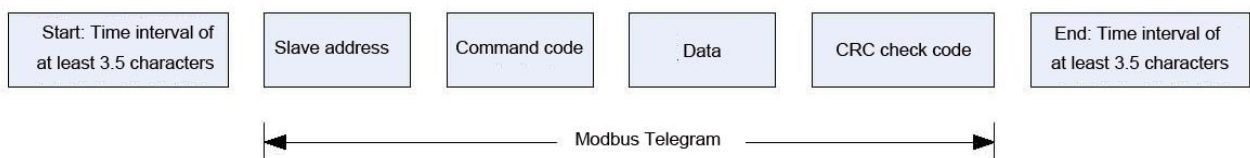


Figure A.2 Modbus Message Format

As shown in Figure A.2, during the communication process, the master and slave determine the start and end of Modbus message according to time interval of at least 3.5 characters. The message includes the complete data information to be transmitted: in the sequence of slave address, command code, data and CRC code. Its length varies with the change of the command code.

The message of Modbus-RTU is classified into three types and two formats:

1) Request (Interrogation) message: Command request message transmitted by master to slave;

2) Normal response message: The slave's feedback message when the master's command is correct.

3) Error response message: The slave's feedback message when the master's command is false / invalid.

1) and 2) have the same format, while 3) adopts other format.

1．Format of request message and normal response message.

Table A.2 Format of request message and normal response message

| Number | Name | Function |
|---|---|---|
| 1 | Slave address | • Configured from 0 to 247<br>• All slaves execute command but provide no feedback information; If slave address is set to 1~247, the dialog is point-to-point mode. All address-matching slaves execute command and provide feedback information.<br>• Under the point-to-point mode, when the matching slave responses, it sends back the slave address of itself. |
| 2 | Command code | • CYTB6000 series frequency inverter supports part of command codes of Modbus protocol.<br>• All slaves execute command code and the matching slave responses code include:<br>　(1) 03H:Read one word (2 bytes)<br>　(2) 06H:Write one word (2 bytes)<br>• During error response, the feedback command code of the slave = the request command code of the master + 80H. |
| 3 | Data | • This part is the main content of communication and the core of data exchange. Its content and length vary with the variation of the command codes. See the following concrete descriptions of every command code. |
| 4 | CRC code | • Cyclical redundancy check (CRC) code is used for error detection of received data done by the receiving equipment and for judging whether the received data are correct. Please refer to "A2.3 Cyclical redundancy check (CRC)" for generation of CRC code.<br>Note: CRC code first sends low bytes then high bytes. Except this, all messages of Modbus-RTU adopt the transmission sequence of "high bytes first - then low bytes". |

## A2.2 Detailed message description of different commands

### A2.2.1 Read one word (2 bytes) —— command code 03H

1. Master request message

Table A.3 Format of master request message

| Slave address | Command code | Communication address | | Read word number | | CRC code | |
|---|---|---|---|---|---|---|---|
| 1 byte | 1 byte | 2 bytes | | 2 bytes | | 2 bytes | |
| | | High byte | Low byte | High byte | Low byte | High byte | Low byte |
| | 03H | | | 00H | 01H | | |

1) Slave address and CRC code: See *"Table A.2"*.

2) Command code: 03H. Request to read 1 word (2 bytes) of the slave.

3) Communication address: The address of read data. This is not the real physical address for data storage, but a number corresponding to the data. Every control, state or monitoring parameter of CYTB6000 series frequency inverter corresponds to a communication address. See *"A2.5 Communication parameter"*.

4) Read word number: The length of the read data with the word (2 bytes) as the count unit. When current request asks for reading one word, it is set to 0001H.

2. Message of slave normal response

Table A.4  Slave normal response message

| Slave address | Command code | Communication address | Read word number | | CRC code | |
|---|---|---|---|---|---|---|
| 1 byte | 1 byte | 2 bytes | 2 bytes | | 2 bytes | |
| | | | High byte | Low byte | Low byte | High byte |
| | 03H | 02H | | | | |

1) Slave address and CRC code:  See "A2.2".

2) Command code: 03H. The same as the master request command code.

3) Read word number: The length of the read data with byte as the count unit. When current master requests to read one word, set read byte number transmitted from the slave to 02H.

   Note: The count unit of the length of the read data is different from that of request message.

4) Read data: Data corresponding to the communication address in the request message.

   Note: Read data firstly sends high byte then low byte in an opposite direcition to CRC code.

3. Slave error response message

Table A.5 Slave error response message of Command code 03H

| Slave address | Command code | Error code | CRC code | |
|---|---|---|---|---|
| 1 byte | 1 byte | 1 byte | 2 bytes | |
| | | | Low byte | High byte |
| | 83H | | | |

1) Slave address and CRC code: See *"A2.2".*

2) Command code: 83H. It is = 03H + 80H.

3) Error code. For detail see "A2.4 Error code".

4) Example: Read upper limit frequency.

   Master request message: 01 03 00 08 00 01 05 C8

   Normal response message: 01 03 02 13 88 B5 12 (Suppose that current upper limit frequency is 50 Hz)

   Error response message: 01 83 03 01 31 (Suppose that read word number is altered from 0001 to 0002)

**A2.2.2  Write one word (2 bytes) — Command code 06H**

1. Master request message

Table A.6  Format of master request message

| Slave address | Command code | Communication address | | Write data | | CRC code | |
|---|---|---|---|---|---|---|---|
| 1 byte | 1 byte | 2 bytes | | 2 bytes | | 2 bytes | |
| | | High byte | Low byte | High byte | Low byte | Low byte | High byte |
| | 06H | | | | | | |

1) Slave address and CRC code:  See *"Table A.2".*

2) Command code: 06H. Request to write 1 word (2 bytes) of the slave.

3) Communication address: The address of read data. This is not the real physical address for data storage, but a number corresponding to the data. Every control, state or monitoring parameter of CYTB6000 series frequency inverter  corresponds to a communication address. See *"A2.5 Communication parameter".*

4) Write data: Request data written by the slave.

2. Slave normal response message

Table A.7  Slave normal response message

| Slave address | Command code | Communication address | | Write data | | CRC code | |
|---|---|---|---|---|---|---|---|
| 1 byte | 1 byte | 2 bytes | | 2 bytes | | 2 bytes | |
| | | High byte | Low byte | High byte | Low byte | Low byte | High byte |
| | 06H | | | | | | |

Slave's normal response message is the same as the master's request message.

3. Slave error response message

Table A.8  Format of slave error response message

| Slave address | Command code | Error code | CRC code | |
|---|---|---|---|---|
| 1 byte | 1 byte | 1 byte | 2 bytes | |
| | | | Low byte | High byte |
| | 86H | | | |

1) Slave address and CRC code: See *"Table A2.2"*.

2) Command code: 86H. It is = 06H + 80H.

3) Error code. For detail see *"A2.4 Error code"*.

4. Example: To write upper limit frequency

Master request message: 01 06 00 08 13 24 05 23 (Suppose that the set upper limit frequency is 49 Hz)

Normal response message: 01 06 00 08 13 24 05 23

Error response message: 01 86 04 43 A3 (Suppose current writing operation can not be performed)

# A2.3 Cyclic redundancy check (CRC)

Modbus-RTU's communication message uses cyclic redundancy check (CRC) for transmission error check.

During each communication, the sender computes CRC code of transmitted data according to CRC rules, then sends the data by attaching the CRC code to them; After receiving the data, the receiver re-computes the CRC code according to the same rules. The computed content does not include the received CRC code. The reciever compares the re-calculated CRC code with the received code. If they are not the same, the transmitted data are determined to be false.

CYTB6000 series frequency inverter  adopts CRC16 rule for message check of serial communication. Every CRC code consists of 2 bytes, including 16-bit binary value. The calculation is as follows:

1) Initialize CRC register (16 bit) to 0xFFFF;

2) Perform XOR to the first byte (slave address) and the low 8 bits of the register, and then put the computed result back to CRC register;

3) Make a right shift by 1 bit to the content of CRC register and fill in the highest bit with 0;

4) Check the shift-out bit after right shift;

- If the shift-out bit is 0, repeat 3), namely, make another right shift;

- If the shift-out bit is 1, make XOR to CRC register and 0xA001, and put the computed result back to the CRC register;

5) Repeat steps 3) and 4) until 8 right shifts are made. Implement the same procedure to all the 8-bit data;

Repeat steps 2) ~ 5) to implement the processing of the next byte in the message;

7) After all the bytes in the message are computed according to the above procedures, the content in the CRC register is the CRC code.

After the CRC code is acquired through the above-mentioned method, attach it to the transmitted data and send them. It is necessary to exchange the high and low bytes of the CRC code, namely, to send the low byte firstly and then the high byte.

There are two methods to compute CRC code with software: table look-up and on-line computation. Computation speed of the table look-up is fast but its table data occupy considerable space; On-line computation method requires no table data. It saves space but needs much time. Suitable computation method is selected according to concrete circumstance during application.

## A2.4 Error code

When the slave is not able to implement master's request, the slave gives feedback of corresponding error code to indicate cause of the current error. Refer to the following table for the concrete meaning of error code.

Table A.9 Description of error code

| Error code | Description |
|---|---|
| 01 | Command code error |
| | ● Command code other than 03H and 06H is set in the request message |
| 02 | Communication address error |
| | ● Visited communication address does not exist. |
| | ● The register corresponding to the communication address does not permit performance of the action demanded by the currrent command code. |
| 03 | Data setting error |
| | ● Written data exceeds the allowable range of the register. |
| | ● Improper setting of certain parameter in the request message. |
| 04 | Unable to continue implementing the master's request. |
| | ● Error occurs during the process of writing data. |
| | ● Currently the register corresponding to the communication address does not permit performance of the action demanded by the command code. |

## A2.5 Communication parameter

1. Control parameter

Control parameters are edited through serial communication in order to realize frequency inverter 's function setting, running frequency setting, start/stop control and logic/analog output setting.

1) Basic parameters

Basic parameters consist of 10 groups: f0 – f9. They are used to control the function setting of the frequency inverter . Their detailed description, communication addresses and value ranges are shown in *"5. Detailed description of parameters"*.

Note: The communication address of the basic parameter corresponds to its display code. However, it is required to change F at the highest bit to 0;

Example: The display code of parameter "Running command selection" is f001, so the corresponding communication address is 0001;

Another example: The display code of parameter "Default keyboard panel display value" is f702, so the corresponding communication address is 0702.

2) Communication control word (Communication address: fa05)

Table A.10  Detailed description of communication control word

| Bit | Description of function | 0 | 1 | Default value |
|-----|-----------------------|---|---|---------------|
| 0 | JOG | NO-JOG | Jog frequency | 0 |
| 1 | Forward/reverse rotation | Forward rotation | Reverse rotation | 0 |
| 2 | Running/stop | Stop | Running | 0 |
| 3 | Free stop | No action | Free stop | 0 |
| 4 | Emergency stop | No action | Emergency stop | 0 |
| 5 | Fault reset | No action | Reset | 0 |
| 6 | Given frequency by communication | Disable | Enable | 0 |
| 7 | Given code by communication | Disable | Enable | 0 |
| 8 | Multi-speed 1 | OFF | ON | 0 |
| 9 | Multi-speed 2 | OFF | ON | 0 |
| 10 | Multi-speed 3 | OFF | ON | 0 |
| 11 | Multi-speed 4 | OFF | ON | 0 |
| 12 | Motor parameter switch | 1nd Motor Parameter | 2nd Motor Parameter | 0 |
| 13 | PID control Disabling | Enabling PID control | Disabling PID control | 0 |
| 14 | Acceleration/ deceleration curve switch | Acceleration/ deceleration curve 1 | Acceleration/ deceleration curve 2 | 0 |
| 15 | DC braking | No DC braking | DC braking start | 0 |

3) Communication running frequency setting (Communicaiton address: fa08)

Table A.11 Communication running frequency setting

| Bit | Description of function | Default |
|-----|------------------------|---------|
| 0-15 | Running frequency data of communication setting. Hexadecimal setting: 50Hz→(50Hz)x100 = 5000→1388Hz<br>It is if setting: 50Hz, write 1388H in the FA08 address | 0.0 |

4) Communication analog output setting (Communicaiton address: fa16)

Table A.12  Communication analog output setting

| Bit | Description of function | Lower limit | Upper limit | Default |
|-----|------------------------|-------------|-------------|---------|
| 0-15 | Analog output data of communicatioin setting (in correspondence with analog output function 10) | 0 （0000H） | 1023 （03FFH） | 0 |

2． Monitoring parameter

Read monitoring parameter through serial communication in order to view the running state of the frequency inverter . The following table provides part of monitoring parameters. See *"5.11 Monitoring function parameter group"* for other parts.

Table A.13  Communication running frequency setting

| No. | Communication address | Description of function | Unit | Note |
|---|---|---|---|---|
| 1 | fd06 | Real-time running state | - | See table A.17 for details |
| 2 | fd05 | Real-time running frequency | 0.01 Hz | |
| 3 | fe10 | Actual output frequency | 0.01 Hz | |
| 4 | fe50 | DC bus input voltage | 0.01 % | |
| 5 | fe51 | Output voltage | 0.01 % | |
| 6 | fe49 | Output current | 0.01 % | |
| 7 | fe12 | Output torque | 0.01 % | |
| 8 | fe21 | Output power | 0.01 kW | |
| 9 | fe45 | Motor speed (estimated) | 1 rpm | |
| 10 | fe03 | Logic input | - | See A.18 for details |
| 11 | fe04 | Logic output | - | See A.19 for details |
| 12 | fe22 | Logic input AI1 (10-bit accuracy) | - | Range (0-1023) |
| 13 | fe23 | Logic input AI2 (10-bit accuracy) | - | Range (0-1023) |
| 14 | fc59 | Fault monitoring | - | See A.20 for details |

Table A.14  Real-time running state monitoring

| Communication address | Description of function | | |
|---|---|---|---|
| FD03 | Real-time running state monitoring | | |
| Bit | Description | 0 | 1 |
| 0 | Reserved | - | - |
| 1 | Fault | No fault | Tripping |
| 2-8 | Reserved | - | - |
| 9 | Forward/reverse rotation | Forward rotation | Reverse rotation |
| 10 | Running/stop | Stop | Running |
| 11-15 | Reserved | - | - |

Table A.15  Logic input state monitoring

| Communication address | Description of function | | |
|---|---|---|---|
| FE11 | Logic input state monitoring | | |
| Bit | Description | 0 | 1 |
| 0 | Terminal L1 | OFF | ON |
| 1 | Terminal L2 | OFF | ON |
| 2 | Terminal L3 | OFF | ON |
| 3 | Terminal L4 | OFF | ON |
| 4 | Terminal L5 | OFF | ON |
| 5 | Terminal L6 | OFF | ON |
| 6 | Terminal L7 or As AI1 during logic input | OFF | ON |
| 7 | Terminal L8 or As AI1 during logic input | OFF | ON |
| 8-15 | Reserved | - | - |

Table A.16  Logic Output state monitoring

| Communication address | Description of function | | |
|---|---|---|---|
| FE11 | Logic output state monitoring | | |
| Bit | Description | 0 | 1 |
| 0 | Terminal LO1-CLO1 | OFF | ON |
| 1 | Relay T2 | OFF | ON |
| 2 | Relay T1 | OFF | ON |
| 3-15 | Reserve | - | - |

Table A.17  Fault monitoring

| Communication address | Description of function | |
|---|---|---|
| FC39 | Fault monitoring | |
| Value | Corresponding fault | Panel display |
| 0000H | No fault | nerr |
| 0001H | Acceleration overcurrent | e-01 |
| 0002H | Deceleration overcurrent | e-01 |
| 0003H | Constant speed overcurrent | e-01 |
| 0008H | Input phase failure | e-41 |
| 0009H | Output phase failure | e-42 |
| 000AH | Acceleration overvoltage | e-11 |
| 000BH | Deceleration overvoltage | e-11 |
| 000CH | Constant speed overvoltage | e-11 |
| 000DH | frequency inverter overload | e-21 |
| 000EH | Motor overload | e-22 |
| 0010H | Overheat tripping | e-24 |
| 0011H | Emergency tripping | e-43 |
| 0012H | EEPROM error 1 (write error) | e-31 |
| 0013H | EEPROM error 2 (Read error) | e-31 |
| 0014H | EEPROM error 3 (Internal error) | e-31 |
| 0018H | External communication error | e-33 |
| 001AH | Current detection fault | e-34 |
| 001EH | Undervoltage | e-12 |

# 8. APPENDIX B: CONCISE PARAMETER LIST

| [-f0-] | | | | | |
|---|---|---|---|---|---|
| NO. | Parameter Name | Setting Range | default | WRT | User setting |
| f000 | Operation frequency of keypad | f009~f008 | 0.0 | ○ | |
| f001 | V/F control mode selection | 0: V/F constant<br>1: Variable torque<br>2: Sensor-less vector control<br>3: Energy saving | 0 | ● | |
| f002 | Command mode selection 1 | 0: Terminal board<br>1: Keypad<br>2: Serial communication | 1 | ● | |
| f003 | Frequency setting mode selection 1 | 0: Built-in potention meter<br>1: AI1 input<br>2: AI2 input<br>3: Keypad<br>4: Serial communication<br>5: UP/DOWN setting<br>6: AI1+AI2<br>7: PID setting of keypad<br>8: Simple PLC running | 3 | ● | |
| f004 | Command mode selection 2 | 0: Terminal board<br>1: Keypad<br>2: Serial communication | 0 | ○ | |
| f005 | Frequency setting mode selection 2 | 0: Built-in potention meter<br>1: AI1 input<br>2: AI2 input<br>3: Keypad<br>4: Serial communication<br>5: UP/DOWN speed given<br>6: AI1+AI2<br>7: PID setting of keypad<br>8: Simple PLC running option | 2 | ○ | |
| f006 | Frequency priority selection | 0: enable<br>1: prohibit | 0 | ○ | |
| f007 | Maximum frequency | 30.0~400.0 Hz | 50.0 | ● | |
| f008 | Upper limit frequency | 0.5 Hz ~f007 | 50.0 | ○ | |
| f009 | Lower limit frequency | 0.0 Hz ~f008 | 0.0 | ○ | |
| f010 | Acceleration time 1 | 0.0~3200 s | varies by model | ○ | |

| NO. | Parameter Name | Setting Range | default | WRT | User setting |
|---|---|---|---|---|---|
| f011 | Deceleration time 1 | 0.0~3200 s | varies by model | ○ | |
| f012 | PWM carrier frequency | 1.5k~12.0 kHz | varies by model | ○ | |
| f013 | Carrier frequency control mode selection | 0： not reduced automatically<br>1： reduced automatically | 1 | ● | |
| f014 | Random PWM mode | 0: Disable.<br>1: Enable. | 0 | ○ | |
| f015 | Automatic acceleration/deceleration | 0: Disabled (manual).<br>1: Automatic (at acceleration & deceleration)<br>2: Automatic (only at acceleration) | 0 | ● | |
| f016 | Factory reserved | - | - | | |
| f017 | Parameter setting mQDo function | 0: Disabled<br>1： 2-wire control<br>2： 3-wire control<br>3： External input UP/DOWN setting | 0 | ● | |
| f018 | Factory reserved | - | - | | |
| f020 | Factory reserved | - | - | | |

| [-f1-] | | | | | |
|---|---|---|---|---|---|
| NO. | Parameter Name | Setting Range | default | WRT | User setting |
| f100 | Auto-tuning | 0: Auto-tuning disabled<br>1: Application of individual settings of f203<br>2: Auto-tuning enabled | 0 | ● | |
| f101 | Base frequency 1 | 25.0~400.0 Hz | 50.0 | ● | |
| f102 | Base frequency voltage1 | 50~660 V | varies by model | ● | |
| f103 | Motor rated current | 0.1~200.0 A | varies by model | ● | |
| f104 | Motor rated speed | 100~15000 rpm | varies by model | ● | |
| f105 | Motor no-load current | 10.0~100.0% | varies by model | ● | |
| f106 | Motor electronic thermal protection level 1 | varies by model | varies by model | ○ | |
| f107 | stall prevention level 1 | varies by model | varies by model | ● | |
| f108 | Base frequency 2 | 25.0~400.0 Hz | 50.0 | ● | |
| f109 | Base frequency voltage 2 | 50~660V | varies by model | ● | |
| f110 | Motor electronic-thermal protection level 2 | varies by model | varies by model | ○ | |
| f111 | Stall prevention level 2 | varies by model | varies by model | ○ | |
| f112 | factory reserved | - | | | |

| NO. | Parameter Name | Setting Range | default | WRT | User setting |
|---|---|---|---|---|---|
| f113 | factory reserved | - | | | |
| f114 | factory reserved | - | | | |
| f115 | factory reserved | - | | | |
| f120 | Default setting | 0: -<br>1: Standard default setting (Initialization)<br>2: Save user-defined parameters<br>3: Call user-defined parameters<br>4: Trip record clear<br>5: Cumulative operation time clear<br>6: Cumulative fan operation time record clear<br>7: Initialization of type information<br>8: P-type rating.<br>9: G-type rating. | 0 | ● | |

| [-f2-] | | | | | |
|---|---|---|---|---|---|
| NO. | Parameter Name | Setting Range | default | WRT | User setting |
| f201 | Supply voltage correction | 0: Supply voltage uncorrected, output voltage limited.<br>1: Supply voltage corrected, output voltage limited.<br>2: Supply voltage uncorrected, output voltage unlimited.<br>3: Supply voltage corrected, output voltage unlimited. | 3 | ● | |
| f202 | Voltage boost 1 | 0.0~30.0% | varies by model | ○ | |
| f203 | Torque boost | 0.0~30.0% | varies by model | ○ | |
| f204 | Slip frequency gain | 0~150% | 50 | ○ | |
| f205 | Exciting current coefficient | 100~130 | 100 | ● | |
| f206 | Voltage boost 2 | 0~30% | varies by model | ○ | |
| f207 | Speed control response coefficient | 1~150 | 40 | ● | |
| f208 | Speed control stability coefficient | 1~100 | 20 | ● | |
| f209 | Stall prevention control coefficient 1 | 10~250 | 100 | ● | |
| f210 | Stall prevention control coefficient 2 | 50~150 | 100 | ● | |
| f211 | Maximum voltage adjustment coefficient | 90~120% | 104 | ● | |
| f212 | Waveform switching adjustment coefficient | 0.1~14kHz | 14.0 | ● | |
| f213 | factory reserved | | | | |

| NO. | Parameter Name | Setting Range | default | WRT | User setting |
|---|---|---|---|---|---|
| f214 | factory reserved | | | | |
| f215 | factory reserved | | | | |
| f216 | factory reserved | | | | |
| f217 | multipoint profile V/F patter | 0: factory reserved. <br> 1: factory reserved. <br> 2: Enable multipoint profile V/F patter. | 0 | ● | |
| f218 | point 1 output frequency （f1） | 0~f220 | 10.0 | ● | |
| f219 | point 1 output frequency voltage （V1） | 0~100% | 20.0 | ● | |
| f220 | point 2 output frequency （f2） | f218~f220 | 20.0 | ● | |
| f221 | point 2 output frequency voltage （V2） | 0~100% | 40.0 | ● | |
| f222 | point 3 output frequency （f3） | f220~f101 | 30.0 | ● | |
| f223 | point 3 output frequency voltage （V3） | 0~100% | 60.0 | ● | |

| [-f3-] | | | | | |
|---|---|---|---|---|---|
| NO. | Parameter Name | Setting Range | default | WRT | User setting |
| f300 | AI1 terminal function selection | 0: AI1 - analog input <br> 1: AI1 - contact input (Sink mode) <br> 2: AI1 - contact input (Source mode) | 0 | ● | |
| f301 | Input terminal function for LI1 | 0: No function is assigned <br> 1: Standby terminal | 2 | ● | |
| f302 | Input terminal function for LI2 | 2: Forward run command <br> 3: Reverse run command | 3 | ● | |
| f303 | Input terminal function for LI3 | 4: Jog run mode | 0 | ● | |
| f304 | Input terminal function for LI4 | 5: Acceleration/deceleration 2 pattern selection <br> 6: Preset-speed command 1 <br> 7: Preset-speed command 2 <br> 8: Preset-speed command 3 <br> 9: Preset-speed command 4 <br> 10: Reset command <br> 11: Trip stop command from external input device <br> 13: DC braking command <br> 14: PID control disabling <br> 15: Permission of parameter editing <br> 16: Combination of standby and reset commands <br> 17: Frequency source switching to AI1 | 10 | ● | |

| NO. | Parameter Name | Setting Range | default | WRT | User setting |
|---|---|---|---|---|---|
| f304 | Input terminal function for LI4 | 18: Combination of forward run and jog run<br>19: Combination of reverse run and jog run<br>20: Frequency setting source switching<br>21: No.2 Switching of V/F setting<br>22: No.2 motor switching<br>23: Frequency UP signal input from external contacts<br>24: Frequency DOWN signal input from external contacts<br>25: Frequency UP/DOWN cancellation signal input from external contacts<br>26: inversion of trip stop command from external device<br>27: Thermal trip stop signal input from external device<br>28: inversion of thermal trip stop signal input from external device<br>29: Forced switching from remote to local control<br>30: Operation holding (stop of 3-wire operation)<br>31: Forced switching of command mode and terminal board command<br>32: Display cancellation of the cumulative power amount (kWh)<br>33: Fire-speed control<br>34: Coast stop (gate off)<br>35: Inversion of Reset<br>36: Forced switching of stall prevention level 2<br>37: PID control integral value clear PID control integral value clear<br>38: inversion of PID error signal<br>39~69: Not used | 10 | ● | |
| f305 | AI1 voltage-current input selection | 0:0～5V voltage signal input.<br>1:0～10V voltage signal input.<br>2: 0-20mA(4-20mA) current signal input. | 0 | ● | |
| f306 | sink/soruce mode selection | 0: Source (Positive) logic terminal mode.<br>1: Sink (Negative) logic terminal mode | 1 | ● | |
| f307 | AO voltage-current output selection | 0: Current signal output.<br>1: Voltage signal output. | 1 | ● | |
| f308 | Input terminal function of AI1 | f301~f304 | 0 | ● | |
| f309 | Always-active terminal selection 1 | f301~f304 | 1 | ● | |

| NO. | Parameter Name | Setting Range | default | WRT | User setting |
|---|---|---|---|---|---|
| f310 | Always-active terminal selection 2 | f301~f304 | 0 | ● | |
| f311 | Output terminal function A of LO1-CLO1 | f315 | 4 | ● | |
| f312 | Output terminal function B of LO1-CLO1 | f315 | 255 | ● | |
| f313 | AI2 terminal function selection | 0: AI2 - analog input<br>1: AI2 - contact input (Sink)<br>2: AI2 - contact input (Source) | 0 | ● | |
| f314 | Input terminal function of AI2 | f301~f304 | 0 | ● | |
| f315 | Output terminal function A of T1 (T1A-T1B-T1C) | 0: Output frequency higher than lower limit frequency<br>2: Output frequency equals to upper limit frequency<br>4: Output frequency is higher or equal to f337<br>6: (set frequency -f339)<output frequency<(set frequency+f339)<br>8: (f338-f339) < output frequency < (f338+f339)<br>10: Output frequency higher or equal to f338+f339<br>12: f003 or f005 source supply given speed=AI1 signal<br>14: f003 or f005 source supply given speed=AI2 signal<br>16: AI1's value higher or equal to f340 +f341<br>18: AI2's value is higher or equal to f342 +f343<br>20: AI2 is the speed given source<br>22: Frequency inverter forward motor power supply (acceleration, deceleration, constant speed or DC braking)<br>24: Ready for running of the frequency inverter (running permission and running command available)<br>26: Motor reverse running<br>28: Under local mode for frequency inverter<br>30: Fault happened in the frequency inverter<br>32: Evaluated motor torque is at f412 level time is still less than f414 set value. | 40 | ● | |

| NO. | Parameter Name | Setting Range | default | WRT | User setting |
|---|---|---|---|---|---|
| f315 | Output terminal function A of T1 (T1A-T1B-T1C) | 34：Motor current is less than f408 and its lasting time is over f410 setting.<br><br>36：Fault occurred and could not reset.<br><br>38：Fault occurred but it could reset.<br><br>40：Fault occurs in the frequency inverter<br><br>42：Alarm occurs<br><br>44：Motor heating status has reached 50% of motor overload fault level.<br><br>46：DC braking resistor status has reached 50% DC braking resistor overload fault level.<br><br>48：Evaluated motor torque reaches f412*70%<br><br>50: Run time≥f428 set value<br><br>52：The equipment sends maintenance alarm warning. (Fan, PCB or capacitor needs replacement.)<br><br>54：PTC heating sensor needle has detected motor temperature reaching 60% of trip level.<br><br>56：Undervoltage alarm is valid.<br><br>58：Brake pull<br><br>60：In the process of motor acceleration process<br><br>62：In the process of motor deceleration<br><br>64：In the process of motor deceleration or acceleration<br><br>66：Heat sink temperature has reached alarm value<br><br>68：One PLC recycle completes<br><br>70：One PLC speed section completes<br><br>72~253：not used<br><br>254：Relay constant output OFF<br><br>255：Relay constant output ON | 40 | ● | |
| f316 | Output terminal logic selection of LO1-CLO1 | 0：And logic<br>1：Or logic | 0 | ● | |
| f317 | LO1-CLO1 output delay | 0.0~60.0 s | 0.0 | ○ | |
| f318 | T1 output delay | 0.0~60.0 s | 0.0 | ○ | |
| f319 | External contact input - UP response time | 0.0~10. 0 s | 0.1 | ○ | |
| f320 | External contact input - UP frequency steps | 0.0 Hz ~f007 | 0.1 | ○ | |
| NO. | Parameter Name | Setting Range | default | WRT | User |

| | | | | | setting |
|---|---|---|---|---|---|
| f321 | External contact input - DOWN response time | 0.0~10.0 s | 0.1 | ○ | |
| f322 | External contact input - DOWN frequency steps | 0.0 Hz ~f007 | 0.1 | ○ | |
| f323 | Initial up/down frequency | 0.0 Hz ~f007 | 0.0 | ○ | |
| f324 | Change of the initial up/down frequency | 0：disabled<br>1：enabled | 1 | ○ | |
| f325 | AI1 input point 1 setting | 0~100% | 0 | ○ | |
| f326 | AI1 input point 1 frequency | 0.0~400.0 Hz | 0.0 | ○ | |
| f327 | AI1 input point 2 setting | 0~100% | 100 | ○ | |
| f328 | AI1 input point 2 frequency | 0.0~400.0 Hz | 50.0 | ○ | |
| f329 | AI2 input point 1 setting | 0~100% | 0 | ○ | |
| f330 | AI2 input point 1 frequency | 0.0~400.0 Hz | 0.0 | ○ | |
| f331 | AI2 input point 2 setting | 0~100% | 100 | ○ | |
| f332 | AI2 input point 2 frequency | 0.0~400.0 Hz | 50.0 | ○ | |
| f333 | AI1 input bias | 0~255 | varies by model | ○ | |
| f334 | AI1 input gain | 0~255 | varies by model | ○ | |
| f335 | AI2 input bias | 0~255 | varies by model | ○ | |
| f336 | AI2 input gain | 0~255 | varies by model | ○ | |
| f337 | Low-speed signal output frequency | 0.0 Hz ~f007 | 0.0 | ○ | |
| f338 | Speed reach detection output frequency | 0.0 Hz ~f007 | 0.0 | ○ | |
| f339 | Speed reach detection band | 0.0 Hz ~f007 | 2.5 | ○ | |
| f340 | AI1 input reach detection level | 0~100% | 0 | ○ | |
| f341 | AI1 input reach detection band | 0~20% | 3 | ○ | |
| f342 | AI2 input reach detection level | 0~100% | 0 | ○ | |
| f343 | AI2 input reach detection band | 0~20% | 3 | ○ | |
| f344 | Frequency command agreement detection range | 0.0 Hz ~f007 | 2.5 | ○ | |
| f345 | Logic output/pulse train output selection (LO1-CLO1) | 0: Logic output<br>1: Pulse train output | 0 | ● | |

| NO. | Parameter Name | Setting Range | default | WRT | User |
|---|---|---|---|---|---|

| | | | | | setting |
|---|---|---|---|---|---|
| f346 | Pulse train output function selection (LO - CLO) | 0: Output frequency<br>1: Output current<br>2: Set frequency (Before PID)<br>3: Frequency setting value (After PID)<br>4: DC voltage<br>5: Output voltage command value<br>6:Input power<br>7:Output power<br>8:AI1 Input value<br>9:AI2 Input value<br>10:Torque<br>11:Torque current<br>12:Motor cumulative load factor<br>13:Inverter cumulative load factor<br>14:PBR (braking reactor) cumulative load factor | 0 | ○ | |
| f347 | Maximum numbers of pulse train | 500~1600 | 800 | ○ | |
| f348 | AO1 selection | 0:Output frequency<br>1:Output current<br>2:Set frequency (betore PID)<br>3:Frequency setting value (after PID)<br>4:DC voltage<br>5:Output voltage command value<br>6:Input power<br>7:Output power<br>8:AI1 input<br>9:AI2 input<br>10:Torque<br>11:Torque current<br>12:Motor cumulative load factor<br>13:Inverter cumulative load factor<br>14:brake resistor cumulative load factor<br>15:Serial communication data | 0 | ○ | |
| f349 | AO1 gain adjustment | 0~1280 | varies by model | ○ | |
| f350 | Inclination characteristic of analog output | 0: Negative<br>1: Positive | 1 | ○ | |
| f351 | Bias of analog output | 0~100% | 0 | ○ | |
| f352 | output frequency when AO1 = 0V | 0 Hz ~f007 | 0.0 | ○ | |
| f353 | output frequency when AO1 = 10V | 0 Hz ~f007 | 0.0 | ○ | |
| f354 | AO1 bias | 0~255 | 128 | ○ | |
| f355 | Input terminal function for LI5 | f301~f304 （15kW and above） | 0 | ● | |

| NO. | Parameter Name | Setting Range | default | WRT | User setting |
|---|---|---|---|---|---|
| f356 | Input terminal function for LI6 | f301~f304 （15kW and above） | 0 | ● | |
| f357 | Input terminal function for LI7 | f301~f304 （15kW and above） | 0 | ● | |
| f358 | Input terminal function for LI8 | f301~f304 （15kW and above） | 0 | ● | |
| f359 | Output terminal function A of T2 | f315 （15kW and above） | 0 | ● | |
| f360 | Output terminal function B of T2 | f315 （15kW and above） | 0 | ● | |
| f361 | Output terminal logic selection of T2 | 0： And Logic（15kW and above） <br> 1： Or Logic | 0 | ● | |
| f362 | T2 output delay | 0~60.0s （15kW and above） | 0.0 | ● | |
| f363 | Input terminal active mode | 0: Input terminal function active when input terminal is OFF. <br> 1: Input terminal function inactive when input terminal is ON. | | | |
| f364 | Input terminal filter time | 0~200 | 0 | | |
| f365 | Relay output 1 assistant function | f315 | 255 | | |
| f366 | Relay output 1 function logic relation | 0~1 | 0 | | |
| f367 | Terminal run detection selection at power on | 0： disable <br> 1： enable | 0 | | |
| f368 | Analog output signal type (AO2) | 0： Current signal output <br> 1： Voltage signal output | 1 | ● | |
| f369 | Analog output function function selection (AO2) | f348 | 0 | ○ | |
| f370 | Analog output scaling(AO2) | 0~1280 | Based on machine model | ○ | |
| f371 | AO2 Analog output slope | 0： Negative slope <br> 1： Positive slope | 1 | ○ | |
| f372 | AO2 Analog output bias | 0~100% | 0 | ○ | |
| f373 | Output terminal function A of LO2-CLO2 | f315 | 4 | ● | |
| f374 | Output terminal function B of LO2-CLO2 | f315 | 255 | ● | |
| f375 | Output terminal logic selection of LO2-CLO2 | 0： And logic <br> 1： Or logic | 0 | ● | |
| f376 | LO2-CLO2 output delay | 0.0~60.0 s | 0.0 | ○ | |

| [-f4-] | | | | | |
|---|---|---|---|---|---|
| NO. | Parameter Name | Setting Range | default | WRT | User setting |
| f400 | Retry selection | 0: disabled<br>1~10 times. | 0 | ● | |
| f401 | Electronic-thermal protection characteristic selection | 0：Trip enable，stall disable (standard motor)<br>1：Trip enable，stall enable (standard motor)<br>2：Trip disable，stall disable (standard motor)<br>3：Trip disable，stall enable (standard motor)<br>5：Trip enable，stall disable (forced cooling motor)<br>6：Trip enable，stall enable (forced cooling motor)<br>7：Trip disable，stall disable (forced cooling motor)<br>8：Trip disable，stall enable (forced cooling motor) | 2 | ○ | |
| f402 | Motor 150%-overload time limit | 10-2400 s | 300 | ○ | |
| f403 | Emergency stop selection | 0: Coast stop<br>1: Slowdown stop<br>2: Emergency DC braking | 0 | ● | |
| f404 | emergency braking time | 0.0-20.0 s | 1.0 | ○ | |
| f405 | Input phase failure detection | 0: Disabled, No tripping.<br>1: Enabled | 0 | ● | |
| f406 | Output phase failure detection mode selection | 0: Disabled<br>1: At start-up (Only one time after power is turned on)<br>2: At start-up (each time)<br>3: During operation<br>4: At start-up + during operation<br>5: Detection of cutoff on output side | 0 | ● | |
| f407 | Small current trip/alarm selection | 0：Alarm<br>1：trip | 0 | ○ | |
| f408 | Small current detection current | 0~100% | 0.00 | ○ | |
| f409 | Small current detection current hysteresis | 1~20% | 10 | ○ | |
| f410 | Small current detection time | 0-255 s | 0 | ○ | |
| f411 | Over-torque trip/alarm selection | 0：Alarm<br>1：trip | 0 | ○ | |
| f412 | Over-torque detection level | 0~250% | 130 | ○ | |

| NO. | Parameter Name | Setting Range | default | WRT | User setting |
|---|---|---|---|---|---|
| f413 | Over-torque detection level hysteresis | 0~100% | 10 | ○ | |
| f414 | Over-torque detection time | 0.0~10.0 s | 0.5 | ○ | |
| f415 | Overvoltage limit operation | 0: Enabled. speed.<br>1: Disabled<br>2: Enabled (Quick deceleration).<br>3: Enabled (Dynamic quick deceleration). | 2 | ● | |
| f416 | Overvoltage limit operation level | 100-150% | 130 | ● | |
| f417 | Undervoltage trip/alarm selection | 0: Alarm only (detection level below 60%)<br>1: Tripping (detection level below 60%).<br>2: Alarm only (detection level below 50%) | 0 | ● | |
| f418 | Instantaneous power failure coast stop selection | 0: disabled<br>1: factory reserved<br>2: Coast stop. | 0 | ● | |
| f419 | Forced fire-speed control function | 0: Disabled.<br>1: Enabled. | 0 | ○ | |
| f420 | Detection of output short-circuit during start-up | 0: Each time (standard pulse)<br>1: Only one time after power is turned on (standard pulse)<br>2: Each time (short-time pulse)<br>3: Only one time after power is turned on (short-time pulse) | 0 | ● | |
| f421 | Motor electric-thermal protection retention selection | 0: disabled.<br>1: Enabled. | 0 | ○ | |
| f422 | AI1 input loss | 1~100% | 0 | ○ | |
| f423 | Activation of the frequency inverter during 4-20mA signal loss | 0: No measures.<br>1: Coast stop.<br>2: switch to Fallback speed.<br>3: Speed maintaining.<br>4: Slowdown stop. | 0 | ● | |
| f424 | Fallback speed | 0.0 Hz ~f007 | 0.0 | ○ | |
| f425 | PTC thermal selection | 0: Disabled<br>1: Enabled (trip mode)<br>2: Enabled (alarm mode) | 0 | ○ | |
| f426 | Resistor value for PTC detection | 100-9999Ω | 3000 | ○ | |
| f428 | Cumulative operation time alarm setting | 0.0-999.9 h (0.1=10 小时) | 610.0 | ○ | |
| f429 | frequency inverter trip retention selection | 0: clearing<br>1: maintaining | 0 | ○ | |
| f430 | Heat sink temperature reaches the alarm value | 0 ~100℃ | 60 | ● | |

| [-f5-] | | | | | |
|---|---|---|---|---|---|
| NO. | Parameter Name | Setting Range | default | WRT | User setting |
| f500 | Auto-restart control selection | 0: Disabled<br>1: At auto-restart after momentary stop<br>2: When turning standby (input terminal function =1) on or off<br>3: At auto-restart or when turning standby (input terminal function =1) on or off<br>4: At start-up<br>5~7: Factory reserved<br>8: DC braking and then start. | 0 | ● | |
| f501 | auto-stop time limit for lower-limit frequency operation | 0.0: disable<br>0.1-600.0 s | 0.1 | ○ | |
| f502 | Bumpless operation selection | 0: disabled.<br>1: enabled. | 1 | ○ | |
| f503 | Starting frequency setting | 0.5~10.0 Hz | 0.5 | ○ | |
| f504 | Operation starting frequency | 0.0 Hz ~f007 | 0.0 | ○ | |
| f505 | Operation starting frequency hysteresis | 0.0 Hz ~f007 | 0.0 | ○ | |
| f506 | DC braking starting frequency | 0.0 Hz ~f007 | 0.0 | ○ | |
| f507 | DC braking current | varies by model | varies by model | ○ | |
| f508 | DC braking time | 0.0~20.0 s | 1.0 | ○ | |
| f510 | Acceleration/deceleration 1 pattern | 0: Linear  1: S pattern 1<br>2: S pattern 2  3 : Elevator acceleration / deceleration curve | 0 | ○ | |
| f511 | Acceleration/deceleration 2 pattern | 0: Linear  1: S pattern 1<br>2: S pattern 2 | 0 | ○ | |
| f512 | Acceleration/deceleration 3 pattern | 0: Linear  1: S pattern 1<br>2: S pattern 2 | 0 | ○ | |
| f513 | Acceleration/deceleration 1 and 2 switching frequency | 0.0 Hz ~f008 | 0.0 | ○ | |
| f514 | Acceleration/deceleration 2 and 3 switching frequency | 0.0 Hz ~f008 | 0.0 | ○ | |
| f515 | Selecting an acceleration/deceleration pattern | 1: Acc/Dec 1   2: Acc/Dec 2<br>3: Acc/Dec 3 | 1 | ○ | |
| f516 | S-pattern lower-limit adjustment amount | 0~50% | 10 | ○ | |
| f517 | S-pattern upper-limit adjustment amount | 0~50% | 10 | ○ | |
| f518 | Acceleration time 2 | 0.0~3200 s | 20.0 | ○ | |

| NO. | Parameter Name | Setting Range | default | WRT | User setting |
|---|---|---|---|---|---|
| f519 | Deceleration time 2 | 0.0~3200 s | 20.0 | ○ | |
| f520 | Acceleration time 3 | 0.0~3200 s | 20.0 | ○ | |
| f521 | Deceleration time 3 | 0.0~3200 s | 20.0 | ○ | |
| f522 | Reverse-run prohibition | 0: Forward/reverse run permitted.<br>1: Reverse run prohibited.<br>2: Forward run prohibited. | 0 | ● | |
| f523 | stop type | 0: Ramp stop.<br>1: Free stop<br>2: Terminal free stop. | 0 | ○ | |
| f526 | Prior for reverse stop | 0: enable<br>1: disable | 0 | ● | |
| f527 | regenerative braking selection | 0: Disabled<br>1: Enabled (with resistor overload protection)<br>2: Enabled (without resistor overload protection) | 2 | | |
| f528 | regenerative braking resistance | 1.0~1000.0Ω | 20.0 | ● | |
| f529 | regenerative braking resistor capacity | 0.01~30.0 kW | 0.12 | ● | |
| f530 | Acceleration / deceleration S - curve lower limit 2 | 0~50 % | 10 | ● | |
| f531 | Acceleration / deceleration S - curve upper limit 2 | 0~50 % | 10 | ● | |
| f532 | Acceleration / deceleration S - curve lower limit 3 | 0~50 % | 10 | ● | |
| f533 | Acceleration / deceleration S - curve upper limit 3 | 0~50 % | 10 | ● | |

| [-f6-] | | | | | |
|---|---|---|---|---|---|
| NO. | Parameter Name | Setting Range | default | WRT | User setting |
| f600 | Prohibition of panel reset operation | 0: Permitted<br>1: Prohibited | 0 | ○ | |
| f601 | Switching between remote control and Local control | 0: Local control mode<br>1: remote control mode | 1 | ○ | |
| f602 | Prohibition of change of parameter setting | 0: Permitted<br>1: Prohibited | 0 | ○ | |
| f603 | Current/voltage display mode | 0: %<br>1: A (ampere)/V (volt), | 1 | ○ | |
| f604 | Frequency free unit magnification | 0: unit is Hz<br>0.01-200.0: free unit | 0.00 | ○ | |

| NO. | Parameter Name | Setting Range | default | WRT | User setting |
|---|---|---|---|---|---|
| f605 | Factory reserved | - | 0 | ● | |
| f606 | Inclination characteristic of free unit display | 0: Negative inclination (downward slope)<br>1: Positive inclination (upward slope) | 1 | ○ | |
| f607 | Bias of free unit display | 0.00 Hz ~f007 | 0.00 | ○ | |
| f608 | Free step 1 (pressing a panel key once) | Disabled: 0.00<br>Enabled: 0.01 Hz~f007 | 0.00 | ○ | |
| f609 | Free step 2 (panel display) | 0: disabled<br>1~255: enabled | 0 | ○ | |
| f610 | Standard monitor display selection | 0: Output frequency(Hz(free))<br>1: Frequency command(Hz(free))<br>2:Output current(%/A)<br>3:frequency inverter rated current (A)<br>4:frequency inverter load (%)<br>5:Output power (kW)<br>6: Stator frequency (Hz (free))<br>7:communication data display<br>8: Output speed<br>9: Communication counter<br>10: Normal communication counter | 0 | ○ | |
| f611 | panel running order clear selection | 0: clear<br>1: keep | 1 | ○ | |
| f612 | Panel operation prohibition (F000) | 0: Permitted<br>1: Prohibited | 0 | ○ | |
| f613 | Prohibition of panel operation (RUN/STOP keys) | 0: Permitted.<br>1: Prohibition. | 0 | ○ | |
| f614 | Prohibition of panel emergency stop operation | 0: Permitted.<br>1: Prohibition. | 0 | ○ | |
| f616 | Integral output power retention selection | 0: (clear)<br>1: (memory) | 1 | ○ | |
| f617 | Integral output power display unit selection | 0: 1kWh.  1: 10kWh.<br>2: 100kWh.  3: 1000kWh. | varies by model | ○ | |
| f618 | Search and resetting of changed parameters selection | 0: disable<br>1: enable | 0 | ○ | |
| f619 | factory reserved | Frequency converter internal temperature monitoring 1 | | | |
| f620 | factory reserved | Frequency converter internal temperature monitoring 2 | | | |
| f621 | factory reserved | | | | |
| f622 | factory reserved | | | | |
| f623 | factory reserved | | | | |

| [-f7-] | | | | | |
|---|---|---|---|---|---|
| NO. | Parameter Name | Setting Range | default | WRT | User setting |
| f700 | Panel JOG mode selection | 0: disable JOG key. <br> 1: enable JOG key. | 0 | ○ | |
| f701 | jog run frequency | 0.0~20.0 Hz | 5.0 | ○ | |
| f702 | Jog stopping pattern | 0: Slow down stop. <br> 1: coast stop. <br> 2: DC braking. | 0 | ● | |
| f703 | Jump frequency 1 | 0.0 Hz ~f007 | 0.0 | ○ | |
| f704 | Jumping width 1 | 0.0 ~30.0 Hz | 0.0 | ○ | |
| f705 | Jump frequency 2 | 0.0 Hz ~f007 | 0.0 | ○ | |
| f706 | Jumping width 2 | 0.0~30.0 Hz | 0.0 | ○ | |
| f707 | Jump frequency 3 | 0.0 Hz ~f007 | 0.0 | ○ | |
| f708 | Jumping width 3 | 0.0~30.0 Hz | 0.0 | ○ | |
| f709 | Braking mode selection | 0~3 | 0 | ● | |
| f710 | Release frequency | f503~20.0Hz | 3.0 | ○ | |
| f711 | Release time | 0~25.0s | 0.5 | ○ | |
| f712 | Creeping frequency | f503~20.0Hz | 3.0 | ○ | |
| f713 | Creeping time | 0~25.0s | 1.0 | ○ | |
| f714 | Droop gain | 0~100% | 0 | ○ | |
| f715 | Droop insensitive torque band | 0~100% | 10 | ○ | |
| f716 | Preset-speed 1 | f009~f008 | 3.0 | ○ | |
| f717 | Preset-speed 2 | f009~f008 | 6.0 | ○ | |
| f718 | Preset-speed 3 | f009~f008 | 9.0 | ○ | |
| f719 | Preset-speed 4 | f009~f008 | 12.0 | ○ | |
| f720 | Preset-speed 5 | f009~f008 | 15.0 | ○ | |
| f721 | Preset-speed 6 | f009~f008 | 18.0 | ○ | |
| f722 | Preset-speed 7 | f009~f008 | 21.0 | ○ | |
| f723 | Preset-speed 8 | f009~f008 | 24.0 | ○ | |
| f724 | Preset-speed 9 | f009~f008 | 27.0 | ○ | |
| f725 | Preset-speed 10 | f009~f008 | 30.0 | ○ | |
| f726 | Preset-speed 11 | f009~f008 | 33.0 | ○ | |
| f727 | Preset-speed 12 | f009~f008 | 36.0 | ○ | |
| f728 | Preset-speed 13 | f009~f008 | 39.0 | ○ | |
| f729 | Preset-speed 14 | f009~f008 | 45.0 | ○ | |
| f730 | Preset-speed 15 | f009~f008 | 50.0 | ○ | |
| f731 | factory reserved | | | | |
| f732 | Multi-speed 0 run time | 0~65000s(min) | 0.0 | | |
| f733 | Multi-speed 1 run time | 0~65000s(min) | 0.0 | | |
| f734 | Multi-speed 2 run time | 0~65000s(min) | 0.0 | | |
| f735 | Multi-speed 3 run time | 0~65000s(min) | 0.0 | | |
| f736 | Multi-speed 4 run time | 0~65000s(min) | 0.0 | | |
| f737 | Multi-speed 5 run time | 0~65000s(min) | 0.0 | | |
| f738 | Multi-speed 6 run time | 0~65000s(min) | 0.0 | | |

| NO. | Parameter Name | Setting Range | default | WRT | User setting |
|---|---|---|---|---|---|
| f739 | Multi-speed 7 run time | 0~65000s(min) | 0.0 | | |
| f740 | Multi-speed 8 run time | 0~65000s(min) | 0.0 | | |
| f741 | Multi-speed 9 run time | 0~65000s(min) | 0.0 | | |
| f742 | Multi-speed 10 run time | 0~65000s(min) | 0.0 | | |
| f743 | Multi-speed 11 run time | 0~65000s(min) | 0.0 | | |
| f744 | Multi-speed 12 run time | 0~65000s(min) | 0.0 | | |
| f745 | Multi-speed 13 run time | 0~65000s(min) | 0.0 | | |
| f746 | Multi-speed 14 run time | 0~65000s(min) | 0.0 | | |
| f747 | Multi-speed 15 run time | 0~65000s(min) | 0.0 | | |
| f732 | Multi-speed 0 run time | 0~65000s(min) | 0.0 | | |
| f733 | Multi-speed 1 run time | 0~65000s(min) | 0.0 | | |
| f734 | Multi-speed 2 run time | 0~65000s(min) | 0.0 | | |
| f735 | Multi-speed 3 run time | 0~65000s(min) | 0.0 | | |
| f736 | Multi-speed 4 run time | 0~65000s(min) | 0.0 | | |
| f737 | Multi-speed 5 run time | 0~65000s(min) | 0.0 | | |
| f738 | Multi-speed 6 run time | 0~65000s(min) | 0.0 | | |
| f739 | Multi-speed 7 run time | 0~65000s(min) | 0.0 | | |
| f740 | Multi-speed 8 run time | 0~65000s(min) | 0.0 | | |
| f741 | Multi-speed 9 run time | 0~65000s(min) | 0.0 | | |
| f742 | Multi-speed 10 run time | 0~65000s(min) | 0.0 | | |
| f743 | Multi-speed 11 run time | 0~65000s(min) | 0.0 | | |
| f744 | Multi-speed 12 run time | 0~65000s(min) | 0.0 | | |
| f745 | Multi-speed 13 run time | 0~65000s(min) | 0.0 | | |
| f746 | Multi-speed 14 run time | 0~65000s(min) | 0.0 | | |
| f747 | Multi-speed 15 run time | 0~65000s(min) | 0.0 | | |
| f748 | PLC speed direction option | 0~65535 | 0 | | |
| f749 | Simple PLC running mode | 0: run one time and then stop<br>1: run one time and keep running at the final value<br>2: recycle running | 0 | | |
| f750 | Simple PLC restart mode selection | 0: start running from the first phase<br>1: keep running from the interrupt frequency | 0 | | |
| f751 | Simple PLC Power drop memory selection | 0: no memory for power drop<br>1: memory for power drop | 0 | | |
| f752 | Simple PLC running time unit selection | 0: second (s)<br>1: min | 0 | | |
| f771 | Reverse jog frequency | 0.0Hz~f007 | 0.0 | | |

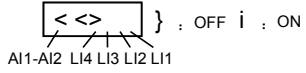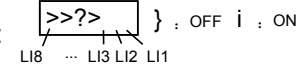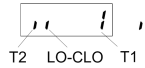| [-f8-] | | | | | |
|---|---|---|---|---|---|
| NO. | Parameter Name | Setting Range | default | WRT | User setting |
| f800 | Modbus baud rate | 0: 9600 bps<br>1: 19200 bps<br>2: 4800 bps<br>3: 2400 bps<br>4: 1200 bps | 1 | ○ | |
| f801 | Modbus parity | 0: NONE<br>1: EVEN<br>2: ODD | 1 | ○ | |
| f802 | Modbus address | 0-247 | 1 | ○ | |
| f803 | Modbus timeout | 0: timeout check disabled.<br>1-100s | 0 | ○ | |
| f804 | Modbus transger waiting time | 0~2.00 s | 0.00 | ○ | |
| f805 | Modbus behaviour on communication fault | 0: frequency inverter stop, communication command, frequency mode open(by f002, f003)<br>1: None (continued operation)<br>2: Deceleration stop<br>3: Coast stop<br>4: Communication error (e-33 trip) or Network error (e-35 trip) | 4 | ○ | |
| f806 | Number of motor poles for communication | 1~8 | 2 | ○ | |
| f821 | factory reserved | | | | |
| f822 | factory reserved | | | | |
| f823 | factory reserved | | | | |
| f824 | factory reserved | | | | |
| f825 | factory reserved | | | | |
| f826 | factory reserved | | | | |
| f827 | factory reserved | | | | |
| f828 | factory reserved | | | | |
| f829 | factory reserved | | | | |
| f830 | PID setting of keypad | 0~100% | 0.0 | ○ | |

| [-f9-] | | | | | |
|---|---|---|---|---|---|
| NO. | Parameter Name | Setting Range | default | WRT | User setting |
| f900 | PID control | 0: Disabled,<br>1: Enabled (Feedback: AI1)<br>2: Enabled (Feedback: AI2) | 0 | ○ | |
| f901 | Proportional gain | 0.01~100.0 | varies by model | ○ | |
| f902 | Integral gain | 0.01~100.0 | varies by model | ○ | |

| NO. | Parameter Name | Setting Range | default | WRT | User setting |
|-----|----------------|---------------|---------|-----|--------------|
| f903 | Differential gain | 0.00~2.55 | 0.00 | ○ | |
| f904 | PID control waiting time | 0~2400 s | 0 | ○ | |
| f905 | PID regulator diviation input signal negation | 0：disable<br>1：enable | 0 | ○ | |
| f906 | Sleep mode awakening hysteresis bandwidth | 0.0 Hz ~f007 | 0.2 | ○ | |
| f907 | Sleeping mode awakening threshold based on PI deviation | 0.0 Hz ~f007 | 0.0 | ○ | |
| f908 | Sleeping mode awakening threshold based on PI feedback | 0.0 Hz ~f007 | 0.0 | ○ | |
| f909 | sleeping mode action | 0: Motor slowdown to a stop.<br>1: Motor keep running at lower limit frequency. | 0 | ● | |
| f910 | wake up delay | 0~600.0s | 0.0 | ● | |
| f911 | Auto wake up level | 0~100.0% | 0.0 | ○ | |
| f912 | Auto sleep level | Auto sleep level | 0~100% | 0.0 | |
| f913 | Upper limit of PID setting | 0~100% | 100 | | |
| f914 | Lower limit of PID setting | 0~100% | 0 | | |
| f915 | Delay control of sleep mode | Disable：0.0<br>Enable：0.1-600.0 s | 0.1 | | |
| f916 | PID setting of keypad | 0~100% | | | |

Note 1：in the volume of "WRT"，"○"：means writable at stop or running status.；"●"：means unwritable at stop or running status；

Note 2：we can obtained modbus parameter address by replacing 'F' of '0'. E.g. f908's address is 0x0908。

| NO. | Parameter Name | Description |
|-----|----------------|-------------|
| u000 | CPU1 Version | E.g: v 100 , G-type, v= g; P-type, v= p; |
| u001 | Operation frequency | Value is displayed in Hz/free unit. See f604. |
| u002 | Direction of rotation | 0 Forward run, 1 Reverse run. |
| u003 | frequency command value | Value is displayed in Hz/free unit. See f604. |
| u004 | load current | The frequency inverter output current (%/A) is displayed. |
| u005 | input voltage (AC RMS) | The frequency inverter input voltage (%/V) is displayed. |
| u006 | output voltage (AC RMS) | The frequency inverter output voltage command (%/V) is displayed. |
| u007 | Input terminal status indicated | 11kW or below: < <> } ：OFF i ：ON .<br>AI1-AI2 LI4 LI3 LI2 LI1<br>15kW or above: >>?> } ：OFF i ：ON .<br>LI8 ⋯ LI3 LI2 LI1 |
| u008 | Output terminal status indicated | ı ı i ：OFF i ：ON , without T2 at 11kW or below<br>T2 LO-CLO T1 |

| NO. | Parameter Name | Description |
|---|---|---|
| u009 | cumulative operation time | (0.01=1 hour, 1.00=100 hours) |
| u010 | Output speed | Displays the motor speed ( min-1) by calculating with output frequency and pole numbers. |
| u011 | Rated current | The rated current of the frequency inverter (A) is displayed. |
| u012 | Torque current | The torque current (%/A) is displayed. |
| u013 | Load current | The frequency inverter output current (load current) (%/A) is displayed. |
| u014 | Torque | The torque (%) is displayed. |
| u015 | Input power | The frequency inverter input power (kW) is displayed. |
| u016 | Output power | The frequency inverter output power (kW) is displayed. |
| u017 | PID feedback | The PID feedback value is displayed. (Hz/free unit) |
| u018 | Frequency command value (PID-computed) | The PID-computed frequency command value is displayed. (Hz/free unit) |
| u019 | Integral input power | The integrated amount of power (kWh) supplied to the frequency inverter is displayed. |
| u020 | Integral output power | The integrated amount of power (kWh) supplied from the frequency inverter is displayed. |
| u021 | Communication counter | Displays the counter numbers of communication through the network. |
| u022 | Normal state communication counter | Displays the counter numbers of communication only at normal state in the all communication through network. |
| u023 | Cpu2 version | v    10 |
| u024 | Parts replacement alarm information |   ON: Needs to be replaced |
| u025 | Cpu1 revision | |
| u026 | PID setting | Displayed in % term. |
| u027 | PID feedback | Displayed in % term. |
| u1-- | Past trip 1 | Enter into the display of detailed information on past trip 1 |
| u2-- | Past trip 2 | Enter into the display of detailed information on past trip 2 |
| u3-- | Past trip 3 | Enter into the display of detailed information on past trip 3 |
| u4-- | Past trip 4 | Enter into the display of detailed information on past trip 4 |