Effective August 2020
Supersedes March 2020

Quick start guide

Powering Business Worldwide

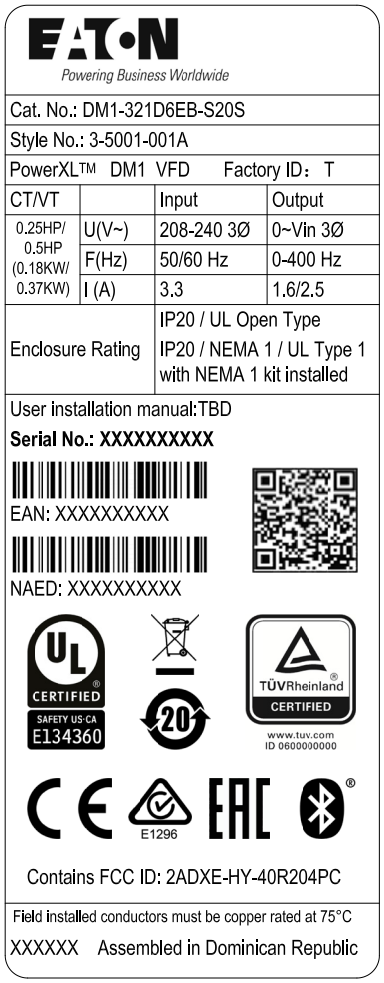
Go to Eaton.com/DM1
Documents Tab: User manuals for DM1
Software Tab: To download Power Xpert inControl and software support

Contents

Step 1 - Ratings

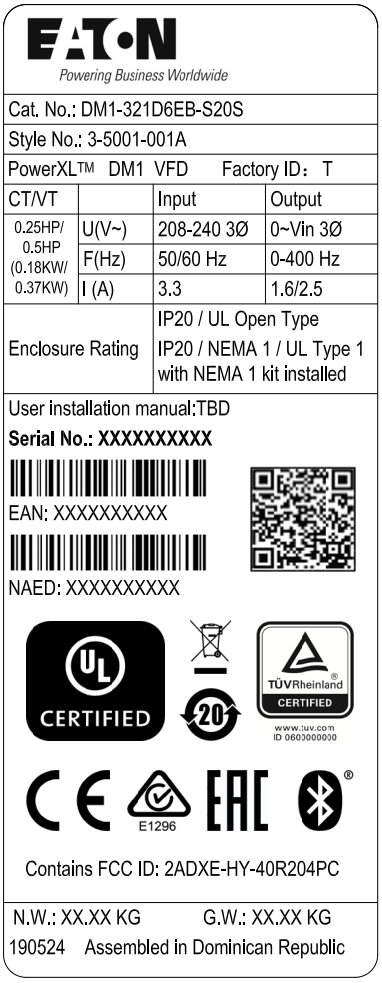
Rating label

Figure 1. Housing rating label.



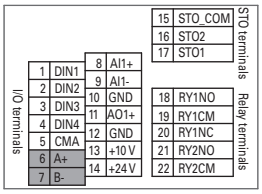
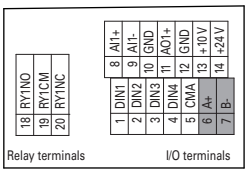
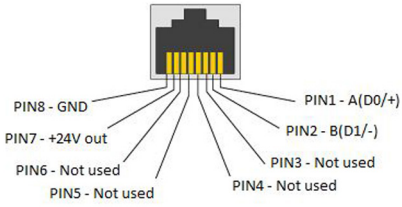
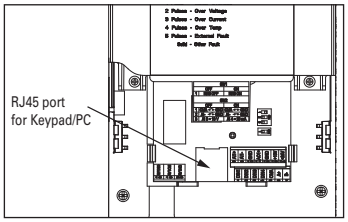
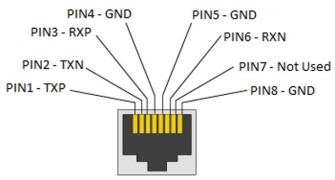
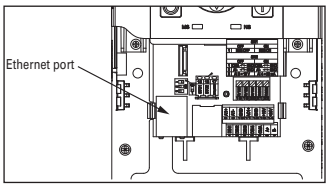
Carton labels (U.S. and Europe)

Figure 2. Carton rating label.



Connection options

Table 1. Connection options - main keypad.

Connection method	Port	Upgrade firmware	Connects to PC tool	Communication settings
RS-485	Modbus serial terminals	✓	✓	DM1 PRO  DM1 
				RS-485 Comm Set: Settable in RS-485 communication parameter group. (Default modbus RTU). **Note:** If set to BACnet MSTP, PC Tool will not communicate.
				Slave address: Settable in RS-485 communication parameter group (Default 1).
				Baud rate: Settable in RS-485 communication parameter group (Default 19,200).
				Parity: Settable in RS-485 communication parameter group (Default even).
				Data bits: Not settable, 8 data bit.
				Stop bits: Not settable, 1 stop bit.
	Keypad port	✓	✓	 
				Slave address: Not settable, set to modbus ID 18.
				Baud rate: Not settable, set to 38,400 Kbaud.
				Parity: Not settable, set to even.
				Data bits: Not settable, 8 data bit.
				Stop bits: Not settable, 1 stop bit.
Ethernet	Ethernet port	---	✓	 **DM1 PRO Only** 
				IP address mode: Settable in ethernet communication parameter group. (Default DHCP with AutoIP). **Note:** Most facilities require a static IP. Change the static IP address before changing. After changing this parameter, a reset or power cycle is required.
				Active IP address: Set depending on IP address assigned static or DHCP.
				Active subnet mask: Set depending on IP address assigned static or DHCP.
				Active default gateway: Set depending on IP address assigned static or DHCP.
				Static IP address: Settable in ethernet communication parameters group. (Default 192.168.1.245).
				Static subnet mask: Settable in ethernet communication parameters group. (Default 255.255.255.0).
				Static default gateway: Settable in ethernet communication parameters group. (Default 192.168.1.1).

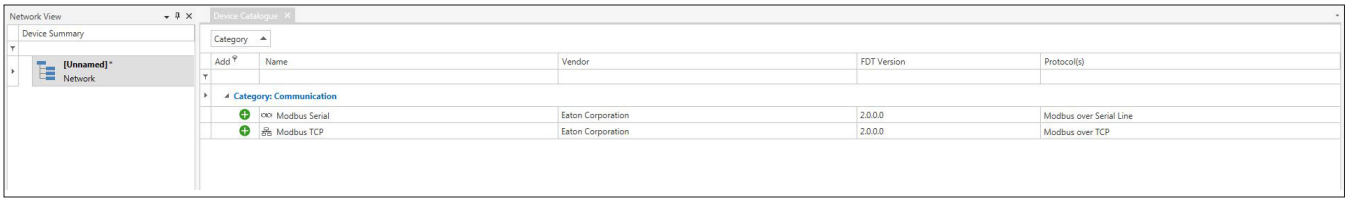
Step 2 - PowerXL DM1 connection process to PowerXpert inControl PC tool

To set up a network, it will require a communication DTM supported by the device DTM being connected to. Determine the communication network being used in your system; Eaton currently supports modbus serial and modbus TCP communication protocols for connecting to its devices.

Creating a network

The framework will show the installed communication modules that are installed along with the saved network name.

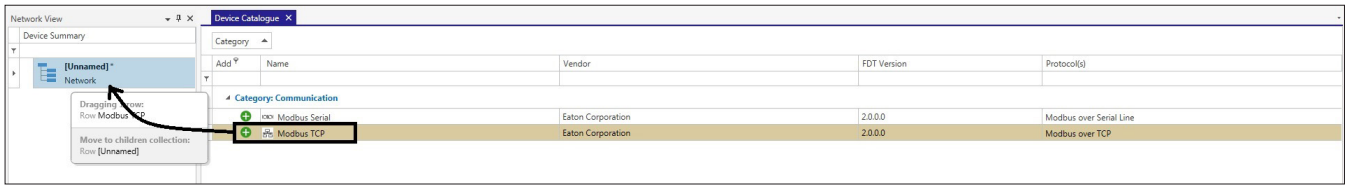
Figure 3. Available communication adapters



Determine what network is being used to connect to the device. To add that network DTM shown in the device catalog there are a few options.

Drag the communication DTM from the Device Catalog to the Network name.

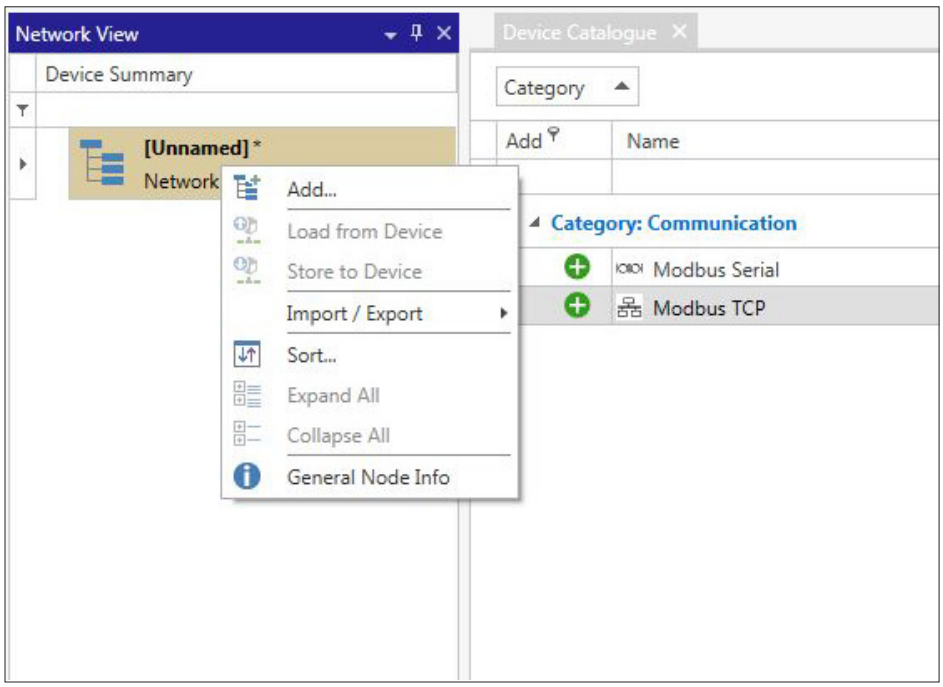
Figure 4. Dragging the communication adapter to create a network.



Press the  sign in the device catalog.

Click on the green "+" next to the communication protocol or right click on the Network Name and select Add. Follow the steps to add the desired network.

Figure 5. Adding the desired network.



Note: If the modbus serial DTM is added an additional window will pop up to set communication protocol settings for the communication adapter.

Connecting to the drive

The PowerXL Series DM1 drive can be connected to the Power Xpert inControl configuration tool through either the RS-485 communication terminals A(25) and B(26), or through the keypad port with Eaton's designed USB to RJ45 cable or with the ethernet port located next to the real-time clock battery. Once the drive has physically been connected to the network, both the drives communication parameter and the PC Tool parameters must be configured. Please refer to the PowerXL DM1 communication manual for configuring the modbus MSTP or modbus TCP communication parameters.

⚠WARNING

Please note that not all communication information for the PowerXL series DM1 drive will be covered in this manual. For additional information regarding the PowerXL DM1 communication abilities, please reference the Communications Manual (MN040051EN).

⚠WARNING

DO NOT attempt to connect through the keypad port with ethernet communication; it is not for ethernet use. It can be used to connect up via RS-485 with Eaton's communication cable.

Quick connection

Modbus TCP on-board communication details

To connect the PowerXL DM1 drive to the Power Xpert inControl PC Tool using an ethernet connection, please follow the below procedure.

1. The static IP address for the DM1 drive defaults to 192.168.001.254. Change the static IP address as needed to follow the site network topology. Example address: 192.168.001.050.
2. The ethernet port on the host computer must also be changed as to match the subnet mask IP requirements of the drive (default set to 255.255.255.000). Find the ethernet port which is connected to the network through the computers network control panel menu (administrative rights to computer are required). Change the IP address as the match first (3) octets of the drives IP address, with a unique address in the last IP octet. Example: 192.168.001.001.

Note: Network administrators at the user's location may have different subnet mask requirements or restrictions. Contact local IT for support for IP addressing if needed.

3. Open the Power Xpert inControl configuration tool and begin a new project.
4. Begin creating the network topology by adding "Modbus TCP" DTM located on the device catalog.
5.
6. Configure the modbus TCP settings to match that of the drive. The default values loaded into the modbus TCP DTM matches the DM1 default IP address.
7. Add a DM1 device DTM to the network by following the same procedure outlined in Step 6. Once added to the network, a prompt will appear requesting an IP address for the device. Enter the same IP address which was set on the device through the keypad in step 1 (Ex: 192.168.001.050), then click "Set".
8. Bring the device online by right-clicking the device node, then select "Go Online", or click the "Go Online" button on the top toolbar.
9. Double-click the DM1 device node to open the drives Online Configuration screen. The user should now be connected to the drive and have the ability to monitor, configure, and control the device.

Modbus RTU on-board communication details

To connect the drive to the Power Xpert inControl remote configuration and control PC Tool, please follow the below procedure.

1. The DM1 drives default slave address for the modbus RTU communication option is "18". It is recommended that the user defines the slave address as to insure a unique address is being assigned to the drive. Change the address as desired by changing parameter P11.2.1 (range available is 1–247 per modbus node).
2. Open the Power Xpert inControl configuration tool and begin a new project.
3. Begin creating the network topology by adding "Modbus Serial" DTM located on the device catalog.
4. Adjust the port setting values for the connected USB-to-serial adaptor by using the Device Manager option through the control panel to match the default values of the drive or to the user's preference. Take note of the COM number assigned to the device as it needs to be assigned in the Power Xpert inControl software.

Note: If the USB-to-serial adaptor port, modbus serial DTM, and DM1 drive are not all configured to the same communication settings the devices will not communicate.

5. Assign the modbus serial communications DTM port setting to match the communication port number found in the device manager in Step 4. Adjust all other values to match the drives default values or to the users preference.
   a. Baud rate default: 38400.
   b. Data bits default: 8 (for modbus TCP specifically).
   c. Parity default: Even.
   d. Stop bits default: 1.
6. Add a DM1 device DTM.

7. Assign the same slave address as in Step 1 to the drives DTM.
8. This will bring up the Multi-frame Setting screen that allows for sizing the drive. This is typically used in creating an offline parameter file. Bring the device online by right-clicking the device node, and then select "Connect" or click the "Connect" button on the top toolbar. The online parameter window will open when once connected.
9. The user should now be connected to the drive and have the ability to monitor, configure, and control the device.

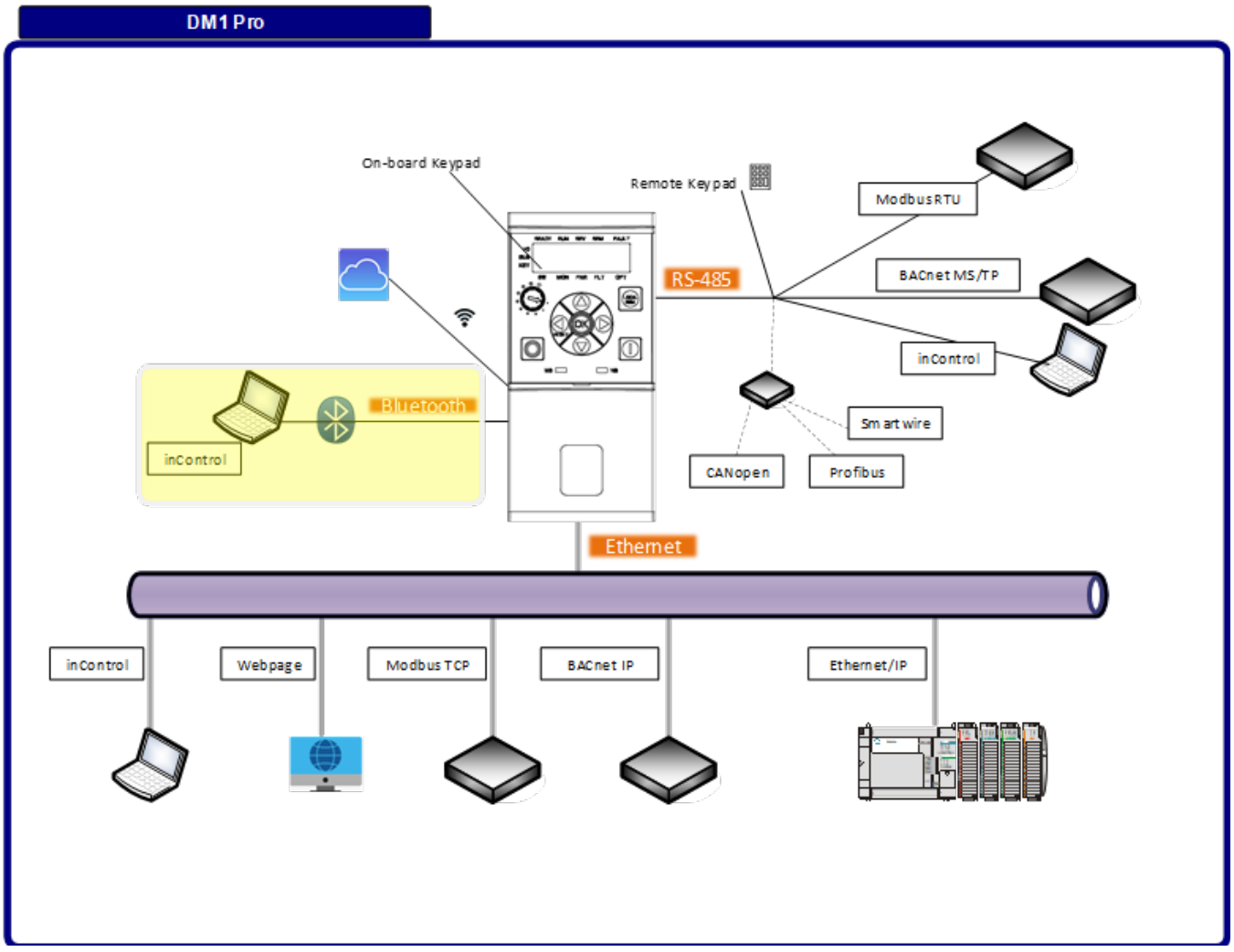
DM1 – Bluetooth connectivity instructions

Introduction

This section contains instructions for configuring DM1/ DM1Pro Bluetooth functionality.

Network Diagram

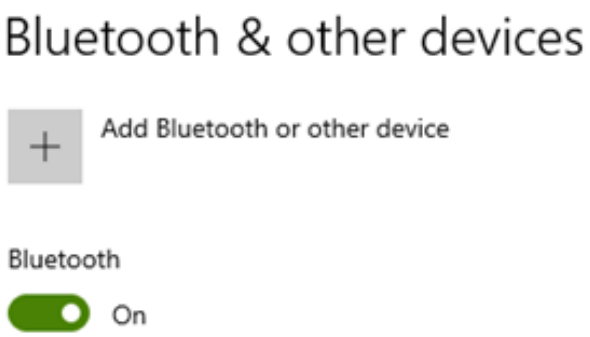
DM1Pro



PC Setup

Insure Bluetooth wireless communication is available on PC/ laptop and set to "Enabled".

On Windows10 computer, WIN-X \ Settings \ Devices.

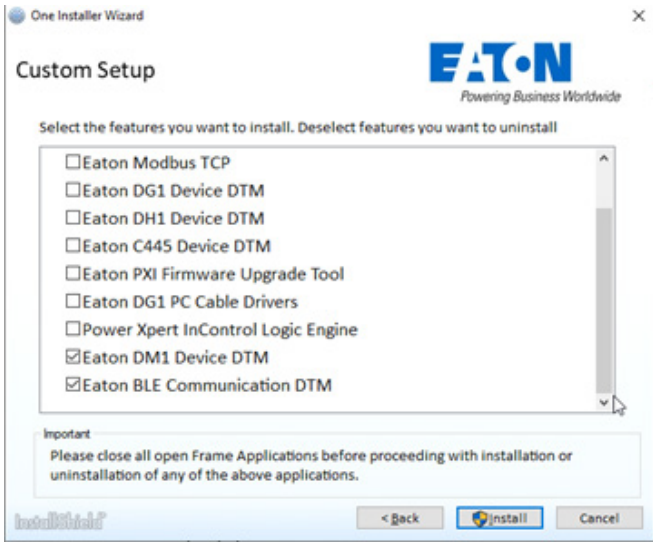


Reference version

Component	Version (or later)
One Installer	2.17.1
Eaton BLE Communication DTM	1.0
PowerXL DM1 DTM	1.0.0.25
PowerXL DM1 bundle	DM1-Pro-V01.03

Power Xpert inControl Installation

Install Power Xpert inControl, DTM for DM1 and BLE Communication DTM using One Installer.

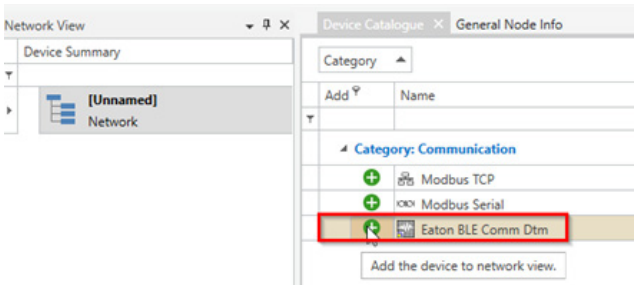


DM1 Bluetooth Parameters

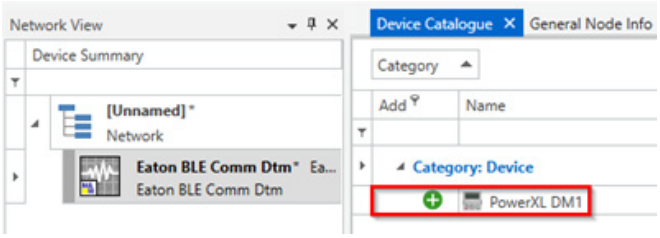
- P11.22 [Blue Tooth Enable] = Enabled
  - (P11.6.1 on keypad)
- P11.48 [Blue Broadcast Mode] = On
  - (P11.6.2 on keypad)

Power Xpert inControl

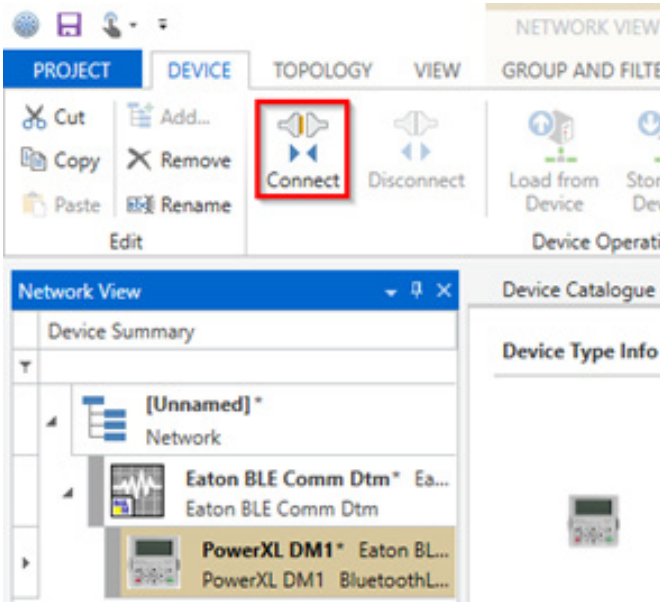
- Open inControl
- Add Eaton BLE Comm DTM in Network View

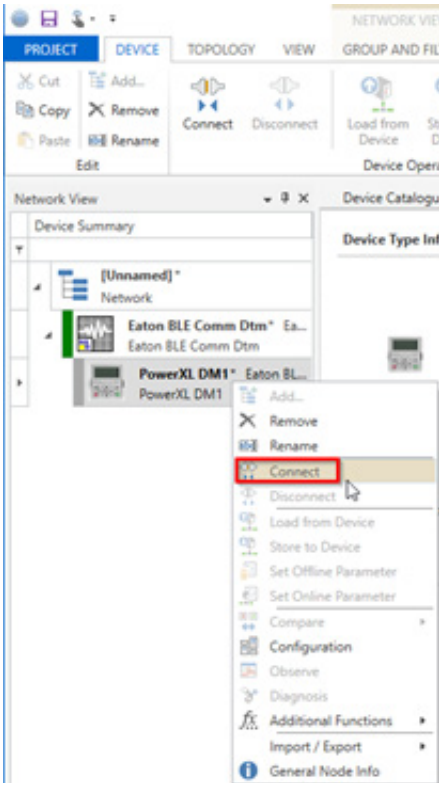


- Select Eaton BLE Communication in Network view and add PowerXL DM1 Device DTM in network view.

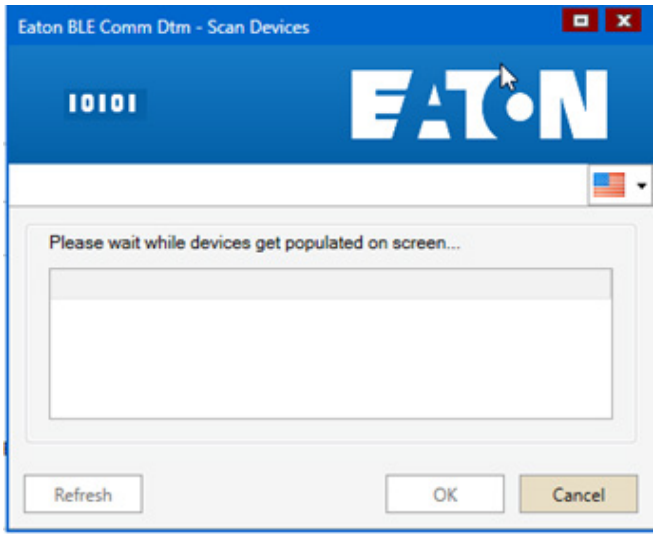


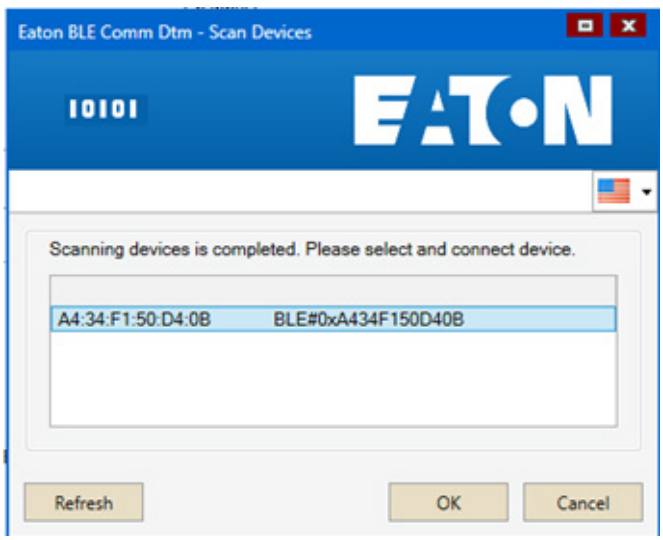
- Connect.
  - Toolbar or right-click context menu.





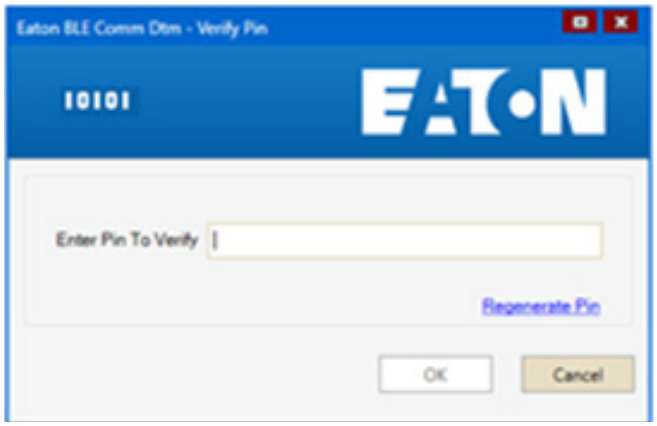
- Eaton BLE Comm DTM will go to Online mode.
- Power XL DM1 starts the connection process.
  - Scan dialog will be displayed to see the devices available within range of Bluetooth.

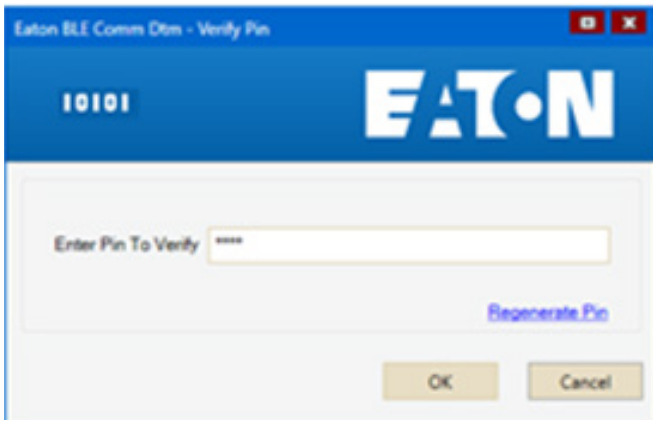




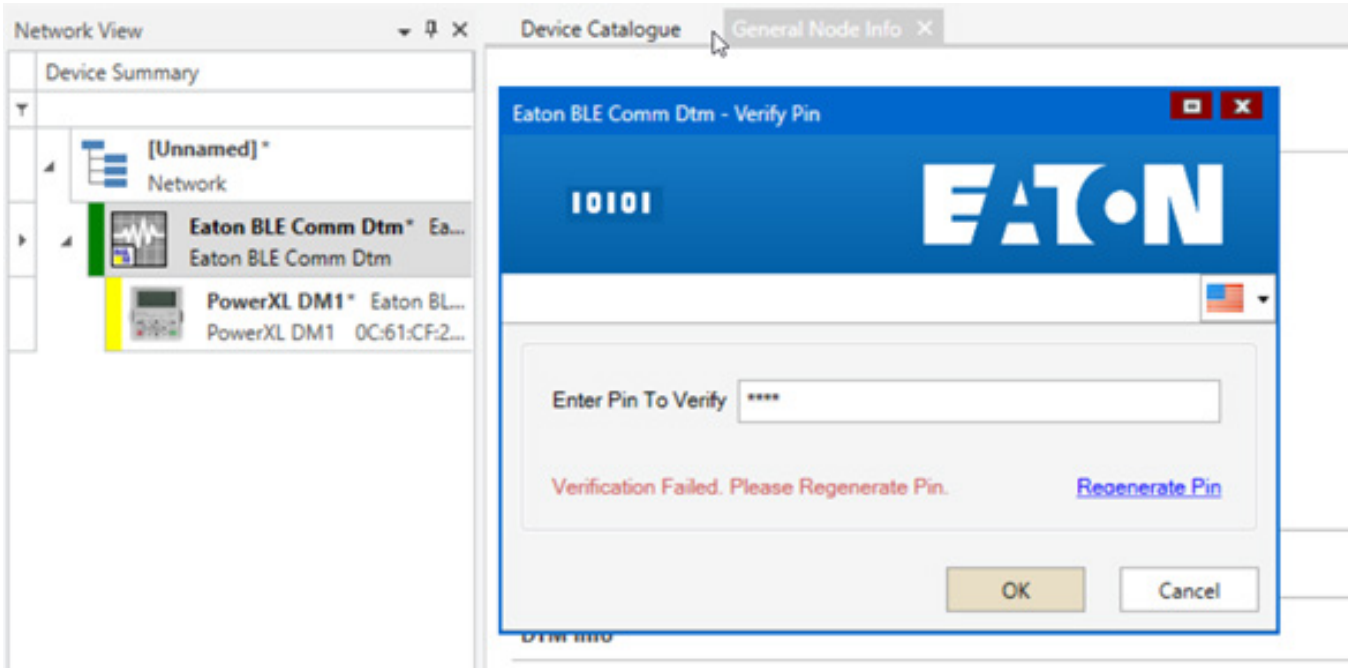
- While scanning is in process, the OK button is disabled.
- Upon completion, the device is selectable and OK is enabled.
- If no device detected, attempt a Refresh.

- **Note:** Scanning will detect only DM1 / DM1 Pro products. All others are filtered.
- Four-digit PIN dialog is generated and displayed on local the keypad and remote keypad.
  - **Note:** It is necessary to have a local or remote keypad to obtain PIN.

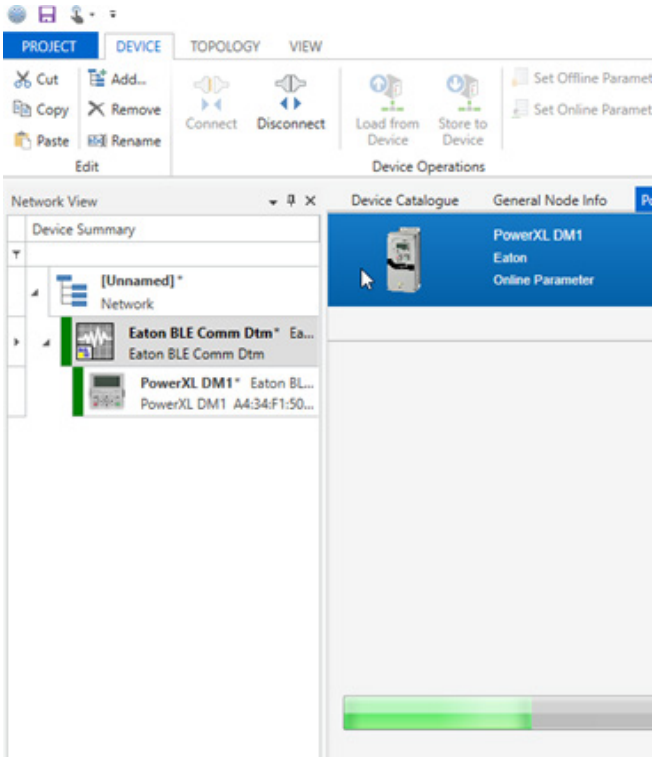




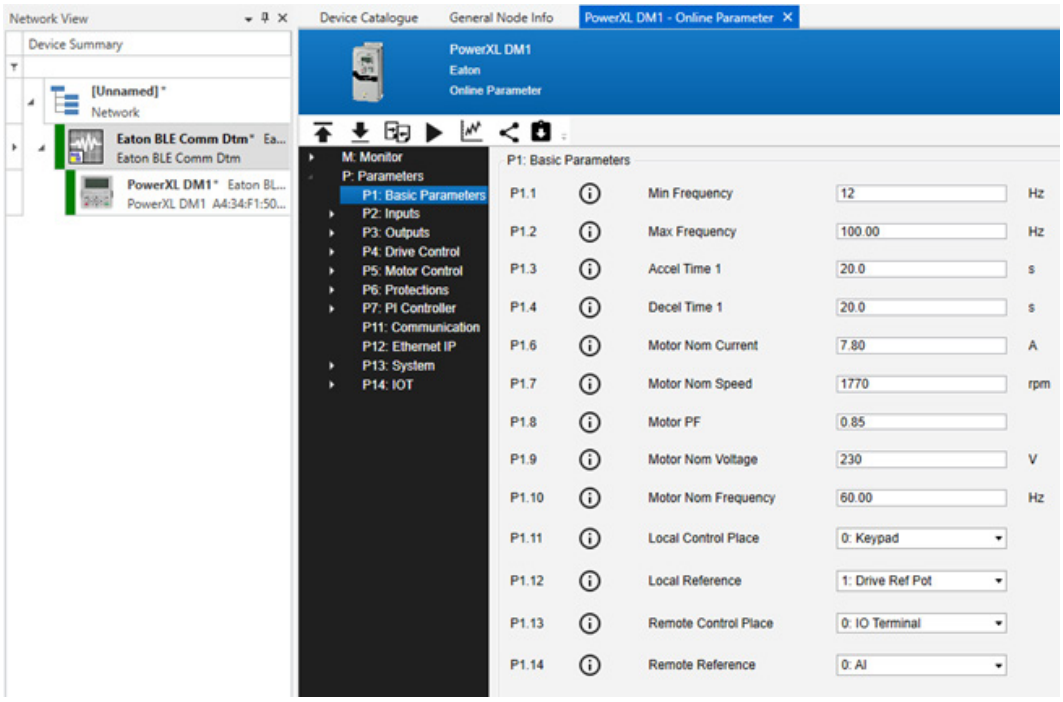
- Regenerated PIN can be used if the entry period elapses.
- If PIN verification fails after two re-attempts, PowerXL DM1 device DTM will move to Disturbed state.



- If PIN verification succeeds, PowerXL DM1 device DTM instance goes to Online connected state and Online parameters page is loaded.



- Parameters page opens.



- Why Verify Pin operation is required.
  - Verify Pin operation is used to create pairing between the device and PC. Pairing information is saved by the device as well as the PC. There are different cases when re-pairing needs to be done. They are as follows:
  - 1. Device was never paired with the PC.
  - 2. Device remembers only the last five pairing information.
  - 3. Pairing information is cleared in the device using P11.49 (P11.6.3 on keypad),
  - **Note:** If pairing is done between the device and PC, and information is available (last five pairs - #2 and pairing info. not cleared - #3) in device, pin verification is not needed.

Additional Help

In the USA please contact the LV Drives Technical Resource Center at 1-800-322-4986 or via email at TRCDrivesTechSupport@Eaton.com.

In Canada please contact the CSC EatonCare Distribution and Control solutions at 1-800-268-3578 or via email at csccanada@eaton.com.

All other supporting documentation is located on the Eaton web site at www.eaton.com/drives.

Device

After inserting the communication DTM, the tool will switch to show device DTMs. Select the device you want to connect to and perform the same sets as used to add communication DTM to add the device. Once the device is added, depending on the communication device selected, a window will pop up to set slave address or IP address of the device (refer to the device specific DTM for an example of setting the device addresses). Once the correct address is set hit the set button.

Offline/online

With the devices added to the Network View, it gives the ability to view an Offline parameter set of the device. By stepping through the multi-frame selection screen, it will size the offline file for the correct drive size or you can connect to the device via the selected communication protocol.

Offline

The offline mode only allows for viewing and setting the parameter without being connect to the device. Once you have the parameters set, you can save this configuration and load it to the drive when you are connected to it. To open an offline file after adding the device to the network, it will open the Multi-frame Settings window, set the drop-downs for the required drive information, and hit set. This will then ask to go through the Quick Start Wizard or open parameters. If you click "Yes" for the Start-up Wizard, it will set through parameter settings; once complete, it will open parameter files. If "No" is selected for the Start-up Wizard, it will close the Multi-frame and then double clicking on the device will open parameter screen.

Figure 6. Selecting the device.

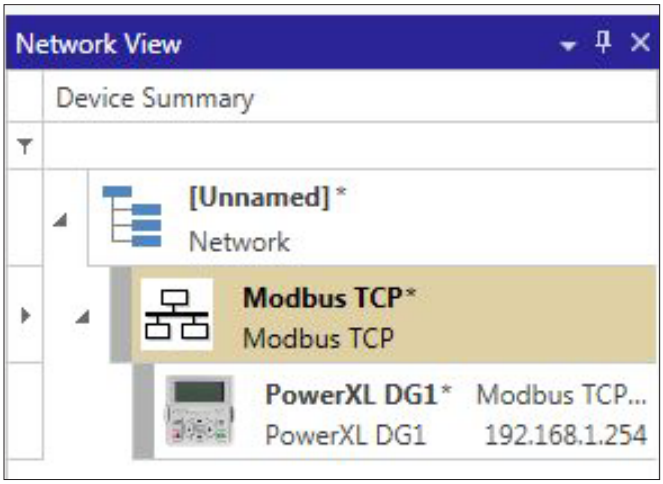
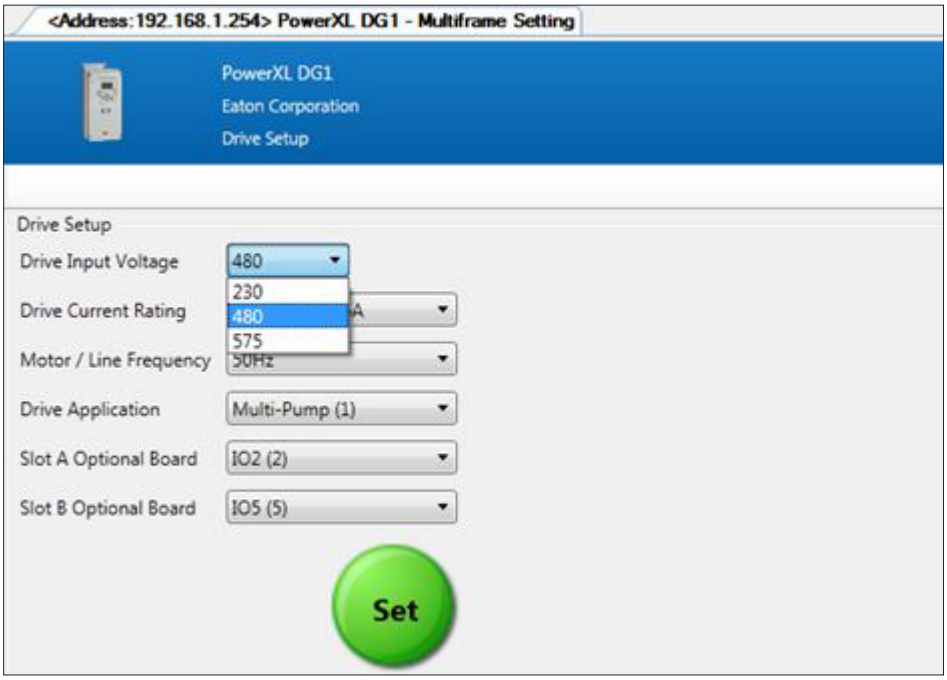


Figure 7. Opening the Parameter screen.

Figure 8. Multi-frame Setting window..



- Drive Voltage would correspond to the voltage rating of the drive in which it is going to be installed.
- Drive Current Rating would correspond to the current rating of the drive in which it is going to be installed.
- Motor/Line Frequency will correspond to the line frequency of the facility in which it is being put.
- Drive Application will select the desired application to be used on the drive depending on the intended use.
- If option cards will be used, select the desired option cards and slots in which they will be inserted.

When Set becomes active, it may be pressed to advance to the Start-up Wizard screen or can press "No" to close the Multi-frame window.

Start-up wizard

The application selected will depend on how many screens will be available in the Start-Up Wizard. The Start-Up Wizard will walk through the most used parameter required to get the drive programmed and running. As the screens come up, by selecting "Next" it will advance you to the next screen, "Back" will take you back to the previous screen, and "Finish" will open up the parameter screen.

Figure 9. Drive setup window.

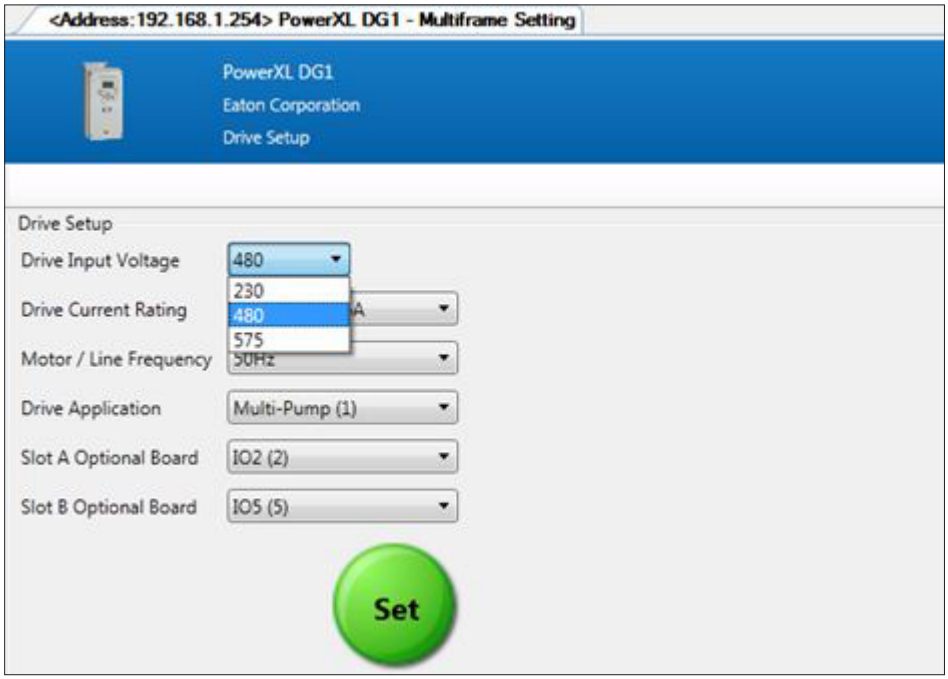
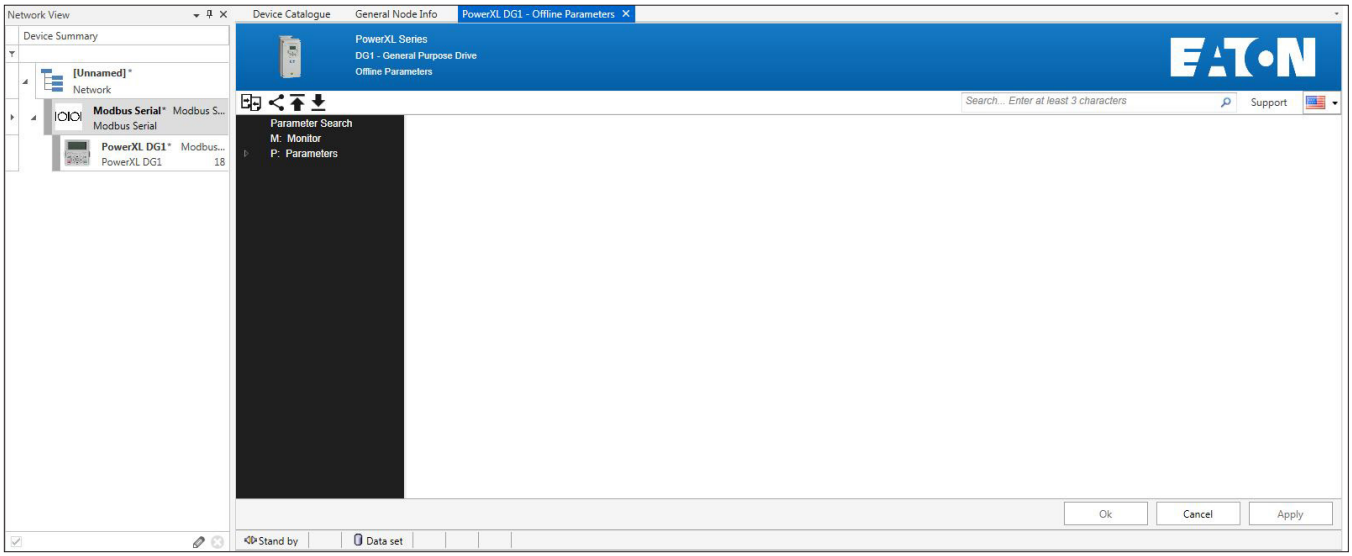


Figure 10. Start-up Wizard screens.



Offline parameter window

The Offline Parameter window gives the ability to compare parameter files, perform a parameter distribution, and Export/Import parameter files that we will discuss in a later section.

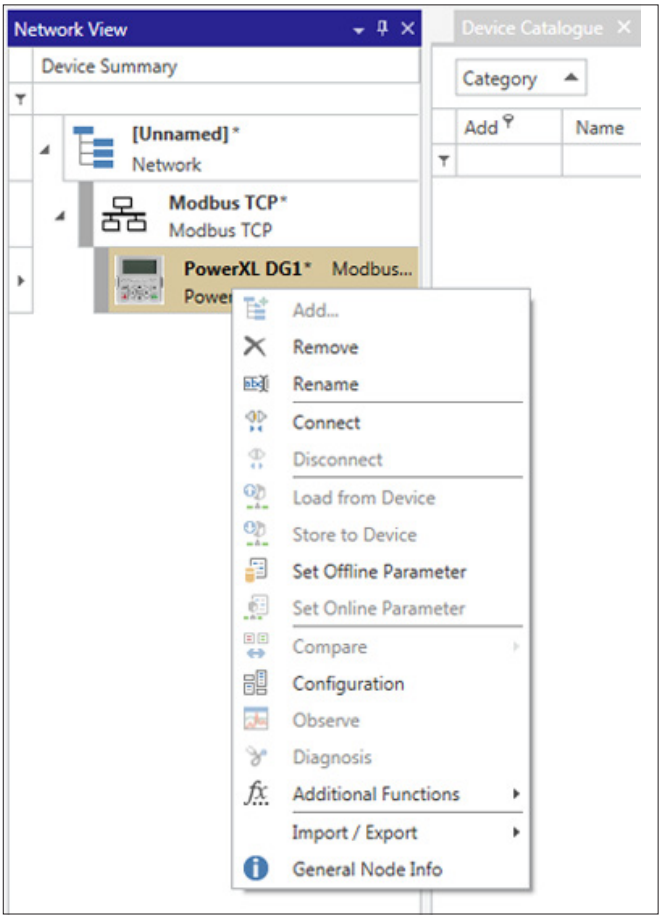
To find a desired parameter or word in a parameter, the Search box allows for a quick way to look for letter order used in a parameter name or by checking the Long description box, it will also look in the parameter descriptions. If further support is needed, the Support button will provide technical support contacts for the Region required. More details on these buttons are described below.

Online

The Online mode is when the tool is connected to the device via the communication protocol. When online, you are able to make changes to the drive and see them change in real time with the drive. It also gives the ability to see fault conditions, monitor device parameters, trend data, and sync real-time clock, compare parameter, device service info, and control the device. To go online with the device, there are a few options.

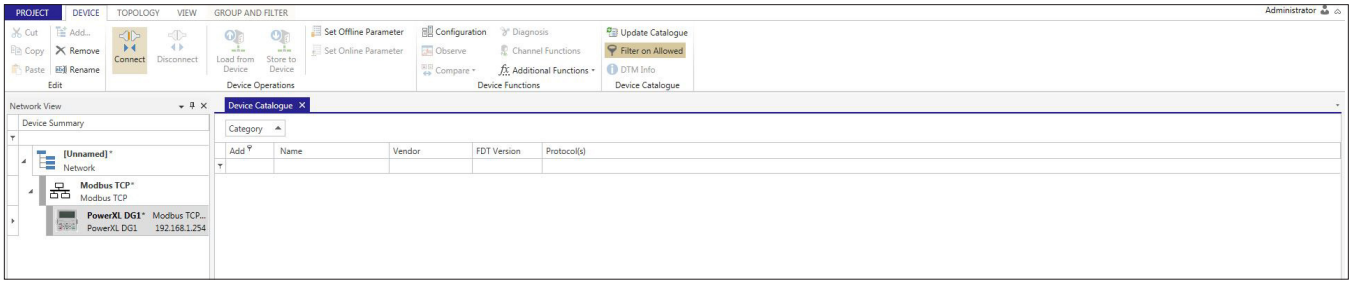
Right click on the device in the Network View and select Connect.

Figure 11. Connecting via the Network View window.



With a device selected in the Network View, click on the Connect button in the ribbon

Figure 12. Connect button in the ribbon.



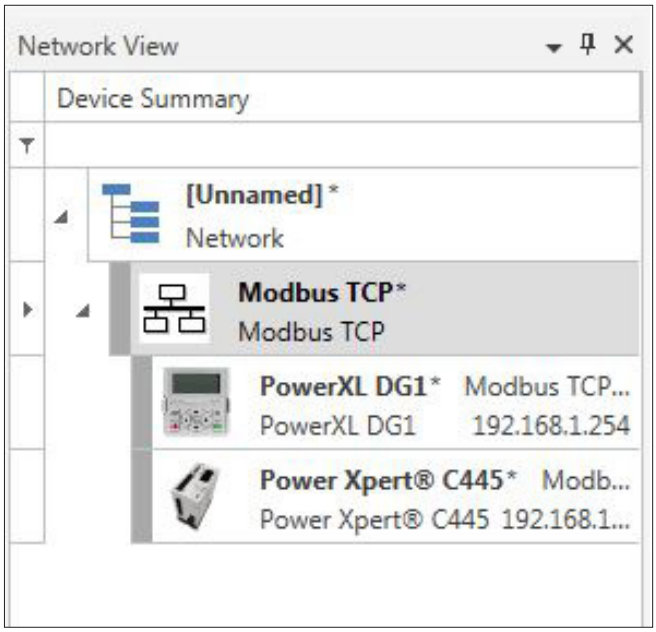
Once connected, the Network tree will show a color bar indicating if the devices connection status:

Green - Online;

Yellow - Communication set issue, check communication settings; and

Grey - Offline.

Figure 13. Network Tree window.



Once connected to the device, you can open the application window by double clicking on the device you would like to view and edit. The tab indicator will show that you are in an online window.

To disconnect from a device, there are the same options as there was to connect to the device with either right clicking on the device and selecting Disconnect or through the ribbon when the device is selected.

Edit DTMs

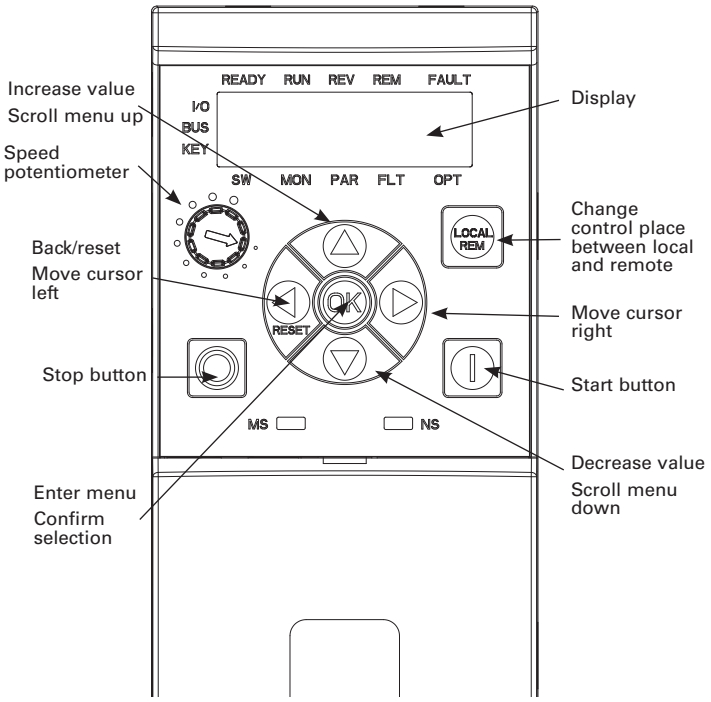
To edit any of the communication or device DTM information, there is a few options, either right click on the device and select configuration or in the Device ribbon select Configuration. Communication DTMs will show communication port settings while Device DTMs will show address settings

Step 3 - Keypad overview

Main keypad

The keypad is the interface between the drive and the user. It features an LCD display, speed potentiometer, and navigation 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 14**).

Figure 14. Main keypad and display.



Main keypad buttons

Buttons description

Table 3. Keypad buttons.

Icon	Button	Description
	Local/Remote	**Local/Remote:** 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.
	Start	**Start:** 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.
	Stop	**Stop:** 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. • Motor stop from the keypad.
	Up	**Up and Down arrows:** • 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 page when in read mode, move to the previous or next brother parameter of this parameter.
	Down	
	Left/Back/Reset	**Left arrow:** • 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. **Back/Reset:** 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. • 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.

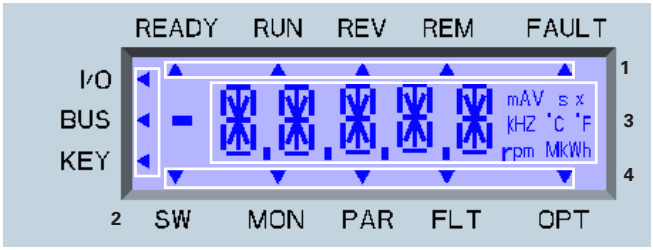
Table 3. Keypad buttons (Cont.).

Icon	Button	Description
	Right	**Right arrow:** • 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:** • To clear all the Fault History if pressed for more than 5 s (including 5 s) 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: • Enter parameter whole edit mode when this parameter can be written. • Enter parameter group mode. • Enter parameter mode from group mode.

Main keypad display

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

Figure 15. Main keypad display and labels.



Overview

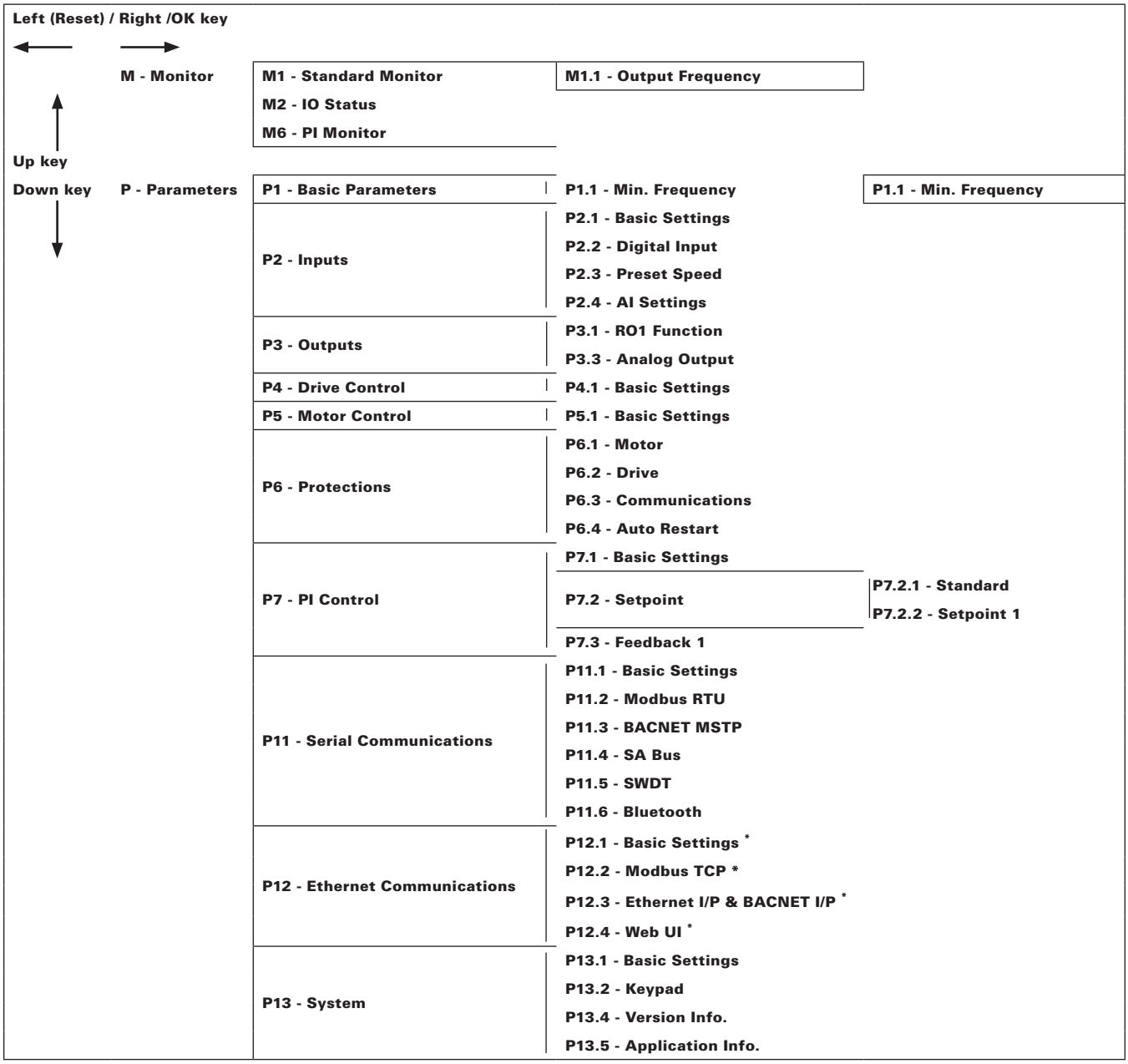
The display on the main keypad is a customized LCD with four information areas:

1. (**Top line**) The top line is state line and indicates whether the device state is:
   - Ready/NRD; Remote/Local;
   - RUN/STP;
   - REV/FWD;
   - Remote/Local; or
   - Fault (lit)/Warning (flashing).
2. (**Left line**) The left line indicates the control source:
   - IO;
   - BUS; or
   - KEY.
3. (**Middle line**) The middle line is the parameter:
   - Path;
   - Value; or
   - Unit.
4. (**Bottom line**) The bottom line is the menu line. It indicates which parameter menu is selected. The choices are:
   - SW: Start-up wizard;
   - MON: Monitor;
   - PAR: Parameter;
   - FLT: Fault; or
   - OPT: Option cards.

Menu navigation - main keypad

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

Figure 16. Main keypad menu navigation.

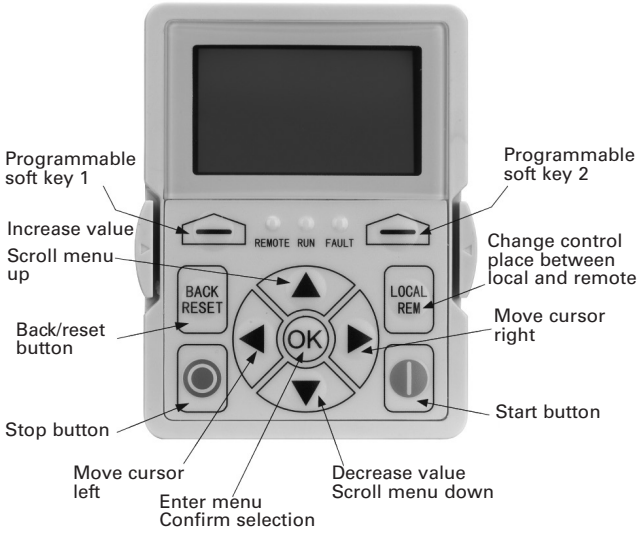


* = DM1 PRO Only.

Remote keypad overview

The remote keypad is another 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.

Figure 17. Remote keypad and display.



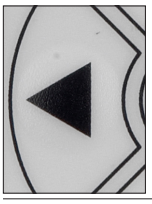
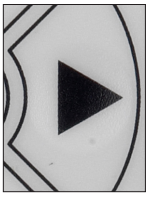
Remote keypad buttons

Buttons description

Table 4. Remote keypad buttons.

Icon	Button	Description
	Soft key 1, Soft key 2	**Soft key 1, soft key 2:** Soft keys 1 and 2 have no functionality with the DM1 device.
	Back/Reset	**Back/Reset:** 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. • 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 2 seconds in any page). • Hold Stop and Back Reset for 5 seconds to return drive to factory default. • At Main Menu page, pressing Back/Reset takes the user to the Default page.
	Local/Remote	**Local/Remote:** 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.
	Up Down	**Up and down arrows:** • 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 the comparison parameter value. • In the Parameter page when in read mode, move to the previous or next brother parameter of this parameter.
		

Table 4. Remote keypad buttons (Cont.).

	Left	**Left arrow:** • 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 the user to the Default page.
	Right	**Right arrow:** • 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:** • To clear all the Fault History if pressed for more than 5 seconds (including 5 seconds) 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: • Enter parameter whole edit mode when this parameter can be written. • Enter parameter group mode. • Enter parameter mode from group mode..
	Stop	**Stop:** 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. • Motor stop from the keypad.
	Start	**Start:** 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.

LED lights

Table 5. 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:** Turns on when there is one or more active drive fault(s).
Remote	**Yellow Local/Remote:** Local: If the local control place is selected, turns off the light. Remote: If the remote control place is selected, turns on the light.

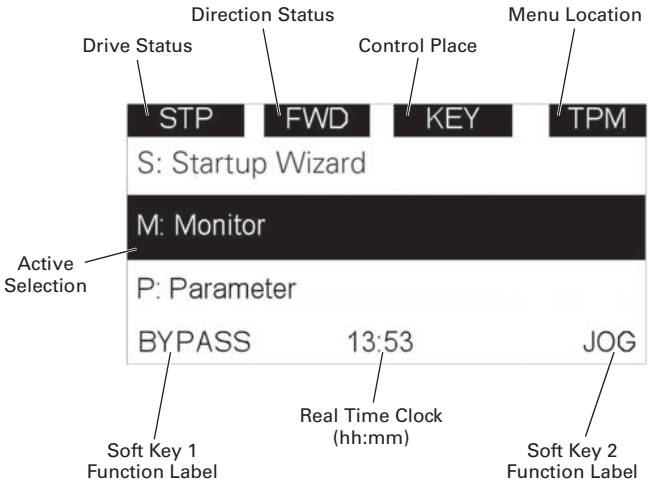
LCD display

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 3.

Figure 18. 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.

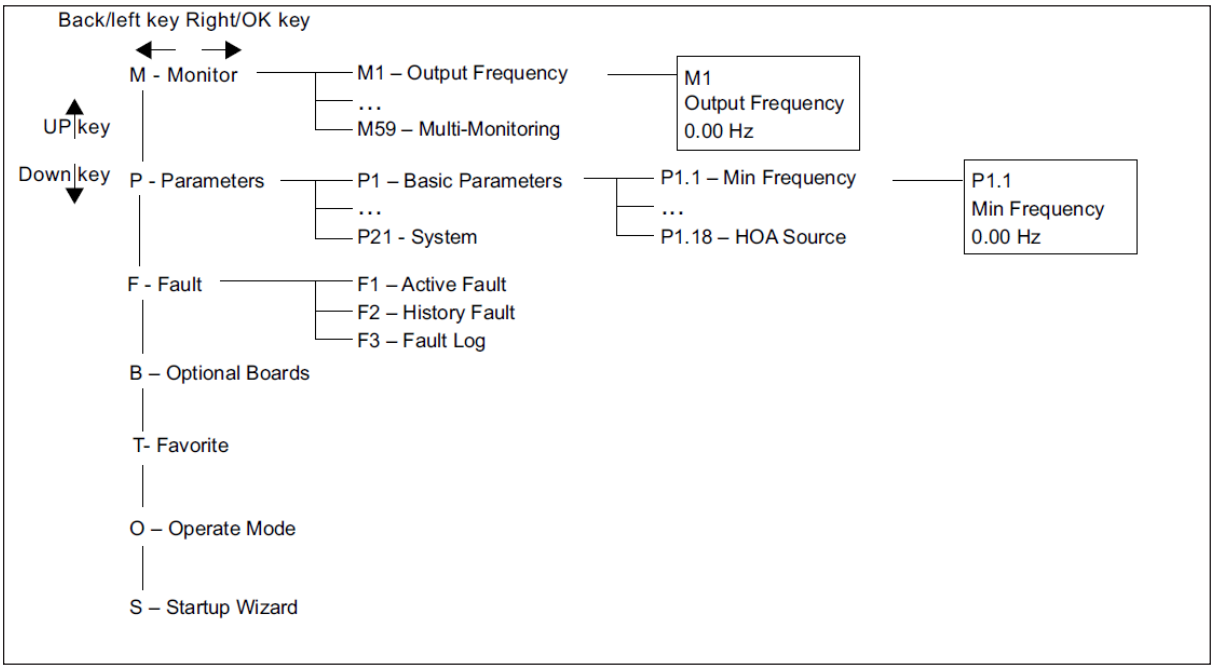
The fourth line is Value line, shows the submenu name or parameters value.

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.

Menu navigation - remote keypad

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

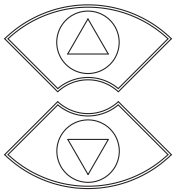
Figure 19. Remote keypad menu navigation.



Step 4 - Start-up

Start-up wizard

In the *Start-up 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 changes value(s).

OK button.

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

Left/back/reset button.

If this button was pressed at the first question, the Start-up Wizard will be cancelled.

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

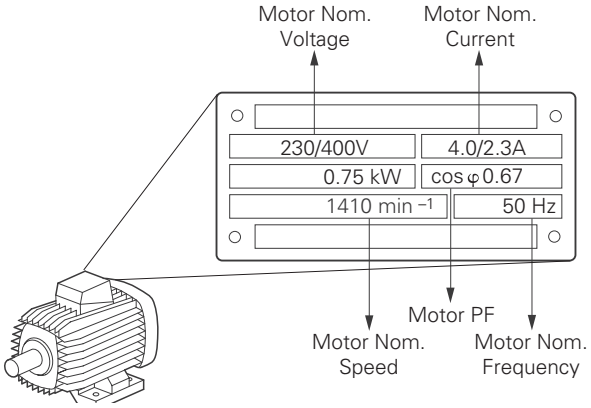
Once you have connected power to your Eaton PowerXL frequency converter, and the Start-up Wizard is enabled, follow these instructions to easily set up your drive.

Table 6. Start-up wizard instructions.

P13.1.7	***Parameter lock PIN***				**ID 624**
Minimum value:	0	**Maximum value:**	9999	**Default value:**	0
Description:	The application selection can be protected against unauthorized changes with the password function. When the password function is enabled, the user will be prompted to enter a password before application changes, parameter value changes, or password changes. By default, the password function is not in use. If you want to activate the password, change the value of this parameter to any number between 1 and 9999. To deactivate the password, reset the parameter value to 0.				
P1.1②	***Minimum frequency***				**ID 101**
Minimum value:	0.00 HZ	**Maximum value:**	400.00 Hz	**Default value:**	0.00 Hz
Description:	These define the frequency limits of the frequency converter. The maximum value for these parameters is 400 Hz. The minimum frequency has to be below the maximum frequency level. These will limit other frequency parameter settings; preset speeds, jog speed, 4 mA fault preset speed, fire mode speed, and brake speed settings.				
P1.2②	***Maximum frequency***				**ID 102**
Minimum value:	0.00 HZ	**Maximum value:**	400.00 Hz	**Default value:**	MaxFreqMFG
Description:	These define the frequency limits of the frequency converter. The maximum value for these parameters is 400 Hz. The minimum frequency has to be below the maximum frequency level. These will limit other frequency parameter settings; preset speeds, jog speed, 4 mA fault preset speed, fire mode speed, and brake speed settings.				
P1.6①	***Motor nominal current***				**ID 486**
Minimum value:	DriveNomCurrCT*1/10 A	**Maximum value:**	DriveNomCurrCT*2 A	**Default value:**	DriveNomCurrCT

Table 6. Start-up wizard instructions (Cont.).

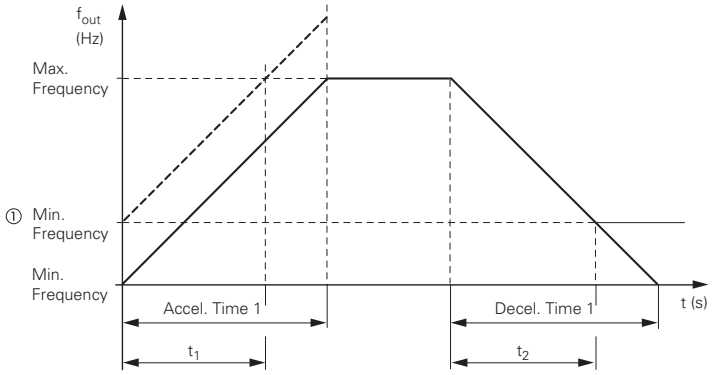
Description:	Motor nominal nameplate full load current. Find this value on the rating plate of the motor.				



P1.7①	***Motor nominal speed***				**ID 489**
Minimum value:	300 rpm	**Maximum value:**	20,000 rpm	**Default value:**	MotorNomSpeedMFG
Description:	Motor nominal nameplate base speed. Find this value on the rating plate of the motor.				
P1.8①	***Motor power factor***				**ID 490**
Minimum value:	0.30	**Maximum value:**	1.00	**Default value:**	0.85
Description:	Motor nominal nameplate full load power factor. Find this value on the rating plate of the motor.				
P1.9①	***Motor nominal voltage***				**ID 487**
Minimum value:	180 V	**Maximum value:**	690 V	**Default value:**	487 V
Description:	Motor nominal nameplate base voltage. Find this value on the rating plate of the motor.				
P1.10①	***Motor nominal frequency***				**ID 488**
Minimum value:	8.00 Hz	**Maximum value:**	400.00 Hz	**Default value:**	MotorNomFreqMFG
Description:	Motor nominal nameplate base frequency. Find this value on the rating plate of the motor. This parameter sets the field weakening point (P8.4) to the same value.				
P1.3②	***Acceleration time 1***				**ID 103**
Minimum value:	0.10 s	**n value:**	3000.00 s	**Default value:**	20 .00 s
Description:	The time required for the output frequency to accelerate from zero frequency to maximum frequency (P1.2). When accelerating from different frequency levels, the acceleration time will be a fraction of the total ramp time.				
P1.4②	***Deceleration time 1***				**ID 104**
Minimum value:	0.10 s	**Maximum value:**	3000.00 s	**Default value:**	20 .00 s

Table 6. Start-up wizard instructions (Cont.).

Description: The time required for the output frequency to decelerate from maximum frequency (P1.2) to zero frequency. When decelerating from different frequency levels, the deceleration time will be a fraction of the total deceleration time.



The values for the acceleration time t_1 and the deceleration time t_2 are calculated as follows:

$$t_1 = \frac{\text{(Max. Frequency - Min. Frequency) x Accel. Time 1}}{\text{Max. Frequency}} \qquad t_2 = \frac{\text{(Max. Frequency - Min. Frequency) x Decel. Time 1}}{\text{Max. Frequency}}$$

P1.13②	***Remote control place***				**ID 135**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = IO terminal; 1 = Fieldbus; or 3 = Keypad.				
Description:	Selects where the drive will look for the start command in the remote location: I/O terminals would be from the digital hard-wired inputs; fieldbus would be a communication bus; and keypad display will indicate what mode is selected				
P1.14①②	***Remote reference***				**ID 137**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = AI; 1 = Drive reference pot; 2 = AI joystick; 3 = Motor pot; 4 = Maximum frequency; 5 = PI control output; 6 = Keypad; or 7 = Fieldbus reference.				
Description:	This parameter determines the reference for remote 1 control mode. This value can be fed from an analog input, keypad, or fieldbus reference signal				
P13.5.3	***Keypad lock PIN***				**ID 75**

Table 6. Start-up wizard instructions (Cont.).

Minimum value:	0	**Maximum value:**	9999	**Default value:**	0
Description:	The keypad can be protected against unauthorized changes with the keypad lock function after no keys are pressed after five minutes. When the password function is enabled, the user will be prompted to enter a password before the keypad display parameter or response to key press except up/down/left/right. By default, the password function is not in use. If you want to activate the password, change the value of this parameter to any number between 1 and 9999. To deactivate the password, reset the parameter value to 0.				
P11.6.1	***Blue tooth enabled***				**ID 1895**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Options:	0 = Disabled; or 1 = Enable.				
Description:	Blue tooth enable.				

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

Now the Start-up 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 ("Start-up Wizard").

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

Step 5 - Standard application

Introduction

The standard application performs all basic functions of a drive. It allows local and remote control, different speed command sources such as analog input and PID. The standard application allows for basic configuration of fault responses. The standard application supports basic tuning of 3-phase induction motors. The standard application allows programming of digital input 3 and 4 and relay outputs 1 and 2.

Standard application includes functions:

- Selectable digital input function;
- Selectable digital output function;
- Output signal filter, scaling, inversion, offset, and range;
- Selectable analog output function;
- PID control;
- Start source (local/remote control function);
- Reference source;
- Flying start;
- 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;
- Programmable switching frequency;
- Multi-preset speeds;
- Emergency stop;
- Fan control;
- DC brake;
- Dynamic brake.

I/O controls

- "Function to terminal" (FTT) programming

The design behind programming of the digital inputs and outs of the DM1 uses "funciton 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.

Control I/O configuration

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

Table 7. I/O connection.

External wiring	Terminal	Short name	Name	Default setting	Description
	1	DI1	Digital input 1	Run forward	Starts the motor in the forward direction.
	2	DI2	Digital input 2	Run reverse	Start the motor in the reverse direction.
	3	DI3	Digital input 3	External fault	Triggers a fault in the drive.
	4	DI4	Digital input 4	Fault reset	Resets active faults in the drive.
	5	CMA	DI1 to DI4 common	Grounded	Allows for sourced input.
	6	A	RS-485 signal A	—	Fieldbus communication (Modbus RTU, BACNet).
	7	B	RS-485 signal B	—	Fieldbus communication (Modbus RTU, BACNet).
Res	8	AI1+ ①	Analog input 1	0 - 10 V	Voltage speed reference (programmable to 4 mA to 20 mA).
	9	AI1-	Analog input 1 ground	—	Analog input 1 common (ground).
	10	GND	I/O signal ground	—	I/O ground for reference and control.
	11	AO1+	Analog output 1	Output frequency	Shows output frequency to motor 0 - 60 Hz (4 mA to 20 mA).
	12	GND	I/O signal ground	—	I/O ground for reference and control.
	13	10 V	10 Vdc reference output	10.3 Vdc +/- 3%	10 Vdc reference voltage.
	14	24 V	24 Vdc control output	24 Vdc In/Out	Control voltage input/output (100 mA max.).
	15	STO_com	Safe torque common	—	Safe torque Off common.
	16	STO2	Safe torque Off 2	—	Safe torque Off 2 input.
	17	STO1	Safe torque Off 1	—	Safe torque Off 1 input.
	18	R1NO	Relay 1 normally open	Run	Changes state when the drive is in the run state.
	19	R1CM	Relay 1 common		
	20	R1NC	Relay 1 normally closed		
	21	R2NO	Relay 2 normally open	Fault	Changes state when the drive is in the fault state.
	22	R2CM	Relay 2 common		

Notes: The above wiring demonstrates a SINK configuration. It is important that CMA and CMB are wired to ground. 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).

① AI1+ and AI2+ support 10K potentiometer.

Standard application—parameters list

On the next pages you will find the lists of parameters within the respective parameter groups. Each parameter section within the table lists:

- Parameter code (location indication on the keypad; shows the operator the present parameter number);.
- Parameter name;
- ID (number of the parameter);

and where applicable:

- Minimum value and units;
- Maximum value and units;
- Default value and units;
- Options (when available); and
- Description of the parameter.

Table 8. Monitor.

M1 - standard.					
M1.1	***Output frequency***				**ID 1**
Minimum value:	Hz	**Maximum value:**	Hz	**Default value:**	Hz
Description:	Output frequency (Hz).				
M1.2	***Frequency reference***				**ID 24**
Minimum value:	Hz	**Maximum value:**	Hz	**Default value:**	Hz
Description:	Reference frequency (Hz).				
M1.3	***Motor speed***				**ID 2**
Minimum value:	rpm	**Maximum value:**	rpm	**Default value:**	rpm
Description:	Motor output speed (rpm).				
M1.4	***Motor current***				**ID 3**
Minimum value:	A	**Maximum value:**	A	**Default value:**	A
Description:	Motor output current RMS (Amps).				
M1.5	***Motor torque***				**ID 4**
Minimum value:	%	**Maximum value:**	%	**Default value:**	%
Description:	Percent motor torque calculated from nameplate values and measured motor current (%).				
M1.6	***Motor power***				**ID 5**
Minimum value:	%	**Maximum value:**	%	**Default value:**	%
Description:	Percent motor power calculated from nameplate values and measured motor current (%).				
M1.7	***Motor voltage***				**ID 6**
Minimum value:	V	**Maximum value:**	V	**Default value:**	V
Description:	Output ac motor voltage (Vac).				
M1.8	***DC-link voltage***				**ID 7**
Minimum value:	V	**Maximum value:**	V	**Default value:**	V
Description:	DC bus voltage (Vdc).				
M1.9	***Unit temperature***				**ID 8**
Minimum value:	°C	**Maximum value:**	°C	**Default value:**	°C
Description:	Heat sink temperature (deg C).				

Table 8. Monitor (Cont.).

M1 - standard (Cont.).					
M1.10	***Motor temperature***				**ID 9**
Minimum value:	%	**Maximum value:**	%	**Default value:**	%
Description:	Motor temperature value calculated from nameplate values and measured motor current (%).				
M1.11	***Latest fault code***				**ID 28**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Description:	Last active fault code value. See fault codes for the value shown here.				
M1.12	***Instant motor power***				**ID 1686**
Minimum value:	kW	**Maximum value:**	kW	**Default value:**	kW
Description:	Instantaneous motor power (kW).				
M2 - I/O status.					
M2.1	***Analog input 1***				**ID 10**
Minimum value:	Varies	**Maximum value:**	Varies	**Default value:**	Varies
Description:	Analog input 1 measured value (Vdc or Amps) selectable with dipswitch.				
M2.2	***Keypad pot voltage***				**ID 1858**
Minimum value:	V	**Maximum value:**	V	**Default value:**	V
Description:	Keypad potentiometer measured value (Vdc). DM1 PRO only.				
M2.3	***Analog output***				**ID 25**
Minimum value:	Varies	**Maximum value:**	Varies	**Default value:**	Varies
Description:	Analog output 1 measured value (Vdc or Amps) selectable with parameter.				
M2.4	***DI1, DI2, DI3***				**ID 12**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Description:	Digital input 1/2/3 status.				
M2.5	***DI4***				**ID 13**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Description:	Digital input 4 status.				
M2.8	***RO1, RO2***				**ID 557**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Description:	Relay output 1 and 2 4 status.				
M5 - PI monitor.					
M5.1	***PI set point***				**ID 16**
Minimum value:	Varies	**Maximum value:**	Varies	**Default value:**	Varies
Description:	PI set point in process units.				
M5.2	***PI feedback***				**ID 18**
Minimum value:	Varies	**Maximum value:**	Varies	**Default value:**	Varies
Description:	PI feedback level in process units.				
M5.3	***PI error value***				**ID 20**
Minimum value:	Varies	**Maximum value:**	Varies	**Default value:**	Varies
Description:	PI error in process units.				
M5.4	***PI output***				**ID 22**
Minimum value:	%	**Maximum value:**	%	**Default value:**	%
Description:	PI output.				

Table 8. Monitor (Cont.).

M5.5	***PI status***				**ID 23**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Options:	0 = Stopped; 1 = Running; or 2 = Sleep mode.				
Description:	PI status indication, indicates if drive is stopped, running in PI mode, or in PI sleep mode.				

M9 - Multi-monitoring.

M9.1	***Multi-monitoring***				**ID 30**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0, 1, 2.
Description:	Displays any three monitoring values in a single screen. The values are selectable via the keypad menu. Multi-monitor page could see three lines of monitoring values. Up and down keys can be used to select the row and then hitting the left arrow key will allow for editing the value then by going up and down.				

Table 9. Operate mode - O.

Code	Parameter	Min.	Max.	Unit	Default	ID	Note
O1	Output frequency			Hz		1	
O2	Freq. reference			Hz		24	
O3	Motor speed			rpm		2	
O4	Motor current			A		3	
O5	Motor torque			%		4	
O6	Motor power			%		5	
O7	Motor voltage			V		6	
O8	DC-link voltage			V		7	
O9	Unit temperature			°C		8	
O10	Motor temperature			%		9	
R11②	Keypad reference	*Minimum frequency*	*Maximum frequency*	Hz	0.00	141	
R12②	PI keypad setpoint 1	*PI process minimum*	*PI process maximum*	Varies	0.00	1307	

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

Table 10. Parameters.

P1 - Basic parameters.					
P1.1②	***Minimum frequency***				**ID 101**
Minimum value:	0.00 Hz	**Maximum value:**	400.00 Hz	**Default value:**	0.00 Hz
Description:	Defines the lowest frequency at which the drive will operate. This setting will limit other frequency parameter settings. 1 = Fire mode minimum frequency. 2 = Derag. 3 = MPFC staging frequency. 4 = MPFC master fixed frequency. 5 = Prime pump frequency. 6 = Prime pump frequency 2.				

Table 10. Parameters (Cont.).

P1.2②	***Maximum frequency***				**ID 102**
Minimum value:	0.00 Hz	**Maximum value:**	400.00 Hz	**Default value:**	MaxFreqMFG
Description:	Defines the highest frequency at which the drive will operate. This will limit other frequency parameters. 1 = Keypad reference. 3 = Motor potentiometer. 3 = Jog speed. 4 = 2nd stage ramp frequency. 5 = Fire mode minimum frequency. 6 = Derag. 7 = MPFC staging frequency. 8 = MPFC master fixed frequency. 9 = Prime pump frequency. 10 = Prime pump frequency 2. 11 = Preset speed frequency. 12 = Frequency limit value. 13 = Reference limit value. 14 = Speed control_fs2. 15 = Stall frequency limit. 16 = 4 mA fault frequency. 17 = MPFC de-staging frequency. 18 = Pipe fill loss frequency low. 19 = Pipe fill loss frequency high. 20 = Broken pipe frequency limit.				
P1.3②	***Accel. time 1***				**ID 103**
Minimum value:	0.10 s	**Maximum value:**	3,000.00 s	**Default value:**	20 s
Description:	Defines the time required for the output frequency to accelerate from zero frequency to maximum frequency.				
P1.4②	***Decel. time 1***				**ID 104**
Minimum value:	0.10 s	**Maximum value:**	3,000.00 s	**Default value:**	20 s
Description:	Defines the time required for the output frequency to decelerate from maximum frequency to zero frequency.				
P1.6①	***Motor nom. current***				**ID 486**
Minimum value:	DriveNomCurrCT*1/10 A	**Maximum value:**	DriveNomCurrCT*2 A	**Default value:**	DriveNomCurrCT A
Description:	Motor nameplate rated full load current. This value is found on the rating plate of the motor.				
P1.7①	***Motor nom. speed***				**ID 489**
Minimum value:	300 rpm	**Maximum value:**	20,000 rpm	**Default value:**	MotorNomSpeedMFG
Description:	Motor nameplate rated speed. This value is found on the rating plate of the motor.				
P1.8①	***Motor PF***				**ID 490**
Minimum value:	0.30	**Maximum value:**	1.00	**Default value:**	0.85
Description:	Motor nameplate rated power factor. This value is found on the rating plate of the motor.				
P1.9①	***Motor nom. voltage***				**ID 487**
Minimum value:	180 V	**Maximum value:**	690 V	**Default value:**	MotorNomVoltMFG V
Description:	Motor nameplate rated voltage. This value is found on the rating plate of the motor.				
P1.10①	***Motor nom. frequency***				**ID 488**
Minimum value:	8.00 Hz	**Maximum value:**	400.00 Hz	**Default value:**	MotorNomFreqMFG Hz
Description:	Motor nameplate rated frequency. This value is found on the rating plate of the motor.				
P1.11②	***Local control place***				**ID 1695**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = keypad; 1 = IO terminal; or 3 = fieldbus.				
Description:	Defines the signal location for the start command in local mode. I/O terminals would be from the digital hard-wired inputs or keypad for Start/Stop buttons on the drive. Keypad display will indicate which mode is selected.				

Table 10. Parameters (Cont.).

P1.12①②	***Local reference***				**ID 136**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	1
Options:	0 = AI; 1 = drive ref. pot; 4 = maximum frequency; 6 = keypad; or 7 = fieldbus ref.				
Description:	Defines the signal location for the speed reference in local mode.				
P1.13②	***Remote control place***				**ID 135**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = IO terminal; 1 = fieldbus; or 3 = keypad.				
Description:	Defines the signal location for the start command in remote mode. I/O terminals would be from the digital hard-wired inputs or keypad for Start/Stop buttons on the drive. Keypad display will indicate which mode is selected.				
P1.14①②	***Remote reference***				**ID 137**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = AI; 1 = drive reference pot; 4 = maximum frequency; 6 = keypad; or 7 = fieldbus reference.				
Description:	Defines the signal location for the speed reference in remote mode.				

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. Inputs.

P2.1 - Basic settings.					
P2.1.3①②	***IO terminal Start/Stop logic***				**ID 143**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Forward - reverse: maintained input on start signal 1 to run forward and a maintained signal on start signal 2 for reverse. 1 = Start - reverse: maintained input on start signal 1 to run forward and a maintained signal on start signal 2 for reverse. 2 = Start - enable: maintained input on start signal 1 to run forward and a maintained signal on start signal 2 to enable the drive to run. 3 = Start pulse - Stop pulse: used for three wire operation. Start signal 1 uses a normally open start and start signal 2 uses a normally closed stop.				
Description:	Defines the functionality for start signal 1 and start signal 2. By default, start signal 1 is DI1 and start signal 2 is DI2.				
	0 = P3.2: DI closed contact = start forward P3.3: DI closed contact = start reverse. This would be considered 2-wire control with either a contact used on the start FWD or start REV commands. When contacts open, the motor stops.				

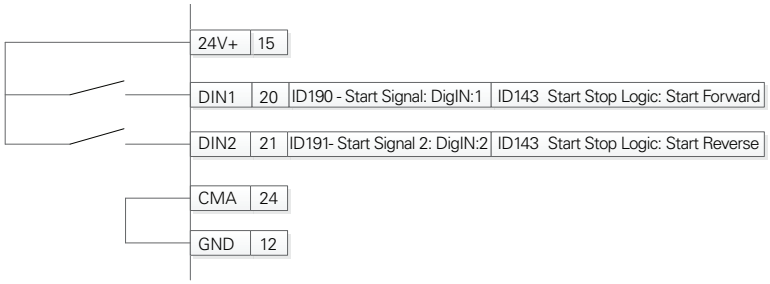
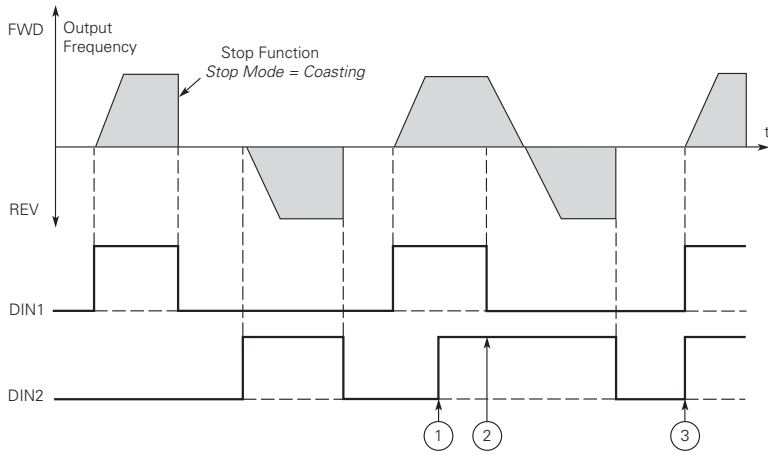
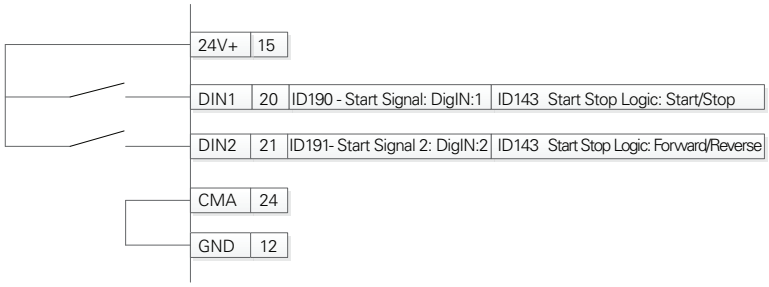


Table 11. Inputs (Cont.).



Notes: ① The first selected direction has the highest priority.
② When the DIN1 contact opens the direction of rotation starts to change.
③ If start forward (DIN1) and start reverse (DIN2) signals are active simultaneously the start forward signal (DIN1) has priority.

1 = P3.2: DI closed contact = start /open contact = stop P3.3: DI closed contact = reverse / open contact = forward. This would be considered 2-wire control with a contact on start/stop, contact open it stops and direction on 2nd start signal.



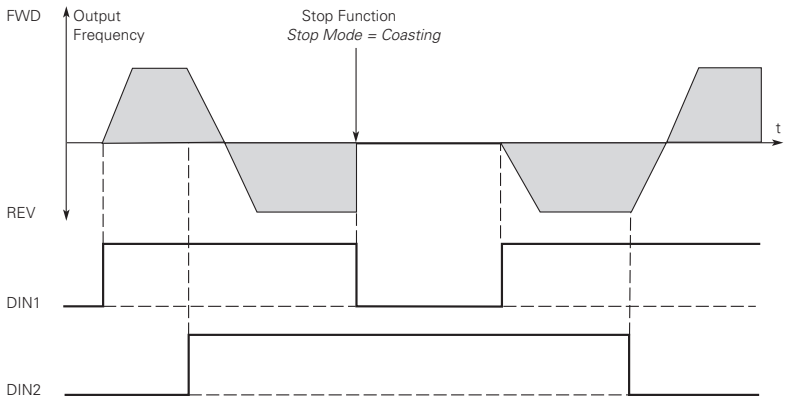
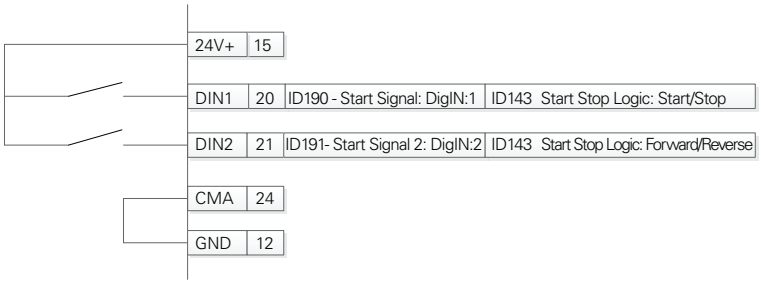
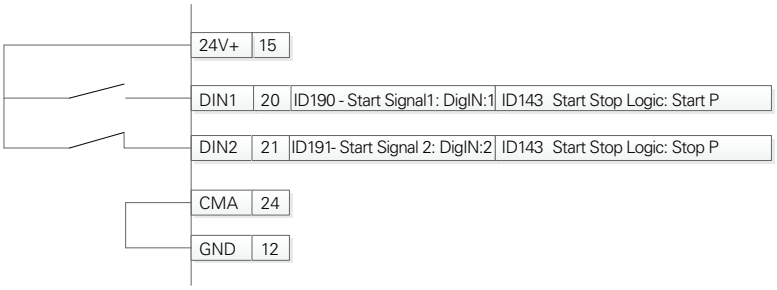


Table 11. Inputs (Cont.).

2 = P3.2: DI closed contact = start/open contact = stop P3.3: DI closed contact = start enabled/open contact = start disabled and drive stopped if running motor direction keeps forward. This would be considered 3-wire control with start signal 2 required to be closed to enable start on start signal 1.



3 = Three-wire connection (pulse control): P3.2: DI changes from open to closed = start pulse P3.3: DI changes from closed to open = stop pulse P3.5: DI closed contact = reverse/open contact = forward. This would be considered 3-wire control with start signal 1 being the start pulse and start signal 2 being the NC stop.



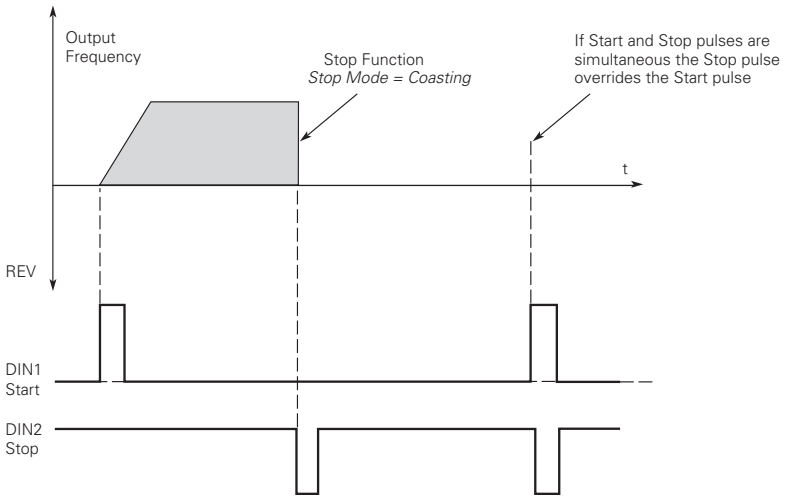


Table 11. Inputs (Cont.).

P2.2 - Digital input.					
P2.2.5②	***DI3 function***				**ID 1805**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	4
Options:	0 = Not used, no action. 1 = IO terminal start signal 1 - when the control source is set to IO terminal, this input when closed will perform the action defined by P2.1.3. 2 = IO terminal start signal 2 - when the control source is set to IO terminal, this input when closed will perform the action defined by P2.1.3. 3 = Reverse - when Start/Stop logic is set to 3 start pulse stop pulse, this input will cause the drive to start in the reverse direction. 4 = Ext. fault 1 - when closed, ext. fault 1 will be activated. 7 = Fault reset - when closed, all active faults will be reset. 8 = Run enable - when closed the drive will allow a start command and be in the ready state. 9 = Preset speed B0 - the seven preset speeds are selected via three binary inputs, this is least significant bit in that binary input. 10 = Preset speed B1 - the seven preset speeds are selected via three binary inputs. 11 = Preset speed B2 - the seven preset speeds are selected via three binary inputs, this is most significant bit in that binary input. 16 = Accel./decel. time set - when open, accel./decel. time 1 will be used, when closed accel./decel. time 2 will be used. 19 = Remote control - when closed, the drive will be forced to the remote control place. 20 = Local control - when closed, the drive will be forced to the local control place. 22 = PI controller - when closed, the drive will force the reference source to PI controller output. 23 = PI setpoint select - when open, parameter setpoint 1 is active, when closed, setpoint 2 is active. 24 = Motor interlock 1 - when closed, motor will be enabled to run. 29 = DC brake active - when closed, DC injection braking will be active. 31 = Derag. enable - when closed. The Derag. cycle for pumps will be initiated.				
Description:	Defines the function of digital input 3.				
P2.2.7②	***DI4 function***				**ID 1807**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	7
Options:	0 = Not used, no action. 1 = IO terminal start signal 1 - when the control source is set to IO terminal, this input when closed will perform the action defined by P2.1.3. 2 = IO terminal start signal 2 - when the control source is set to IO terminal, this input when closed will perform the action defined by P2.1.3. 3 = Reverse - when Start/Stop logic is set to 3 start pulse stop pulse, this input will cause the drive to start in the reverse direction. 4 = Ext. fault 1 - when closed, ext. fault 1 will be activated. 7 = Fault reset - when closed, all active faults will be reset. 8 = Run enable - when closed the drive will allow a start command and be in the ready state. 9 = Preset speed B0 - the seven preset speeds are selected via three binary inputs, this is least significant bit in that binary input. 10 = Preset speed B1 - the seven preset speeds are selected via three binary inputs. 11 = Preset speed B2 - the seven preset speeds are selected via three binary inputs, this is most significant bit in that binary input. 16 = Accel./decel. time set - when open, accel./decel. time 1 will be used, when closed accel./decel. time 2 will be used. 19 = Remote control - when closed, the drive will be forced to the remote control place. 20 = Local control - when closed, the drive will be forced to the local control place. 22 = PI controller - when closed, the drive will force the reference source to PI controller output. 23 = PI setpoint select - when open, parameter setpoint 1 is active, when closed, setpoint 2 is active. 24 = Motor interlock 1 - when closed, motor will be enabled to run. 29 = DC brake active - when closed, DC injection braking will be active. 31 = Derag. enable - when closed. The Derag. cycle for pumps will be initiated.				
Description:	Defines the function of digital input 4.				
P2.3 - Preset speed.					
P2.3.1②	***Preset speed 1***				**ID 105**
Minimum value:	0.00 Hz	**Maximum value:**	MaxFreq Hz	**Default value:**	5.00 Hz
Description:	Preset speed is selected with digital inputs using a binary input.				
P2.3.2②	***Preset speed 2***				**ID 106**
Minimum value:	0.00 Hz	**Maximum value:**	MaxFreq Hz	**Default value:**	10.00 Hz
Description:	Preset speed is selected with digital inputs using a binary input.				
P2.3.3②	***Preset speed 3***				**ID 118**
Minimum value:	0.00 Hz	**Maximum value:**	MaxFreq Hz	**Default value:**	15.00 Hz
Description:	Preset speed is selected with digital inputs using a binary input.				

Table 11. Inputs (Cont.).

P2.3.4②	***Preset speed 4***				**ID 119**
Minimum value:	0.00 Hz	**Maximum value:**	MaxFreq Hz	**Default value:**	20.00 Hz
Description:	Preset speed is selected with digital inputs using a binary input.				
P2.3.5②	***Preset speed 5***				**ID 120**
Minimum value:	0.00 Hz	**Maximum value:**	MaxFreq Hz	**Default value:**	25.00 Hz
Description:	Preset speed is selected with digital inputs using a binary input.				
P2.3.6②	***Preset speed 6***				**ID 121**
Minimum value:	0.00 Hz	**Maximum value:**	MaxFreq Hz	**Default value:**	30.00 Hz
Description:	Preset speed is selected with digital inputs using a binary input.				
P2.3.7②	***Preset speed 7***				**ID 122**
Minimum value:	0.00 Hz	**Maximum value:**	MaxFreq Hz	**Default value:**	35.00 Hz
Description:	Preset speed is selected with digital inputs using a binary input.				

P2.4 - AI settings.

P2.4.1	***AI mode***				**ID 222**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	1
Options:	0 = 0 - 20 mA; or 1 = 0 - 10 V.				
Description:	Defines the analog input mode to current or voltage the DIP switches on control board will need to be set to the same mode as this parameter. *DM1 PRO CN5 terminals 8 and 9 for current or voltage, also need to set DIP switches SW2 2 and 3 on control board, near the RJ45 port. DIP switches SW2 2 and 3 off for voltage. Current mode, if using the +10 V supply on CN5 terminals 13 of the DM1 / DM1 Pro, it will require DIP switches SW2 2 and 3 on to complete the current loop. When doing a current loop with an external supply, the DIP switches SW2 2 off and 3 on.				

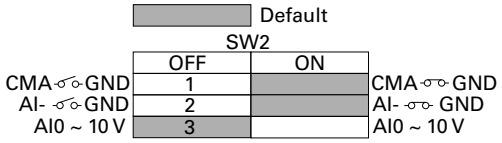
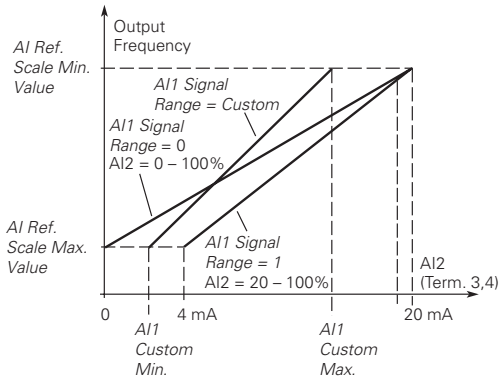


Table 11. Inputs (Cont.).

P2.4.2②	***AI signal range***				**ID 175**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = 0-100%/0-20 mA/0-10 V. 1 = 20-100%/4-20 mA/2-10 V.				
Description:	With this parameter, you can select the analog input 1 signal range. For selection "Customized," see "AI Custom Min" and "AI Custom Max", this enables a customized signal range.				



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 12. Outputs.

P3.1 - Digital output.					
P3.1.1②	***RO1 function***				**ID 152**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	2
Options:	0 = Not used - no action. 1 = Ready - drive is ready for operation. 2 = Run - drive is running. 3 = Fault - drive is faulted. 4 = Fault invert - drive is not faulted. 5 = Warning - drive has a warning message. 6 = Reverse - drive is outputting reverse phase rotation. 7 = At speed - output frequency has reached the set reference. 8 = Zero frequency - drive output is at zero frequency. 24 = STO fault output - safe torque off input is activated. 26 = Remote control - remote is the control place. 37 = PI sleep - PI controller is in a sleep state.				
Description:	Defines the function associated with changing the state of relay output 1.				
P3.1.4②	***RO2 function***				**ID 153**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	3
Options:	0 = Not used - no action. 1 = Ready - drive is ready for operation. 2 = Run - drive is running. 3 = Fault - drive is faulted. 4 = Fault invert - drive is not faulted. 5 = Warning - drive has warning message. 6 = Reverse - drive is outputting reverse phase rotation. 7 = At speed - output frequency has reached the set reference. 8 = Zero frequency - drive output is at zero frequency. 24 = STO fault output - safe torque off input is activated. 26 = Remote control - remote is the control place. 37 = PI sleep - PI controller is in a sleep state.				
Description:	Defines the function associated with changing the state of relay output 2.				

Table 12. Outputs (Cont.).

P3.3 - Analog output.					
P3.3.1②	***AO mode***				**ID 227**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = 0 - 20 mA; or 1 = 0 - 10 V.				
Description:	Defines the analog output mode to current or voltage.				
P3.3.2②	***AO function***				**ID 146**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	1
Options:	1 = Output frequency (0 - maximum frequency). 2 = Frequency reference (0 - max frequency). 3 = Motor speed rpm (0 - nameplate rpm). 4 = Motor current (0 - nameplate current). 5 = Motor torque (0 - calculated nominal). 6 = Motor power (0 - calculated nominal). 7 = Motor voltage (0 - nameplate voltage.; 8 = DC bus voltage (0 - 1,000 Vdc). 12 = Analog input (0% - 100%).				
Description:	Select the function desired to the terminal AO1.				

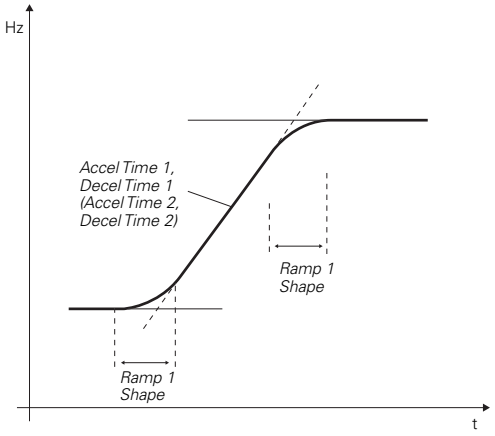
② Parameter value will be set to be default when changing macros.

Table 13. Drive control.

P4.1 - Basic settings.					
P4.1.1②	***Keypad reference***				**ID 141**
Minimum value:	MinFreq	**Maximum value:**	MaxFreq	**Default value:**	0.00 Hz
Description:	Keypad reference value.				
P4.1.3②	***Keypad stop***				**ID 114**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	1
Options:	0 = Enabled - keypad operation - In this mode, the keypad stop will only operate when the control source is set to keypad. 1 = Always enabled - In this mode, the stop button will always stop the drive regardless of control mode.				
Description:	Enabled or always enabled keypad operation.				
P4.1.4①	***Reverse enabled***				**ID 1679**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	1
Options:	0 = Disabled; or 1 = Enabled.				
Description:	Enables or disables the reverse motor direction.				
P4.1.5	***Change phase sequence motor***				**ID 2515**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Change disable; or 1 = Change enable.				
Description:	This parameter allows for swapping the motor phase output from u, v, w to u, w, v.				
P4.1.6②	***Power up local remote select***				**ID 1685**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Hold last; 1 = Local control; or 2 = Remote control.				
Description:	Selects what control place the drive will start at after power is applied. The default setting will hold the last state that the drive was in when powered down, selecting Local or Remote will cause the drive to start in that mode regardless of last state.				

Table 13. Drive control (Cont.).

P4.1.8②	***Start mode***				**ID 252**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Ramp - The drive starts from 0 Hz and ramps to the frequency reference value. 1 = Flying start from stop frequency - The drive will catch a spinning motor. This setting searches for the current frequency using the last operating frequency as a starting point. 2 = Flying start from maximum frequency - The drive will catch a spinning motor. This setting searches for the current frequency using the maximum operating frequency as a starting point.				
Description:	Selects the start mode operation.				
P4.1.9②	***Stop mode***				**ID 253**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	1
Options:	0 = Coasting - After a stop command, the motor coasts to a stop uncontrolled by the drive. 1 = Ramp - After the stop command, the speed of the motor is decelerated according to the set deceleration parameters.				
Description:	Selects the stop mode operation.				
P4.1.10②	***Ramp 1 shape***				**ID 247**
Minimum value:	0.00 s	**Maximum value:**	10.00 s	**Default value:**	0.00 s
Description:	The start and end of the acceleration and deceleration ramps can be smoothed with these parameters. Setting a value of 0.00 seconds gives a linear ramp shape that causes acceleration and deceleration to react immediately to the changes in the reference signal. Setting a value from 0.10 to 10.00 seconds for this parameter produces an S-shaped acceleration/deceleration at the start and stop of the slope.				



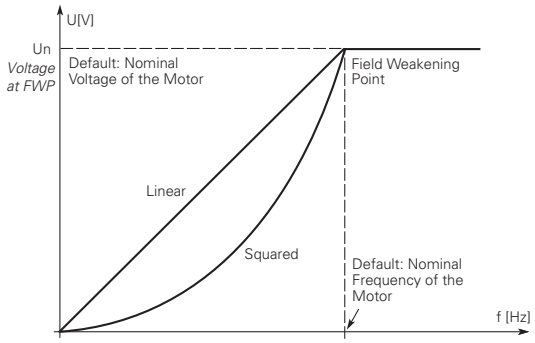
① Parameter value can only be changed after the drive has stopped.
② Parameter value will be set to be default when changing macros.

Table 14. Motor control.

P5.1 - Basic settings.					
P5.1.1①②	***Motor control mode***				**ID 287**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Frequency control - Output frequency is controlled directly by the frequency reference. 1 = Speed control - Output frequency is controlled by giving a frequency reference to it with slip compensation. 2 = Open loop vector control - Similar to the standard speed control mode, higher performance slip calculation requires running a motor identification. 3 = PM control 1 - PM motor control mode 1, used for SPM (surface mounted permanent magnet) and it also can be used for IPM. 4 = PM control 2 - PM motor control mode 2, used for IPM (internally mounted permanent magnet) and it can not be used for SPM.				
Description:	Selects the motor control mode.				

Table 14. Motor control (Cont.).

P5.1.2[1]	***Current limit***				**ID 107**
Minimum value:	DriveNomCurrCT*1/10 A	**Maximum value:**	DriveNomCurrCT*2 A	**Default value:**	DriveNomCurrCT*3/2 A
Description:	This parameter determines the maximum output current allowed from the drive. The parameter value range differs from size to size. Once the motor current hits this level, it goes into the current limiter controller and tries to limit the output current.				
P5.1.3[1][2]	***V/Hz optimization***				**ID 109**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Disable torque boost function. 1 = Enable torque boost function.				
Description:	Automatic torque boost - the voltage to the motor increases automatically, which assists the motor to produce sufficient torque to start and run at low frequencies with high loads.				
P5.1.4[1][2]	***V/Hz ratio***				**ID 108**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Linear - the voltage of the motor changes linearly with the frequency in the constant flux area from 0 Hz to the field weakening point where the nominal voltage is supplied. A linear V/Hz ratio should be used in constant torque applications. 1 = Squared - the voltage of the motor changes following a squared curve with the frequency in the area from 0 Hz to the field weakening point where the nominal voltage is supplied. The motor runs under magnetized below the field weakening point and produces less torque and electromechanical noise. A squared V/Hz ratio can be used in applications where the torque demand of the load is proportional to the square of the speed. 2 = Programmable V/Hz curve - the V/Hz curve can be programmed with three different points. These points are the 0 frequency voltage, midpoint and weakening point. A programmable V/Hz curve can be used if the other settings do not satisfy the needs of the application. 3 = Linear with flux optimization - the drive starts to search for the minimum motor current in order to save energy. This mode is called Eaton's Active Energy Control which will reduce the voltage and current but still maintain the desired speed.				
Description:	Selects the V/Hz ratio. 0 = Linear; 1 = Squared; 2 = Programmable; or 3 = Linear + flux optimization.				



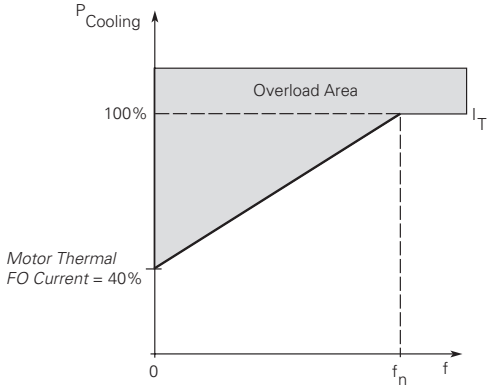
0 = Linear and 1 = Squared.

P5.1.10[2]	***Switching frequency***				**ID 2522**
Minimum value:	MinSwitchFreq kHz	**Maximum value:**	MaxSwitchFreq kHz	**Default value:**	DefaultSwitchFreqCT kHz
Description:	Sets the switching frequency for the PWM output waveform.				
P5.1.16[1][2]	***Identification***				**ID 299**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Not action. 1 = Identification only stator resistor - does not spin the motor. This can be done with load attached. 2 = Identification with run - motor stator resistor is completed then the motor is run. This **must** be completed with unloaded motor. 3 = Identification no run - motor is supplied with current and voltage but at zero frequency. 4 = Identification only inertia - identification for the system inertia only.				
Description:	This parameter enables the drive to make an motor identification cycle of the motor once complete the drive will adjust tuning parameters to improve starting torque and open loop vector control performance. Once set and a run command is given, the operation will be active then set back to 0 when completed. When a run command is issued, the message on the keypad will indicate "Auto tuning" is being performed. If there is an issue with the motor identification, a fault message will be displayed.				

[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. Protections.

P6.1 - Motor.					
P6.1.4[1][2]	***Motor thermal protection***				**ID 310**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	2
Options:	0 = No response. 1 = Warning. 2 = Fault, stop mode after fault according to parameter stop mode. 3 = Fault, stop mode after fault always by coasting.				
Description:	If a fault condition is selected, the drive will stop and activate the fault stage based off the % of calculated motor temperature. The calculated motor temp is based off the install power on values of the drive and monitoring values as the drive is running. Deactivating this protection, i.e., setting parameter to 0, will reset the thermal stage of the motor to 0%.				
P6.1.5[2]	***Motor thermal FO current***				**ID 311**
Minimum value:	0.00%	**Maximum value:**	150.00%	**Default value:**	100.00%
Description:	The current can be set between 0 - 150.0% x InMotor. This parameter sets the value for thermal current at zero frequency. The default value is set assuming that there is no external fan cooling the motor. If an external fan is used, this parameter can be set to 90% (or even higher). **Note:** The value is set as a percentage of the motor nameplate data, P1.6 (nominal current of the motor), not the drive's nominal output current. The motor's nominal current is the current that the motor can withstand in direct on-line use without being overheated. If you change the parameter nominal current of motor, this parameter is automatically restored to the default value. Setting this parameter does not affect the maximum output current of the drive.				



P6.2 - Drive.					
P6.2.2[1][2]	***Input phase fault***				**ID 332**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	2
Options:	0 = No response; 1 = Warning; 2 = Fault, stop mode after fault according to parameter stop mode; 3 = Fault, stop mode after fault always by coasting; or 4 = Single phase power limit.				
Description:	The input phase supervision ensures that the input phases of the frequency converter have approximately equal current draw.				
P6.2.3[1][2]	***4 mA input fault***				**ID 306**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = No response. 1 = Warning. 2 = Warning, the frequency from 10 seconds back is set as reference. 3 = Warning, the preset frequency P6.2.4 is set as reference. 4 = Fault, stop mode after fault according to parameter stop mode. 5 = Fault, stop mode after fault always by coasting.				
Description:	A warning or a fault action and message is generated if the 4 - 20 mA reference signal is used and the signal falls below 4 mA for 5 seconds, or below 0.5 mA for 0.5 seconds. The information can also be programmed into relay outputs RO1 and RO2.				

Table 15. Protections (Cont.).

P6.2.4[1][2]	***4 mA fault frequency***				**ID 331**
Minimum value:	0.00 Hz	**Maximum value:**	MaxFreq Hz	**Default value:**	0.00
Description:	When 4 mA fault happens, the output frequency of drive goes to this preset speed when P6.2.3 = 3.				
P6.2.5[1][2]	***External fault***				**ID 307**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	2
Options:	0 = No action; 1 = Warning; 2 = Fault, stop mode after fault according to parameter stop mode. 3 = Fault, stop mode after fault always by coasting.				
Description:	A warning or a fault action and message is generated from the external fault signal in the programmable (digital inputs function select external fault). The status information can also be programmed into digital output relay outputs RO1 and RO2.				
P6.2.11[2]	***STO fault response***				**ID 2427**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	2
Options:	0 = No Action - drive will stop, no indication shown, no reset required, have to cycle start command. 1 = Warning - drive indicate warning/if STO clears drive will run without reset. 2 = Fault - drive will indicate fault/require reset to start again.				
Description:	STO fault response defines the function of how the STO input will be seen on the keypad and how the drive functions to it.				
P6.2.12[1]	***PI feedback AI loss response***				**ID 2401**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = No action; 1 = Warning; 2 = Fault; or 3 = Warning: preset frequency (P6.2.13).				
Description:	This parameter defines the function of the PI feedback analog input loss response. If the AI feedback is lost based off the programed AI feedback.				
P6.2.13[1][2]	***PI feedback AI loss pre-frequency***				**ID 2402**
Minimum value:	0.00 Hz	**Maximum value:**	400.00 Hz	**Default value:**	0.00 Hz
Description:	This parameter defines the frequency the master would run to if a feedback is lost and P6.2.12 was set to option 3.				
P6.2.14[2]	***PI feedback AI loss pipe fill***				**ID 2403**
Minimum value:	0.00 varies	**Maximum value:**	1000.00 varies	**Default value:**	0.00 varies
Description:	Detects loss of prime in the pump based off the measured level. If the value drops below this level for the time in P6.2.15 and below, the frequency in P6.2.13 "loss of prime" occurs.				
P6.2.15[2]	***PI feedback AI loss pre-frequency***				**ID 2404**
Minimum value:	0.00 s	**Maximum value:**	6,000.00 s	**Default value:**	0.00 s
Description:	PI feedback AI loss pre-frequency timeout - when P6.2.12 is set to 3 or 4, when the feedback signal is lost, the drive will run at the frequency in P6.2.15 for the time set here. After this time, the drive will fault out on "feedback loss". The time is disabled when set to 0 seconds.				

P6.3 - Communications.

P6.3.1[1][2]	***Fieldbus fault response***				**ID 334**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	2
Options:	0 = No action; 1 = Warning; 2 = Fault; or 3 = Fault, coast.				
Description:	This sets the response mode for the fieldbus fault when a fieldbus mode is used and communication is lost between the PLC and communication port. Each protocol has another parameter to select in all control or only in fieldbus control to set fault or warning.				

Table 15. Protections (Cont.).

P6.3.2[1][2]	***OPTcard fault response***				**ID 335**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	2
Options:	0 = No action; 1 = Warning; 2 = Fault; or 3 = Fault, coast.				
Description:	This sets the response mode for a board slot fault caused by a missing or failed option board not communicating to the central processor.				

[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 16. PI Controller.

P7.1 - Basic settings.					
P7.1.1[2]	***PI control gain***				**ID 1294**
Minimum value:	0.00%	**Maximum value:**	200.00%	**Default value:**	100.00%
Description:	Defines the gain of the PI Controller. It adjust the slope of the speed increase according to the initial of the load. If this value is set to 100%, a change of 10% in the error value causes the controller output to change 10%.				
P7.1.2[2]	***PI control itime***				**ID 1295**
Minimum value:	0.00 s	**Maximum value:**	600.00 s	**Default value:**	1.00 s
Description:	Defines the integration time of the PI controller. Over the time, the integral time contributes to the deviation between the reference and the feedback signal. If this value is set to 1.00 sec., a change of 10% in the error value causes the controller output to change by 10.00%/s.				

Table 16. PI Controller (Cont.).

P7.1.3[1][2]	***PI process unit***				**ID 1297**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	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 = ft^3/s; 31 = ft^3/min.; 32 = ft^3/h; 33 = ft/s; 34 = in. wg; 35 = ft wg; 36 = PSI; 37 = lb/in.2; 38 = HP; 39 = Deg. F; 40 = PA; 41 = WC; 42 = HG; 43 = ft; 44 = m;				
Description:	Defines the unit type for PI feedback unit.				
P7.1.4[2]	***PI process unit minimum***				**ID 1298**
Minimum value:	-99999.99 varies	**Maximum value:**	PID1_ProcessUnitMax varies	**Default value:**	0.00 varies
Description:	Defines the minimum process unit value.				
P7.1.5[2]	***PI process unit maximum***				**ID 1300**
Minimum value:	PID1_ProcessUnitMin	**Maximum value:**	99999.99 varies	**Default value:**	100.00 varies
Description:	Defines the maximum process unit value.				
P7.1.6[1][2]	***PI error inversion***				**ID 1303**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Normal - if feedback is less than set-point, PI controller output increases. 1 = Inverted - if feedback is less than set-point, PI controller output decreases.				
Description:	Defines the way the process value output reacts to the feedback signal.				

[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 17. Setpoint.

P7.2.1 - Standard.					
P7.2.1.1②	***PI keypad setpoint 1***				**ID 1307**
Minimum value:	PID1_ProcessUnitMin	**Maximum value:**	PID1_ProcessUnitMax	**Default value:**	0.00 varies
Description:	Keypad PI reference value set point 1.				
P7.2.1.3②	***PI wake-up action***				**ID 2466**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Wake-up when below wake-up level. 1 = Wake-up when above wake-up-level. 2 = Wake-up when below wake-up level % from PI setpoint. 3 = Wake-up when above wake-up level %from PI setpoint.				
Description:	This parameter defines the wake-up function action.				
P7.2.2 - Setpoint 1.					
P7.2.2.1①	***PI setpoint 1 source***				**ID 1312**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	1
Options:	0 = Not used; 1 = PI keypad setpoint 1; 2 = PI keypad setpoint 2; 3 = AI; 4 = Drive reference pot; 5 = FB process data input 1; 6 = FB process data input 2; 7 = FB process data input 3; 8 = FB process data input 4; 9 = FB process data input 5; 10 = FB process data input 6; 11 = FB process data input 7; 12 = FB process data input 8; 13 = FB PI setpoint 1; or 14 = FB PI setpoint 2.				
Description:	Defines source of the setpoint value the drive uses. This can either be an internal preset value, keypad setpoint, analog signal, or fieldbus message.				
P7.2.2.2①	***PI setpoint 1 sleep enable***				**ID 1315**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Disabled; or 1 = Enabled.				
Description:	This function will disable the output when the frequency drops below the sleep frequency for the sleep delay time. The output re-engages when feedback rises above the wake-up level.				
P7.2.2.3②	***PI setpoint 1 sleep delay***				**ID 1317**
Minimum value:	0.00 s	**Maximum value:**	3,000.00 s	**Default value:**	0.00 s
Description:	This parameter sets the delay time after the setpoint drops below the sleep level for this amount of time and then the drives output will shut off till the wake up level is met. It is to prevent large fluctuations when going into the sleep function to save motor run time.				
P7.2.2.4②	***PI setpoint 1 wake-up level***				**ID 1318**
Minimum value:	-99999.99 varies	**Maximum value:**	99999.99 varies	**Default value:**	0.00 varies
Description:	Defines the level for the PI feedback value to go above top enable the PI output to be re enabled. This value is based of the % of feedback which can be scaled based off the PI unit min./max, values.				
P7.2.2.5②	***PI setpoint 1 boost***				**ID 1320**
Minimum value:	-2.00 varies	**Maximum value:**	2.00 varies	**Default value:**	1.00 varies
Description:	The setpoint can be boosted via a multiplier value.				

Table 17. Setpoint (Cont.).

P7.2.2.6②	***PI setpoint 1 sleep level***				**ID 2450**
Minimum value:	PID1_ProcessUnitMin Hz	**Maximum value:**	PID1_ProcessUnitMax Hz	**Default value:**	0.00 Hz
Description:	Defines the level of which the unit value is used to look at to go into the sleep mode. When the unit drops below this level for the sleep delay time, it will put the drive into the sleep mode.				
P7.2.2.7②	***SP1 sleep mode over cycle time***				**ID 1842**
Minimum value:	0.00 varies	**Maximum value:**	10.00 varies	**Default value:**	0.00 varies
Description:	Defines the count the drive come in and out of sleep mode. If multiple times done in this time frame, the drive would trip on "pump over cycle" fault. One cycle is defined when the drive transfers from normal mode to sleep mode. 0 value means do not do the sleep over cycle check and clear "pump over cycle" fault.				
P7.2.2.8②	***SP1 sleep mode maximum cycle time***				**ID 1843**
Minimum value:	0.00 s	**Maximum value:**	3,600.00 s	**Default value:**	300.00 s
Description:	Defines the maximum time for sleep over cycle checking.				

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 18. Feedback.

P7.3.2 - Feedback 1.					
P7.3.2.1①	***PI feedback 1 source***				**ID 1332**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	2 varies
Options:	0 = Not used; 1 = AI; 2 = Drive reference pot; 3 = FB process data input 1; or 11 = FB PI feedback.				
Description:	Defines where feedback signal is being fed into the drive, via analog or fieldbus data value.				

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

Table 19. Serial communication.

P11.1 - Basic settings.					
P11.1.1①	***Serial communication***				**ID 586**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Modbus RTU; 1 = BACnet MSTP; or 2 = SWD.				
Description:	This parameter defines the communication protocol for RS-485.				

P11.2 - Modbus RTU.					
P11.2.1①	***Slave address***				**ID 587**
Minimum value:	1.00 varies	**Maximum value:**	247.00 varies	**Default value:**	1.00 varies
Description:	This parameter defines the slave address for RS-485 communication.				

Table 19. Serial communication (Cont.).

P11.2.2ⓘ	***Baud rate***				**ID 584**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	1
Options:	0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 57,600; or 4 = 115,200				
Description:	This parameter defines communication speed for RS-485 communication.				
P11.2.3ⓘ	***Parity type***				**ID 585**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	2
Options:	0 = None; 1 = Odd; or 2 = Even.				
Description:	This parameter defines parity type for RS-485 communication.				
P11.2.4	***Modbus RTU protocol status***				**ID 588**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Options:	0 = Initial; 1 = Stopped; 2 = Operational; or 3 = Faulted.				
Description:	This parameter shows the protocol status for RS-485 communication.				
P11.2.5	***Communication timeout modbus RTU***				**ID 593**
Minimum value:	0.00 ms	**Maximum value:**	60,000.00 ms	**Default value:**	10,000.00 ms
Description:	Selects the time to wait before a communication fault occurs over modbus RTU if a message is not received.				
P11.2.6	***Modbus RTU fault response***				**ID 2516**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 - Only in fieldbus control mode. When fieldbus is the control place and fieldbus fault is active, the drive will fault on loss of communications; if not in fieldbus control, place will not fault. 1 - In all control modes. No matter the control place setting, if communication is lost, fieldbus fault response will occur.				
Description:	Defines the fieldbus fault condition for modbus RTU communication.				

P11.3 - BACnet RTU MSTP.

P11.3.1ⓘ	***MSTP baud rate***				**ID 594**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	2
Options:	0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200.				
Description:	This parameter defines the communication speed for RS-485 communication.				
P11.3.2ⓘ	***MSTP device address***				**ID 595**
Minimum value:	0	**Maximum value:**	127	**Default value:**	1
Description:	Defines the device address of the drive on the BACnet MSTP network.				
P11.3.3ⓘ	***MSTP instance number***				**ID 596**
Minimum value:	0	**Maximum value:**	4,194,302	**Default value:**	0
Description:	Defines the instance number of the drive on the BACnet MSTP network.				
P11.3.4	***MSTP communication timeout***				**ID 598**
Minimum value:	0 ms	**Maximum value:**	60,000 ms	**Default value:**	10,000 ms
Description:	Selects the time to wait before a communication fault occurs over BACnet MSTP if a message is not received.				

Table 19. Serial communication (Cont.).

P11.3.5	***MSTP protocol status***				**ID 599**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Options:	0 = Stopped; 1 = Operational; or 2 = Faulted.				
Description:	This parameter shows the protocol status for BACnet MSTP communication.				
P11.3.6	***MSTP fault code***				**ID 600**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Options:	0 = None; 1 = Sole master; 2 = Duplicate MAC ID; or 3 = Baud rate fault.				
Description:	This parameter shows the protocol status for BACnet MSTP communication.				
P11.3.7	***MSTP fault response***				**ID 2526**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Only in fieldbus control mode - when fieldbus is the control place and fieldbus fault is active, the drive will fault on loss of communications. If not in fieldbus control, place will not fault. 1 = In all control modes - no matter the control place setting. If communication is lost, fieldbus fault response will occur.				
Description:	Defines the fieldbus fault condition for BACnet MSTP communication.				
P11.3.8	***MSTP maximum master***				**ID 1537**
Minimum value:	1	**Maximum value:**	127	**Default value:**	127
Description:	Defines the maximum number of masters that can establish connections with the drive.				

P11.4 - SA bus.

P11.4.1①	***SA bus device address***				**ID 1726**
Minimum value:	204	**Maximum value:**	254	**Default value:**	204
Description:	This parameter is used to set the SA bus address at which the drive will be located on instance node.				
P11.4.2①	***SA bus baud rate***				**ID 1727**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	2
Options:	0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; or 4 = 115,200.				
Description:	This parameter defines communication speed for SA bus communication.				
P11.4.3①	***SA instance number***				**ID 1728**
Minimum value:	0	**Maximum value:**	4,194,302	**Default value:**	0
Description:	Defines the instance number of the drive on the SA bus network.				
P11.4.4	***SA communication timeout***				**ID 1730**
Minimum value:	0	**Maximum value:**	60,000	**Default value:**	10,000
Description:	Selects the time to wait before a communication fault occurs over SA bus if a message is not received.				
P11.4.5	***SA bus protocol status***				**ID 1731**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Options:	0 = Stopped; 1 = Operational; or 2 = Faulted.				
Description:	This parameter shows the protocol status for SA bus communication.				

Table 19. Serial communication (Cont.).

P11.4.6	***SA bus fault response***				**ID 1732**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Only in fieldbus control mode - when fieldbus is the control place and fieldbus fault is active. The drive will fault on loss of communications. If not in fieldbus control, place will not fault. 1 = In all control modes - no matter the control place setting, if communication is lost, fieldbus fault response will occur.				
Description:	Defines the fieldbus fault condition for SA bus communication.				

P11.5 - SWD.

P11.5.1	***Parameter access***				**ID 2630**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	1
Options:	0 = No permission to read/write on acyclic channel. 1 = Acyclic read/write are allowed on Profibus.				
Description:	PNU927 which specifies the operation priority of parameters for acyclic communication.				
P11.5.2①	***Parameter data access***				**ID 2631**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	4
Options:	0 = Local control; 1 = Fieldbus; 2 = Mixed interface; 4 = NET, local on fault; or 5 = Dual mode.				
Description:	PNU928 which specifies the control priority of the device for cyclic communication.				
P11.5.3	***Fault situation counter***				**ID 2632**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Description:	PNU952 which specifies the fault situation counter. Only write of 0 is allowed, then the whole fault buffer (actual fault situation and all other fault situations) and the fault message counter (parameter 944) are erased.				
P11.5.4	***Board status***				**ID 2609**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Description:	Status of the board. B0-DCOM communication fault. B1-Board HW fault B2-IO1 24 volt overload fault. B3-Profibus communication fault. B4-fieldbus fault.				
P11.5.5	***Firmware version***				**ID 2610**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Description:	This parameter provides the firmware version of the SWD.				
P11.5.6	***Protocol status***				**ID 2612**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Not configured; 1 = Operational; or 2 = Diagnostics.				
Description:	This parameter specifies the protocol status for SWD card.				

P11.6 - Bluetooth.

P11.6.1	***Bluetooth enabled***				**ID 1895**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Disabled; or 1 = Enabled.				
Description:	Bluetooth enabled.				

Table 19. Serial communication (Cont.).

P11.6.2②	***Bluetooth broadcast mode***				**ID 2920**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Off; or 1 = On.				
Description:	Bluetooth broadcast mode.				
P11.6.3	***Bluetooth pairing reset***				**ID 2935**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Options:	0 = Not reset; or 1 = Reset.				
Description:	Bluetooth pairing reset.				

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 20. Ethernet communication.

P12.1 - Basic settings.					
P12.1.1①	***IP address mode***				**ID 1500**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Static IP; or 1 = DHCP with AutoIP.				
Description:	This parameter defined the IP address configuration mode for EIP/modbus TCP.				
P12.1.2	***Active IP address***				**ID 1507**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Description:	Reads the current active IP address.				
P12.1.3	***Active subnet mask***				**ID 1509**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Description:	Reads the current active subnet mask.				
P12.1.4	***Active default gateway***				**ID 1511**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Description:	Reads the current active default gateway.				
P12.1.5	***MAC address***				**ID 1513**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Description:	Reads the current MAC address.				
P12.1.6①	***Static IP address***				**ID 1501**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	192.168.1.254
Description:	Defines the static IP address.				
P12.1.7①	***Static subnet mask***				**ID 1503**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	255.255.255.0
Description:	Defines the static subnet mask.				
P12.1.8①	***Static default gateway***				**ID 1505**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	192.168.1.1
Description:	Defines the static default gateway.				
P12.1.9	***Ethernet communication timeout***				**ID 611**
Minimum value:	0.00 ms	**Maximum value:**	60,000 ms	**Default value:**	10,000 ms
Description:	Selects the time it waits before a communication fault occurs over ethernet.				

Table 20. Ethernet communication (Cont.).

P12.2 - Trusted IP filter (DM1 PRO only).					
P12.2.1	***Trusted IP white list***				**ID 68**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	192.168.1.255 0.0.0. 0 0.0.0.0
Description:	Defines the IP addresses in the white list. A setting of 192.168.1.255 enables all connections on the local subnet.				
P12.2.2	***Trusted IP filter enable***				**ID 76**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	1
Options:	0 = Disabled; or 1 = Enabled.				
Description:	Enables IP white listing. Devices not in the white list will not be able to establish communications with the drive.				
P12.3 - Modbus TCP (DM1 PRO only).					
P12.3.1①	***Modbus TCP enable***				**ID 1942**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Disable; or 1 = Enable.				
Description:	Enables modbus TCP communications, must be enabled to connect to Power Xpert inControl.				
P12.3.2	***Modbus TCP connection limit***				**ID 609**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	5
Description:	Maximum number of connections allowed to the drive.				
P12.3.3	***Modbus TCP unit identifier number***				**ID 610**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	1
Description:	Unit identifier unit value for modbus TCP.				
P12.3.4	***Modbus TCP protocol status***				**ID 612**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Options:	0 = Stopped; 1 = Operational; or 2 = Faulted.				
Description:	This parameter shows the protocol status for modbus TCP communication.				
P12.3.5	***Modbus TCP fault response***				**ID 2517**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Only in fieldbus control mode - when fieldbus is the control place and fieldbus fault is active, the drive will fault on loss of communications. If not in fieldbus control, place will not fault. 1 = In all control modes - no matter the control place setting, if communication is lost, fieldbus fault response will occur.				
Description:	Defines the fieldbus fault condition for modbus TCP communication.				
P12.4 - Ethernet IP (DM1 PRO only).					
P12.4.1①	***Ethernet based protocol select***				**ID 1997**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Disabled; or 2 = BACnet IP.				
Description:	Selects the active communication protocol on the ethernet I/P port.				
P12.4.2	***Ethernet IP protocol status***				**ID 608**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Options:	0 = Off; 1 = Operational; or 2 = Faulted.				
Description:	Indicates if ethernet protocol is active or not.				

Table 20. Ethernet communication (Cont.).

P12.4.3	***Ethernet IP fault response***				**ID 2518**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Only in fieldbus control mode - when fieldbus is the control place and Fieldbus fault is active, the drive will fault on loss of communications. If not in fieldbus control, place will not fault. 1 = In all control modes - no matter the control place setting. If communication is lost, fieldbus fault response will occur.				
Description:	Defines the fieldbus fault condition for ethernet IP communication.				

P12.5 - BACnet IP (DM1 PRO only).

P12.5.1①	***BACnet IP UDP port number***				**ID 1733**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	47,808
Options:	47808 = BAC0; 47809 = BAC1; 47810 = BAC2; 47811 = BAC3; 47812 = BAC4; 47813 = BAC5; 47814 = BAC6; 47815 = BAC7; 47816 = BAC8; 47817 = BAC9; 47818 = BACA; 47819 = BACB; 47820 = BACC; 47821 = BACD; 47822 = BACE; or 47823 = BACF.				
Description:	Defines the BACnet UDP port number.				
P12.5.2①	***BACnet IP foreign devise***				**ID 1734**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Disabled; or 1 = Enabled.				
Description:	Enables BACNET IP foreign device configuration.				
P12.5.3①	***BACnet IP BBMD IP***				**ID 1735**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0.0.0.0
Description:	Displays the BACnet BBMD IP address.				
P12.5.4①	***BACnet IP UDP port***				**ID 1737**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	47,808
Options:	47808 = BAC0; 47809 = BAC1; 47810 = BAC2; 47811 = BAC3; 47812 = BAC4; 47813 = BAC5; 47814 = BAC6; 47815 = BAC7; 47816 = BAC8; 47817 = BAC9; 47818 = BACA; 47819 = BACB; 47820 = BACC; 47821 = BACD; 47822 = BACE; or 47823 = BACF.				
Description:	Displays the BACnet BBMD UDP port number.				
P12.5.5①	***BACnet IP registration interval***				**ID 1738**
Minimum value:	0.00	**Maximum value:**	65,535	**Default value:**	10
Description:	Defines the registration interval.				

Table 20. Ethernet communication (Cont.).

P12.5.6	***BACnet IP communication timeout***				**ID 1739**
Minimum value:	0.00	**Maximum value:**	60,000	**Default value:**	0
Description:	Selects the time it waits before a communication fault occurs over BACnet IP.				
P12.5.7	***BACnet IP protocol status***				**ID 1740**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Stopped; 1 = Operational; or 2 = Faulted.				
Description:	This parameter shows the protocol status for BACnet IP communication.				
P12.5.8	***BACnet IP fault behavior***				**ID 1741**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Only in fieldbus control mode - when fieldbus is the control place and Fieldbus fault is active, the drive will fault on loss of communications. If not in fieldbus control, place will not fault. 1 = In all control modes - no matter the control place setting. If communication is lost, fieldbus fault response will occur.				
Description:	Defines the fieldbus fault condition for BACnet IP communication.				
P12.5.9[1]	***BACnet IP instance number***				**ID 1742**
Minimum value:	0.00	**Maximum value:**	4,194,302	**Default value:**	0
Description:	Displays the BACnet instance number.				

P12.6 - Web UI (DM1 PRO only).

P12.6.1	***Web UI protocol status***				**ID 2915**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Options:	0 = Off; 1 = Operational; or 2 = Faulted.				
Description:	This parameter shows the protocol status for web server communication.				
P12.6.2	***Web UI fault response***				**ID 2916**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Only in fieldbus control mode - when fieldbus is the control place and fieldbus fault is active, the drive will fault on loss of communications. If not in fieldbus control, place will not fault. 1 = In all control modes - no matter the control place setting. If communication is lost, fieldbus fault response will occur.				
Description:	Defines the fieldbus fault condition for web server communication.				
P12.6.3	***Web UI communication timeout***				**ID 2919**
Minimum value:	30,000 ms	**Maximum value:**	60,000 ms	**Default value:**	60,000 ms

[1] Parameter value can only be changed after the drive has stopped.

Table 21. System.

P13.1 - Basic settings.					
P13.1.1	***Language***				**ID 340**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = English; 1 = English; or 2 = English.				
Description:	This parameter offers the ability to control the frequency converter through the keypad in the language of your choice. Currently available language is English only.				
P13.1.2①	***Application***				**ID 142**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Options:	0 = Standard;; 1 = Pump; 2 = Fan; or 3 = Multi-purpose.				
Description:	This parameter sets the active application if multiple applications have been loaded.				
P13.1.3①	***Parameter sets***				**ID 619**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Options:	0 = No; 1 = Reload defaults; 2 = Reload set 1; 3 = Reload set 2; 4 = Store set 1; 5 = Store set 2; 6 = Reset; or 7 = Reload defaults VM.				
Description:	This parameter allows you to reload the factory default parameter values, and to store and load two customized parameter sets.				
P13.1.4	***Up to keypad***				**ID 620**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Options:	0 = No; or 1 = Yes (all parameters).				
Description:	This function uploads all existing parameter groups to the keypad.				
P13.1.5①	***Down from keypad***				**ID 621**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Options:	0 = No; 1 = All parameters; 2 = All, no motor; or 3 = Application parameters.				
Description:	This function downloads one or all parameter groups from the keypad to the drive.				
P13.1.7	***Parameter lock PIN***				**ID 624**
Minimum value:	0	**Maximum value:**	9,999	**Default value:**	0
Description:	The application selection can be protected against unauthorized changes with the password function. When the password function is enabled, the user will be prompted to enter a password before application changes, parameter value changes, or password changes. By default, the password function is not in use. If you want to activate the password, change the value of this parameter to any number between 1 and 9,999. To deactivate the password, reset the parameter value to 0.				

Table 21. System (Cont.).

P13.1.8	***Keypad parameter lock***				**ID 625**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Change enable; or 1 = Change disable.				
Description:	This function allows the user to prohibit changes to the parameters. If the parameter lock is activated, the text "locked" will appear on the display if you try to edit a parameter value. **Note:** This function does not prevent unauthorized editing of parameter values.				
P13.1.9	***Start-up Wizard***				**ID 626**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Enabled. 1 = Disabled.				
Description:	The Start-up Wizard facilitates commissioning the DM1 PRO. If selected "Enable", the Start-up Wizard prompts the operator for the application desired and then advances parameters through the start-up parameter list/Application Mini wizard in keypad. After completion, it allows the user to go to the main menu or default page and this parameter is set to "Disabled". The Start-up Wizard is always enabled for the initial power up of the DM1 PRO. By setting this parameter to "Disable" without going through the Start-up Wizard, it will not cause it to be active on start-up. If user goes into Start-up Wizard after completion, or defaults drive, the Start-up Wizard will be "Enabled".				

P13.2 - Keypad.

P13.2.4	***Timeout time***				**ID 629**
Minimum value:	1 s	**Maximum value:**	65.535 s.	**Default value:**	30 s
Description:	The timeout time setting defines the time after which the keypad display returns to the Default Page. **Note:** If the default page value is 0, the timeout time setting has no effect.				
P13.2.5	***Contrast adjust***				**ID 630**
Minimum value:	5	**Maximum value:**	18	**Default value:**	12
Description:	If the remote keypad display is not clear, you can adjust the keypad contrast with this parameter.				
P13.2.6	***Backlight time***				**ID 631**
Minimum value:	1 min.	**Maximum value:**	65,535 min.	**Default value:**	10 min.
Description:	This parameter determines how long the backlight stays on before going out.				
P13.2.7	***Fan control***				**ID 632**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	2
Options:	0 = Continuous - fan runs continuously. 1 = Temperature - based on the temperature of the unit. The fan is switched on automatically when the heat sink temperature reaches 60°C (140°F). The fan receives a stop command when the heat sink temperature falls to 55°C (131°F). The fan runs for about a minute after receiving the stop command or switching on the power, as well as after changing the value from "Continuous" to "Temperature". 2 = Run follow - after power up, the fan is stopped until the run command is given and then fan runs continuously. This is mainly made for common DC-bus systems to prevent cooling fans to load charging resistors on power up moment.				
Description:	This function allows you to control the DM1 PRO's cooling fan.				

P13.4 - Version information.

P13.4.1	***Keypad software version***				**ID 640**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Description:	Keypad firmware version.				
P13.4.2	***Motor control software version***				**ID 642**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Description:	DSP/motor control software version.				

Table 21. System (Cont.).

P13.4.3	***Application software version***				**ID 644**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Description:	MCU/application software version.				
P13.4.4	***Software bundle version***				**ID 1714**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Description:	Software bundle version.				

P13.5 - Application information.

P13.5.1	***Serial number***				**ID 648**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.
Description:	Product serial number.				
P13.5.2	***Multi-monitor set***				**ID 627**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	0
Options:	0 = Change enable; or 1 = Change disable.				
Description:	The keypad display can display three actual monitored values at the same time. This parameter determines if the operator is allowed to replace the values monitored with other values.				
P13.5.3	***Keypad lock PIN***				**ID 75**
Minimum value:	0	**Maximum value:**	9,999	**Default value:**	0
Description:	The keypad can be protected against unauthorized changes with the keypad lock function after keys are not pressed five minutes. When the password function is enabled, the user will be prompted to enter a password before the keypad display parameter or response to key press except up/down/left/right. By default, the password function is not in use. If you want to activate the password, change the value of this parameter to any number between 1 and 9,999. To deactivate the password, reset the parameter value to 0.				
P13.5.4	***Drive application name***				**ID 2922**
Minimum value:	N.A.	**Maximum value:**	N.A.	**Default value:**	N.A.

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

Step 6 - Faults and warning codes

Under this menu, you can find active faults, history faults, and fault codes.

Table 22. 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 23. 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 5 s). 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/ description	Fault type	Default configuration	Possible cause	Remedy
1	Over current	Fault		AC drive has detected too high a current (>4*IH) in the motor cable: • Sudden heavy load increase; • Short circuit in motor cables; • Unsuitable motor.	• Check loading. • Check motor. • Check cables and connections. • Make identification run. • Check ramp times.
2	Over voltage	Fault		The DC-link voltage has exceeded the limits defined: • Too short a deceleration time; • Brake chopper is disabled; • High overvoltage spikes in supply; • Start/stop sequence too fast.	• Make deceleration time longer. • Use brake chopper or brake resistor (available as options). • Activate overvoltage controller. • Check input voltage.
3	Earth fault	Fault	Configurable	Current measurement has detected that the sum of motor phase current is not zero: • Insulation failure in cables or motor.	• Check motor cables and motor.
9	Under voltage	Fault	Configurable	DC link voltage is under the voltage limits defined: • 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 the Run state.	• 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.
10	Input phase superv	No action	Configurable	Input line phase is missing.	• Check supply voltage, fuses, and cable.
11	Output phase superv	Fault	Configurable	Current measurement has detected that there is no current in one motor phase.	Check motor cable and motor.
13	Drive under temp	Warning	Configurable	Too low temperature measured in power. Unit's heat sink or board. Heat sink temperature is under -10°C.	
14	Drive over temp	Fault		Too high temperature measured in power. Unit's heat sink or board. Heat sink temperature is over 90°C.	• 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.
15	Motor stalled	No action	Configurable	Motor is stalled.	Check motor and load.

Fault code	Fault name/ description	Fault type	Default configuration	Possible cause	Remedy
16	Motor over load	No action	Configurable	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.
17	Motor under load	No action	Configurable	Condition defined by parameter underload protection, underload Fnom torque, underload F0 torque, valid longer than the time defined by underload time limit.	Check load.
18	IP address conflict	Warning	Configurable	IP setting issue.	Check settings for IP address. Verify no duplicates are on the network.
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.
20	Control board EEPROM fault (MCU EEPROM fault)	Fault		EEPROM data error in EEPROM memory.	Cycle power to drive. Try updating software. If issue continues, contact a distributor near you.
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.
22	Speed deviation	Fault		Estimated speed is greater than 115% of maximum frequency. Or current loop is oscillating.	Check motor parameters and run identification. Adjust the Observer Kp.
23	STO circuit fault	Fault		STO switch is broken; STO circuit failure.	Check STO switch and STO circuit. If issue continues, contact a distributor near you.
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.
26	Start-up prevent	Fault		The time when interlock signal activates is over setting time.	Stop drive and resend start command.
37	Device change	Warning		Power board or option card change.	Alarm will reset.
38	Device added	Warning		Power board or option board added.	Device is ready for use. Old parameter settings will be used.
39	Device removed	Fault		Optional board removed from slot; or power board removed from control board.	Device no longer available in drive.
40	Device unknown	Fault		Unknown device connected (power board/option board).	Check EEPROM connection. Check board connection on slot A/B. Power cycle to drive..
41	IGBT over temp	Fault		IGBT temperature is too high.	• Check output loading. • Check motor size. • Decrease switching frequency.
50	AI < 4 mA (4 to 20 mA)	No action	Configurable	Loss in analog input signal, dropped below 4 mA.	Verify analog input current reference value on either AI1 or AI2, check cabling.
51	External fault	Fault	Configurable	Digital input is activated for external fault input.	Check digital input settings and verify input level, could be an external device causing fault.
52	Keypad comm. Fault	Fault	Configurable	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.
54	Option card fault	Fault	Configurable	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.
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.
58	Current measure fault	Fault		Current measurement is out of range.	Restart the drive again. Should the fault re-occur, contact the distributor nearest to you.
66	Safety torque off	Fault	Configurable	STO triggered; STO input is open.	Reset STO trigger and verify wiring. Reset fault after input is enabled.
67	Current limit control	Warning		The output current has reached the current limit value.	Check the load. Set the acceleration time longer.

Fault code	Fault name/ description	Fault type	Default configuration	Possible cause	Remedy
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.
70	System fault	Fault		MCU sending wrong parameters to DSP.	Restart the drive again. Should the fault re-occur, contact the distributor nearest to you.
80	Fieldbus fault	Fault	Configurable	BACnet IP fieldbus fault.	Check the fieldbus communication wiring. Verify drive parameters are set correctly. Check BACnet master programming to verify proper addressing.
81	Fieldbus fault	Fault	Configurable	SA bus fieldbus fault.	Check the fieldbus communication wiring on A/B terminal. Verify drive parameters are set correctly. Check SA bus master programming to verify proper addressing.
83	Fieldbus fault	Fault	Configurable	(1) DCI_ubRTUBacNetFaultBehavior parameter's value is 0, loss of communication with modbus RTU, 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"; (2) DCI_ubRTUBacNetFaultBehavior parameter's value is 1, loss of communication with modbus RTU.	Check RS485 communication wiring. Verify drive parameters are set correctly. Check master programming to verify proper addressing.
84	Fieldbus fault	Fault	Configurable	(1) DCI_ubTCPFaultBehavior parameter's value is 0, loss of communication with modbus TCP ,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";(2)DCI_ubTCPFaultBehavior parameter's value is 1, loss of communication with modbus TCP.	Check ethernet communication wiring. Verify drive parameter are set correctly. Check master programming to verify proper addressing.
85	Fieldbus fault	Fault	Configurable	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 parameters are set correctly. Check BACnet master configuration programming to verify proper addressing.
86	Fieldbus fault	Fault	Configurable	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 parameters are set correctly. Check EIP master configuration programming to verify proper addressing.
87	Fieldbus fault	Fault	Configurable	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".	Profibus/Canopen/Devicenet communication wiring. Verify drive parameters are set correctly. Check Profibus/Canopen/Devicenet master configuration programming to verify proper addressing.
90	Drive under temp. (Cold weather drive under temp.)	Warning		• Cold weather mode is not enabled, and unit temperature is less than -10°C. • Cold weather mode is enabled and Under Temp Fault Override is not set, unit temperature is less than -30°C. • Cold weather mode is enabled and Under Temp Fault Override is not set, unit temperature is -20 ~ -30°C. The temp <-20°C when cold weather start time out.	If unit temp -20 ~ -10°C, start motor in cold weather mode. If unit temp <-20°C, warm up unit above -20°C for proper operation using cold weather mode. If still < -20°C when cold weather mode time out, try higher output voltage in cold weather mode.
92	External fault (External fault 2)	Fault	Configurable	Digital input is activated for external fault input.	Check digital input settings and verify input level, could be an external device causing fault.
93	External fault (External fault 3)	Fault	Configurable	Digital input is activated for external fault input.	Check digital input settings and verify input level, could be an external device causing fault.
97	Pipe fill loss (Prime loss)	No action	Configurable	• In single drive control mode of MPFC, include FC, interlock enable, and all interlock signals lost. • In single drive control mode of MPFC, not include FC, interlock enable, and interlock 1 lost. • In multi drive network mode of MPFC, interlock enable, and interlock 1 lost.	Check digital inputs for interlock.

Fault code	Fault name/ description	Fault type	Default configuration	Possible cause	Remedy
98	PI feedback AI loss	No action	Configurable	The feedback function has a relationship with feedback 1/2 and the feedback 1/2 source has relationship with AI. The AI signal range is 1 (20-100%/2-10 V/4-20m A). The AI value is out of range (AI mode: 0~20 mA, AI < 4 mA or AI > 20 mA, AI mode: 0~10 V, AI < 2 V or AI > 10 V) of PID1 feedback.	Check the AI of PI1 feedback, the AI value whether is out of range or not, the AI range shall be 2~10 V (AI mode is 0~10 V) or 4~20 mA (AI mode is 0~20 mA).
100	Fieldbus fault (Fieldbus SMDT fault)	Fault	Configurable	Smart wire sus fieldbus fault.	Check SmartWire DT card.
101	Option card fault	Fault	Configurable	SMDT board hardware fault.	Check SmartWire DT card.
102	External fault (External fault from SWD)	Fault	Configurable	External fault from SWD.	Check SmartWire DT card.
111	Profibus firmware incompatible	Warning		Profibus card firmware is not compatible with MCB firmware.	Check the Profibus card firmware revision.
113	CANOpen firmware incompatible	Warning		CANOpen card firmware is not compatible with MCB firmware.	Check the CANOpen firmware revision.
114	SWD firmware incompatible	Warning		SWD card firmware is not compatible with MCB firmware.	Check the SWD card firmware revision.
115	Fieldbus fault	Fault	Configurable	FieldBus EIP idle fault	Check ethernet IP master programming to verify proper addressing and ensure idle communication bit is not set.
117	Pump over cycle	Warning		During a period, the times which the drive sleeps and wakes up exceed a user configurable value.	Check the reason that drive is not stable. Check why the drive sleeps and wakes up frequently.
118	Broken pipe	Warning	Configurable	PID feedback is less than broken pipe level and the drive output frequency is more than broke pipe frequency for delay time.	
125	Freq. limit supv. (Freq. limit)	No action		The output frequency exceeds the range of frequency supervision limit.	Check the output frequency and check the setting of frequency supervision limit.
126	Torque limit supv. (Torque limit)	No action		The motor torque exceeds the range of torque supervision limit.	Check the motor torque and check the setting of torque supervision limit.
127	Ref. limit supv. (Ref. limit)	No action		The frequency reference exceeds the range of freq. reference supervision limit.	Check the frequency reference and check the setting of frequency reference supervision limit.
128	Power limit supv. (Power limit)	No action		The motor power exceeds the range of power supervision limit.	Check the motor power and check the setting of power supervision limit.
129	Temp. limit supv. (Temp. limit)	No action		The unit temperature exceeds the range of temperature supervision limit.	Check the unit temperature and check the setting of temperature supervision limit.
130	AI limit supv. (AI limit)	No action		The AI value exceeds the range of AI supervision limit.	Check the AI value and check the setting of AI supervision limit.
131	Motor current supv. (Motor current limit)	No action		The motor current exceeds the range of current supervision limit	Check the motor current and check the setting of current supervision limit.
132	PI superv.	No action		The PI1 feedback exceeds the range of PI1 supervision limit.	Check the PI1 feedback and check the setting of PI1 supervision limit.
133	Fieldbus fault (Fieldbus web UI fault)	Fault	Configurable	FieldBus web UI fault.	Check the web connection with RJ45 connector. Verify drive parameters are set correctly. Check the web UI tool to know if there is proper request going to drive or not.

Notes:

Notes:

We make what matters work.*

* At Eaton, we believe that power is a fundamental part of just about everything people do. Technology, transportation, energy, and infrastructure - these are things the world relies on every day. That is why Eaton is dedicated to helping our customers find new ways to manage electrical, hydraulic, and mechanical power more efficiently, safely, and sustainably. To improve people's lives, the communities where we live and work, and the planet our future generations depend upon. Because that's what really matters. And we're here to make sure it works.

See more at Eaton.com/whatmatters

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

Printed in USA
Publication No. PUB53696/TBG001481
August 2020

Powering Business Worldwide