

Quick Start Guide



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Step 1 — PowerXL series overview

This chapter describes the purpose and contents of this manual, the receiving inspection recommendations and the PowerXL Series Open Drive catalog numbering system.

How to use this manual

The purpose of this manual is to provide you with information necessary to install, set and customize parameters, start up, troubleshoot and maintain the Eaton PowerXL Series variable frequency drive. To provide for safe installation and operation of the equipment, read the safety guidelines at the beginning of this manual and follow the procedures outlined in the following chapters before connecting power to the PowerXL Series VFD. Keep this operating manual handy and distribute to all users, technicians and maintenance personnel for reference.

Receiving and inspection

The PowerXL Series VFD has met a stringent series of factory quality requirements before shipment. It is possible that packaging or equipment damage may have occurred during shipment. After receiving your PowerXL Series VFD, please check for the following:

Check to make sure that the package includes the Instruction Leaflet, Quick Start Guide, User Manual CD and accessory packet. The accessory packet includes:

- Rubber grommets
- Control cable grounding clamps
- Additional grounding screw

Inspect the unit to ensure it was not damaged during shipment.

Make sure that the part number indicated on the nameplate corresponds with the catalog number on your order.

If shipping damage has occurred, please contact and file a claim with the carrier involved immediately.

If the delivery does not correspond to your order, please contact your Eaton Electrical representative.

Note: Do not destroy the packing. The template printed on the protective cardboard can be used for marking the mounting points of the PowerXL VFD on the wall or in a cabinet.

Real time clock battery activation

To activate the real time clock (RTC) functionality in the PowerXL Series VFD, the RTC battery (already mounted in the drive) must be connected to the control board.

Simply remove the primary drive cover, locate the RTC battery directly below the keypad, and connect the white 2-wire connector to the receptacle on the control board.

Figure 1. RTC battery connection














Table 1. Common abbreviations

| Abbreviation | Definition |
|----------------|--|
| CT | Constant torque with high overload rating (150%) |
| VT | Variable torque with low overload rating (110%) |
| IH | High overload current (150%) |
| I _L | Low overload current (110%) |
| VFD | Variable Frequency Drive |
| RTC | Real Time Clock |

Step 1 — PowerXL series overview

Rating label

Figure 2. Rating label

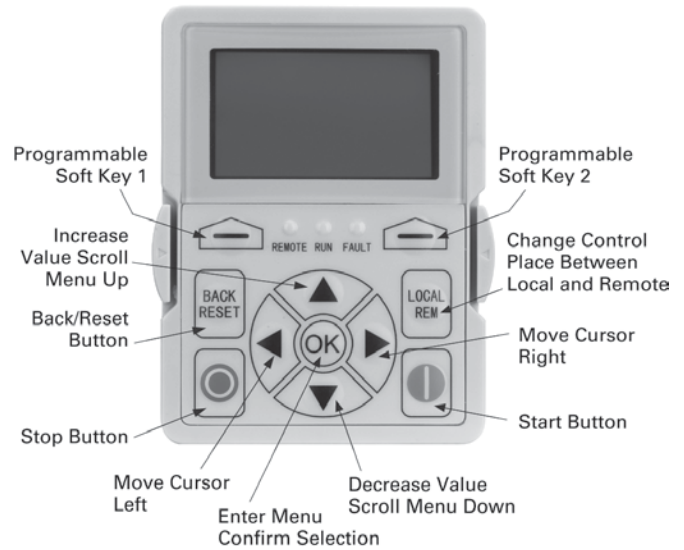
|  Powering Business Worldwide | | | |
|---|-------|--|----------|
| Type: DG1-34038FB-C21C | | | |
| Style No.: 9702-3005-XX | | | |
| Article No.: 9702-3004-XX | | | |
| PowerXL™ DG1 VFD Factory ID: I | | | |
| CT/VT | | Input | Output |
| 18.5KW/ 22KW | U(V~) | 380-440 3Ø | 0~Vin 3Ø |
| | F(Hz) | 50/60 Hz | 0-400 Hz |
| | I (A) | 42.6 | 38/46 |
| 25HP/ 30HP | U(V~) | 440-500 3Ø | 0~Vin 3Ø |
| | F(Hz) | 50/60 Hz | 0-400 Hz |
| | I (A) | 42.6 | 34/40 |
| Enclosure Rating | | TYPE1 / IP21 | |
| User installation manual: MN040002EN | | | |
| Serial No.: XXXXXXXXXX | | | |
|  E A N: 4015081721450 | |  | |
|  NAED: 786685878928 | | | |
|     | | | |
|    | | | |
| Field installed conductors must be copper rated at 75°C XXXXXX www.eaton.com Made in China | | | |

Carton labels (U.S. and Europe)

Same as rating label shown above.

Keypad Overview

Figure 3. Keypad and Display








Step 2 — Keypad overview

The keypad is the interface between the drive and the user. It features an LCD display, 3 LED lights and 11 buttons. With the control keypad, it is possible to control the speed of a motor, to supervise the state of the equipment and to set the frequency converter's parameters. See **Figure 3**.






Keypad buttons

Buttons description

Table 2. Keypad Buttons




| Icon | Button | Description |
|---|---------------------------|--|
|  | Soft key 1, Soft key 2 | <p>Soft key 1, soft key 2:</p> <p>The functions of these two buttons shall be the following: Forward/Reverse, this shall change motor's run direction.</p> <ul style="list-style-type: none"> • Menu, this shall return to main menu • Details, this shall display the details of the fault • Bypass, this shall make drive go into bypass • Jog, this shall activate jog • Favorite, this shall add this parameter to the Favorite menu • Delete, this shall delete this parameter from the Favorite menu |
|  | Back/Reset | <p>Back/Reset:</p> <p>This button has three integrated functions. The button operates as backward button during normal mode. In edit mode, it is used as cancel operate. It is also used to reset faults when faults occur.</p> <ul style="list-style-type: none"> • Backs up one step • Cancels Modify in edit mode • Resets the active faults (all the active faults shall be reset by pressing this button more than 2s in any page) • Hold Stop and Back Reset for 5 seconds to return drive to factory default • At Main Menu page by hitting Back/Reset takes to Default Page. |
|  | Local/Remote | <p>Local/Remote:</p> <p>Switches between LOCAL and REMOTE control for start and speed reference. The control locations corresponding to local and remote shall be selected within an application.</p> |
|  | Up Down | <p>Up and down arrows:</p> <ul style="list-style-type: none"> • Move either up or down a menu list to select the desired menu item. • Editing a parameter bit by bit, while the active digit is scrolled. • Increase/decrease the reference value of the selected parameter. • In parameter comparison mode, scroll through the parameters of which current value is different from comparison parameter value. • In parameter page when in read mode, move to the previous or next brother parameter of this parameter. |
|  | | |

Step 2 — Keypad overview

| | | |
|---|-------|--|
|  | Left | Left arrow: <ul style="list-style-type: none">• Navigation button, movement to left when editing a parameter digit by digit• Backs up one step• At Main Menu page by hitting Back/Reset takes to Default Page |
|  | Right | Right arrow: <ul style="list-style-type: none">• Enter parameter group mode• Enter parameter mode from group mode• Enter parameter whole edit mode when this parameter can be written• Enter parameter bit by bit edit mode from whole edit mode• Navigation button, movement to right when editing a parameter bit by bit |
|  | OK | OK: <ul style="list-style-type: none">• To clear all the Fault History if pressed for more than 5s (including 5s) in any page.• This button is used in the parameter edit mode to save the parameter setting.• To confirm the start-up list at the end of the Start-Up Wizard.• To confirm the comparison item in parameters comparison mode. The following is the same with Right key: <ul style="list-style-type: none">• Enter parameter whole edit mode when this parameter can be written.• Enter parameter group mode.• Enter parameter mode from group mode.. |
|  | Stop | Stop: <p>This button operates as motor stop button for normal operation when the “Keypad” is selected as the control source and keypad stop button is active, or stop button is always enabled regardless of control source..</p> <ul style="list-style-type: none">• Motor stop from the keypad. |
|  | Start | Start: <p>This button operates as motor start button for normal operation when the “Keypad” is selected as the active control source. When Keypad is the reference place after hitting the start button, it will jump directly to the Keypad Ref Screen..</p> |

LED lights

Table 3. LED state indicators

| Indicator | Description |
|---|---|
|  Run | Green Run: Indicates that the VFD is running and controlling the load in Drive or Bypass. Blinks when a stop command has been given but the drive is still ramping down. |
|  Fault | Red Fault: Turn on when there is one or more active drive fault(s). Blinks when there is one or more active drive warning(s). |
|  Remote | Yellow Local/Remote: Local: If the local control place is selected, turn off the light. Remote: If the remote control place is selected, turn on the light. |

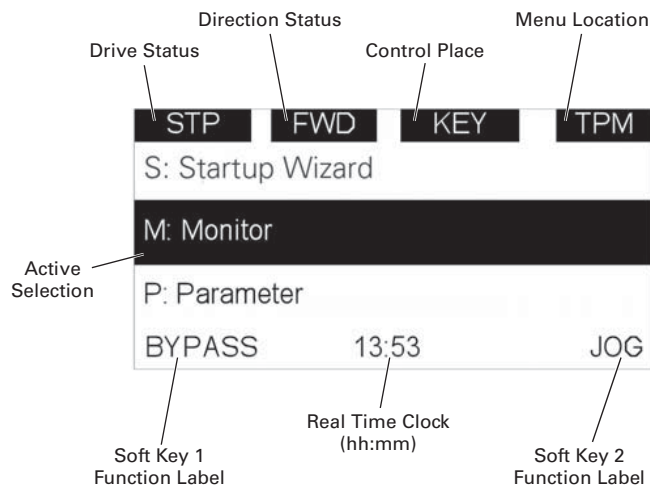
LCD display

The keypad LCD indicates the status of the motor and the drive and any faults in motor or drive functions. On the LCD, the user sees information about the current location in the menu structure and the item displayed.

Overview

Five lines shall be displayed in the screen. General view is as following in Figure 4.

Figure 4. General view of LCD



The lines definition is as below:

The first line is State line, shows:

- **RUN/STP/NRD/FIM/TFM** — If motor is running, the run state shall display "RUN"; otherwise the state display "STP". "RUN" blinks when the stop command is sent but the drive is decelerating. "NRD" is displayed if the drive is not ready or does not have a signal "FIM" is displayed to indicate it is in Fire Mode and the drive is in a Run state. "TFM" is displayed when in the Fire Mode Test Mode and the drive is in a Run State.
- **FWD/REV/JOG** — If the motor running direction is clockwise, display "FWD"; otherwise display "REV" "Jog" if the drive is in Jog mode the status indication will occur.
- **KEY/I/O/BPS/RBP/BUS/OFF** — If it is in bypass currently, display "BPS"; when run command is given it will got to "RBP". otherwise, if the current control source is I/O terminal, display "I/O". If it is keypad, then display "KEY"; otherwise display "BUS." if HOA enabled and switch to OFF, it shall show OFF.
- **PAR/MON/FLT/OPE/QSW/FAV/TPM/MS1/SL1/SL2/SL3/SL4/BUx.** — If the current page is parameter menu, display "PAR"; If monitor menu, then display "MON"; If fault menu, then display "FLT"; If operation menu, then display "OPE"; If quick start wizard, then display "QSW"; If optional card menu, then display "BOA"; If favorite menu, then display "FAV"; If main menu, then display "TPM" when doing the Multi-drive Pump and Fan mode, the drive mode will be defined with MS- Master and SL being a slave drive. The 1 through 5 will indicate the number in the series it is. "BUx" indicates the drive being a backup drive when in the redundant drive system.

The second line is Code line, shows the menu code.

The third line is Name line, shows the menu name or parameters name.

The fourth line is Value line, shows the submenu name or parameters value.

The fifth line is Soft key line, the functions of Soft key 1 and Soft key 2 are changeable, and the real time is in the middle.

Step 3 — Menu structure

Step 3 — Menu structure

Table 4. Keypad menus

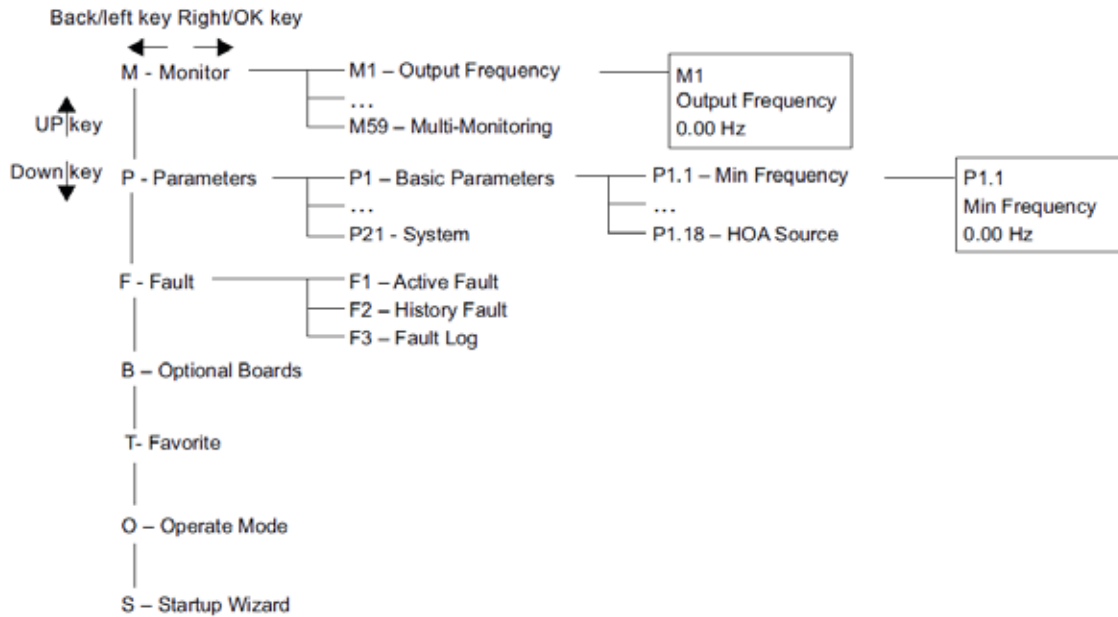
| Item | Description | Item | Description | Item | Description | |
|---------|-----------------------------------|-------------------------------|-------------|-----------------------|-----------------|----------------------------|
| Monitor | M1—Output Frequency | M31—PID1 Feedback | Parameters | P1—Basic Parameters | Fault | F1—Active Fault |
| | M2—Freq Reference | M32—PID1 Error Value | | P2—Analog Input | | F2—History Fault |
| | M3—Motor Speed | M33—PID1 Output | | | | F3—Fault Log |
| | M4—Motor Current | M34—PID1 Status | | P3—Digital Input | Optional Boards | Bx—SlotA |
| | M5—Motor Torque | M35—PID2 Set Point | | P4—Analog Output | | |
| | M6—Motor Power | M36—PID2 Feedback | | P5—Digital Output | Favorite | — |
| | M7—Motor Voltage | M37—PID2 Error Value | | P6—Logic Function | Operate Mode | O1—Output Frequency |
| | M8—DC-link Voltage | M38—PID2 Output | | P7—Drive Control | | O2—Freq Reference |
| | M9—Unit Temperature | M39—PID2 Status | | P8—Motor Control | | O3—Motor Speed |
| | M10—Motor Temperature | M40—Running Motors | | P9—Protections | | O4—Motor Current |
| | M11—Torque Reference | M41—PT100 Temp | | P10—PID Controller1 | | O5—Motor Torque |
| | M12—Analog Input 1 | M42—Last Active Fault | | P11—PID Controller2 | | O6—Motor Power |
| | M13—Analog Input 2 | M43—RTC Battery Status | | P12—Preset Speed | | O7—Motor Voltage |
| | M14—Analog Output 1 | M44—Instance Motor Power | | P13—Torque Control | | O8—DC-Link Voltage |
| | M15—Analog Output 2 | M45—Energy Savings | | P14—Brake | | O9—Unit Temperature |
| | M16—DI1, DI2, DI3 | M46—Control Board DIDO Status | | P15—Fire Mode | | O10—Motor Temperature |
| | M17—DI4, DI5, DI6 | M47—SlotA DIDO Status | | P16—Second Motor Para | | R11—Keypad Torque Ref |
| | M18—DI7, DI8 | M48—SlotB DIDO Status | | P17—Bypass | | R12—Keypad Reference |
| | M19—DO1, Virtual RO1, Virtual RO2 | M49—Application Status Word | | P18—Pump Parameters | | R13—PID1 Keypad Setpoint 1 |
| | M20—RO1, RO2, RO3 | M50—Standard Status Word | | P19—Real Time Clock | | R14—PID1 Keypad Setpoint 2 |
| | M21—TC1, TC2, TC3 | M51—Output | | P20—Communication | Startup Wizard | S—Startup Wizard |
| | M22—Interval 1 | M52—Reference | | P21—System | | |
| | M23—Interval 2 | M53—Total MWh Count | | | | |
| | M24—Interval 3 | M54—Total Power Day Count | | | | |
| | M25—Interval 4 | M55—Total Power Hr Count | | | | |
| | M26—Interval 5 | M56—Trip MWh Count | | | | |
| | M27—Timer 1 | M57—Trip Power Day Count | | | | |
| | M28—Timer 2 | M58—Trip Power Hr Count | | | | |
| | M29—Timer 3 | M59—Multi-Monitoring | | | | |
| | M30—PID1 Set Point | | | | | |

Note: Will vary depending on application selected.

Menu navigation

This section provides basic instruction on navigating each section in the menu structure.

Figure 4. Main menu navigation



Step 4 — Startup

Step 4 — Startup

Startup wizard

In the *Startup Wizard*, you will be prompted for essential information needed by the drive so that it can start controlling your process. In the Wizard, you will need the following keypad buttons:



Up/Down buttons.

Use these to change value.



OK button.

Confirm selection with this button, and enter into next question.



Back/Reset button.

If this button was pressed at the first question, the Startup Wizard will be cancelled.

If this button is pressed in any step on the Startup Wizard, the Startup Wizard will be cancelled.

Once you have connected power to your Eaton PowerXL frequency converter, and the Startup Wizard is enabled, follow these instructions to easily set up your drive.

Table 5. Startup wizard instructions

| Item | Description | |
|------|-------------------|--|
| 1 | Startup Wizard | Press OK? |
| 2 | Application | 0 = Standard 1 = Multi-Pump 2 = Multi-PID 3 = Multi-Purpose |
| 3 | Language | 0 = English 1 = 中文 2 = Deutsch |
| 4 | Real Time Clock | yy.mm.dd hh:mm:ss |
| 5 | Daylight Saving | 0 = Off 1 = EU 2 = US |
| 6 | Min Frequency | Min: 0.00Hz Max: Max Frequency |
| 7 | Max Frequency | Min: Min Frequency Max: 400.00Hz |
| 8 | Motor Nom Current | Min: DriveNomCurrCT*1/10 Max: DriveNomCurrCT*2 |
| 9 | Current Limit | Min: lh*1/10 Max: lh*2 |
| 10 | Motor Nom Speed | Min: 300 Max: 20000 |

Table 5. Startup wizard instructions, continued

| Item | Description | |
|------|------------------------|---|
| 11 | Motor PF | Min: 0.30 Max: 1.0 |
| 12 | Motor Nom Volt | Min: 180 V Max: 690 V |
| 13 | Motor Nom Freq | Min: 30.00 Hz Max: 400.00 Hz |
| 14 | Accel Time 1 | Min: 0.1 s Max: 3000.0 s |
| 15 | Decel Time 1 | Min: 0.1 s Max: 3000.0 s |
| 16 | Local Control Place | 0 = Keypad 1 = I/O terminal Start 1 2 = I/O Terminal Start 2 3 = Fieldbus |
| 17 | Local Reference | 0 = AI1 1 = AI2 2 = Slot A: AI1 3 = Slot B: AI1 4 = AI1 Joystick 5 = AI2 Joystick 6 = Keypad 7 = Fieldbus Ref 8 = Motor Pot 9 = Max Frequency 10 = AI1 + AI2 11 = AI1 - AI2 12 = AI2 - AI1 13 = AI1 * AI2 14 = AI1 or AI2 15 = MIN(AI1,AI2) 16 = MAX(AI1,AI2) 17 = PID1 Control Output 18 = PID2 Control Output |
| 18 | Remote 1 Control Place | 0 = Keypad 1 = I/O terminal Start 1 2 = I/O Terminal Start 2 3 = Fieldbus |
| 19 | Remote 1 Reference | 0 = AI1 1 = AI2 2 = Slot A: AI1 3 = Slot B: AI1 4 = AI1 Joystick 5 = AI2 Joystick 6 = Keypad 7 = Fieldbus Ref 8 = Motor Pot 9 = Max Frequency 10 = AI1 + AI2 11 = AI1 - AI2 12 = AI2 - AI1 13 = AI1 * AI2 14 = AI1 or AI2 15 = MIN(AI1,AI2) 16 = MAX(AI1,AI2) 17 = PID1 Control Output 18 = PID2 Control Output |

Now the Startup Wizard is done. It will not show again at the next power up. If you want to reset it, please select it from the main menu ("Startup Wizard").

The PID Mini-Wizard is activated in the Quick Setup menu.

Step 5 — Standard application

Introduction

The Standard Application is typically used in basic motor control scenarios where multiple pump control, PID loops, or advanced control loops are not required. It provides the ability for the user to define its local and remote control and reference signals. In addition there is the ability to scale the analog input and output signals to be read based off the desired motor response. There are also 8 digital inputs, 3 relay outputs, and 1 digital output that can be programmed to allow for control schemes that require the drive to have certain functions. It provides full customization on the motor control sequence with the ability to be in frequency or speed control mode, and tuning of the V/Hz curve can be selected. Drive/Motor protections can be customized to defined actions for added user control. Below is a list of other features that are available in the Standard Application.

Standard Application includes functions:

- Selectable digital input function
- Selectable digital output function
- Reference filter, scaling, inversion, offset and range
- Output signal filter, scaling, inversion, offset and range
- Selectable analog output function
- Programmable start/stop and reverse signal logic
- Two independent set of Acceleration/Deceleration ramps
- S curves
- Skip frequency
- Start source (Local/Remote control function)
- Reference source
- Flying start
- Jog
- Volts per Hertz control
- Real time clock function—RTC time display
- Drive temperature limit supervision
- Output frequency 1 limit supervision
- Output frequency 2 limit supervision
- Torque limit supervision
- Reference frequency limit supervision
- Power limit supervision
- Analog input limit supervision
- Auto restart
- Power loss ride through
- Trend buffer
- Programmable switching frequency
- Multi-Preset speeds
- Emergency stop
- Line start lockout
- Fan control
- DC brake
- Flux brake
- Dynamic brake
- Motor current limit supervision

I/O controls

- “Terminal To Function” (TTF) Programming

The design behind the programming of the digital inputs in the DG1 drive is to use “Terminal To Function” programming, which is composed of multiple functions that get assigned a digital input to that function. The parameters in the drive are set up with specific functions and by defining the digital input and slot in some cases, depending on which options are available. For use of the drives control board inputs, they will be referred to as DigIN:1 through DigIN:8. When additional option cards are used, they will be defined as DigIN:X:IOY:Z. The X indicates the slot that the card is being installed in, which will be either A or B. The IOY determines the type of card it is, which would be IO1 or IO5. The Z indicates which input is being used on that available option card.

- “Function To Terminal” (FTT) Programming

The design behind the programming of the relay outputs and digital output in the DG1 drive is to use “Function To Terminal” programming. It is composed of a terminal, be it a relay output or a digital output, that is assigned a parameter. Within that parameter, it has different functions that can be set.

The parameters of the Standard Application are explained on **Page 11** of this manual, “Description of Parameters.” The explanations are arranged according to the parameter number.

Step 5 — Standard application

Force open/force close selection

The Force Open Selection would make the selected function always off. Essentially this is a virtual switch that is always open. The Force Close Selection would make the selected function always on. Essentially this is a virtual switch that is always closed. These options are assigned to a function if we want to force a state without using a hardware input.

The standard options are DigIn: Force Open - indication that the parameter function is always going to be open, that being said depending on the logic of the function this could mean the function is always not active or always active. When the selection of a function is DigIn: Force Closed - indication that the parameter function is always going to be closed, that being said again depending on the location of the function this could mean the function is always active or not active. Examples of these options would be P3.2 Start Signal 1, when set to "Force Open" and the drive is looking at I/O terminals for control, in this case the drive would never start since this Function is always Open. If this function is set to "Force closed" the drive would always be in a start mode when in that control location.

Example:

If we set Run Enable to Force Closed the drive is always enabled. If we set the same function to Force Open the drive would never be Enabled. If a Digital input is to be used to activate this Run Enable the function should be assigned to a hardware input(See below for DIGIN Selections).

DIGIN selection

This allows Assignment of a hardware digital input to a function, this is set in a format of DigIN:X where X is one of the 8 Digital inputs on the Main control board.

Example:

If we set Run Enable to DigI N:6 the drive will be enabled when digital input 6 (Terminal 8) is closed, and would not be enabled when digital input 6 (Terminal 8) is open.

Option board digIN selection

This allows Assignment of a hardware digital input on an option card to a function, this is set in a format of DigIN: Y:IO1:X where Y is the slot the option card is inserted on the Main control board and X is the Input on the Board and IO1 is the type of option board used.

Example:

If we set Run Enable to DigIN:A:IO5:6 the drive will be enabled when digital input 6 is closed on the IO5 option card which is inserted in Slot A, and would not be enabled when digital input 6 on the option card is open.

Timer channel selection

A Time Channel is a virtual path to link the digital output of a timer function to a digital input function. To utilize this feature a timer or interval would need to be assigned to a time channel 1 through 3, and the input function to be controlled would need to be assigned to the same time channel.

Example:

If we set Run Enable to DigIN:TimeChannel1 the drive will be enabled when the timer assigned to Time Channel 1 is active or High, and would not be enabled when the Time Channel is inactive or Low.

Table 6 Drive communication ports

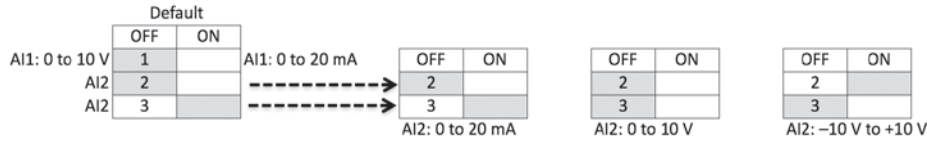
| Port | Communication |
|-----------------------------|-----------------------|
| RJ45 Keypad Port | |
| Upload/Download Parameters | USB to RJ45 |
| Remote Mount Keypad | Ethernet |
| Upgrade Drive Firmware | USB to RJ45 |
| RJ45 Ethernet Port | |
| Upload/Download Parameters | Ethernet |
| Ethernet IP Communications | Ethernet |
| Modbus TCP Communications | Ethernet |
| RS-485 Serial Port ① | |
| Upload/Download Parameters | Two-Wire Twisted Pair |
| Upgrade Drive Firmware | Two-Wire Twisted Pair |
| Modbus RTU Communications | Two-Wire Twisted Pair |
| BACnet MS/TP Communications | Two-Wire Twisted Pair |

① Shielded wire recommended.

Control I/O configuration

- Run 240 Vac and 24 Vdc control wiring in separate conduit
- Communication wire to be shielded

Table 6. I/O connection



| External Wiring | Pin | Signal Name | Signal | Default Setting | Description |
|-----------------|-----|-------------|-------------------------|--------------------|---|
| | 1 | +10 V | Ref. Output Voltage | — | 10 Vdc Supply Source |
| | 2 | AI1+ ⊕ | Analog Input 1 | 0–10 V | Voltage Speed Reference (Programmable to 4 mA to 20 mA) |
| | 3 | AI1– | Analog Input 1 Ground | — | Analog Input 1 Common (Ground) |
| | 4 | AI2+ ⊕ | Analog Input 2 | 4 mA to 20 mA | Current Speed Reference (Programmable to 0–10 V) |
| | 5 | AI2– | Analog Input 2 Ground | — | Analog Input 2 Common (Ground) |
| | 6 | GND | I/O Signal Ground | — | I/O Ground for Reference and Control |
| | 7 | DIN5 | Digital Input 5 | Preset Speed B0 | Sets frequency output to Preset Speed 1 |
| | 8 | DIN6 | Digital Input 6 | Preset Speed B1 | Sets frequency output to Preset Speed 2 |
| | 9 | DIN7 | Digital Input 7 | Not used (TI–) | Input forces VFD output to shut off |
| | 10 | DIN8 | Digital Input 8 | Force Remote (TI+) | Input takes VFD from Local to Remote |
| | 11 | CMB | DI5 to DI8 Common | Grounded | Allows source input |
| | 12 | GND | I/O Signal Ground | — | I/O Ground for Reference and Control |
| | 13 | 24 V | +24 Vdc Output | — | Control voltage output (100 mA max.) |
| | 14 | DO1 | Digital Output 1 | Ready | Shows the drive is ready to run |
| | 15 | 24 Vo | +24 Vdc Output | — | Control voltage output (100 mA max.) |
| | 16 | GND | I/O Signal Ground | — | I/O Ground for Reference and Control |
| | 17 | AO1+ | Analog Output 1 | Output Frequency | Shows Output frequency to motor 0–60 Hz (4 mA to 20 mA) |
| | 18 | AO2+ | Analog Output 2 | Motor Current | Shows Motor current of motor 0–FLA (4 mA to 20 mA) |
| | 19 | 24 Vi | +24 Vdc Input | — | External control voltage input |
| | 20 | DIN1 | Digital Input 1 | Run Forward | Input starts drive in forward direction (start enable) |
| | 21 | DIN2 | Digital Input 2 | Run Reverse | Input starts drive in reverse direction (start enable) |
| | 22 | DIN3 | Digital Input 3 | External Fault | Input causes drive to fault |
| | 23 | DIN4 | Digital Input 4 | Fault Reset | Input resets active faults |
| | 24 | CMA | DI1 to DI4 Common | Grounded | Allows source input |
| | 25 | A | RS-485 Signal A | — | Fieldbus Communication (Modbus, BACnet) |
| | 26 | B | RS-485 Signal B | — | Fieldbus Communication (Modbus, BACnet) |
| | 27 | R3NO | Relay 3 Normally Open | At Speed | Relay output 3 shows VFD is at Ref. Frequency |
| | 28 | R1NC | Relay 1 Normally Closed | Run | Relay output 1 shows VFD is in a run state |
| | 29 | R1CM | Relay 1 Common | | |
| | 30 | R1NO | Relay 1 Normally Open | | |
| | 31 | R3CM | Relay 3 Common | At Speed | Relay output 3 shows VFD is at Ref. Frequency |
| | 32 | R2NC | Relay 2 Normally Closed | Fault | Relay output 2 shows VFD is in a fault state |
| | 33 | R2CM | Relay 2 Common | | |
| | 34 | R2NO | Relay 2 Normally Open | | |

Notes: The above wiring demonstrates a SINK configuration. It is important that CMA and CMB are wired to ground (as shown by dashed line). If a SOURCE configuration is desired, wire 24 V to CMA and CMB and close the inputs to ground. When using the +10 V for AI1, it is important to wire AI1— to ground (as shown by dashed line). If using +10 V for AI1 or AI2, terminals 3, 5, and 6 need to be jumpered together.

⊕ AI1+ and AI2+ support 10K potentiometer.

Step 5 — Standard application

Standard application—parameters list

On the next pages you will find the lists of parameters within the respective parameter groups.

Column explanations:

Code = Location indication on the keypad; shows the operator the present parameter number

Parameter = Name of parameter

Min = Minimum value of parameter

Max = Maximum value of parameter

Unit = Unit of parameter value; given if available

Default = Value preset by factory

ID = ID number of the parameter

Table 7. Monitor—M

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|------|-------------------------------|------|------|--------|---------|-----|------|
| M1 | Output Frequency | | | Hz | 0.00 | 1 | |
| M2 | Freq Reference | | | Hz | 0.00 | 24 | |
| M3 | Motor Speed | | | rpm | 0 | 2 | |
| M4 | Motor Current | | | A | 0.0 | 3 | |
| M5 | Motor Torque | | | % | 0.0 | 4 | |
| M6 | Motor Power | | | % | 0.0 | 5 | |
| M7 | Motor Voltage | | | V | 0.0 | 6 | |
| M8 | DC-link Voltage | | | V | 0 | 7 | |
| M9 | Unit Temperature | | | °C | 0.0 | 8 | |
| M10 | Motor Temperature | | | % | 0.0 | 9 | |
| M12 | Analog Input 1 | | | Varies | 0.00 | 10 | |
| M13 | Analog Input 2 | | | Varies | 0.00 | 11 | |
| M14 | Analog Output 1 | | | Varies | 0.00 | 25 | |
| M15 | Analog Output 2 | | | Varies | 0.00 | 575 | |
| M16 | DI1, DI2, DI3 | | | | 0 | 12 | |
| M17 | DI4, DI5, DI6 | | | | 0 | 13 | |
| M18 | DI7, DI8 | | | | 0 | 576 | |
| M19 | DO1, Virtual RO1, Virtual RO2 | | | | 0 | 14 | |
| M20 | RO1, RO2, RO3 | | | | 0 | 557 | |
| M41 | PT100 Temperature | | | °C | 1000.0 | 27 | |

Table 7. Monitor—M, continued

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|------|---------------------------|------|------|--------|---------|------|--|
| M42 | Last Active Faults | | | | 0 | 28 | See fault section below for Fault Code. |
| M43 | RTC Battery Status | | | | | 583 | 0 = Not Installed 1 = Installed 2 = Change Battery 3 = Over Voltage |
| M44 | Instance Motor Power | | | kW | 0.00 | 1686 | |
| M45 | Energy Savings | | | Varies | | 2119 | |
| M46 | Control board DIDO Status | | | | 0 | 2209 | Bit 0 = DIN1 Status Bit 1 = DIN2 Status Bit 2 = DIN3 Status Bit 3 = DIN4 Status Bit 4 = DIN5 Status Bit 5 = DIN6 Status Bit 6 = DIN7 Status Bit 7 = DIN8 Status Bit 8 = DO1 Status Bit 9 = RO1 Status Bit 10 = RO2 Status Bit 11 = RO3 Status Bit 12 = Slot A with Board Bit 13 = Slot B with Board Bit 14 -15 = Not used |
| M47 | SlotA DIDO Status | | | | 0 | 2210 | Bit 0 = IO1_DIN1 Status Bit 1 = IO1_DIN2 Status Bit 2 = IO1_DIN3 Status Bit 3 = IO1_DO1 Status Bit 4 = IO1_DO2 Status Bit 5 = IO1_DO3 Status Bite 6 = IO3_RO1 Status Bit 7 = IO3_RO2 Status Bit 8 = IO3_RO3 Status Bit 9 = IO5_AC1 Status Bit 10 = IO5_AC2 Status Bit 11 = IO5_AC3 Status Bit 12 = IO5_AC4 Status Bit 13 = IO5_AC5 Status Bit 14 = IO5_AC6 Status Bit 15 = Not Used |
| M48 | SlotB DIDO Status | | | | 0 | 2211 | Bit 0 = IO1_DIN1 Status Bit 1 = IO1_DIN2 Status Bit 2 = IO1_DIN3 Status Bit 3 = IO1_DO1 Status Bit 4 = IO1_DO2 Status Bit 5 = IO1_DO3 Status Bite 6 = IO3_RO1 Status Bit 7 = IO3_RO2 Status Bit 8 = IO3_RO3 Status Bit 9 = IO5_AC1 Status Bit 10 = IO5_AC2 Status Bit 11 = IO5_AC3 Status Bit 12 = IO5_AC4 Status Bit 13 = IO5_AC5 Status Bit 14 = IO5_AC6 Status Bit 15 = Not Used |

Notes: ① Parameter value can only be changed after the drive has stopped.
 ② Parameter value will be set to be default when changing macros.

Step 5 — Standard application

Table 7. Monitor—M, continued

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|------|-----------------------|------|------|------|---------|------|--|
| M49 | App Status Word | | | | 0 | 29 | Bit 0 = MC Ready Bit 1 = MC_Run Bit 2 = MC_Fault Bit 3 = FB_Ref_Active Bit 4 = MC_Stopping Bit 5 = MC_Reverse Bit 6 = MC_Warning/AR-Fault Bit 7 = MC_ZeroSpeed Bit 8 = I/O Control Indicate Bit 9 = Panel Control Indicator Bit 10 = Panel Fieldbus Indicator Bit 11 = MC_DC_Brake Bit 12 = RunEnable Bit 13 = Run Bypass Bit 14 = Ext Brake Control Bit 15 = Bypass Mode |
| M50 | Standard Status Word | | | | 0 | 2414 | Bit 0 = P20.1.9 (default = Ready) Bit 1 = P20.1.10 (default = Run) Bit 2 = P20.1.11 (default = Fault) Bit 3 = P20.1.12 (default = Fault Invert) Bit 4 = P20.1.13 (default = Warning) Bit 5 = P20.1.14 (default = Reversed) Bit 6 = P20.1.15 (default = At Speed) Bit 7 = P20.1.16 (default = Zero Frequency) Bit 8 - 15 = Not Used |
| M51 | Output | | | | 0 | 2447 | |
| M52 | Reference | | | | 0 | 2449 | |
| M53 | Total MWh Count | | | | Varies | 601 | |
| M54 | Total Power Day Count | | | | Varies | 603 | |
| M55 | Total Power Hr Count | | | | Varies | 606 | |
| M56 | Trip MWh Count | | | | Varies | 604 | |
| M57 | Trip Power Day Count | | | | Varies | 636 | |
| M58 | Trip Power Hr Count | | | | Varies | 637 | |
| M59 | Multi-Monitoring | | | | 1, 2, 3 | 30 | |

Table 8. Operate mode—O

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|-------|-------------------|-----------------|-----------------|------|---------|-----|------|
| 01 | Output Frequency | | | Hz | 0.00 | 1 | |
| 02 | Freq Reference | | | Hz | 0.00 | 24 | |
| 03 | Motor Speed | | | rpm | 0 | 2 | |
| 04 | Motor Current | | | A | 0.0 | 3 | |
| 05 | Motor Torque | | | % | 0.0 | 4 | |
| 06 | Motor Power | | | % | 0.0 | 5 | |
| 07 | Motor Voltage | | | V | 0.0 | 6 | |
| 08 | DC-link Voltage | | | V | 0 | 7 | |
| 09 | Unit Temperature | | | °C | 0.0 | 8 | |
| 010 | Motor Temperature | | | % | 0.0 | 9 | |
| R12 ② | Keypad Reference | See Para ID 101 | See Para ID 102 | Hz | 0.00 | 141 | |

Table 9. Basic parameters—P1

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|---------|------------------------------|-------------------|-----------------|------|-------------------|------|--|
| P1.1 ①② | Min Frequency | 0.00 | See Para ID 102 | Hz | 0.00 | 101 | |
| P1.2 ①② | Max Frequency | See Para ID 101 | 400.00 | Hz | 60.00 | 102 | |
| P1.3 ② | Accel Time 1 | 0.1 | 3000.0 | s | 3.0 | 103 | |
| P1.4 ② | Decel Time 1 | 0.1 | 3000.0 | s | 3.0 | 104 | |
| P1.5 ① | Motor Nom Current | Drive Nom CT*1/10 | Drive Nom CT*2 | A | Drive Nom CT | 486 | |
| P1.6 ① | Motor Nom Speed | 300 | 20000 | rpm | Motor Nom Speed | 489 | |
| P1.7 ① | Motor PF | 0.30 | 1.00 | | 0.85 | 490 | |
| P1.8 ① | Motor Nom Voltage | 180 | 690 | V | Motor Nom Voltage | 487 | |
| P1.9 ① | Motor Nom Frequency | 8.00 | 400.00 | Hz | Motor Nom Freq | 488 | |
| P1.10 ② | Power Up Local Remote Select | | | | 0 | 1685 | 0 = Hold Last 1 = Local Control 2 = Remote Control |
| P1.11 ② | Remote1 Control Place | | | | 0 | 135 | 0 = I/O Terminal Start 1 1 = Fieldbus 2 = I/O Terminal Start 2 3 = Keypad |
| P1.12 ② | Local Control Place | | | | 0 | 1695 | 0 = Keypad 1 = I/O Terminal Start 1 2 = I/O Terminal Start 2 3 = Fieldbus |
| P1.13 ② | Bumpless Enable | | | | 0 | 2464 | 0 = Disabled 1 = Enabled |

Notes: ① Parameter value can only be changed after the drive has stopped.

② Parameter value will be set to be default when changing macros.

Step 5 — Standard application

Table 9. Basic parameters—P1, continued

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|----------|-------------------|------|-------|------|---------|------|---|
| P1.14 ①② | Local Reference | | | | 6 | 136 | 0 = AI1 1 = AI2 2 = Slot A: AI1 3 = Slot B: AI1 4 = AI1 Joystick 5 = AI2 Joystick 6 = Keypad 7 = Fieldbus Ref 9 = Max Frequency 10 = AI1 + AI2 11 = AI1–AI2 12 = AI2–AI1 13 = AI1 * AI2 14 = AI1 or AI2 15 = Min (AI1, AI2) 16 = MAX(AI1,AI2) |
| P1.15 ①② | Remote1 Reference | | | | 1 | 137 | See Para ID 136 |
| P1.16 ① | Reverse Enable | | | | 1 | 1679 | 0 = Disabled 1 = Enabled |
| P1.17 ② | Run Delay Time | 0 | 32500 | s | 0 | 2423 | |
| P1.18 ② | HOA Source | 0 | 2 | | 0 | 2465 | 0 = Disable 1 = I/O Terminal 2 = Keypad |
| P1.13①② | Local Reference | | | | 6 | 136 | 0 = AI1 1 = AI2 2 = Slot A: AI1 3 = Slot B: AI1 4 = AI1 Joystick 5 = AI2 Joystick 6 = Keypad 7 = Fieldbus Ref 9 = Max Frequency 10 = AI1 + AI2 11 = AI1 –AI2 12 = AI2–AI1 13 = AI1 * AI2 14 = AI1 or AI2 15 = MIN(AI1, AI2) 16 = MAX(AI1, AI2) |
| P1.14①② | Remote1 Reference | | | | 1 | 137 | See Para ID 1695 |
| P1.15① | Reverse Enable | | | | 1 | 1679 | 0 = Disabled 1 = Enabled |

Notes: ① Parameter value can only be changed after the drive has stopped.

② Parameter value will be set to be default when changing macros.

Table 10. Analog input—P2

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|-----------|------------------------|-----------------|-----------------|------|---------|------|--|
| P2.1.1 | AI Ref Scale Min Value | 0.00 | See Para ID 145 | Hz | 0 | 144 | |
| P2.1.2 | AI Ref Scale Max Value | See Para ID 144 | 400.00 | Hz | 0 | 145 | |
| P2.2.1 ② | AI1 Mode | 0 | 1 | | 1 | 222 | 0 = 0–20 mA 1 = 0–10 V |
| P2.2.2 ② | AI1 Signal Range | 0 | 2 | | 0 | 175 | 0 = 0–100% / 0–20 mA / 0–10 V 1 = 20–100% / 4–20 mA / 2–10 V 2 = Customized |
| P2.2.3 ② | AI1 Custom Min | 0.00 | See Para ID 177 | % | 0.00 | 176 | |
| P2.2.4 ② | AI1 Custom Max | See Para ID 176 | 100.00 | % | 100.00 | 177 | |
| P2.2.5 ② | AI1 Filter Time | 0.00 | 10.00 | s | 0.10 | 174 | |
| P2.2.6 ② | AI1 Signal Invert | 0 | 1 | | 0.00 | 181 | 0 = Not Inverted 1 = Inverted |
| P2.2.7 ② | AI1 Joystick Hyst | 0.00 | 20.00 | % | 0.00 | 178 | |
| P2.2.8 ② | AI1 Sleep Limit | 0.00 | 100.00 | % | 0.00 | 179 | |
| P2.2.9 ② | AI1 Sleep Delay | 0.00 | 320.00 | s | 0.00 | 180 | |
| P2.2.10 ② | AI1 Joystick Offset | –50.00 | 50.00 | % | 0.00 | 133 | |
| P2.3.1 ② | AI2 Mode | 0 | 2 | | 1 | 223 | 0 = 0–20 mA 1 = 0–10 V 2 = –10 to +10 V |
| P2.3.2 ② | AI2 Signal Range | 0 | 2 | | 0 | 183 | 0 = 0–100% / 0–20 mA / 0–10 V 1 = 20–100% / 4–20 mA / 2–10 V 2 = Customized |
| P2.3.3 ② | AI2 Custom Min | 0.00 | 0.00 | % | 0.00 | 184 | |
| P2.3.4 ② | AI2 Custom Max | See Para ID 184 | 100.00 | % | 100.00 | 185 | |
| P2.3.5 ② | AI2 Filter Time | 0.00 | 10.00 | s | 0.10 | 182 | |
| P2.3.6 ② | AI2 Signal Invert | 0 | 1 | | 0.00 | 189 | "0 = Not Inverted 1 = Inverted" |
| P2.3.7 ② | AI2 Joystick Hyst | 0.00 | 20.00 | % | 0.00 | 186 | |
| P2.3.8 ② | AI2 Sleep Limit | 0.00 | 100.00 | % | 0.00 | 187 | |
| P2.3.9 ② | AI2 Sleep Delay | 0.00 | 320.00 | s | 0.00 | 188 | |
| P2.3.10 ② | AI2 Joystick Offset | –50.00 | 50.00 | % | 0.00 | 134 | |
| P2.4.1 ② | Fine Tuning Input | 0 | 5 | | 0 | 2484 | 0 = Not Used 1 = AI1 2 = AI2 3 = Slot A: AI1 4 = Slot A: AI1 5 = Fieldbus |
| P2.4.2 ② | Fine Tuning Min | 0.00 | 100.00 | % | 0.00 | 2485 | |
| P2.4.3 ② | Fine Tuning Max | 0.00 | 100.00 | % | 0.00 | 2486 | |

Notes: ① Parameter value can only be changed after the drive has stopped.

② Parameter value will be set to be default when changing macros.

Step 5 — Standard application

Table 11. Digital input—P3

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|---------|-----------------------------------|------|------|------|---------|-----|---|
| P3.1 ①② | IO Terminal 1 Start/Stop Logic | | | | 0 | 143 | 0 = Forward–Reverse 1 = Start–Reverse 2 = Start–Enable 3 = Start Pulse–Stop Pulse |
| P3.2 ②③ | IO Terminal 1 Start Signal 1 | | | | 2 | 190 | 0 = DigIN:ForceOpen 1 = DigIN:ForceClose 2 = DigIN: 1 3 = DigIN: 2 4 = DigIN: 3 5 = DigIN: 4 6 = DigIN: 5 7 = DigIN: 6 8 = DigIN: 7 9 = DigIN: 8 10 = DigIN: A: IO1: 1 11 = DigIN: A: IO1: 2 12 = DigIN: A: IO1: 3 13 = DigIN: A: IO5: 1 14 = DigIN: A: IO5: 2 15 = DigIN: A: IO5: 3 16 = DigIN: A: IO5: 4 17 = DigIN: A: IO5: 5 18 = DigIN: A: IO5: 6 19 = DigIN: B: IO1: 1 20 = DigIN: B: IO1: 2 21 = DigIN: B: IO1: 3 22 = DigIN: B: IO5: 1 23 = DigIN: B: IO5: 2 24 = DigIN: B: IO5: 3 25 = DigIN: B: IO5: 4 26 = DigIN: B: IO5: 5 27 = DigIN: B: IO5: 6 28 = Time Channel 1 29 = Time Channel 2 30 = Time Channel 3 31 = RO1 Function 32 = RO2 Function 33 = RO3 Function 34 = Virtual RO1 Function 35 = Virtual RO2 Function |

Notes: ① Parameter value can only be changed after the drive has stopped.
② Parameter value will be set to be default when changing macros.

Table 11. Digital input—P3, continued

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|----------|--------------------------------|------|------|------|---------|------|--|
| P3.3 ②⑤ | IO Terminal 1 Start Signal 2 | | | | 3 | 191 | See Para ID 190 |
| P3.4 ①② | Thermistor Input Select | | | | 0 | 881 | 0 = Digital Input 1 = Thermistor Input |
| P3.5 ②③ | Reverse | | | | 0 | 198 | See Para ID 190 |
| P3.6 ②③ | Ext. Fault Close | | | | 4 | 192 | See Para ID 190 |
| P3.7 ②③ | Ext. Fault Open | | | | 1 | 193 | See Para ID 190 |
| P3.8 ②④ | Fault Reset | | | | 5 | 200 | See Para ID 190 |
| P3.9 ②③ | Run Enable | | | | 1 | 194 | See Para ID 190 |
| P3.10 ②③ | Preset Speed B0 | | | | 6 | 205 | See Para ID 190 |
| P3.11 ②③ | Preset Speed B1 | | | | 7 | 206 | See Para ID 190 |
| P3.12 ②③ | Preset Speed B2 | | | | 0 | 207 | See Para ID 190 |
| P3.15 ②③ | Accel/Decel Time Set | | | | 0 | 195 | See Para ID 190 |
| P3.16 ②③ | Accel/Decel Prohibit | | | | 0 | 201 | See Para ID 190 |
| P3.17 ②④ | No Access To Param | | | | 0 | 215 | See Para ID 190 |
| P3.21 ②③ | Remote Control | | | | 9 | 196 | See Para ID 190 |
| P3.22 ②③ | Local Control | | | | 0 | 197 | See Para ID 190 |
| P3.23 ②③ | Remote1/2 Select | | | | 0 | 209 | See Para ID 190 |
| P3.26 ②③ | DC Brake Enable | | | | 0 | 202 | See Para ID 190 |
| P3.32 ②③ | Jog Enable | | | | 0 | 199 | See Para ID 190 |
| P3.36 ②③ | AI Ref Source Select | | | | 0 | 208 | See Para ID 190 |
| P3.42 ②③ | Emergency Stop | | | | 1 | 747 | See Para ID 190 |
| P3.45 ①② | IO Terminal 2 Start Stop Logic | | | | 0 | 2206 | See Para ID 143 |
| P3.46 ②⑤ | IO Terminal 2 Start Signal 1 | | | | 2 | 2207 | See Para ID 190 |
| P3.47 ②⑤ | IO Terminal 2 Start Signal 2 | | | | 3 | 2208 | See Para ID 190 |
| P3.48 ②③ | Ext. Fault 2 NO | | | | 0 | 2293 | See Para ID 190 |
| P3.49 ②③ | Ext. Fault 2 NC | | | | 1 | 2294 | See Para ID 190 |
| P3.50 ②③ | Ext. Fault 3 NO | | | | 0 | 2295 | See Para ID 190 |
| P3.51 ②③ | Ext. Fault 3 NC | | | | 1 | 2296 | See Para ID 190 |
| P3.52 ② | Ext. Fault 1 Text | | | | 0 | 2297 | 0 = External Fault 1 = Vibration Cut out 2 = High Motor temp 3 = Low Pressure 4 = High Pressure 5 = Low Water 6 = Damper Interlock 7 = Run Enable 8 = Freeze Stat Trip 9 = Smoke Detect 10 = Seal Leakage 11 = Rod Breakage |
| P3.53 ② | Ext. Fault 2 Text | | | | 1 | 2298 | 0 = External Fault 1 = Vibration Cut out 2 = High Motor temp 3 = Low Pressure 4 = High Pressure 5 = Low Water 6 = Damper Interlock 7 = Run Enable 8 = Freeze Stat Trip 9 = Smoke Detect 10 = Seal Leakage 11 = Rod Breakage |

Notes: ① Parameter value can only be changed after the drive has stopped.

② Parameter value will be set to be default when changing macros.

- Input function is Level sensed
- Input function is edge sensed
- Input function is edge sensed when using StartP/StopP start logic Para ID 143 and 2206

Step 5 — Standard application

Table 11. Digital input—P3, continued

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|----------|----------------------|------|------|------|---------|------|--|
| P3.54 ② | Ext. Fault 3 Text | | | | 2 | 2299 | 0 = External Fault 1 = Vibration Cut out 2 = High Motor temp 3 = Low Pressure 4 = High Pressure 5 = Low Water 6 = Damper Interlock 7 = Run Enable 8 = Freeze Stat Trip 9 = Smoke Detect 10 = Seal Leakage 11 = Rod Breakage |
| P3.55 ②④ | Parameter Set1/2 Sel | | | | 0 | 2312 | See Para ID 190 |
| P3.56 ②④ | Deragging Enable | | | | 0 | 2394 | See Para ID 190 |
| P3.57 ②③ | Off Control | | | | 0 | 2395 | See Para ID 190 |

Table 12. Analog output—P4

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|--------|--------------|------|------|------|---------|-----|---|
| P4.1 ② | A01 Mode | | | | 0 | 227 | 0 = 0–20 mA 1 = 0–10 V |
| P4.2 ② | A01 Function | | | | 1 | 146 | 0 = Not Used 1 = Output Frequency 2 = Freq Reference 3 = Motor Speed 4 = Motor Current 5 = Motor Torque (0–Nom) 6 = Motor Power 7 = Motor Voltage 8 = DC-Bus Voltage 19 = AI1 20 = AI2 21 = Output Freq (–2 to +2N) 22 = Motor Torque (–2 to +2N) 23 = Motor Power (–2 to +2N) 24 = PT100 Temperature 25 = FB Data Input 1 26 = FB Data Input 2 27 = FB Data Input 3 28 = FB Data Input 4 29 = FB Data Input 5 30 = FB Data Input 6 31 = FB Data Input 7 32 = FB Data Input 8 33 = SlotA PT100 Temp Channel 1 34 = SlotA PT100 Temp Channel 2 |

- Notes:**
- ① Parameter value can only be changed after the drive has stopped.
 - ② Parameter value will be set to be default when changing macros.
 - ③ Input function is Level sensed.
 - ④ Input function is Edge sensed.
 - ⑤ Input function is Edge sensed when using StartP/StopP start logic.

Table 12. Analog output—P4, continued

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|---------|-----------------|---------|--------|------|---------|-----|---|
| | | | | | | | 35 = SlotA PT100 Temp Channel 3 36 = SlotB PT100 Temp Channel 1 37 = SlotB PT100 Temp Channel 2 38 = SlotB PT100 Temp Channel 3 39 = User Defined Output 40 = Motor Current(-2 to +2N) |
| P4.3 ② | A01 Minimum | | | | 1 | 149 | 0 = 0 V / 0 mA 1 = 2 V / 4 mA |
| P4.4 ② | A01 Filter Time | 0.00 | 10.00 | s | 1.00 | 147 | |
| P4.5 ② | A01 Scale | 10 | 1000 | % | 100 | 150 | |
| P4.6 ② | A01 Inversion | | | | 0 | 148 | 0 = Not Inverted 1 = Inverted |
| P4.7 ② | A01 Offset | -100.00 | 100.00 | % | 0.00 | 173 | |
| P4.8 ② | A02 Mode | | | | 0 | 228 | See Para ID 227 |
| P4.9 ② | A02 Function | | | | 4 | 229 | See Para ID 146 |
| P4.10 ② | A02 Minimum | | | | 1 | 232 | See Para ID 149 |
| P4.11 ② | A02 Filter Time | 0.00 | 10.00 | s | 1.00 | 230 | |
| P4.12 ② | A02 Scale | 10 | 1000 | % | 100 | 233 | |
| P4.13 ② | A02 Inversion | | | | 0 | 231 | See Para ID 148 |
| P4.14 ② | A02 Offset | -100.00 | 100.00 | % | 0.00 | 234 | |

Table 13. Digital output—P5

| Code | Parameter | Min. | Min. | Unit | Default | ID | Note |
|--------|--------------|------|------|------|---------|-----|--|
| P5.1 ② | DO1 Function | | | | 1 | 151 | 0 = Not Used 1 = Ready 2 = Run 3 = Fault 4 = Fault Invert 5 = Warning 6 = Reversed 7 = At Speed 8 = Zero Frequency 9 = Freq Limit 1 Superv 10 = Freq Limit 2 Superv 13 = Overheat Fault 14 = Overcurrent Regular 15 = Overvoltage Regular 16 = Undervoltage Regular 17 = 4 mA Ref Fault/Warning 20 = Torq Limit Superv 21 = Ref Limit Superv 22 = Control from I/O 23 = Un-Requested Rotation Direction 24 = Thermistor Fault Output 27 = Ext Fault/Warning 28 = Remote Control 29 = Jog Speed Select 30 = Motor Therm Protection 31 = FB Digital Input 1 |

Notes: ① Parameter value can only be changed after the drive has stopped.
② Parameter value will be set to be default when changing macros.

Step 5 — Standard application

Table 13. Digital output—P5, continued

| Code | Parameter | Min. | Min. | Unit | Default | ID | Note |
|---------|-----------------------|--------|-----------------|------|---------|------|--|
| | | | | | | | 32 = FB Digital Input 2 33 = FB Digital Input 3 34 = FB Digital Input 4 36 = TC1 Status 37 = TC2 Status 38 = TC3 Status 39 = In E-Stop 40 = Power Limit Superv 41 = Temp Limit Superv 42 = Analog Input Superv 51 = Motor Current 1 Supv 52 = Motor Current 2 Supv 53 = Second AI Limit Supv 54 = DC Charge Switch Close 55 = Preheat Active 56 = Cold Weather Active note ⑥ 58 = 2th Stage Ramp Frequency Active 59 = STO Fault 60 = Run Bypass/Drive 61 = Bypass Overload |
| P5.2 ② | RO1 Function | | | | 2 | 152 | See Para ID 151 |
| P5.3 ② | RO2 Function | | | | 3 | 153 | See Para ID 151 |
| P5.4 ② | RO3 Function | | | | 7 | 538 | See Para ID 151 |
| P5.5 ② | Virtual RO1 Function | | | | 0 | 2465 | See Para ID 151 |
| P5.6 ② | Virtual RO2 Function | | | | 0 | 2466 | See Para ID 151 |
| P5.7 ② | Freq Limit 1 Supv | | | | 0 | 154 | 0 = No Limit 1 = Low Limit Superv 2 = High Limit Superv |
| P5.8 ② | Freq Limit 1 Supv Val | 0.00 | See Para ID 102 | Hz | 0.00 | 155 | |
| P5.9 ② | Freq Limit 2 Supv | | | | 0 | 157 | 0 = No Limit 1 = Low Limit Superv 2 = High Limit Superv |
| P5.10 ② | Freq Limit 2 Supv Val | 0.00 | See Para ID 102 | Hz | 0.00 | 158 | |
| P5.11 ② | Torque Limit Supv | | | | 0 | 159 | 0 = No Limit 1 = Low Limit Superv 2 = High Limit Superv |
| P5.12 ② | Torque Limit Supv Val | -300.0 | 300.0 | % | 100.0 | 160 | |
| P5.13 ② | Ref Limit Supv | | | | 0 | 161 | 0 = No Limit 1 = Low Limit Superv 2 = High Limit Superv |
| P5.14 ② | Ref Limit Supv Val | 0.00 | See Para ID 102 | Hz | 0.00 | 162 | |
| P5.17 ② | Temp Limit Supv | | | | 0 | 165 | See Para ID 161 |
| P5.18 ② | Temp Limit Supv Val | -10.0 | 75.0 | °C | 40.0 | 166 | |
| P5.19 ② | Power Limit Supv | | | | 0 | 167 | See Para ID 161 |
| P5.20 ② | Power Limit Supv Val | 0.0 | 200.0 | % | 0.0 | 168 | |
| P5.21 ② | AI Supv Select | | | | 0 | 170 | 0 = AI1 1 = AI2 |
| P5.22 ② | AI Limit Supv | | | | | 171 | |
| P5.23 ② | AI Limit Supv Val | 0.00 | 100.00 | % | 0.00 | 172 | |
| P5.24 ② | RO1 On Delay | 0 | 320 | s | 0 | 2111 | |
| P5.25 ② | RO1 Off Delay | 0 | 320 | s | 0 | 2112 | |

- Notes:** ① Parameter value can only be changed after the drive has stopped.
 ② Parameter value will be set to be default when changing macros.
 ⑥ Function is not available in FR7 and FR8 drives.

Table 13. Digital output—P5, continued

| Code | Parameter | Min. | Min. | Unit | Default | ID | Note |
|---------|----------------------------|------|------------------|------|----------------|------|---|
| P5.34 ② | R02 On Delay | 0 | 320 | s | 0 | 2113 | |
| P5.35 ② | R02 Off Delay | 0 | 320 | s | 0 | 2114 | |
| P5.36 ② | R03 On Delay | 0 | 320 | s | 0 | 2115 | |
| P5.37 ② | R03 Off Delay | 0 | 320 | s | 0 | 2116 | |
| P5.38 ② | R03 Reverse | 0 | 1 | | 0 | 2117 | 0 = Not Inverted 1 = Inverted |
| P5.39 ② | Motor Current 1 Supv | | | | 0 | 2189 | 0 = No Limit 1 = Low Limit Superv 2 = High Limit Superv |
| P5.40 ② | Motor Current 1 Supv Value | 0 | DriveNomCurrCT*2 | A | DriveNomCurrCT | 2190 | |
| P5.41 ② | Motor Current 2 Supv | | | | 0 | 2191 | 0 = No Limit 1 = Low Limit Superv 2 = High Limit Superv |
| P5.42 ② | Motor Current 2 Supv Value | 0 | DriveNomCurrCT*2 | A | DriveNomCurrCT | 2192 | |
| P5.43 ② | Second AI Supv Select | | | | 0 | 2193 | 0 = AI1 1 = AI2 |
| P5.44 ② | Second AI Limit Supv | | | | 0 | 2194 | See Para ID 161 |
| P5.45 ② | Second AI Limit Supv Val | 0 | 100 | % | 0 | 2195 | |
| P5.46 ② | Motor Current 1 Supv Hyst | 0.1 | 1 | A | 0.1 | 2196 | |
| P5.47 ② | Motor Current 2 Supv Hyst | 0.1 | 1 | A | 0.1 | 2197 | |
| P5.48 ② | AI Supv Hyst | 1 | 10 | % | 1 | 2198 | |
| P5.49 ② | Second AI Supv Hyst | 1 | 10 | % | 1 | 2199 | |
| P5.50 ② | Freq Limit 1 Supv Hyst | 0.1 | 1 | Hz | 0.1 | 2200 | |
| P5.51 ② | Freq Limit 2 Supv Hyst | 0.1 | 1 | Hz | 0.1 | 2201 | |
| P5.52 ② | Torque Limit Supv Hyst | 1 | 5 | % | 1 | 2202 | |
| P5.53 ② | Ref Limit Supv Hyst | 0.1 | 1 | Hz | 0.1 | 2203 | |
| P5.54 ② | Temp Limit Supv Hyst | 1 | 10 | ? | 1 | 2204 | |
| P5.55 ② | Power Limit Supv Hyst | 0.1 | 10 | % | 0.1 | 2205 | |

Notes: ① Parameter value can only be changed after the drive has stopped.
 ② Parameter value will be set to be default when changing macros.

Step 5 — Standard application

Table 14. Drive control—P7

| Code | Parameter | Min. | Min. | Unit | Default | ID | Note |
|---------|-----------------------------|-----------------|-----------------|------|---------|------|--|
| P7.1 ② | Remote 2 Control Place | | | | 1 | 138 | See Para ID 135 |
| P7.2 ①② | Remote 2 Reference | | | | 7 | 139 | See Para ID 136 |
| P7.3 ② | Keypad Reference | See Para ID 101 | See Para ID 102 | Hz | 0.00 | 141 | |
| P7.4 ② | Keypad Direction | | | | 0 | 116 | 0 = Forward 1 = Reverse |
| P7.5 ② | Keypad Stop | | | | 1 | 114 | 0 = Enabled-Keypad Operation 1 = Always Enabled |
| P7.6 ② | Jog Reference | See Para ID 101 | See Para ID 102 | Hz | 0.00 | 117 | |
| P7.9 ② | Start Mode | | | | 0 | 252 | 0 = Ramp 1 = Flying Start |
| P7.10 ② | Stop Mode | | | | 1 | 253 | 0 = Coasting 1 = Ramp |
| P7.11 ② | Ramp 1 Shape | 0.0 | 10.0 | s | 0.0 | 247 | |
| P7.12 ② | Ramp 2 Shape | 0.0 | 10.0 | s | 0.0 | 248 | |
| P7.13 ② | Accel Time 2 | 0.1 | 3000.0 | s | 10.0 | 249 | |
| P7.14 ② | Decel Time 2 | 0.1 | 3000.0 | s | 10.0 | 250 | |
| P7.15 ② | Skip F1 Low Limit | 0.00 | See Para ID 257 | Hz | 0.00 | 256 | |
| P7.16 ② | Skip F1 High Limit | See Para ID 256 | 400.00 | Hz | 0.00 | 257 | |
| P7.17 ② | Skip F2 Low Limit | 0.00 | See Para ID 259 | Hz | 0.00 | 258 | |
| P7.18 ② | Skip F2 High Limit | See Para ID 258 | 400.00 | Hz | 0.00 | 259 | |
| P7.19 ② | Skip F3 Low Limit | 0.00 | See Para ID 261 | Hz | 0.00 | 260 | |
| P7.20 ② | Skip F3 High Limit | See Para ID 260 | 400.00 | Hz | 0.00 | 261 | |
| P7.21 ② | Prohibit Accel/Decel Ramp | 0.1 | 10.0 | | 1.0 | 264 | |
| P7.22 ② | Power Loss Function | | | | 0 | 267 | 0 = Disabled 1 = Enabled |
| P7.23 ② | Power Loss Time | 0.3 | 5.0 | s | 2.0 | 268 | |
| P7.24 ② | Currency | 0 | 8 | | \$ | 2121 | 0 = \$ 1 = GBP 2 = Eur 3 = JPY 4 = Rs 5 = R\$ 6 = Fr 7 = Kr |
| P7.25 ② | Energy Cost | | | | 0 | 2122 | |
| P7.26 ② | Data Type | 0 | 4 | s | 0 | 2123 | 0 = Cumulative 1 = Daily Avg 2 = Weekly Avg 3 = Monthly Avg |
| P7.27 ② | Energy Savings Reset | 0 | 1 | s | 0 | 2124 | 0 = No Action 1 = Reset |
| P7.28 ② | 2th Stage Ramp Frequency | See Para ID 101 | See Para ID 102 | Hz | 30 | 2447 | |
| P7.29 ② | Change Phase Sequence Motor | 0 | 1 | | 0 | 2515 | 0 = Change Disable 1 = Change Enable |

Notes: ① Parameter value can only be changed after the drive has stopped.
② Parameter value will be set to be default when changing macros.

Table 15. Motor control—P8

| Code | Parameter | Min. | Min. | Unit | Default | ID | Note |
|----------|--|-----------------------|-----------------------|------|------------------------------|------|---|
| P8.1 ①② | Motor Control Mode | | | | 0 | 287 | 0 = Freq Control 1 = Speed Control |
| P8.2 ① | Current Limit | Drive Nom CT*1/10 | Drive Nom CT*2 | A | Drive Nom VT | 107 | |
| P8.3 ①② | V/Hz Optimization | | | | 0 | 109 | 0 = Disabled 1 = Enabled |
| P8.4 ①② | V/Hz Ratio | | | | 0 | 108 | 0 = Linear 1 = Squared 2 = Programmable 3 = Linear + Flux Optimization |
| P8.5 ①② | Field Weakening Point | 8.00 | 400.00 | Hz | 60.00 | 289 | |
| P8.6 ①② | Voltage at FWP | 10.00 | 200.00 | % | 100.00 | 290 | |
| P8.7 ①② | V/Hz Mid Frequency | 0.00 | See Para ID 289 | Hz | V/Hz Midpoint Freq | 291 | |
| P8.8 ①② | V/Hz Mid Voltage | 0.00 | 100.00 | % | 100.00 | 292 | |
| P8.9 ①② | Zero Frequency Voltage | 0.00 | 40.00 | % | 0.00 | 293 | |
| P8.10 ② | Switching Frequency | Min Switching Freq | Max Switching Freq | kHz | Default Switching Freq CT | 288 | |
| P8.11 ② | Sine Filter Enable | | | | 0 | 1665 | 0 = Disabled 1 = Enabled |
| P8.12 ①② | Overvoltage Control | | | | 1 | 294 | 0 = Disabled 1 = Enabled |
| P8.17 ② | Frequency Ramp Out Filter Time Constant | 0 | 3000 | ms | 0 | 1585 | |
| P8.39 ② | Start Boost Rise Time | -1 | 32000 | s | 0 | 1622 | |

Table 16. Protections—P9

| Code | Parameter | Min. | Min. | Unit | Default | ID | Note |
|----------|--------------------------|------|-------------------------|------|-----------------------------|-----|---|
| P9.1 ①② | 4 mA Input Fault | | | | 0 | 306 | 0 = No Action 1 = Warning 2 = Warning: Previous Freq 3 = Warning: Preset Freq 4 = Fault 5 = Fault, Coast |
| P9.2 ①② | 4 mA Fault Frequency | 0.00 | See Para ID 102 | Hz | 0.00 | 331 | |
| P9.3 ①② | External Fault | | | | 2 | 307 | See Para ID 313 |
| P9.4 ①② | Input Phase Fault | | | | 2 | 332 | See Para ID 313 |
| P9.5 ①② | Uvolt Fault Response | | | | 2 | 330 | See Para ID 313 |
| P9.6 ①② | Output Phase Fault | | | | 2 | 308 | See Para ID 313 |
| P9.7 ①② | Ground Fault | | | | 2 | 309 | See Para ID 313 |
| P9.8 ①② | Motor Thermal Protection | | | | 2 | 310 | See Para ID 313 |
| P9.9 ② | Motor Thermal FO Current | 0.0 | 150.0 | % | 40.0 | 311 | |
| P9.10 ② | Motor Thermal Time | 1 | 200 | min | 12 | 312 | |
| P9.11 ①② | Stall Protection | | | | 0 | 313 | 0 = No Action 1 = Warning 2 = Fault 3 = Fault, Coast |
| P9.12 ② | Stall Current Limit | 0.1 | Active Motor Nom I*2 | A | Active Motor Nom I*13/10 | 314 | |
| P9.13 ② | Stall Time Limit | 1.0 | 120.0 | s | 15.0 | 315 | |
| P9.14 ② | Stall Frequency Limit | 1.00 | See Para ID 102 | Hz | 25.00 | 316 | |
| P9.15 ①② | Underload Protection | | | | 0 | 317 | See Para ID 313 |
| P9.16 ② | Underload Fnom Torque | 10.0 | 150.0 | % | 50.0 | 318 | |

Notes: ① Parameter value can only be changed after the drive has stopped.
② Parameter value will be set to be default when changing macros.

Step 5 — Standard application

Table 16. Protections—P9, continued

| Code | Parameter | Min. | Min. | Unit | Default | ID | Note |
|----------|--------------------------------|------|--------|------|---------|------|---|
| P9.17 ② | Underload F0 Torque | 5.0 | 150.0 | % | 10.0 | 319 | |
| P9.18 ② | Underload Time Limit | 2.00 | 600.00 | s | 20.00 | 320 | |
| P9.19 ①② | Thermistor Fault Response | | | | 2 | 333 | See Para ID 313 |
| P9.20 ② | Line Start Lockout | | | | 2 | 750 | 0 = Disabled, No Change 1 = Enable, No Change 2 = Disabled, Changed 3 = Enable, Changed |
| P9.21 ①② | Fieldbus Fault Response | | | | 2 | 334 | See Para ID 313 |
| P9.22 ①② | OPTCard Fault Response | | | | 2 | 335 | See Para ID 313 |
| P9.23 ①② | Unit Under Temp Prot | | | | 2 | 1564 | See Para ID 313 |
| P9.24 ② | Wait Time | 1.00 | 300.00 | s | 1.00 | 321 | |
| P9.25 ② | Trail Time | 0.00 | 600.00 | s | 30.00 | 322 | |
| P9.26 ② | Start Function | | | | 0 | 323 | 0 = Flying Start 1 = Ramp |
| P9.27 ② | Undervoltage Attempts | 0 | 10 | | 1 | 324 | |
| P9.28 ② | Overvoltage Attempts | 0 | 10 | | 1 | 325 | |
| P9.29 ② | Overcurrent Attempts | 0 | 3 | | 1 | 326 | |
| P9.30 ② | 4 mA Fault Attempts | 0 | 10 | | 1 | 327 | |
| P9.31 ② | Motor Temp Fault Attempts | 0 | 10 | | 1 | 329 | |
| P9.32 ② | External Fault Attempts | 0 | 10 | | 0 | 328 | |
| P9.33 ② | Underload Attempts | 0 | 10 | | 1 | 336 | |
| P9.34 ①② | RTC Fault | | | | 1 | 955 | See Para ID 313 |
| P9.36 ①② | Replace Battery Fault Response | | | | 1 | 1256 | See Para ID 313 |
| P9.37 ①② | Replace Fan Fault Response | | | | 1 | 1257 | See Para ID 313 |
| P9.38 ①② | IP Address Conflicion Resp | | | | 1 | 1678 | See Para ID 313 |
| P9.39 ② | Cold Weather Mode | | | | 0 | 2126 | 0 = Disable 1 = Enable |
| P9.35 ①② | PT100 Fault Response | | | | 2 | 337 | See Para ID 313 |
| P9.40 ②⑥ | Cold Weather Voltage Level | 0 | 20 | % | 2 | 2127 | |
| P9.41②⑥ | Cold Weather Time Out | 0 | 10 | min | 3 | 2128 | |
| P9.44 ② | Ground Fault Limit | 0 | 30 | % | 15 | 2158 | |
| P9.45 ①② | Keypad Comm Fault Response | | | | 2 | 2157 | See Para ID 313 |
| P9.46 ② | Preheat Mode | | | | 0 | 2159 | 0 = Disabled 1 = Enabled |
| P9.47 ② | Preheat Temp Source | | | | 31 | 2160 | 0 = DigIN: NormallyOpen 1 = DigIN: NormallyClosed 2 = DigIN: 1 3 = DigIN: 2 4 = DigIN: 3 5 = DigIN: 4 6 = DigIN: 5 7 = DigIN: 6 8 = DigIN: 7 9 = DigIN: 8 10 = DigIN: A: IO1: 1 11 = DigIN: A: IO1: 2 12 = DigIN: A: IO1: 3 |

Notes: ① Parameter value can only be changed after the drive has stopped.
 ② Parameter value will be set to be default when changing macros.
 ③ Function is not available in FR7 and FR8 drives

Table 16. Protections—P9, continued

| Code | Parameter | Min. | Min. | Unit | Default | ID | Note |
|---------|------------------------|------|------|------|---------|------|---|
| P9.47 ② | Preheat Temp Source | | | | 31 | 2160 | 13 = DigIN: A: I05: 1 14 = DigIN: A: I05: 2 15 = DigIN: A: I05: 3 16 = DigIN: A: I05: 4 17 = DigIN: A: I05: 5 18 = DigIN: A: I05: 6 19 = DigIN: B: I01: 1 20 = DigIN: B: I01: 2 21 = DigIN: B: I01: 3 22 = DigIN: B: I05: 1 23 = DigIN: B: I05: 2 24 = DigIN: B: I05: 3 25 = DigIN: B: I05: 4 26 = DigIN: B: I05: 5 27 = DigIN: B: I05: 6 28 = Time Channel 1 29 = Time Channel 2 30 = Time Channel 3 31 = Drive Temperature 32 = Slot A PT100 Temp Channel 1 33 = Slot A PT100 Temp Channel 2 34 = Slot A PT100 Temp Channel 3 35 = Slot A Max PT100 Temp 36 = Slot B PT100 Temp Channel 1 37 = Slot B PT100 Temp Channel 2 38 = Slot B PT100 Temp Channel 3 39 = Slot B Max PT100 Temp 40 = Slot A and Slot B Max PT100 Temp |
| P9.48 ② | Preheat Enter Temp | 0.0 | 19.9 | °C | 10.0 | 2161 | |
| P9.49 ② | Preheat Quit Temp | 20.0 | 40.0 | °C | 20.0 | 2162 | |
| P9.50 ② | Preheat Output Voltage | 0.0 | 20.0 | % | 2.0 | 2163 | |
| P9.56 ② | STO Fault Response | | | | 2 | 2429 | 0 = No Action 1 = Warning 2 = Fault |
| P9.57 ② | Fault Reset Start | 0 | 1 | | 0 | 2483 | 0 = Start/Stop After Fault Reset 1 = Restart After Fault Reset |

Table 17. Preset speed—P12

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|---------|----------------|------|-----------------|------|---------|-----|------|
| P12.1 ② | Preset Speed 1 | 0.00 | See Para ID 102 | Hz | 5.00 | 105 | |
| P12.2 ② | Preset Speed 2 | 0.00 | See Para ID 102 | Hz | 10.00 | 106 | |
| P12.3 ② | Preset Speed 3 | 0.00 | See Para ID 102 | Hz | 15.00 | 118 | |
| P12.4 ② | Preset Speed 4 | 0.00 | See Para ID 102 | Hz | 20.00 | 119 | |
| P12.5 ② | Preset Speed 5 | 0.00 | See Para ID 102 | Hz | 25.00 | 120 | |
| P12.6 ② | Preset Speed 6 | 0.00 | See Para ID 102 | Hz | 30.00 | 121 | |
| P12.7 ② | Preset Speed 7 | 0.00 | See Para ID 102 | Hz | 35.00 | 122 | |

Step 5 — Standard application

Table 18. Brake—P14

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|----------|-------------------------|----------------------------|-----------------------|------|---------------------------|-----|--|
| P14.1 ①② | DC-Brake Current | Drive Nom CT*15/100 | Drive Nom CT*15/10 | A | Drive Nom CT*1/2 | 254 | |
| P14.2 ①② | Start DC-Brake Time | 0.00 | 600.00 | s | 0.00 | 263 | |
| P14.3 ①② | Stop DC-Brake Frequency | 0.10 | 10.00 | Hz | 1.50 | 262 | |
| P14.4 ①② | Stop DC-Brake Time | 0.00 | 600.00 | s | 0.00 | 255 | |
| P14.5 ①② | Brake Chopper Define | | | | 0 | 251 | 0 = Disabled 1 = B(Run) T(Rdy) 2 = External 3 = B(Rdy) T(Rdy) 4 = B(Run) T(No) |
| P14.6 ①② | Flux Brake | | | | 0 | 266 | 0 = Off 1 = On |
| P14.7 ①② | Flux Brake Current | Active Motor Nom I*1/10 | See Para ID 107 | A | Active Motor Nom I*1/2 | 265 | |

Communication P20

Table 19. FB Data Output Sel—P20.1

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|---------|----------------------|------|------|------|---------|------|------|
| P20.1.1 | FB Data Output 1 Sel | | | | 2541 | 1556 | |
| P20.1.2 | FB Data Output 2 Sel | | | | 2542 | 1557 | |
| P20.1.3 | FB Data Output 3 Sel | | | | 2550 | 1558 | |
| P20.1.4 | FB Data Output 4 Sel | | | | 103 | 1559 | |
| P20.1.5 | FB Data Output 5 Sel | | | | 104 | 1560 | |
| P20.1.6 | FB Data Output 6 Sel | | | | 107 | 1561 | |
| P20.1.7 | FB Data Output 7 Sel | | | | 0 | 1562 | |
| P20.1.8 | FB Data Output 8 Sel | | | | 0 | 1563 | |

Table 20. FB Process Data Output Sel—P20.2

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|----------|---|------|------|------|---------|------|-----------------|
| P20.2.1 | FB Process Data Output 1 Sel | | | | 1 | 1556 | |
| P20.2.2 | FB Process Data Output 2 Sel | | | | 2 | 1557 | |
| P20.2.3 | FB Process Data Output 3 Sel | | | | 3 | 1558 | |
| P20.2.4 | FB Process Data Output 4 Sel | | | | 4 | 1559 | |
| P20.2.5 | FB Process Data Output 5 Sel | | | | 5 | 1560 | |
| P20.2.6 | FB Process Data Output 6 Sel | | | | 6 | 1561 | |
| P20.2.7 | FB Process Data Output 7 Sel | | | | 7 | 1562 | |
| P20.2.8 | FB Process Data Output 8 Sel | | | | 28 | 1563 | |
| P20.2.9 | Standard Status Word Bit0 Function Select | | | | 1 | 2415 | See Para ID 151 |
| P20.2.10 | Standard Status Word Bit1 Function Select | | | | 1 | 2416 | See Para ID 151 |
| P20.2.11 | Standard Status Word Bit2 Function Select | | | | 1 | 2417 | See Para ID 151 |
| P20.2.12 | Standard Status Word Bit3 Function Select | | | | 1 | 2418 | See Para ID 151 |
| P20.2.13 | Standard Status Word Bit4 Function Select | | | | 1 | 2419 | See Para ID 151 |
| P20.2.14 | Standard Status Word Bit5 Function Select | | | | 1 | 2420 | See Para ID 151 |
| P20.2.15 | Standard Status Word Bit6 Function Select | | | | 1 | 2421 | See Para ID 151 |
| P20.2.16 | Standard Status Word Bit7 Function Select | | | | 1 | 2422 | See Para ID 151 |

RS485 Bus P20.3

Table 21. Basic Setting— P20.3.1

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|-----------|----------------|------|------|------|---------|-----|---|
| P20.3.1.1 | RS485 Comm Set | | | | 0 | 586 | 0 = Modbus RTU 1 = BACnet MS/TP 2 = SWD |

Notes: ① Parameter value can only be changed after the drive has stopped.
② Parameter value will be set to be default when changing macros.

Table 22. Modbus RTU— P20.3.2

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|------------|----------------------------|------|------|------|---------|------|---|
| P20.3.2.1 | Slave Address | 1 | 247 | | 1 | 587 | |
| P20.3.2.2 | Baud Rate | | | | 1 | 584 | 0 = 9600 1 = 19200 2 = 38400 3 = 57600 4 = 115200 |
| P20.3.2.3 | Parity Type | | | | 0 | 585 | 0 = None 1 = Odd 2 = Even |
| P20.3.2.4 | Modbus RTU Protocol Status | | | | 0 | 588 | 0 = Initial 1 = Stopped 2 = Operational 3 = Faulted |
| P20.3.2.5 | Slave Busy | | | | 0 | 589 | 0 = Not Busy 1 = Busy |
| P20.3.2.6 | Parity Error | | | | 0 | 590 | |
| P20.3.2.7 | Slave Fault | | | | 0 | 591 | |
| P20.3.2.8 | Last Fault Response | | | | 0 | 592 | |
| P20.3.2.9 | Comm Timeout Modbus RTU | | | ms | 10000 | 593 | |
| P20.3.2.10 | Modbus RTU Fault Response | 0 | 1 | | 0 | 2516 | 0 = In Fieldbus Control 1 = In All Control |

Table 23. BACnet MS/TP— P20.3.3

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|-----------|---------------------------|------|---------|------|---------|------|--|
| P20.3.3.1 | MSTP Baud Rate | | | | 2 | 594 | 0 = 9600 1 = 19200 2 = 38400 3 = 57600 4 = 115200 |
| P20.3.3.2 | MSTP MS/TP Device Address | 0 | 127 | | 1 | 595 | |
| P20.3.3.3 | MSTP Instance Number | 0 | 4194302 | | 0 | 596 | |
| P20.3.3.4 | MSTP Comm Timeout MSTP | | | ms | 10000 | 598 | |
| P20.3.3.5 | MSTP Protocol Status | | | | 0 | 599 | 0 = Stopped 1 = Operational 2 = Faulted |
| P20.3.3.6 | MSTP Fault Code | | | | 0 | 600 | 0 = None 1 = Sole Master 2 = Duplicate MAC ID 3 = Baud Rate Fault |
| P20.3.3.7 | MSTP Fault Response | 0 | 1 | | 0 | 2526 | 0 = In Fieldbus Control 1 = In All Control |

Table 24. Ethernet IP—P20.4

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|----------|-----------------------------|------|------|------|---------------|------|---|
| P20.4.1 | IP Address Mode | | | | 1 | 1500 | 0 = Static IP 1 = DHCP with AutoIP |
| P20.4.2 | Active IP Address | | | | | 1507 | |
| P20.4.3 | Active Subnet Mask | | | | | 1509 | |
| P20.4.4 | Active Default Gateway | | | | | 1511 | |
| P20.4.5 | MAC Address | | | | | 1513 | |
| P20.4.6 | Static IP Address | | | | 192.168.1.254 | 1501 | |
| P20.4.7 | Static Subnet Mask | | | | 255.255.255.0 | 1503 | |
| P20.4.8 | Static Default Gateway | | | | 192.168.1.1 | 1505 | |
| P20.4.9 | Ethernet IP Protocol Status | | | | | 608 | 0 = Stopped 1 = Operational 2 = Faulted |
| P20.4.10 | EIP Fault Response | 0 | 1 | | 0 | 2518 | 0 = In Fieldbus Control 1 = In All Control |

Step 5 — Standard application

Table 25. Modbus TCP—P20.5

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|---------|----------------------------|------|------|------|---------|------|---|
| P20.5.1 | Connection Limit | | | | 5 | 609 | |
| P20.5.2 | Modbus TCP Unit ID | | | | 1 | 610 | |
| P20.5.3 | Comm Timeout Modbus TCP | | | ms | 10000 | 611 | |
| P20.5.4 | Modbus TCP Protocol Status | | | | 0 | 612 | 0 = Stopped 1 = Operational 2 = Faulted |
| P20.5.5 | Slave Busy | | | | 0 | 613 | 0 = Not Busy 1 = Busy |
| P20.5.6 | Parity Error | | | | 0 | 614 | |
| P20.5.7 | Slave Failure | | | | 0 | 615 | |
| P20.5.8 | Last Fault Response | | | | 0 | 616 | |
| P20.5.9 | Modbus TCP Fault Response | 0 | 1 | | 0 | 2517 | 0 = In Fieldbus Control 1 = In All Control |

Table 26. Basic setting—P21.1

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|-----------|----------------------|------|-------|------|---------|-----|--|
| P21.1.1 | Language | | | | 0 | 340 | 0 = English 1 = Depends upon Language Pack 2 = Depends upon Language Pack |
| P21.1.2 ① | Application | | | | 0 | 142 | 0 = Standard 1 = Multi-Pump 2 = Multi-PID 3 = Multi-Purpose |
| P21.1.3 | Parameter Sets | | | | 0 | 619 | 0 = No 1 = Reload Defaults 2 = Reload Set 1 3 = Reload Set 2 4 = Store Set 1 5 = Store Set 2 6 = Reset 7 = Reload Defaults VM |
| P21.1.4 | Up To Keypad | | | | 0 | 620 | 0 = No 1 = Yes |
| P21.1.5 | Down From Keypad | | | | 0 | 621 | 0 = No 1 = All Parameters 2 = All, No Motor 3 = App Parameters |
| P21.1.6 | Parameter Comparison | | | | 0 | 623 | 0 = No 1 = Compare with Keypad 2 = Compare with Default 3 = Compare with Set 1 4 = Compare with Set 2 |
| P21.1.7 | Password | 0 | 9999 | | 0 | 624 | |
| P21.1.8 | Parameter Lock | | | | 0 | 625 | 0 = Change Enable 1 = Change Disable |
| P21.1.9 | Multimonitor Set | | | | 0 | 627 | See Para ID 625 |
| P21.1.10 | Default Page | | | | 0 | 628 | 0 = None 1 = Main Menu 2 = Multi-Monitor 3 = Favorite Menu 4 = Keypad Reference |
| P21.1.11 | Timeout Time | 0 | 65535 | s | 30 | 629 | |
| P21.1.12 | Contrast Adjust | 5 | 18 | | 12 | 630 | |

Notes: ① Parameter value can only be changed after the drive has stopped.
② Parameter value will be set to be default when changing macros.

Table 27. Basic setting—P21.1 , continued

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|----------|-------------------------|------------------|------------------|--------|---------|------|--|
| P21.1.13 | Backlight Time | 1 | 65535 | min | 10 | 631 | |
| P21.1.14 | Fan Control | | | | 2 | 632 | 0 = Continuous 1 = Temperature 2 = Run Follow note ② 3 = Calculate Temp note ④ |
| P21.1.15 | HMI ACK Timeout | 200 | 5000 | ms | 200 | 633 | |
| P21.1.16 | HMI Retry Number | 1 | 10 | | 5 | 634 | |
| P21.1.17 | Startup Wizard | 0 | 1 | | 1 | 626 | 0 = No 1 = Yes |
| P21.1.18 | Jog Soft Key Hidden | 0 | 1 | | 0 | 2412 | 0 = Disable 1 = Enable |
| P21.1.19 | Reverse Softkey Hidden | 0 | 1 | | 0 | 2413 | 0 = Disable 1 = Enable |
| P21.1.20 | Output Display Unit | | | | 45 | 2426 | 0 = % 1 = 1/min 2 = rpm 3 = ppm 4 = pps 5 = l/s 6 = l/min 7 = l/h 8 = kg/s 9 = kg/min 10 = kg/h 11 = m3/s 12 = m3/min 13 = m3/h 14 = m/s 15 = mbar 16 = bar 17 = Pa 18 = kPa 19 = mVs 20 = kW 21 = deg C 22 = GPM 23 = gal/s 24 = gal/min 25 = gal/h 26 = lb/s 27 = lb/min 28 = lb/h 29 = CFM 30 = ft3/s 31 = ft3/min 32 = ft3/h 33 = ft/s 34 = in wg 35 = ft wg 36 = PSI 37 = lb/in2 38 = HP 39 = deg F 40 = PA 41 = WC 42 = HG 43 = ft 44 = m 45 = Hz |
| P21.1.21 | Output Display Unit Min | -60000.00 | See Para ID 2427 | varies | 0.00 | 2462 | |
| P21.1.22 | Output Display Unit Max | See Para ID 2462 | 60000.00 | varies | 60 | 2427 | |

Notes: ① Parameter value can only be changed after the drive has stopped.
 ② Parameter value will be set to be default when changing macros.
 ④ Function is not available in FR7 and FR8 drives.

Step 5 — Standard application

Table 28. Version Info—P21.2

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|---------|--------------------------------|------|------|------|----------------|------|------|
| P21.2.1 | Keypad Software Version | | | | | 640 | |
| P21.2.2 | Motor Control Software Version | | | | | 642 | |
| P21.2.3 | Application Software Version | | | | App Firmware | 644 | |
| P21.2.4 | Software Bundle Version | | | | App bundle rev | 1714 | |

Table 29. Application Info—P21.3

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|---------|-----------------------|------|------|------|---------|-----|-------------------|
| P21.3.1 | Brake Chopper | | | | | 646 | 0 = No 1 = Yes |
| P21.3.2 | Brake Resistor Status | | | | | 647 | See Para ID 646 |
| P21.3.3 | Serial Number | | | | | 648 | |

Table 30. User Info—P21.4

| Code | Parameter | Min. | Max. | Unit | Default | ID | Note |
|----------|------------------------|------|------|------|--------------|-----|-----------------------------|
| P21.4.1 | Real Time Clock | | | | 0.0.0.1:1:13 | 566 | |
| P21.4.2 | Daylight Saving | | | | 0 | 582 | 0 = Off 1 = EU 2 = US |
| P21.4.3 | Total MWh Count | | | Mwh | | 601 | |
| P21.4.4 | Total Power Day Count | | | | | 603 | |
| P21.4.5 | Total Power Hr Count | | | | | 606 | |
| P21.4.6 | Trip MWh Count | | | Mwh | | 604 | |
| P21.4.7 | Clear Trip MWh Count | | | | 0 | 635 | 0 = Not Reset 1 = Reset |
| P21.4.8 | Trip Power Day Count | | | | | 636 | |
| P21.4.9 | Trip Power Hr Count | | | | | 637 | |
| P21.4.10 | Clear Trip Power Count | | | | 0 | 639 | See Para ID 635 |

Step 6 — Faults and Warning Codes

Under this menu, you can find Active faults, History faults and Fault codes.

Table 31. Active Faults

| Menu | Function | Note |
|---------------|--|---|
| Active Faults | When a fault/faults appear(s), the display with the name and fault time of the fault will be pop. Press DETAIL to see the fault data. The Active Faults submenu shows the list of faults. Select the fault and push DETAIL to see the fault data. | The fault remains active until it is cleared with the Reset button push for 2s) or with a reset signal from the I/O terminal or Fieldbus. The memory of active faults can store the maximum of 10 faults in the order of appearance. |

Table 30. History Faults

| Menu | Function | Note |
|----------------|---|--|
| History Faults | 10 latest faults are stored in the Fault history, Select the fault and push DETAIL to see the fault data. | The history fault will be stored until it is cleared with the OK button (push for 5s). The memory of active faults can store the maximum of 10 faults in the order of appearance. |

Fault Codes and Descriptions

Configurable 1 = The fault type of this fault is configurable, fault type can be configured as
0 = No Action; 1 = Warning; 2 = Fault; 3= Fault, Coast

| Fault Code | Fault Name | Fault Type | Default Fault Type | Possible Cause | Remedy | Realization |
|------------|--------------------|--------------|--------------------|--|--|-------------|
| 1 | Over Current | Fault | | AC drive has detected too high a current (>4*I _H) in the motor cable: <ul style="list-style-type: none"> • Sudden heavy load increase • Short circuit in motor cables • Unsuitable motor | <ul style="list-style-type: none"> • Check loading • Check motor • Check cables and connections • Make identification run • Check ramp times | DSP |
| 2 | Over Voltage | Fault | | The DC-link voltage has exceeded the limits defined: <ul style="list-style-type: none"> • Too short a deceleration time • Brake chopper is disabled • High overvoltage spikes in supply • Start/Stop sequence too fast | <ul style="list-style-type: none"> • Make deceleration time longer • Use brake chopper or brake resistor (available as options) • Activate overvoltage controller • Check input voltage | DSP |
| 3 | Earth Fault | Configurable | Fault | Current measurement has detected that the sum of motor phase current is not zero: <ul style="list-style-type: none"> • Insulation failure in cables or motor | <ul style="list-style-type: none"> • Check motor cables and motor | DSP |
| 5 | Charging Switch | Fault | | The charging switch is open, when the START command has been given: <ul style="list-style-type: none"> • Faulty operation • Component failure | <ul style="list-style-type: none"> • Reset the fault and restart • Should the fault re-occur, contact the distributor near to you | DSP |
| 6 | Emergency Stop | Fault | | Emergency stop input is active from DI | Remove signal form DI | DSP |
| 7 | Saturation Trip | Fault | | <ul style="list-style-type: none"> • Short circuit in motor cables • IGBT module is damaged | <ul style="list-style-type: none"> • Check cables and connections • Reset the fault and restart • Verify that EMC screw is installed • Should the fault re-occur, contact the distributor near to you | DSP |
| 9 | UnderVoltage | Configurable | Fault | DC link voltage is under the voltage limits defined: <ul style="list-style-type: none"> • Most probable cause: Too low a supply voltage • AC drive internal fault • Defect input fuse • External charge switch not closed Note: This fault is activated only if the drive is in Run state. | <ul style="list-style-type: none"> • In case of temporary supply voltage break reset the fault and restart the AC drive Check the supply voltage. If it is adequate, an internal failure has occurred. Contact the distributor near you | DSP |
| 10 | Input Phase Superv | Configurable | Fault | Input line phase is missing | <ul style="list-style-type: none"> • Check supply voltage, fuses and cable | DSP |

Step 6 — Faults and Warning Codes

| Fault Code | Fault Name | Fault Type | Default Fault Type | Possible Cause | Remedy | Realization |
|------------|--------------------------|--------------|--------------------|--|---|-------------|
| 11 | Output Phase Superv | Configurable | Fault | Current measurement has detected that there is no current in one motor phase | Check motor cable and motor | DSP |
| 12 | Brake Chopper Superv | Fault | | <ul style="list-style-type: none"> No brake resistor installed Brake resistor is broken Brake chopper failure | Check brake resistor and cabling. If these are OK, the chopper is faulty. Contact the distributor near you | DSP |
| 13 | Drive UnderTemp | Configurable | Warning | Too low temperature measured in power Unit's heat sink or board. Heat sink temperature is under -10°C | | DSP |
| 14 | Drive OverTemp | Fault | | Too high temperature measured in power Unit's heat sink or board. Heat sink temperature is over 90°C | <ul style="list-style-type: none"> Check the correct amount and flow of cooling air Check the heat sink for dust Check the ambient temperature Make sure that the switching frequency is not too high in relation to ambient temperature and motor load | DSP |
| 15 | Motor Stalled | Configurable | No Action | Motor is stalled | Check motor and load | DSP |
| 16 | Motor Over Temp | Configurable | No Action | Motor is too hot, based on either the drive's estimate or on temperature feedback | Decrease motor load. If no motor overload exists, check the temperature model parameters | DSP |
| 17 | Motor Under Load | Configurable | No Action | Condition defined by parameter P1.9.15–P1.9.17 have been valid longer than the time defined by P1.9.18 | Check load | DSP |
| 18 | IP Address Conflict | Configurable | Warning | IP setting issue. | Check settings for IP address, verify no duplicates are on the network. | MCU |
| 19 | Power Board EEPROM Fault | Fault | | Power board eeprom fault, memory lost in eeprom. | Cycle power to drive. Try updating software, if issue continues contact Distributor near you. | MCU |
| 20 | FRAM Fault | Fault | | FRAM data error in FRAM memory. | Cycle power to drive. Try updating software, if issue continues contact a Distributor near you. | MCU |
| 21 | S-Flash Fault | Warning | | Serial flash error, serial flash memory failed. | Cycle power to drive. Try updating software, if issue continues contact a Distributor near you. | MCU |
| 25 | MCU WatchDog Fault | Fault | | Watchdog register overflows in MCU | Cycle power to drive. Try updating software, if issue continues contact a Distributor near you. | MCU |
| 26 | Start-up Prevent | Fault | | The time when Interlock signal activates is over setting time. | Stop drive and resend start command. | MCU |
| 29 | Thermistor Fault | Configurable | Fault | Option board or control board thermistor resistor larger than 4.7K | Thermistor open or short, over temperature | MCU |
| 32 | Fan Cooling | Fault | | Fan is damaged or stalled. | Check fan and fan connected wires, verify 24Vdc is supplied to fan. | DSP |
| 36 | Compatibility Fault | Fault | | The control board isn't match with the power board. | Cycle power to drive. Try updating software, if issue continues contact a Distributor near you. | MCU |
| 37 | Device Change | Warning | | Power board or option card change. | Alarm will reset | MCU |
| 38 | Device Added | Warning | | Power board or option board added. | Device is ready for use | MCU |
| 39 | Device Removed | Fault | | Optional board removed from slot, or power board removed from control board. | Device no longer available in drive. | MCU |
| 40 | Device Unknown | Fault | | Unknown device connected (power board/option board) | Check eeprom connection. | MCU |
| 41 | IGBT Over Temp | Fault | | IGBT temperature is too high. | <ul style="list-style-type: none"> Check output loading Check motor size Decrease switching frequency | DSP |
| 50 | AI < 4mA (4to20mA) | Configurable | No Action | Loss in analog input signal, dropped below 4mA. | Verify analog input current reference value on either AI1 or AI2, check cabling. | MCU |

Step 6 — Faults and Warning Codes

| Fault Code | Fault Name | Fault Type | Default Fault Type | Possible Cause | Remedy | Realization |
|------------|--------------------------|--------------|--------------------|---|---|-------------|
| 51 | External Fault | Configurable | Fault | Digital input is activated for external fault input. | Check digital input settings and verify input level, could be an external device causing fault. | MCU |
| 52 | Keypad Comm Fault | Configurable | Fault | The connection between the control keypad and frequency converter is broken, and The local reference is keypad reference or the local control place is keypad, and The keypad communication fault protection is not "NO action" | Check keypad connection and possible keypad cable. | MCU |
| 54 | Option Card Fault | Configurable | Fault | Defective option card or option card slot | "Check right option card and option card slot connections. Check Board Status on Keypad for exact cause of fault. Contact distributor nearest you." | MCU |
| 55 | Realtime Clock Fault | Configurable | Warning | <ul style="list-style-type: none"> Communication between MCU and RTC chip isn't normal The power of RTC chip isn't normal The real time isn't normal | Check the RTC chip, power cycle to drive. If issue continues contact distributor near you. | MCU |
| 56 | PT100 Fault | Configurable | Fault | Temperature is beyond the limit of sensing capacity of PT100 | Pt100 short, open or over temperature, check PT100 temperature probe. | MCU |
| 57 | Motor ID fault | Fault | | The Motor parameters Identification running was not completed successfully | Check motor size Verify the input and output wiring is connected properly. | DSP |
| 58 | Current Measure Fault | Fault | | Current measurement is out of range | Restart the drive again. Should the fault re-occur, contact the distributor near to you | DSP |
| 59 | Power Wiring Error | Fault | | Power wiring connected to output of drive. | Verify power input wiring is connected to L1, L2 and L3 terminals and they are properly torqued. | DSP |
| 60 | Control Board OverTemp | Fault | | Control board is over +85 degrees or under -30 degrees | Check NTC resistor Check control board temperature | MCU |
| 61 | Internal Control Supply | Fault | | +24V port voltage is over 27V or under 17V | Check voltage range of +24V on terminals 12 to 13. If voltage is out of range contact distributor near you. | MCU |
| 62 | Speed Search Fault | Fault | | Speed searching failed when performing flying start. | Check motor parameters' setting and motor connections. | DSP |
| 64 | Replace Battery | Configurable | Warning | RTC Battery voltage is too low. | Check the RTC battery voltage, contact distributor near you for replacement battery. | MCU |
| 65 | Replace Fan | Configurable | Warning | Fan life is less than 2 months | Check the fan, clean out any contamination, contact distributor near you for replacement fan. | MCU |
| 66 | Safety Torque Off | Fault | | STO Triggered, STO input is open. | Reset STO Trigger and verify wiring. Reset fault after input is enabled. | DSP |
| 67 | Current Limit Control | Warning | | The output current has reached the current limit value | Check the load Set the acceleration time longer | DSP |
| 68 | Over Voltage Control | Warning | | The DC link voltage has reached its voltage limit value | Check the input voltage Set the acceleration/deceleration time longer | DSP |
| 69 | System Fault | Fault | | Thermistor spi communication error. | Check thermistor chip. | MCU |
| 70 | System Fault | Fault | | MCU send wrong parameters to DSP. | Restart the drive again. Should the fault re-occur, contact the distributor near to you. | DSP |
| 72 | Power Board EEPROM Fault | Fault | | Power board eeprom fault, memory lost in eeprom when initial drive. | Cycle power to drive. Try updating software, if issue continues contact Distributor near you. | MCU |
| 73 | FRAM Fault | Fault | | Fram chip is broken. | Contact Distributor near you. | MCU |
| 74 | FRAM Fault | Fault | | Crc check fault when access fram data. | Try recovery factory default setting if issue continues contact Distributor near you. | MCU |
| 75 | Power Board EEPROM Fault | Fault | | Eeprom chip or I2c circuit is broken. | Contact Distributor near you. | MCU |

Step 6 — Faults and Warning Codes

| Fault Code | Fault Name | Fault Type | Default Fault Type | Possible Cause | Remedy | Realization |
|-------------------|--------------------------|-------------------|---------------------------|---|--|--------------------|
| 76 | Power Board EEPROM Fault | Fault | | Crc check fault when access eeprom data. | Try recovery factory default setting if issue continues contact Distributor near you. | MCU |
| 77 | S-Flash Fault | Warning | | External serial flash chip is broken. | Contact Distributor near you. | MCU |
| 80 | FieldBus Fault | Configurable | Fault | Loss of communication with BACnet IP, and the fieldbus reference is the remote reference OR the fieldbus control place is the remote control place. | Check RS485 communication wiring. Verify drive parameter are set correctly. Check master programming to verify proper addressing. | MCU |
| 81 | FieldBus Fault | Configurable | Fault | Loss of communication with SA Bus, and the fieldbus reference is the remote reference OR the fieldbus control place is the remote control place. | Check RS485 communication wiring. Verify drive parameter are set correctly. Check master programming to verify proper addressing. | MCU |
| 82 | Bypass Overload | Fault | | Over load when motor is in bypass mode | Check motor connection situation | MCU |
| 83 | FieldBus Fault | Configurable | Fault | Loss of communication with Modbus RTU, and the fieldbus reference is the remote reference OR the fieldbus control place is the remote control place. | Check RS485 communication wiring. Verify drive parameter are set correctly. Check master programming to verify proper addressing. | MCU |
| 84 | FieldBus Fault | Configurable | Fault | Loss of communication with Modbus TCP, and the fieldbus reference is the remote reference OR the fieldbus control place is the remote control place. | Check Ethernet communication wiring. Verify drive parameter are set correctly. Check master programming to verify proper addressing. | MCU |
| 85 | FieldBus Fault | Configurable | Fault | Loss of communication with BACnet, and The fieldbus reference is the remote reference OR The fieldbus control place is the remote control place ,and The fault protection is not "NO action" | Check RS485 communication wiring. Verify drive parameter are set correctly. Check BACnet master configuration programming to verify proper addressing. | MCU |
| 86 | FieldBus Fault | Configurable | Fault | Loss of communication with Ethernet IP, and The fieldbus reference is the remote reference OR The fieldbus control place is the remote control place ,and The fault protection is not "NO action" | Check Ethernet communication wiring. Verify drive parameter are set correctly. Check EIP master configuration programming to verify proper addressing. | MCU |
| 87 | FieldBus Fault | Configurable | Fault | Loss of communication with Profibus/Canopen/Devicenet master on Slot A, and The fieldbus reference is the remote reference OR The fieldbus control place is the remote control place ,and The fault protection is not "NO action" | Check Profibus/Canopen/Devicenet communication wiring. Verify drive parameter are set correctly. Check Profibus/Canopen/Devicenet master configuration programming to verify proper addressing. | MCU |
| 88 | FieldBus Fault | Configurable | Fault | Loss of communication with Profibus/Canopen/Devicenet master on Slot B, and The fieldbus reference is the remote reference OR The fieldbus control place is the remote control place ,and The fault protection is not "NO action" | Check Profibus/Canopen/Devicenet communication wiring. Verify drive parameter are set correctly. Check Profibus/Canopen/Devicenet master configuration programming to verify proper addressing. | MCU |
| 89 | Under Voltage Stop | Fault | | The DC link voltage has reached the Drive under voltage stop limit value. | In case of temporary supply voltage break reset the fault and restart the AC drive Check the supply voltage. If it is adequate, an internal failure has occurred. Contact the distributor near you | DSP |
| 90 | Drive Under Temp | Warning/Fault | | <ul style="list-style-type: none"> Cold weather mode is not enabled, and unit temperature is less than -10 degree. Cold weather mode is enabled and Under Temp Fault Override is not set, unit temperature is less than -30 degree. Cold weather mode is enabled and Under Temp Fault Override is not set, unit temperature is -20~-30 degree. The temp <-20 degree when cold weather start time out. | <p>If unit temp -20 ~ -10 degree, start motor in cold weather mode.</p> <p>If unit temp <-20 degree, Warm up unit above -20deg C for proper operation using cold weather mode.If still < -20 degree when cold weather mode time out, try higher output voltage in cold weather mode.</p> | DSP |

| Fault Code | Fault Name | Fault Type | Default Fault Type | Possible Cause | Remedy | Realization |
|-------------------|------------------------|-------------------|---------------------------|--|---|--------------------|
| 91 | Option Card Fault | Configurable | Fault | External supply on the DeviceNet communication connector is not present. | Check voltage and wiring of power supply of the DeviceNet communication. | MCU |
| 92 | External Fault 2 | Configurable | Fault | Digital input is activated for external fault input. | check digital input settings and verify input level, could be an external device causing fault. | MCU |
| 93 | External Fault 3 | Configurable | Fault | Digital input is activated for external fault input. | check digital input settings and verify input level, could be an external device causing fault. | MCU |
| 103 | Drive OverTemp Warning | Warning | | Drive is 10 degrees away from the trip point of 90 deg C. | Check the drive degree | DSP |
| 104 | Compatibility Fault | Warning | | DSP firmware is not compatible with MCB firmware | Check the DSP firmware revision | MCU |
| 105 | Compatibility Fault | Warning | | Keypad firmware is not compatible with MCB firmware | Check the keypad firmware revision | MCU |
| 106 | Compatibility Fault | Warning | | IO1 card firmware is not compatible with MCB firmware | Check the IO1 card firmware revision | MCU |
| 107 | Compatibility Fault | Warning | | IO2 card firmware is not compatible with MCB firmware | Check the IO2 card firmware revision | MCU |
| 108 | Compatibility Fault | Warning | | IO3 card firmware is not compatible with MCB firmware | Check the IO3 card firmware revision | MCU |
| 109 | Compatibility Fault | Warning | | IO4 card firmware is not compatible with MCB firmware | Check the IO4 card firmware revision | MCU |
| 110 | Compatibility Fault | Warning | | IO5 card firmware is not compatible with MCB firmware | Check the IO5 card firmware revision | MCU |
| 111 | Compatibility Fault | Warning | | Profibus card firmware is not compatible with MCB firmware | Check the Profibus card firmware revision | MCU |

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