Application manual





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Cover Photo: Eaton PowerXL® Series Drives

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Support services

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Safety



WARNING! DANGEROUS ELECTRICAL VOLTAGE!

Before commencing the installation

- · Disconnect the power supply of the device
- · Ensure that devices cannot be accidentally restarted
- · Verify isolation from the supply
- · Earth and short circuit the device
- · Cover or enclose any adjacent live components
- Only suitably qualified personnel in accordance with EN 50110-1/-2 (VDE 0105 Part 100) may work on this device/system
- Before installation and before touching the device ensure that you are free of electrostatic charge
- The functional earth (FE, PES) must be connected to the protective earth (PE) or the potential equalization.
 The system installer is responsible for implementing this connection
- Connecting cables and signal lines should be installed so that inductive or capacitive interference does not impair the automation functions
- Install automation devices and related operating elements in such a way that they are well protected against unintentional operation
- Suitable safety hardware and software measures should be implemented for the I/O interface so that an open circuit on the signal side does not result in undefined states in the automation devices
- Ensure a reliable electrical isolation of the extra-low voltage of the 24 V supply. Only use power supply units complying with IEC 60364-4-41 (VDE 0100 Part 410) or HD384.4.41 S2
- Deviations of the input voltage from the rated value must not exceed the tolerance limits given in the specifications, otherwise this may cause malfunction and dangerous operation
- Emergency stop devices complying with IEC/EN 60204-1 must be effective in all operating modes of the automation devices. Unlatching the emergency-stop devices must not cause a restart
- Devices that are designed for mounting in housings or control cabinets must only be operated and controlled after they have been installed and with the housing closed. Desktop or portable units must only be operated and controlled in enclosed housings

- Measures should be taken to ensure the proper restart of programs interrupted after a voltage dip or failure. This should not cause dangerous operating states even for a short time. If necessary, emergency-stop devices should be implemented
- Wherever faults in the automation system may cause injury or material damage, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (for example, by means of separate limit switches, mechanical interlocks, and so on)
- Depending on their degree of protection, adjustable frequency drives may contain live bright metal parts, moving or rotating components, or hot surfaces during and immediately after operation
- Removal of the required covers, improper installation, or incorrect operation of motor or adjustable frequency drive may cause the failure of the device and may lead to serious injury or damage
- The applicable national accident prevention and safety regulations apply to all work carried out on live adjustable frequency drives
- The electrical installation must be carried out in accordance with the relevant regulations (for example, with regard to cable cross sections, fuses, PE)
- Transport, installation, commissioning, and maintenance work must be carried out only by qualified personnel (IEC 60364, HD 384 and national occupational safety regulations)
- Installations containing adjustable frequency drives must be provided with additional monitoring and protective devices in accordance with the applicable safety regulations. Modifications to the adjustable frequency drives using the operating software are permitted
- All covers and doors must be kept closed during operation
- To reduce hazards for people or equipment, the user must include in the machine design measures that restrict the consequences of a malfunction or failure of the drive (increased motor speed or sudden standstill of motor). These measures include:
 - Other independent devices for monitoring safety-related variables (speed, travel, end positions, and so on)
 - Electrical or non-electrical system-wide measures (electrical or mechanical interlocks)
 - Never touch live parts or cable connections of the adjustable frequency drive after it has been disconnected from the power supply. Due to the charge in the capacitors, these parts may still be live after disconnection. Fit appropriate warning signs

Definitions and symbols



WARNING

This symbol indicates high voltage. It calls your attention to items or operations that could be dangerous to you and other persons operating this equipment. Read the message and follow the instructions carefully. This symbol is the "Safety Alert Symbol". It occurs with either of two signal words: CAUTION or WARNING, as described below.



WARNING

Indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, can result in minor to moderate injury, or serious damage to the product. The situation described in the CAUTION may, if not avoided, lead to serious results. Important safety measures are described in CAUTION (as well as WARNING).

Hazardous high voltage



WARNING

Motor control equipment and electronic controllers are connected to hazardous line voltages. When servicing drives and electronic controllers, there may be exposed components with housings or protrusions at or above line potential. Extreme care should be taken to protect against shock.

Stand on an insulating pad and make it a habit to use only one hand when checking components. Always work with another person in case an emergency occurs. Disconnect power before checking controllers or performing maintenance. Be sure equipment is properly grounded. Wear safety glasses whenever working on electronic controllers or rotating machinery.

Warnings and cautions

This manual contains clearly marked cautions and warnings which are intended for your personal safety and to avoid any unintentional damage to the product or connected appliances. Please read the information included in cautions and warnings carefully.



WARNING

The relay outputs and other I/O-terminals may have a dangerous control voltage present even when PowerXL DM1 is disconnected from mains.



WARNING

Be sure not to plug the Ethernet IP cable to the terminal under the keypad! This might harm your personal computer.



WARNING

Be sure not to plug the Modbus TCP cable to the terminal under the keypad! This might harm your personal computer.



CAUTION

Remove external control signal before resetting the fault to prevent unintentional restart of the drive.

Important safety information

Hazardous high voltage

WARNING

The components of the power unit of PowerXL Series are live when the AC drive is connected to mains potential. Coming into contact with this voltage is extremely dangerous and may cause death or severe injury.

WARNING

The motor terminals U, V, W and the brake resistor terminals are live when PowerXL Series is connected to mains, even if the motor is not running.

№ WARNING

After disconnecting the AC drive from the mains, wait until the indicators on the keypad go out (if no keypad is attached see the indicators on the cover). Wait 5 more minutes before doing any work on the connections of PowerXL Series. Do not open the cover before this time has expired. After expiration of this time, use a measuring equipment to absolutely ensure that no voltage is present. Always ensure absence of voltage before starting any electrical work!

▲ WARNING

The control I/O-terminals are isolated from the mains potential. However, the relay outputs and other I/O-terminals may have a dangerous control voltage present even when PowerXL DM1 is disconnected from mains.

▲ WARNING

Before connecting the AC drive to mains, confirm that the front and cable covers of PowerXL DM1 are closed.

▲ WARNING

During a ramp stop (see the Application Manual), the motor is still generating voltage to the drive. Therefore, do not touch the components of the AC drive before the motor has completely stopped. Wait until the indicators on the keypad go out (if no keypad is attached see the indicators on the cover). Wait additional 5 minutes before starting any work on the drive.

Important warnings

WARNING

PowerXL Series AC drive is meant for fixed installations only.

▲ WARNING

Do not perform any measurements when the AC drive is connected to the mains.

WARNING

The ground leakage current of PowerXL Series AC drives exceeds 3.5 mA AC. According to standard EN61800-5-1, a reinforced protective ground connection must be ensured.

WARNING

If the AC drive is used as a part of a machine, the machine manufacturer is responsible for providing the machine with a supply disconnecting device (EN 60204-1).

WARNING

Only spare parts delivered by Eaton can be used.

WARNING

At power-up, power brake or fault reset the motor will start immediately if the start signal is active, unless the pulse control for Start/Stop logic has been selected. Furthermore, the I/O functionalistic (including start inputs) may change if parameters, applications or software are changed. Disconnect, therefore, the motor if an unexpected start can cause danger.

WARNING

The motor starts automatically after automatic fault reset if the auto restart function is activated. See the Application Manual for more detailed information.

WARNING

Prior to measurements on the motor or the motor cable, disconnect the motor cable from the AC drive.

WARNING

Do not touch the components on the circuit boards. Static voltage discharge may damage the components.

▲ WARNING

Check that the EMC level of the AC drive corresponds to the requirements of your supply network.

Additional cautions

A CAUTION

The PowerXL DM1 AC drive must always be grounded with an grounding conductor connected to the grounding terminal.

Please follow the grounding practices from the PowerXL DM1 Installation Leaflet and Installation Manual to properly address and protect from any grounding issues.

The ground fault protection inside the AC drive protects only the drive itself against ground faults in the motor or the motor cable. It is not intended for personal safety. Due to the high capacitive currents present in the AC drive, fault current protective switches may not function properly.

Do not perform any voltage withstand tests on any part of PowerXL Series. There is a certain procedure according to which the tests shall be performed. Ignoring this procedure may result in damaged product.

Chapter 1 - PowerXL DM1 series overview

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

How to use this manual

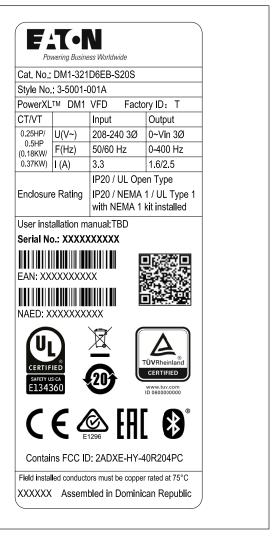
The purpose of this manual is to provide you with information necessary to install, set and customize parameters, start up, troubleshoot, and maintain the Eaton PowerXL Series variable frequency drive (VFD). To provide for safe installation and operation of the equipment, read the safety guidelines at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

Table 1. Common abbreviations.

Definition		
oad rating (15	%)	
Variable torque with low overload rating (110%)		

Rating label

Figure 1. Rating label.



1

Carton labels (U.S. and Europe)

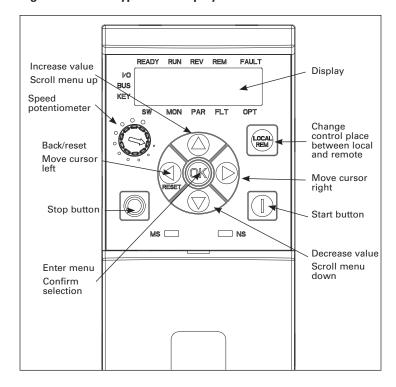
Figure 2. Carton rating label.



Chapter 2 - Keypad overview

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 3**.

Figure 3. Main keypad and display.



Main keypad buttons

Buttons description

Table 2. Keypad buttons.

lcon	Button	Description
LOCAL	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.
RESET	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.

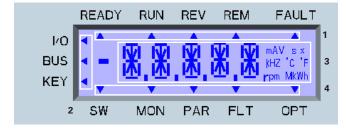
Table 2. Keypad buttons (Cont.).

lcon	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	 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 4. Main keypad display and labels.



Overview

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

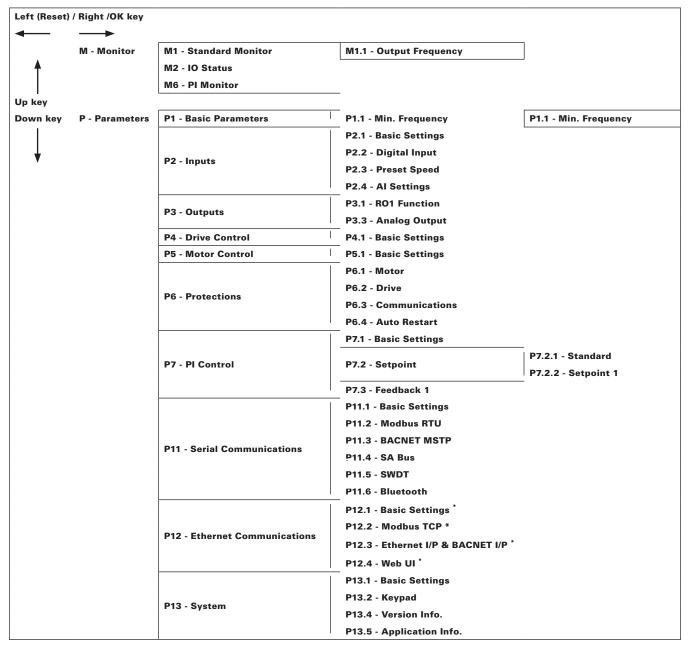
- 1. (**Top line**) The top line is state line and indicates whether the device state is:
 - Ready/NRD; Remote/Local;
 - RUN/STP;
 - REV/FWD;
 - Remote/Local; or
 - Fault (lit)/Warning (flashing).

- 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 5. Main keypad menu navigation.

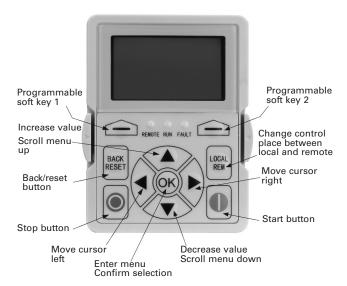


^{* =} DM1 PRO Only.

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 6. Remote keypad and display.



Remote keypad buttons

Buttons description

Table 3. 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	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	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 3. 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 4. 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.

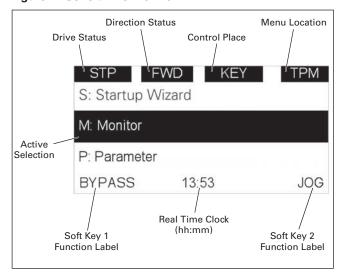
LCD display

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 7. 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.

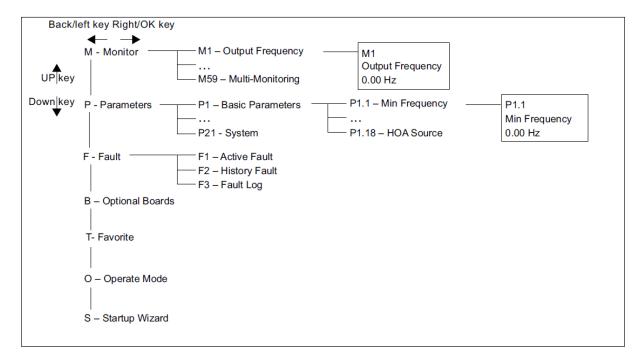
The fourth line is Value line, shows the submenu name or parameters value.

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.

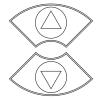
Figure 8. Remote keypad menu navigation.



Chapter 3 - Startup

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.

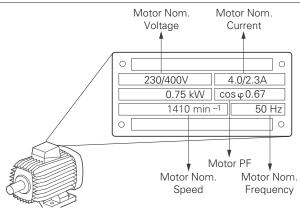
Once you have connected power to your Eaton PowerXL frequency converter, and the Start-up Wizard is enabled, follow these instructions to easily set up your drive.

Table 5. Start-up wizard instructions.

P13.1.7	Parameter lock	C 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 va	lue to 0.				
P1.1 ²	Minimum frequ	iency			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.						
P1.2 ^②	Maximum freq	uency			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, jo 4 mA fault preset speed, fire mode speed, and brake speed settings.						

Table 5. Start-up wizard instructions (Cont.).

P1.6 ^①	Motor nominal current	tor nominal current		
Minimum value:	DriveNomCurrCT*1/10 A Maximum value:	DriveNomCurrCT*2 A	Default value:	DriveNomCurrCT
Description:	Motor nominal nameplate full load current. Find this value on the rating plate of the motor.			



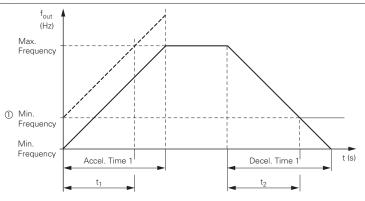
		(~ >			
P1.7 ^①	Motor nominal spee	d			ID 489
Minimum value:	linimum value: 300 rpm Maximum value: 20,000 rp		20,000 rpm	Default value:	MotorNomSpeedMF(
Description:	Motor nominal namepla	te base speed. Find this val	ue on the rating plate of	of the motor.	
P1.8 ^①	Motor power factor				ID 490
Minimum value:	0.30	Maximum value:	1.00	Default value:	0.85
Description:	Motor nominal namepla	te full load power factor. Fi	nd this value on the rat	ting plate of the motor.	
P1.9 ^①	Motor nominal volta	ge			ID 487
Minimum value:	180 V	Maximum value:	690 V	Default value:	MotorNomVoltMFG
Description:	Motor nominal namepla	te base voltage. Find this v	alue on the rating plate	of the motor.	
P1.10 ^①	Motor nominal frequ	iency			ID 488
Minimum value:	8.00 Hz	Maximum value:	400.00 Hz	Default value:	MotorNomFreqMFG
Description:	Motor nominal nameplar point (P8.4) to the same		s value on the rating pla	ate of the motor. This paramete	r sets the field weakening
P1.3 ^②	Acceleration time 1				ID 103
Minimum value:	0.1 s	Maximum value:	3000.0 s	Default value:	20 .0 s
Description:	The time required for the different frequency leve	e output frequency to accelo	erate from zero frequen Il be a fraction of the to	ncy to maximum frequency (P1.2) otal ramp time.	. When accelerating from

Table 5. Start-up wizard instructions (Cont.).

P1.4 ²	Deceleration time 1				ID 104
Minimum value:	0.1 s	Maximum value:	3000.0 s	Default value:	20 .0 s

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

① When setting a minimum output frequency (decal time greater than 0 Hz), the acceleration and deceleration time of the drive is reduced to t, or t,

P1.13 ^②	Remote control place				ID 135			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = I0 terminal; 1 = Fieldbus; or 3 = Keypad.							
Description:				ocation: I/O terminals would be from indicate what mode is selected	m the digital hard-wired			
P1.14 ^{①②}	Remote reference				ID 137			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Al; 1 = Drive reference pot; 2 = Al joystick; 3 = Motor pot; 4 = Maximum frequency; 5 = Pl control output; 6 = Keypad; or 7 = Fieldbus reference.							
Description:	This parameter determine reference signal	s the reference for remote	e 1 control mode. Th	is value can be fed from an analog	input, keypad, or fieldbus			
P13.5.3	Keypad lock PIN				ID 75			
Minimum value:	0	Maximum value:	9999	Default value:	0			
Description:	The keypad can be protect	ed against unauthorized	changes with the key	pad lock function after no keys are	e 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 to between 1 and 9999.	function is not in use. If y	ou want to activate	the password, change the value of	this parameter to any number			
		d, reset the parameter va						

Table 5. Start-up wizard instructions (Cont.).

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.				

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

Chapter 4 - Standard

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 6. Monitor.

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

Table 6. Monitor (Cont.)

Table 6. Monitor	(Cont.).				
M1 - standard (Cont.).				,
M1.10	Motor temperature	9			ID 9
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Motor temperature va	lue calculated from nameplate	e values and measure	d motor current (%).	
W1.11	Latest fault code				ID 28
Viinimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Last active fault code	value. See fault codes for the	e value shown here.		
M1.12	Instant motor pow	rer			ID 1686
Minimum value:	kW	Maximum value:	kW	Default value:	kW
Description:	Instantaneous motor p	oower (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 measu	red value (Vdc or Amps) selec	table with dipswitch.		
M2.2	Keypad pot voltage	e			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 meas	ured value (Vdc or Amps) sele	ctable with paramete	r.	
W12.4	DI1, DI2, DI3				ID 12
Viinimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Digital input 1/2/3 sta	itus.			
W2.5	DI4	,	,	'	ID 13
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Digital input 4 status.				
M2.8	RO1, RO2	1			ID 557
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Relay output 1 and 2 4	l status.			
	· ·	,			
M5 - PI monitor. M5.1	DI sat naint				ID 16
Minimum value:	PI set point	Maximum value:	Varios	Default value:	
	Varies		Varies	Delault value.	Varies
Description:	PI set point in process	uiiits.			ID 40
M5.2	PI feedback	Ba i		Dafa II	ID 18
Winimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	PI feedback level in pr	ocess units.			
M5.3	PI error value				ID 20
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	PI error in process uni	ts.			
M5.4	PI output				ID 22
Minimum value:	%	Maximum value:	%	Default value:	%

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Table 6. 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-monitorin	g		·	ID 30
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0, 1, 2.
Description:	see three lines of r	monitoring values in a single screnonitoring values. Up and down len by going up and down.	een. The values keys can be used	are selectable via the keypad menu. Nat o select the row and then hitting the	fulti-monitor page could left arrow key will allow for

Table 7. Operate mode - O.

Code	Parameter	Min.	Max.	Unit	Default	ID	Note
01	Output frequency			Hz		1	_
02	Freq. reference			Hz		24	
03	Motor speed			rpm		2	
04	Motor current			А		3	
05	Motor torque			%		4	
06	Motor power			%		5	
07	Motor voltage			V		6	
08	DC-link voltage			V		7	
09	Unit temperature			°C		8	
010	Motor temperature			%		9	
R11 [®]	Keypad reference	Minimum frequency	Maximum frequency	Hz	0.00	141	
R12 [®]	PI keypad setpoint 1	PI process minimum	PI process maximum	Varies	0.00	1307	

 $[\]ensuremath{^{\circ}}$ Parameter value will be set to be default when changing macros.

Table 8. Parameters .

P1 - Basic parameters.					,
P1.1 [©]	Minimum frequ	iency		,	ID 101
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz
Description:	Defines the lowes 1 = Fire mode mini 2 = Derag. 3 = MPFC staging 4 = MPFC master 5 = Prime pump fr 6 = Prime pump fr	frequency. fixed frequency. requency.	ll operate. This setting	will limit other frequency paran	neter settings.

Table 8. Parameters (Cont.).

P1.2 ²	Maximum frequency		,	'	ID 102
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	MaxFreqMFG
Description:	Defines the highest frequence and stage ramp frequence and stage and st	ency. equency. ncy. equency. y. icy 2. ncy. e. e. y. quency. y. cy bigh.	Il operate. This will limit oth	er frequency parameters.	
P1.3 ^②	Accel. time 1				ID 103
Minimum value:	0.1 s	Maximum value:	3,000.0 s	Default value:	20.0 s
Description:	Defines the time required	for the output frequency t	o accelerate from zero frequ	ency to maximum frequenc	÷γ.
P1.4 ²	Decel. time 1				ID 104
Minimum value:	0.1 s	Maximum value:	3,000.0 s	Default value:	20.0 s
Description:	Defines the time required	for the output frequency t	o decelerate from maximum	frequency to zero frequenc	cy.
P1.6 ^①	Motor nom. current				ID 486
Minimum value:	DriveNomCurrCT*1/10 A	Maximum value:	DriveNomCurrCT*2 A	Default value:	DriveNomCurrCT A
Description:	Motor nameplate rated f	ull load current. This value	is found on the rating plate	of the motor.	
P1.7 ^①	Motor nom. speed				ID 489
Minimum value:	300 rpm	Maximum value:	20,000 rpm	Default value:	MotorNomSpeedMFG
Description:	Motor nameplate rated s	peed. This value is found o	on the rating plate of the mot	or.	
P1.8 ^①	Motor PF				ID 490
Minimum value:	0.30	Maximum value:	1.00	Default value:	0.85
Description:	Motor nameplate rated p	ower factor. This value is	found on the rating plate of t	he motor.	
P1.9 ^①	Motor nom. voltage				ID 487
Minimum value:	180 V	Maximum value:	690 V	Default value:	MotorNomVoltMFG V
Description:	Motor nameplate rated v	oltage. This value is found	on the rating plate of the mo	otor.	
P1.10 ^①	Motor nom. frequenc	ey .			ID 488
Minimum value:	8.00 Hz	Maximum value:	400.00 Hz	Default value:	MotorNomFreqMFG Hz
Description:	Motor nameplate rated f	requency. This value is fou	nd on the rating plate of the	motor.	
P1.11 ^②	Local control place				ID 1695
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = keypad; 1 = I0 terminal; or 3 = fieldbus.				
Description:	Defines the signal location Start/Stop buttons on the	on for the start command in e drive. Keypad display wi	n local mode. I/O terminals w Il indicate which mode is sele	vould be from the digital ha	ard-wired inputs or keypad fo

Table 8. Parameters (Cont.).

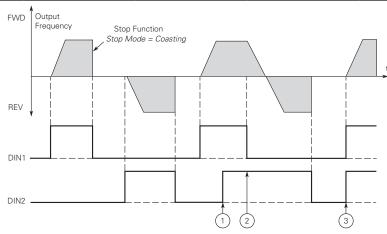
P1.12 ^{①②}	Local reference				ID 136
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Al; 1 = drive ref. pot; 4 = maximum frequency; 6 = keypad; or 7 = fieldbus ref.				
Description:	Defines the signal location	n for the speed reference	in local mode.		
P1.13 ^②	Remote control place	•	,	'	ID 135
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = IO terminal; 1 = fieldbus; or 3 = keypad.				
Description:		n for the start command in the drive. Keypad display		O terminals would be from the digital h mode is selected.	hard-wired inputs or keypad
P1.14 ^{①②}	Remote reference				ID 137
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Al; 1 = drive reference pot; 4 = maximum frequency; 6 = keypad; or 7 = fieldbus reference.				
Description:	Defines the signal location	n for the speed reference	in remote mode.		

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

Table 9. Inputs.

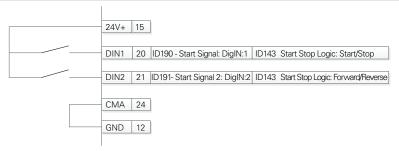
P2.1 - Basic settings.	'	'		'	'
P2.1.3 ^{①②}	IO terminal Start/St	top logic			ID 143
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	1 = Start - reverse: mair 2 = Start - enable: main	ntained input on start signal tained input on start signal	1 to run forward 1 to run forward a	ard and a maintained signal on start s and a maintained signal on start signa and a maintained signal on start signa nal 1 uses a normally open start and	al 2 for reverse. I 2 to enable the drive to run.
Description:	Defines the functionalit	y for start signal 1 and start	signal 2. By def	ault, start signal 1 is DI1 and start sig	nal 2 is DI2.
		24V+ DIN1 DIN2 CMA	art REV commar 15 20 ID190 - Start S	ct = start reverse. This would be conds. When contacts open, the moto of the moto of the contacts open, the moto of the contacts open, the moto of the contact of the conta	r stops. t Forward

Table 9. 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.
 - (DIN1) and start reverse (DIN2) signals are active simultaneously the start forward signal (DIN1)

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.



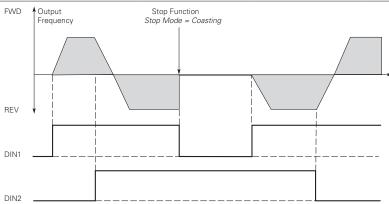
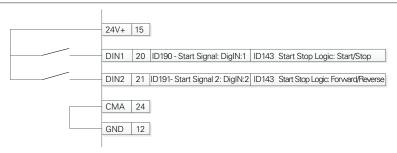
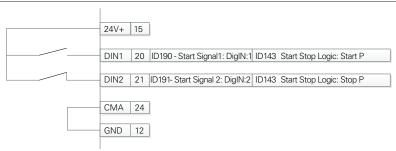


Table 9. Inputs (Cont.).

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.



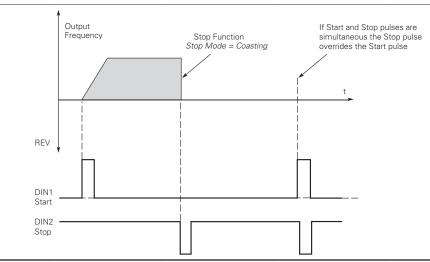


Table 9. Inputs (Cont.).

P2.2 - Digital input.					
P2.2.5 ^②	DI3 function			'	ID 1805
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	4
Options:	by P2.1.3. 2 = IO terminal start by P2.1.3. 3 = Reverse - when St 4 = Ext. fault 1 - when 7 = Fault reset - when 8 = Run enable - wher 9 = Preset speed B0 - 10 = Preset speed B1 11 = Preset speed B2 16 = Accel./decel. tim 19 = Remote control - 20 = Local control - w 22 = Pl controller - wh 23 = Pl setpoint select 24 = Motor interlock 1 29 = DC brake active -	signal 1 - when the control so signal 2 - when the control so art/Stop logic is set to 3 start closed, ext. fault 1 will be ac closed, all active faults will be all closed the drive will allow a the seven preset speeds are the	urce is set to 10 termin pulse stop pulse, this tivated. e reset. start command and be selected via three binar selected via three binar selected via three binar selected via three binar el. time 1 will be used, forced to the remote of corced to the local contrathe reference source to oint 1 is active, when of enabled to run. aking will be active.	y inputs, this is least significant iry inputs. Iry inputs, this is most significan when closed accel./decel. time : control place. It place. It place. It place. It place. It place. It controller output. It sective.	erform the action defined to the reverse direction. bit in that binary input. t bit in that binary input.
		hen closed. The Derag. cycle	e for pumps will be initi	ated.	
Description:	Defines the function of	f digital input 3.			ID 1807
P2.2.7 ^② 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 local control place. 20 = Local control - 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, DC injection braking will be active. 31 = Derag, enable - when closed. The Derag, cycle for pumps will be initiated. 				
Description:	Defines the function of	f digital input 4.			
P2.3 - Preset speed.					
P2.3.1 ^②	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 2 2 ²	Preset speed 2				ID 106

P2.3.1 ^②	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.						
P2.3.2 ^②	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.						
P2.3.3 ^②	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 9. Inputs (Cont.).

P2.3.4 ^②	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.						
P2.3.5 ^②	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.						
P2.3.6 ^②	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.						
P2.3.7 ^②	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 - Al settings.

P2.4.1	Al 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.

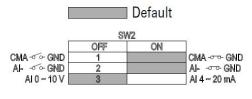
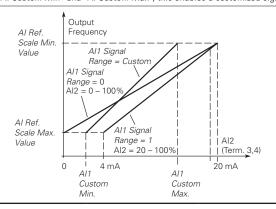


Table 9. Inputs (Cont.).

P2.4.2 ^②	Al signal range	ID 175				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = 0-100%/0-20 r 1 = 20-100%/4-20					
Description:	With this parameter, you can select the analog input 1 signal range.					
	For calaction "Customized" see "Al Custom Min" and "Al Custom May", this anables a customized signal range					



[©] Parameter value can only be changed after the drive has stopped.
© Parameter value will be set to be default when changing macros.

Table 10. Outputs.

P3.1.1 ^②	RO1 function	'		,	ID 152
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	6 = Reverse - drive is 7 = At speed - output 8 = Zero frequency - 24 = STO fault outpu 26 = Remote control	eady for operation. ning. ulted.	t reference. cy.		
Description:	Defines the function	associated with changing the	state of relay output 1		
P3.1.4 ^②	RO2 function				ID 153
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	3
Options:	6 = Reverse - drive is 7 = At speed - output 8 = Zero frequency - 24 = STO fault outpu 26 = Remote control	eady for operation. ning. ulted.	t reference. cy.		

Table 10. Outputs (Cont.).

P3.3 - Analog output.							
P3.3.1 ^②	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	je.					
P3.3.2 ^②	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.						

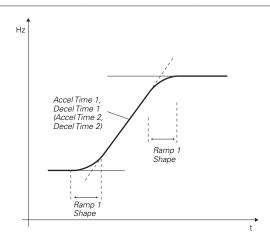
^② Parameter value will be set to be default when changing macros.

Table 11. Drive control.

P4.1 - Basic setting	s.				
P4.1.1 ²	Keypad reference				ID 141
Minimum value:	MinFreq	Maximum value:	MaxFreq	Default value:	0.00 Hz
Description:	Keypad reference value.				
P4.1.3 ^②	Keypad stop				ID 114
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:				perate when the control source is ive regardless of control mode.	s set to keypad.
Description:	Enabled or always enabl	ed keypad operation.			
P4.1.4 ^①	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 r	everse motor direction.			
P4.1.5	Change phase seque	nce 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 fo	r swapping the motor phas	e output from u, v, w t	0 u, w, v.	
P4.1.6 ^②	Power up local remo	te 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:				The default setting will hold the lart in that mode regardless of las	

Table 11. Drive control (Cont.).

P4.1.8 ^②	Start mode				ID 252
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	1 = Flying start from last operating from 2 = Flying start from	equency as a starting point.	catch a spinning m will catch a spinn	rence value. lotor. This setting searches for the c ing motor. This setting searches for	. , ,
Description:	Selects the start mo	ode operation.			
P4.1.9 ^②	Stop mode				ID 253
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:		a stop command, the motor coa e stop command, the speed of th		ntrolled by the drive. ated according to the set deceleration	on parameters.
Description:	Selects the stop mo	de operation.			
P4.1.10 ^②	Ramp 1 shape			,	ID 247
Minimum value:	0.0 s	Maximum value:	10.0 s	Default value:	0.0 s
Description:	gives a linear ramp s	shape that causes acceleration	and deceleration to	moothed with these parameters. See preact immediately to the changes it is an S-shaped acceleration/deceleration/	n the reference signal.



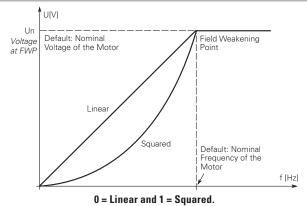
[©] Parameter value can only be changed after the drive has stopped. © Parameter value will be set to be default when changing macros.

Table 12. Motor control.

P5.1 - Basic settings.									
P5.1.1 [©]	Motor control	mode			ID 287				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0				
Options:	1 = Speed contro 2 = Open loop ve identification 3 = PM control 1	ntrol - Output frequency is controll I - Output frequency is controlled b ctor control - Similar to the standal - PM motor control mode 1, used f - PM motor control mode 2, used f	oy giving á fréquency rd speed control mod or SPM (surface mou	r reference to it with slip compensa de, higher performance slip calcula unted permanent magnet) and it als	tion requires running a motor so can be used for IPM.				
Description:	Selects the moto	r control mode.							

Table 12. 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:			rent allowed from the drive. ne current limiter controller a		
P5.1.3 ^{①②}	V/Hz optimization			"	ID 109
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disable torque boost f 1 = Enable torque boost fu				
Description:	Automatic torque boost - and run at low frequencie		ncreases automatically, which	h assists the motor to pro	duce sufficient torque to start
P5.1.4 [©]	V/Hz ratio		,		ID 108
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	where the nominal vol 1 = Squared - the voltage weakening point wher produces less torque a the load is proportiona 2 = Programmable V/Hz cu voltage, midpoint, and the application. 3 = Linear with flux optim	tage is supplied. A linear of the motor changes folke e the nominal voltage is sund electromechanical noial to the square of the speurve - the V/Hz curve can tweakening point. A progration - the drive starts to	V/Hz ratio should be used in owing a squared curve with t upplied. The motor runs und se. A squared V/Hz ratio can ed. oe programmed with three di rammable V/Hz curve can be	constant torque application of the frequency in the area for magnetized below the formation of the used in applications with the formation of the used if the other settings tor current in order to save	rom 0 Hz to the field ield weakening point and where the torque demand of the are the 0 frequency do not satisfy the needs of the energy. This mode is called
Description:	Selects the V/Hz ratio. 0 = Linear; 1 = Squared; 2 = Programmable; or 3 = Linear + flux optimizat	ion.			



P5.1.10 ²	Switching frequence	ID 288			
Minimum value:	MinSwitchFreq kHz	Maximum value:	MaxSwitchFreq kHz	Default value:	DefaultSwitchFreqCT kHz
Description:	Sets the switching freq	uency for the PWM output v	vaveform.		
P5.1.16 ^{①②}	Identification		,		ID 299
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	2 = Identification with 3 = Identification no ru	stator resistor - does not spir run - motor stator resistor is n - motor is supplied with cu nertia - identification for the	completed then the motor is rrent and voltage but at zero	run. This must be comple	eted with unloaded motor.
Description:	parameters to improve will be active then set I	s the drive to make an motor starting torque and open loo back to 0 when completed. med. If there is an issue wit	op vector control performand When a run command is issu	e. Once set and a run com ued, the message on the ke	mand is given, the operation eypad will indicate "Auto

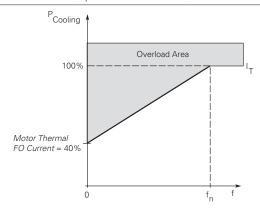
 $^{^{\}scriptsize \textcircled{0}}$ Parameter value can only be changed after the drive has stopped. $^{\scriptsize \textcircled{0}}$ Parameter value will be set to be default when changing macros.

Table 13. Protections.

P6.1 - Motor.									
P6.1.4 ^{①②}	Motor thermal	protection			ID 310				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2				
Options:		ode after fault according to param ode after fault always by coasting							
Description:	calculated motor	n is selected, the drive will stop ar temp is based off the install powe e., setting parameter to 0, will res	er on values of the driv	ve and monitoring values as the d					
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 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 ^{①②}	Input phase fa	ult			ID 332		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2		
Options:		ode after fault according to parame ode after fault always by coasting;					
Description:	The input phase	supervision ensures that the input	phases of the frequ	uency converter have approximately	equal current draw.		
P6.2.3 ^{①②}	4 mA input fa	ult			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:				reference signal is used and the sign e programmed into relay outputs RO			

Table 13. Protections (Cont.).

P6.2.4 ^{①②}	4 mA fault freque	ency			ID 331			
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00			
Description:	When 4 mA fault hap	ppens, the output frequency of	drive goes to this preset	speed when P6.2.3 = 3.				
P6.2.5 ^{①②}	External fault				ID 307			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2			
Options:		after fault according to parame after fault always by coasting.	eter stop mode.					
Description:		action and message is generate status information can also be						
P6.2.11 ^②	STO fault respons	se			ID 2427			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2			
Options:	1 = Warning - drive i	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 of	defines the function of how the	STO input will be seen of	on the keypad and how the driv	e functions to it.			
P6.2.12 ^①	PI feedback Al lo	ss 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 defir feedback.	nes the function of the PI feedba	ack analog input loss res	ponse. If the AI feedback is lo	st based off the programed A			
P6.2.13 ^{①②}	PI feedback Al lo	ss pre-frequency	'	'	ID 2402			
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz			
Description:	This parameter defir	nes the frequency the master w	ould run to if a feedback	is lost and P6.2.12 was set to	option 3.			
P6.2.14 ^②	PI feedback Al lo	ss pipe fill		'	ID 2403			
Minimum value:	0.00 varies	Maximum value:	1000.00 varies	Default value:	0.00 varies			
Description:		e in the pump based off the me 2.13 "loss of prime" occurs.	asured level. If the value	e drops below this level for the	time in P6.2.15 and below,			
P6.2.15 ^②	PI feedback Al lo	ss pre-frequency timeout			ID 2404			
Minimum value:	0.0 s	Maximum value:	6,000.0 s	Default value:	0.0 s			
Description:	PI feedback AI loss p frequency in P6.2.15 0 seconds.	ore-frequency timeout - when P for the time set here. After thi	6.2.12 is set to 3 or 4, wh s time, the drive will fau	nen the feedback signal is lost, It out on "feedback loss". The	the drive will run at the time is disabled when set to			

P6.3 - Communications.

P6.3.1 [©]	Fieldbus fault respo	ID 334					
	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 13. Protections (Cont.).

P6.3.2 ^{①②}	OPTcard fault re	esponse		'	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 respo processor.	nse mode for a board slot fault c	aused by a missing	or failed option board not communic	ating to the central

[©] Parameter value can only be changed after the drive has stopped.
© Parameter value will be set to be default when changing macros.

Table 14. Pl Controller.

P7.1 - Basic settings	5.				
P7.1.1 ^②	PI control gain				ID 1294
Minimum value:	0.00%	Maximum value:	200.00%	Default value:	100.00%
Description:		the PI Controller. It adjust the s 10% in the error value causes th		ease according to the initial of the	ne load. If this value is set to
		'		'	ID 4000
P7.1.2 ^②	PI control itime				ID 1295
P7.1.2 [©] Minimum value:	0.00 s	Maximum value:	600.00 s	Default value:	1.00 s

Table 14. PI Controller (Cont.).

P7.1.3 ^{①②}	PI process unit				ID 1297
Viinimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = %; 1 = 1/min.; 2 = rpm; 3 = ppm; 4 = pps; 5 = 1/s; 6 = 1/min.; 7 = 1/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/h; 25 = gal/h; 26 = lb/s; 27 = lb/min.; 28 = lb/h; 29 = CFM; 30 = ft³/k; 31 = ft³/min.; 32 = ft³/h; 33 = ft sy; 34 = in. wg; 35 = ft wg; 36 = PSl; 37 = lb/in.2; 38 = HP; 39 = Deg. F; 40 = PA; 41 = WC; 42 = HG; 43 = ft;		N.C.		
Description:	Defines the unit type f	or PI feedback unit.			
7.1.4 ^②	PI process unit mir	nimum			ID 1298
/linimum value:	-99999.99 varies	Maximum value:	PI Process Unit Max	Default value:	0.00 varies
escription:	Defines the minimum p	rocess unit value.			
7.1.5 ^②	PI process unit ma	ximum			ID 1300
linimum value:	PI Process Unit Min	Maximum value:	99999.99 varies	Default value:	100.00 varies
escription:	Defines the maximum	process unit value.			
7.1.6 ^{①②}	PI error inversion				ID 1303
linimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Normal - if feedbac 1 = Inverted - if feedbac	ck is less than set-point, PI co	ontroller output increases. ontroller output decreases.		
			·		

[©] Parameter value can only be changed after the drive has stopped.
© Parameter value will be set to be default when changing macros.

Table 15. Setpoint.

P7.2.1 - Standard.								
P7.2.1.1 ^②	PI keypad setpoint	1			ID 1307			
Minimum value:	PI Process Unit Min	Maximum value:	PI Process Unit Max	Default value:	0.00 varies			
Description:	Keypad PI reference va	ue set point 1.						
P7.2.1.3 ^②	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	1.					

P7.2.2 - Setpoint 1.

P7.2.2.1 ^①	PI setpoint 1 sou	rce			ID 1312
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Not used; 1 = PI keypad setpoi 2 = PI keypad setpoi 3 = AI; 4 = Drive reference p 5 = FB process data 6 = FB process data 8 = FB process data 9 = FB process data 10 = FB process data 11 = FB process data 12 = FB process data 13 = FB PI setpoint 1 14 = FB PI setpoint 2	nt 2; pot; input 1; input 2; input 3; input 4; input 5; input 6; i input 7; i input 8; ; or			
Description:	Defines source of th fieldbus message.	e setpoint value the drive uses.	This can either be an inte	ernal preset value, keypad se	tpoint, analog signal, or
P7.2.2.2 ^①	PI setpoint 1 slee	ep enable			ID 1315
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; or 1 = Enabled.				
Description:		sable the output when the frequedback rises above the wake-u		ep frequency for the sleep del	ay time. The output
P7.2.2.3 ^②	PI setpoint 1 slee	ep delay		'	ID 1317
Minimum value:	0 s	Maximum value:	3,000 s	Default value:	0 s
Description:		the delay time after the setpoin e up level is met. It is to preven			
P7.2.2.4 ^②	PI setpoint 1 wal	ke-up level		,	ID 1318
Minimum value:	-99999.99 varies	Maximum value:	99999.99 varies	Default value:	0.00 varies
Description:		the PI feedback value to go ab be scaled based off the PI unit		ut to be re enabled. This valu	ue is based of the % of
P7.2.2.5 ^②	PI setpoint 1 boo	st			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 15. Setpoint (Cont.).

P7.2.2.6 ^②	PI setpoint 1 sle	ID 2450				
Minimum value:	MinFreqMin Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz	
Description:		which the unit value is used to ut the drive into the sleep mode.		eep mode. When the unit drops	below this level for the slee	
P7.2.2.7 ^②	SP1 sleep mode	over cycle time			ID 1842	
Minimum value:	0	Maximum value:	10	Default value:	0	
Description:	cycle" fault. One cycle is defined	ne drive come in and out of slee I when the drive transfers from ot do the sleep over cycle check	normal mode to sleep n		lrive would trip on "pump ove	
P7.2.2.8 ^②	SP1 sleep mode maximum cycle time				ID 1843	
Minimum value:	0 s	Maximum value:	3,600 s	Default value:	300 s	
Description:	Defines the maximum time for sleep over cycle checking.					

[©] Parameter value can only be changed after the drive has stopped. © Parameter value will be set to be default when changing macros.

Table 16. Feedback.

P7.3.2 - Feedback 1.							
P7.3.2.1 ^①	PI feedback 1 s	source			ID 1332		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2		
Options:	0 = Not used; 1 = AI; 2 = Drive referenc; 3 = FB process dat 11 = FB PI feedbac	ta input 1; or					
Description:	Defines where fee	edback 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 17. Serial communication.

P11.1 - Basic settings.									
P11.1.1 ^①	Serial communication	on			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 t	he communication protocol	for RS-485.						

P11.2 - Modbus RTU.

P11.2.1 ^①	Slave address		,		ID 587
Minimum value:	1	Maximum value:	247	Default value:	1
Description:	This parameter defines th	e slave address for RS-485	communication.		

Table 17. Serial communication (Cont.).

P11.2.2 ^①	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	G-485 communication.		
P11.2.3 ^①	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 comn	nunication.		
P11.2.4	Modbus RTU protoc	ol 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 t	he protocol status for RS-48	5 communication.	,	
P11.2.5	Communication tim	eout modbus RTU			ID 593
Minimum value:	0 ms	Maximum value:	60,000 ms	Default value:	10,000 ms
Description:	Selects the time to wait	before a communication far	ult occurs over modbus f	RTU if a message is not receive	d
P11.2.6	Modbus RTU fault re	esponse			ID 2516
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options: Description:	communications; if n 1 - In all control modes. Defines the fieldbus fau	ot in fieldbus control, place	will not fault. e setting, if communicat	eldbus fault is active, the drive vion is lost, fieldbus fault respon	
P11.3 - BACnet RTU P11.3.1 ^①	MSTP. MSTP baud rate				ID 594
P11.3.1♥ Minimum value:		Maximum value:	NI A	Default value:	
value.	N.A.	waxiiiuiii value.	N.A.	Delault Value.	2
Options:	0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200.				-
	0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200.	the communication speed fo	r RS-485 communicatio	n.	-
Description:	0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200.	· · ·	r RS-485 communicatio	n.	ID 595
Description: P11.3.2 [©]	0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200. This parameter defines	· · ·	r RS-485 communicatio 127	n. Default value:	
Description: P11.3.2 ^① Minimum value:	0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200. This parameter defines MSTP device addres	s	127		ID 595
Description: P11.3.2 ^① Minimum value: Description:	0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200. This parameter defines MSTP device addres	Maximum value: ess of the drive on the BACr	127		ID 595
Description: P11.3.2 ^① Minimum value: Description: P11.3.3 ^①	0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200. This parameter defines MSTP device addres 0 Defines the device addr	Maximum value: ess of the drive on the BACr	127		ID 595
Description: P11.3.2 ^① Minimum value: Description: P11.3.3 ^①	0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200. This parameter defines MSTP device addres 0 Defines the device addr MSTP instance num	Maximum value: ess of the drive on the BACr	127 net MSTP network. 4,194,302	Default value:	ID 595 1 ID 596
Description: P11.3.2 ^① Minimum value: Description: P11.3.3 ^① Minimum value:	0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200. This parameter defines MSTP device addres 0 Defines the device addr MSTP instance num	Maximum value: ess of the drive on the BACr ber Maximum value: mber of the drive on the BAC	127 net MSTP network. 4,194,302	Default value:	ID 595 1 ID 596
Description: P11.3.2 [©] Minimum value: Description: P11.3.3 [©] Minimum value: Description:	0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200. This parameter defines MSTP device addres 0 Defines the device addr MSTP instance num 0 Defines the instance nu	Maximum value: ess of the drive on the BACr ber Maximum value: mber of the drive on the BAC	127 net MSTP network. 4,194,302	Default value:	ID 595 1 ID 596

Table 17. Serial communication (Cont.).

	MSTP protocol status				ID 599
Minimum value:	N.A.	laximum value:	N.A.	Default value:	N.A.
Options:	0 = Stopped; 1 = Operational; or 2 = Faulted.				
Description:	This parameter shows the pro	otocol status for BACno	et MSTP communication	on.	
P11.3.6	MSTP fault code			,	ID 600
Minimum value:	N.A.	laximum 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 pro	otocol status for BACno	et MSTP communication	on.	
P11.3.7	MSTP fault response				ID 2526
Minimum value:	N.A.	laximum value:	N.A.	Default value:	0
Options:	communications. If not in	fieldbus control, place	e will not fault.	fieldbus fault is active, the drive vation is lost, fieldbus fault respo	
Description:	Defines the fieldbus fault con	dition for BACnet MS1	P communication.		
P11.3.8	MSTP maximum master				ID 1537
Minimum value:	1 N	laximum value:	127	Default value:	127
Description:	Defines the maximum number	r of masters that can e	stablish connections v	with the drive.	
	CA hua davias address		,		ID 1726
P11.4.1 ^①	SA bus device address	faximum value:	254	Default value:	ID 1726
P11.4.1 ^① Winimum value:	204 N	Naximum value:	254	Default value:	ID 1726 204
P11.4.1 [©] Minimum value: Description:					-
P11.4.1 [©] Minimum value: Description: P11.4.2 [©]	204 N This parameter is used to set SA bus baud rate				204
P11.4 - SA bus. P11.4.1 [©] Minimum value: Description: P11.4.2 [©] Minimum value: Options:	204 N This parameter is used to set SA bus baud rate	the SA bus address at	which the drive will b	pe located on instance node.	204 ID 1727
P11.4.1 [©] Winimum value: Description: P11.4.2 [©] Winimum value: Options:	204 N This parameter is used to set SA bus baud rate N.A. N 0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; or	the SA bus address at	which the drive will b	pe located on instance node.	204 ID 1727
P11.4.1 [©] Winimum value: Description: P11.4.2 [©] Winimum value: Options:	204 N This parameter is used to set SA bus baud rate N.A. N 0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; or 4 = 115,200.	the SA bus address at	which the drive will b	pe located on instance node.	204 ID 1727
P11.4.1 [©] Minimum value: Description: P11.4.2 [©] Minimum value: Options: Description: P11.4.3 [©]	204 N This parameter is used to set SA bus baud rate N.A. N 0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; or 4 = 115,200. This parameter defines comm SA instance number	the SA bus address at	which the drive will b	pe located on instance node.	204 ID 1727 2
P11.4.1 [©] Minimum value: Description: P11.4.2 [©] Minimum value: Options: Description: P11.4.3 [©] Minimum value:	204 N This parameter is used to set SA bus baud rate N.A. N 0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; or 4 = 115,200. This parameter defines comm SA instance number	the SA bus address at laximum value: nunication speed for SA laximum value:	N.A. A bus communication. 4,194,302	Default value:	204 ID 1727 2 ID 1728
P11.4.1© Winimum value: Description: P11.4.2© Winimum value: Dptions: Description: P11.4.3© Winimum value: Description:	204 N This parameter is used to set SA bus baud rate N.A. N 0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; or 4 = 115,200. This parameter defines comm SA instance number 0 N	the SA bus address at laximum value: unication speed for SA laximum value: of the drive on the SA	N.A. A bus communication. 4,194,302	Default value:	204 ID 1727 2 ID 1728
P11.4.1© Winimum value: Description: P11.4.2© Winimum value: Dptions: Description: P11.4.3© Winimum value: Description: P11.4.3©	This parameter is used to set SA bus baud rate N.A. 0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; or 4 = 115,200. This parameter defines comm SA instance number 0 N Defines the instance number SA communication times	the SA bus address at laximum value: unication speed for SA laximum value: of the drive on the SA	N.A. A bus communication. 4,194,302	Default value:	204 ID 1727 2 ID 1728 0
P11.4.1© Minimum value: Description: P11.4.2© Minimum value: Options: Description: P11.4.3© Minimum value: Description: P11.4.4 Minimum value:	This parameter is used to set SA bus baud rate N.A. 0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; or 4 = 115,200. This parameter defines comm SA instance number 0 N Defines the instance number SA communication times	the SA bus address at laximum value: unication speed for SA laximum value: of the drive on the SA out laximum value:	N.A. A bus communication. 4,194,302 bus network.	Default value: Default value:	204 ID 1727 2 ID 1728 0 ID 1730
P11.4.1© Minimum value: Description: P11.4.2© Minimum value: Options: Description: P11.4.3© Minimum value: Description: P11.4.4 Minimum value: Description:	This parameter is used to set SA bus baud rate N.A. 0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; or 4 = 115,200. This parameter defines comm SA instance number 0 N Defines the instance number SA communication times 0 N	the SA bus address at laximum value: unication speed for SA laximum value: of the drive on the SA out laximum value:	N.A. A bus communication. 4,194,302 bus network.	Default value: Default value:	204 ID 1727 2 ID 1728 0 ID 1730
P11.4.1 [©] Minimum value: Description: P11.4.2 [©] Minimum value:	This parameter is used to set SA bus baud rate N.A. 0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; or 4 = 115,200. This parameter defines comm SA instance number 0 N Defines the instance number SA communication times 0 N Selects the time to wait before SA bus protocol status	the SA bus address at laximum value: unication speed for SA laximum value: of the drive on the SA out laximum value:	N.A. A bus communication. 4,194,302 bus network.	Default value: Default value:	204 ID 1727 2 ID 1728 0 ID 1730 10,000
P11.4.1 [©] Minimum value: Description: P11.4.2 [©] Minimum value: Options: Description: P11.4.3 [©] Minimum value: Description: P11.4.4 Minimum value: Description: P11.4.5	This parameter is used to set SA bus baud rate N.A. 0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; or 4 = 115,200. This parameter defines comm SA instance number 0 N Defines the instance number 0 N Selects the time to wait before SA bus protocol status	the SA bus address at laximum value: nunication speed for SA laximum value: of the drive on the SA out laximum value: re a communication fal	N.A. A bus communication. 4,194,302 bus network. 60,000 ult occurs over SA bus	Default value: Default value: Default value:	204 ID 1727 2 ID 1728 0 ID 1730 10,000

Table 17. Serial communication (Cont.).

P11.4.6	SA bus fault respo	nse			ID 1732
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	communications.	lf not in fieldbus control, plac	e will not fault.	nd fieldbus fault is active. The drive	
Description:	Defines the fieldbus fa	ault condition for SA bus com	munication.		
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 r 1 = Acyclic read/write	ead/write on acyclic channel. are allowed on Profibus.			
Description:	PNU927 which specifi	es the operation priority of pa	arameters for acycli	c communication.	
P11.5.2 ^①	Parameter data ac	cess	1		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 5 = Dual mode.	; or			
Description:	PNU928 which specifi	es the control priority of the o	device for cyclic con	nmunication.	
P11.5.3	Fault situation cou	ınter			ID 2632
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	PNU952 which specifi Only write of 0 is allov (parameter 944) are er		fer (actual fault situ	ation and all other fault situations) a	and the fault message coun
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 communica B1-Board HW fault B2-IO1 24 volt overloa B3-Profibus communic B4-fieldbus fault.	d fault.			
P11.5.5	Firmware version				ID 2610
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	This parameter provid	es the firmware version of the	e 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 specifi	es the protocol status for SW	/D card.		
P11.6 - Bluetooth.					
P11.6.1	Bluetooth enabled				ID 1895
Minimum value	NI A	Maximum value	N. A	Default value	0

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 17. Serial communication (Cont.).

P11.6.2 ²	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 mod	e.			-
P11.6.3	Bluetooth pairing res	Bluetooth pairing reset			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Not reset; or 1 = Reset.				
Description:	Bluetooth pairing reset.				

[©] 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. Ethernet communication.

P12.1.1 ^①	IP address mod	e			ID 1500
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Static IP; or 1 = DHCP with Aut	oIP.			
Description:	This parameter de	fined the IP address configuration	n mode for EIP/modbus T	CP.	
P12.1.2	Active IP addre	ss			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 n	nask			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 of	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.			
P12.1.6 ^①	Static IP addres	is			ID 1501
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	192.168.1.254
Description:	Defines the static	IP address.			
P12.1.7 ^①	Static subnet m	nask			ID 1503
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	255.255.255.0
Description:	Defines the static	subnet mask.			
P12.1.8 ^①	Static default g	ateway			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 comm	unication timeout			ID 611
Minimum value:	0 ms	Maximum value:	60,000 ms	Default value:	10,000 ms
Description:	Selects the time it	waits before a communication fa	ault occurs over etherne	t.	

Table 18.	Ethernet	communication	(Cont.).
iable lo.	Ememe	communication	(COIIL. <i>)</i>

	Iter (DM1 PRO only).				
P12.2.1	Trusted IP white I	ist			ID 68
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0.0.0.0 0.0.0.0 192.168.1.255
Description:	Defines the IP addres	ses in the white list. A setting	g of 192.168.1.255 en	nables all connections on the local	subnet.
P12.2.2	Trusted IP filter e	ID 76			
F12.2.2	musicum miter e				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
		Maximum value:	N.A.	Default value:	1

P12.3 - Modbus TCP (DM1 PRO only).

P12.3.1 ^①	Modbus TCP enab	le			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 enal	oled to connect to P	ower Xpert inControl.	
P12.3.2	Modbus TCP conn	ection limit		'	ID 609
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Description:	Maximum number of	connections allowed to the dri	ve.		
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 val	ue for modbus TCP.			
P12.3.4	Modbus TCP proto	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 modb	us TCP communicati	on.	
P12.3.5	Modbus TCP fault	response		'	ID 2517
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	communications.	If not in fieldbus control, place	will not fault.	nd fieldbus fault is active, the drive nication is lost, fieldbus fault respo	
Description:	Defines the fieldbus f	ault condition for modbus TCP	communication.		

P12.4 - Ethernet IP (DM1 PRO only).

P12.4.1 ^①	Ethernet based pro	tocol 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 com	munication protocol on the e	thernet I/P port.		
P12.4.2	Ethernet IP protoco	ol 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 pr	otocol is active or not.			

Table 18. Ethernet communication (Cont.).

P12.4.3	Ethernet IP fa	ID 2518			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	communicati	ons. If not in fieldbus control, place	e will not fault.	and Fieldbus fault is active, the drive nunication is lost, fieldbus fault respo	
Description:	Defines the field	Ibus fault condition for ethernet IP of	communication.		

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

P12.5.1 ^①	BACnet IP UDP po	rt number			ID 1733
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	47,808
Options:	47808 = BACO; 47809 = BAC1; 47810 = BAC2; 47811 = BAC3; 47812 = BAC4; 47813 = BAC5; 47814 = BAC6; 47815 = BAC7; 47816 = BAC8; 47817 = BAC9; 47818 = BACA; 47819 = BACC; 47821 = BACD; 47821 = BACD; 47822 = BACE; or 47823 = BACF.				
Description:	Defines the BACnet U	DP port number.			
P12.5.2 ^①	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 fo	reign device configuration.			
P12.5.3 ^①	BACnet IP BBMD I	P			ID 1735
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0.0.0.0
Description:	Displays the BACnet E	BBMD IP address.			
P12.5.4 ^①	BACnet IP UDP po	rt		'	ID 1737
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	47,808
Options:	47808 = BACO; 47809 = BAC1; 47810 = BAC2; 47811 = BAC3; 47813 = BAC4; 47813 = BAC5; 47814 = BAC6; 47815 = BAC7; 47816 = BAC8; 47817 = BAC9; 47818 = BACA; 47819 = BACC; 47821 = BACC; 47821 = BACC; 47821 = BACC;				
Description:		BBMD UDP port number.			
P12.5.5 ^①	BACnet IP registra	ntion interval	,		ID 1738
Minimum value:	0	Maximum value:	65,535	Default value:	10
Description:	Defines the registration	on interval			

P12.5.6	BACnet IP commun	ication timeout			ID 1739	
Minimum value:	0	Maximum value:	60,000	Default value:	0	
Description:	Selects the time it wait	s before a communication fa	ult 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 t	he protocol status for BACn	et IP communication.			
P12.5.8	BACnet IP fault beh	avior	,		ID 1741	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	communications. If 1 = In all control modes	not in fieldbus control, place - no matter the control place	will not fault. e setting. If communica	ieldbus fault is active, the drive		
Description:	Defines the fieldbus far	ult condition for BACnet IP co	mmunication.			
	BACnet IP instance number					
P12.5.9 ^①	DAONOL II IIIOLUNOO					
P12.5.9 ^① Minimum value:	0	Maximum value:	4,194,302	Default value:	0	
			4,194,302	Default value:	0	
Minimum value:	0 Displays the BACnet in:		4,194,302	Default value:	0	
Minimum value: Description:	0 Displays the BACnet in:	stance number.	4,194,302	Default value:	0 ID 2915	
Minimum value: Description: P12.6 - Web UI (DM	0 Displays the BACnet in: 1 PRO only).	stance number.	4,194,302 N.A.	Default value: Default value:	Ţ	

P12.6.1	Web UI protocol sta	tus			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 t	he protocol status for web s	erver communication.		
P12.6.2	Web UI fault respon	se			ID 2916
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	communications. If	not in fieldbus control, place	e will not fault.	ieldbus fault is active, the drive ation is lost, fieldbus fault respo	
Description:	Defines the fieldbus fau	It condition for web server of	communication.		
P12.6.3	Web UI communicat	tion timeout	'		ID 2919
Minimum value:	30,000 ms	Maximum value:	60,000 ms	Default value:	60,000 ms
Description:	Selects the time it waits	s before a communication fa	ult occurs over the web	b server.	
P12.6.4 ^①	Web UI enable				ID 2921
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; or 1 = Enabled.				
Description:	Enables web server con	figuration and monitoring pa	ige.		
P12.7.2					ID 3001
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disconnected; or 1 = Connected.				
	i = Connecteu.				

Table 18. Ethernet communication (Cont.).

P12.7.3	Proxy enable			"	ID 3003
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Disabled; or 1 = Enabled.				
Description:	Proxy enable.				

 $^{^{\}scriptsize \textcircled{\tiny 1}}$ Parameter value can only be changed after the drive has stopped.

Table 19. System.

P13.1 - Basic setting	ys.				
P13.1.1	Language			,	ID 340
Minimum value:	N.A. Ma	aximum value:	N.A.	Default value:	0
Options:	0 = English; 1 = English; or 2 = English.				
Description:	This parameter offers the abili available language is English o		uency converter throu	ugh the keypad in the language of	your choice. Currentl
P13.1.2 ^①	Application				ID 142
Minimum value:	N.A. Ma	aximum 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 multipl	e applications have b	peen loaded.	
P13.1.3 ^①	Parameter sets				ID 619
Minimum value:	N.A. Ma	aximum 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 r	eload the factory def	ault parameter value	s, and to store and load two custo	mized parameter sets
P13.1.4	Up to keypad				ID 620
Minimum value:	N.A. Ma	aximum value:	N.A.	Default value:	N.A.
Options:	0 = No; or 1 = Yes (all parameters).				
Description:	This function uploads all existing	ng parameter groups	to the keypad.		
P13.1.5 ^①	Down from keypad				ID 621
Minimum value:	N.A. Ma	aximum 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 o	- all navamatar araun	c from the keypad to	the drive	

Table 19. System (Cont.).

	Parameter lock PIN							
Minimum value:	0	Maximum value:	9,999	Default value:	0			
Description:				vith the password function. W changes, parameter value char				
	By default, the password between 1 and 9,999.	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 passwo	ord, reset the parameter va	lue to 0.					
P13.1.8	Keypad parameter loc	ck			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 u		the parameters. If the	parameter lock is activated, th	e text "locked" will appear on			
	Note: This function does	not prevent unauthorized	editing of parameter va	llues.				
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 application desired ar completion, it allows the	nd then advances paramet user to go to the main mei	ers through the start-up nu or default page and t	Enable", the Start-up Wizard proparameter list/Application Mithis parameter is set to "Disable"	ni wizard in keypad. After ed". The Start-up Wizard is			
	always enabled for the in Wizard, it will not cause i Wizard will be "Enabled".	it to be active on start-up.	PRO. By setting this particle of the particle	arameter to "Disable" without of -up Wizard after completion, or	defaults drive, the Start-up			
P13.2 - Keypad.	Wizard, it will not cause i Wizard will be "Enabled".	it to be active on start-up.	PRO. By setting this part of the set of the	arameter to Disable Without (-up Wizard after completion, or	Joing through the Start-up defaults drive, the Start-up			
P13.2.4	Wizard, it will not cause i Wizard will be "Enabled". Timeout time	it to be active on start-up.	If user goes into Start	arameter to Disable Without g-up Wizard after completion, or Default value:	defaults drive, the Start-up			
P13.2.4 Minimum value:	Wizard, it will not cause i Wizard will be "Enabled". Timeout time 1 s	it to be active on start-up.	If user goes into Start-	-up Wizard after completion, or Default value:	defaults drive, the Start-up			
P13.2.4	Wizard, it will not cause i Wizard will be "Enabled". Timeout time 1 s The timeout time setting	Maximum value: defines the time after whi	If user goes into Start- 65,535 s. ch the keypad display r	Default value: eturns to the Default Page.	defaults drive, the Start-up			
P13.2.4 Minimum value: Description:	Wizard, it will not cause it Wizard will be "Enabled". Timeout time 1 s The timeout time setting Note: If the default page	it to be active on start-up.	If user goes into Start- 65,535 s. ch the keypad display r	Default value: eturns to the Default Page.	ID 629			
P13.2.4 Minimum value: Description:	Wizard, it will not cause it Wizard will be "Enabled". Timeout time 1 s The timeout time setting Note: If the default page Contrast adjust	Maximum value: defines the time after whi	If user goes into Start- 65,535 s. ch the keypad display r le setting has no effect	Default value: eturns to the Default Page.	ID 629 30 s			
P13.2.4 Minimum value: Description: P13.2.5 Minimum value:	Wizard, it will not cause i Wizard will be "Enabled". Timeout time 1 s The timeout time setting Note: If the default page Contrast adjust 5	Maximum value: defines the time after whi value is 0, the timeout tim Maximum value:	If user goes into Start- 65,535 s. ch the keypad display r ie setting has no effect	Default value: Default value: Eturns to the Default Page. Default value:	ID 629			
P13.2.4 Minimum value: Description: P13.2.5 Minimum value: Description:	Wizard, it will not cause it Wizard will be "Enabled". Timeout time 1 s The timeout time setting Note: If the default page Contrast adjust 5 If the remote keypad disp	Maximum value: defines the time after whi	If user goes into Start- 65,535 s. ch the keypad display r ie setting has no effect	Default value: Default value: Eturns to the Default Page. Default value:	ID 629 30 s ID 630			
P13.2.4 Minimum value: Description: P13.2.5 Minimum value: Description: P13.2.6	Wizard, it will not cause i Wizard will be "Enabled". Timeout time 1 s The timeout time setting Note: If the default page Contrast adjust 5	Maximum value: defines the time after whi value is 0, the timeout tim Maximum value:	65,535 s. ch the keypad display r se setting has no effect 18 ljust the keypad contra:	Default value: eturns to the Default Page Default value: st with this parameter.	ID 629 30 s ID 630 12 ID 631			
P13.2.4 Minimum value: Description: P13.2.5 Minimum value: Description:	Wizard, it will not cause it Wizard will be "Enabled". Timeout time 1 s The timeout time setting Note: If the default page Contrast adjust 5 If the remote keypad disp	Maximum value: defines the time after whi value is 0, the timeout tim Maximum value:	If user goes into Start- 65,535 s. ch the keypad display r ie setting has no effect	Default value: Default value: Eturns to the Default Page. Default value:	ID 629 30 s ID 630			
P13.2.4 Minimum value: Description: P13.2.5 Minimum value: Description: P13.2.6 Minimum value:	Wizard, it will not cause i Wizard will be "Enabled". Timeout time 1 s The timeout time setting Note: If the default page Contrast adjust 5 If the remote keypad disp Backlight time 1 min.	Maximum value: defines the time after whi value is 0, the timeout tim Maximum value:	65,535 s. ch the keypad display r se setting has no effect 18 ljust the keypad contra: 65,535 min.	Default value: eturns to the Default Page Default value: st with this parameter. Default value:	ID 629 30 s ID 630 12 ID 631			
P13.2.4 Minimum value: Description: P13.2.5 Minimum value: Description: P13.2.6 Minimum value: Description:	Wizard, it will not cause i Wizard will be "Enabled". Timeout time 1 s The timeout time setting Note: If the default page Contrast adjust 5 If the remote keypad disp Backlight time 1 min.	Maximum value: defines the time after whi value is 0, the timeout tim Maximum value: llay is not clear, you can ac Maximum value:	65,535 s. ch the keypad display r se setting has no effect 18 ljust the keypad contra: 65,535 min.	Default value: eturns to the Default Page Default value: st with this parameter. Default value:	ID 629 30 s ID 630 12 ID 631			
P13.2.4 Minimum value: Description: P13.2.5 Minimum value: Description: P13.2.6	Wizard, it will not cause it Wizard will be "Enabled". Timeout time 1 s The timeout time setting Note: If the default page Contrast adjust 5 If the remote keypad disp Backlight time 1 min. This parameter determine	Maximum value: defines the time after whi value is 0, the timeout tim Maximum value: llay is not clear, you can ac Maximum value:	65,535 s. ch the keypad display r se setting has no effect 18 ljust the keypad contra: 65,535 min.	Default value: eturns to the Default Page Default value: st with this parameter. Default value:	ID 629 30 s ID 630 12 ID 631 10 min.			
P13.2.4 Minimum value: Description: P13.2.5 Minimum value: Description: P13.2.6 Minimum value: Description: P13.2.7	Wizard, it will not cause i Wizard will be "Enabled". Timeout time 1 s The timeout time setting Note: If the default page Contrast adjust 5 If the remote keypad disp Backlight time 1 min. This parameter determine Fan control N.A. 0 = Continuous - fan runs 1 = Temperature - based of 60°C (140°F). The far minute after receiving the sto "Temperature". 2 = Run follow - after pow	Maximum value: defines the time after whi value is 0, the timeout tim Maximum value: alay is not clear, you can act Maximum value: as how long the backlight so Maximum value: continuously. on the temperature of the neceives a stop command or switching over up, the fan is stopped	65,535 s. ch the keypad display r le setting has no effect 18 lijust the keypad contra: 65,535 min. stays on before going o N.A. unit. The fan is switch I when the heat sink te on the power, as well a until the run command i	Default value: eturns to the Default Page Default value: st with this parameter. Default value: ut.	ID 629 30 s ID 630 12 ID 631 10 min. ID 632 2 eat sink temperature reaches The fan runs for about a "Continuous" to			

Table 19. System (Cont.).

P13.4 - Version info	rmation.				
P13.4.1	Keypad software ve	rsion			ID 640
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Keypad firmware version	n.			
P13.4.2	Motor control softw	are version			ID 642
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	DSP/motor control softv	vare version.			
P13.4.3	Application softwar	e version			ID 644
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	MCU/application softwa	are version.			
P13.4.4	Software bundle ver	rsion		'	ID 1714
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Software bundle version	1.			
P13.5 - Application P13.5.1	information. Serial number				ID 648
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 replace the values monitoring		red values at the sa	me time. This parameter determines	if the operator is allowed to
P13.5.3	Keypad lock PIN				ID 75
Minimum value:	0	Maximum value:	9,999	Default value:	0
Description:	When the password fun	ected against unauthorized of the control of the co	changes with the ke ill be prompted to e	eypad lock function after keys are no enter a password before the keypad o	t pressed five minutes. display parameter or
	By default, the password between 1 and 9,999.	d function is not in use. If y	ou want to activate	e the password, change the value of t	his parameter to any number
	To deactivate the passw	vord, reset the parameter va	lue to 0.		
P13.5.4	Drive application na	nme			ID 2922

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

Introduction

The fan application builds on the features included in standard. In addition to all of the features in the standard application, the fan application provides features specific for HVAC applications and fan related protective features.

Fan application includes functions:

- · Damper control;
- · Fire mode;
- · Smoke purge; and
- · Broken belt protection.

I/O controls

"Function to terminal" (FTT) programming

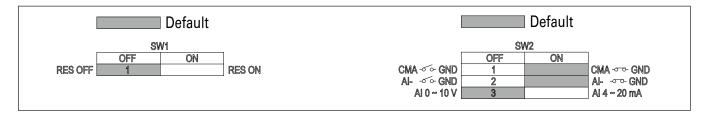
The design behind programming of the digital inputs and outs of the DM1 uses "function to terminal" programming. It is composed of a terminal, be it a relay output or a digital output, that is assigned a parameter. Within that parameter, it has different functions that can be set.

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Control I/O configuration

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

Table 20. Fan application default 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.
<u> </u>	- 2	DI2	Digital input 2	Run reverse	Start the motor in the reverse direction.
<u> </u>	- 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	Α	RS-485 signal A	_	Fieldbus communication (Modbus RTU, BACNet).
	- 7	В	RS-485 signal B	_	Fieldbus communication (Modbus RTU, BACNet).
	. 8	Al1+ ①	Analog input 1	0 - 10 V	Voltage speed reference (programmable to 4 mA to 20 mA).
"\tag{\tau}	9	Al1-	Analog input 1 ground	_	Analog input 1 common (ground).
	- 10	GND	I/O signal ground	_	I/O ground for reference and control.
	- 11	A01+	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	ST02	Safe torque Off 2	_	Safe torque Off 2 input.
	- 17	ST01	Safe torque Off 1	_	Safe torque Off 1 input.
, <u>, , , , , , , , , , , , , , , , , , </u>	- 18	R1NO	Relay 1 normally open	Run	Changes state when the drive is in the run state.
Ϋ	- 19	R1CM	Relay 1 common		
	20	R1NC	Relay 1 normally closed		
<u>*</u>	- 21	R2N0	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 is wired to ground (as shown by dashed line). If a SOURCE configuration is desired, wire 24 V to CMA and close the inputs to ground. When using the +10 V for Al1, it is important to wire Al1- to ground (as shown by dashed line). If using +10 V for Al1, terminals 9 and 10 need to be jumpered together.

① Al1+ support 10 K potentiometer.

Fan 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 21. Monitor.

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:	А	Default value:	А
Description:	Motor output current RMS	S (Amps).			
M1.5	Motor torque				ID 4
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Percent motor torque calc	ulated from nameplate va	lues and measured n	notor current (%).	
M1.6	Motor power	'		'	ID 5
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Percent motor power calc	ulated from nameplate va	ues and measured m	notor current (%).	
M1.7	Motor voltage	1		,	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).				

Table 21. Monitor (Cont.).

M1 - standard (Cont.)	_				
M1.9	Unit temperature	1			ID 8
Minimum value:	°C	Maximum value:	°C	Default value:	°C
Description:	Heat sink temperature	(deg. C).			
M1.10	Motor temperature				ID 9
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Motor temperature va	lue calculated from nameplat	e values and measure	d 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	e value shown here.		
M1.12	Instant motor pow	er			ID 1686
Minimum value:	kW	Maximum value:	kW	Default value:	kW
Description:	Instantaneous motor p	oower (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 measur	red value (Vdc or Amps) selec	table with dipswitch.		
M2.2	Keypad pot voltage	9			ID 1858
Vinimum value:	V	Maximum value:	V	Default value:	V
Description:	Keypad potentiometer	measured value (Vdc). DM1	PRO only.		
W12.3	Analog output				ID 25
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	Analog output 1 meas	ured value (Vdc or Amps) sele	ctable with paramete	r.	
W12.4	DI1, DI2, DI3				ID 12
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Digital input 1/2/3 sta	tus.			
W12.5	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 s	tatus.			
		,			,
M5 - PI monitor.					
W5.1	PI setpoint	1		,	ID 16
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	PI setpoint in process	units.			
VI5.2	PI feedback	,			ID 18
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	PI feedback level in pr	ocess units.			
M5.3	PI error value				ID 20
		Maximum value:	Varies	Default value:	Varies
Minimum value:	Varies	maxilliulli value.	Valles	Delauit value.	Valles

Table 21. Monitor (Cont.).

M5.4	PI output	'		'	ID 22
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	PI output.				
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, in	dicates if drive is stopped, ru	nning 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 monitor see three lines of monitori editing the value then by g	ng values. Up and down ke	n. The values are selectable ys can be used to select the	via the keypad menu. Mulrow and then hitting the lef	ti-monitor page could ft arrow key will allow for

Table 22. Parameters -

P1 - Basic parameters.					
P1.1 ^②	Minimum freque	псу			ID 101
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz
Description:	Defines the lowest 1 = Fire mode minin 2 = Derag. 3 = MPFC staging fi 4 = MPFC master fi 5 = Prime pump fre 6 = Prime pump fre	equency. ked frequency. quency.	ll operate. This setting	will limit other frequency paran	neter settings.
P1.2 ^②	Maximum freque	ency			ID 102
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	MaxFreqMFG
	1 = Keypad referent 3 = Motor potentior 3 = Jog speed. 4 = 2nd stage ramp 5 = Fire mode minin 6 = Derag. 7 = MPFC staging fr 8 = MPFC master fi. 9 = Prime pump fret 10 = Prime pump fr 11 = Preset speed f 12 = Frequency limi 13 = Reference limi 14 = Speed control 15 = Stall frequency 16 = 4 mA fault fret 17 = MPFC de-stagi 18 = Pipe fill loss fr 19 = Pipe fill loss fr 20 = Broken pipe fre	neter. frequency. num frequency. equency. ed frequency. juency. equency 2. requency. value. t value. fs2. Ilimit. juency. ng frequency. equency low. equency low. equency high.			
P1.3 ^②	Accel. time 1				ID 103
Minimum value:	0.1 s	Maximum value:	3,000.0 s	Default value:	20.0 s
Description:	Nofinas the time re	quired for the output frequency	to accolorate from zero	fraguancy to maximum fraguan	01/

Table 22. Parameters (Cont.)

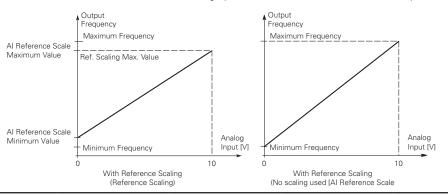
P1.4 ²	Decel. time 1				ID 104
Minimum value:	0.1 s	Maximum value:	3,000.0 s	Default value:	20.0 s
Description:	Defines the time required for	r the output frequency t	o decelerate from maximum	frequency to zero frequen	cy.
P1.6 ^①	Motor nom. current				ID 486
Minimum value:	DriveNomCurrCT*1/10 A	Maximum value:	DriveNomCurrCT*2 A	Default value:	DriveNomCurrCT A
Description:	Motor nameplate rated full l	oad current. This value	is found on the rating plate	of the motor.	
P1.7 ^①	Motor nom. speed				ID 489
Minimum value:	300 rpm	Maximum value:	20,000 rpm	Default value:	MotorNomSpeedMFG
Description:	Motor nameplate rated spee	ed. This value is found o	on the rating plate of the mot	or.	
P1.8 ^①	Motor PF				ID 490
Minimum value:	0.30	Maximum value:	1.00	Default value:	0.85
Description:	Motor nameplate rated power	er factor. This value is	found on the rating plate of t	he motor.	
P1.9 ^①	Motor nom. voltage				ID 487
Minimum value:	180 V	Maximum value:	690 V	Default value:	MotorNomVoltMFG V
Description:	Motor nameplate rated volta	age. This value is found	on the rating plate of the mo	otor.	
P1.10 ^①	Motor nom. frequency			,	ID 488
Minimum value:	8.00 Hz	Maximum value:	400.00 Hz	Default value:	MotorNomFreqMFG Hz
Description:	Motor nameplate rated frequ	uency. This value is fou	nd on the rating plate of the	motor.	
P1.11 ^②	Local control place				ID 1695
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
wiiiiiiuiii value:	IV.A.				
Options:	0 = keypad; 1 = IO terminal; or 3 = fieldbus.	or the start command in	ulocal mode 1/O terminals w	yould be from the digital b	ard-wired innuts or keynad fo
Options:	0 = keypad; 1 = IO terminal; or 3 = fieldbus.	or the start command ir ive. Keypad display wi	local mode. I/O terminals w Il indicate which mode is sele	yould be from the digital h	ard-wired inputs or keypad fo
Options: Description:	0 = keypad; 1 = IO terminal; or 3 = fieldbus.	or the start command ir ive. Keypad display wi	local mode. I/O terminals w Il indicate which mode is sele	vould be from the digital h	ard-wired inputs or keypad fo ID 136
Options: Description:	0 = keypad; 1 = IO terminal; or 3 = fieldbus. Defines the signal location for Start/Stop buttons on the dr	or the start command ir ive. Keypad display wi Maximum value:	l local mode. I/O terminals w Il indicate which mode is sele N.A.	vould be from the digital handled	
Options: Description: P1.12 ^{©2} Minimum value:	0 = keypad; 1 = IO terminal; or 3 = fieldbus. Defines the signal location for Start/Stop buttons on the dr	ive. Keypad display wi	ll indicate which mode is sele	ected.	ID 136
Options: Description: P1.12 ^{©©} Minimum value: Options:	0 = keypad; 1 = I0 terminal; or 3 = fieldbus. Defines the signal location for Start/Stop buttons on the dr Local reference N.A. U = Al; 1 = drive ref. pot; 4 = maximum frequency; 6 = keypad; or	ive. Keypad display wi	Il indicate which mode is sele	ected.	ID 136
Options: Description: P1.12 ^{©®} Minimum value: Options: Description:	0 = keypad; 1 = I0 terminal; or 3 = fieldbus. Defines the signal location for Start/Stop buttons on the dreference N.A. 0 = Al; 1 = drive ref. pot; 4 = maximum frequency; 6 = keypad; or 7 = fieldbus ref.	ive. Keypad display wi	Il indicate which mode is sele	ected.	ID 136
Options: Description: P1.12 ^{©3} Minimum value: Options: Description: P1.13 ²	0 = keypad; 1 = I0 terminal; or 3 = fieldbus. Defines the signal location for Start/Stop buttons on the dr Local reference N.A. 0 = Al; 1 = drive ref. pot; 4 = maximum frequency; 6 = keypad; or 7 = fieldbus ref. Defines the signal location for Remote control place	ive. Keypad display wi	Il indicate which mode is sele	ected.	ID 136
Options: Description: P1.12 [©] Minimum value: Options: Description: P1.13 [©] Minimum value:	0 = keypad; 1 = I0 terminal; or 3 = fieldbus. Defines the signal location for Start/Stop buttons on the dr Local reference N.A. 0 = Al; 1 = drive ref. pot; 4 = maximum frequency; 6 = keypad; or 7 = fieldbus ref. Defines the signal location for Remote control place	ive. Keypad display wi	N.A. In local mode.	Default value:	ID 136
Options: Description: P1.12 ^{©®} Minimum value: Options: Description: P1.13 [®] Minimum value: Options:	0 = keypad; 1 = I0 terminal; or 3 = fieldbus. Defines the signal location for Start/Stop buttons on the dreference N.A. 0 = Al; 1 = drive ref. pot; 4 = maximum frequency; 6 = keypad; or 7 = fieldbus ref. Defines the signal location for Remote control place N.A. 0 = I0 terminal; 1 = fieldbus; or 3 = keypad.	Maximum value: or the speed reference Maximum value:	Il indicate which mode is sele N.A. In local mode. N.A.	Default value: Default value:	ID 136
Options: Description: P1.12 [©] Minimum value: Options: Description: P1.13 [©] Minimum value: Options:	0 = keypad; 1 = I0 terminal; or 3 = fieldbus. Defines the signal location for Start/Stop buttons on the dr Local reference N.A. 0 = Al; 1 = drive ref. pot; 4 = maximum frequency; 6 = keypad; or 7 = fieldbus ref. Defines the signal location for Remote control place N.A. 0 = I0 terminal; 1 = fieldbus; or 3 = keypad. Defines the signal location for the signal	Maximum value: or the speed reference Maximum value:	Il indicate which mode is sele N.A. In local mode. N.A.	Default value: Default value:	ID 136 1 ID 135
Options: Description: P1.12 [©] Minimum value: Options:	0 = keypad; 1 = I0 terminal; or 3 = fieldbus. Defines the signal location for Start/Stop buttons on the dr Local reference N.A. 0 = Al; 1 = drive ref. pot; 4 = maximum frequency; 6 = keypad; or 7 = fieldbus ref. Defines the signal location for Remote control place N.A. 0 = I0 terminal; 1 = fieldbus; or 3 = keypad. Defines the signal location for Start/Stop buttons on the Remote reference	Maximum value: or the speed reference Maximum value:	Il indicate which mode is sele N.A. In local mode. N.A.	Default value: Default value:	ID 136 1 ID 135 0 hard-wired inputs or keypad
Options: Description: P1.12 ^{©®} Minimum value: Options: Description: P1.13 [®] Minimum value: Options: Description: P1.14 ^{©®}	0 = keypad; 1 = I0 terminal; or 3 = fieldbus. Defines the signal location for Start/Stop buttons on the drawn of the draw	maximum value: or the speed reference Maximum value: or the start command ir e drive. Keypad display	I indicate which mode is sele N.A. In local mode. N.A. I remote mode. I/O terminals will indicate which mode is	Default value: Default value: Sewould be from the digital selected.	ID 136 1 ID 135 0 hard-wired inputs or keypad ID 137

Table 23. Inputs.

P2.1 - Basic setting	s.				
P2.1.1 ^②	Al reference scale	minimum value	'	'	ID 144
Minimum value:	0.00 Hz	Maximum value:	RefScaleMax Hz	Default value:	0.00 Hz
Description:	Defines the minimum	frequency associated with 0% num value both to zero will ca	input from the analog inp	out. Setting Al reference sca	le minimum value and Al
	TOTOTOTIOO COUTO ITIAANI	num value both to zero win ca	use the analog input to sca	ale to the minimum and maxi	mum frequencies.
P2.1.2 ^②	Al reference scale		use the analog input to sca	ale to the minimum and maxi	mum frequencies. ID 145

Description:

Defines the maximum frequency associated with 100% input from the analog input. Setting AI reference scale minimum value and AI reference scale maximum value both to zero will cause the analog input to scale to the minimum and maximum frequencies.



P2.1.3 ^{①②}	IO terminal St	ID 143			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	1 = Start - revers 2 = Start - enable	e: maintained input on start signal e: maintained input on start signal ´	1 to run forward I to run forward	vard and a maintained signal on start si d and a maintained signal on start signa and a maintained signal on start signal nal 1 uses a normally open start and sta	N 2 for reverse.
Description:	Defines the func	tionality for start signal 1 and start	signal 2. By de	fault, start signal 1 is DI1 and start sign	nal 2 is DI2.

Defines the functionality for start signar Land start signar 2. By default, start signar Lis DIT and start signar 2 is DIZ.

0 = P3.2: 10 terminal start signal 1 = start forward - P3.3: 10 terminal start signal 2 = 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.

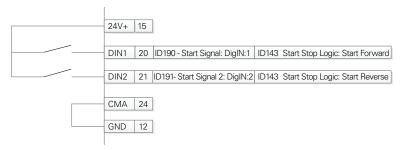
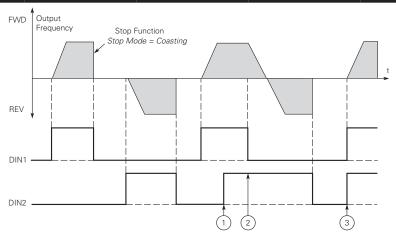


Table 23. Inputs (Cont.).



Notes: ① The first selected direction has the highest priority.
② When the DIN1 contact opens the direction of rotation

starts to change.

- (DIN1) and start reverse (DIN2) signals are active simultaneously the start forward signal (DIN1)
- 1 = P3.2: IO terminal start signal 1 = start forward P3.3: IO terminal start signal 2 = start reverse. This would be considered 2-wire control with a contact on start/stop, contact open it stops and direction on 2nd start signal.

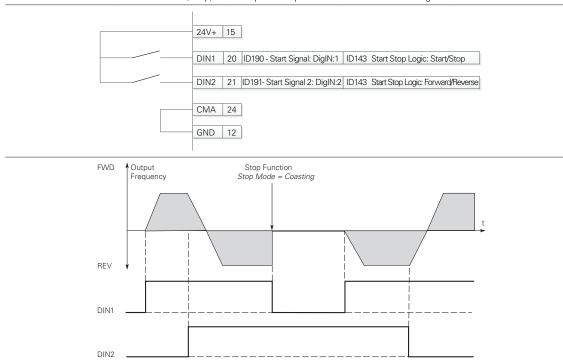
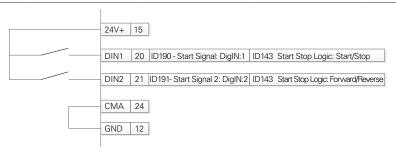
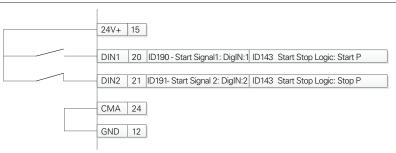


Table 23. Inputs (Cont.).

2 = P3.2: DI closed contact = start/open contact = stop P3.3: IO terminal start signal 1 = start forward - P3.3: IO terminal start signal 2 = start reverse. 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: IO terminal start signal 1 = start forward - P3.3: IO terminal start signal 2 = start reverse. This would be considered 3-wire control with start signal 1 being the start pulse and start signal 2 being the NC stop.



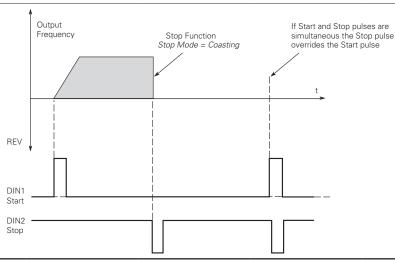


Table 23. Inputs (Cont.).

P2.2 - Digital input.					
P2.2.1 ^②	DI1 function	'	'		ID 1801
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	P2.1.3. 2 = IO terminal start s P2.1.3. 3 = Reverse, when St: 4 = Ext. fault 1, when 5 = Ext. fault 2, when 6 = Ext. fault 3, when 7 = Fault reset, when 8 = Run enable, when 9 = Preset speed B0, 10 = Preset speed B1, 11 = Preset speed B2, 12 = Jog enable, when 13 = Accel. pot value, 14 = Decel. pot value, 15 = Reset pot zero, who is a Cacel. Poecel. In 17 = Accel./Decel. profered is a No access to par 19 = Remote control, who is a P1 = Parameter 1/2 Sc 22 = P1 controller, who is a P1 setpoint selection 27 = Fire mode, when 27 = Fire mode Ref. 1, Ref. 2 will be act 28 = Fire mode reverse. 29 = DC brake active, 30 = Preheat active, verse.	ignal 1, when the control sociant/Stop logic is set to 3 star closed, Ext. fault 1 will be acclosed, Ext. fault 2 will be acclosed, Ext. fault 2 will be acclosed, Ext. fault 3 will be acclosed all active faults will be closed, the drive will allow ache seven preset speeds are the seven preset speeds are closed, the jog speed defin when closed, the motor pote when closed, the motor pote when closed, the motor pote is est, when open, Accel./Deshibit, when closed, the drive will be fel., when open, parameter set an closed, the drive will be fel., when open, parameter set, when open, parameter set, when open, parameter set, when open, parameter set, when closed, motor will be fel. when closed, motor will be fel. select, when fire mode will be closed, the fire mode will be closed, the fire mode will be closed, when fire mode is a five.	t pulse stop pulse ctivated. ctivated. ctivated. ctivated. ctivated. er eset. a start command a selected via three tiometer value wentiometer value wentiometer value we will hold the out as can be made to e forced to the local command to the selective. enabled to run, be active. eactive and this input is of raking will be active.	e binary inputs. This is least significan e binary inputs. This is most significa be binary inputs. This is most significal override the frequency reference. Will increment at the rate defined by mill decrement at the rate defined by mill reset to zero. But seet to zero. But frequncy and ignore changes to the any setting in the drive. The mote control place. Control place. Control place. Control place. When closed, parameter set 2 is active. When closed setpoint 2 is active. When closed setpoint 2 is active. But is open, fire mode Ref. 1 will be active, the direction will be forward. When the direction will be forward. When the direction will be forward.	rform the action defined by It in the reverse direction. It bit in that binary input. Int bit in that binary input. Intoor pot ramp time. Intoor pot ramp time. Intoor pot ramp time. Into 2 will be used. Interest ereference value.
Description:	Defines the function of	digital input 1			

Table 23. Inputs (Cont.).

P2.2.3 ^②	DI2 function				ID 1803		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2		
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 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 P2.1.3. 3 = Reverse, when Start/Stop logic is set to three start pulse stop pulse, this input will cause the drive to start in the reverse of the Ext. fault 1, when closed, Ext. fault 1 will be activated. 5 = Ext. fault 2, when closed, Ext. fault 2 will be activated. 6 = Ext. fault 3, when closed, Ext. fault 3 will be activated. 7 = Fault reset, when closed, Ext. fault 3 will be activated. 8 = Run enable, when closed, all active faults will be reset. 9 = Preset speed B0, the seven preset speeds are selected via three binary inputs. This is least significant bit in that binary in 10 = Preset speed B1, the seven preset speeds are selected via three binary inputs. This is most significant bit in that binary in Preset speed B2, the seven preset speeds are selected via three binary inputs. This is most significant bit in that binary in Preset speed B2, the seven preset speeds are selected via three binary inputs. This is most significant bit in that binary in Preset speed B2, the seven preset speeds are selected via three binary inputs.						
	12 = Jog enable, v 13 = Accel. pot va 14 = Decel. pot va 15 = Reset pot zer 16 = Accel./decel. 17 = Accel./decel. 18 = No access to 19 = Remote contr 20 = Local control 21 = Parameter 1/ 22 = Pl controller,	when closed, the jog speed defin lue, when closed, the motor pote lue, when closed, the motor poten, when closed, the motor poten time set, when open, accel./dec prohibit, when closed, the drive param., when closed, no changerol, when closed, the drive will be, when closed, the drive will be for the when open, parameter se when closed, the drive will force	ed at P2.3.8 will over entiometer value will etiometer value will el. time 1 will be us will hold the output is can be made to all e forced to the remotorced to the local of t 1 is active. When et the reference sour	erride the frequency reference. I increment at the rate defined by m Il decrement at the rate defined by m reset to zero. ied. When closed, accel./decel. tim It frequency and ignore changes to the my setting in the drive. mote control place. motrol place. closed. Parameter set 2 is active.	notor pot ramp time. motor pot ramp time. e 2 will be used.		
	24 = Motor interlo 25 = Smoke mode 26 = Fire mode, w 27 = Fire mode Re Ref. 2 will be 28 = Fire mode reverse. 29 = DC brake act 30 = Preheat activ	ock 1, when closed, the motor wil , when closed, smoke mode will hen closed, fire mode will be act of. 1/2 Sel., when fire mode is act active.	I be enabled to run. be active. ive. ive and this input is ind this input is ope aking will be active ill be active.	s open, fire mode Ref. 1 will be activ n, the direction will be forward. Wh			
Description:	24 = Motor interlo 25 = Smoke mode 26 = Fire mode, w 27 = Fire mode Re Ref. 2 will be 28 = Fire mode reverse. 29 = DC brake act 30 = Preheat activ	ick 1, when closed, the motor wil, when closed, smoke mode will hen closed, fire mode will be act of 1/2 Sel., when fire mode is act active. It is active, when fire mode is active a cive, when closed, DC injection brow, when closed, preheat mode we, when closed, the Derag. cycle	I be enabled to run. be active. ive. ive and this input is ind this input is ope aking will be active ill be active.	s open, fire mode Ref. 1 will be activ n, the direction will be forward. Wh			
	24 = Motor interlo 25 = Smoke mode 26 = Fire mode, w 27 = Fire mode Re Ref. 2 will be 28 = Fire mode rev be reverse. 29 = DC brake act 30 = Preheat activ 31 = Derag. enabl	ick 1, when closed, the motor wil, when closed, smoke mode will hen closed, fire mode will be act of 1/2 Sel., when fire mode is act active. It is active, when fire mode is active a cive, when closed, DC injection brow, when closed, preheat mode we, when closed, the Derag. cycle	I be enabled to run. be active. ive. ive and this input is ind this input is ope aking will be active ill be active.	s open, fire mode Ref. 1 will be activ n, the direction will be forward. Wh			
P2.2.5 [©] Minimum value:	24 = Motor interlo 25 = Smoke mode 26 = Fire mode, w 27 = Fire mode Re Ref. 2 will be 28 = Fire mode rev be reverse. 29 = DC brake act 30 = Preheat activ 31 = Derag. enable Defines the function N.A.	ick 1, when closed, the motor wil, when closed, smoke mode will hen closed, fire mode will be act if. 1/2 Sel., when fire mode is active. verse, when fire mode is active a cive, when closed, DC injection brown the closed, preheat mode we, when closed, the Derag. cycle in of digital input 2. Maximum value:	I be enabled to run. be active. ive. ive and this input is ind this input is ope aking will be active ill be active.	s open, fire mode Ref. 1 will be activ n, the direction will be forward. Wh	nen closed, the direction will		
Description: P2.2.5 [©] Minimum value: Options:	24 = Motor interlo 25 = Smoke mode 26 = Fire mode, w 27 = Fire mode Re Ref. 2 will be 28 = Fire mode re be reverse. 29 = DC brake act 30 = Preheat activ 31 = Derag. enable Defines the functio DI3 function N.A. 0 = Not used, no act 1 = 10 terminal star by P2.1.3. 2 = 10 terminal star by P2.1.3. 3 = Reverse - when 4 = Ext. fault 1 - wit 7 = Fault reset - wh 8 = Run enable - wit 9 = Preset speed Bt 10 = Preset speed Bt 11 = Preset speed Bt 12 = Remote control 22 = Pl controller - ' 23 = Pl setpoint sel 24 = Motor interloc 29 = DC brake activ	ick 1, when closed, the motor will, when closed, smoke mode will hen closed, fire mode will be act of 1/2 Sel., when fire mode is active. It is active. It is when closed, DC injection be the control source, when closed, DC injection be the control source, when closed, the Derag. cycle of digital input 2. Maximum value: It is in a 1 - when the control source is in a start/Stop logic is set to 3 start en closed, ext. fault 1 will be active faults will be active faults will be active faults will allow a 0 - the seven preset speeds are set to seven preset speeds are set to seven preset speeds are set.	l be enabled to run. be active. ive. ive. and this input is ope aking will be active ill be active. If the active in the active in the active in the active. If the active is set to 10 term in the active in the active in the active. If the active is set to 10 term in the active in the active. If the active is active, when abled to run. In active, will be active.	Default value: Intiated. Intiate	ID 1805 4 Form the action defined form the action defined t in the reverse direction. bit in that binary input.		

Table 23. Inputs (Cont.).

P2.2.7 ^②	DI4 function				ID 1807
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	7
Minimum value: Options:	0 = Not Used, no a 1 = I0 terminal sta P2.1.3; 2 = I0 terminal sta P2.1.3; 3 = Reverse - whe 4 = Ext. fault 1 - w 6 = Ext. fault 2 - w 6 = Ext. fault 3 - w 7 = Fault reset - w 8 = Run enable - w 9 = Preset speed 10 = Preset speed 11 = Preset speed 12 = Jog enable - v 13 = Accel. pot val 14 = Decel. pot val 15 = Reset pot zer 16 = Accel./decel. 17 = Accel./decel. 18 = No access to 19 = Remote contr 20 = Local controll contr		rce is set to IO termin rce is set to IO termin pulse stop pulse, this tivated; tivated; tivated; tivated; start command and be ted via 3 binary inputed via 1 binary inputed via 2 binary inputed via 3 binary inputed via	al this input when closed will pe al this input when closed will pe input will cause the drive to star in the ready state; s, this is least significant bit in the frequency reference; increment at the rate defined by necrement at the rate defined by necrement at the rate defined by necrement at the rate defined by set to zero; when closed accel./decel. time equency and ignore changes to the any setting in the drive; control place; trol place; trol place; to PI controller output;	rform the action defined by rform the action defined by t in the reverse direction; at binary input; hat binary input; hotor pot ramp time; motor pot ramp time; 2 will be used;
	26 = Fire mode - w 27 = Fire mode ref fire mode ref 28 = Fire mode rev 29 = DC brake acti 30 = Preheat activ	hen closed, fire mode will be acti erence 1/2 sel when fire mode i erence 2 will be active; erse - when fire mode is active ar ve - when closed, DC injection bra e - when closed, preheat mode wi - when closed, the Deraq. cycle i	ve; is active and this inpu nd this input is open, aking will be active; ill be active; or	direction will be forward: when c	
Description:	Defines the functi	, , ,	- p - p		

P2.3 - Preset speed.	Preset speed 1				105
P2.3.1 ^②	Preset speed 1				ID 105
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	5.00 Hz
Description:	Preset speed is sele	ected with digital inputs using a	binary input.		
P2.3.2 ^②	Preset speed 2				ID 106
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	5.00 Hz
Description:	Preset speed is sele	ected with digital inputs using a	binary input.		
P2.3.3 ^②	Preset speed 3				ID 118
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	15.00 Hz
Description:	Preset speed is sele	ected with digital inputs using a	binary input.		
P2.3.4 ^②	Preset speed 4				ID 119
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	20.00 Hz
Description:	Preset speed is sele	ected with digital inputs using a	binary input.		
P2.3.5 ^②	Preset speed 5				ID 120
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	25.00 Hz
Description:	Preset speed is sele	ected with digital inputs using a	binary input.		
P2.3.6 ^②	Preset speed 6				ID 121
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	30.00 Hz
Description:	Preset speed is sele	ected with digital inputs using a	binary input.		

Table 23. Inputs (Cont.).

P2.3.7 ^②	Preset speed 7	,			ID 122			
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	35.00 Hz			
Description:	Preset speed is se	Preset speed is selected with digital inputs using a binary input.						

P2.4 - Al settings.

P2.4.1	Al 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 inp parameter.	out mode to current or voltage	e the DIP switches	on control board will need to be set t	to the same mode as this		
	*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.						
				M1 / DM1 Pro, it will require DIP swit al supply, the DIP switches SW2 2 of			

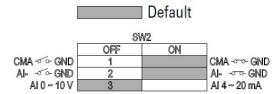


Table 23. Inputs (Cont.).

P2.4.2 ^②	Al signal range	·			ID 175
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = 0-100%/0-20 mA, 1 = 20-100%/4-20 mA				
Description:	With this parameter,	you can select the analog input	1 signal range.		
	For selection "Custon	nized," see "Al Custom Min" an	d "Al Custom Max",	this enables a customized signal	ange.
		AI Ref. Fr. Scale Min. — — Value AI Ra	Al1 Signal Range = Custom I Signal Range = 0 P = 0 - 100% Al1 Signal Range = 1 Al2 = 20 - 1 Al1 Custom	00% (Term. 3,4) 	

[©] Parameter value can only be changed after the drive has stopped. © Parameter value will be set to be default when changing macros.

Table 24. Outputs.

P3.1 - Digital output	t.				
P3.1.1 ^②	RO1 function	'	,	'	ID 152
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	2 = Run - drive is 3 = Fault - drive is 4 = Fault invert - d 5 = Warning - driv 6 = Reverse - driv 7 = At speed - dri 8 = Zero frequenc 9 = Frequency lim 10 = Pl supervisio 11 = Torque limit : 12 = Reference lif 13 = Power limit s 14 = Temperature 15 = Analog input 16 = Motor currer 17 = Over heat fa 18 = Over current 19 = Over volt reg 20 = Under volt reg 20 = Under volt reg 21 = 4 mA fault - 22 = External faul 23 = Motor therm 24 = STO fault ou 25 = Control from 26 = Remote cont 27 = Unrequested 28 = Fire mode - d 29 = Damper cont 30 = Valve contro 31 = Jog speed - d 32 = Fieldbus input 33 = Fieldbus input 34 = DC charge s 35 = Preheat active 36 = Cold weathe 37 = Pl sleep - Pl 38 = 2nd stage ra 39 = Prime pump 40 = Master drive 41 = Slave drive s	is ready for operation; running;	he set reference; ;;; quency limit 1 is ac activated; e limit; ference limit; r limit; drive temperature og input limit; tor current limit; ured; enabled; d; occurred; vated; nand location; on is not the same a word; word; s closed; tted; tive; I time 2 is active ump mode; drive in the multi-pue ein the multi-pue	limit; as the reference direction; ump control mode; control mode;	
Description:	Dofings the funct	on associated with changing the	state of rolay outpu	+ 1	

Table 24. Outputs (Cont.).

P3.1.4 ^②	RO2 function				ID 153
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	3
Options:	7 = At speed - drive output 8 = Zero frequency - drive 9 = Frequency limit supervision - supe 11 = Torque limit supervision - supe 11 = Torque limit supervisi 12 = Reference limit supervisi 14 = Temperature limit supervisi 14 = Temperature limit supervisi 16 = Motor current supervi 16 = Motor current supervi 17 = Over heat fault - driv 18 = Over current regular 19 = Over volt regular - ov 20 = Under volt regular - ov 21 = 4 mA fault - 4 mA fault 22 = External fault - exter 23 = Motor thermal fault 24 = STO fault output - sa 25 = Control from IO - I/O 26 = Remote control - rem 27 = Unrequested rotation 28 = Fire mode - drive is in 29 = Damper control - dar 30 = Valve control - valve 31 = Jog speed - drive is in 32 = Fieldbus input 1 - cor 33 = Fieldbus input 2 - cor 34 = DC charge switch cla 35 = Preheat active - preh 36 = Cold weather active 37 = Pl sleep - Pl control 38 = 2nd stage ramp freq 39 = Prime pump active - 40 = Master drive state - in 43 = Single drive control -	into faulted; warning message; butting reverse phase rotat it frequency has reached it output is at zero frequency ision - supervision for freq rvision or PI controller is a ion - supervision for torque rvision - supervision for power pervision - supervision for analo ision - supervision for analo rision - supervision for mot e over heat fault has occu - over current regulator is enabled inder volt regulator is enabled in fine in the soccurred; motor thermal fault has o fe torque Off input is activ is the selected start com note is the control place; in direction - active direction if ire mode; in per control output; control output; in jog mode; it of it is the control it ris in a sleep state; it is in a sleep state; it is the master d dicates it is the master d dicates it is the slave drive indicates the motor conta	e set reference; // uency limit 1 is a ctivated; limit; erence limit; limit; erence limit; limit; or current limit; or current limit; red; enabled; ; led; curred; and location; an is not the same word; word; closed; ed; ive; time 2 is active mp mode; rive in the multi- in the multi-pun ctor is open or cl	e limit; e as the reference direction; pump control mode; np control mode; or ose in multi-pump control mode.	
Description: P3.3 - Analog output.	Delines the Infiction 9220	ciated with changing the s	iaie vi reiay vulļ	JUL Z.	
P3.3.1 ^②	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	t mode to current or voltage	9.		

Table 24. Outputs (Cont.).

P3.3.2 ^②	AO function				ID 146	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1	
Options:	2 = Frequency ref 3 = Motor speed 4 = Motor curren 5 = Motor torque 6 = Motor power 7 = Motor voltag; 8 = DC bus voltag; 9 = Pl setpoint (p 10 = Pl error valu; 11 = Pl output (pr 12 = Analog inpu; 13 = Drive referei 14 = Fieldbus pro 15 = Fieldbus pro 16 = Fieldbus pro 17 = Fieldbus pro 18 = Fieldbus pro 19 = Fieldbus pro 20 = Fieldbus pro 21 = Fieldbus pro 22 = User defined; 23 = Motor torqui	rocess unit minimum - process unit e (process unit minimum - process ocess unit minimum - process unit	unit maximum); maximum);	n);		
Description:	Select the function	on desired to the terminal AO1.				

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

Table 25. Drive control.

P4.1 - Basic setting	s.							
P4.1.1 ^②	Keypad reference	9			ID 141			
Minimum value:	MinFreq	Maximum value:	MaxFreq	Default value:	0.00 Hz			
Description:	Keypad reference va	alue.						
P4.1.3 ^②	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 e	nabled keypad operation.						
P4.1.4 ^①	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 se	quence motor			ID 2515			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Change disable; 1 = Change enable.	or						
Description:	This parameter allow	vs for swapping the motor phas	e output from u, v, w	to u, w, v.				

Chapter 5 - Fan control application

Table 25. Drive control (Cont.)

P4.1.6 ^②	Power up local r	emote 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:				ed. The default setting will hold the l to start in that mode regardless of las	
P4.1.8 ^②	Start mode	,			ID 252
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Description:	1 = Flying start fron last operating fi 2 = Flying start fron	requency as a starting point. In maximum frequency - The driv perating frequency as a starting	l catch a spinning r e will catch a spini	notor. This setting searches for the onling motor. This setting searches for	. , ,
		oue operation.			ID 253
P4.1.9 ^②	Stop mode		A. A.	B () (10 293
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:		a stop command, the motor coa e stop command, the speed of t		introlled by the drive. rated according to the set deceleration	on parameters.
Description:	Selects the stop mo	de operation.			
P4.1.10 ^②	Ramp 1 shape				ID 247
Minimum value:	0.0 s	Maximum value:	10.0 s	Default value:	0.0 s
Description:	gives a linear ramp	shape that causes acceleration	and deceleration t	smoothed with these parameters. So react immediately to the changes in	n the reference signal.

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.

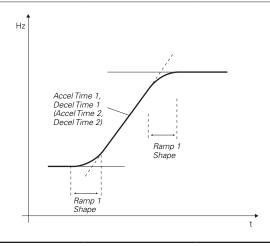


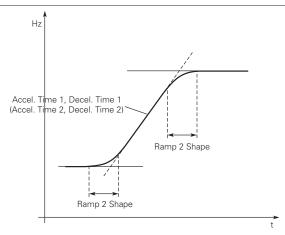
Table 25. Drive control (Cont.)

P4.1.11 ^②	Ramp 2 shape	,			ID 248
Minimum value:	0.0 s	Maximum value:	10.0 s	Default value:	0.0 s
Descriptions	The start and and a	f the cooleration and decolarat	ion romno con ho cm	anthad with these parameters. C	atting a value of 0.00 gives a

Description:

The start and end of the acceleration and deceleration ramps can be smoothed with these parameters. Setting a value of 0.00 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.



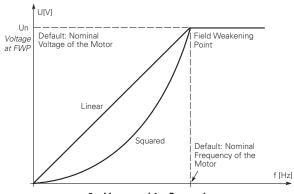
P4.1.12 ²	Accel. time 2				ID 249	
Minimum value:	0.1 s	Maximum value:	3000.0 s	Default value:	10.0 s	
Description:	These values corre frequency.	spond to the time required for th	e output frequency to	accelerate from the zero frequen	cy to the set maximum	
		provide the possibility to set two e programmable digital input.	different acceleratio	n/deceleration time sets for one a	application. The active set car	
P4.1.13 ^②	Decel. time 2				ID 250	
Minimum value:	0.1 s	Maximum value:	3000.0 s	Default value:	10.0 s	
Description:	These values correspond to the time required for the output frequency to decelerate from the set maximum frequency to the zero frequency.					
		provide the possibility to set two se programmable digital input.	different acceleratio	n/deceleration time sets for one a	application. The active set car	
P4.1.14 ^{①②}	2nd Stage ramp	frequency			ID 2444	
Minimum value:	MinFreq.	Maximum value:	MaxFreq.	Default value:	30.00 Hz	
Description:		mp frequency is the frequency le sed for other inputs or devices to		e will enable the 2nd stage ramp f	requency output function.	

[©] Parameter value can only be changed after the drive has stopped. © Parameter value will be set to be default when changing macros.

Table 26. Motor control.

P5.1 - Basic setting	s.				
P5.1.1 ^{©2}	Motor control mode				ID 287
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	1 = Speed control - Outpu 2 = Open loop vector cont identification. 3 = PM control 1 - PM mo	at frequency is controlled by trol - Similar to the standa by tor control mode 1, used f	ed directly by the frequency by giving a frequency referen rd speed control mode, highe or SPM (surface mounted pe or IPM (internally mounted p	ice to it with slip compensa er performance slip calcula ermanent magnet) and it als	tion requires running a motor so can be used for IPM.
Description:	Selects the motor control	mode.			
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 determine Once the motor current hi	es the maximum output cu its this level, it goes into t	rrent allowed from the drive. he current limiter controller a	. The parameter value rang and tries to limit the outpu	ge differs from size to size. t current.
P5.1.3 [©]	V/Hz optimization				ID 109
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disable torque boost 1 = Enable torque boost f				
Description:	Automatic torque boost - and run at low frequencie		ncreases automatically, whic	ch assists the motor to pro	duce sufficient torque to start
P5.1.4 ^{①②}	V/Hz ratio		,		ID 108
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	where the nominal vo 1 = Squared - the voltage weakening point whe produces less torque the load is proportion 2 = Programmable V/Hz c voltage, midpoint, and the application. 3 = Linear with flux optim	Itage is supplied. A linear of the motor changes foll re the nominal voltage is and electromechanical noi al to the square of the speurve - the V/Hz curve can did weakening point. A prognization - the drive starts to	V/Hz ratio should be used in owing a squared curve with supplied. The motor runs und se. A squared V/Hz ratio cal sed. be programmed with three d grammable V/Hz curve can be	n constant torque application the frequency in the area for magnetized below the found in the used in applications with the found in the used in applications with the used if the other settings of the current in order to savi	rom 0 Hz to the field rield weakening point and where the torque demand of the are the 0 frequency do not satisfy the needs of the energy. This mode is called
Description:	Selects the V/Hz ratio. 0 = Linear; 1 = Squared; 2 = Programmable; or	4 :	-		

3 = Linear + flux optimization.



0 = Linear and 1 = Squared.

P5.1.10 ²	Switching frequenc	y			ID 288
Minimum value:	MinSwitchFreq kHz	Maximum value:	MaxSwitchFreq kHz	Default value:	DefaultSwitchFreqCT kHz
Description:	Sets the switching freq	uency for the PWM output v	vaveform.		

Table 26. Motor control (Cont.).

P5.1.16 ^{①②}	Identification	,		'	ID 299
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	2 = Identification wi 3 = Identification no	nly stator resistor - does not spin ith run - motor stator resistor is o o run - motor is supplied with cur ily inertia - identification for the	completed then to	can be done with load attached. he motor is run. This must be comple but at zero frequency. nly.	ted with unloaded motor.
Description:	parameters to impro will be active then s	ove starting torque and open loo set back to 0 when completed. V	p vector control p Vhen a run comm	le of the motor once complete the driv performance. Once set and a run comm nand is issued, the message on the key fication, a fault message will be displa	mand is given, the operation pad will indicate "Auto"

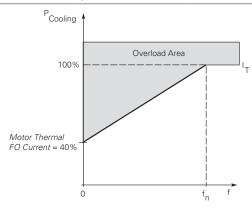
^① Parameter value can only be changed after the drive has stopped. ^② Parameter value will be set to be default when changing macros.

Table 27. Protections.

P6.1 - Motor.					
P6.1.4 ^{①②}	Motor thermal	protection			ID 310
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:		lode after fault according to param lode after fault always by coasting			
Description:	calculated motor	n is selected, the drive will stop ar temp is based off the install powe e., setting parameter to 0, will res	er on values of the driv	ve and monitoring values as the d	
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				

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.



Chapter 5 - Fan control application

Table 27. Protections (Cont.).

P6.2.2 ^{①②}	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 at 3 = Fault, stop mode at 4 = Single phase powe	fter fault according to parame fter fault always by coasting; r limit.	eter stop mode; or		
Description:	The input phase superv	vision ensures that the input	phases of the frequency	converter have approximately	equal current draw.
P6.2.3 ^{①②}	4 mA input fault	,	,	'	ID 306
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	3 = Warning, the prese 4 = Fault, stop mode at	ency from 10 seconds back is tt frequency P6.2.4 is set as r fter fault according to parame fter fault always by coasting.	eference.		
Description:				ence signal is used and the sigr grammed into relay outputs RO	
P6.2.4 ^{①②}	4 mA fault frequen	су			ID 331
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	When 4 mA fault happ	ens, the output frequency of	drive goes to this preset	speed when P6.2.3 = 3.	
P6.2.5 ^{①②}	External fault	,	,		ID 307
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	3 = Fault, stop mode at	fter fault according to parame fter fault always by coasting.			
Description:				t signal in the programmable (coutput relay outputs RO1 and F	
P6.2.11 ²	STO fault response				ID 2427
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	1 = Warning - drive ind	vill stop, no indication shown, licate warning/if STO clears o dicate fault/require reset to s	lrive will run without res		
Description:	STO fault response def	fines the function of how the	STO input will be seen o	on the keypad and how the driv	e 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 fre	equency (P6.2.13).			
Description:	This parameter defines feedback.	s the function of the PI feedba	ack analog input loss res	ponse. If the AI feedback is lo	st based off the programed A
P6.2.13 ^{①②}	PI feedback AI loss	s pre-frequency			ID 2402
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz
Description:	This parameter defines	s the frequency the master w	ould run to if a feedback	is lost and P6.2.12 was set to	option 3.
P6.2.14 ²	PI feedback AI loss	s pipe fill			ID 2403
Minimum value:	0.0 varies	Maximum value:	1000.0 varies	Default value:	0.0 varies
Description:		n the pump based off the me 3 "loss of prime" occurs.	asured level. If the value	e drops below this level for the	time in P6.2.15 and below,

Table 27. Protections (Cont.).

P6.2.15 ^②	PI feedback A	Al loss pre-frequency timeout			ID 2404
Minimum value:	0 s	Maximum value:	6,000 s	Default value:	0 s
Description:	PI feedback AI I frequency in P6 0 seconds.	oss pre-frequency timeout - when Pl 2.15 for the time set here. After thi	6.2.12 is set to 3 or 4, s time, the drive will	, when the feedback signal is lost, fault out on "feedback loss". The	the drive will run at the time is disabled when set to

P6.3 - Communications.

P6.3.1 ^{©2}	Fieldbus fault resp	onse			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:	communication port.			is used and communication is los	
P6.3.2 ^{①②}	OPTcard fault resp	onse		,	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.				

Table 28. PI Controller.

P7.1 - Basic settings.									
P7.1.1 ^②	PI control itim	PI control itime							
Minimum value:	0.00%	Maximum value:	200.00%	Default value:	100.00%				
Description:		of the PI Controller. It adjust the s of 10% in the error value causes th			ne load. If this value is set to				
P7.1.2 ^②	PI control gain	,	1	'	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 10.00%/s.							

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 28. PI Controller (Cont.).

P7.1.3 ^{①②}	PI process unit				ID 1297
/linimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = %; 1 = 1/min.; 2 = rpm; 3 = ppm; 4 = pps; 5 = 1/s; 6 = 1/min.; 7 = 1/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/min.; 25 = ggl/h; 24 = gal/min.; 25 = ggl/h; 27 = lb/min.; 28 = lb/h; 30 = ft³/s; 31 = ft³/min.; 32 = ft³/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 fo	r PI feedback unit.			,
P7.1.4 ^②	PI process unit min	imum			ID 1298
linimum value:	-99999.99 varies	Maximum value:	PID1_ProcessUnitMax varies	Default value:	0.00 varies
Description:	Defines the minimum pr				
7.1.5 ^②	PI process unit max	imum			ID 1300
linimum value:	PID1_ProcessUnitMin	Maximum value:	99999.99 varies	Default value:	100.00 varies
escription:	Defines the maximum p	rocess unit value.			
7.1.6 ^{①②}	PI error inversion				ID 1303
/linimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Normal - if feedback 1 = Inverted - if feedback	k is less than set-point, PI cock is less than set-point, PI c	ntroller output increases. ontroller output decreases.		
Description:	Dofines the way the pro	ocess value output reacts to	the feedback signal		

Table 28. Pl Controller (Cont.).

P7.1.7 ^②	PI dead band				ID 1304	
Minimum value:	-99999.99 varies	Maximum value:	99999.99 varies	Default value:	0 varies	
Description:		etpoint in process units. This ler. The PI output is locked it		ions occur to prevent oscillati n the dead band area.	on or repeated activation/	
P7.1.8 ^②	PI dead band delay	,	,		ID 1306	
Minimum value:	0.00 s	Maximum value:	320.00 s	Default value:	0.00 s	
Description:	If the PI process value level out again.	goes out of the dead band ar	ea for the desired time de	lay, at that point the controlle	er will re-initialize and try to	
P7.1.9 ^②	PI ramp time				ID 1311	
Minimum value:	0.00 s	Maximum value:	300.00 s	Default value:	0.00 s	
Description:	Defines the rising and falling ramp times for changes in the process value.					

[©] Parameter value can only be changed after the drive has stopped. @ Parameter value will be set to be default when changing macros.

Table 29. Setpoint.

P7.2.1 - Standard.								
P7.2.1.1 ^②	PI keypad setpoint	1			ID 1307			
Minimum value:	PI Process Unit Min	Maximum value:	PI Process Unit Max	Default value:	0.00 varies			
Description:	Keypad PI reference val	ue setpoint 1.						
P7.2.1.2 ^②	PI keypad setpoint a	2			ID 1309			
Minimum value:	PI Process Unit Min	Maximum value:	PI Process Unit Max	Default value:	0.00 varies			
Description:	Keypad PI reference val	ue setpoint 2.						
P7.2.1.3 ^②	PI wake-up action				ID 2466			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	1 = Wake-up when abov 2 = Wake-up when belo	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	i.					

P7.2.2 - Setpoint 1.

P7.2.2.1 ^{①②}	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 6 = FB process data input 7 = FB process data input 8 = FB process data input 9 = FB process data input 10 = FB process data input 11 = FB process data input 12 = FB process data input 13 = FB PI setpoint 1; or 14 = FB PI setpoint 2.	2; 3; 4; 5; t 6; t 7;				
Description:	Defines source of the set fieldbus message.	point value the drive uses.	This can either be a	n internal preset value, keypad se	tpoint, analog signal, or	

Table 29. Setpoint (Cont.).

P7.2.2.2 ^{①②}	PI setpoint 1 slee	ep enable			ID 1315			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Disabled; or 1 = Enabled.							
Description:		sable the output when the frequedoack rises above the wake-u		sleep frequency for the sleep de	lay time. The output			
P7.2.2.3 ^②	PI setpoint 1 slee	ep delay			ID 1317			
Minimum value:	0 s	Maximum value:	3,000 s	Default value:	0 s			
Description:				p level for this amount of time a en going into the sleep function				
P7.2.2.4 ^②	PI setpoint 1 wal	ke-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.						
P7.2.2.5 ^②	PI setpoint 1 boo	est			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.						
P7.2.2.6 ^②	PI setpoint 1 slee	ep level		,	ID 2450			
Minimum value:	Min Freq	Maximum value:	Max Freq	Default value:	0.00 Hz			
Description:		which the unit value is used to t the drive into the sleep mode.		eep mode. When the unit drops	below this level for the sleep			
P7.2.2.7 ^②	SP1 sleep mode	over cycle time			ID 1842			
Minimum value:	0	Maximum value:	10	Default value:	0			
Description:	cycle" fault. One cycle is defined	e drive come in and out of sleep when the drive transfers from the sleep over cycle check	normal mode to sleep n		rive would trip on "pump over			
P7.2.2.8 ^②	SP1 sleep mode	maximum cycle time	,		ID 1843			
Minimum value:	0	Maximum value:	3,600	Default value:	0			
Description:	Defines the maximu	m time for sleep over cycle chec	cking.					

P7.2.3 - Setpoint 2.

Minimum value: Options:	N.A.	Maximum value:	N.A.		
Options:			IV.A.	Default value:	1
	0 = Not used; 1 = PI keypad setpoint 1 2 = PI keypad setpoint 2 3 = Al; 4 = Drive reference pot; 5 = Fieldbus process dat 7 = Fieldbus process dat 8 = Fieldbus process dat 10 = Fieldbus process dat 11 = Fieldbus process dat 12 = Fieldbus process dat 13 = Fieldbus PI setpoint 14 = Fieldbus PI setpoint	a input 1; a input 2; a input 3; a input 3; a input 4; a input 5; tta input 6; tta input 7; tta input 8;			
Description:	Defines source of the se fieldbus message.	tpoint value the drive uses.	This can either be	an internal preset value, keypad set	point, analog signal, or

Table 29. Setpoint (Cont.).

P7.2.3.2 ^{①②}	PI setpoint 2 sleep	enable			ID 1324			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Disabled; or 1 = Enabled.							
Description:		ble the output when the frequ dback rises above the wake-up		ep frequency for the sleep de	lay time. The output			
P7.2.3.3 ^②	PI setpoint 2 sleep	delay		,	ID 1326			
Minimum value:	0 s	Maximum value:	3,000 s	Default value:	0 s			
Description:	This parameter sets the shut off till the wake	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.						
P7.2.3.4 ^②	PI setpoint 2 wake	e-up level	,	,	ID 1327			
Minimum value:	-99999.99 varies	Maximum value:	99999.99 varies	Default value:	0.00 varies			
Description:	Defines the level for t feedback which can b	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.						
P7.2.3.5 ^②	PI setpoint 2 boos	t		,	ID 1329			
Minimum value:	-2.00 varies	Maximum value:	2.00 varies	Default value:	1.00 varies			
Description:	The setpoint can be b	oosted via a multiplier value.						
P7.2.3.6 ^②	PI setpoint 2 sleep	level	,	'	ID 2452			
Minimum value:	Min Freq	Maximum value:	Max Freq	Default value:	0.00 Hz			
Description:		hich the unit value is used to the drive into the sleep mode.		mode. When the unit drops	s below this level for the slee			
P7.2.3.7 ^②	SP2 sleep mode o	ver cycle time	,	,	ID 1844			
Minimum value:	0	Maximum value:	10	Default value:	0			
Description:	cycle" fault. One cycle is defined v	drive come in and out of sleep when the drive transfers from do the sleep over cycle check	normal mode to sleep mod	le.	drive would trip on "pump ov			
P7.2.3.8 ^②	SP2 sleep mode m	aximum cycle time			ID 1845			
Minimum value:	0	Maximum value:	3,600	Default value:	0			
		time for sleep over cycle ched						

[©] Parameter value can only be changed after the drive has stopped. @ Parameter value will be set to be default when changing macros.

Table 30. Feedback.

P7.3.1 - Standard.									
P7.3.1.1 ^②	PI feedback gain	1							
Minimum value:	-1,000.00%	Maximum value:	1,000.00%	Default value:	100.00%				
Description:	Defines gain associ	Defines gain associated with the feedback signal from the measuring device.							

Table 30. Feedback (Cont.).

P7.3.2 - Feedback 1					
P7.3.2.1 ^{①②}	PI feedback 1 s	ID 1332			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = Not used; 1 = Al; 2 = Drive reference; 3 = Fieldbus proce; 4 = Fieldbus proce; 5 = Fieldbus proce; 6 = Fieldbus proce; 7 = Fieldbus proce; 9 = Fieldbus proce; 10 = Fieldbus Pl fe;				
Description:	Defines where fee	dback signal is being fed into the	drive, via analog or fie	eldbus data value.	
P7.3.2.2 ^②	PI feedback 1 r	ninimum			ID 1333
Minimum value:	-200.00 %	Maximum value:	200.00%	Default value:	0.00%
Description:	Minimum unit valu	e for the feedback signal.			
P7.3.2.3 ^②	PI feedback 1 r	naximim			ID 1334
Minimum value:	-200.00 %	Maximum value:	200.00%	Default value:	100.00%
Description:	Maximim unit valu	e for the feedback signal.			

Table 31. HVAC parameters.

P8.1 - Damper (*DM	1 PRO).	,	'	,	'	
P8.1.1 ^{①②}	Damper start	'		,	ID 483	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Normal; 1 = Damper start; 2 = Damper tout; or 3 = Damper delay.					
Description:	This parameter determine	nes the function of th damp	er.			
P8.1.2 ^{①②}	Damper time out	'		'	ID 484	
Minimum value:	1 s	Maximum value:	32,500 s	Default value:	5 s	
Description:	The time out time used is received.	for an interlocked time start	, after which the start	sequence must be restarted if n	o acknowledgement conta	
P8.1.3 [©]	Damper delay				ID 485	
Minimum value:	1 s	Maximum value:	32,500 s	Default value:	5 s	
Description:	The delay time following a delay start, after which the frequency converter will be started.					

P8.2 - Fire mode (*DM1 PRO).

P8.2.1 ^{①②}	Fire mode pro	ID 535						
Minimum value:	N.A.	Maximum value:	Maximum value: N.A. Default value:					
Options:		0 = Closing contact initiates fire mode function. 1 = Opening contact initiates fire mode function.						
Description:	This parameter determines whether the fire mode function is determined by a contact closure or contact opening on the desired digital input function select fire mode.							
	Note: When fire mode is enabled, this causes the drive to ignore any fault and run till its death. Warranty will be non-valid in the case this is enabled and the drive causes issues to the system.							

^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 31. HVAC parameters (Cont.).

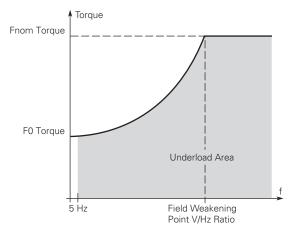
P8.2.2 ^{①②}	Fire mode refere	ence select function			ID 536
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	3 = AI; or				
Description:	This parameter allo	ws for setting the reference loca	ation for when the fire r	mode is enabled.	
P8.2.3 ^②	Fire mode minin	num frequency			ID 537
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	15.00 Hz
Description:	This parameter set	s the minimum output frequency	for fire mode. This can	be used as a selection for refer	ence command.
P8.2.4 ^②	Fire mode frequ	ency reference 1	'	'	ID 565
Minimum value:	0.00%	Maximum value:	100.00%	Default value:	75.00%
Description:	This parameter set frequency (P1.2) for	s the drive operating percentage r fire mode reference 1.	based off the 0% being	g minimum frequency (P1.1) and	100% being maximum
P8.2.5 ^②	Fire mode frequ	ency reference 2		,	ID 564
Minimum value:	0.00%	Maximum value:	100.00%	Default value:	100.00%
Description:		s the drive operating percentage r fire mode reference 2.	based off the 0% being	g minimum frequency (P1.1) and	100% being maximum
P8.2.6	Fire mode test e	enable			ID 2443
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Disabled; or 1 = Enabled.				
Description:		ws for testing the fire mode fea e speed desired but all faults are		ter set to enable and fire mode i	nput enabled, the drive will
P8.2.7 ^{①②}	Smoke purge fro	equency			ID 554
Minimum value:	0.00%	Maximum value:	100.00%	Default value:	50.00%
Description:		or smoke purge. Preset speed u d 100% being maximum frequenc		election. The percentage is bas	ed off the 0% being minimum
P8.3 - Protections (*DM1 PRO).				
P8.3.1 [©]	Broken belt pro				ID 317
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No action; 1 = Warning; 2 = Fault; or 3 = Fault, coast.				
Description:	status of the motor	function, the drive will stop and If the motor torque drops below otection by setting the paramete	v the Fnom and F0 torg	ue levels for the time limit, the p	tions and the monitoring protection is enabled.

Table 31. HVAC parameters (Cont.).

P8.3.2 ^②		que			ID 318
Minimum value:	10.00%	Maximum value:	150.00%	Default value:	50.00%

Description:

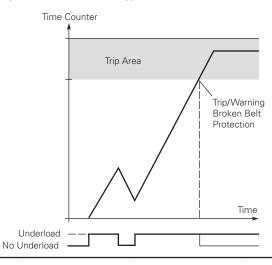
The torque limit can be set between 10.0-150.0 % x TnMotor. This parameter gives the value for the minimum torque allowed when the output frequency is at or above the field weakening point. If you change P1.6, nominal motor current, this parameter is automatically restored to the default value.



P8.3.3 ^②	Broken belt FC) torque			ID 319
Minimum value:	5.00%	Maximum value:	150.00%	Default value:	10.00%
Description:	The torque limit of frequency. If you	can be set between 5.0—150.0 % x u change the value of P1.6, nominal	TnMotor. This parame motor current, this par	eter gives the value for the minim rameter is automatically restored	um torque allowed at zero d to the default value.
P8.3.4 ^②	Broken belt til	me limit			ID 320
Minimum value:	2.00 s	Maximum value:	600.00 s	Default value:	20.00 s

Description:

This time can be set between 2.00 and 600.00 seconds. This is the time allowed for an fault state to exist. An internal up/down counter counts the accumulated underload time. If the underload counter value goes above this limit, the protection will cause a trip according to protection parameter. If the drive is stopped, the counter is reset to zero.



Parameter value can only be changed after the drive has stopped. [®] Parameter value will be set to be default when changing macros.

Table 32. Serial communication.

P11.1 - Basic setting	s.			,	,
P11.1.1 ^①	Serial communicat	tion			ID 586
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Modbus RTU; 1 = BACnet MS/TP (DI 2 = SWD (DM1 PRO).	M1 PR0); or			
Description:	This parameter define	s the communication protocol	for RS-485.		
P11.2 - Modbus RTU					
P11.2.1 ^①	Slave address	,	,	,	ID 587
Minimum value:	1	Maximum value:	247	Default value:	1
Description:	This parameter define	s the slave address for RS-48	5 communication.		
P11.2.2 ^①	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 define	s communication speed for RS	G-485 communication.		
P11.2.3 ^①	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 define	s parity type for RS-485 comm	nunication.		
P11.2.4	Modbus RTU proto	col 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-48	5 communication.		
P11.2.5	Communication til	neout modbus RTU			ID 593
Minimum value:	0 ms	Maximum value:	60,000 ms	Default value:	10,000 ms
Description:	Selects the time to wa	nit before a communication fa	ult occurs over modbus	RTU if a message is not receive	d
P11.2.6	Modbus RTU fault				ID 2516
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	communications; if	not in fieldbus control, place	will not fault.	ieldbus fault is active, the drive vation is lost, fieldbus fault respon	
		ault condition for modbus RTU	communication.		
Description:	Defines the fieldbus fa				
		Tark Condition for modbus fire			
Description: P11.3 - BACnet RTU P11.3.1 [©]		ant contained for mouses in o			ID 594

P11.3.1 ^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	or RS-485 communicati	on.	

Table 32. Serial communication (Cont.).

	MSTP device address				ID 595
P11.3.2 ^① Minimum value:	0	Maximum value:	127	Default value:	1
Description:	Defines the device address				· · · · · · · · · · · · · · · · · · ·
P11.3.3 ^①	MSTP instance number				ID 596
Minimum value:	0	Maximum value:	4,194,302	Default value:	0
Description:	Defines the instance number	er of the drive on the RAC			
P11.3.4	MSTP communication t		TICE IVIOTI TICEWORK.		ID 598
Minimum value:	0 ms	Maximum value:	60,000 ms	Default value:	10,000 ms
Description:			<u> </u>	MSTP if a message is not receive	
P11.3.5	MSTP protocol status	oro a commandation rad	TOUGHT OVER BY TOTHER	- I a moodago to noc roooty	ID 599
Minimum value:		Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Stopped; 1 = Operational; or 2 = Faulted.				
Description:	This parameter shows the p	rotocol status for BACne	t MSTP communication	n.	
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 p	rotocol status for BACne	t MSTP communication	n.	
P11.3.7	MSTP fault response			'	ID 2526
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
	0 = Only in fieldbus control of communications. If not 1 = In all control modes - no	mode - when fieldbus is t in fieldbus control, place matter the control place	he control place and fi will not fault. setting. If communica	Default value: eldbus fault is active, the drive value is lost, fieldbus fault response.	will fault on loss of
Options:	0 = Only in fieldbus control of communications. If not	mode - when fieldbus is t in fieldbus control, place matter the control place	he control place and fi will not fault. setting. If communica	eldbus fault is active, the drive	will fault on loss of
Options: Description:	0 = Only in fieldbus control of communications. If not 1 = In all control modes - no	mode - when fieldbus is t in fieldbus control, place matter the control place andition for BACnet MST	he control place and fi will not fault. setting. If communica	eldbus fault is active, the drive	will fault on loss of
Options: Description: P11.3.8	0 = Only in fieldbus control communications. If not 1 = In all control modes - no Defines the fieldbus fault co	mode - when fieldbus is t in fieldbus control, place matter the control place andition for BACnet MST	he control place and fi will not fault. setting. If communica	eldbus fault is active, the drive	will fault on loss of
Options: Description: P11.3.8 Minimum value:	0 = Only in fieldbus control communications. If not 1 = In all control modes - no Defines the fieldbus fault communication.	mode - when fieldbus is t in fieldbus control, place matter the control place ondition for BACnet MST r Maximum value:	he control place and fi will not fault. setting. If communica communication.	eldbus fault is active, the drive vation is lost, fieldbus fault response	will fault on loss of nse will occur.
Options: Description: P11.3.8 Minimum value: Description:	0 = Only in fieldbus control communications. If not 1 = In all control modes - no Defines the fieldbus fault communication master 1	mode - when fieldbus is t in fieldbus control, place matter the control place ondition for BACnet MST r Maximum value:	he control place and fi will not fault. setting. If communica communication.	eldbus fault is active, the drive vation is lost, fieldbus fault response	will fault on loss of nse will occur.
Options: Description: P11.3.8 Minimum value: Description: P11.5 - SWD.	0 = Only in fieldbus control communications. If not 1 = In all control modes - no Defines the fieldbus fault communication master 1	mode - when fieldbus is t in fieldbus control, place matter the control place ondition for BACnet MST r Maximum value:	he control place and fi will not fault. setting. If communica communication.	eldbus fault is active, the drive vation is lost, fieldbus fault response	will fault on loss of nse will occur.
Options: Description: P11.3.8 Minimum value: Description: P11.5 - SWD.	0 = Only in fieldbus control communications. If not 1 = In all control modes - no Defines the fieldbus fault communication master 1 Defines the maximum numb	mode - when fieldbus is t in fieldbus control, place matter the control place ondition for BACnet MST r Maximum value:	he control place and fi will not fault. setting. If communica communication.	eldbus fault is active, the drive vation is lost, fieldbus fault response	will fault on loss of nse will occur. ID 1537 127
Options: Description: P11.3.8 Minimum value: Description: P11.5 - SWD. P11.5.1 Minimum value:	0 = Only in fieldbus control communications. If not 1 = In all control modes - no Defines the fieldbus fault co MSTP maximum master 1 Defines the maximum numb Parameter access	mode - when fieldbus is to in fieldbus control, place or matter the control place on matter the control place on the first series of matters that can estimate the control matter that can estimate the first series of matters that can estimate the first series of the first seri	he control place and fi will not fault. setting. If communica communication. 127 tablish connections w	eldbus fault is active, the drive vation is lost, fieldbus fault responsition is lost, fieldbus fault respons	will fault on loss of nse will occur. ID 1537 127
Options: Description: P11.3.8 Minimum value: Description: P11.5 - SWD. P11.5.1 Minimum value: Options:	0 = Only in fieldbus control communications. If not 1 = In all control modes - no Defines the fieldbus fault communications. If not 1 = In all control modes - no Defines the fieldbus fault communication. It is not perfectly the second maximum master 1 Defines the maximum number 1 Defines the number 1	mode - when fieldbus is to in fieldbus control, place of matter the control place on the first place of matter the control place on the first place of matter the control place on the first place of matters that can estimate the first place of matters that can estimate of matte	he control place and fi will not fault. setting. If communica communication. 127 tablish connections w	eldbus fault is active, the drive vation is lost, fieldbus fault response per per per per per per per per per pe	will fault on loss of nse will occur. ID 1537 127
Description: P11.3.8 Winimum value: Description: P11.5 - SWD. P11.5.1 Winimum value: Descriptions:	0 = Only in fieldbus control communications. If not 1 = In all control modes - no Defines the fieldbus fault communications. If not 1 = In all control modes - no Defines the fieldbus fault communication. If not perfect the maximum master 1 Defines the maximum numb Parameter access N.A. 0 = No permission to read/v 1 = Acyclic read/write are a	mode - when fieldbus is to in fieldbus control, place of matter the control place on the first place of matter the control place on the first place of matter the control place on the first place of matters that can estimate the first place of matters that can estimate of matte	he control place and fi will not fault. setting. If communica communication. 127 tablish connections w	eldbus fault is active, the drive vation is lost, fieldbus fault response per per per per per per per per per pe	will fault on loss of nse will occur. ID 1537 127
Minimum value: Options: Description: P11.3.8 Minimum value: Description: P11.5 - SWD. P11.5.1 Minimum value: Options: Description: P11.5.2 Minimum value:	0 = Only in fieldbus control communications. If not 1 = In all control modes - no Defines the fieldbus fault communications. If not 1 = In all control modes - no Defines the fieldbus fault communication. If not maximum masters 1 Defines the maximum numb Parameter access N.A. 0 = No permission to read/v 1 = Acyclic read/write are a PNU927 which specifies the	mode - when fieldbus is to in fieldbus control, place of matter the control place on the first place of matter the control place on the first place of matter the control place on the first place of matters that can estimate the first place of matters that can estimate of matte	he control place and fi will not fault. setting. If communica communication. 127 tablish connections w	eldbus fault is active, the drive vation is lost, fieldbus fault response per per per per per per per per per pe	will fault on loss of nse will occur. ID 1537 127 ID 2630
Options: Description: P11.3.8 Minimum value: Description: P11.5 - SWD. P11.5.1 Minimum value: Options: Description: P11.5.2 P11.5.2	0 = Only in fieldbus control communications. If not 1 = In all control modes - no Defines the fieldbus fault communications. If not 1 = In all control modes - no Defines the fieldbus fault communication. If not maximum masters of the maximum numbers of the maximum numbers of the maximum numbers of the maximum numbers. If not permission to read/v 1 = Acyclic read/write are a PNU927 which specifies the Parameter data access.	mode - when fieldbus is to in fieldbus control, place of matter the control place of matter that can established the control place of matters that can established the control place of	he control place and fi will not fault. setting. If communicate communication. 127 tablish connections w N.A.	eldbus fault is active, the drive varion is lost, fieldbus fault responsition is lost, fieldbus fault responsition. Default value: Default value: mmunication.	ID 1537 127 ID 2630 1 ID 2631

P11.5.3	Fault situation coul	nter			ID 2632
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	PNU952 which specifie	s the fault situation counter.			
	Only write of 0 is allow (parameter 944) are era		fer (actual fault situa	ition and all other fault situations)	and the fault message cour
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 communicat B1-Board HW fault B2-IO1 24 volt overload B3-Profibus communica B4-fieldbus fault.	fault.			
P11.5.5	Firmware version				ID 2610
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	This parameter provide	s the firmware version of the	e 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 specifie	es the protocol status for SW	/D card.		
P11.6 - Bluetooth.					
P11.6.1	Bluetooth enabled				ID 1895
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0

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.				
P11.6.2 ^②	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 mod	le.			
P11.6.3	Bluetooth pairing res	set			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.				

[©] Parameter value can only be changed after the drive has stopped. @ Parameter value will be set to be default when changing macros.

Table 33. Ethernet communication.

P12.1 - Basic settings.								
P12.1.1 ^①	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 t	he IP address configuration	n mode for EIP/modb	ous TCP.				

Table 33. Ethernet communication (Cont.).

P12.1.2	Active IP addre	ess			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 i	nask			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.			
P12.1.6 ^①	Static IP addre	ss			ID 1501
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	192.168.1.254
Description:	Defines the static	IP address.			
P12.1.7 ^①	Static subnet n	nask			ID 1503
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	255.255.255.0
Description:	Defines the static	subnet mask.			
P12.1.8 ^①	Static default g	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 comm	nunication timeout			ID 611
Minimum value:	0 ms	Maximum value:	60,000 ms	Default value:	10,000 ms
Description:	Selects the time in	t waits before a communication fa	nult occurs over ethernet	i.	

P12.2 - Trusted IP filter (DM1 PRO only).

P12.2.1	Trusted IP white I	ist			ID 68
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0.0.0.0 0.0.0.0 192.168.1.254
Description:	Defines the IP addres	ses in the white list. A setting	g of 192.168.1.255 e	enables all connections on the local	subnet.
P12.2.2	Trusted IP filter e	nable			ID 76
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Disabled; or 1 = Enabled.				
Description:	Enables IP white listi	ng. Devices not in the white li	st will not be able t	to establish communications with th	e drive.

P12.3 - Modbus TCP (DM1 PRO only).

P12.3.1 ^①	Modbus TCP ena	ble			ID 1942
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disable; or 1 = Enable.				
Description:	Enables modbus TCF	communications, must be ena	oled to connect to Po	ower Xpert inControl.	
P12.3.2	Modbus TCP con	nection limit			ID 609
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Description:	Maximum number of	f connections allowed to the dri	ve.		

Table 33. Ethernet communication (Cont.).

P12.3.3	Modbus TCP unit id	lentifier number			ID 610
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Description:	Unit identifier unit valu	e for modbus TCP.			
P12.3.4	Modbus TCP protoc	col 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 modb	us TCP communicat	ion.	
P12.3.5	Modbus TCP fault r	esponse			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).

P12.4.1 ^①	Ethernet based pro	tocol 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 com	munication protocol on the e	thernet I/P port.			
P12.4.2	Ethernet IP protoco	ol 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 pr	rotocol is active or not.				
P12.4.3	Ethernet IP fault re	esponse			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 fieldhus fa	ult condition for ethernet IP o	communication.			

Table 33. Ethernet communication (Cont.).

P12.5 - BACnet IP (D	M1 PRO only).	'		·	,
P12.5.1 ^①	BACnet IP UDP po	ort number			ID 1733
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	47,808
Options:	47808 = BACO; 47809 = BAC1; 47810 = BAC2; 47811 = BAC3; 47812 = BAC4; 47813 = BAC5; 47815 = BAC7; 47816 = BAC8; 47817 = BAC9; 47818 = BACA; 47819 = BACB; 47820 = BACC; 47821 = BACD; 47822 = BACE; or 47823 = BACF.				
Description:	Defines the BACnet L	JDP port number.			
P12.5.2 ^①	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 fo	oreign device configuration.			
P12.5.3 ^①	BACnet IP BBMD	IP			ID 1735
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0.0.0.0
Description:	Displays the BACnet I	BBMD IP address.			
P12.5.4 ^①	BACnet IP UDP po	ort			ID 1737
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	47,808
Options:	47808 = BACO; 47809 = BAC1; 47810 = BAC2; 47811 = BAC3; 47813 = BAC4; 47813 = BAC6; 47815 = BAC7; 47816 = BAC8; 47817 = BAC9; 47819 = BAC8; 47820 = BACC; 47820 = BACC; 47822 = BACE; or 47823 = BACF.				
Description:	Displays the BACnet I	BBMD UDP port number.			
P12.5.5 ^①	BACnet IP registra	ation interval			ID 1738
Minimum value:	0	Maximum value:	65,535	Default value:	10
Description:	Defines the registrati	on interval.			
P12.5.6	BACnet IP commu	nication timeout		,	ID 1739
Minimum value:	0	Maximum value:	60,000	Default value:	0
Description:		aits before a communication fa	<u> </u>	-+ ID	

Table 33. Ethernet communication (Cont.).

P12.5.7	BACnet IP protocol statu	ıs	'	,	ID 1740	
Minimum value:	N.A.	laximum value:	N.A.	Default value:	0	
Options:	0 = Stopped; 1 = Operational; or 2 = Faulted.					
Description:	This parameter shows the pro	otocol status for BACne	et IP communication			
P12.5.8	BACnet IP fault behavior			,	ID 1741	
Minimum value:	N.A.	laximum value:	N.A.	Default value:	0	
Options:	communications. If not in	fieldbus control, place	will not fault.	d Fieldbus fault is active, the drive nication is lost, fieldbus fault respo		
Description:	Defines the fieldbus fault con	dition for BACnet IP co	mmunication.			
P12.5.9 ^①	BACnet IP instance num	ber		,	ID 1742	
Minimum value:	0	laximum 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 show	vs the protocol status for web s	erver communication.		
P12.6.2	Web UI fault resp	oonse			ID 2916
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	communications.	. If not in fieldbus control, place	e will not fault.	eldbus fault is active, the drive	WIII TAUIT OU IOSS OF
Description:		des - no matter the control plac fault condition for web server (ation is lost, fieldbus fault respo	onse will occur.
Description: P12.6.3		fault condition for web server of		ation is lost, fieldbus fault respo	ID 2919
	Defines the fieldbus	fault condition for web server of		ation is lost, fieldbus fault respo	
P12.6.3	Defines the fieldbus Web UI communi 30,000 ms	fault condition for web server of cation timeout	communication. 60,000 ms	Default value:	ID 2919
P12.6.3 Minimum value:	Defines the fieldbus Web UI communi 30,000 ms	fault condition for web server (ication timeout Maximum value:	communication. 60,000 ms	Default value:	ID 2919
P12.6.3 Minimum value: Description:	Defines the fieldbus Web UI communi 30,000 ms Selects the time it w	fault condition for web server (ication timeout Maximum value:	communication. 60,000 ms	Default value:	ID 2919 60,000 ms
P12.6.3 Minimum value: Description: P12.6.4 ^①	Defines the fieldbus Web UI communi 30,000 ms Selects the time it w Web UI enable	fault condition for web server of cation timeout Maximum value: vaits before a communication fa	60,000 ms	Default value:	ID 2919 60,000 ms ID 2921

 $^{^{\}scriptsize \textcircled{\tiny 1}}$ Parameter value can only be changed after the drive has stopped.

Table 34. System.

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.					

Chapter 5 - Fan control application

Table 34. System (Cont.).

P13.1.2 ^①	Application				ID 142				
Minimum value:	N.A.	laximum value:	N.A.	Default value:	N.A.				
Options:	0 = Standard;; 1 = Pump; 2 = Fan; or 3 = Multi-purpose.								
Description:	This parameter sets the active	e application if multipl	e applications hav	e been loaded.					
P13.1.3 ^①	Parameter sets		'	,	ID 619				
Minimum value:	N.A.	laximum 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 defa	ault parameter val	ues, and to store and load two custom	nized parameter sets.				
P13.1.4	Up to keypad		'	'	ID 620				
Minimum value:	N.A.	laximum value:	N.A.	Default value:	N.A.				
Options:	0 = No; or 1 = Yes (all parameters).								
Description:	This function uploads all exist	ing parameter groups	to the keypad.						
P13.1.5 ^①	Down from keypad				ID 621				
Minimum value:	N.A.	laximum 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 group	s from the keypad	to the drive.					
P13.1.7	Parameter lock PIN				ID 624				
Minimum value:	0	laximum value:	9,999	Default value:	0				
Description:	The application selection can enabled, the user will be prom	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 fund between 1 and 9,999.	tion is not in use. If y	ou want to activat	e the password, change the value of t	his parameter to any number				
	To deactivate the password, r	eset the parameter va	lue to 0.						
P13.1.8	Keypad parameter lock		ı		ID 625				
Minimum value:	N.A.	laximum value:	N.A.	Default value:	0				
Options:	0 = Change enable; or 1 = Change disable.								
Description:	This function allows the user the display if you try to edit a		the parameters. I	f the parameter lock is activated, the	text "locked" will appear on				
	Note: This function does not	orevent unauthorized (editing of paramet	er values.					

Table 34. System (Cont.).

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 application desi completion, it allow always enabled for	red and then advances paramete s the user to go to the main men the initial power up of the DM1 ause it to be active on start-up.	ers through the st nu or default page PRO. By setting t	cted "Enable", the Start-up Wizard proc tart-up parameter list/Application Min and this parameter is set to "Disable this parameter to "Disable" without go Start-up Wizard after completion, or c	i wizard in keypad. After d". The Start-up Wizard is bing through the Start-up

P13.2 - Keypad.

P13.2 - Keypau.							
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 whi	ch the keypad display re	eturns to the Default Page.			
	Note: If the defa	ult page value is 0, the timeout tin	ne setting has no effect.				
P13.2.5	Contrast adjus	st		·	ID 630		
Minimum value:	5	Maximum value:	18	Default value:	12		
Description:	If the remote key	pad display is not clear, you can ac	ljust the keypad contras	t 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 d	etermines how long the backlight	stays on before going ou	ıt.			
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 allo	ws you to control the DM1 PRO's (cooling fan.	· · · · · ·			

P13.4 - Version information.

P13.4.1	Keypad softw	are version		·	ID 640	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Description:	Keypad firmware	e 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.					
P13.4.3	Application se	oftware version			ID 644	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Description:	MCU/application	software version.				
P13.4.4	Software bun	dle version			ID 1714	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Description:	Software bundle	version.				

Chapter 5 - Fan control application

Table 34. System (Cont.).

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:		display three actual monitor itored with other values.	ed values at the s	same time. This parameter determine	s if the operator is allowed to
P13.5.3	Keypad lock PIN	'			ID 75
Minimum value:	0	Maximum value:	9,999	Default value:	0
Description:	When the password fur response to key press e	nction is enabled, the user wexcept up/down/left/right.	ill be prompted to	keypad lock function after keys are no enter a password before the keypad te the password, change the value of	display parameter or
	To deactivate the passy	word, reset the parameter va	lue to 0.		
P13.5.4	Drive application na	ame			ID 2922
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Drive application name				

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

Chapter 6 - Pump control application

Introduction

The pump application builds on the features included in standard. In addition to all of the features in the standard application, the pump application provides features specific for pumping applications and pump related protective features.

Fan application includes functions:

- · Pump derag mode;
- · Valve control;
- · Backspin control;
- · Minimum run time;
- · Separate minimum frequency ramp time;
- Multi-pump control;
- · Pipe fill mode;
- · Loss of prime detection; and
- · Broken pipe detection.

I/O controls

"Function to terminal" (FTT) programming

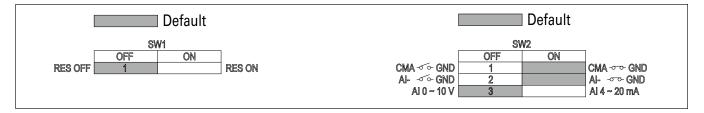
The design behind programming of the digital inputs and outs of the DM1 uses "function to terminal" programming. It is composed of a terminal, be it a relay output or a digital output, that is assigned a parameter. Within that parameter, it has different functions that can be set.

Chapter 6 - Pump control application

Control I/O configuration

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

Table 35. Multi-Pump application default 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.
<u> </u>	- 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	Α	RS-485 signal A	_	Fieldbus communication (Modbus RTU, BACNet).
	- 7	В	RS-485 signal B	_	Fieldbus communication (Modbus RTU, BACNet).
Seg 	8	Al1+ ①	Analog input 1	0 - 10 V	Voltage speed reference (programmable to 4 mA to 20 mA).
1 "\"	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	A01+	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	ST02	Safe torque Off 2	_	Safe torque Off 2 input.
	- 17	ST01	Safe torque Off 1	_	Safe torque Off 1 input.
*	- 18	R1N0	Relay 1 normally open	Run	Changes state when the drive is in the run state.
Ϋ	- 19	R1CM	Relay 1 common		
	20	R1NC	Relay 1 normally closed		
<u>, , , , , , , , , , , , , , , , , , , </u>	- 21	R2N0	Relay 2 normally open	Fault	Changes state when the drive is in the fault state.
<u> </u>	- 22	R2CM	Relay 2 common		

Notes:

The above wiring demonstrates a SINK configuration. It is important that CMA is wired to ground (as shown by dashed line). If a SOURCE configuration is desired, wire 24 V to CMA and close the inputs to ground. When using the +10 V for Al1, it is important to wire Al1- to ground (as shown by dashed line). If using +10 V for Al1, terminals 9 and 10 need to be jumpered together.

① Al1+ support 10 K potentiometer.

Pump 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 36. 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:	А	Default value:	А
Description:	Motor output current RMS	(Amps).			
M1.5	Motor torque				ID 4
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Percent motor torque calcu	lated from nameplate va	ues and measured r	notor current (%).	
M1.6	Motor power				ID 5
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Percent motor power calcu	lated from nameplate va	ues and measured n	notor current (%).	
M1.7	Motor voltage				ID 6
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Output ac motor voltage (V	ac).			
M1.8	DC-link voltage				ID 7
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	DC bus voltage (Vdc).				

Chapter 6 - Pump control application

Table 36. Monitor (Cont.).

M1.9	Unit temperature				ID 8
Minimum value:	°C	Maximum value:	°C	Default value:	°C
Description:	Heat sink temperature (de	eg. C).			
M1 - standard (Cont.).		,	,	'
M1.10	Motor temperature				ID 9
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Motor temperature value	calculated from nameplate	e values and measured	l 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	ue. 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 pow	ver (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) selec	table with dipswitch.		
M2.2	Keypad pot voltage	'	'	,	ID 1858
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Keypad potentiometer me	easured value (Vdc). DM1	PRO only.		
M2.3	Analog output			,	ID 25
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	Analog output 1 measure	d value (Vdc or Amps) sele	ctable 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 stat	us.			
		,			'
M5 - PI monitor.					
M5.1	PI setpoint				ID 16
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	PI setpoint in process uni	ts.			
M5.2	PI feedback				ID 18
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	PI feedback level in proce	ess units.			
M5.3	PI error value				ID 20
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	PI error in process units.				
			_		

Table 36. Monitor (Cont.).

M5.4	PI output				ID 22
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	PI output.				
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, in	dicates if drive is stopped, ru	nning in PI mode, or	in PI sleep mode.	

Table 37. Multi-pump status.

M7.1 - Operation mo	ode.				
M7.1.1	Drive 1				ID 2218
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Offline; 1 = Slave drive; or 2 = Master drive.				
Description:	Provides the operating	mode of drive 1 while using	multi-pump mode.		
M7.1.2	Drive 2			'	ID 2230
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Offline; 1 = Slave drive; or 2 = Master drive.				
Description:	Provides the operating	mode of drive 2 while using	multi-pump mode.		
M7.1.3	Drive 3	'	'	'	ID 2242
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Offline; 1 = Slave drive; or 2 = Master drive.				
Description:	Provides the operating	mode of drive 3 while using	multi-pump mode.		
M7.1.4	Drive 4				ID 2254
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Offline; 1 = Slave drive; or 2 = Master drive.				
Description:	Provides the operating	mode of drive 4 while using	multi-pump mode.		
M7.1.5	Drive 5			'	ID 2266
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Offline; 1 = Slave drive; or 2 = Master drive.				
Description:	Provides the energting	mode of drive 5 while using	multi numn mada		

Table 37. Multi-pump status (Cont.).

M7.2 - Multi-pump s	status.				
M7.2.1	Drive 1	'		'	ID 2219
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Options:	0 = Stopped; 1 = Sleep; 2 = Regulating; 3 = Wait for CMD 4 = Following; or 5 = Unknown.				
Description:	Provides the run stat	us of drive 1 while using the m	ulti-pump mode.		
M7.2.2	Drive 2	'	'	,	ID 2231
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Options:	0 = Stopped; 1 = Sleep; 2 = Regulating; 3 = Wait for CMD 4 = Following; or 5 = Unknown.				
Description:	Provides the run stat	us of drive 2 while using the m	ulti-pump mode.		
M7.2.3	Drive 3				ID 2243
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Options:	0 = Stopped; 1 = Sleep; 2 = Regulating; 3 = Wait for CMD 4 = Following; or 5 = Unknown.	f div 20 dille vice de			
Description:		us of drive 3 while using the m	ulti-pump mode.		
M7.2.4	Drive 4				ID 2255
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Options:	0 = Stopped; 1 = Sleep; 2 = Regulating; 3 = Wait for CMD 4 = Following; or 5 = Unknown.				
Description:	Provides the run stat	us of drive 4 while using the m	ulti-pump mode.		
M7.2.5	Drive 5				ID 2267
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Options:	0 = Stopped; 1 = Sleep; 2 = Regulating; 3 = Wait for CMD 4 = Following; or 5 = Unknown.				
Description:	Provides the run stat	us of drive 5 while using the m	ulti-pump mode.		
		-			
M7.3 - Network stat	tus.				
M7.3.1	Drive 1				ID 2220
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.

M7.3.1	Drive 1				ID 2220	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Options:	0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; or 4 = No error.					
Description:	Provides the network stat	tus of drive 1 while using t	he multi-pump mode.			

Table 37. Multi-pump status (Cont.).

M7.3.2	Drive 2				ID 2232
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; or 4 = No error.				
Description:	Provides the network stat	tus of drive 2 while using t	he multi-pump mode.		
M7.3.3	Drive 3				ID 2244
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; or 4 = No error.				
Description:	Provides the network stat	tus of drive 3 while using t	he multi-pump mode.		
M7.3.4	Drive 4	'			ID 2256
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; or 4 = No error.				
Description:	Provides the network stat	tus of drive 4 while using t	he multi-pump mode.		
M7.3.5	Drive 5			, , , , , , , , , , , , , , , , , , ,	ID 2268
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; or 4 = No error.				
		tus of drive 5 while using t			

Table 38. Multi-pump measurement.

M8.1 - Latest fault o	code.		
M8.1.1	Drive 1		ID 2221
Minimum value:	Maximum value:	Default value:	
Description:	Provides the latest fault code of drive 1 while using the multi-pump mode.		
M8.1.2	Drive 2		ID 2233
Minimum value:	Maximum value:	Default value:	
Description:	Provides the latest fault code of drive 2 while using the multi-pump mode.		
M8.1.3	Drive 3	,	ID 2245
Minimum value:	Maximum value:	Default value:	
Description:	Provides the latest fault code of drive 3 while using the multi-pump mode.		
M8.1.4	Drive 4		ID 2257
Minimum value:	Maximum value:	Default value:	
Description:	Provides the latest fault code of drive 4 while using the multi-pump mode.		
M8.1.5	Drive 5		ID 2269
Minimum value:	Maximum value:	Default value:	
Description:	Provides the latest fault code of drive 5 while using the multi-pump mode.		

M8.2 - Output frequ	ency.				
M8.2.1	Drive 1				ID 2222
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the outpu	t frequency (Hz) of drive 1 while	using the multi-pum	ıp mode.	
M8.2.2	Drive 2				ID 2234
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the outpu	t frequency (Hz) of drive 2 while	using the multi-pum	ip mode.	
M8.2.3	Drive 3	'		'	ID 2246
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the outpu	t frequency (Hz) of drive 3 while	using the multi-pum	ip mode.	
M8.2.4	Drive 4			'	ID 2258
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the outpu	t frequency (Hz) of drive 4 while	using the multi-pum	ip mode.	
M8.2.5	Drive 5	,		'	ID 2270
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the outpu	t frequency (Hz) of drive 5 while	using the multi-pum	ip mode.	
	'				
M8.3 - Motor voltag	e.				
M8.3.1	Drive 1				ID 2223
Minimum value:	V	Maximum value:	V	Default value:	V

M8.3.1	Drive 1				ID 2223
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Provides the motor	voltage (Vac) of drive 1 while us	ing the multi-pump	mode.	
M8.3.2	Drive 2				ID 2235
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Provides the motor	voltage (Vac) of drive 2 while us	ing the multi-pump	mode.	
M8.3.3	Drive 3				ID 2247
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Provides the motor	voltage (Vac) of drive 3 while us	ing the multi-pump	mode.	
M8.3.4	Drive 4				ID 2259
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Provides the motor	voltage (Vac) of drive 4 while us	ing the multi-pump	mode.	
M8.3.5	Drive 5				ID 2271
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Provides the motor	voltage (Vac) of drive 5 while us	ing the multi-pump	mode.	

M8.4 - Motor current.

M8.4.1	Drive 1				ID 2224
Minimum value:	А	Maximum value:	Α	Default value:	А
Description:	Provides the moto	or current (Amps) of drive 1 while (using the multi-pum	np mode.	
M8.4.2	Drive 2				ID 2236
Minimum value:	А	Maximum value:	Α	Default value:	А
Description:	Provides the moto	or current (Amps) of drive 2 while i	using the multi-pum	np mode.	
M8.4.3	Drive 3				ID 2248
Minimum value:	А	Maximum value:	А	Default value:	А
Description:	Provides the moto	or current (Amps) of drive 3 while i	using the multi-pum	np mode.	

Table 38. Multi-pump measurem

M8.4.4	Drive 4		'	'	ID 2260		
Minimum value:	A	Maximum value:	А	Default value:	А		
Description:	Provides the motor current (Amps) of drive 4 while using the multi-pump mode.						
M8.4.5	Drive 5				ID 2272		
Minimum value:	А	Maximum value:	А	Default value:	А		
Description:	Provides the motor current (Amps) of drive 5 while using the multi-pump mode.						

M8.5 - Motor torque.

M8.5.1	Drive 1				ID 2225		
Minimum value:	%	Maximum value:	%	Default value:	%		
Description:	Provides the motor	r torque (%) of drive 1 while using	the multi-pump mod	de.			
M8.5.2	Drive 2				ID 2237		
Minimum value:	%	Maximum value:	%	Default value:	%		
Description:	Provides the motor torque (%) of drive 2 while using the multi-pump mode.						
M8.5.3	Drive 3	,			ID 2249		
Minimum value:	%	Maximum value:	%	Default value:	%		
Description:	Provides the motor torque (%) of drive 3 while using the multi-pump mode.						
M8.5.4	Drive 4				ID 2261		
Minimum value:	%	Maximum value:	%	Default value:	%		
Description:	Provides the motor torque (%) of drive 4 while using the multi-pump mode.						
M8.5.5	Drive 5				ID 2273		
Minimum value:	%	Maximum value:	%	Default value:	%		
Description:	Provides the motor	r torque (%) of drive 5 while using	the multi-pump mod	de.			

M8.6 - Motor power.

M8.6.1	Drive 1				ID 2226
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Provides the moto	or power (%) of drive 1 while using	the multi-pump mo	de.	
M8.6.2	Drive 2				ID 2238
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Provides the moto	or power (%) of drive 2 while using	the multi-pump mo	de.	
M8.6.3	Drive 3				ID 2250
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Provides the moto	or power (%) of drive 3 while using	the multi-pump mo	de.	
M8.6.4	Drive 4				ID 2262
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Provides the moto	or power (%) of drive 4 while using	the multi-pump mo	de.	
M8.6.5	Drive 5				ID 2274
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Provides the moto	or power (%) of drive 5 while using	the multi-pump mo	de.	

M8.7 - Motor speed.

M8.7.1	Drive 1	Drive 1				
Minimum value:	rpm	Maximum value:	rpm	Default value:	rpm	
Description:	Provides the motor sp	Provides the motor speed (rpm) of drive 1 while using the multi-pump mode.				

Chapter 6 - Pump control application

Table 38. Multi-pump measurement (Coi

rpm Provides the motor speed Prive 3 rpm Provides the motor speed Prive 4 rpm Provides the motor speed Prive 5 rpm Provides the motor speed Prive 1 Hours	Maximum value: (rpm) of drive 3 while usin Maximum value: (rpm) of drive 4 while usin Maximum value:	rpm g the multi-pump mode. rpm g the multi-pump mode. rpm g the multi-pump mode.	Default value: Default value: Default value: Default value:	rpm ID 2251 rpm ID 2263 rpm ID 2275 rpm
prive 3 rpm Provides the motor speed Prive 4 rpm Provides the motor speed Prive 5 rpm Provides the motor speed	Maximum value: (rpm) of drive 3 while usin Maximum value: (rpm) of drive 4 while usin Maximum value: (rpm) of drive 5 while usin	rpm g the multi-pump mode. rpm g the multi-pump mode. rpm g the multi-pump mode.	Default value:	rpm ID 2263 rpm ID 2275 rpm
Provides the motor speed Prive 4 rpm Provides the motor speed Prive 5 rpm Provides the motor speed Prive 1	(rpm) of drive 3 while usin Maximum value: (rpm) of drive 4 while usin Maximum value: (rpm) of drive 5 while usin	rpm g the multi-pump mode. rpm g the multi-pump mode. rpm g the multi-pump mode.	Default value:	rpm ID 2263 rpm ID 2275 rpm
Provides the motor speed Prive 4 rpm Provides the motor speed Prive 5 rpm Provides the motor speed Drive 1	(rpm) of drive 3 while usin Maximum value: (rpm) of drive 4 while usin Maximum value: (rpm) of drive 5 while usin	rpm g the multi-pump mode. rpm g the multi-pump mode. rpm g the multi-pump mode.	Default value:	ID 2263 rpm ID 2275 rpm
prive 4 rpm Provides the motor speed Prive 5 rpm Provides the motor speed	Maximum value: (rpm) of drive 4 while usin Maximum value: (rpm) of drive 5 while usin	rpm g the multi-pump mode. rpm g the multi-pump mode.		rpm ID 2275 rpm
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Provides the motor speed Drive 1	Maximum value: (rpm) of drive 5 while usin	rpm g the multi-pump mode.	Default value:	rpm
rpm Provides the motor speed Drive 1	(rpm) of drive 5 while usin	g the multi-pump mode.	Default value:	rpm
Provides the motor speed	(rpm) of drive 5 while usin	g the multi-pump mode.	Default value:	•
Drive 1				ID 2228
	Maximum value:			ID 2228
	Maximum value:			ID 2228
	Maximum value:			ID 2228
Hours	Maximum value:			
		Hours	Default value:	Hours
Provides the motor run tim	ne (h) of drive 1 while using	the multi-pump mode.		
Drive 2		,		ID 2240
Hours	Maximum value:	Hours	Default value:	Hours
Provides the motor run tim	ne (h) of drive 2 while using	the multi-pump mode.		
Drive 3				ID 2252
Hours	Maximum value:	Hours	Default value:	Hours
Provides the motor run tim	ne (h) of drive 3 while using	g the multi-pump mode.		
Drive 4				ID 2264
Hours	Maximum value:	Hours	Default value:	Hours
Provides the motor run tim	ne (h) of drive 4 while using	g the multi-pump mode.		
Drive 5				ID 2276
Hours	Maximum value:	Hours	Default value:	Hours
Provides the motor run tim	ne (h) of drive 5 while using	g the multi-pump mode.		
		,		
Multi-monitoring				ID 30
N.A.	Maximum value:	N.A.	Default value:	0, 1, 2.
	Prive 2 Hours Provides the motor run tim Prive 3 Hours Provides the motor run tim Prive 4 Hours Provides the motor run tim Prive 5 Hours Provides the motor run tim Multi-monitoring N.A. Displays any three monitorsee three lines of monitoring	Provides the motor run time (h) of drive 2 while using Provides the motor run time (h) of drive 2 while using Provides the motor run time (h) of drive 3 while using Provides the motor run time (h) of drive 3 while using Provides the motor run time (h) of drive 4 while using Provides the motor run time (h) of drive 4 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 3 while using Provides the motor run time (h) of drive 4 while using Provides the motor run time (h) of drive 4 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides the motor run time (h) of drive 5 while using Provides th	Hours Maximum value: Hours Provides the motor run time (h) of drive 2 while using the multi-pump mode. Drive 3 Hours Maximum value: Hours Provides the motor run time (h) of drive 3 while using the multi-pump mode. Drive 4 Hours Maximum value: Hours Provides the motor run time (h) of drive 4 while using the multi-pump mode. Drive 5 Hours Maximum value: Hours Provides the motor run time (h) of drive 5 while using the multi-pump mode. Drive 5 Hours Maximum value: Hours Provides the motor run time (h) of drive 5 while using the multi-pump mode. Multi-monitoring N.A. Maximum value: N.A. Displays any three monitoring values in a single screen. The values are selecta see three lines of monitoring values. Up and down keys can be used to select the selectant of the selec	Hours Maximum value: Hours Default value: Provides the motor run time (h) of drive 2 while using the multi-pump mode. Drive 3 Hours Maximum value: Hours Default value: Provides the motor run time (h) of drive 3 while using the multi-pump mode. Drive 4 Hours Maximum value: Hours Default value: Provides the motor run time (h) of drive 4 while using the multi-pump mode. Drive 5 Hours Maximum value: Hours Default value: Provides the motor run time (h) of drive 5 while using the multi-pump mode. Drive 5 Hours Maximum value: Hours Default value: Provides the motor run time (h) of drive 5 while using the multi-pump mode. Displays any three monitoring values in a single screen. The values are selectable via the keypad menu. Nesee three lines of monitoring values. Up and down keys can be used to select the row and then hitting the

Table 39. Parameters.

P1 - Basic paramete	rs.					
P1.1 ^②	Minimum frequency	/			ID 101	
Viinimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz	
Description:	Defines the lowest free 1 = Fire mode minimum 2 = Derag. 3 = MPFC staging frequ 4 = MPFC master fixed 5 = Prime pump freque 6 = Prime pump freque	ency. frequency. ncy.	I operate. This setting will I	imit other frequency param	neter settings.	
P1.2 ^②	Maximum frequenc	у			ID 102	
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	MaxFreqMFG	
Description:	1 = Keypad reference. 2 = Motor potentiomete 3 = Jog speed. 4 = 2nd stage ramp free 5 = Fire mode minimum 6 = Derag. 7 = MPFC staging frequ 8 = MPFC master fixed 9 = Prime pump freque 10 = Prime pump freque 11 = Preset speed frequ 12 = Frequency limit va 13 = Reference limit va 14 = Speed control_fs2 15 = Stall frequency lim 16 = 4 mA fault frequer 17 = MPFC de-staging f 18 = Pipe fill loss freque 19 = Pipe fill loss freque	quency. frequency. frequency. frequency. frequency. frequency. fuency. fue. fue. fue. fit. ficy. frequency. frequency. frequency. frequency.	ii operate. This will lilliit ou	ier frequency parameters.		
P1.3 ^②	20 = Broken pipe freque	ency limit.			ID 103	
Minimum value:	0.1 s	Maximum value:	3,000.0 s	Default value:	20.0 s	
Description:		ed for the output frequency t	·	ency to maximum frequence		
P1.4 ^②	Decel. time 1	ID 104				
Minimum value:	0.1 s	Maximum value:	3,000.0 s	Default value:	20.0 s	
Description:		ed for the output frequency t	·	frequency to zero frequenc		
P1.6 ^①	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.					
P1.7 ^①	Motor nom. speed				ID 489	
Minimum value:	300 rpm	Maximum value:	20,000 rpm	Default value:	MotorNomSpeedMFG	
Description:	<u> </u>	speed. This value is found of	<u> </u>	tor.	•	
P1.8 ^①	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 t	the motor.		
P1.9 ^①	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 m	otor.		
		ID 400				
P1.10 ^①	Motor nom. frequei	icy			ID 488	
P1.10 ^① Minimum value:	Motor nom. frequer	Maximum value:	400.00 Hz	Default value:	MotorNomFreqMFG Hz	

Chapter 6 - Pump control application

Table 39. Parameters (Cont.).

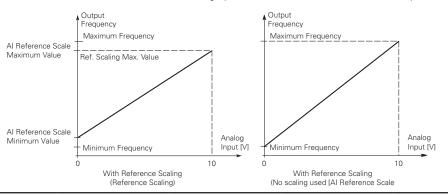
P1.11 ²	Local control place				ID 1695
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = keypad; 1 = IO terminal; or 3 = fieldbus.				
Description:		on for the start command in e drive. Keypad display wi		erminals would be from the digital hander is selected.	ard-wired inputs or keypad fo
P1.12 ^{①②}	Local reference				ID 136
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Al; 1 = drive ref. pot; 4 = maximum frequency; 6 = keypad; or 7 = fieldbus ref.				
Description:	Defines the signal location	on for the speed reference	in local mode.		
P1.13 ^②	Remote control place	9			ID 135
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = IO terminal; 1 = fieldbus; or 3 = keypad.				
Description:		on for the start command in the drive. Keypad display		terminals would be from the digital n mode is selected.	hard-wired inputs or keypad
P1.14 ^{①②}	Remote reference				ID 137
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Al; 1 = drive reference pot; 4 = maximum frequency; 6 = keypad; or 7 = fieldbus reference.				
			in remote mode.		

Table 40. Inputs.

P2.1 - Basic setting	s.				
P2.1.1 ^②	Al reference scale	minimum value		,	ID 144
Minimum value:	0.00 Hz	Maximum value:	RefScaleMax Hz	Default value:	0.00 Hz
Description:	Defines the minimum reference scale maxir	frequency associated with 0% num value both to zero will ca	6 input from the analog inpuse the analog inpuse the analog input to sca	out. Setting AI reference sca ale to the minimum and maxi	ale minimum value and Al mum frequencies.
P2.1.2 ^②	Al reference scale maximim value ID 145				

Description:

Defines the maximum frequency associated with 100% input from the analog input. Setting AI reference scale minimum value and AI reference scale maximum value both to zero will cause the analog input to scale to the minimum and maximum frequencies.



P2.1.3 ^{①②}	IO terminal St	art/Stop logic			ID 143
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	1 = Start - revers 2 = Start - enabl	se: maintained input on start signal e: maintained input on start signal	1 to run forwar 1 to run forward	vard and a maintained signal on start si d and a maintained signal on start signa l and a maintained signal on start signal nal 1 uses a normally open start and sta	al 2 for reverse. I 2 to enable the drive to run.
Description:	Defines the func	tionality for start signal 1 and start	signal 2. By de	fault, start signal 1 is DI1 and start sign	nal 2 is DI2.

0 = P3.2: 10 terminal start signal 1 = start forward - P3.3: 10 terminal start signal 2 = 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.

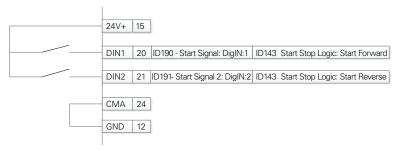
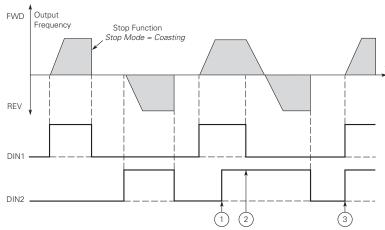


Table 40. Inputs (Cont.).

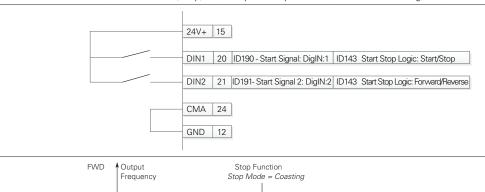


Notes: ① The first selected direction has the highest priority. ② When the DIN1 contact opens the direction of rotation

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



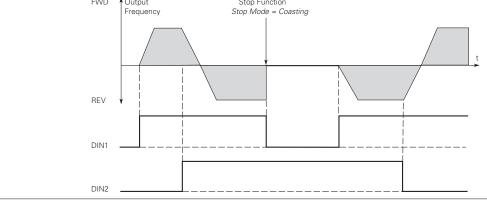
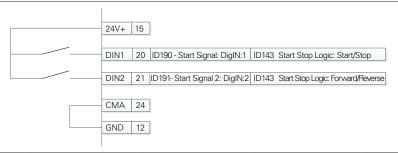
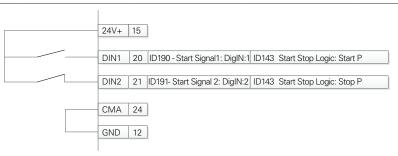


Table 40. Inputs (Cont.).

2 = P3.2: DI closed contact = start/open contact = stop P3.3: IO terminal start signal 1 = start forward - P3.3: IO terminal start signal 2 = start reverse. 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: IO terminal start signal 1 = start forward - P3.3: IO terminal start signal 2 = start reverse. This would be considered 3-wire control with start signal 1 being the start pulse and start signal 2 being the NC stop.



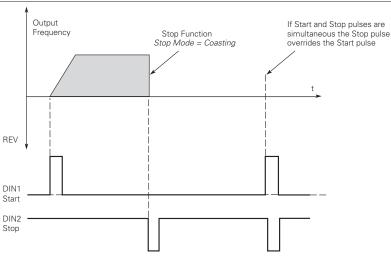


Table 40. Inputs (Cont.).

P2.2 - Digital input.					
P2.2.1 ^②	DI1 function	,	'		ID 1801
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	P2.1.3; 2 = 10 terminal star P2.1.3; 3 = Reverse - when 4 = Ext. fault 1 - wh 5 = Ext. fault 2 - wh 6 = Ext. fault 3 - wh 7 = Fault reset - wh 8 = Run enable - wh 9 = Preset speed B 10 = Preset speed B 11 = Preset speed B 12 = Jog enable - w 13 = Accel. pot valu 14 = Decel. pot valu 15 = Reset pot zero 16 = Accel./decel. t 17 = Accel./decel. t 17 = Accel./decel. t 18 = No access to p 19 = Remote control 20 = Local control - 21 = Parameter 1/2 22 = Pl controller - v 23 = Pl set point se 24 = Motor interloc 25 = Smoke mode - c 26 = Fire mode refe fire mode refe fire mode refe 8 = Fire mode refe 28 = Fire mode refe 28 = Fire mode refe 29 = DC brake activ 30 = Preheat active 31 = Derag. enable	t signal 1 - when the control sour t signal 2 - when the control sour start/stop logic is set to 3 start pen closed, ext. fault 1 will be activen closed, ext. fault 2 will be activen closed, ext. fault 2 will be activen closed, ext. fault 3 will be activen closed, all active faults will be activen closed, the drive will allow a 10 - the 7 preset speeds are select at 1 - the 7 preset speeds are select at 1 - the 7 preset speeds are select at 1 - the 7 preset speeds are select at 1 - when closed, the motor poten at 1 - when closed, the motor poten when closed, the motor poten when closed, the motor poten ime set - when closed, the drive will be considered the closed, who the when closed, the drive will be considered the closed, fire mode will be activen closed, fire mode will be activence 2 will be active; are set when closed, DC injection brawhen closed, preheat mode will when closed, preheat mode will when closed, the Derag. cycle for the control of the prediction brayen closed, the Derag. cycle for when closed, the Derag. cycle for the control of the prediction brayen closed, the Derag. cycle for the control of the	ce is set to 10 to pulse stop pulse ivated; ivated; ivated; ivated; ivated; et reset; start command ed via 3 binary ted via 1 binary ted via 2 binary ted via 3	inputs, this is least significant bit in that inputs; riputs, this is most significant bit in the viputs, this is most significant bit in the voerride the frequency reference; will increment at the rate defined by mill decrement at the rate defined by mill reset to zero; sused; when closed accel./decel. time input frequency and ignore changes to the deto any setting in the drive; mote control place; all control place; all control place; source to PI controller output; when closed, set point 2 is active; source to PI controller output; so when closed, set point 2 is active; as input is open, fire mode reference 1 we open, direction will be forward: when closed, very controller output; when closed parameter set 2 is active;	orm the action defined by in the reverse direction; It binary input; at binary input; otor pot ramp time; otor pot ramp time; 2 will be used; e reference value;
Description:	Defines the functio	n of digital input 1.			

Table 40. Inputs (Cont.).

Table 40. Inputs (Cont.).

P2.2.5 ^②	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 P2.1.3; 2 = IO terminal start signal 2 P2.1.3; 3 = Reverse - when start/sto 4 = Ext. fault 1 - when closed 5 = Ext. fault 2 - when closed 6 = Ext. fault 2 - when closed 8 = Run enable - when closed 9 = Preset speed B0 - the 7 p 10 = Preset speed B0 - the 7 p 11 = Preset speed B2 - the 7 11 = Preset speed B2 - the 7 11 = Decel. pot value - when 14 = Decel. pot value - when 15 = Reset pot zero - when closed 16 = Accel./decel. time set - value - value 17 = Accel./decel. prohibit - value - value 18 = No access to parameter 19 = Remote control - when closed 20 = Local control - when closed 21 = Parameter 1/2 sel when 22 = Pl controller - when closed 23 = Pl set point select - when 24 = Motor interlock 1 - when 25 = Smok mode - when closed 27 = Fire mode reference 1/2 fire mode reference 2 w 28 = Fire mode reverse - when 30 = Preheat active - when closed	- when the control source p logic is set to 3 start put, ext. fault 1 will be actived, ext. fault 2 will be actived, ext. fault 2 will be actived, ext. fault 3 will be actived, ext. fault 3 will be actived, ext. fault 3 will be actived, the faults will be reset speeds are selected preset speeds are selected, the jog speed defined closed, the motor potentions of the fault of the f	e is set to IO terminal this input will ated; ated; ated; eset; art command and be in the related; at it is left and it is left at P2.3.8 will override the free ometer value will increment; ometer value will decrement meter value will reset to zero time 1 will be used; when cl I hold the output frequency ages can be made to any setting and the Local control place is active: when closed parame e reference source to Pl cont int 1 is active: when closed, abled to run; active; is active and this input is open, this input is open, direction vang will be active; or	and y state; and y state; and y state; and y state; and y significant bit in that be and y significant bit in that be and y state; and the rate defined by mote at the rat	in the action defined by the reverse direction; inary input; binary input; r pot ramp time; or pot ramp time; eference value; be active: when closed,
Description:	Defines the function of digital	al input 3.			

P2.2.7 ^②	DI4 function				ID 1807	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	7	
Minimum value:	N.A.					
	 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; 21 = Parameter 1/2 sel when open, parameter set 1 is active: when closed parameter set 2 is active; 22 = Pl controller - when closed, the drive will force the reference source to Pl controller output; 23 = Pl set point select - when open, parameter set point 1 is active: when closed, set point 2 is active; 24 = Motor interlock 1 - when closed, motor will be enabled to run; 25 = Smoke mode - when closed, smoke mode will be active; 26 = Fire mode - when closed, fire mode will be active; 27 = Fire mode reference 1/2 sel when fire mode is active and this input is open, fire mode reference 1 will be active: when closed, fire mode reference 2 will be active; 28 = Fire mode reverse - when fire mode is active and this input is open, direction will be forward: when closed, reverse; 29 = DC brake active - when closed, DC injection braking will be active; 30 = Preheat active - when closed, preheat mode will be active; or 31 = Derag, enable - when closed, preheat mode will be active; or 31 = Derag, enable - when closed, the Derag, cycle for pumps will be initiated. 					
	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - v	e - when fire mode is active a when closed, DC injection br when closed, preheat mode w	aking will be active; ill be active; or		osed, reverse;	
Description:	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - v	e - when fire mode is active a when closed, DC injection br when closed, preheat mode w /hen closed, the Derag. cycle	aking will be active; ill be active; or		osed, reverse;	
<u> </u>	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - v 31 = Derag. enable - w Defines the function o	e - when fire mode is active a when closed, DC injection br when closed, preheat mode w /hen closed, the Derag. cycle	aking will be active; ill be active; or		osed, reverse;	
2.3 - Preset speed.	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - v 31 = Derag. enable - w	e - when fire mode is active a when closed, DC injection br when closed, preheat mode w /hen closed, the Derag. cycle	aking will be active; ill be active; or			
2.3 - Preset speed.	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - v 31 = Derag. enable - w Defines the function o	e - when fire mode is active a when closed, DC injection br when closed, preheat mode w /hen closed, the Derag. cycle	aking will be active; ill be active; or		105	
2.3 - Preset speed. 2.3.1 [©] Iinimum value:	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - 31 = Derag. enable - w Defines the function o Preset speed 1 Preset speed 1 0.00 Hz	e - when fire mode is active a when closed, DC injection br when closed, preheat mode w when closed, the Derag. cycle f digital input 4.	aking will be active; ill be active; or for pumps will be initiate MaxFreq Hz	ed.	105 ID 105	
P2.3 - Preset speed. P2.3.1 [©] Minimum value: Description:	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - 31 = Derag. enable - w Defines the function o Preset speed 1 Preset speed 1 0.00 Hz	e - when fire mode is active a when closed, DC injection br when closed, preheat mode w when closed, the Derag. cycle of digital input 4.	aking will be active; ill be active; or for pumps will be initiate MaxFreq Hz	ed.	105 ID 105	
22.3 - Preset speed. 22.3.1 [©] Minimum value: Description:	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - v 31 = Derag. enable - w Defines the function o Preset speed 1 0.00 Hz Preset speed is select	e - when fire mode is active a when closed, DC injection br when closed, preheat mode w when closed, the Derag. cycle of digital input 4.	aking will be active; ill be active; or for pumps will be initiate MaxFreq Hz	ed.	105 ID 105 5.00 Hz	
P2.3 - Preset speed. P2.3.1 [©] Minimum value: Description: P2.3.2 [©] Minimum value:	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - v 31 = Derag. enable - w Defines the function o Preset speed 1 0.00 Hz Preset speed 2 0.00 Hz	e - when fire mode is active a when closed, DC injection browner closed, preheat mode worken closed, the Derag. cycle of digital input 4. Maximum value: ed with digital inputs using a	aking will be active; ill be active; or for pumps will be initiate MaxFreq Hz binary input. MaxFreq Hz	Default value:	105 ID 105 5.00 Hz ID 106	
P2.3 - Preset speed. P2.3.1 [®] Minimum value: Pescription: P2.3.2 [®] Minimum value: Pescription:	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - v 31 = Derag. enable - w Defines the function o Preset speed 1 0.00 Hz Preset speed 2 0.00 Hz	e - when fire mode is active a when closed, DC injection brownen closed, preheat mode worken closed, the Derag. cycle of digital input 4. Maximum value: ed with digital inputs using a Maximum value:	aking will be active; ill be active; or for pumps will be initiate MaxFreq Hz binary input. MaxFreq Hz	Default value:	105 ID 105 5.00 Hz ID 106	
P2.3 - Preset speed. P2.3.1 [©] Minimum value: P2.3.2 [©] Minimum value: P2.3.2 [©] Minimum value: P2.3.3 [©] P2.3.3 [©]	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - v 31 = Derag. enable - w Defines the function o Preset speed 1 0.00 Hz Preset speed 2 0.00 Hz Preset speed is select Preset speed is select	e - when fire mode is active a when closed, DC injection brownen closed, preheat mode worken closed, the Derag. cycle of digital input 4. Maximum value: ed with digital inputs using a Maximum value:	aking will be active; ill be active; or for pumps will be initiate MaxFreq Hz binary input. MaxFreq Hz	Default value:	105 ID 105 5.00 Hz ID 106 10.00 Hz	
P2.3 - Preset speed. P2.3.1 [©] Minimum value: P2.3.2 [©] Minimum value: P2.3.3 [©] Minimum value: P2.3.3 [©] Minimum value:	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - v 31 = Derag. enable - w Defines the function o Preset speed 1 0.00 Hz Preset speed is select Preset speed is select Preset speed is select Preset speed 3 0.00 Hz	e - when fire mode is active a when closed, DC injection browner closed, preheat mode when closed, the Derag. cycle of digital input 4. Maximum value: ed with digital inputs using a maximum value: ed with digital inputs using a	aking will be active; ill be active; or for pumps will be initiate MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz MaxFreq Hz	Default value: Default value:	105 ID 105 5.00 Hz ID 106 10.00 Hz	
22.3 - Preset speed. 22.3.1 [®] //inimum value: Description: 22.3.2 [®] //inimum value: Description: 22.3.3 [®] //inimum value:	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - v 31 = Derag. enable - w Defines the function o Preset speed 1 0.00 Hz Preset speed is select Preset speed is select Preset speed is select Preset speed 3 0.00 Hz	e - when fire mode is active a when closed, DC injection brownen closed, preheat mode worken closed, the Derag. cycle of digital input 4. Maximum value: ed with digital inputs using a maximum value: ed with digital inputs using a maximum value:	aking will be active; ill be active; or for pumps will be initiate MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz MaxFreq Hz	Default value: Default value:	105 ID 105 5.00 Hz ID 106 10.00 Hz	
2.3 - Preset speed. 2.3.1 [©] Minimum value: Description: 2.3.2 [©] Minimum value: Description: 2.3.3 [©] Minimum value: Description: 2.3.4 [©]	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - v 31 = Derag. enable - w Defines the function o Preset speed 1 O.00 Hz Preset speed is select Preset speed 3 O.00 Hz Preset speed 3 O.00 Hz Preset speed is select Preset speed is select Preset speed is select	e - when fire mode is active a when closed, DC injection brownen closed, preheat mode worken closed, the Derag. cycle of digital input 4. Maximum value: ed with digital inputs using a maximum value: ed with digital inputs using a maximum value:	aking will be active; ill be active; or for pumps will be initiate MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz MaxFreq Hz	Default value: Default value:	105 ID 105 5.00 Hz ID 106 10.00 Hz ID 118 15.00 Hz	
22.3 - Preset speed. 22.3.1 [©] Minimum value: Description: 22.3.2 [©] Minimum value: Description: 22.3.3 [©] Minimum value: Description: 22.3.4 [©] Minimum value:	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - v 31 = Derag. enable - w Defines the function o Preset speed 1 0.00 Hz Preset speed is select Preset speed 3 0.00 Hz Preset speed is select Preset speed is select Preset speed 4 0.00 Hz	e - when fire mode is active a when closed, DC injection browner closed, preheat mode when closed, the Derag. cycle of digital input 4. Maximum value: ed with digital inputs using a maximum value:	aking will be active; ill be active; or for pumps will be initiate MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz binary input.	Default value: Default value: Default value:	105 ID 105 5.00 Hz ID 106 10.00 Hz ID 118 15.00 Hz	
22.3 - Preset speed. 22.3.1 [©] Minimum value: 22.3.2 [©] Minimum value: 22.3.2 [©] Minimum value: 22.3.3 [©] Minimum value: 22.3.4 [©] Minimum value: 22.3.4 [©] Minimum value: 22.3.4 [©] Minimum value:	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - v 31 = Derag. enable - w Defines the function o Preset speed 1 0.00 Hz Preset speed is select Preset speed 3 0.00 Hz Preset speed is select Preset speed is select Preset speed 4 0.00 Hz	e - when fire mode is active a when closed, DC injection brownen closed, preheat mode worken closed, the Derag. cycle of digital input 4. Maximum value: ed with digital inputs using a maximum value:	aking will be active; ill be active; or for pumps will be initiate MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz binary input.	Default value: Default value: Default value:	105 ID 105 5.00 Hz ID 106 10.00 Hz ID 118 15.00 Hz	
P2.3 - Preset speed. P2.3.1® Minimum value: P2.3.2® Minimum value: P2.3.3® Minimum value: P2.3.3® Minimum value: P2.3.4® Minimum value: P2.3.4® Minimum value: P2.3.5®	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - 31 = Derag. enable - w Defines the function o Preset speed 1 Preset speed 1 0.00 Hz Preset speed is select Preset speed 3 0.00 Hz Preset speed is select Preset speed 4 0.00 Hz Preset speed 4 0.00 Hz Preset speed 4	e - when fire mode is active a when closed, DC injection brownen closed, preheat mode worken closed, the Derag. cycle of digital input 4. Maximum value: ed with digital inputs using a maximum value:	aking will be active; ill be active; or for pumps will be initiate MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz binary input.	Default value: Default value: Default value:	105 ID 105 5.00 Hz ID 106 10.00 Hz ID 118 15.00 Hz ID 119 20.00 Hz	
P2.3 - Preset speed. P2.3.1 [©] Winimum value: P2.3.2 [©] Winimum value: P2.3.3 [©] Winimum value: P2.3.3 [©] Winimum value: P2.3.3 [©] Winimum value: P2.3.5 [©] Winimum value: P2.3.5 [©] Winimum value:	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - 31 = Derag. enable - w Defines the function of Preset speed 1 0.00 Hz Preset speed is select Preset speed 3 0.00 Hz Preset speed is select Preset speed 5 0.00 Hz Preset speed 5 0.00 Hz	e - when fire mode is active a when closed, DC injection browner closed, preheat mode when closed, the Derag. cycle of digital input 4. Maximum value: ed with digital inputs using a maximum value:	aking will be active; ill be active; or for pumps will be initiate MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz binary input.	Default value: Default value: Default value:	105 ID 105 5.00 Hz ID 106 10.00 Hz ID 118 15.00 Hz ID 119 20.00 Hz	
Description: P2.3 - Preset speed. P2.3.1 [®] Minimum value: Description: P2.3.2 [®] Minimum value: Description: P2.3.3 [®] Minimum value: Description: P2.3.4 [®] Minimum value: Description: P2.3.5 [®] Minimum value: Description: P2.3.5 [®] Minimum value: Description: P2.3.6 [®]	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - 31 = Derag. enable - w Defines the function of Preset speed 1 0.00 Hz Preset speed is select Preset speed 3 0.00 Hz Preset speed is select Preset speed 5 0.00 Hz Preset speed 5 0.00 Hz	Maximum value: ed with digital inputs using a Maximum value: ed with digital inputs using a Maximum value: ed with digital inputs using a	aking will be active; ill be active; or for pumps will be initiate MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz binary input.	Default value: Default value: Default value:	105 ID 105 5.00 Hz ID 106 10.00 Hz ID 118 15.00 Hz ID 119 20.00 Hz	
P2.3 - Preset speed. P2.3.1® Winimum value: Description: P2.3.2® Winimum value: Description: P2.3.3® Winimum value: Description: P2.3.4® Winimum value: Description: P2.3.5® Winimum value: Description: P2.3.5® Winimum value: Description:	28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - 31 = Derag. enable - w Defines the function o Preset speed 1 O.00 Hz Preset speed is select Preset speed 5 O.00 Hz Preset speed is select Preset speed is select Preset speed 5 O.00 Hz Preset speed 5 O.00 Hz Preset speed is select	Maximum value: ed with digital inputs using a Maximum value: ed with digital inputs using a Maximum value: ed with digital inputs using a	aking will be active; ill be active; or for pumps will be initiate MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz binary input. MaxFreq Hz binary input.	Default value: Default value: Default value:	105 ID 105 5.00 Hz ID 106 10.00 Hz ID 118 15.00 Hz ID 119 20.00 Hz ID 120 25.00 Hz	

Table 40. Inputs (Cont.).

P2.3.7 [©]	Preset speed 7	,			ID 122
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	35.00 Hz
Description:	Preset speed is se	elected with digital inputs using a	binary input.		

P2.4 - Al settings.

P2.4.1	Al 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 inp parameter.	ut mode to current or voltage	the DIP switches or	control board will need to be set	to the same mode as this	
	*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.

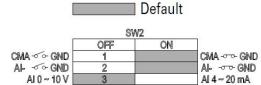
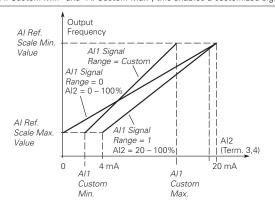


Table 40. Inputs (Cont.).

P2.4.2 ^②	Al signal rang	e			ID 175	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = 0-100%/0-20 1 = 20-100%/4-2					
Description:	With this parameter, you can select the analog input 1 signal range.					
	For selection "Customized" see "Al Custom Min" and "Al Custom Max", this enables a customized signal range					



[©] Parameter value can only be changed after the drive has stopped. © Parameter value will be set to be default when changing macros.

P3.1 - Digital outpu	ıt.				
P3.1.1 ^②	RO1 function	'	,	'	ID 152
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	2 = Run - drive is 3 = Fault - drive is 4 = Fault invert - 5 = Warning - dri 6 = Reverse - driv 7 = At speed - dri 8 = Zero frequenc 9 = Frequency lim 10 = Pl supervisic 11 = Torque limit 12 = Reference li 13 = Power limit 14 = Temperature 15 = Analog inpu 16 = Motor curre 17 = Over heat fa 18 = Over current 19 = Over volt re 20 = Under volt re 20 = Under volt re 21 = 4 mA fault - 22 = External fau 23 = Motor therm 24 = STO fault ou 25 = Control from 26 = Remote con 27 = Unrequeste 28 = Fire mode - i 29 = Damper con 30 = Valve contro 31 = Jog speed - 32 = Fieldbus inp 34 = DC charge s 35 = Preheat acti 36 = Cold weathe 37 = Pl sleep - Pl 38 = 2nd stage re 39 = Prime pump 40 = Master drive 41 = Slave drive s	is ready for operation; running;	ne set reference; y; juency limit 1 is acti ctivated; e limit; erence limit; limit; drive temperature li g input limit; or current limit; rred; enabled; t; eled; ccurred; ated; and location; n is not the same as word; word; s closed; ted; time 2 is active imp mode; rive in the multi-pure	imit; s the reference direction; mp control mode; control mode;	

Table 41. Outputs (Cont.).

P3.1.4 ^②	RO2 function				ID 153
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	3
Options:	2 = Run - drive is ru 3 = Fault - drive is ru 4 = Fault invert - drive 5 = Warning - drive 6 = Reverse - drive 7 = At speed - drive 8 = Zero frequency 9 = Frequency limit 10 = Pl supervision 11 = Torque limit su 12 = Reference limi 13 = Power limit su 14 = Temperature li 15 = Analog input s 16 = Motor current 17 = Over heat fault 18 = Over current re 19 = Over volt regul 20 = Under volt reg 21 = 4 mA fault - 4 22 = External fault 23 = Motor thermal 24 = STO fault outp 25 = Control from li 26 = Remote contro 27 = Unrequested r 28 = Fire mode - dri 29 = Damper contro 30 = Valve control 31 = Jog speed - dr 32 = Fieldbus input 34 = DC charge swi 35 = Preheat active 36 = Cold weather 37 = Pl sleep - Pl co 38 = 2nd stage ram 39 = Prime pump ac 40 = Master drive s 41 = Slave drive sta 43 = Single drive co	ready for operation; nning; aultd; ve is not faulted; has a warning message; is outputting reverse phase rota output frequency has reached t drive output is at zero frequenc supervision - supervision for frei - supervision for Pl controller is a pervision - supervision for torqui t supervision - supervision for power mit supervision - supervision for analisupervision - supervision for molitary and the supervision for analisupervision - supervision for molitary over volt regulator is enable ular - over current regulator is ar - over volt regulator is enable ular - under volt regulator is enable ular - under volt regulator is enable ular - under volt regulator is enable ular - in over current regulator is ar - over over current regulator is and a courred; external fault has occurred; fault - motor thermal fault has occurred; fault - motor thermal fault has occurred; all - control place; otation direction - active direction il - remote is the control place; otation direction - active direction il - controller by fieldbus control 2 - controller by fieldbus control 2 - controller by fieldbus control 2 - controller by fieldbus control 3 - controller by fieldbus control 4 - controller by fieldbus control 5 - controller by fieldbus control 6 - controller by fieldbus control 7 - controller by fieldbus control 8 - controller by fieldbus control 9 - controller by fieldbus control 1 - controller by fieldbus control 2 - controller by fieldbus control 3 - controller by fieldbus control 4 - controller by fieldbus control 5 - controller by fieldbus control 6 - controller by fi	ne set reference; y; uency limit 1 is ac ctivated; limit; erence limit; limit; drive temperature g input limit; or current limit; rred; enabled; l; led; ccurred; and location; n is not the same a word; word; s closed; ted; ive; time 2 is active timp mode; rive in the multi-pump ctor is open or clo	limit; as the reference direction; ump control mode; o control mode; or se in multi-pump control mode.	
Description:		n associated with changing the s	tate of relay outpu	ut Z.	
'3.3 - Analog output. '' '3.3.1 [©]	AO mode				ID 227
/linimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = 0 - 20 mA; or 1 = 0 - 10 V.				

Table 41. Outputs (Cont.).

P3.3.2 ^②	AO function	,			ID 146	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1	
Options:	2 = Frequency ref 3 = Motor speed 4 = Motor curren 5 = Motor rorque 6 = Motor power 7 = Motor voltag; 8 = DC bus voltag; 9 = Pl setpoint (p 10 = Pl error valu; 11 = Pl output (pr 12 = Analog inpu; 13 = Drive referei 14 = Fieldbus pro 15 = Fieldbus pro 16 = Fieldbus pro 17 = Fieldbus pro 18 = Fieldbus pro 19 = Fieldbus pro 20 = Fieldbus pro 21 = Fieldbus pro 22 = User defined; 23 = Motor torqui	rocess unit minimum - process unit e (process unit minimum - process ocess unit minimum - process ocess unit i (0% - 100%); note potentiometer (0% - 100%); note potentiometer (0% - 100%); notess data input 1 (0% - 100%); notess data input 3 (0% - 100%); notess data input 4 (0% - 100%); notess data input 5 (0% - 100%); notess data input 5 (0% - 100%); notess data input 6 (0% - 100%); notess data input 7 (0% - 100%); notess data input 7 (0% - 100%); notess data input 8 (0% - 100%); notess data input 8 (0% - 100%); notess data input 8 (0% - 100%);	unit maximum); maximum);	um);		
Description:	Select the function	on desired to the terminal A01.				

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

Table 42. Drive control.

P4.1 - Basic settings.					
P4.1.1 ^②	Keypad reference	'			ID 141
Minimum value:	MinFreq	Maximum value:	MaxFreq	Default value:	0.00 Hz
Description:	Keypad reference value.				
P4.1.3 ^②	Keypad stop	'	'		ID 114
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Enabled - keypad oper 1 = Always enabled - In th	ation - In this mode, the key is mode, the stop button wi	pad stop will only operate w I always stop the drive rega	when the control source is se rdless of control mode.	et to keypad.
Description:	Enabled or always enabled	d keypad operation.			
P4.1.4 ^①	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 re-	verse motor direction.			
P4.1.5	Change phase sequen	ce 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	·.	

Table 42. Drive control (Cont.).

P4.1.6 ²	Power up local ren	note 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:				d. The default setting will hold the lostart in that mode regardless of la	
P4.1.8 ^②	Start mode	,	,	,	ID 252
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Description:	1 = Flying start from s last operating freq 2 = Flying start from m	quency as a starting point. naximum frequency - The driv rating frequency as a starting	catch a spinning m e will catch a spinn	otor. This setting searches for the origing motor. This setting searches for	
		e operation.	1		
P4.1.9 ^②	Stop mode				ID 253
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:		stop command, the motor coatop command, the speed of the		ntrolled by the drive. ated according to the set deceleration	on parameters.
Description:	Selects the stop mode	e operation.			
P4.1.10 ^②	Ramp 1 shape	,		'	ID 247
Minimum value:	0.0 s	Maximum value:	10.0 s	Default value:	0.0 s
Description:		he acceleration and decelerat ape that causes acceleration		moothed with these parameters. Se	

Accel Time 1,
Decel Time 1
(Accel Time 2)

Ramp 1
Shape

Ramp 1 Shape

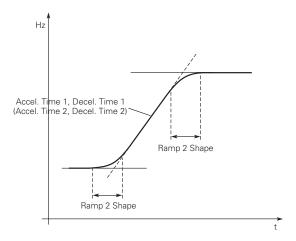
Table 42. Drive control (Cont.).

P4.1.11 ²	Ramp 2 shape				ID 248
Minimum value:	0.0 s	Maximum value:	10.0 s	Default value:	0.0 s

Description:

The start and end of the acceleration and deceleration ramps can be smoothed with these parameters. Setting a value of 0.00 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.

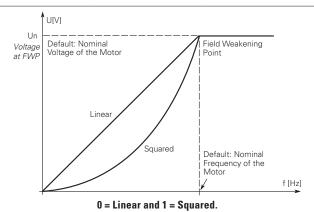


P4.1.12 ²	Accel. time 2				ID 249			
Minimum value:	0.1 s	Maximum value:	3000.0 s	Default value:	10.0 s			
Description:	These values corre frequency.	spond to the time required for th	e output frequency to	accelerate from the zero frequen	cy to the set maximum			
		provide the possibility to set two ne programmable digital input.	different acceleration	n/deceleration time sets for one a	application. The active set can			
P4.1.13 ²	Decel. time 2	,		,	ID 250			
Minimum value:	0.1 s	Maximum value:	3000.0 s	Default value:	10.0 s			
Description:	These values corre frequency.	These values correspond to the time required for the output frequency to decelerate from the set maximum frequency to the zero frequency.						
		provide the possibility to set two ne programmable digital input.	different acceleration	n/deceleration time sets for one a	application. The active set can			
P4.1.14 ^{①②}	2nd Stage ramp	frequency		'	ID 2444			
Minimum value:	MinFreq.	Maximum value:	MaxFreq.	Default value:	30.00 Hz			
Description:		amp frequency is the frequency le sed for other inputs or devices to			frequency output function.			

 $^{^{\}circledR}$ Parameter value can only be changed after the drive has stopped. $^{\circledcirc}$ Parameter value will be set to be default when changing macros.

Table 43. Motor control.

P5.1 - Basic setting	s				
P5.1.1 ^{©2}	Motor control mode	9			ID 287
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	1 = Speed control - Out 2 = Open loop vector co identification. 3 = PM control 1 - PM r	ontrol - Similar to the standa motor control mode 1, used f	oy giving a fréquency refeird rd speed control mode, hi or SPM (surface mounted	rence to it with slip compensa	tion requires running a motor so can be used for IPM.
Description:	Selects the motor contr	rol mode.			
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:				ve. The parameter value ranger and tries to limit the output	
P5.1.3 ^{①②}	V/Hz optimization				ID 109
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disable torque boos 1 = Enable torque boos				
Description:	Automatic torque boost and run at low frequenc		ncreases automatically, w	hich assists the motor to prod	duce sufficient torque to start
P5.1.4 ^{①②}	V/Hz ratio	'	'	'	ID 108
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	where the nominal value of the voltary weakening point who produces less torque the load is proportic 2 = Programmable V/Hz voltage, midpoint at the application. 3 = Linear with flux opt	voltage is supplied. A linear ge of the motor changes foll here the nominal voltage is see and electromechanical nor onal to the square of the spectrure - the V/Hz curve cannot weakening point. A progimization - the drive starts to	W/Hz ratio should be used owing a squared curve wi supplied. The motor runs in see. A squared V/Hz ration seed. be programmed with three rammable V/Hz curve can o search for the minimum	ne constant flux area from 0 hd in constant torque application that the frequency in the area funder magnetized below the focan be used in applications where different points. These point be used if the other settings motor current in order to save but still maintain the desired settings.	rom 0 Hz to the field rield weakening point and where the torque demand of the are the 0 frequency do not satisfy the needs of the energy. This mode is called
Description:	Selects the V/Hz ratio. 0 = Linear; 1 = Squared; 2 = Programmable; or 3 = Linear + flux optimiz	zation.			



P5.1.10[®] Switching frequency
MinSwitchFreq kHz Maximum value: MaxSwitchFreq kHz Default value: DefaultSwitchFreqCT kHz

Description: Sets the switching frequency for the PWM output waveform.

Table 43. Motor control (Cont.).

P5.1.16 ^{①②}	Identification	"			ID 299
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	2 = Identification with r 3 = Identification no rur	stator resistor - does not spir run - motor stator resistor is n - motor is supplied with cu nertia - identification for the	completed then the rrent and voltage b	can be done with load attached. ne motor is run. This must be complet but at zero frequency. Ily.	ted with unloaded motor.
Description:	parameters to improve will be active then set t	starting torque and open loo back to 0 when completed.	op vector control p When a run comm	le of the motor once complete the driv erformance. Once set and a run comr and is issued, the message on the key fication, a fault message will be displa	nand is given, the operation pad will indicate "Auto

[©] Parameter value can only be changed after the drive has stopped. © Parameter value will be set to be default when changing macros.

Table 44. Protections

P6.1 - Motor.									
P6.1.4 ^{①②}	Motor thermal prote	ction			ID 310				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2				
Options:		er fault according to param er fault always by coasting							
Description:	calculated motor temp is		r on values of the driv	tage based off the % of calculate we and monitoring values as the d of the motor to 0%.					
P6.1.5 ^②	Motor thermal FO cu	rrent			ID 311				
Minimum value:	0.00%	Maximum value:	150.00%	Default value:	100.00%				
Description:	The current can be set be	etween 0 - 150.0% x InMot	or. This parameter se	ets the value for thermal current a	nt 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

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.

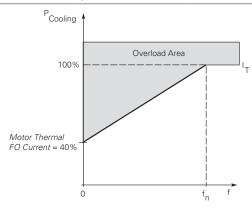


Table 44. Protections (Cont.).

P6.2.2 ^{①②}	Input phase fault			1	ID 332
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = No response; 1 = Warning; 2 = Fault, stop mode af	ter fault according to parame ter fault always by coasting;	eter stop mode;		
Description:	The input phase superv	ision ensures that the input	phases of the frequency of	converter have approximately	equal current draw.
P6.2.3 ^{①②}	4 mA input fault				ID 306
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	3 = Warning, the preset 4 = Fault, stop mode af	ency from 10 seconds back is frequency P6.2.4 is set as r ter fault according to parame ter fault always by coasting.	eference.		
Description:				nce signal is used and the sigr rammed into relay outputs RO	
P6.2.4 ^{①②}	4 mA fault frequenc	ey			ID 331
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00
Description:	When 4 mA fault happe	ens, the output frequency of	drive goes to this preset	speed when P6.2.3 = 3.	
P6.2.5 [©]	External fault				ID 307
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options: Description:	3 = Fault, stop mode af	ter fault according to parameter fault always by coasting.		t signal in the greateness while t	digital inputs function calcut
Description.				t signal in the programmable (o output relay outputs RO1 and F	
P6.2.11 ^②	STO fault response				ID 2427
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	1 = Warning - drive indi	ill stop, no indication shown cate warning/if STO clears o icate fault/require reset to s	drive will run without rese		
Description:	STO fault response def	nes the function of how the	STO input will be seen or	n the keypad and how the driv	e functions to it.
P6.2.12 ^①	PI feedback Al 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 fre	quency (P6.2.13).			
Description:	This parameter defines feedback.	the function of the PI feedba	ack analog input loss resp	oonse. If the Al feedback is lo	st based off the programed A
P6.2.13 ^{①②}	PI feedback Al 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 w	ould run to if a feedback	is lost and P6.2.12 was set to	option 3.
P6.2.14 ^②	PI feedback Al loss	pipe fill			ID 2403
Minimum value:	0.0 varies	Maximum value:	1000.0 varies	Default value:	0.0 varies
Description:		the pump based off the me 3 "loss of prime" occurs.	asured level. If the value	drops below this level for the	time in P6.2.15 and below,

Table 44. Protections (Cont.).

P6.2.15 ^②	PI feedback A	ID 2404			
Minimum value:	0.0 s	Maximum value:	6,000.0 s	Default value:	0.0 s
Description:	PI feedback AI lo frequency in P6.2 0 seconds.	ss pre-frequency timeout - when P 2.15 for the time set here. After thi	6.2.12 is set to 3 or 4, vs time, the drive will fa	when the feedback signal is lost, ault out on "feedback loss". The	the drive will run at the time is disabled when set to

P6.3 - Communications.

P6.3.1 ^{①②}	Fieldbus fault res	ponse			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:	communication port.			e is used and communication is lost eldbus control to set fault or warnin	
	OPTcard fault response ID 335				
P6.3.2 ^{①②}	OPTcard fault res	ponse			ID 335
P6.3.2 ^{①②} Minimum value:	OPTcard fault res	ponse Maximum value:	N.A.	Default value:	ID 335
		<u>-</u>	N.A.	Default value:	

Table 45. PI Controller.

P7.1 - Basic settings	s.				
P7.1.1 ^②	PI control gair	1			ID 1294
Minimum value:	0.00%	Maximum value:	200.00%	Default value:	100.00%
Description:		of the PI Controller. It adjust the s of 10% in the error value causes th			ne load. If this value is set to
P7.1.2 ^②	PI control itim	e			ID 1295
Minimum value:	0.00 s	Maximum value:	600.00 s	Default value:	1.00 s
Description:		ration time of the PI controller. Ov		al time contributes to the deviat in the error value causes the cor	

[©] Parameter value can only be changed after the drive has stopped. © Parameter value will be set to be default when changing macros.

Table 45. Pl Controller (Cont.).

P7.1.3 ^{①②}	PI process unit				ID 1297
/linimum value:	N.A.	Maximum value:	N.A.	Default value:	0
inimum value: ptions:	N.A. 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/s; 24 = gal/min.; 25 = gal/s; 30 = ft³/s; 31 = ft³/min.; 32 = ft³/h; 33 = ftfs; 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;	Maximum value:	N.A.	Default value:	
escription:	Defines the unit type for	or PI feedback unit.			
7.1.4 ^②	PI process unit min	imum			ID 1298
inimum value:	-99999.99 varies	Maximum value:	PI Process Unit Max	Default value:	0.00 varies
escription:	Defines the minimum p	rocess unit value.			
7.1.5 ^②	PI process unit max	kimum			ID 1300
inimum value:	PI Process Unit Min	Maximum value:	99999.99 varies	Default value:	100.00 varies
escription:	Defines the maximum p	process unit value.			
7.1.6 ^{①②}	PI error inversion				ID 1303
inimum value:	N.A.	Maximum value:	N.A.	Default value:	0
otions:	0 = Normal - if feedbac	k is less than set-point, PI cock is less than set-point, PI c	ntroller output increases.		
escription:	Defines the way the pro	ocess value output reacts to	the feedback signal.		
7.1.7 ^②	PI dead band				ID 1304
inimum value:	-99999.99 varies	Maximum value:	99999.99 varies	Default value:	0 varies
escription:		tpoint in process units. This			

Table 45. PI Controller (Cont.).

P7.1.8 ^②	PI dead band de	lay		,	ID 1306
Minimum value:	0.00 s	Maximum value:	320.00 s	Default value:	0.00 s
Description:	If the PI process va level out again.	lue goes out of the dead band ar	ea for the desired time	e delay, at that point the controlle	er will re-initialize and try t
P7.1.9 ^②	PI ramp time		'	·	ID 4244
F7.1.9	ri ranip time				ID 1311
Minimum value:	0.00 s	Maximum value:	300.00 s	Default value:	0.00 s

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 46. Setpoint.

P7.2.1 - Standard.				_	
P7.2.1.1 ^②	PI keypad setpoint	1			ID 1307
Minimum value:	PI Process Unit Min	Maximum value:	PI Process Unit Max	Default value:	0.00 varies
Description:	Keypad PI reference va	lue setpoint 1.			
P7.2.1.2 ^②	PI keypad setpoint	2		,	ID 1309
Minimum value:	PI Process Unit Min	Maximum value:	PI Process Unit Max	Default value:	0.00 varies
Description:	Keypad PI reference va	lue setpoint 2.			
P7.2.1.3 ^②	PI wake-up action				ID 2466
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:					
Description:	This parameter defines	the wake-up function action	1.		

P7.2.2 - Setpoint 1.

P7.2.2.1 ^①	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 inp 6 = FB process data inp 7 = FB process data inp 8 = FB process data inp 9 = FB process data inp 10 = FB process data in 11 = FB process data in 12 = FB process data in 13 = FB PI setpoint 1; or 14 = FB PI setpoint 2.	ut 1; ut 1; ut 2; ut 3; ut 4; ut 5; put 6; put 7; put 8;			
Description:	Defines source of the s fieldbus message.	etpoint value the drive uses.	This can either be	e an internal preset value, keypad set	tpoint, analog signal, or
P7.2.2.2 ^①	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:		le the output when the frequency rises above the wake-up		the sleep frequency for the sleep del	ay time. The output

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Table	46.	Setpo	oint ((Cont.)	١.

P7.2.2.3 ^②	PI setpoint 1 sleep o	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 a shut off till the wake up level is met. It is to prevent large fluctuations when going into the sleep function						
P7.2.2.4 ^②	PI setpoint 1 wake-	up level	'		ID 1318			
Minimum value:	-99999.99 varies	Maximum value:	99999.99 varies	Default value:	0.00 varies			
Description:		e PI feedback value to go abo scaled based off the PI unit	ove top enable the PI output t min./max, values.	o be re enabled. This val	ue is based of the % of			
P7.2.2.5 ^②	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 boo	sted via a multiplier value.						
P7.2.2.6 ^②	PI setpoint 1 sleep l	evel			ID 2450			
Minimum value:	PID1_ProcessUnitMin H	Z Maximum value:	PID1_ProcessUnitMax Hz	Default value:	0.00 Hz			
Description:		ch the unit value is used to e drive into the sleep mode.	look at to go into the sleep mo	ode. When the unit drops	s below this level for the slee			
P7.2.2.7 ^②	SP1 sleep mode ove	r cycle time			ID 1842			
Minimum value:	0.00 varies	Maximum value:	10.00 varies	Default value:	0.00 varies			
Description:	cycle" fault. One cycle is defined wh	en the drive transfers from	p mode. If multiple times don normal mode to sleep mode. and clear "pump over cycle" f	·	drive would trip on "pump ove			
P7.2.2.8 ^②	SP1 sleep mode ma.	ximum cycle time			ID 1843			
Minimum value:	0.00 s	Maximum value:	3,600.00 s	Default value:	300.00 s			
Description:	Defines the maximum ti	me for sleep over cycle ched	ckina.					

P7.2.3 - Setpoint 2.

P7.2.3.1 ^①	PI setpoint 2 sour	ce			ID 1321
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Not used; 1 = PI keypad setpoint 2 = PI keypad setpoint 3 = AI; 4 = Drive reference pc 5 = FB process data in 6 = FB process data in 8 = FB process data in 9 = FB process data in 10 = FB process data in 11 = FB process data in 12 = FB process data in 13 = FB PI setpoint 1; 14 = FB PI setpoint 2.	t 2; pot; iput 1; iput 2; iput 3; iput 4; iput 4; iput 5; input 6; input 6; input 8;			
Description:	Defines source of the fieldbus message.	setpoint value the drive uses.	This can either be	e an internal preset value, keypad set	point, analog signal, or
P7.2.3.2 ^①	PI setpoint 2 sleep	enable		,	ID 1324
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; or 1 = Enabled.				
Description:		ble the output when the frequ		the sleep frequency for the sleep del	ay time. The output

Table 46. Setpoint (Cont.).

P7.2.3.3 ^②	PI setpoint 2 sleep d	elay			ID 1326
Minimum value:	0.00 s	Maximum value:	3,000.00 s	Default value:	0.00 s
Description:			nt drops below the sleep level t large fluctuations when goin		
P7.2.3.4 ^②	PI setpoint 2 wake-u	p level	,	'	ID 1327
Minimum value:	-99999.99 varies	Maximum value:	99999.99 varies	Default value:	0.00 varies
Description:		PI feedback value to go ab caled based off the PI unit	ove top enable the PI output t min./max, values.	o be re enabled. This val	ue is based of the % of
P7.2.3.5 ^②	PI setpoint 2 boost				ID 1329
Minimum value:	-2.00 varies	Maximum value:	2.00 varies	Default value:	1.00 varies
Description:	The setpoint can be boos	sted via a multiplier value.			
P7.2.3.6 ^②	PI setpoint 2 sleep le	evel	,		ID 2452
Minimum value:	PID1_ProcessUnitMin Hz	Maximum value:	PID1_ProcessUnitMax Hz	Default value:	0.00 Hz
Description:		th the unit value is used to drive into the sleep mode.	look at to go into the sleep mo	ode. When the unit drops	s below this level for the slee
P7.2.3.7 ^②	SP2 sleep mode over	cycle time			ID 1844
Minimum value:	0.00 varies	Maximum value:	10.00 varies	Default value:	0.00 varies
Description:	cycle" fault. One cycle is defined whe	en the drive transfers from	o mode. If multiple times don normal mode to sleep mode. and clear "pump over cycle" f	·	drive would trip on "pump ove
P7.2.3.8 ^②	SP2 sleep mode max	imum cycle time			ID 1845
Minimum value:	0.00 s	Maximum value:	3,600.00 s	Default value:	300.00 s
Description:	Defines the maximum tin	ne for sleep over cycle che	cking.		

^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 47. Feedback .

P7.3.1 - Standard.	'	,	'	'	'
P7.3.1.1 ^②	PI feedback gair	1		'	ID 1331
Minimum value:	-1,000.00%	Maximum value:	1,000.00%	Default value:	100.00%
Description:	Defines gain associ	ated with the feedback signal fr	om the measuring device	Ce.	

P7.3.2 - Feedback 1.

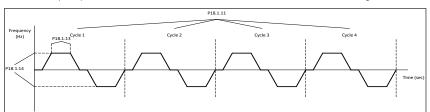
P7.3.2.1 ^①	PI feedback 1 s	ource			ID 1332	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2	
Options:	0 = Not used; 1 = AI; 2 = Drive reference 3 = FB process data 11 = FB PI feedback	a input 1; or				
Description:	Defines where fee	dback signal is being fed into the	drive, via analog or f	ieldbus data value.		
P7.3.2.2 ^②	PI feedback 1 m	ninimum	'	'	ID 1333	
Minimum value:	-200.00 %	Maximum value:	200.00%	Default value:	0.00%	
Description:	Minimum unit valu	e for the feedback signal.				

Table 47. Feedback (Cont.).

P7.3.2.3 ^②	PI feedback 1 m	naximim			ID 1334
Minimum value:	-200.00 %	Maximum value:	200.00%	Default value:	100.00%
Description:	Maximim unit value	e for the feedback signal.			

Table 48. Pump parameters.

P9.1 - Derag (*DM1	PRO).	,	'	'	
P9.1.1 ^②	Derag cycles				ID 2468
Minimum value:	0.00	Maximum value:	10.00	Default value:	3.00
Description:	This parameter define	s the number of cycles in the	forward/reverse direction	on for removing any debris in sy	rstem.
P9.1.2 ^②	Derag at Start/Sto	р	,		ID 2469
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0.00
Options:	0 = Off; 1 = Start; 2 = Stop; 3 = Start and stop; 4 = Digital input; or 5 = Current.				
Description:	Defines how the derag	ge function will become activa	ited; start, stop, both, o	r based off the digital input.	
P9.1.3 ^②	Deragging run tim	е			ID 2470
Minimum value:	1.00 s	Maximum value:	3,600.00 s	Default value:	0.00 s
Description:	Defines the length of	time the drive will run at the o	lerag speed in the forwa	ard and reverse direction.	-
P9.1.4 ^②	Derag speed				ID 2471
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	5.00 Hz
Description:	Defines the frequency	the drive will run at in the fo	ward/reverse direction	when in the derag mode.	



P9.1.5 ^②	Derag off delay	у			ID 2472
Minimum value:	1.00 s	Maximum value:	600.00 s	Default value:	10.00 s
Description:	Defines the lengtl	h of time the drive will run the der	ag function when enab	oled at stop.	
P9.1.6 ^{①②}	Derag current	'			ID 1879
Minimum value:	А	Maximum value:	A	Default value:	0.00 A

P9.2 - Start/stop timing (*DM1 PRO).

P9.2.1 ^{①②}	Valve start				ID 1847
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Normal; 1 = Damper start; 2 = Damper tout; or 3 = Damper delay.				
Description:	This parameter determi	nes the function of damper.			

[©] Parameter value can only be changed after the drive has stopped.
© Parameter value will be set to be default when changing macros.

Table 48.	Pump	parameters	(Cont.)	١.
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P9.2.2 ^{①②}	Valve timeout		'		ID 1848
Minimum value:	1.00 s	Maximum value:	32,500.00 s	Default value:	5.00 s
Description:	The timeout time used for received.	or an interlocked time start,	after which the start se	quence must be restarted if no	acknowledgement contact
P9.2.3 [©]	Valve delay	'	,		ID 1849
Vinimum value:	1.00 s	Maximum value:	32,500.00 s	Default value:	5.00 s
Description:	The delay time following	a delay start, after which	the frequency converter v	will be started.	
P9.2.4 [©]	Back spin delay				ID 2423
Minimum value:	0.00 s	Maximum value:	32,500.00 s	Default value:	0.00 s
Description:				another run command can be will then start. This is true fo	
P9.2.5 ^{①②}	Minimum run time	'	'		ID 1813
Viinimum value:	0.00 s	Maximum value:	32,500.00 s	Default value:	0.00 s
Description:	Drive minimum run time.				
P9.2.6 ^②	Minimum frequency	ramp time			ID 1850
Minimum value:	0.10 s	Maximum value:	2,000.00 s	Default value:	10.00
Description:	Ramp time for output to	minimum frequency.			
P9.3 - Multi-pump m	ulti-drive (*DM1 PRO).				
P9.3.1 ^{①②}	Multi-pump mode		,	'	ID 2279
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled or 1 = Multi-drive network.				
Description:	0 = Single drive - single of	of drives being used in the Irive for main motor, contact Ilower sequence with multi	ctors used on other moto		
P9.3.2 [©]	Number of drives				ID 2449
Minimum value:	1	Maximum value:	5	Default value:	1
Description:	This defines the number	of drives active when doing	g the multi-drive pump ar	nd fan scheme. By default, the	ere will be always one drive

Table 34. Pump parameters (Cont.).

P9.3.3 ^{①②}	Drive ID				ID 2278
Minimum value:	0	Maximum value:	5	Default value:	0
Description:		the drive address when usir onitored at this drive ID valu		. Based off this ID, the drive	enables in the desired
P9.3.4 ^{①②}	Regulation source				ID 2284
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Network only or 1 = PI controller.				
Description:	For drives that have bee to be the master.	n connected with both star	t/stop signal and PI feedb	ack - can be set up as "Feedb	ack", so they will have ability
P9.3.5 ^②	PI bandwidth		,	'	ID 2458
Minimum value:	0.00 varies	Maximum value:	6,000.00 varies	Default value:	10.00 varies
Description:	Percentage based off th	e setpoint above and below	which defines when the	auxiliary motor will come onli	ne or offline.

Table 34. Pump parameters (Cont.).

P9.3.6 ^{①②}	Staging frequency				ID 2315			
Minimum value:	MinFreq	Maximum value:	400.00	Default value:	50.00			
Description:	Output frequency is abo	ve stagging frequency and I	PI error is out of PI bandv	vidth - motor should add to sys	stem.			
P9.3.7 ^{①②}	De-staging frequence	ey .			ID 2316			
Minimum value:	0.00	Maximum value:	MaxFreq	Default value:	0.00			
Description:	Output frequency is bel	utput frequency is below de-stagging frequency and PI error is out of PI bandwidth - motor should remove fr						
P9.3.8 ^②	Add/remove delay	'	'	'	ID 344			
Minimum value:	0.00 s	Maximum value:	3,600.00 s	Default value:	10.00 s			
Description:	With feedback outside	the bandwidth, this time mu	st pass before motors/pu	umps are added or removed fro	om the system.			
P9.3.9 [©]	Interlock enabled	'	'	'	ID 350			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Disabled or 1 = Enabled.							
Description:	This parameter enables offline.	the drive to look at the digit	tal input interlocks to tell	which motor is available for r	unning or if they were brough			
P9.3.10 ^{©2}	Recovery method				ID 2285			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Automatic or 1 = Stop.							
Description:	This parameter is for th However, the slave driv	e slave when multi-drive sys e will stop immediately if it	stem lost the master. The is set to be "Stop".	e slave drive can continue run	if it set to be "Automatic".			
P9.3.11 ²	Add/remove drive s	election			ID 2311			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Drive ID or 1 = Run time.							
Description:	In default, MPFC system drive's running time: ad	n will add/remove pump acc d the drive that has shortest	ording to their drive ID, f running time and remov	rom small to large. The order on the drive that has longest rule.	can also depend on each slave nning time first.			
P9.3.12 ^②	Run time enabled				ID 2280			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Disabled or 1 = Enabled.							
Description:	The run time counter w	Il start counting only if this	parameter is enabled.					
P9.3.13 ^②	Run time limit	'			ID 2281			
Minimum value:	0.00 h	Maximum value:	300,000.00 h	Default value:	0.00 h			
Description:	If drive run time is over	this limit, its network status	s will be "Need Alternation	on". Limit equals 0 means run	time counter disabled.			
P9.3.14	Run time reset				ID 2283			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.			
Options:	0 = No action or 1 = Reset.							
Description:	One-time parameter, se	t to be 1 will clear run time	counter.					
P9.3.15 ^②	Master drive mode				ID 2473			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Follow PI; 1 = Fixed speed; or 2 = Turn off.							
Description:	Defines how the master	drive will maintain the freq	uency control when slav	es are brought in; follow PI, fix	ed speed, or turn off.			

Table 34. Pump parameters (Cont.).

P9.3.16 ^②	Master fixed spe	eed	'	'	ID 2474
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	50.00 Hz
Description:	Defines the fixed sp	peed frequency when the master	drive mode is set for fi	xed speed control when slaves	are brought in.
P9.3.17 ^②	Master fixed spe	eed delay	'	'	ID 2475
Minimum value:	0.00 s	Maximum value:	1,000.00 s	Default value:	5.00 s
Description:	Defines the delay to or turn off.	me before the master drive begi	ns running at the fixed	speed or turns off if the maste	r mode is set for fixed spee

P9.4 - Pipe fill (Loss of prime) (*DM1 PRO).

P9.4.1 [©]	Pipe fill loss respons	e			ID 2410
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No action; 1 = Warning; 2 = Fault; or 3 = Fault, coast.				
Description:	Defines the response me	thod when a "loss of prime	" condition occurs.		
P9.4.2 [©]	Pipe fill loss detection	on method	,	'	ID 2406
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Motor current; 1 = Motor power (%); or 2 = Motor torque (%).				
Description:	Defines the value for look	king at a loss of prime.			
P9.4.3 ^②	Pipe fill loss low leve	el			ID 2407
Minimum value:	0.00 varies	Maximum value:	1,000.00 varies	Default value:	0.00 varies
Description:	If the monitor value is les	s than low level value and	the output frequency is m	ore than low frequency, chec	k the pipe fill loss start.
P9.4.4 [©]	Pipe fill loss low free	juency	,	'	ID 2409
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	Defines the frequency po disabled.	int at which the drive need	s to be above to enable th	ne "loss of prime" feature. W	hen set to 0 Hz, protection i
P9.4.5 ^②	Pipe fill loss high lev	el	,		ID 1851
Minimum value:	0.00 varies	Maximum value:	1,000.00 varies	Default value:	0.00 varies
Description:	If the monitor value is mo loss start.	ore than high level (the high	n level is not 0) and the ou	tput frequency is more than h	nigh frequency, check pipe fi
P9.4.6 ^{①②}	Pipe fill loss high fre	quency	,	'	ID 1852
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	Defines high frequency p is disabled.	oint at which the drive nee	ds to be above to enabled	the "loss of prime" feature.	When set to 0 Hz, protection
P9.4.7 [©]	Pipe fill loss time				ID 2408
Minimum value:	0.00 s	Maximum value:	600.00 s	Default value:	0.00 s
Description:	Defines the delay time be	efore a "loss of prime" cond	lition will occur based of t	he detection method and prir	ne loss level.
P9.4.8 ^②	Pipe fill loss attempt	s			ID 2411
Minimum value:	0.00	Maximum value:	10.00	Default value:	1.00
Description:	Defines the amount of at	temps to auto restart the c	Irive on a "prime loss" con	dition.	

Table 34. Pump parameters (Cont.).

P9.5 - Prime pump (*	DM1 PRO).			'	'
P9.5.1 ^②	Prime pump enable			,	ID 2428
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; or 1 = Enabled.				
Description:	Prime pump enable.				
P9.5.2 ^②	Prime pump level			'	ID 2429
Minimum value:	0.00 varies	Maximum value:	6,000.00 varies	Default value:	0.00 varies
Description:	This defines the level at wh deactivated. If the level is	ich the pre-charge funct not reached, it will switc	ion will drop out. If the fe ch after the delay time.	edback level raises above thi	s value, pre-charge becomes
P9.5.3 ^②	Prime pump frequency				ID 2431
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	Frequency at which the pre-	-charge function will ope	erate when enabled.		
P9.5.4 ^②	Prime pump delay time				ID 2432
Minimum value:	0.00 min.	Maximum value:	3,600.00 min.	Default value:	0.00 min.
Description:	This is the time that the driv	ve will run the pre-charg	e function on start up. W	hen set to "O Hz", this functio	n is not enabled.
P9.5.5 ^②	Prime pump loss of pri	me level			ID 2433
Minimum value:	0.00 varies	Maximum value:	1,000.00 varies	Default value:	0.00 varies
Description:	Selects the limit to indicate the prime loss of time setting				value for the value assigned in
P9.5.6 ^②	Prime pump level 2				ID 2434
Minimum value:	0.00 varies	Maximum value:	6,000.00 varies	Default value:	0.00 varies
Description:	This defines the level at wh deactivated. If the level is a			edback level raises above thi	s value, pre-charge becomes
P9.5.7 [©]	Prime pump frequency	2	,		ID 2436
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	Frequency at which the pre-	-charge level 2 will oper	ate at when enabled.		
P9.5.8 ^②	Prime pump delay time	2		'	ID 2437
Minimum value:	0.00 s	Maximum value:	3,600.00 s	Default value:	0.00 s
Description:	This is the time that the driv	ve will run at the 2nd lev	el pre-charge function lev	el. When set to "O Hz", this f	unction is not enabled.
P9.5.9 ^②	Prime pump loss of pri	me level 2		'	ID 2438
Minimum value:	0.00 varies	Maximum value:	1,600.00 varies	Default value:	0.00 varies
Description:	Selects the limit to indicate the prime loss of time settir			drops below the determined	value for the value assigned in
P9.6 - Broken pipe (*	DM1 PRO).		-		
P9.6.1 ^{①②}	Broken pipe fault respo	onse			ID 1853
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No action; 1 = Warning; 2 = Fault, coast; or 3 = Fault.				
Description:	Broken pipe fault/warning s broke pipe frequency for de		PI feedback is less than bro	oken pipe level and the drive	output frequency is more that
P9.6.2 ^②	Broken pipe level				ID 1854
Minimum value:	0.00 varies	Maximum value:	6,000.00 varies	Default value:	15 varies

Table 34. Pump parameters (Cont.).

P9.6.3 ^②	Broken pipe frequenc	ID 1856			
Minimum value:	1.00 Hz	Maximum value:	MaxFreq Hz	Default value:	25.00 Hz
Description:	Broken pipe frequency.				
P9.6.4 ^②	Broken pipe delay			,	ID 1855
Minimum value:	1.00 s	Maximum value:	120.00 s	Default value:	15.00 s
Description:	Broken pipe delay time.				

[©] Parameter value can only be changed after the drive has stopped. © Parameter value will be set to be default when changing macros.

P11.1 - Basic setting	js.				
P11.1.1 ^①	Serial communica	tion			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 define	es the communication protocol	for RS-485.		
P11.2 - Modbus RTU	ı.				
P11.2.1 ^①	Slave address		,		ID 587
Minimum value:	1.00 varies	Maximum value:	247.00 varies	Default value:	1.00 varies
Description:	This parameter define	es the slave address for RS-48	5 communication.		
P11.2.2 ^①	Baud rate	,	,		ID 584
Minimum value	NA	Maximum value:	NΔ	Default value:	1

Minimum value:	N.A.
Options:	0 = 9,600;

num	value:	Ν

Default	va

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 ^①	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. Maxii	mum value:	N.A.	Default value:	N.A.	
Options:	0 = Initial; 1 = Stopped; 2 = Operational; or 3 = Faulted.					
Description:	This parameter shows the protoco	l status for RS-48	5 communication.			
P11.2.5	Communication timeout mod	dbus RTU			ID 593	

Description:	This parameter shows the protocol status for RS-485 communication.					
P11.2.5	Communicatio	n 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	Selects the time to wait before a communication fault occurs over modbus RTU if a message is not received.				
	'	1		'	-	

Table 49. Serial communication (Cont.).

Minimum value:

Description:

P11.2.6	Modbus RTU fault res	ponse			ID 2516		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	communications; if no	t in fieldbus control, place	will not fault.	fieldbus fault is active, the drive ation is lost, fieldbus fault respo			
Description:	Defines the fieldbus fault	condition for modbus RTU	communication.				
P11.3 - BACnet RTU	MSTP.						
P11.3.1 ^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 th	e communication speed fo	r RS-485 communicati	on.			
P11.3.2 ^①	MSTP device address				ID 595		
Minimum value:	0	Maximum value:	127	Default value:	1		
Description:	Defines the device addres	ss of the drive on the BACr	net MSTP network.				
P11.3.3 ^①	MSTP instance numb	er			ID 596		
Minimum value:	0	Maximum value:	4,194,302	Default value:	0		
Description:	Defines the instance num	ber of the drive on the BA	Cnet 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 b	efore a communication fa	ult occurs over BACnet	MSTP if a message is not receive	ved.		
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 BACne	et MSTP communicatio	n.			
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 BACne	et MSTP communication	n.			
P11.3.7	MSTP fault response			·	ID 2526		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	communications. If no	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 MST	P communication.				
P11.3.8 ^①	MSTP maximum mast	er		-	ID 1537		

127

Default value:

127

Maximum value:

Defines the maximum number of masters that can establish connections with the drive.

Table 49. Serial communication (Cont.).

P11.5 - SWD.					-
P11.5.1	Parameter access				ID 2630
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:		read/write on acyclic channel. e are allowed on Profibus.			
Description:	PNU927 which specif	ies the operation priority of pa	rameters for acyclic	communication.	
P11.5.2 ^①	Parameter data ac	cess			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 5 = Dual mode.	;; or			
Description:	PNU928 which specifi	es the control priority of the d	levice for cyclic com	munication.	
P11.5.3	Fault situation cou	ınter			ID 2632
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	·	es the fault situation counter. wed, then the whole fault buff rased.		tion and all other fault situations)	
P11.5.4	Board status				ID 2609
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
	B0-DCOM communica B1-Board HW fault B2-I01 24 volt overloa B3-Profibus communic B4-fieldbus fault.	d fault.			
P11.5.5	Firmware version				ID 2610
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	This parameter provid	es 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 specif	ies the protocol status for SW	D 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.				-
	Bluetooth broadca	st mode			ID 2920
P11.6.2 ²			NI A	Default value:	0
P11.6.2 ^② Minimum value:	N.A.	Maximum value:	N.A.	Delauit value.	U
	N.A. 0 = Off; or 1 = On.	Maximum value:	N.A.	Default value.	0

Table 49. Serial communication (Cont.).

P11.6.3	Bluetooth pairing res	Bluetooth pairing reset				
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 50. Ethernet communication.

P12.1 - Basic setting	ys.				
P12.1.1 ^①	IP address mode				ID 1500
Minimum value:	N.A.	laximum value:	N.A.	Default value:	0
Options:	0 = Static IP; or 1 = DHCP with AutoIP.				
Description:	This parameter defined the IF	address configuration	mode for EIP/modbus T	TCP.	
P12.1.2	Active IP address				ID 1507
Minimum value:	N.A.	laximum value:	N.A.	Default value:	N.A.
Description:	Reads the current active IP ac	ddress.			
P12.1.3	Active subnet mask		,		ID 1509
Minimum value:	N.A.	laximum value:	N.A.	Default value:	N.A.
Description:	Reads the current active subr	net mask.			
P12.1.4	Active default gateway				ID 1511
Minimum value:	N.A.	laximum value:	N.A.	Default value:	N.A.
Description:	Reads the current active defa	ult gateway.			
P12.1.5	MAC address				ID 1513
Minimum value:	N.A.	laximum value:	N.A.	Default value:	N.A.
Description:	Reads the current MAC addre	ess.			
P12.1.6 ^①	Static IP address			'	ID 1501
Minimum value:	N.A.	laximum value:	N.A.	Default value:	192.168.1.254
Description:	Defines the static IP address.				
P12.1.7 ^①	Static subnet mask				ID 1503
Minimum value:	N.A.	laximum value:	N.A.	Default value:	255.255.255.0
Description:	Defines the static subnet ma	sk.			
P12.1.8 ^①	Static default gateway				ID 1505
Minimum value:	N.A.	laximum value:	N.A.	Default value:	192.168.1.1
Description:	Defines the static default gat	eway.			
P12.1.9	Ethernet communication	timeout			ID 611
Minimum value:	0 ms	laximum value:	60,000 ms	Default value:	10,000 ms
Description:	Selects the time it waits befo	re a communication fa	ult occurs over etherne	t.	

127

P12.2 - Trusted IP fi	ter (DM1 PRO only).			1	,			
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			
Description:	Defines the IP addresses	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 enab	le	,	,	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 li	st will not be able to e	stablish communications with the	e drive.			
P12.3 - Modbus TCP	(DM1 PRO only).							
P12.3.1 ^①	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 com	munications, must be enab	oled to connect to Pow	er Xpert inControl.				
P12.3.2	Modbus TCP connect	ion limit	,	1	ID 609			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5			
Description:	Maximum number of conr	nections allowed to the dri	ve.					
P12.3.3	Modbus TCP unit ide	ntifier number			ID 610			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1			
Description:	Unit identifier unit value f	for modbus TCP.						
P12.3.4	Modbus TCP protoco	l 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	e protocol status for modb	us TCP communication					
P12.3.5	Modbus TCP fault res	sponse			ID 2517			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	communications. If no	ot in fieldbus control, place	e will not fault.	fieldbus fault is active, the drive ation is lost, fieldbus fault respor				
Description:	Defines the fieldbus fault	condition for modbus TCP	communication.					
			,					
P12.4 - Ethernet IP (·			
P12.4.1 ^①	Ethernet based proto				ID 1997			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Disabled; or 2 = BACnet IP.							
Description:	Selects the active commu	unication protocol on the e	thernet I/P port.					
P12.4.2	Ethernet IP protocol	status			ID 608			
		Maximum value:						

Options:

Description:

0 = Off; 1 = Operational; or 2 = Faulted.

Indicates if ethernet protocol is active or not.

Table 50. Ethernet communication (Cont.).

P12.4.3	Ethernet IP fa	Ethernet IP fault response			ID 2518		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	communicati	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 field	Defines the fieldbus fault condition for ethernet IP communication.					

P12.5.1 ^①	BACnet IP UDP por	rt 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; 47821 = BACE; or 47823 = BACE;					
Description:	Defines the BACnet UI	OP port number.				
P12.5.2 ^①	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 for	reign device configuration.				
P12.5.3 ^①	BACnet IP BBMD II	•		,	ID 1735	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0.0.0.0	
Description:	Displays the BACnet B	BMD IP address.				
P12.5.4 ^①	BACnet IP UDP por	rt			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; 47819 = BACB; 47820 = BACC; 47821 = BACD; 47822 = BACE; or 47823 = BACF.					
Description:	Displays the BACnet B	BMD UDP port number.				
	BACnet IP registration interval					
P12.5.5 ^①						

Table 50. Ethernet communication (Cont.).

P12.5.6	BACnet IP comm	nunication timeout		'	ID 1739		
Minimum value:	0.00	Maximum value:	60,000	Default value:	0		
Description:	Selects the time it	waits before a communication fa	ault occurs over BAC	net IP.			
P12.5.7	BACnet IP proto	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 fieldbu	s fault condition for BACnet IP co	ommunication.				
P12.5.9 ^①	BACnet IP insta	nce number			ID 1742		
Minimum value:	0	Maximum value:	4,194,302	Default value:	0		
Description:	Displays the BACne	et instance number.					

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

P12.6.1	Web UI protocol statu	s			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 o	communication.					
	Web UI communication timeout ID 29'							
P12.6.3	Web UI communicatio	n timeout			ID 2919			
P12.6.3 Minimum value:	Web UI communication 30,000 ms	n timeout Maximum value:	60,000 ms	Default value:	ID 2919 60,000 ms			
		Maximum value:	<u>`</u>					
Minimum value:	30,000 ms	Maximum value:	<u>`</u>					
Minimum value: Description:	30,000 ms Selects the time it waits b	Maximum value:	<u>`</u>		60,000 ms			
Minimum value: Description: P12.6.4 ^①	30,000 ms Selects the time it waits b	Maximum value: efore a communication fa	ult occurs over the web) server.	60,000 ms			

 $^{^{\}scriptsize \textcircled{\tiny 1}}$ Parameter value can only be changed after the drive has stopped.

Table 51. System.

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.								
P13.1.2 ^①	Application ID 142								
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.				
Options:	0 = Standard;; 1 = Pump; or 2 = Fan 3 = Multi-purpose.								
Description:	This parameter sets the ac	tive application if multipl	e applications have b	een loaded.					
P13.1.3 ^①	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 def	ault parameter values	s, and to store and load two custo	mized 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 ex	kisting parameter groups	to the keypad.						
P13.1.5 ^①	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	3.							
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.								

Table 51. System (Cont.).

P13.1.8	Keypad paramet	er lock			ID 625				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0				
Options:	0 = Change enable; 1 = Change disable.								
Description:		s the user to prohibit changes to y to edit a parameter value.	the parameters. If the	parameter lock is activated, the	text "locked" will appear or				
	Note: This function	does not prevent unauthorized	editing of parameter val	ues.					
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 application desi completion, it allow always enabled for Wizard, it will not c	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				
Vlinimum 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 keypa	d display is not clear, you can ac	just the keypad contras	t 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:		s you to control the DM1 PRO's o		·					
	rmation.								
		<u>.</u>							
P13.4 - Version info P13.4.1 Minimum value:	Keypad software	e version Maximum value:	N.A.	Default value:	ID 640 N.A.				

P13.4.1	Keypad softwa	ID 640				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Description:	Keypad firmware	version.				

Table 51. System (Cont.).

P13.4.2	Motor control	software version			ID 642
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	DSP/motor contro	ol software version.			
P13.4.3	Application so	ftware version		'	ID 644
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	MCU/application	software version.			
P13.4.4	Software bund	lle 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 num	ber.			
P13.5.2	Multi-monitor s	et			ID 627
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Change enable; 1 = Change disable				
Description:	The keypad display replace the values	can display three actual monitor monitored with other values.	ed values at the same	e time. This parameter determine	es if the operator is allowed to
P13.5.3	Keypad lock PII	ı			ID 75
Minimum value:	0	Maximum value:	9,999	Default value:	0
Description:	When the passwor response to key pre	d function is enabled, the user wi ess except up/down/left/right. sword function is not in use. If yo	Il be prompted to ent	pad lock function after keys are noter a password before the keypad ne password, change the value of	display parameter or
	To deactivate the p	assword, reset the parameter va	ue to 0.		
P13.5.4	Drive applicatio	n name			ID 2922
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.

 $^{^{\}scriptsize \textcircled{\scriptsize 1}}$ Parameter value can only be changed after the drive has stopped.

Introduction

The multi-purpose application is designed for a large set of applications with the ability to have advanced motor control systems. It takes the same functions provided in the standard, fan, and multi-pump applications and adds in some additional control techniques. The application is designed with two control places that use eight digital inputs, two analog inputs, three relay outputs, one digital output, and two analog outputs that are programmable. Motor control-wise, it provides the ability to do frequency and speed control and adds open loop speed control as well as torque control. For tuning the V/Hz curve, it has the ability to go out and ID the motor characteristic and enters those specific measurements into its parameters for better control. Drive/motor protections are programmable for desired actions depending on the application. Below is a list of additional features available in addition to the standard, fan, and multi-pump application features that are available in the multi-purpose application.

- Motor potentiometer reference control;
- · External brake control;
- · Droop function with multiple loads;
- · Motor identification;
- · Motor control modes; and
- I/O controls:
 - "Terminal to function" (TTF) programming

The design behind the programming of the digital inputs in the DM1 drive is to use "terminal to function" programming. It is composed of multiple functions that get assigned a digital input to that function. The parameters in the drive are set up with specific functions and by defining the digital input and slot in some cases depending on the what options are available. For use of the drives control board inputs, they will be referred to as DigIN:1 through DigIN:8. When additional option cards are used, they will be defined as DigIN:X:IOY:Z. The X indicates the slot that the card is being installed in which will be either A or B, then the IOY determines the type of card it is, which would be IO1 or IO5, and the Z would indicate which input is being used on that available option card.

• "Function to terminal" (FTT) programming

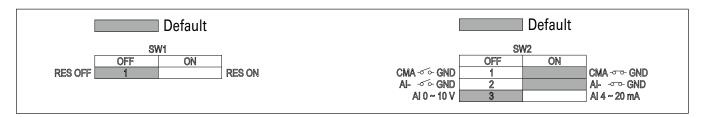
The design behind the programming of the relay outputs and digital output in the DM1 drive is to use "function to terminal" programming. It is composed of a terminal be it a relay output or a digital output that is assigned a parameter. Within that parameter, it has different functions that can be set.

For the DI function, we use terminal programming method to function (TTF), where there is a fixed input that gets programmed to a list of functions. This allows for multiple inputs to be used for different functions. Connecting a certain input with a certain parameter function is done by giving a parameter an appropriate value. The value is formed by the location of the input, either being on the standard control board or an external option board and the slot in which it is located.

Control I/O configuration

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

Table 52. Multi-purpose application default I/O connection.



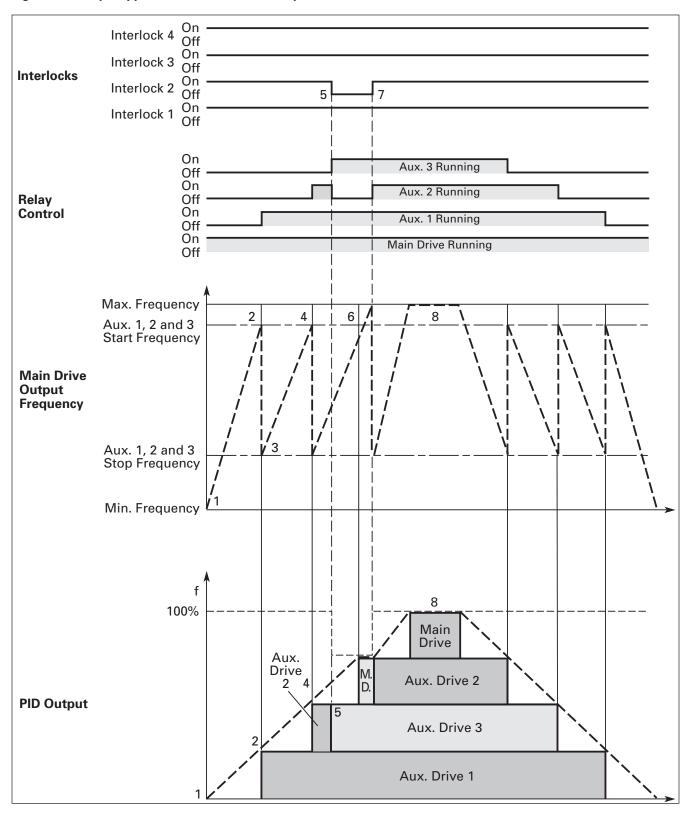
External wiring	Terminal	Short name	Name	Default setting	Description
	- 1	DI1	Digital input 1	Run forward	Starts the motor in the forward direction.
<u> </u>	- 2	DI2	Digital input 2	Run reverse	Start the motor in the reverse direction.
<u> </u>	- 3	DI3	Digital input 3	External fault	Triggers a fault in the drive.
<u> </u>	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	А	RS-485 signal A	_	Fieldbus communication (Modbus RTU, BACNet).
	- 7	В	RS-485 signal B	_	Fieldbus communication (Modbus RTU, BACNet).
	8	Al1+ ①	Analog input 1	0 - 10 V	Voltage speed reference (programmable to 4 mA to 20 mA).
	9	Al1-	Analog input 1 ground	_	Analog input 1 common (ground).
	- 10	GND	I/O signal ground	_	I/O ground for reference and control.
	- 11	A01+	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	ST01	Safe torque Off 1	_	Safe torque Off 1 input.
	- 16	ST02	Safe torque Off 2	_	Safe torque Off 2 input.
	- 17	STO_COM	Safe torque common	_	Safe torque Off common.
*	- 18	R1N0	Relay 1 normally open	Run	Changes state when the drive is in the run state.
Έ	- 19	R1CM	Relay 1 common		
	20	R1NC	Relay 1 normally closed		
,	- 21	R2N0	Relay 2 normally open	Fault	Changes state when the drive is in the fault state.
	- 22	R2CM	Relay 2 common		
					<u> </u>

Notes:

The above wiring demonstrates a SINK configuration. It is important that CMA is wired to ground (as shown by dashed line). If a SOURCE configuration is desired, wire 24 V to CMA and close the inputs to ground. When using the +10 V for Al1, it is important to wire Al1- to ground (as shown by dashed line). If using +10 V for Al1, terminals 9 and 10 need to be jumpered together.

① Al1+ support 10 K potentiometer.

Figure 9. Example application with three auxiliary drives.



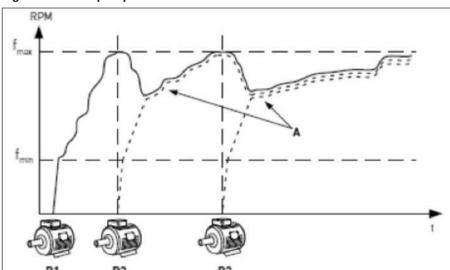
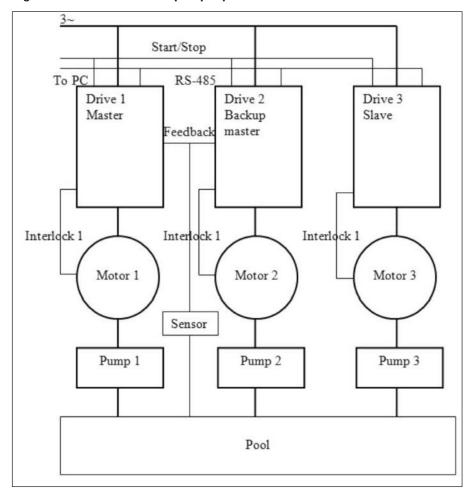


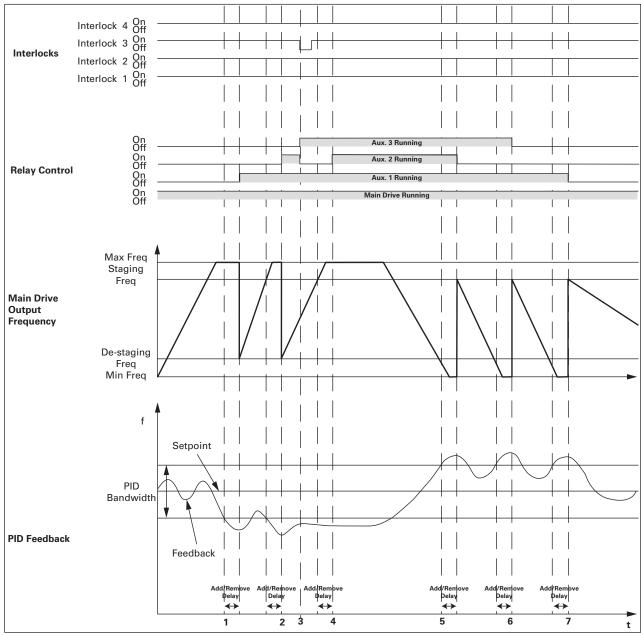
Figure 10. Multi-pump control curve.

Figure 11. Multi-drive/multi-pump layout.



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Figure 12. Bandwidth feedback.



- 1. Feedback out of bandwidth, output frequency over staging frequency, start delay counter; delay times out, and interlock 2 is OK, add aux. 1 motor by closing its corresponding relay.
- 2. As above, add aux. 2 motor.
- 3. Aux. 2's interlock lost, add aux. 3 as backup immediately.
- 4. Add aux. 2 motor again since its interlock resumed.
- 5. Feedback out of bandwidth, output frequency below de-staging frequency, start delay counter; delay times out, remove aux. 2 motor first because it's the last one which been added.
- 6. As above, remove aux. 3 motor.
- 7. As above, remove aux. 1 motor.

Multi-purpose 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 53. 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	1).			
M1.4	Motor current		,		ID 3
Minimum value:	А	Maximum value:	А	Default value:	А
Description:	Motor output current RN	IS (Amps).			
M1.5	Motor torque	'			ID 4
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Percent motor torque cal	culated from nameplate va	lues and measured	d motor current (%).	,
M1.6	Motor power				ID 5
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Percent motor power cal	culated from nameplate va	lues and measured	l 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 (d	eg C).			

Table 53. Monitor (Cont.).

M1 - standard (Cont).				
M1.10	Motor temperature			_	ID 9
Minimum value:	% Max	kimum value:	%	Default value:	%
Description:	Motor temperature value calcula	ated from nameplate	e values and measured	d motor current (%).	
M1.11	Latest fault code				ID 28
Minimum value:	N.A. Max	kimum value:	N.A.	Default value:	N.A.
Description:	Last active fault code value. Se	e fault codes for the	value shown here.		
M1.12	Instant motor power				ID 1686
Minimum value:	kW Ma x	kimum value:	kW	Default value:	kW
Description:	Instantaneous motor power (kW).			
M2 - I/O status.					
M2.1	Analog input 1		,	,	ID 10
Minimum value:	Varies Ma x	kimum value:	Varies	Default value:	Varies
Description:	Analog input 1 measured value (Vdc or Amps) select	able with dipswitch.		
M2.2	Keypad pot voltage	· · · · · · · · · · · · · · · · · · ·			ID 1858
Minimum value:	∨ Max	kimum value:	V	Default value:	V
Description:	Keypad potentiometer measured	d value (Vdc). DM1 i	PRO only.		
M2.3	Analog output				ID 25
Minimum value:	Varies Max	kimum value:	Varies	Default value:	Varies
Description:	Analog output 1 measured value	(Vdc or Amps) sele	ctable with paramete	r.	
M2.4	DI1, DI2, DI3		-		ID 12
Minimum value:	N.A. Ma x	cimum value:	N.A.	Default value:	N.A.
Description:	Digital input 1/2/3 status.				
M2.5	DI4				ID 13
Minimum value:	N.A. Ma x	cimum value:	N.A.	Default value:	N.A.
Description:	Digital input 4 status.				
M2.6	Virtual DI1, Virtual DI2				ID 1998
Minimum value:	N.A. Max	kimum value:	N.A.	Default value:	N.A.
Description:	Virtual digital output status. Inte The virtual RO1 as virtual DI1 inp The virtual RO2 as virtual DI2 inp	out.	al output.		
M2.7	Virtual RO1, Virtual RO2				ID 1817
Minimum value:	N.A. Max	kimum value:	N.A.	Default value:	N.A.
Description:	Virtual relay output 1 and 2 state	us.			
M2.8	RO1, RO2				ID 557
Minimum value:	N.A. Max	kimum value:	N.A.	Default value:	N.A.
Description:	Relay output 1 and 2 4 status.				
M3 - Energy savings					
M3.1 ²	Energy savings				ID 2120
Minimum value:	Varies Max	kimum value:	Varies	Default value:	0.000 varies
Description:	Displays the energy savings of the	ha driva compared t			

Table 53. Monitor (Cont.).

M3.2 ^②	CO2 savings				ID 1818
Minimum value:	mt/y	Maximum value:	mt/y	Default value:	0.000 mt/y
Description:	Displays the CO2 savings	of the drive compared to li	near V/f curve.		

M4.1	Control board DIDO	status			ID 2209
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	Bit 0 = DI1_Status; Bit 1 = DI2_Status; Bit 2 = DI3_Status; Bit 3 = DI4_Status; Bit 4 = RO1_Status; Bit 5 = RO2_Status; Bit 6 = SlotA with board; Bit 7 = Virtual_RO1_Status; Bit 8 = Virtual_RO2_Status	tus; or			
Description:	Control board digital inpo	ut and relay output status p	rovides the status of inputs a	nd outputs on the control	board.
M4.2	Application status w	vord			ID 29
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	Bit 0 = MC_Ready; Bit 1 = MC_Run; Bit 2 = MC_Fault or Fault Bit 3 = FB_Ref_Active; Bit 4 = MC_Stopping; Bit 5 = MC_Reverse; Bit 6 = MC_Warning or A Bit 7 = MC_ZeroSpeed; Bit 8 = IO control indicate Bit 9 = Panel control indi Bit 10 = Panel fieldbus or Bit 11 = MC_DC_Brake; Bit 12 = Run enable; Bit 13 = Run bypass; Bit 14 = External brake c Bit 15 = In bypass mode.	AR-Fault; or; cator; ontrol indicator;			
Description:	Application status word	will provide additional statu	us indication of the health of	the drive.	
M4.3	Standard status wor	d			ID 2414
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	Bit 1 = See STD status w Bit 2 = See STD status w Bit 3 = See STD status w Bit 4 = See STD status w Bit 5 = See STD status w Bit 6 = See STD status w	vord B0 Sel (default = ready vord B1 Sel (default = run); vord B2 Sel (default = fault); vord B3 Sel (default = fault); vord B4 Sel (default = warni vord B5 Sel (default = revers vord B6 Sel (default = at spevord B7 Sel (default = zero f	nvert); ng); sed); eed);		
Description:		defined based of the param ese bits are based off the s	eter setting in the fieldbus pratandard relay functions.	rocess data group, define	the first 8 bits of this stat
VI4.4	FB PI setpoint 1				ID 2542
Minimum value:	Varies	Maximum value:	PID1_ProcessUnit Max	Default value:	Varies.
Description:	PID setpoint 1 value from	n fieldbus.			
M4.5	FB PI setpoint 2				ID 2544
Minimum value:	PID1_ProcessUnitMin	Maximum value:	PID1_ProcessUnit Max	Default value:	Varies.

Table 53. Monitor (Cont.).

M4.6	FB PI feedback				ID 2550
Minimum value:	% varies	Maximum value:	% varies	Default value:	% varies.
Description:	PID feedback 1 value from	fieldbus.			

M5 - PI monitor.

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 pr	ocess units.			
M5.3	PI error value				ID 20
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	PI error in process uni	ts.			
M5.4	PI output				ID 22
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	PI output.				
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, in	ndicates if drive is stopped, ru	nning in PI mode, or in	n PI sleep mode.	

M6 - User defined scale.

M6.1	Output				ID 2445
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	User defined outp	put value that can be configured w	ith the users desired	unit and scale.	
M6.2	Reference			,	ID 2447
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	User defined refe	erence value that can be configured	d with the users desir	ed unit and scale.	

Table 54. Multi-pump status.

M7.1 - Operation me	M7.1 - Operation mode.								
M7.1.1	Drive 1				ID 2218				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.				
Options:	0 = Offline; 1 = Slave drive; 2 = Master drive; or 3 = Redundant drive.								
Description:	Provides the operating n	node of drive 1 while using	multi-pump mode.						

Table 54. Multi-pump status (Cont.).

Description:

M7.1.2	Drive 2				ID 2230
Vinimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Offline; 1 = Slave drive; 2 = Master drive; or 3 = Redundant drive.				
Description:	Provides the operating r	mode of drive 2 while using	multi-pump mode.		
M7.1.3	Drive 3				ID 2242
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Offline; 1 = Slave drive; 2 = Master drive; or 3 = Redundant drive.				
Description:	Provides the operating r	node of drive 3 while using	multi-pump mode.		
W7.1.4	Drive 4				ID 2254
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Offline; 1 = Slave drive; 2 = Master drive; or 3 = Redundant drive.				
Description:	Provides the operating r	mode of drive 4 while using	multi-pump mode.		
W7.1.5	Drive 5				ID 2266
Viinimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Offline; 1 = Slave drive; 2 = Master drive; or 3 = Redundant drive.				
Description:	Provides the operating r	mode of drive 5 while using	multi-pump mode.		
M7.2 - Multi-pump s	status.				
M7.2.1	Drive 1				ID 2219
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Options:	0 = Stopped; 1 = Sleep; 2 = Regulating; 3 = Wait for CMD 4 = Following; or 5 = Unknown.				
Description:	Provides the run status	of drive 1 while using the m	ulti-pump mode.		
M7.2.2	Drive 2				ID 2231
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Options:	0 = Stopped; 1 = Sleep; 2 = Regulating; 3 = Wait for CMD				

Provides the run status of drive 2 while using the multi-pump mode.

Table 54. Multi-pump status (Cont.).

M7.2.3	Drive 3	,	,	,	ID 2243
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Options:	0 = Stopped; 1 = Sleep; 2 = Regulating; 3 = Wait for CMD 4 = Following; or 5 = Unknown.				
Description:	Provides the run status	s of drive 3 while using the m	ulti-pump mode.		
M7.2.4	Drive 4	'		'	ID 2255
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Options:	0 = Stopped; 1 = Sleep; 2 = Regulating; 3 = Wait for CMD 4 = Following; or 5 = Unknown.				
Description:	Provides the run status	s of drive 4 while using the m	ulti-pump mode.		
M7.2.5	Drive 5				ID 2267
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Options:	0 = Stopped; 1 = Sleep; 2 = Regulating; 3 = Wait for CMD 4 = Following; or 5 = Unknown.				
Description:	Provides the run status	s of drive 5 while using the m	ulti-pump mode.		

M7.3 - Network status.

M7.3.1	Drive 1				ID 2220	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Options:	0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; or 4 = No error.					
Description:	Provides the network sta	tus of drive 1 while using t	he multi-pump mode			
M7.3.2	Drive 2				ID 2232	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Options:	0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; or 4 = No error.					
Description:	Provides the network status of drive 2 while using the multi-pump mode.					
M7.3.3	Drive 3			,	ID 2244	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Options:	0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; or 4 = No error.					
Description:	Provides the network sta	tus of drive 3 while using t	he multi-numn mode			

Table 54. Multi-pump status (Cont.).

M7.3.4	Drive 4	'		'	ID 2256
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; or 4 = No error.				
Description:	Provides the network sta	tus of drive 4 while using t	he multi-pump mode		
M7.3.5	Drive 5			,	ID 2268
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; or 4 = No error.				
Description:	Provides the network sta	tus of drive 5 while using t	he multi-pump mode		

Table 55. Multi-pump measurement.

M8.1 - Latest fault o	code.		
M8.1.1	Drive 1	'	ID 2221
Minimum value:	Maximum value:	Default value:	
Description:	Provides the latest fault code of drive 1 while using the multi-pump mode.		
M8.1.2	Drive 2		ID 2233
Minimum value:	Maximum value:	Default value:	
Description:	Provides the latest fault code of drive 2 while using the multi-pump mode.		
M8.1.3	Drive 3		ID 2245
Minimum value:	Maximum value:	Default value:	
Description:	Provides the latest fault code of drive 3 while using the multi-pump mode.		
M8.1.4	Drive 4	,	ID 2257
Minimum value:	Maximum value:	Default value:	
Description:	Provides the latest fault code of drive 4 while using the multi-pump mode.		
M8.1.5	Drive 5		ID 2269
Minimum value:	Maximum value:	Default value:	
Description:	Provides the latest fault code of drive 5 while using the multi-pump mode.		

M8.2 - Output frequency.

M8.2.1	Drive 1				ID 2222
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the outp	out frequency (Hz) of drive 1 while	using the multi-pum	p mode.	
M8.2.2	Drive 2				ID 2234
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the outp	out frequency (Hz) of drive 2 while	using the multi-pum	p mode.	
M8.2.3	Drive 3				ID 2246
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the outp	out frequency (Hz) of drive 3 while	using the multi-pum	p mode.	

Table 55.	Multi-pump	measurement	(Cont.).

M8.2.4	Drive 4	,			ID 2258
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the outp	out frequency (Hz) of drive 4 while	using the multi-pum	p mode.	
M8.2.5	Drive 5				ID 2270
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz

M8.3 - Motor voltage.

M8.3.1	Drive 1	,			ID 2223
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Provides the moto	r voltage (Vac) of drive 1 while us	ing the multi-pump	o mode.	
M8.3.2	Drive 2				ID 2235
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Provides the moto	r voltage (Vac) of drive 2 while us	ing the multi-pump	o mode.	
M8.3.3	Drive 3	,			ID 2247
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Provides the moto	r voltage (Vac) of drive 3 while us	ing the multi-pump	o mode.	
M8.3.4	Drive 4	,			ID 2259
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Provides the moto	r voltage (Vac) of drive 4 while us	ing the multi-pump	o mode.	
M8.3.5	Drive 5				ID 2271
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Provides the moto	r voltage (Vac) of drive 5 while us	ing the multi-pump	o mode.	

M8.4 - Motor current.

M8.4.1	Drive 1				ID 2224
Minimum value:	А	Maximum value:	А	Default value:	А
Description:	Provides the motor	current (Amps) of drive 1 while u	sing the multi-pum	p mode.	
M8.4.2	Drive 2				ID 2236
Minimum value:	А	Maximum value:	Α	Default value:	А
Description:	Provides the motor	current (Amps) of drive 2 while u	sing the multi-pum	p mode.	
M8.4.3	Drive 3				ID 2248
Minimum value:	А	Maximum value:	А	Default value:	А
Description:	Provides the motor	current (Amps) of drive 3 while u	sing the multi-pum	p mode.	
M8.4.4	Drive 4	'	'		ID 2260
Minimum value:	А	Maximum value:	Α	Default value:	А
Description:	Provides the motor	current (Amps) of drive 4 while u	sing the multi-pum	p mode.	
M8.4.5	Drive 5	'		'	ID 2272
Minimum value:	А	Maximum value:	А	Default value:	А
Description:	Provides the motor	current (Amps) of drive 5 while u	sing the multi-pum	p mode.	

Table 55. Mu	ılti-pump	measurement	(Cont.)	
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M8.5 - Motor torque					
M8.5.1	Drive 1				ID 2225
Minimum value:	% Maxin	num value:	%	Default value:	%
Description:	Provides the motor torque (%) of dr	ive 1 while using the	multi-pump mode.		
M8.5.2	Drive 2				ID 2237
Minimum value:	% Maxin	num value:	%	Default value:	%
Description:	Provides the motor torque (%) of dr	ive 2 while using the	multi-pump mode.		
M8.5.3	Drive 3				ID 2249
Minimum value:	% Maxin	num value:	%	Default value:	%
Description:	Provides the motor torque (%) of dr	ive 3 while using the	multi-pump mode.		
M8.5.4	Drive 4				ID 2261
Minimum value:	% Maxin	num value:	%	Default value:	%
Description:	Provides the motor torque (%) of dr	ive 4 while using the	multi-pump mode.		
M8.5.5	Drive 5				ID 2273
Minimum value:	% Maxin	num value:	%	Default value:	%
Description:	Provides the motor torque (%) of dr	ive 5 while using the	multi-pump mode.		

M8.6 - Motor power.

M8.6.1	Drive 1				ID 2226
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Provides the motor	power (%) of drive 1 while using	the multi-pump mod	le.	
M8.6.2	Drive 2	,		,	ID 2238
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Provides the motor	power (%) of drive 2 while using	the multi-pump mod	le.	
M8.6.3	Drive 3			,	ID 2250
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Provides the motor	power (%) of drive 3 while using	the multi-pump mod	le.	
M8.6.4	Drive 4			<u> </u>	ID 2262
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Provides the motor	power (%) of drive 4 while using	the multi-pump mod	le.	
M8.6.5	Drive 5			,	ID 2274
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Provides the motor	power (%) of drive 5 while using	the multi-pump mod	le.	

M8.7 - Motor speed.

M8.7.1	Drive 1				ID 2227
Minimum value:	rpm	Maximum value:	rpm	Default value:	rpm
Description:	Provides the moto	r speed (rpm) of drive 1 while usir	g the multi-pump m	ode.	
M8.7.2	Drive 2			'	ID 2239
Minimum value:	rpm	Maximum value:	rpm	Default value:	rpm
Description:	Provides the moto	r speed (rpm) of drive 2 while usir	g the multi-pump m	ode.	
M8.7.3	Drive 3				ID 2251
Minimum value:	rpm	Maximum value:	rpm	Default value:	rpm
Description:	Provides the moto	r speed (rpm) of drive 3 while usir	g the multi-pump m	ode.	

Table 55. Multi-pump measurement (Cont.).

M8.7.4	Drive 4	'	'	'	ID 2263		
Minimum value:	rpm	Maximum value:	rpm	Default value:	rpm		
Description: Provides the motor speed (rpm) of drive 4 while using the multi-pump mode.							
M8.7.5	Drive 5	'			ID 2275		
Minimum value:	rpm	Maximum value:	rpm	Default value:	rpm		
Description:	Provides the moto	or speed (rpm) of drive 5 while usi	ng the multi-pump m	iode.			

M8.8 - Run time.

M8.8.1	Drive 1				ID 2228				
Minimum value:	Hours	Maximum value:	Hours	Default value:	Hours				
Description:	Provides the motor	r run time (h) of drive 1 while usin	g the multi-pump mod	de.					
M8.8.2	Drive 2				ID 2240				
Minimum value:	Hours	Maximum value:	Hours	Default value:	Hours				
Description:	Provides the motor	Provides the motor run time (h) of drive 2 while using the multi-pump mode.							
M8.8.3	Drive 3				ID 2252				
Minimum value:	Hours	Maximum value:	Hours	Default value:	Hours				
Description:	Provides the motor	r run time (h) of drive 3 while usin	g the multi-pump mod	de.					
M8.8.4	Drive 4				ID 2264				
Minimum value:	Hours	Maximum value:	Hours	Default value:	Hours				
Description:	Provides the motor	r run time (h) of drive 4 while usin	g the multi-pump mod	de.					
M8.8.5	Drive 5				ID 2276				
Minimum value:	Hours	Maximum value:	Hours	Default value:	Hours				
Description:	Provides the motor	r run time (h) of drive 5 while usin	g the multi-pump mod	de.					

M9 - Multi-monitoring.

M9.1	Multi-monito	ID 30			
Minimum value:	N.A.	Maximum value:	N.A.	Default value: 0, 1, 2.	
Description:	see three lines			are selectable via the keypad menu. Multi-monitor page co I to select the row and then hitting the left arrow key will al	

Table 56. Parameters.

P1 - Basic parameters.					
P1.1 ²	Minimum frequ	iency		,	ID 101
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz
Description:	Defines the lowes 1 = Fire mode min 2 = Derag. 3 = MPFC staging 4 = MPFC master 5 = Prime pump fi 6 = Prime pump fi	frequency. fixed frequency. requency.	ll operate. This setting	will limit other frequency paran	neter settings.

Table 56. Parameters (Cont.).

P1.2 ^②	Maximum frequency	,			ID 102
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	MaxFreqMFG
Description:	Defines the highest freq 1 = Keypad reference. 2 = Motor potentiometer 3 = Jog speed. 4 = 2nd stage ramp freq 5 = Fire mode minimum 6 = Derag. 7 = MPFC staging freque 8 = MPFC master fixed f 9 = Prime pump freque 11 = Preset speed freque 12 = Frequency limit valu 13 = Reference limit valu 14 = Speed control_fs2. 15 = Stall frequency limi 16 = 4 mA fault frequenc 17 = MPFC de-staging fr 18 = Pipe fill loss freque 19 = Pipe fill loss freque 20 = Broken pipe freque	r. uency. frequency. ency. requency. cy. ncy 2. ency. le. t. ty. equency. ncy low. ncy high.	II operate. This will limit oth	er frequency parameters.	
P1.3 ^②	Accel. time 1				ID 103
Minimum value:	0.1 s	Maximum value:	3,000.0 s	Default value:	20.0 s
Description:	Defines the time require	d for the output frequency t	to accelerate from zero frequ	ency to maximum frequen	Cy.
P1.4 ^②	Decel. time 1				ID 104
Minimum value:	0.1 s	Maximum value:	3,000.0 s	Default value:	20.0 s
Description:	Defines the time require	d for the output frequency t	to decelerate from maximum	frequency to zero frequen	Cy.
P1.5 ^②	Motor type selection	1			ID 1820
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options: Description:	0 = Inverter duty; 1 = IPM; or 2 = SPM. Defines the type of moto	or connected to the drive: st	andard induction motor, inte	rnally mounted permanent	magnet, or surface mount
	permanent magnet.				·
P1.6 ^①	Motor nom. current				ID 486
Minimum value:	DriveNomCurrCT*1/10 A		DriveNomCurrCT*2 A	Default value:	DriveNomCurrCT A
Description:	· · · · · · · · · · · · · · · · · · ·	full load current. This value	is found on the rating plate	of the motor.	
P1.7 ^①	Motor nom. speed				ID 489
Minimum value:	300 rpm	Maximum value:	20,000 rpm	Default value:	MotorNomSpeedMFG
Description:	1	speed. This value is found o	on the rating plate of the mot	tor.	
P1.8 ^①	Motor PF				ID 490
Minimum value:	0.30	Maximum value:	1.00	Default value:	0.85
Description:	· · · · · · · · · · · · · · · · · · ·	power factor. This value is	found on the rating plate of t	the motor.	
P1.9 ^①	Motor nom. voltage		2021/		ID 487
Minimum value:	180 V	Maximum value:	690 V	Default value:	MotorNomVoltMFG V
Description:	· · · · · · · · · · · · · · · · · · ·		on the rating plate of the m	otor.	
P1.10 ^①	Motor nom. frequen	<u></u>			ID 488
Minimum value:	8.00 Hz	Maximum value:	400.00 Hz	Default value:	MotorNomFregMFG Ha

Table 56. Parameters (Cont.).

P1.11 ^②	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 Start/Stop buttons on the dr			minals would be from the digital hade is selected.	ard-wired inputs or keypad f		
P1.12 ^{①②}	Local reference				ID 136		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1		
Options:	0 = Al; 1 = Drive reference pot; 2 = Al joystick; 3 = Motor pot; 4 = Maximum frequency; 5 = Pl control output; 6 = Keypad; or 7 = Fieldbus reference.						
Description:	Defines the signal location for the speed reference in local mode.						
P1.13 ^②	Remote control place				ID 135		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = I0 terminal; 1 = fieldbus; or 3 = keypad.						
Description:	Defines the signal location for Start/Stop buttons on the			erminals would be from the digital mode is selected.	hard-wired inputs or keypad		
				,	ID 137		
P1.14 ^{①②}	Remote reference				ID 137		
P1.14 ^{①②} Minimum value:		Maximum value:	N.A.	Default value:	0		
		Maximum value:	N.A.	Default value:			

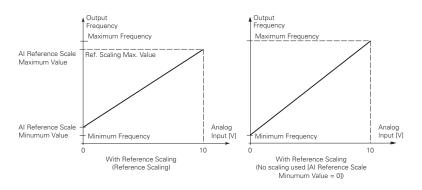
Table 57. Inputs .

P2.1.1 ²	Al reference s	ID 144			
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	Defines the minir scale maximum v	num frequency associated with 0% alue both to zero will cause the an	6 input from the analog i alog input to scale to the	nput. Setting AI ref scale mini e minimum and maximum frequ	imum value and Al referenc uencies.

P2.1.2 ^②	Al reference scale m	ID 145			
Minimum value:	RefScaleMin Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz

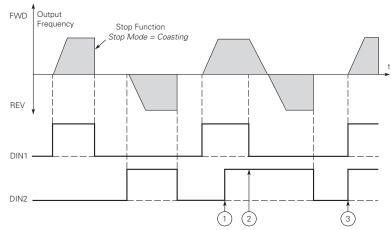
Description:

Defines the maximum frequency associated with 100% input from the analog input. Setting AI reference scale minimum value and AI reference scale maximum value both to zero will cause the analog input to scale to the minimum and maximum frequencies.



P2.1.3 ^{①②}	IO terminal St	tart/Stop logic			ID 143
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	1 = Start - revers 2 = Start - enabl	se: maintained input on start signal e: maintained input on start signal	1 to run forward 1 to run forward	ard and a maintained signal on start s and a maintained signal on start sign and a maintained signal on start signa aal 1 uses a normally open start and st	al 2 for reverse. Il 2 to enable the drive to run.
Description:	Defines the func	tionality for start signal 1 and star	signal 2. By det	ault, start signal 1 is DI1 and start sig	nal 2 is DI2.
				ninal start signal 2 = start reverse. or start REV commands. When cont	
		24V+ DIN1	20 ID190 - Start S	Signal: DigIN:1 ID143 Start Stop Logic: Sta	rt Forward
		DIN2	21 ID191- Start Si	gnal 2: DigIN:2 ID143 Start Stop Logic: Sta	rt Reverse
		CMA	24		
		GND	12		

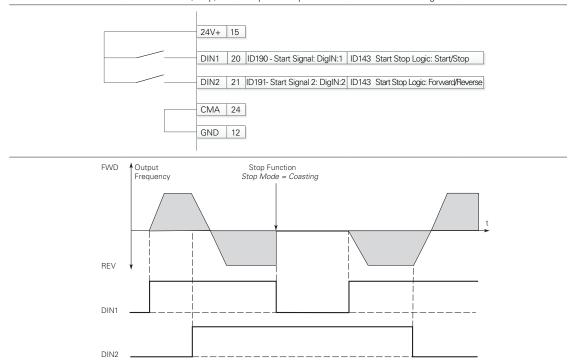
Table 57. Inputs (Cont.).



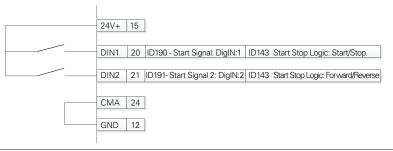
Notes: ① The first selected direction has the highest priority. ② When the DIN1 contact opens the direction of rotation

starts to change.

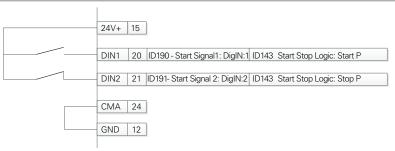
- (DIN1) and start reverse (DIN2) signals are active simultaneously the start forward signal (DIN1)
- 1 = P3.2: IO terminal start signal 1 = start forward P3.3: IO terminal start signal 2 = start reverse. This would be considered 2-wire control with a contact on start/stop, contact open it stops and direction on 2nd start signal.



2 = P3.2: IO terminal start signal 1 = start forward - P3.3: IO terminal start signal 2 = start reverse. 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: IO terminal start signal 1 = start forward - P3.3: IO terminal start signal 2 = start reverse. This would be considered 3-wire control with start signal 1 being the start pulse and start signal 2 being the NC ston



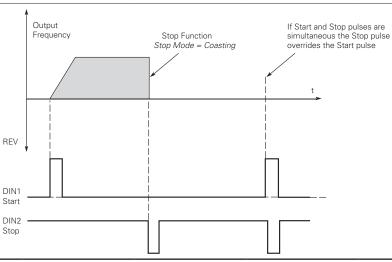


Table 57. Inputs (Cont.).

P2.1.4 ^②	External fault 1 text				ID 2227
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = External fault; 1 = Vibration cutout; 2 = High motor temperati 3 = Low pressure; 4 = High pressure; 5 = Low water; 6 = Damper interlock; 7 = Run enable; 8 = Freeze stat trip; 9 = Smoke detect; 10 = Seal leakage; 11 = Rod breakage; or 12 = Belt break.	ure;			
Description:	Defines the text to be disp PowerXpert inControl, or t		t 1 NO or NC is triggered.	This text will be viewable us	ing a remote keypad,
P2.1.5 ^②	External fault 2 text				ID 2298
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = External fault; 1 = Vibration cutout; 2 = High motor temperati 3 = Low pressure; 4 = High pressure; 5 = Low water; 6 = Damper interlock; 7 = Run enable; 8 = Freeze stat trip; 9 = Smoke detect; 10 = Seal leakage; 11 = Rod breakage; or 12 = Belt break.				
Description:	Defines the text to be disp PowerXpert inControl, or t External fault 3 text		t 2 NO or NC is triggered.	This text will be viewable us	ing a remote keypad,
P2.1.6 ^② Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = External fault; 1 = Vibration cutout; 2 = High motor temperate; 3 = Low pressure; 4 = High pressure; 5 = Low water; 6 = Damper interlock; 7 = Run enable; 8 = Freeze stat trip; 9 = Smoke detect; 10 = Seal leakage; 11 = Rod breakage; or 12 = Belt break.	ure;			
Description:	Defines the text to be disp PowerXpert inControl, or t		t 3 NO or NC is triggered.	This text will be viewable us	ing a remote keypad,
P2.1.7 ^②	Motor pot ramp time				ID 156
Minimum value:	0.1 Hz/s	Maximum value:	2,000.0 Hz/s	Default value:	10.0 Hz/s
Description:	Defines the speed of chan	ge for the motor potention	meter reference value.		
P2.1.8 ^②	Motor pot reference r	eset			ID 169
Vinimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No reset - reference st 1 = Memory reset in stop to 2 = Memory reset in power	and power down - referen		is stopped or the power is cy red down only.	cled to the drive; or
Description:	Defines how the motor po converter.	t reference signal is hand	ed on shutting down freq	uency converter output or pov	wering down the freque

P2.2 - Digital input.					
P2.2.1 ^②	DI1 function				ID 1801
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	P2.1.3. 2 = IO terminal star P2.1.3. 3 = Reverse, when 9 4 = Ext. fault 1, whe 5 = Ext. fault 2, whe 6 = Ext. fault 3, whe 7 = Fault reset, whe 8 = Run enable, wh 9 = Preset speed B 10 = Preset speed B 12 = Jog enable, wh 13 = Accel. pot valu 14 = Decel. pot valu 15 = Reset pot zero, 16 = Accel./Decel. p 17 = Accel./Decel. p 18 = No access to p 19 = Remote contro 20 = Local control, 21 = Parameter 1/2 22 = Pl controller, w 23 = Pl setpoint sel 24 = Motor interloc 25 = Smoke mode, y 26 = Fire mode Ref. Ref. 2 will be a 28 = Fire mode reverbe be reverse. 29 = DC brake activ 30 = Preheat active	t signal 1, when the control sort signal 2, when closed, Ext. fault 1 will be a sen closed, Ext. fault 2 will be a sen closed, Ext. fault 3 will be a sen closed, the drive sill be a closed, the drive will allow a sen closed, the seven preset speeds are preset speeds are considered to the seven preset speeds are considered to seven preset speeds are considered to seven preset speeds are considered to seven closed, the motor potter when closed, when open, parameter set considered to seven closed, the drive will be seven closed, the drive will be considered to seven closed, motor will be when closed, motor will be when closed, the fire mode will be conclosed, the fire mode will be considered to the c	t pulse stop pulse, t tivated. Stivated. Stiva	inary inputs. This is least significabinary inputs. binary inputs. This is most significabinary inputs. This is most significateride the frequency reference. I increment at the rate defined by ill decrement at the rate defined by reset to zero. Issed. When closed, Accel./Decel. to the frequency and ignore changes to the setting in the drive. In the control place. In the control place. In the closed, parameter set 2 is active. It is open, fire mode Ref. 1 will be an another than the direction will be forward. We have the control will be forward.	erform the action defined by our in the reverse direction. Int bit in that binary input. Interpretation of the control of th
Description:	Defines the function	of digital input 1.			ID 4005
P2.2.2 ^②	DI1 invert				ID 1802
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; or 1 = Enabled.				
Description:	When enabled the fi	unction assigned to DI1 will be	activated with the	onnocite state of DI1	·

P2.2.3 ^②	DI2 function		<u> </u>		ID 1803
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	P2.1.3. 2 = IO terminal start s P2.1.3. 3 = Reverse, when St: 4 = Ext. fault 1, when 5 = Ext. fault 2, when 6 = Ext. fault 3, when 7 = Fault reset, when 8 = Run enable, when 9 = Preset speed B0, 10 = Preset speed B1, 11 = Preset speed B2, 12 = Jog enable, when 13 = Accel. pot value, 14 = Decel. pot value, 15 = Reset pot zero, w 16 = Accel./decel. tim 17 = Accel./decel. tim 17 = Accel. pot value, 19 = Remote control, who 19 = Remote control, who 19 = Remote control, who 21 = Parameter 1/2 Sc 22 = Pl controller, who 23 = Pl setpoint selec 24 = Motor interlock 10 = Fire mode, when 27 = Fire mode Ref. 1, Ref. 2 will be act 28 = Fire mode reverse be reverse. 29 = DC brake active, value for Ext. fault 2 = Preheat active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode reverse 29 = DC brake active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode reverse 29 = DC brake active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active, value for Ext. fault 2 = Fire mode active for Ext. faul	ignal 1, when the control sou ignal 2, when the control sou art/Stop logic is set to three closed, Ext. fault 1 will be ac closed, Ext. fault 2 will be ac closed, Ext. fault 3 will be ac closed, the drive will allow a the seven preset speeds are sthe seven preset speeds are the seven preset speeds are not closed, the jog speed define when closed, the motor poten when closed, the motor poten when closed, the motor poten am, when closed, the drive will be not closed, the drive will force the closed, the drive will be not closed, the motor will en closed, smoke mode will le closed, fire mode will be act (2 Sel., when fire mode is active.	start pulse stop putivated. tivated. tivated. tivated. tivated. tivated. te reset. start command a start comma	e binary inputs. This is least significante binary inputs. the binary inputs. This is most significante binary inputs. This is most significanter be binary inputs. This is most significanter be belowed the frequency reference, will increment at the rate defined by mill decrement from the decrement of the section of t	rform the action defined by start in the reverse direction. In the bit in that binary input. Into bit in that binary input. Into pot ramp time. I
Description:	Defines the function of	digital input 2.			
P2.2.4 ^②	DI2 invert				ID 1804
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disable; or 1 = Enable.				
Description:	When enabled, the fun	ction assigned to DI2 will be	activated with th	e opposite state of DI2.	

P2.2.5 ²	DI3 function				ID 1805
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	4
Options:	P2.1.3. 2 = IO terminal star P2.1.3. 3 = Reverse, when if the star should be seen as the star fault 1, who is ext. fault 2, who is ext. fault 3, who is ext. fault 4, who is ex	t signal 1, when the control sout signal 2, when the control sout start/Stop logic is set to three en closed, Ext. fault 1 will be acted to see the closed, Ext. fault 2 will be acted to see the closed, Ext. fault 3 will be acted to see the closed, Ext. fault 3 will be acted to see the closed, Ext. fault 3 will be acted to see the closed, the drive shall allow a see the closed, the drive will allow a see the seven preset speeds are seed. The seven preset speeds are seed to see the seven preset speeds are seed. The seven preset speeds are seed to see the seven preset speeds are seed. The seven preset speeds are seed to see the seven preset speeds are seed to see the seven preset speeds are seed to see the seven preset speeds are seed to seed, the motor poten seed, when closed, the motor poten serious will be when closed, the drive will be when closed, the drive will be seet, when open, parameter see the seed to seed, the motor will when closed, the motor will when closed, smoke mode will see closed, fire mode will be act 1/2 Sel., when fire mode is act active.	start pulse stop pulsitivated. ctivated. ctivated. ctivated. se reset. a start command and selected via three be selected via three le time 1 will be us will tiometer value will sel. time 1 will be us will hold the output is can be made to a reforced to the local cit to 1 is active. When the reference sour point 1 is active. We I be enabled to run, be active, itve, and this input is operaking will be active vill be active.	inary inputs. This is least significationary inputs. In this is most significationary inputs. This is most significationary inputs. This is most significationary inputs. This is most signification in the frequency reference. I increment at the rate defined by reset to zero. I decrement at the rate defined by r	erform the action defined by a start in the reverse direction. Int bit in that binary input. Interpretation of the start in the start in that binary input. Interpretation of the start in the start in that binary input. Interpretation of the start in the start in that binary input. Interpretation of the start in the start in that binary input. Interpretation of the start in the start in that binary input. Interpretation of the start in the start in that binary input. Interpretation of the start in the s
Description:	Defines the function	of digital input 3.			
P2.2.6 ^②	DI3 invert				ID 1806
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disable; or 1 = Enable.				

Provided Head of the Company of th	P2.2.7 ²	DI4 function		<u> </u>		ID 1807
1 = 0 terminal start signal 1, when the control source is set to 10 terminal, this input when closed will perform the action defined by P2 1.3. 2 = 10 terminal start signal 3, when the control source is set to 10 terminal, this input when closed will perform the action defined by P2 1.3. 3 = Neverse, when Start/Stop logic is set to three start pulse stop pulse, this input will cause the drive to start in the reverse direction 4 = Ext, fault 2, when closed, Ext fault 1 will be activated. 6 = Ext, fault 2, when closed, Ext fault 1 will be activated. 6 = Ext, fault 3, when closed, Ext fault 3 will be activated. 7 = Fault reset, when closed, all active faults will be reset. 8 = Neu 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 B1, the seven preset speeds are selected via three binary inputs. 12 = Jog enable, when closed, the go gspeed defined at P2.3.8 will override the frequery reference. 13 = Accel, pot value, when closed, the motor potentiometer value will increment at the rate defined by motor pot ramp time. 14 = Decel, pot value, when closed, the motor potentiometer value will corement at the rate defined by motor pot ramp time. 15 = Reset pot zero, when closed, the motor potentiometer value will carement at the rate defined by motor pot ramp time. 15 = Reset pot zero, when closed, the motor potentiometer value will carement at the rate defined by motor pot ramp time. 15 = Reset pot zero, when closed, the motor potentiometer value will carement at the rate defined by motor pot ramp time. 15 = Reset pot zero, when closed, the drive will be used. 17 = Accel./decel time set, when open, parameter set to zero. 18 = Accel./decel time set, when open, parameter set to zero. 29 = Potential caremater potential caremater and the province of the provi	Minimum value:	N.A.	Maximum value:	N.A.	Default value:	7
P2.2.8 [©] Minimum value: N.A. Maximum value: N.A. Default value: 0 Options: 1 = Enable.	Options:	1 = IO terminal star P2.1.3. 2 = IO terminal star P2.1.3. 3 = Reverse, when \$\frac{4}{2} = \text{Ext. fault 1, whe }\frac{5}{6} = \text{Ext. fault 2, whe }\frac{6}{6} = \text{Ext. fault 3, whe }\frac{7}{6} = \text{Fault reset, whe }\frac{8}{6} = \text{Rut reset} = \text{Preset speed B}\frac{10}{2} = \text{Preset speed B}\frac{12}{2} = \text{Jog enable, whe }\frac{13}{2} = \text{Accel. pot value }\frac{14}{2} = \text{Pot value }\frac{15}{2} = \text{Reset pot control }\frac{17}{2} = \text{Accel. /decel. to }\frac{17}{2} = \text{Remote control }\frac{20}{2} = \text{Pl controller, whe }\frac{23}{2} = \text{Pl controller, whe }\frac{23}{2} = \text{Pl controller, whe }\frac{23}{2} = \text{Pl controller, whe }\frac{25}{2} = \text{Smoke mode, whe }\frac{26}{2} = \text{Fire mode Ref. }\text{Ref. 2 will be a }\frac{28}{2} = \text{Fire mode revented be reverse.}\frac{29}{2} = \text{DC brake active }\frac{30}{2} = \text{Preheat active }\frac{20}{2} = Preheat active	t signal 1, when the control sout signal 3, when the condition of the conclosed, Ext. fault 1 will be at en closed, Ext. fault 2 will be at en closed, Ext. fault 3 will be at en closed, the drive faults will be not closed, the drive will allow at the seven preset speeds are signal 2, the seven preset speeds are enclosed, the jog speed define, when closed, the motor potent when closed, the drive will be set, when open, parameter set the closed, the motor will when closed, the motor will when closed, fire mode will be act 1/2 Sel., when fire mode is active a creation of the closed, preheat mode were the closed, preheat mode were controlled to the control of the control of the controlled to the controlled	start pulse stop positivated. ctivated. ctivated. ctivated. ctivated. ctivated. caster command a selected via three selected via three selected via three at P2.3.8 will contiometer value with the selected via three selected via three contiometer value with the contioned to the local to the contioned to the local to the loca	rminal, this input when closed will per ulse, this input will cause the drive to ulse, this input will cause the drive to ulse, this input will cause the drive to ulse, this inputs. This is least significate binary inputs. This is most significate binary inputs. This is most significate werride the frequency reference. Will increment at the rate defined by Il reset to zero. used. When closed, accel./decel. tim will decrement at the rate defined by Il reset to zero. used. When closed, accel./decel. tim will frequency and ignore changes to the any setting in the drive. mote control place. control place. control place. urce to Pl controller output. When closed, setpoint 2 is active. is open, fire mode Ref. 1 will be active. the direction will be forward. We we.	erform the action defined by a start in the reverse direction. In the bit in that binary input. In the start in the reverse direction.
Minimum value: N.A. Maximum value: N.A. Default value: 0 Options: 0 = Disable; or 1 = Enable.	Description:	Defines the function	of digital input 4.			
Options: 0 = Disable; or 1 = Enable.	P2.2.8 ^②	DI4 invert				ID 1808
1 = Enable.	Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Description: When enabled, the function assigned to DI4 will be activated with the opposite state of DI4.	Options:					
	Description:	When enabled, the for	unction assigned to DI4 will be	activated with th	e opposite state of DI4.	

P2.2.9 ^②	Virtual RO1 in	put			ID 1809
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	P2.1.3. 2 = IO terminal: P2.1.3. 3 = Reverse, wh 4 = Ext. fault 1, 5 = Ext. fault 2, 6 = Ext. fault 3, 7 = Fault reset, 8 = Run enable, 9 = Preset spee 10 = Preset spee 11 = Preset spee 12 = Jog enable 13 = Accel. pot 14 = Decel. pot 15 = Reset pot 2 16 = Accel./dec 17 = Accel./dec 18 = No access 19 = Remote co 20 = Local contr 21 = Parameter 22 = PI controlle 23 = PI setpoint 24 = Motor inte 25 = Smoke moi 26 = Fire mode, 27 = Fire mode Ref. 2 will 28 = Fire mode be reverse 29 = DC brake a 30 = Preheat ac	start signal 1, when the control sous start signal 3, when closed, Ext. fault 1 will be at when closed, Ext. fault 2 will be at when closed, Ext. fault 3 will be at when closed, all active faults will I when closed, the drive will allow at dB0, the seven preset speeds are dB1, the seven preset speeds are at B1, the seven preset speeds are by when closed, the motor pote value, when closed, the motor pote value, when closed, the motor pote lt time set, when open, accel./decel. prohibit, when closed, the drive will be followed by the closed, the drive will be followed by the closed, the drive will be followed. When closed, the drive will be followed by the closed, the motor wild be when closed, the motor wild be when closed, the motor wild be when closed, smoke mode will when closed, fire mode will be act Ref. 1/2 Sel., when fire mode is active a sective.	start pulse stop putivated. ctivated. ctivated. ctivated. ctivated. start command and selected via three will onto the selected via three selected via the selected value will be cative. Whe the reference sout onto 1 is active. It is enabled to run be active. It is and this input is opposite the selected via three selected via	binary inputs. This is least significa binary inputs. This is most significa be binary inputs. This is most significate binary inputs. This is most significate verride the frequency reference. Fill increment at the rate defined by rill decrement at the rate defined by I reset to zero. Issed. When closed, accel./decel. timust frequency and ignore changes to the tany setting in the drive. In the control place. Control place. Control place. It is active. In closed, Parameter set 2 is active. In the closed, setpoint 2 is active. In the direction will be forward. We re.	erform the action defined by a start in the reverse direction on the bit in that binary input. In the start in the reverse direction
Description:		tion of virtual RO1.			
P2.2.10 ^②	Virtual RO1 in				ID 1810
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disable; or 1 = Enable.				
Description:	When enabled, tl				

DO 0 44®	Vintual BOO :				ID 1811			
P2.2.11 ^② Minimum value:	Virtual RO2 input	Maximum value:	N.A.	Default value:	0			
Options:			N.A.	Delauit value.	U			
Options.	1 = IO terminal start	0 = Not used, no action. 1 = 10 terminal start signal 1, when the control source is set to 10 terminal, this input when closed will perform the action defined by						
	P2.1.3. 2 = 10 terminal start	t signal 3, when the control so	urce is set to IO term	inal, this input when closed will pe	erform the action defined by			
	P2.1.3. 3 = Reverse, when \$	Start/Stop logic is set to three	start pulse stop puls	e, this input will cause the drive to	start in the reverse direction.			
	4 = Ext. fault 1, whe	en closed, Ext. fault 1 will be a en closed, Ext. fault 2 will be a	ctivated.	-,				
	6 = Ext. fault 3, whe	en closed, Ext. fault 3 will be a	ctivated.					
	8 = Run enable, who	en closed, all active faults will en closed, the drive will allow	a start command and	be in the ready state.				
	9 = Preset speed B0 10 = Preset speed B), the seven preset speeds are 1, the seven preset speeds are	selected via three bi selected via three b	nary inputs. This is least significar inary inputs.	nt bit in that binary input.			
	11 = Preset speed B		e selected via three b	oinary inputs. This is most significa	ant bit in that binary input.			
	13 = Accel. pot valu	e, when closed, the motor pot	entiometer value will	increment at the rate defined by n				
	15 = Reset pot zero,	when closed, the motor poter	ntiometer value will r					
				ed. When closed, accel./decel. tim frequency and ignore changes to t				
	18 = No access to p	aram., when closed, no change I, when closed, the drive will b	es can be made to ar	y setting in the drive.				
	20 = Local control, v	when closed, the drive will be	forced to the local co	introl placė.				
	22 = PI controller, w	hen closed, the drive will force	e the reference sourc	closed, Parameter set 2 is active. se to PI controller output.				
	23 = PI setpoint sele 24 = Motor interlock	ect, when open, parameter set k 1, when closed, the motor wi	point 1 is active. WI II be enabled to run.	nen closed, setpoint 2 is active.				
	25 = Smoke mode, v	when closed, smoke mode will	be active.					
	27 = Fire mode Ref.	26 = Fire mode, when closed, fire mode will be active. 27 = Fire mode Ref. 1/2 Sel., when fire mode is active and this input is open, fire mode Ref. 1 will be active. When closed, fire mode						
		Ref. 2 will be active. 28 = Fire mode reverse, when fire mode is active and this input is open, the direction will be forward. When closed, the direction will						
		136, William tille mode is detive i	and this input is oper	ı, the direction will be forward. Wl	hen closed, the direction will			
	be reverse.				hen closed, the direction will			
	be reverse. 29 = DC brake active, 30 = Preheat active,	e, when closed, DC injection b , when closed, preheat mode v	raking will be active. vill be active.		hen closed, the direction will			
Description:	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable,	e, when closed, DC injection b , when closed, preheat mode v when closed, the Derag. cycle	raking will be active. vill be active.		hen closed, the direction will			
Description:	be reverse. 29 = DC brake active, 30 = Preheat active,	e, when closed, DC injection b, when closed, preheat mode when closed, the Derag. cycle of virtual RO2.	raking will be active. vill be active.		hen closed, the direction will			
<u>.</u>	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function	e, when closed, DC injection b, when closed, preheat mode when closed, the Derag. cycle of virtual RO2.	raking will be active. vill be active.					
P2.2.12 ^②	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invert	e, when closed, DC injection b, when closed, preheat mode v when closed, the Derag. cycle of virtual RO2.	raking will be active. vill be active. I for pumps will be in	itiated.	ID 1810			
P2.2.12 ^② Minimum value:	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invertion N.A.	e, when closed, DC injection b, when closed, preheat mode v when closed, the Derag. cycle of virtual RO2.	raking will be active. vill be active. I for pumps will be in	itiated.	ID 1810			
P2.2.12 ^② Minimum value:	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invert N.A. 0 = Disable; or 1 = Enable.	e, when closed, DC injection b, when closed, preheat mode v when closed, the Derag. cycle of virtual RO2. Maximum value:	raking will be active. vill be active. for pumps will be in N.A.	itiated.	ID 1810			
P2.2.12 [©] Minimum value: Options:	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invert N.A. 0 = Disable; or 1 = Enable.	e, when closed, DC injection b, when closed, preheat mode v when closed, the Derag. cycle of virtual RO2. Maximum value:	raking will be active. vill be active. for pumps will be in N.A.	Default value:	ID 1810			
P2.2.12® Minimum value: Options: Description: P2.3 - Preset speed.	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invertor N.A. 0 = Disable; or 1 = Enable. When enabled, the form	e, when closed, DC injection b, when closed, preheat mode v when closed, the Derag. cycle of virtual RO2. Maximum value:	raking will be active. vill be active. for pumps will be in N.A.	Default value:	I D 1810 0 al R02 input.			
P2.2.12 [®] Minimum value: Options: Description: P2.3 - Preset speed. P2.3.1 [®]	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invertor N.A. 0 = Disable; or 1 = Enable. When enabled, the for	e, when closed, DC injection b, when closed, preheat mode v when closed, the Derag. cycle of virtual RO2. Maximum value: unction assigned to virtual RO2	raking will be active. vill be active. for pumps will be in N.A. input will be activa	Default value: ted with the opposite state of virtu	ID 1810 0 al R02 input.			
P2.2.12® Minimum value: Options: Description: P2.3 - Preset speed. P2.3.1® Minimum value:	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invert N.A. 0 = Disable; or 1 = Enable. When enabled, the function Preset speed 1 0.00 Hz	e, when closed, DC injection b, when closed, preheat mode v when closed, the Derag. cycle of virtual RO2. t Maximum value: Maximum value: Maximum value:	raking will be active. vill be active. for pumps will be in N.A. rinput will be activa	Default value:	I D 1810 0 al R02 input.			
P2.2.12 [©] Minimum value: Options: Description: P2.3 - Preset speed. P2.3.1 [©] Minimum value: Description:	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invertor N.A. 0 = Disable; or 1 = Enable. When enabled, the function Preset speed 1 0.00 Hz Preset speed is select	e, when closed, DC injection b, when closed, preheat mode v when closed, the Derag. cycle of virtual RO2. Maximum value: unction assigned to virtual RO2	raking will be active. vill be active. for pumps will be in N.A. rinput will be activa	Default value: ted with the opposite state of virtu	ID 1810 0 al R02 input. ID 105 5.00 Hz			
P2.2.12® Minimum value: Options: Description: P2.3 - Preset speed. P2.3.1® Minimum value: Description: P2.3.2®	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invert N.A. 0 = Disable; or 1 = Enable. When enabled, the function Preset speed 1 0.00 Hz Preset speed 2	e, when closed, DC injection b, when closed, preheat mode v when closed, the Derag. cycle of virtual RO2. Maximum value: Maximum value: Maximum value:	raking will be active. vill be active. for pumps will be in N.A. 2 input will be activa MaxFreq Hz binary input.	Default value: ted with the opposite state of virtue Default value:	ID 1810 0 aal R02 input. ID 105 5.00 Hz			
P2.2.12® Minimum value: Options: Description: P2.3 - Preset speed. P2.3.1® Minimum value: Description: P2.3.2® Minimum value:	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invertor N.A. 0 = Disable; or 1 = Enable. When enabled, the function Preset speed 1 0.00 Hz Preset speed 2 0.00 Hz	e, when closed, DC injection b, when closed, preheat mode v when closed, the Derag. cycle of virtual RO2. **Maximum value:**	raking will be active. vill be active. for pumps will be in N.A. input will be activa MaxFreq Hz binary input.	Default value: ted with the opposite state of virtu	ID 1810 0 al R02 input. ID 105 5.00 Hz			
P2.2.12 [©] Minimum value: Options: Description: P2.3 - Preset speed. P2.3.1 [©] Minimum value: Description: P2.3.2 [©] Minimum value: Description:	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invertor N.A. 0 = Disable; or 1 = Enable. When enabled, the form Preset speed 1 0.00 Hz Preset speed 2 0.00 Hz Preset speed is selected.	e, when closed, DC injection b, when closed, preheat mode v when closed, the Derag. cycle of virtual RO2. Maximum value: Maximum value: Maximum value:	raking will be active. vill be active. for pumps will be in N.A. input will be activa MaxFreq Hz binary input.	Default value: ted with the opposite state of virtue Default value:	ID 1810 0 ral R02 input. ID 105 5.00 Hz ID 106 10.00 Hz			
P2.2.12 [®] Minimum value: Options: Description: P2.3 - Preset speed. P2.3.1 [®] Minimum value: Description: P2.3.2 [®] Minimum value: Description: P2.3.3 [®]	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invertor N.A. 0 = Disable; or 1 = Enable. When enabled, the function Preset speed 1 0.00 Hz Preset speed 2 0.00 Hz Preset speed is select Preset speed is select Preset speed 3	e, when closed, DC injection be, when closed, preheat mode when closed, the Derag. cycle of virtual RO2. Maximum value: Maximum value: Ited with digital inputs using a maximum value:	raking will be active. vill be active. for pumps will be in N.A. 2 input will be activa MaxFreq Hz binary input. MaxFreq Hz binary input.	Default value: Default value: Default value: Default value:	ID 1810 0 al R02 input. ID 105 5.00 Hz ID 106 10.00 Hz ID 118			
P2.2.12 [©] Minimum value: Options: Description: P2.3 - Preset speed. P2.3.1 [©] Minimum value: Description: P2.3.2 [©] Minimum value: Description: P2.3.3 [©] Minimum value: Description: P2.3.3 [©] Minimum value:	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invertor N.A. 0 = Disable; or 1 = Enable. When enabled, the function Preset speed 1 0.00 Hz Preset speed 2 0.00 Hz Preset speed is select Preset speed 3 0.00 Hz	e, when closed, DC injection b, when closed, preheat mode when closed, the Derag. cycle of virtual RO2. **Maximum value:** **Maximum value:** **Maximum value:** **Maximum value:** **Maximum value:** **Sted with digital inputs using a maximum value:** **Sted with digital inputs using a maximum value:** **Sted with digital inputs using a maximum value:** **Maximum value:**	raking will be active. vill be active. for pumps will be in N.A. Input will be activa MaxFreq Hz binary input. MaxFreq Hz binary input.	Default value: ted with the opposite state of virtue Default value:	ID 1810 0 ral R02 input. ID 105 5.00 Hz ID 106 10.00 Hz			
P2.2.12® Minimum value: Options: Description: P2.3 - Preset speed. P2.3.1® Minimum value: Description: P2.3.2® Minimum value: Description: P2.3.3® Minimum value: Description: P2.3.3® Minimum value: Description:	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invertor N.A. 0 = Disable; or 1 = Enable. When enabled, the form Preset speed 1 0.00 Hz Preset speed is select Preset speed 3 0.00 Hz Preset speed is select Preset speed 3 0.00 Hz Preset speed is select Preset speed 3	e, when closed, DC injection be, when closed, preheat mode when closed, the Derag. cycle of virtual RO2. Maximum value: Maximum value: Ited with digital inputs using a maximum value:	raking will be active. vill be active. for pumps will be in N.A. Input will be activa MaxFreq Hz binary input. MaxFreq Hz binary input.	Default value: Default value: Default value: Default value:	ID 1810 0 ral R02 input. ID 105 5.00 Hz ID 106 10.00 Hz ID 118 15.00 Hz			
P2.2.12® Minimum value: Options: Description: P2.3 - Preset speed. P2.3.1® Minimum value: Description: P2.3.2® Minimum value: Description: P2.3.3® Minimum value: Description: P2.3.4®	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invertor N.A. 0 = Disable; or 1 = Enable. When enabled, the function Preset speed 1 0.00 Hz Preset speed 2 0.00 Hz Preset speed is select Preset speed 3 0.00 Hz	e, when closed, DC injection be, when closed, preheat mode when closed, the Derag. cycle of virtual RO2. Maximum value: Maximum value: Ited with digital inputs using a maximum value:	raking will be active. vill be active. for pumps will be in N.A. Input will be activa MaxFreq Hz binary input. MaxFreq Hz binary input.	Default value: Default value: Default value: Default value:	ID 1810 0 al R02 input. ID 105 5.00 Hz ID 106 10.00 Hz ID 118			
P2.2.12 [©] Minimum value: Options: Description: P2.3 - Preset speed. P2.3.1 [©] Minimum value: Description: P2.3.2 [©] Minimum value: Description: P2.3.3 [©] Minimum value: Description: P2.3.3 [©] Minimum value: Description:	be reverse. 29 = DC brake active, 30 = Preheat active, 31 = Derag. enable, Defines the function Virtual RO2 invertor N.A. 0 = Disable; or 1 = Enable. When enabled, the form Preset speed 1 0.00 Hz Preset speed is select Preset speed 3 0.00 Hz Preset speed is select Preset speed 3 0.00 Hz Preset speed is select Preset speed 3	e, when closed, DC injection b, when closed, preheat mode when closed, the Derag. cycle of virtual RO2. **Maximum value:** **Maximum value:** **Maximum value:** **Maximum value:** **Maximum value:** **Sted with digital inputs using a maximum value:** **Sted with digital inputs using a maximum value:** **Sted with digital inputs using a maximum value:** **Maximum value:**	raking will be active. vill be active. for pumps will be in N.A. Input will be activa MaxFreq Hz binary input. MaxFreq Hz binary input.	Default value: Default value: Default value: Default value:	ID 1810 0 ral R02 input. ID 105 5.00 Hz ID 106 10.00 Hz ID 118 15.00 Hz			

P2.3.5 ²	Preset speed 5				ID 120
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	25.00 Hz
Description:	Preset speed is selec	cted with digital inputs using a	binary input.		
P2.3.6 ^②	Preset speed 6	'			ID 121
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	30.00 Hz
Description:	Preset speed is selec	cted with digital inputs using a	binary input.		
P2.3.7 ^②	Preset speed 7				ID 122
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	35.00 Hz
Description:	Preset speed is selec	cted with digital inputs using a	binary input.		
P2.3.8 ^②	Jog reference				ID 117
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:		speed set point - this speed is so so to this speed, input removed		input programmed for jogging	speed. When enabled, th

P2.4 - Al settings.

P2.4.1	Al 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.

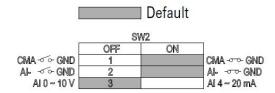
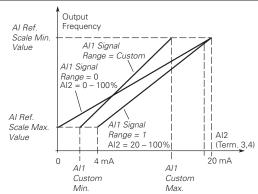


Table 57. Inputs (Cont.).

P2.4.2 ^②	Al signal range	Al signal range					
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = 0-100%/0-20 1 = 20-100%/4-20 2 = Customized.						
Description:	With this parame	With this parameter, you can select the analog input 1 signal range.					

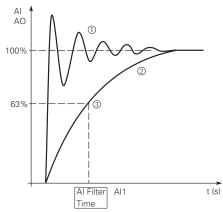
For selection "Customized," see "AI Custom Min" and "AI Custom Max", this enables a customized signal range.



P2.4.3 ^②	Al custom minimu	m		,	ID 176
Minimum value:	0.00%	Maximum value:	Ai1CustomMax %	Default value:	0.00%
Descriptions:	Defines the minimum	percentage for the input range	e to be associated with Al	reference minimum scale.	
P2.4.4 ²	Al custom maximin	n	'	,	ID 177
Minimum value:	Ai1CustomMin %	Maximum value:	100.00%	Default value:	100.00%
Descriptions:	Defines the minimum p	percentage for the input range	e to be associated with Al	reference maximum scale.	
P2.4.5 ^②	Al filter time	,	,	,	ID 174
Minimum value:	0.00 s	Maximum value:	10.00 s	Default value:	0.10 s

Descriptions:

Defines the filter time applied to the analog input signal, zero equals no filtering.



Notes: ① Analog signal with faults (unfiltered).

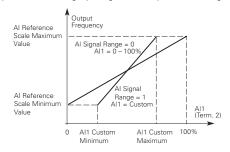
- ^② Filtered analog signal.
- 3 Filter time constant at 63% of the set value.

Table 57. Inputs (Cont.).

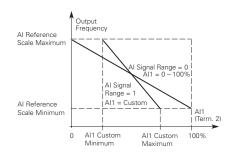
P2.4.6 ^②	Al signal invert		,	ID 181
Minimum value:		Maximum value:	Default value:	0
Options:	0 = Not invert; or 1 = Invert.			

Descriptions:

Defines the filter time applied to the analog input signal, zero equals no filtering.



Al1 Signal Inversion

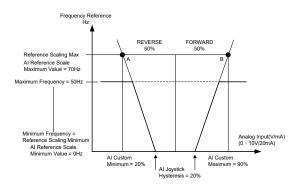


Maximum Al1 signal = minimum set speed. Minimum Al1 signal = maximum set speed.

P2.4.7 ^②	Al joystick hys	Al joystick hysteresis					
Minimum value:	0.00%	Maximum value:	20.00%	Default value:	0.00%		

Descriptions:

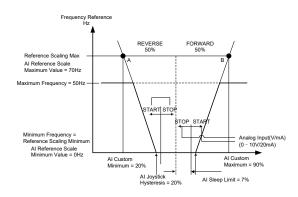
Defines the joystick hysteresis - when the analog input is within this range, the drive will interpret this as a zero speed reference.



P2.4.8 ^②	Al sleep limit				ID 179
Minimum value:	0.00%	Maximum value:	100.00%	Default value:	0.00%

Descriptions:

Defines the sleep level of the analog input - if the analog input signal is below this level for a time greater than the analog sleep delay, the drive will transition to a sleep state and restart when the analog input increases above this level.



P2.4.9 ^②	Al sleep delay				ID 180		
Minimum value:	0.00 s	Maximum value:	320.00 s	Default value:	0.00 s		
Descriptions:	Defines the delay for the analog input sleep level.						
P2.4.10 ^②	Al joystick offs	et	,	'	ID 133		
Minimum value:	-50.00%	Maximum value:	50.00%	Default value:	0.00%		
Descriptions:	Joysticks zero point by default is the middle of Al range. Joystick offset defines how much the zero point is moved in the forward reverse from this analog input center point.					or	

P2.5 - Drive reference pot.

P2.5.1 ^②	Pot custom minimu	m			ID 1814			
Minimum value:	0.00%	Maximum value:	100.00%	Default value:	20.00%			
Description:	Defines the minimum pe	ercentage for the input rang	e to be associated with	h Al reference minimum scale.				
P2.5.2 ^②	Pot custom maximi	m			ID 1815			
Minimum value:	0.00%	Maximum value:	100.00%	Default value:	100.00%			
Description:	Defines the maximum percentage for the input range to be associated with AI reference maximum scale.							
P2.5.3 ^②	Pot filter time	,			ID 1816			
Minimum value:	0.00 s	Maximum value:	10.00 s	Default value:	1.00 s			
Description:	Defines the filter time a	Defines the filter time applied to the analog input signal - zero equals no filtering.						

^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 58. Outputs.

P3.1 - Digital output.							
P3.1.1 ^②	RO1 function				ID 152		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2		
Options:	6 = Reverse - drive is 7 = At speed - the ou 8 = Zero frequency - 9 = Frequency limit si 10 = PI supervision - 11 = Torque limit supe 12 = Reference limit supe 14 = Temperature lim 15 = Analog input sup 16 = Motor current su 17 = Over heat fault - 18 = Over volt regulal 20 = Under volt regulal 20 = Under volt regulal 21 = 4 mA fault - 4 m 22 = External fault - 6 23 = Motor thermal fault - 6 23 = Motor thermal fault - 6 24 = STO fault output 25 = Control from IO 26 = Remote control 27 = Un-requested ro 28 = Fire mode - drive 29 = Damper control 30 = Valve control - v 31 = Jog speed - driv 32 = Fieldbus input 1 33 = Fieldbus input 1 33 = Fieldbus input 2 34 = DC charge switc 35 = Preheat active - 36 = Cold weather ac 37 = PI sleep - PI con 38 = 2nd stage ramp 39 = Prime pump acti 40 = Master drive state 41 = Slave drive state 43 = Single drive con	eady for operation; aing; lited; e is not faulted; as a warning message; outputting reverse phase rota tput frequency has reached the drive output is at zero frequency pervision - supervision for freesupervision for Pl controller is ervision - supervision for rore supervision - supervision for rore supervision - supervision for powe it supervision - supervision for mo drive over heat fault has occular - over current regulator is ervision - supervision for mo drive over heat fault has occular - over current regulator is enable ar - under volt regulator is enable ar - under volt regulator is enab fa fault has occurred; external fault has occurred; ault - motor thermal fault has ot esternal fault has occurred; ault - motor thermal fault has of esternal fault has occurred; ault - motor thermal fault has of esternal fault has occurred; ault - motor thermal fault has of esternal fault has occurred; ault - motor thermal fault has of esternal fault has occurred; ault - motor thermal fault has of esternal fault has occurred; ault - motor thermal fault has	e set reference; cy; quency limit 1 is activated; e limit; ference limit; limit; drive temperature lir og input limit; or current limit; ured; enabled; d; eled; excurred; vated; nand location; ection isn't the same word; s closed; ted; tive; . time 2 is active; ump mode; drive in the multi-pump cictor is open or close	nit; as the reference direction; p control mode; ontrol mode; or in multi-pump control mode.			
Description: P3.1.2 ²	RO1 on delay	associated with changing the	iale of relay output	I	ID 2112		
Minimum value:	0.0 s	Maximum value:	320.0 s	Default value:	0.0 s		
Description:				Soldait value.	0.0 3		
P3.1.3 ²	Delay time for R01 relay to turn on after signal received. R01 off delay ID 2113						
Minimum value:	0.0 s	Maximum value:	320.0 s	Default value:	0.0 s		
	0.0 0		320.00		0.0 0		

Table 58. Outputs (Cont.).

P3.1.4 ^②	RO2 function				ID 153					
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	3					
Options:	1 = Ready - drive is ready for operation; 2 = Run - drive is running; 3 = Fault - drive is running; 4 = Fault invert - drive is not 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 - the output frequency has reached the set reference; 8 = Zero frequency - drive output is at zero frequency; 9 = Frequency limit supervision - supervision for frequency limit 1 is activated; 10 = Pl supervision - supervision for frequency limit 1; 12 = Reference limit supervision - supervision for reque limit; 13 = Power limit supervision - supervision for reque limit; 14 = Temperature limit supervision - supervision for reque limit; 15 = Analog input supervision - supervision for drive temperature limit; 16 = Motor current supervision - supervision for motor current limit; 17 = Over heat fault - drive over heat fault has occurred; 18 = Over current regular - over volt regulator is enabled; 19 = Over volt regular - over volt regulator is enabled; 20 = Under volt regular - over volt regulator is enabled; 21 = 4 mA fault - 4 mA fault has occurred; 22 = External fault - drive orque Off input is activated; 23 = Motor thermal fault - motor thermal fault has occurred; 24 = STO fault output - safe torque Off input is activated; 25 = Control from IO - I/O is the selected start command location; 26 = Remote control - remote is the control place; 27 = Un-requested rotation direction - the active direction isn't the same as the reference direction; 31 = Fire mode - drive is in fire mode; 32 = Polation in the surface of the safe is a selection; 33 = Fieldbus input 1 - controled by fieldbus control word; 34 = DC charge switch close - DC pre-charge relay is closed; 35 = Preheat active - preheat control mode is active; 39 = Prime pump active - drive is in in pime pump mode; 40 = Master drive state - indicates it is the sake drive in the multi-pump control mode; 41 = Slave drive state - indicates it is the sake drive in the multi-pump									
Description:		sociated with changing the s	state of relay output	I Z.	ID 2114					
P3.1.5 [©] Minimum value:	RO2 on delay	Maximum value:	220.0 -	Default value:						
	0.0 s		320.0 s	Detault value:	0.0 s					
Description:	1	y to turn on after signal rece	ervea.		ID 211E					
P3.1.6 ^②	RO2 off delay		200.5	B. C. V. C.	ID 2115					
Minimum value:	0.0 s	Maximum value:	320.0 s	Default value:	0.0 s					
Description:	•	y to turn off after signal rem	ioved.							
P3.1.7 ^②	RO2 reverse				ID 2118					
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0					
Options:	0 = No; or 1 = Yes.									

Table 58. Outputs (Cont.).

P3.1.8 ^②	Virtual RO1 f	ID 2463			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	2 = Run - 'drive i 3 = Fault - drive 4 = Fault invert 5 = Warning - di 6 = Reverse - th 7 = At speed - tl 8 = Zero frequer 9 = Frequency li 10 = Pl supervis 11 = Torque limi 12 = Reference 13 = Power limit 14 = Temperatur 15 = Analog inpi 16 = Motor curri 17 = Over heat f 18 = Over curre 19 = Over volt re 20 = Under volt 21 = 4 mA fault 22 = External fa 23 = Motor ther 24 = STO fault o 25 = Control fro 26 = Remode - o 27 = Unrequeste 28 = Fire mode - o 29 = Damper co 30 = Valve contri 31 = Jog speed 32 = Fieldbus in 33 = Fieldbus in 34 = DC charge 35 = Preheat ac 36 = Cold weath 37 = Pl sleep - P 38 = 2nd stage 39 = Prime pum 40 = Master driv 41 = Slave drive	e is ready for operation; s running;	set reference; y; quency limit 1 is ac ictivated; e limit; ference limit; limit; drive temperature g input limit; or current limit; rred; enabled; d; ccurred; ated; hand location; ction is not the sar s closed; ted; ive; i. time 2 is active; imp mode; live in the multi-put in the multi-put in the multi-put	limit; me as the reference direction; ump control mode; control mode;	
	1				

Table 58. Outputs (Cont.).

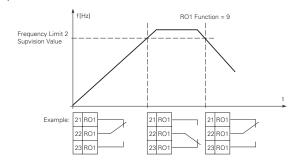
P3.1.9 ^②	Virtual RO2 function	ID 2464			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	7 = At speed - the output 8 = Zero frequency - di 9 = Frequency limit sup 10 = Pl supervision - su 11 = Torque limit super 12 = Reference limit super 13 = Power limit super 14 = Temperature limit 15 = Analog input supe 16 = Motor current sup 17 = Over heat fault - 0	ady for operation; ng; ted; is not faulted; s a warning message; is outputting reverse phase rout frequency has reached the rive output is at zero frequence pervision - supervision for frequency is not for preservision - supervision for torque appropriation - supervision for power supervision - supervision for motoric supervision - supervision for motoric fault has occurred; ult - motor thermal fault has oc	set reference; y; juency limit 1 is ac ctivated; e limit; erence limit; limit; drive temperature g input limit; or current limit; rred; enabled; d; enabled; d; ccurred; and location; ction is not the sa s closed; ted; ive; . time 2 is active; imp mode; lrive in the multi-pum; ctor is open or clo	limit; me as the reference direction; ump control mode; o control mode; or se in multi-pump control mode.	
Description:	Defines the function a	ssociated with changing the s	tate of virtual RO.		

P3.2 - Supervisions.

P3.2.1 ²	Frequency limit	ID 154					
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = No limit; 1 = Low limit super 2 = High limit Supe						
Description:	Selects how the drives frequency limit supervision controller functions.						
P3.2.2 ^②	Frequency limit	display	,	,	ID 1821		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Enable D0; 1 = Warning (W/0 S)/enable D0; 2 = Warning (W S)/enable D0; or 3 = Fault/enable D0.						
Description:	Supervision display	y selection.					

Table 58. Outputs (Cont.).

P3.2.3 ²	Frequency limi	t supervision value			ID 155
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	Selects the freque	ency value supervised by the frequ	iency limit supervision fu	unction.	
P3.2.4 ^②	Frequency limi	t supervision hysteresis		,	ID 2200
Minimum value:	0.10 Hz	Maximum value:	1.00 Hz	Default value:	0.10 Hz
Description:	This value selects	the bandwidth between when the	e output frequency supe	rvision enables and disables.	
P3.2.5 ^②	Torque limit su	pervision	,	,	ID 159
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No limit; 1 = Low limit supe 2 = High limit supe				
Description:	Supervision displa	ay selection.			



P3.2.6 ^②	Torque limit dis	play			ID 1822
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Enable DO; 1 = Warning (W/O 2 = Warning (W S), 3 = Fault/enable DO	enable DO; or			
Description:	Supervision display	selection.			
P3.2.7 ^②	Torque limit sup	pervision value	,		ID 160
Minimum value:	-1,000.00%	Maximum value:	1,000.00%	Default value:	100.00%
Description:	Selects the torque	value supervised by the torque li	mit supervision function	1.	
P3.2.8 ^②	Torque limit sup	pervision hysteresis	,		ID 2202
Minimum value:	1.00%	Maximum value:	5.00%	Default value:	1.00%
Description:	This value selects t	the bandwidth between when th	e torque supervision en	ables and disables.	
P3.2.9 ^②	Reference limit	supervision			ID 161
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No limit; 1 = Low limit super 2 = High limit super				
Description:	This value selects t	the bandwidth between when th	e torque supervision en	ables and disables.	
P3.2.10 ^②	Reference limit	display			ID 1823
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Enable DO; 1 = Warning (W/O 2 = Warning (W S), 3 = Fault/enable DO	enable DO; or			
Description:	Supervision display	selection			,

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Table 58. Outputs (Cont.).

P3.2.11 ^②	Reference limit superv	rision value			ID 162	
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz	
Description:	Selects the reference frequency	uency value supervised b	y the reference frequenc	cy limit supervision function.		
P3.2.12 ^②	Reference limit superv	rision hysteresis			ID 12203	
Minimum value:	0.10 Hz	Maximum value:	1.00 Hz	Default value:	0.10 Hz	
Description:	This value selects the band	lwidth between when th	e reference limit supervi	sion enables and disables.		
P3.2.13 ^②	Temperature limit sup	ervision		,	ID 165	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = No limit; 1 = Low limit supervision; α 2 = High limit supervision.	or				
Description:	Selects how the drives ten	nperature limit supervisio	n controller functions.			
P3.2.14 ^②	Temperature limit disp	olay			ID 1842	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Enable DO; 1 = Warning (W/O S)/enab 2 = Warning (W S)/enable 3 = Fault/enable DO.	le DO; DO; or				
Description:	Supervision display selecti	on.				
P3.2.15 ^②	Temperature limit sup	ervision value			ID 166	
Minimum value:	-10.0°C	Maximum value:	75.0°C	Default value:	40.0°C	
Description:	Selects the drive temperat	ure value supervised by t	he drive temperature lim	nit supervision function.		
P3.2.16 ^②	Temperature limit sup	ervision hysteresis			ID 2204	
Minimum value:	1.0°C	Maximum value:	10.0°C	Default value:	1.0°C	
Description:	This value selects the band	lwidth between when the	e temperature limit supe	rvision enables and disables.		
P3.2.17 ^②	Power limit supervisio	n			ID 167	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = No limit; 1 = Low limit supervision; c 2 = High limit supervision.	OT.				
Description:	Selects how the drives pov	ver limit supervision cont	roller function.			
P3.2.18 ^②	Power limit display				ID 1825	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Enable DO; 1 = Warning (W/O S)/enab 2 = Warning (W S)/enable 3 = Fault/enable DO.	le DO; DO; or				
Description:	Supervision display selecti	on.				
P3.2.19 ^②	Power limit supervisio	n value			ID 168	
	-200.0%	Maximum value:	200.0%	Default value:	0.0%	
Minimum value:		alue supervised by the p	ower limit supervision fu	unction.		
	Selects the output power value supervised by the power limit supervision function. Power limit supervision hysteresis					
Description: P3.2.20 [©]	- ' '	. , ,			ID 2205	

Table 58. Outputs (Cont.).

P3.2.21 ^②	Al supervision select	t			ID 170
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Analog reference fro 1 = Analog reference fro	m Al; or m keypad potentiometer.			
Description:	Selects analog signal to	use for the analog input sup	pervision.		
P3.2.22 ^②	Al limit supervision	'			ID 171
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No limit; 1 = Low limit supervisior 2 = High limit supervision				
Description:	Selects analog signal to	use for the analog input sup	pervision.		
P3.2.23 ^②	Al limit display				ID 1826
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Enable DO; 1 = Warning (W/O S)/enable 2 = Warning (W S)/enable 3 = Fault/enable DO.				
Description:	Supervision display sele	ction.			
P3.2.24 ^②	Al limit supervision	value			ID 172
Minimum value:	1.00%	Maximum value:	10.00%	Default value:	0.00%
Description:	Selects the analog refer	ence value supervised by th	e analog reference limit sup	ervision function.	
P3.2.25 ^②	Al supervision hysteresis				ID 2198
Minimum value:	1.00%	Maximum value:	10.00%	Default value:	1.00%
Description:	This value selects the ba	andwidth between when the	e AI supervision enables and	disables.	
P3.2.26 ^②	Motor current super	vision			ID 2189
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No limit; 1 = Low limit supervisior 2 = High limit supervision				
Description:	Selects how the motor c	urrent limit supervision con	troller functions.		
P3.2.27 ^②	Motor current limit o	display			ID 1827
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Enable DO; 1 = Warning (W/O S)/enable 2 = Warning (W S)/enable 3 = Fault/enable DO.	able DO; le DO; or			
Description:	Supervision display sele	ction.			
P3.2.28 ^②	Motor current super				ID 2190
Minimum value:	0.00 A	Maximum value:	DriveNomCurrCT*2 A	Default value:	DriveNomCurrCT A
Description:	Selects the motor curren	nt value supervised by the m	notor current limit supervisio	n function.	
P3.2.29 ^②	Motor current super	vision hysteresis			ID 2196
Minimum value:	0.10 A	Maximum value:	1.00 A	Default value:	0.10 A
Description:	This value selects the ba	andwidth between when the	e motor current supervision e	enables and disables.	

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Table 58. Outputs (Cont.).

P3.2.30 ²	PI supervision enab	le			ID 1346
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; or 1 = Enabled.				
Description:	delay timer will increme	ent. When the actual value	. When the actual value goo s within the allowed area, th ctivated. This function is us	ne delay counter decremen	ts. After the delay time
P3.2.31 ^②	PI supervision displ	ay			ID 1828
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Enable DO; 1 = Warning (W/O S)/er 2 = Warning (W S)/enab 3 = Fault/enable DO.				
Description:	Supervision display sele	ection.			
P3.2.32 ^②	PI supervision uppe	r limit			ID 1347
Minimum value:	PI Process Unit Min varies	Maximum value:	PI Process Unit Max varies	Default value:	0.00 varies
Description:	Upper limit for PI feedba	ack value used with the PI s	pervision controller.		
P3.2.33 ^②	PI supervision lowe	r limit		'	ID 1349
Minimum value:	PI Process Unit Min varies	Maximum value:	PI Process Unit Max varies	Default value:	0.00 varies
Description:	Lower limit for PI feedba	ack value used with the PI s	upervision controller.		
P3.2.34 ^②	PI supervision delay	7	,		ID 1351
Minimum value:	0 s	Maximum value:	3,000 s	Default value:	0 s
Description:	Defines the delay time t	hat the PI feedback value m	ust be out of range before a	ctivating the PI supervision	n outnut

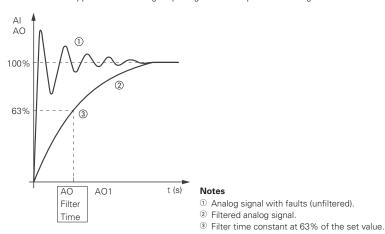
P3.3 - Analog output.

P3.3.1 ^②	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 outp	Defines the analog output mode to current or voltage.						

Table 58. Outputs (Cont.).

P3.3.2 ^②	AO function				ID 146
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	2 = Frequency refera 3 = Motor speed RP 4 = Motor current (C 5 = Motor torque (O 6 = Motor power (O 7 = Motor voltage (I 8 = DC bus voltage I 9 = Pl setpoint (proc 10 = Pl error value (I 11 = Pl output (proc 12 = Analog input (C 13 = Drive reference 14 = Fieldbus proces 15 = Fieldbus proces 17 = Fieldbus proces 18 = Fieldbus proces 19 = Fieldbus proces 20 = Fieldbus proces 21 = Fieldbus proces 22 = User defined o 23 = Motor torque (I	less unit minimum - process unit process unit minimum - process unit minimum - process unit minimum - process unit nimum - process unit nimum - process unit nimum - process unit nimum - 100%); so data input 1 (0% - 100%); so data input 3 (0% - 100%); so data input 4 (0% - 100%); so data input 5 (0% - 100%); so data input 6 (0% - 100%); so data input 7 (0% - 100%); so data input 7 (0% - 100%); so data input 8 (0% - 100%);	unit maximum); maximum);		
Description:	Select the function	desired to the terminal A01.		,	
P3.3.3 ^②	AO filter time				ID 147

Defines the filter time applied to the analog output signal. Zero equals no filtering.



P3.3.4 ^②	AO custom minimum				ID 1863
Minimum value:	N.A.%	Maximum value:	N.A.%	Default value:	0.00%
Description:	Negative value shall be all	owed for x1.	o .	lue (percent) that user wants. Def Il calculate from gain and offset.	ault value is 0.
P3.3.5 ²	AO custom maximum				ID 1865
Minimum value:	N.A.%	Maximum value:	N.A.%	Default value:	100.00%
Description:	Default value is 100%. Negative value shall be all	owed for x2.	Ü	ue (percent) that user wants. calculate from gain and offset.	

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Table 58. Outputs (Cont.).

P3.3.6 ^②	AO value minim	um	'	'	ID 1867
Minimum value:	0.00 varies	Maximum value:	100.00 varies	Default value:	0.00 varies
Description:	Default value is 0 m	xis y1, define AO value selected A. ,y2) will get gain and offset. The	,		
P3.3.7 ^②	AO value maxim	um	'	'	ID 1868
Minimum value:	0.00 varies	Maximum value:	100.00 varies	Default value:	20.00 varies
willillium value.	0.00 varios				

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

Table 59. Drive control.

P4.1 - Basic setting	s.				
P4.1.1 ²	Keypad reference	,			ID 141
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq HZ	Default value:	0.00 Hz
Description:	Keypad reference value				
P4.1.2 ^②	Keypad/drive refere	nce pot direction			ID 141
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options"	0 = Forward; or 1 = Reverse.				
Description:				the keypad is the active contro n, when the keypad is the acti	
P4.1.3 ^②	Keypad stop				ID 114
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:				rate when the control source is e regardless of control mode.	s set to keypad.
Description:	Enabled or always enab	oled keypad operation.			
P4.1.4 ^①	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 sequ	ence 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	or swapping the motor phas	e output from u, v, w to	u, w, v.	
P4.1.6 ^②	Power up local rem	ote 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 pl when powered down, s	ace the drive will start at af electing Local or Remote wi	ter power is applied. The	e default setting will hold the l	ast state that the d

Table 59. Drive control (Cont.).

P4.1.8 ^②	Start mode				ID 252
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	1 = Flying start from last operating from 2 = Flying start from	equency as a starting point.	catch a spinning m will catch a spinn	rence value. notor. This setting searches for the c ning motor. This setting searches for	. , ,
Description:	Selects the start mo	de operation.			
P4.1.9 ^②	Stop mode				ID 253
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Coasting - After 1 = Ramp - After the	a stop command, the motor coa stop command, the speed of th	sts to a stop uncor e motor is deceler	ntrolled by the drive. ated according to the set deceleration	n parameters.
Description:	Selects the stop mo	de operation.			
P4.1.10 ^②	Ramp 1 shape	'		<u> </u>	ID 247
Minimum value:	0.0 s	Maximum value:	10.0 s	Default value:	0.0 s
Description:	gives a linear ramp s	shape that causes acceleration	and deceleration to	moothed with these parameters. Se o react immediately to the changes it s an S-shaped acceleration/decelera	the reference signal.

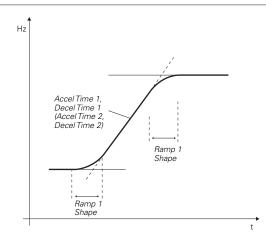


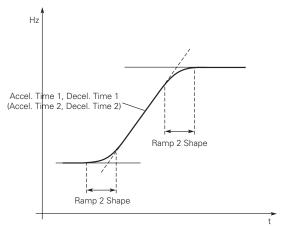
Table 59. Drive control (Cont.).

P4.1.11 ^②	Ramp 2 shape				ID 248	
Minimum value:	0.0 s	Maximum value:	10.0 s	Default value:	0.0 s	

Description:

The start and end of the acceleration and deceleration ramps can be smoothed with these parameters. Setting a value of 0.00 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.



P4.1.12 ^②	Accel. time 2				ID 249
Minimum value:	0.1 s	Maximum value:	3000.0 s	Default value:	10.0 s
Description:	These values correspond frequency.	d to the time required for th	e output frequency to ac	celerate from the zero frequen	ncy to the set maximum
		de the possibility to set two ogrammable digital input.	different acceleration/c	leceleration time sets for one a	application. The active set o
P4.1.13 ^②	Decel. time 2				ID 250
Minimum value:	0.1 s	Maximum value:	3000.0 s	Default value:	10.0 s
Description:	These values correspond frequency.	d to the time required for th	e output frequency to de	celerate from the set maximur	m frequency to the zero
	rioquoney.				
	These parameters provid	de the possibility to set two ogrammable digital input.	o different acceleration/c	leceleration time sets for one a	application. The active set o
P4.1.14 [©]	These parameters provid	ogrammable digital input.	o different acceleration/c	leceleration time sets for one a	application. The active set o
P4.1.14 [©] Minimum value:	These parameters provided be selected with the pro	ogrammable digital input.	o different acceleration/c	leceleration time sets for one a	
	These parameters provide selected with the provided Stage ramp frequency MinFreq Hz When 2nd stage ramp fr	grammable digital input. guency Maximum value:	MaxFreq Hz	Default value: ill enable the 2nd stage ramp	ID 2444 30.00 Hz
Minimum value:	These parameters provide selected with the provided Stage ramp frequency MinFreq Hz When 2nd stage ramp fr	ogrammable digital input. quency Maximum value: requency is the frequency le	MaxFreq Hz	Default value: ill enable the 2nd stage ramp	ID 2444 30.00 Hz
Minimum value: Description:	These parameters provide be selected with the pro 2nd Stage ramp freq MinFreq Hz When 2nd stage ramp fr This then can be used fo	ogrammable digital input. quency Maximum value: requency is the frequency le	MaxFreq Hz	Default value: ill enable the 2nd stage ramp	ID 2444 30.00 Hz frequency output function.
Minimum value: Description: P4.1.15 ^{©®}	These parameters provide be selected with the provided selected with the provided Stage ramp frequency. When 2nd stage ramp from This then can be used for Fult reset start N.A. 0 = Start/stop after fault	grammable digital input. grammable digital input. grammable digital input. maximum value: maximum value: t reset - the run command h	MaxFreq Hz evel at which the drive w signal a frequency level N.A. has to be cycled to restar	Default value: ill enable the 2nd stage ramp i . Default value:	ID 2444 30.00 Hz frequency output function. ID 2483 0

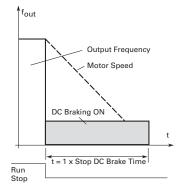
P4.2 - Brake.

P4.2.1 ^{①②}	Brake chopper	ID 829			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disable - dyna 1 = Enable - dyna	amic brake OFF; or mic brake ON.			
Description:	If an external res through the attac		ing, this parameter	to enabled will allow excess DC bu	s voltage to be bled off

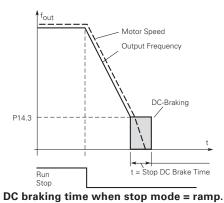
Table 59. Drive control (Cont.).

P4.2.2 ^{①②}	DC brake current			ID 254					
Minimum value:	DriveNomCurrCT*15/100 Maximum A	DriveNomCurrCT*	15/10 Default value:	DriveNomCurrCT*1/2 A					
Description:	Defines the current level injected into the	he motor during DC-braking.							
P4.2.3 ^{①②}	Start DC brake time	'	'	ID 263					
Minimum value:	0.00 s Maximum	value: 600.00 s	Default value:	0.00 s					
		This parameter defines the time the drive injects DC braking current before starting to ramp. This can be used to stop motors that are potentially spinning before a run command is given or before ramping to reference level. This is to stop motors that are potentially spinning before a run command is given							
Description:		and is given or before ramping to re							
Description: P4.2.4 ^{©2}	potentially spinning before a run comma	and is given or before ramping to re							
	potentially spinning before a run comma spinning before a run command is given	and is given or before ramping to re		otors that are potentially					
P4.2.4 [©] 2	potentially spinning before a run comma spinning before a run command is given Stop DC brake frequency	and is given or before ramping to re value: 10.00 Hz	eference Tevel. This is to stop m Default value:	otors that are potentially					
P4.2.4 [©]	potentially spinning before a run comma spinning before a run command is given Stop DC brake frequency 0.10 Hz Maximum	and is given or before ramping to re value: 10.00 Hz	eference Tevel. This is to stop m Default value:	otors that are potentially					

Determines the length of DC braking while stopping. 0.00 = DC brake is not used; or >0.0 = The amount of time DC-braking will occur after falling below the stop DC brake frequency.



DC braking time when stop mode = coasting.



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Table 59. Drive control (Cont.).

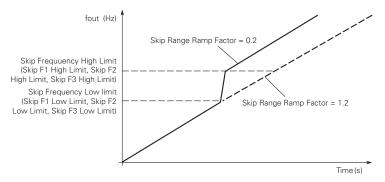
P4.2.6 ^{①②}	Flux brake				ID 266
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Flux braking OFF; or 1 = Flux braking ON.				
Description:				is increased, which in turn incre ng. The flux braking can be set	
	Note: Flux braking damage.	converts the energy in	to heat in the motor	and should be used caref	ully to avoid motor
P4.2.7 ^{①②}	Flux brake current				ID 265
Minimum value:	MotorNomCurr*1/10	Maximum value:	CurrLimit A	Default value:	MotorNomCurr*1/2 A

P4.3 - Skip frequency.

P4.3.1 ^②	Skip rang	Skip range ramp factor				
Minimum value:	0.1	Maximum value:	10.0	Default value:	1.0	

Description:

Defines the acceleration/deceleration time when the output frequency is between the selected prohibit frequency range limits. The ramping speed (selected acceleration/deceleration time 1 or 2) is multiplied with this factor: e.g., value 0.1 makes the acceleration time 10 times shorter than outside the prohibit frequency range limits.



Ramp speed scaling between skip frequencies.

P4.3.2 ^②	Skip F1 low limit				ID 256				
Minimum value:	0.00 Hz	Maximum value:	SkipRange1HighLimit Hz	Default value:	0.00 Hz				
Description:	ramping speed (selected		ne output frequency is between time 1 or 2) is multiplied with t y range limits.						
P4.3.3 ^②	Skip F1 high limit				ID 257				
Minimum value:	SkipRange1LowLimit Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz				
Description:	ramping speed (selected	Defines the acceleration/deceleration time when the output frequency is between the selected prohibit frequency range limits. The ramping speed (selected acceleration/deceleration time 1 or 2) is multiplied with this factor: e.g., value 0.1 makes the acceleration time 10 times shorter than outside the prohibit frequency range limits.							
P4.3.4 ²	Skip F2 low limit	,	,		ID 258				
Minimum value:	0.00 HZ	Maximum value:	SkipRange2HighLimit Hz	Default value:	0.00 Hz				
Description:	ramping speed (selected		ne output frequency is between time 1 or 2) is multiplied with t y range limits.						
P4.3.5 ²	Skip F2 high limit	'	,		ID 259				
Minimum value:	SkipRange2LowLimit HZ	Maximum value:	400.00 Hz	Default value:	0.00 Hz				
Description:	ramping speed (selected		ne output frequency is between time 1 or 2) is multiplied with the grange limits.						

Table 59. Drive control (Cont.).

P4.3.6 ^②	Skip F3 low limit		,		ID 260			
Minimum value:	0.00 HZ	Maximum value:	SkipRange3HighLimit Hz	Default value:	0.00 Hz			
Description:	Defines the acceleration/deceleration time when the output frequency is between the selected prohibit frequency range limits. The ramping speed (selected acceleration/deceleration time 1 or 2) is multiplied with this factor: e.g., value 0.1 makes the acceleration time 10 times shorter than outside the prohibit frequency range limits.							
P4.3.7 ^②	Skip F3 high limit				ID 261			
Minimum value:	SkipRange3LowLimit HZ	Maximum value:	400.00 Hz	Default value:	0.00 Hz			
Description:		acceleration/deceleration	ne output frequency is betweer time 1 or 2) is multiplied with t y range limits.					

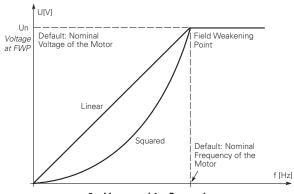
P4.4.1 ^②	Currency				ID 2122
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = \$; 1 = £; 2 = €; 3 = ¥; 4 = Rs; 5 = R\$; 6 = Fr; or 7 = kr.				
Description:	Sets the local currency us	sed for energy savings esti	mation.		
P4.4.2 ^②	Energy cost			'	ID 2123
Minimum value:	Varies	Maximum value:	Varies	Default value:	0.00 varies
Description:	Sets the local energy cos	t per kW. Used for energy	savings estimation.		
P4.4.3 ^②	Data type				ID 2124
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Cumulative; 1 = Daily average; 2 = Weekly average; 3 = Monthly average; or 4 = Yearly average.				
Description:	Selects the format to view parameter. The savings of	w energy savings. The drivestimation is based on com	ve takes four recordir nparing the drives end	ngs in an hour and then calculates ergy usage compared to a across t	the average based off this he line starter.
P4.4.4	Energy savings reset			'	ID 2125
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Not reset; or 1 = Reset.				
Description:	Resets the energy saving				

[©] Parameter value can only be changed after the drive has stopped. @ Parameter value will be set to be default when changing macros.

Table 60. Motor control.

P5.1 - Basic setting	s.	,			
P5.1.1 ¹⁾²	Motor control mode				ID 287
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	1 = Speed control - Outpu 2 = Open loop vector con identification. 3 = PM control 1 - PM mo	ut frequency is controlled be trol - Similar to the standa otor control mode 1, used f	ed directly by the frequency by giving a frequency referen rd speed control mode, highe or SPM (surface mounted pe or IPM (internally mounted p	ice to it with slip compensa er performance slip calcula ermanent magnet) and it als	tion requires running a motor so can be used for IPM.
Description:	Selects the motor control	l mode.			
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 determine Once the motor current h	es the maximum output cu its this level, it goes into t	rrent allowed from the drive. he current limiter controller a	. The parameter value rang and tries to limit the outpu	ge differs from size to size. t current.
P5.1.3 [©]	V/Hz optimization				ID 109
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disable torque boost 1 = Enable torque boost f				
Description:	Automatic torque boost - and run at low frequencie		ncreases automatically, whic	ch assists the motor to pro	duce sufficient torque to start
P5.1.4 ^{①②}	V/Hz ratio		,		ID 108
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	where the nominal vo 1 = Squared - the voltage weakening point whe produces less torque the load is proportion 2 = Programmable V/Hz c voltage, midpoint and the application. 3 = Linear with flux optim	oltage is supplied. A linear of the motor changes foll in the nominal voltage is and electromechanical noi al to the square of the speurve - the V/Hz curve can weakening point. A proginization - the drive starts to	V/Hz ratio should be used in owing a squared curve with supplied. The motor runs und se. A squared V/Hz ratio cal sed. be programmed with three d rammable V/Hz curve can be	n constant torque application the frequency in the area for magnetized below the found in the used in applications with the second of the control of the second of the control of the cont	rom 0 Hz to the field rield weakening point and where the torque demand of the are the 0 frequency do not satisfy the needs of the energy. This mode is called
Description:	Selects the V/Hz ratio. 0 = Linear; 1 = Squared; 2 = Programmable; or				•

3 = Linear + flux optimization.



0 = Linear and 1 = Squared.

P5.1.5 [©]	Field weakening	Field weakening point					
Minimum value:	8.00 Hz	Maximum value:	400.00 Hz	Default value:	FieldWeakPointMFG Hz		
Description:	The field weakenir	ng point is the frequency at which	the output voltage rea	aches the set maximum value.	This value is usually determined		

Table 60. Motor control (Cont.).

P5.1.6 ^{①②}	Voltage at FWP				ID 290			
Minimum value:	10.00%	Maximum value:	200.00%	Default value:	00.00%			
Description:	Defines the voltage at t constant.	Defines the voltage at the field weakening point, when the output frequency exceeds the field weakening point, the voltage will remain constant.						
P5.1.7 ^{①②}	VV/Hz mid frequenc	;y		'	ID 291			
Minimum value:	0.00 H	Maximum value:	FieldWeakPoint Hz	Default value:	VHzCurveMidFreqMFG Hz			
Description:	anywhere between 0 ai		this parameter defines the m . To either have a different V					
P5.1.8 ^{①②}	VV/Hz mid voltage				ID 292			
Minimum value:	0.00%	Maximum value:	100.00%	Default value:	100.00%			
Description:		Hz curve has been selected, o frequency volt and the field	this parameter defines the m I weakening point voltage.	iid-point voltage of the cur	ve. This value can be set			
P5.1.9 [©]	Zero frequency volt	age		'	ID 293			
Minimum value:	0.00%	Maximum value:	40.00%	Default value:	0.00%			
Description:	If the programmable V/	Hz curve has been selected,	this parameter defines the ze	ero frequency voltage of th	ne curve.			
P5.1.10 ^②	Switching frequenc	у	'		ID 288			
Minimum value:	MinSwitchFreq kHz	Maximum value:	MaxSwitchFreq kHz	Default value:	DefaultSwitchFreqCT kHz			
Description:	Sets the switching freq	uency for the PWM output v	vaveform.					
P5.1.11 ^②	Sine filter enabled				ID 1665			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Disabled; or 1 = Enabled.							
Description:		the drive to have a fixed sw ne switching frequency base	ritching frequency which is red on the unit temperature.	quired by some sine filter	s. The drive no longer			
P5.1.12 ^{①②}	Over voltage contro	oller			ID 294			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	3			
Options:	2 = The maximum contr	oller output frequency is the oller output frequency is the						
Description:			voltage below the preset limi		ontrol is enabled, the drive will itor to use the energy.			
P5.1.13 ^①	Over voltage contro	ller reference			ID 1874			
Minimum value:	DCLinkUnderVolt- ResumeExcursion V	Maximum value:	DCLinkOverVoltBrake- ChopperStartLimit V	Default value:	DCLinkRegenerating- EnergyControlExcursion V			
	Th	nce defines the preset limit	value used in the overvoltage	controller.				
Description:	rne over vortage refere				ID 298			
	Load drooping							
P5.1.14 ^②		Maximum value:	100.00%	Default value:	0.00%			
Description: P5.1.14 [®] Minimum value: Description:	Load drooping		100.00% tion of load. This parameter		0.00%			
P5.1.14 [©] Minimum value: Description:	Load drooping 0.00% The drooping function e	nables speed drop as a func			0.00%			
P5.1.14 [©] Minimum value:	Load drooping 0.00% The drooping function e of the motor.	nables speed drop as a func			0.00% onding to the nominal torque			

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Table 60. Motor control (Cont.).

P5.1.16 ^{①②}	Identification				ID 299
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	2 = Identification with 3 = Identification no ru	stator resistor - does not spir run - motor stator resistor is ın - motor is supplied with cu inertia - identification for the	completed then the motor rrent and voltage but at 2	or is run. This must be comple	ted with unloaded motor.
Description:	parameters to improve will be active then set	e starting torque and open loo back to 0 when completed. '	op vector control perform When a run command is	e motor once complete the drivance. Once set and a run com issued, the message on the ken, a fault message will be displ	mand is given, the operation ypad will indicate "Auto
P5.1.17 ^①	Stator resistor				ID 771
Minimum value:	0.001 ohm	Maximum value:	65.535 ohm	Default value:	Base on motor.
Description:	Motor stator resistor r performing identificati		tator winding resistance	of the windings in the motor.	The value is measured when
P5.1.18 ^①	Rotor resistor	,		,	ID 772
Minimum value:	0.001 ohm	Maximum value:	65.535 ohm	Default value:	Base on motor.
Description:	Motor rotor resistor re	al value - this value is the rot	or resistance of the moto	or. The value is measured whe	n performing identification.
P5.1.19 ^①	Leak inductance				ID 773
Minimum value:	0.01 mh	Maximum value:	655.35 mh	Default value:	Base on motor.
Description:		nce real value - this value is en performing identification.	the amount of magnetic	inductance that does not link to	o a winding in the motor. The
P5.1.20 ^①	Mutual inductance				ID 774
Minimum value:	0.10 mh	Maximum value:	6553.50 mh	Default value:	Base on motor.
Description:	Motor mutual inductar measured when perfor		he amount of inductance	between two sets of windings	s in the motor. The value is
P5.1.21 ^①	Excitation current				ID 775
Minimum value:	0.01 A	Maximum value:	655.35 A	Default value:	Base on motor.
Description:		real value - this value is the a		ent required to generate a rota	ting magnetic field in the
P5.1.22 ^①	Motor inertia	,		,	ID 1881
Minimum value:	0.000 kgm ²	Maximum value:	65.535 kgm²	Default value:	Base on motor.
Description:	System rotation inertia	a - real value for speed loop p	parameter tuning. The va	alue is measured when perform	ing identification.
P5.1.23 ^①	PM back electrome	otive force (BEMF) voltag	ye .	,	ID 1882
Minimum value:	0.0 V	Maximum value:	6553.5 V	Default value:	0.1 V
Description:	Back electromotive for	ce (BEMF) voltage. The value	e is measured when perf	orming identification.	
P5.1.24 ^①	PM d-axis stator in	ductance			ID 1884
Minimum value:	0.00 mh	Maximum value:	655.35 mh	Default value:	0.01 mh
Description:		xis stator inductance of the F value is measured when per		otor current and the rated moto	or frequency displayed in line-
P5.1.25 ^①	PM q-axis stator in	ductance			ID 1883
Minimum value:	0.00 mh	Maximum value:	655.35 mh	Default value:	0.01 mh
Description:		xis stator inductance of the F value is measured when per		otor current and the rated moto	or frequency displayed in line-
P5.1.26	Slip compensation	coefficient			ID 1664
Minimum value:	0%	Maximum value:	500%	Default value:	100%
Description:	The linear coefficient of	of the slip compensation freq	uency which is valid only	v in the speed control mode	

Table 60. Motor control (Cont.).

P5.1.27	VF stable Kd	'		'	ID 1888
Minimum value:	0%	Maximum value:	1,000%	Default value:	100%
Description:	The compensation co	efficient of the d-axis, which i	s used to suppress osc	cillation.	
P5.1.28	VF stable Kq	,		,	ID 1889
Minimum value:	0%	Maximum value:	1,000%	Default value:	100%
Description:	The compensation co	efficient of the q-axis, which i	s used to suppress osc	cillation.	
P5.1.29 [©]	Over-modulation 6	enable			ID 2835
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; or 1 = Enabled.				
Description:	The linear coefficient	of the slip compensation frequency	uency, which is valid o	nly in the speed control mode.	

P5.2 - Sensorless Vector Control parameters.

P5.2.1 ^②	Speed error filter til	ne constant			ID 1591			
Minimum value:	0 ms	Maximum value:	3,000 ms	Default value:	20 ms			
Description:	Filter time constant for	Filter time constant for speed reference and actual speed error.						
P5.2.2	Speed control Kp1				ID 1830			
Minimum value:	0.0%	Maximum value:	6,000.0%	Default value:	100.0%			
Description:	Sets P-gain of "Vector"	control mode when in frequ	ency region 1 for faster speed	response.				
P5.2.3	Speed control Ti1				ID 1831			
Minimum value:	1 ms	Maximum value:	3,000 ms	Default value:	100 ms			
Description:	Sets time constant of "\	/ector" control mode when	in frequency region 1 for faste	r speed response.				
P5.2.4 ^②	Speed control FS1				ID 1832			
Minimum value:	0.00 Hz	Maximum value:	SPEED_CONTROL_FS2 Hz	Default value:	5.00 Hz			
Description:	Sets the "Vector" contr	ol mode frequency.						
P5.2.5 ^②	Speed control FS2				ID 1833			
Minimum value:	SPEED_CONTROL_ FS1 Hz	Maximum value:	MaxFreq Hz	Default value:	10.00 Hz			
Description:	Sets the "Vector" contr	ol mode frequency.						
P5.2.6 ^②	Speed control Kp2				ID 1834			
Vinimum value:	0.0%	Maximum value:	6,000.0%	Default value:	50.0%			
Description:	Sets P-gain of "Vector"	control mode when in frequ	ency region two for faster spe	ed response.				
P5.2.7 ^②	Speed control Ti2				ID 1835			
Minimum value:	1 ms	Maximum value:	3,000 ms	Default value:	100 ms			
Description:	Sets time constant of "\	/ector" control mode when	in frequency region two for fa	ster speed response.				
P5.2.8 ^②	Motoring torque lim	it FWD			ID 1836			
Minimum value:	0.0%	Maximum value:	300.0%	Default value:	300.0%			
Description:	Motoring torque limit in	the forward direction.						
P5.2.9 ^②	Generator torque lin	nit FWD			ID 1837			
Minimum value:	0.0%	Maximum value:	300.0%	Default value:	300.0%			
Description:	Generation torque limit	in the forward direction.						

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Table 60. Motor control (Cont.).

P5.2.10 ^②	Motoring torque	limit REV			ID 1838
Minimum value:	0.0%	Maximum value:	300.0%	Default value:	300.0%
Description:	Motoring torque limi	t in the reverse direction.			
P5.2.11 ^②	Generator torque	limit REV			ID 1839
Minimum value:	0.0%	Maximum value:	300.0%	Default value:	300.0%
Description:	Generation torque lir	nit in the reverse direction.			
P5.2.12 ^②	Motoring power l	imit			ID 1607
Minimum value:	0.0%	Maximum value:	300.0%	Default value:	300.0%
Description:	Motor power limit se	etting.			
P5.2.13 ^②	Generator power	limit			ID 1608
Minimum value:	0.0%	Maximum value:	300.0%	Default value:	300.0%
Description:	Generator power lim	it setting.			
P5.2.14 ^{①②}	Flux reference				ID 1620
Minimum value:	0.0%	Maximum value:	500.0%	Default value:	100.0%
Description:	This parameter defin	es the amount of flux that is ou	itput to the motor, which is	valid only in open loop vect	or control.
P5.2.15 ^①	PM initial selection	on		'	ID 1890
Minimum value:	N.S.	Maximum value:	N.A.	Default value:	1
Options:	0 = Align; 1 = Six pluse; or 2 = HFI.				
Description:	PM initial angle dete	ct method.			
P5.2.16 ^①	PM initial time				ID 1891
Minimum value:	0.0 s	Maximum value:	60.0 s	Default value:	0.7 s
Description:	PM initial angle dete	ct time.			
P5.2.17 ^①	PM excited curre	nt			ID 1892
Minimum value:	0%	Maximum value:	200%	Default value:	20%
Description:	PM excited current d	uring the low speed.			
P5.2.18 ^①	PM excited curre	nt off frequency	,	'	ID 1893
Minimum value:	10.00%	Maximum value:	MotorNomFreq %	Default value:	20.00%
Description:	PM excited current c	ut off frequency.			
P5.2.19	Observer Kp		,	'	ID 2901
Minimum value:	1%	Maximum value:	3,000%	Default value:	100%

[©] Parameter value can only be changed after the drive has stopped. © Parameter value will be set to be default when changing macros.

Table 61. Protections.

P6.1 - Motor.									
P6.1.1 ^{①②}	Output phase f	fault		,	ID 308				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2				
Options:	0 = No response; 1 = Warning; 2 = Fault - stop mo 3 = Fault - stop mo	ode after fault according to param ode after fault always by coasting	eter stop mode; or						
Description:	Output phase supervision of the motor ensures that the motor phases have equal currents. If phases are 5% different another, the frequency converter will respond corresponding to this setting.								

Table 61. Protections (Cont.).

P6.1.2 ^{①②}	Ground fault				ID 309
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:		after fault according to param after fault always by coasting			
Description:	ground fault limit that	t allows for setting the allowa d protects the frequency conve	ble ground current le	currents is zero. There is a curren evel based off the total drive currer ts with high currents. Frequency c	it. The overcurrent protection
P6.1.3 ^{①②}	Ground fault limit	!	,	'	ID 2158
Minimum value:	0%	Maximum value:	30%	Default value:	15%
Description:	Sets the level of the output of the drive.	ground fault protection. This p	protection is based o	ff the amount of leakage current th	nat is seen to ground on the
P6.1.4 ^{①②}	Motor thermal pro	otection			ID 310
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:		after fault according to param after fault always by coasting			
Description:	calculated motor tem	selected, the drive will stop ar p is based off the install powe etting parameter to 0, will res	er on values of the dr	stage based off the % of calculate ive and monitoring values as the diof the motor to 0%.	d motor temperature. The rive is running. Deactivating
P6.1.5 ^②	Motor thermal FO	current			ID 311
Minimum value:	0.00%	Maximum value:	150.00%	Default value:	100.00%

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.

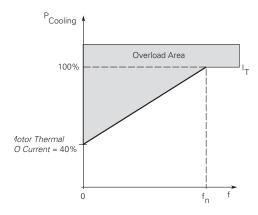
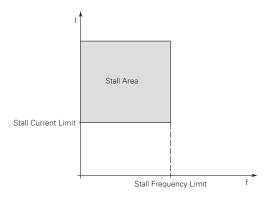


Table 61. Protections (Cont.).

P6.1.6 ^{①②}	Stall protection		'	,	ID 313
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No action; 1 = Warning; 2 = Fault; or 3 = Fault, coast.				
Description:			tection. It protects the moto el, frequency level, and time.		situations like a stalled shaft.
P6.1.7 ^②	Stall current limit	'	'	,	ID 314
Minimum value:	0.10 A	Maximum value:	2 * MotorNomCurr A	Default value:	1.3 * MotoNomCurr A
Description:	The current can be set t	o 0.1-InMotor*2. For a sta	I stage to occur, the current	must have exceeded this I	imit.

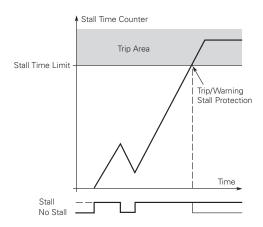
The software does not allow entering a greater value than InMotor*2. If P1.6, nominal motor current is changed, this parameter is automatically restored to the default value (IL).



P6.1.8 ^②	Stall time limit				ID 315
Minimum value:	1.0 s	Maximum value:	120.0 s	Default value:	15.0 s

Description:

This time can be set between 1.0 and 120.0s. This is the maximum time allowed for a stall stage. The stall time is counted by an internal up/down counter based off the current being above the limit setting. If the stall time counter value goes above this limit the protection will cause a trip (see P6.1.6).

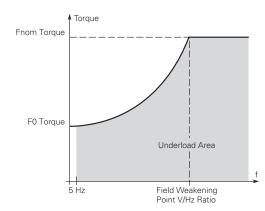


P6.1.9 ^②	ID 316				
Minimum value:	1.00 Hz	Maximum value:	MaxFreq Hz	Default value:	25.00 Hz
Description:		n be set between 1—fmax (P1.2). I limit for the stall time to occur.	For a stall state to occur	, the output frequency must ha	ve remained below this limit,

Table 61. Protections (Cont.).

P6.1.10 ^{①②}	Underload protecti	on			ID 317
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:		fter fault according to param fter fault always by coasting			
Description:	status of the motor. If	the motor torque drops below	w the Fnom and FO, to	age based on the parameter condi orque levels for the time limit the underload time counter to zero.	
P6.1.11 ^{①②}	Underload Fnom to	rque			ID 318
Minimum value:	10.0%	Maximum value:	150.0%	Default value:	50.0%
Description:	The torque limit can be	set hetween 10.0 - 150.0 %	v TnMotor This pars	amotor gives the value for the min	imum torquo allowed w

The torque limit can be set between 10.0 - 150.0 % x TnMotor. This parameter gives the value for the minimum torque allowed when the output frequency is at or above the field weakening point. If you change P1.6, nominal motor current, this parameter is automatically restored to the default value.

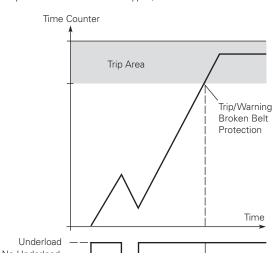


P6.1.12 ²	Underload F0 t	torque			ID 319
Minimum value:	5.0%	Maximum value:	150.0%	Default value:	10.0%
Description:	The torque limit c frequency. If you	can be set between 5.00 - 150.00% change the value of P1.6, nominal	x TnMotor. This para motor current, this pa	ameter gives value for the minimu arameter is automatically restore	ım torque allowed at zero d to the default value.

Table 61. Protections (Cont.).

P6.1.13 ^②	Underload time limit	Underload time limit				
Minimum value:	2.00 s	Maximum value:	600.00 s	Default value:	20.00 s	

This time can be set between 2.00 and 600.00 seconds. This is the time allowed for an fault state to exist. An internal up/down counter counts the accumulated underload time. If the underload counter value goes above this limit, the protection will cause a trip according to protection parameter. If the drive is stopped, the counter is reset to zero.



P6.1.14 ^②	Preheat mode				ID 2159		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Disable; or 1 = Enable						
Description:		ables/disables the preheat functi v current to flow to the motor, thi		where the temperature being rea en the motor is not running.	d from the drive will turn		
P6.1.15 ^②	Preheat control	l source		'	ID 2160		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1		
Options:	0 = DI function; or 1 = Drive temperat						
Description:	Selects the source could be at a diffe		ning from, either digita	al input or the drive heat sink tem	perature, which potentiall		
P6.1.16 ^②	Preheat enter to	emperature			ID 2161		
Minimum value:	-10.0°C	Maximum value:	20.0°C	Default value:	10.0°C		
Description:	Temperature wher some current.	n the preheat is enabled - drive go	es into a run state to	all the preheat voltage to flow th	rough the motor an create		
P6.1.17 ^②	Preheat quit ter	mperature			ID 2162		
Minimum value:	-10.0°C	Maximum value:	39.9°C	Default value:	20.0°C		
Description:	Temperature when the preheat is disabled - drive goes into a stop state if the temperature is above this rating.						

Table 61. Protections (Cont.).

P6.2 - Drive.					
P6.2.1 ^②	Line start lockou	t			ID 750
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	(Run command had a Do not respond to respond. (Run cc 2 = Respond to I/O commantained run c 3 = Do not respond to I/O commantained run c 3 = Do not respond to I/O commantained run c	as to be cycled.) o I/O run command when powe mmand has to be cycled.) ommands when power is applic ommand.	er is applied. If in ano	ontrol place and switched to I/O, o ther control place and switched to rol place and switched to I/O cont er control place and switched to I/	o I/O, control does not rol, the drive will respond to
Description:	Determines the resp	onse of frequency converter go	ing to a run state cyc	le with I/O run command is still ac	ctive as the control place.
P6.2.2 ^{①②}	Input phase fault				ID 332
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:		after fault according to parame after fault always by coasting; ver limit.			
Description:	The input phase sup	ervision ensures that the input	phases of the frequer	ncy converter have approximately	equal current draw.
P6.2.3 [©]	4 mA input fault	,	'	'	ID 306
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	3 = Warning - the pro 4 = Fault - stop mode	quency from 10 seconds back is eset frequency P6.2.4 is set as e after fault according to param e after fault always by coasting	reference; eter stop mode; or		
Description:				ference signal is used and the sig programmed into relay outputs RO	
P6.2.4 ^{①②}	4 mA fault freque	ency		'	ID 331
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	When 4 mA fault hap	opens, the output frequency of	drive goes to this pre	set speed when P6.2.3 = 3.	
P6.2.5 ^{①②}	External fault				ID 307
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:		after fault according to parame after fault always by coasting.	eter stop mode; or		
Description:	A warning or a fault external fault). The	action and message is generate status information can also be	ed from the external f programmed into digi	fault signal in the programmable (tal output relay outputs RO1 and l	digital inputs function select RO2.
P6.2.6 ^{①②}	Undervoltage fau	lt response			ID 330
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = No response; 1 = Warning; 2 = Fault, stop mode 3 = Fault, stop mode	after fault according to parame after fault always by coasting.	eter stop mode; or		
Description:	Frequency converter the drive will respon	monitors DC Bus voltage if it d d corresponding to this setting.	rops below set level (via trouble shooting guide for mo	re information on fault level),

Table 61. Protections (Cont.).

P6.2.7 ^{①②}	Unit under temperat	ure protection			ID 1564
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 protection sets the	response to a low frequenc	y converter temperature	e on the heat sink.	
P6.2.8 ^②	Cold weather mode		,	,	ID 2126
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; or 1 = Enabled.				
Description:	from -10°C to -30°C. Thi when given a run comma to warm up. If it does no	s then enables a warm-up and, will turn on for the cold	feature when the frequent I weather time-out and ter that the time freque	e causing the frequency conver ency converter is between -30°t output the cold weather voltage ncy converter will fault on unde	C and -20°C. The motor, e at 0.5 Hz to allow the motor
P6.2.10 ^②	Cold weather time o	ut			ID 2128
Minimum value:	0 min	Maximum value:	10 min	Default value:	3 min
Description:	With this parameter, you	are able to select the time	limit that the frequency	y converter will run in the warm	-up period.
P6.2.11 ^②	STO fault response				ID 2427
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	1 = Warning - drive indic	stop, no indication shown, ate warning/if STO clears o ate fault/require reset to s	drive will run without re		
Description:	STO fault response defin	es the function of how the	STO input will be seen	on the keypad and how the driv	e functions to it.
P6.2.12 ^①	PI feedback AI loss r	esponse	'	'	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 freq	uency (P6.2.13).			
Description:	This parameter defines t feedback.	he function of the PI feedba	ack analog input loss re	sponse. If the AI feedback is lo	st based off the programed Al
P6.2.13 ^{①②}	PI feedback Al loss p	ore-frequency			ID 2402
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz
Description:	This parameter defines t	he frequency the master w	ould run to if a feedback	c is lost and P6.2.12 was set to o	option 3.
P6.2.14 ^②	PI feedback Al loss p	pipe fill			ID 2403
Minimum value:	0.0 varies	Maximum value:	1000.0 varies	Default value:	0.0 varies
Description:	Detects loss of prime in the frequency in P6.2.13		asured level. If the valu	e drops below this level for the	time in P6.2.15 and below,
P6.2.15 ^②	PI feedback Al loss p	ore-frequency timeout	'	'	ID 2404
Minimum value:	0 s	Maximum value:	6,000 s	Default value:	0 s
Description:				hen the feedback signal is lost, ult out on "feedback loss". The	
P6.2.16 ^{①②}	Overvoltage controll	er response			ID 1840
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No action; 1 = Warning (W/O S); or 2 = Warning (W S).				
Description:	Display options for overv	oltage controller warning.			

Table 61. Protections (Cont.).

P6.2.17 ^{©2}	Overcurrent contro	oller response			ID 1841
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No action; 1 = Warning (W/O S); 2 = Warning (W S).	or			
Description:	Display options for cur	rent limit controller warning.			
P6.2.18	Cold weather pass	word			ID 2129
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Description:		access to override the under to d. Password should be set to		otection. This parameter is seen b gets reset on cycle of power.	y pressing the left and righ
P6.2.19	Under-temperature	fault override			ID 2130
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No; or 1 = Yes.				
Description:	With the password se function gets reset wh		ameter is enabled a	nd will give the ability to override t	he under temp fault. This

P6.3 - Communications.

P6.3.1 ^{①②}	Fieldbus fault response				ID 334
Minimum value:	N.A.	/laximum value:	N.A.	Default value:	2
Options:	0 = No action; 1 = Warning; 2 = Fault; or 3 = Fault, coast.				
Description:	communication port.			le is used and communication is lost ieldbus control to set fault or warning	
P6.3.2 ^{①②}	OPTcard fault response				ID 335
Minimum value:	N.A.	/laximum value:	N.A.	Default value:	2
Options:	0 = No action; 1 = Warning; 2 = Fault; or 3 = Fault, coast.				
Description:	This sets the response mode processor.	for a board slot fault o	aused by a missing	or failed option board not communic	ating to the central
P6.3.3 ^{①②}	IP address confliction re	esponse			ID 1678
P6.3.3 [©]		sponse Naximum value:	N.A.	Default value:	ID 1678
		Aaximum value:	neter stop mode; or	Default value:	
Minimum value:	N.A. 0 = No action; 1 = Warning; 2 = Fault - stop mode after fa 3 = Fault - stop mode after fa	Maximum value: ult according to param ult always by coasting	neter stop mode; or	Default value:	1
Minimum value: Options:	N.A. 0 = No action; 1 = Warning; 2 = Fault - stop mode after fa 3 = Fault - stop mode after fa Indicates there is a conflict in	Maximum value: ult according to paramult always by coasting the IP address assign	neter stop mode; or		1
Minimum value: Options: Description:	N.A. 0 = No action; 1 = Warning; 2 = Fault - stop mode after fa 3 = Fault - stop mode after fa Indicates there is a conflict ir address assigned Keypad communication	Maximum value: ult according to paramult always by coasting the IP address assign	neter stop mode; or		1 vices with the same IF
Minimum value: Options: Description: P6.3.4 ^{©2}	N.A. 0 = No action; 1 = Warning; 2 = Fault - stop mode after fa 3 = Fault - stop mode after fa Indicates there is a conflict ir address assigned Keypad communication	Maximum value: ult according to paramult always by coasting the IP address assign	neter stop mode; or I. led to the drive, typi	cally meaning there are multiple dev	1 vices with the same If

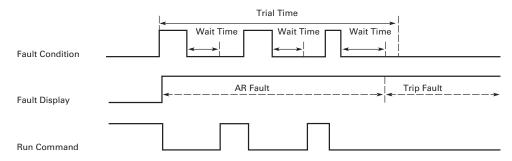
Table 61. Protections (Cont.).

P6.4 - Auto restart.									
P6.4.1 ^②	AR wait time			'	ID 321				
Minimum value:	1.00 s	Maximum value:	300.00 s	Default value:	1.00 s				
Description:	Defines the time b	efore the frequency converter tri	es to automatically res	tart the motor after a specific fa	ult condition has been clear.				
P6.4.2 ^②	AR trail time				ID 322				
Minimum value:	1.00 s	Maximum value:	600.00 s	Default value:	30.00 s				

Description:

Amount of time after fault set that the drive uses the restart attempts to reset the fault and restart the motor, after this time has run out without resetting the alarm drive will fault.

P6.4.4 to P6.4.11 determine the maximum number of automatic restarts during the trial time set by P6.4.2. The time count starts from the first auto restart. If the number of faults occurring during the trial time exceeds the values of P6.4.4 to P6.4.11, the fault state becomes active. Otherwise the fault is cleared after the trial time has elapsed and the next fault starts the trial time count again. If a single fault remains during the trial time, a fault state is true.



Auto Restart Fail (Try Number >2.)

P6.4.3 ^②	AR start func	tion			ID 323			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	1 = Start accord	rom stop frequency; ing to parameter stop mode; or rom maximum frequency.						
Description:				er. The parameter defines the start nutomatically restart the motor after a				
P6.4.4 ^②	Undervoltage	attempts			ID 324			
Minimum value:	0	Maximum value:	10	Default value:	1			
Description:	This parameter determines how many automatic restarts can be made during the trial time after an undervoltage trip.							
	0 = No automatic restart. >0 = Number of automatic restarts after undervoltage fault.							
	The fault is reset and the drive is started automatically after the DC-link voltage has returned to the normal level.							
P6.4.5 ^②	Overvoltage a	ttempts			ID 325			
Minimum value:	0	Maximum value:	10	Default value:	1			
Description:	This parameter determines how many automatic restarts can be made during the trial time after an overvoltage trip.							
	0 = No automatic restart after overvoltage fault trip. >0 = Number of automatic restarts after overvoltage fault trip.							
	The fault is rese	t and the drive is started automatic	ally after the DC-I	link voltage has returned to the norma	l level.			

Table 61. Protections (Cont.).

P6.4.6 ^②	Overcurrent at	ttempts			ID 326			
Minimum value:	0	Maximum value:	3	Default value:	1			
Description:	This parameter d	This parameter determines how many automatic restarts can be made during the trial time.						
	Note: An IGBT to	emperature fault, saturation fault,	and overcurrent fa	aults are included as part of this fault.				
		restart after overcurrent fault trip utomatic restarts after an overcur		on trip, or IGBT temperature fault.				
P6.4.7 ^②	4 mA fault att	empts			ID 327			
Minimum value:	0	Maximum value:	10	Default value:	1			
Description:	This parameter d	etermines how many automatic re	starts can be mad	e during the trial time.				
	0 = No automatic >0 = Number of a	restart after reference fault trip. utomatic restarts after the analog	current signal (4-	-20 mA) has returned to the normal le	vel (>4 mA).			
P6.4.8 ^②	Motor tempera	ature fault attempts	'		ID 329			
Minimum value:	0	Maximum value:	10	Default value:	1			
Description:	This parameter determines how many automatic restarts can be made during the trial time.							
	0 = No automatic >0 = Number of a							
P6.4.9 ^②	External fault	attempts			ID 328			
Minimum value:	0	Maximum value:	10	Default value:	0			
Description:	This parameter determines how many automatic restarts can be made during the trial time.							
		restart after external fault trip. utomatic restarts after external fa	ult trip.					
P6.4.10 ^②	Underload atte	empts	·		ID 336			
Minimum value:	0	Maximum value:	10	Default value:	1			
Description:	This parameter determines how many automatic restarts can be made during the trial time.							
	0 = No automatic >0 = Number of a	restart after an underload fault tr utomatic restarts after an underlo	ip. ad fault trip.					
	PI feedback A	l loss attempts			ID 2405			
P6.4.11 ²								
P6.4.11 [©] Minimum value:	0	Maximum value:	10	Default value:	1			

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 62. PI Controller.

P7.1 - Basic settings	3.				
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 100%, a change of 1	the PI Controller. It adjust the s 10% in the error value causes th	lope of the speed incre e controller output to c	rease according to the initial of the change 10%.	ne load. If this value is set to
5	PI control itime				ID 1295
P7.1.2®	Pi control itime				
P7.1.2 ^② Minimum value:	0.00 s	Maximum value:	600.00 s	Default value:	1.00 s

Table 62. PI Controller (Cont.).

P7.1.3 ^{①②}	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 = 1/s; 6 = 1/min.; 7 = 1/h; 8 = kg/s; 9 = kg/min.; 10 = kg/h; 11 = m3/s; 12 = m3/min.; 13 = m3/h; 14 = m/s; 15 = mbar; 16 = bar; 17 = Pa; 18 = kPa; 19 = mVS; 20 = kW; 21 = Deg. C; 22 = GPM; 23 = gal/s; 24 = gal/min.; 25 = gal/h; 26 = lb/s; 27 = lb/min.; 28 = lb/h; 29 = CFM; 30 = ft³/s; 31 = ft³/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; or 44 = m.				
Description:	Defines the unit type fo				
P7.1.4 ^②	PI process unit mini		DI D		ID 1298
Minimum value:	-99999.99 varies	Maximum value:	PI Process Unit Max varies	Default value:	0.00 varies
Description:	Defines the minimum pr				
P7.1.5 ^②	PI process unit max	imum			ID 1300
Minimum value:	PI Process Unit Min	Maximum value:	99999.99 varies	Default value:	100.00 varies
Description:	Defines the maximum p	rocess unit value.	,		,
P7.1.6 ^{①②}	PI error inversion				ID 1303
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Normal - if feedback 1 = Inverted - if feedback	k is less than set-point, PI cock is less than set-point, PI c	ntroller output increases. ontroller output decreases.		
Description:	Defines the way the pro	ocess value output reacts to	the feedback signal		

Table 62. Pl Controller (Cont.).

P7.1.7 ^②	PI dead band				ID 1304
Minimum value:	-99999.99 varies	Maximum value:	99999.99 varies	Default value:	0 varies
Description:		etpoint in process units. This ller. The PI output is locked it			ion or repeated activation/
P7.1.8 ^②	PI dead band delay	,			ID 1306
Minimum value:	0.00 s	Maximum value:	320.00 s	Default value:	0.00 s
Description:	If the PI process value level out again.	goes out of the dead band ar	ea for the desired time de	lay, at that point the controll	er will re-initialize and try to
P7.1.9 ^②	PI ramp time				ID 1311
Minimum value:	0.00 s	Maximum value:	300.00 s	Default value:	0.00 s
Description:	D (; .)	falling ramp times for change	2.01		· · · · · · · · · · · · · · · · · · ·

[©] Parameter value can only be changed after the drive has stopped. @ Parameter value will be set to be default when changing macros.

Table 63. Setpoint .

P7.2.1 - Standard.								
P7.2.1.1 ^②	PI keypad setpoint	1		,	ID 1307			
Minimum value:	PI Process Unit Min	Maximum value:	PI Process Unit Max	Default value:	0.00 varies			
Description:	Keypad PI reference va	ue setpoint 1.						
P7.2.1.2 ^②	PI keypad setpoint	2	,		ID 1309			
Minimum value:	PI Process Unit Min	Maximum value:	PI Process Unit Max	Default value:	0.00 varies			
Description:	Keypad PI reference va	ue setpoint 2.						
P7.2.1.3 ^②	PI wake-up action	,	,	'	ID 2466			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	1 = Wake-up when abo 2 = Wake-up when belo	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	1.					

P7.2.2 - Setpoint 1.

P7.2.2.1 ^①	PI setpoint 1 source	e			ID 1312
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Not used; 1 = PI keypad setpoint 2 = PI keypad setpoint 3 = AI; 4 = Drive reference po 5 = FB process data in 6 = FB process data in 7 = FB process data in 8 = FB process data in 9 = FB process data in 10 = FB process data in 11 = FB process data in 12 = FB process data in 13 = FB PI setpoint 1; c 14 = FB PI setpoint 2.	2; t; put 1; put 2; put 3; put 4; put 5; nput 5; nput 7; nput 8;			
Description:	Defines source of the fieldbus message.	setpoint value the drive uses.	This can either be	an internal preset value, keypad se	tpoint, analog signal, or

Table 63. Setpoint (Cont.).

P7.2.2.2 ^①	PI setpoint 1 slee	ep enable			ID 1315
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; or 1 = Enabled.				
Description:		sable the output when the frequedoack rises above the wake-u		sleep frequency for the sleep de	lay time. The output
P7.2.2.3 ^②	PI setpoint 1 slee	ep delay			ID 1317
Minimum value:	0 s	Maximum value:	3,000 s	Default value:	0 s
Description:				p level for this amount of time a en going into the sleep function	
P7.2.2.4 ^②	PI setpoint 1 wal	ke-up level	'	'	ID 1318
Minimum value:	-99999.99 varies	Maximum value:	99999.99 varies	Default value:	0.00 varies
Description:		the PI feedback value to go ab be scaled based off the PI unit		utput to be re enabled. This valu	ue is based of the % of
P7.2.2.5 ^②	PI setpoint 1 boo	ost			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.			
P7.2.2.6 ^②	PI setpoint 1 slee	ep level		,	ID 2450
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:		which the unit value is used to it the drive into the sleep mode.		eep mode. When the unit drops	below this level for the sleep
P7.2.2.7 ^②	SP1 sleep mode	over cycle time			ID 1842
Minimum value:	0	Maximum value:	10	Default value:	0
Description:	cycle" fault. One cycle is defined	e drive come in and out of sleep when the drive transfers from to to the sleep over cycle check	normal mode to sleep n		rive would trip on "pump ove
P7.2.2.8 ^②	SP1 sleep mode	maximum cycle time	,		ID 1843
Minimum value:	0 s	Maximum value:	3,600 s	Default value:	300 s
Description:	Defines the maximu	m time for sleep over cycle chec	cking.		

P7.2.3 - Setpoint 2.

P7.2.3.1 ^①	PI setpoint 2 source				ID 1321
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 inpu 6 = FB process data inpu 7 = FB process data inpu 8 = FB process data inpu 9 = FB process data inpu 10 = FB process data inpu 11 = FB process data inpu 12 = FB process data inpu 13 = FB PI setpoint 1; or 14 = FB PI setpoint 2.	t 1; t 2; t 3; t 4; t 5; ut 6; ut 7;			
Description:	Defines source of the se fieldbus message.	tpoint value the drive uses	. This can either be	an internal preset value, keypad se	tpoint, analog signal, or

Table 63. Setpoint (Cont.).

P7.2.3.2 ^①	PI setpoint 2 sleep	enable			ID 1324			
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.						
P7.2.3.3 ^②	PI setpoint 2 sleep	delay			ID 1326			
Minimum value:	0 s	Maximum value:	3,000 s	Default value:	0 s			
Description:				p level for this amount of time a en going into the sleep function				
P7.2.3.4 ^②	PI setpoint 2 wake	-up level		,	ID 1327			
Minimum value:	-99999.99 varies	Maximum value:	99999.99 varies	Default value:	0.00 varies			
Description:		ne PI feedback value to go abo e scaled based off the PI unit		utput to be re enabled. This valu	ue is based of the % of			
P7.2.3.5 ^②	PI setpoint 2 boost	:			ID 1329			
Minimum value:	-2.00 varies	Maximum value:	2.00 varies	Default value:	1.00 varies			
Description:	The setpoint can be bo	osted via a multiplier value.						
P7.2.3.6 ^②	PI setpoint 2 sleep	level		,	ID 2452			
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz			
Description:		nich the unit value is used to he drive into the sleep mode.		eep mode. When the unit drops	below this level for the slee			
P7.2.3.7 ^②	SP2 sleep mode ov	er cycle time	,	'	ID 1844			
Minimum value:	0	Maximum value:	10	Default value:	0			
Description:	cycle" fault. One cycle is defined w	drive come in and out of sleep hen the drive transfers from do the sleep over cycle check	normal mode to sleep r		lrive would trip on "pump ove			
P7.2.3.8 ^②	SP2 sleep mode ma	aximum cycle time			ID 1845			
Minimum value:	0 s	Maximum value:	3,600 s	Default value:	300 s			
Description:	Defines the maximum	time for sleep over cycle ched	cking.					

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

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

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Table 64. Feedback.

P7.3.1 - Standard.							
P7.3.1.1 ^②	PI feedback gai	in		,	ID 1331		
Minimum value:	-1,000.0%	Maximum value:	1,000.0%	Default value:	100.0%		
Description:	Defines gain assoc	Defines gain associated with the feedback signal from the measuring device.					

P7.3.2.1 ^①	PI feedback 1 se	ource			ID 1332
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = Not used; 1 = Al; 2 = Drive reference 3 = FB process data 4 = FB Process Data 5 = FB Process Data 6 = FB Process Data 7 = FB Process Data 9 = FB Process Data 10 = FB Process Data 11 = FB Pl feedback	rinput 1; a Input 2; a Input 3; a Input 4; a Input 5; a Input 6; a Input 7; ta Input 8; or			
Description:	Defines where feed	lback signal is being fed into the	drive, via analog or fie	eldbus data value.	
P7.3.2.2 ^②	PI feedback 1 m	inimum			ID 1333
Minimum value:	-200.00 %	Maximum value:	200.00%	Default value:	0.00%
Description:	Minimum unit value	for the feedback signal.			
P7.3.2.3 ^②	PI feedback 1 m	aximim			ID 1334
	-200.00 %	Maximum value:	200.00%	Default value:	100.00%
Minimum value:	200.00 /0		200.0070		

[©] Parameter value can only be changed after the drive has stopped. [©] Parameter value will be set to be default when changing macros.

Table 65. HVAC parameters.

P8.1 - Damper (*DM1	PRO).	•	,		,			
P8.1.1 ^{①②}	Damper start	'		'	ID 483			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	 0 = Start - standard start. 1 = Interlocked start: To use this, a relay output, R01/R02, needs to be programmed for selections 29 "Damper Control" and a digital input function must be programmed for selection "RunEnable". The relay output is used to energize an element of the driven sysuch as a damper, seal water solenoid, or a pre-lube pump. Upon a return acknowledgement of contact closure to the programmed digital input, the frequency converter will start. 2 = Interlock time start: This functions the same as the interlocked start, except that if the return acknowledgement contact is not received within the interlock timeout, a "prevent-up start" fault is displayed in keypad and the start sequence will need to be restarted. 3 = Delay start: This start is similar to the interlocked start, except that a return contact is not used. After the "Delay Time" following the relay output closure, the frequency converter starts. 							
Description:	This parameter detern	nines the function of the dam	oer.					
P8.1.2 ^{①②}	Damper time out				ID 484			
Minimum value:	1 s	Maximum value:	32,500 s	Default value:	5 s			
Description:	The time out time use is received.	d for an interlocked time start	, after which the st	art sequence must be restarted if no	acknowledgement contact			
P8.1.3 ^{①②}	Damper delay				ID 485			
Minimum value:	1 s	Maximum value:	32,500 s	Default value:	5 s			
Description:	The delay time followi	ng a delay start, after which	the frequency conve	erter will be started.				

Table 65. HVAC parameters (Cont.).

P8.2 - Fire mode (*D	OM1 PRO).		1	1					
P8.2.1 [©]	Fire mode protec	tion			ID 535				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0				
Options:		initiates fire mode function. : initiates fire mode function.							
Description:	This parameter dete input function select	rmines whether the fire mode f fire mode.	unction is determined by	a contact closure or contact o	pening on the desired digital				
		ode is enabled, this causes the he drive causes issues to the sy		and run till its death. Warrant	y will be non-valid in the cas				
P8.2.2 ^{①②}	Fire mode refere	nce select function			ID 536				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0				
Options:	1 = Fire mode refere 2 = Fieldbus reference 3 = AI; or	0 = Fire mode minimum frequency; 1 = Fire mode reference; 2 = Fieldbus reference - reference from fieldbus process in; 3 = Al; or 4 = Pl1 control - follows the Pl control algorithm settings.							
Description:	This parameter allov	vs for setting the reference loca	ation for when the fire mo	ode is enabled.					
P8.2.3 ^②	Fire mode minim	um frequency			ID 537				
Minimum value:	MinFreq. Hz	Maximum value:	MaxFreq. Hz	Default value:	15.00				
Description:	This parameter sets	the minimum output frequency	for fire mode. This can b	oe used as a selection for refer	ence command.				
P8.2.4 ^②	Fire mode freque	ncy reference 1	'	'	ID 565				
Minimum value:	0.0%	Maximum value:	100.0%	Default value:	75.0%				
Description:		the drive operating percentage fire mode reference 1.	based off the 0% being	minimum frequency (P1.1) and	100% being maximum				
P8.2.5 ^②	Fire mode freque	ncy reference 2		'	ID 564				
Minimum value:	0.0%	Maximum value:	100.0%	Default value:	100.0%				
Description:		the drive operating percentage fire mode reference 2.	based off the 0% being	minimum frequency (P1.1) and	100% being maximum				
P8.2.6	Fire mode test er	nable	'		ID 2443				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.				
Options:	0 = Disabled; or 1 = Enabled.								
Description:	This parameter allow run at the fire mode	vs for testing the fire mode fea speed desired but all faults are	ture. With the parameter enabled.	r set to enable and fire mode i	nput enabled, the drive will				
P8.2.7 ^{①②}	Smoke purge free	quency			ID 554				
Minimum value:	0.0%	Maximum value:	100.0%	Default value:	50.0%				
Description:	Frequency setting fo	r smoke purge. Preset speed u 100% being maximum frequen	sed for a digital input select (P1 2)	ection. The percentage is bas	ed off the 0% being minimur				

P8.3 - Protections (*DM1 PRO).

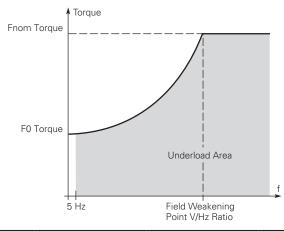
P8.3.1 ^{①②}	Broken belt prot	otection			ID 317	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = No action; 1 = Warning; 2 = Fault - stop mod 3 = Fault - stop mod	le after fault according to param le after fault always by coasting	eter stop mode; or			
Description:	status of the motor.	If the motor torque drops below	w the Fnom and FO	stage based on the parameter condi torque levels for the time limit, the e underload time counter to zero.		

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Table 65. HVAC parameters (Cont.).

P8.3.2 ²	Broken belt Fnom to	ID 318			
Minimum value:	10.0%	Maximum value:	150.0%	Default value:	50.0%

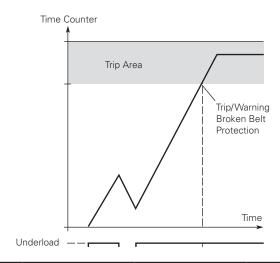
The torque limit can be set between 10.0-150.0 % x TnMotor. This parameter gives the value for the minimum torque allowed when the output frequency is at or above the field weakening point. If you change P1.6, nominal motor current, this parameter is automatically restored to the default value.



P8.3.3 ^②	Broken belt FC) torque	,		ID 319		
Minimum value:	5.0%	Maximum value:	150.0%	Default value:	10.0%		
Description:	The torque limit of frequency. If you	can be set between 5.0—150.0 % x change the value of P1.6, nominal	TnMotor. This param motor current, this pa	eter gives the value for the minimarameter is automatically restore	num torque allowed at zero d to the default value.		
P8.3.4 ^②	Broken belt til	me limit			ID 320		
Minimum value:	2.00 s	Maximum value:	600.00 s	Default value:	20.00 s		

Description:

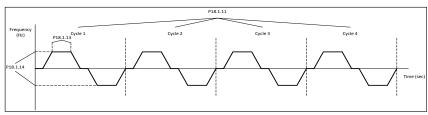
This time can be set between 2.00 and 600.00 seconds. This is the time allowed for a fault state to exist. An internal up/down counter counts the accumulated underload time. If the underload counter value goes above this limit, the protection will cause a trip according to protection parameter. If the drive is stopped, the counter is reset to zero.



^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 66. Pump parameters.

P9.1 - Derag (*DM1	PhO).				
P9.1.1 ^②	Derag cycles				ID 2468
Minimum value:	0	Maximum value:	10	Default value:	3
Description:	This parameter defi	nes the number of cycles in the	forward/reverse direction	on for removing any debris in sy	rstem.
P9.1.2 ^②	Derag at Start/S	top			ID 2469
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Off; 1 = Start; 2 = Stop; 3 = Start and stop; 4 = Digital input; or 5 = Current.				
Description:	Defines how the der	rage function will become activa	ated; start, stop, both, o	r based off the digital input.	
P9.1.3 ^②	Deragging run ti	me	,		ID 2470
Minimum value:	1 s	Maximum value:	3,600 s	Default value:	0 s
Description:	Defines the length of	of time the drive will run at the o	derag speed in the forwa	ard and reverse direction.	
P9.1.4 ^②	Derag speed				ID 2471
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	5.00 Hz
Description:	Defines the frequen	cy the drive will run at in the fo	rward/reverse direction	when in the derag mode.	
			P18.1.11		7



P9.1.5 ^②	Derag off delay	,					
Minimum value:	1 s	Maximum value:	600 s	Default value:	10 s		
Description:	Defines the length	of time the drive will run the der	ag function when en	abled at stop.			
P9.1.6 ^{①②}	Derag current	,			ID 1879		
Minimum value:	N.A. A	Maximum value:	N.A. A	Default value:	0.00 A		

P9.2 - Start/stop timing (*DM1 PRO).

P9.2.1 ^{①②}	Valve start				ID 1847
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Normal; 1 = Damper start; 2 = Damper tout; or 3 = Damper delay.				
Description:	This parameter determi	nes the function of damper.			
P9.2.2 ^{①②}	Valve timeout		'	'	ID 1848
Minimum value:	1 s	Maximum value:	32,500 s	Default value:	5 s
Description:	The timeout time used treceived.	for an interlocked time start,	, after which the start	sequence must be restarted if no	acknowledgement contact is
P9.2.3 ^{①②}	Valve delay	,		,	ID 1849
Minimum value:	1 s	Maximum value:	32,500 s	Default value:	5 s
Description:	The delay time following a delay start, after which the frequency converter will be started.				

Table 66.	Pump	parameters	(Cont.).
Table ou.	I WILL	Dalailleteis	\UU111./.

P9.2.4 ^{①②}	Back spin delay				ID 2423		
Minimum value:	0 s	Maximum value:	32,500 s	Default value:	0 s		
Description:	Run delay time parameter sets the time required for the drive to wait before another run command can be received. During this time, the run signal is given. It is ignored until the time has expired upon which it will then start. This is true for keypad, I/O, or Fieldbus Control places.						
P9.2.5 [©]	Minimum run time				ID 1813		
Minimum value:	0 s	Maximum value:	32,500 s	Default value:	0 s		
Description:	Drive minimum run time.						
P9.2.6 ^②	Minimum frequency	ramp time	,	,	ID 1850		
Minimum value:	0.1 s	Maximum value:	2,000.0 s	Default value:	10.0 s		
Description:	Ramp time for output to	minimum frequency.					
P9.3 - Multi-pump m	ulti-drive (*DM1 PRO).						
P9.3.1 ^{①②}	Multi-pump mode				ID 2279		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Disabled or 1 = Multi-drive network.						
Description:	0 = Disabled - single driv	Determines the number of drives being used in the multi-pump configuration: 0 = Disabled - single drive for motor; or 1 = Multi-drive - multi-follower sequence with multiple drives.					
P9.3.2 ^{①②}	Number of drives				ID 2449		
Minimum value:	1	Maximum value:	5	Default value:	1		
Description:	This defines the number of drives active when doing the multi-drive pump and fan scheme. By default, there will be always one drive active at one time. By setting value to above one, it allows for bringing in additional drives to maintain the sytem.						
P9.3.3 ^{①②}	Drive ID	'	'	'	ID 2278		
Minimum value:	0	Maximum value:	5	Default value:	0		
Description:		This parameter defines the drive address when using mult- drive pump mode. Based off this ID, the drive enables in the desired sequence and can be monitored at this drive ID value in the monitor screen.					
P9.3.4 ^{①②}	Regulation source				ID 2284		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Network only; or 1 = PI controller.						
Description:	For drives that have been connected with both start/stop signal and PI feedback - can be set up as "Feedback", so they will have abilit to be the master.						
P9.3.5 ^②	PI bandwidth				ID 2458		
Minimum value:	0.00 varies	Maximum value:	6,000.00 varies	Default value:	10.00 varies		
Description:	Percentage based off th	e setpoint above and below	which defines when the	e auxiliary motor will come onli	ne or offline.		
P9.3.6 [©]	Staging frequency				ID 2315		
Minimum value:	MinFreq	Maximum value:	400.00	Default value:	50.00		
Description:	Output frequency is abo	ve stagging frequency and F	PI error is out of PI band	width - motor should add to sys	stem.		
P9.3.7 ^{①②}	De-staging frequence	y			ID 2316		
Minimum value:	0.00	Maximum value:	MaxFreq	Default value:	0.00		
Description:	Output frequency is belo	w de-stagging frequency a	nd PI error is out of PI ba	andwidth - motor should remove	e from system.		
P9.3.8 ^②	Add/remove delay		,	,	ID 344		
Minimum value:	0 s	Maximum value:	3,600 s	Default value:	10 s		
Description:				umps are added or removed fro			

Table 66. Pump parameters (Cont.).

P9.3.9 ²	Interlock enabled				ID 350			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Disabled; or 1 = Enabled.							
Description:	This parameter enables t offline.	This parameter enables the drive to look at the digital input interlocks to tell which motor is available for running or if they were brought offline.						
P9.3.10 ^{①②}	Recovery method			,	ID 2285			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Automatic; or 1 = Stop.							
Description:		slave when multi-drive sys will stop immediately if it		e slave drive can continue run	if it set to be "Automatic".			
P9.3.11 ²	Add/remove drive se	lection			ID 2311			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Drive ID; or 1 = Run time.							
Description:	In default, MPFC system drive's running time: add	will add/remove pump acc the drive that has shortest	ording to their drive ID, f running time and remov	rom small to large. The order or the drive that has longest rule.	can also depend on each slav nning time first.			
P9.3.12 ^②	Run time enabled		'	,	ID 2280			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Disabled; or 1 = Enabled.							
Description:	The run time counter will	start counting only if this	parameter is enabled.					
P9.3.13 ^②	Run time limit				ID 2281			
Minimum value:	0.0 h	Maximum value:	300,000.0 h	Default value:	0.0 h			
Description:	If drive run time is over t	his limit, its network status	will be "Need Alternati	on". Limit equals 0 means run	time counter disabled.			
P9.3.14	Run time reset				ID 2283			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.			
Options:	0 = No action; or 1 = Reset.							
Description:	One-time parameter, set	to be 1 will clear run time	counter.					
P9.3.15 ^②	Master drive mode				ID 2473			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Follow PI; 1 = Fixed speed; or 2 = Turn off.							
Description:	Defines how the master	drive will maintain the freq	uency control when slav	es are brought in; follow PI, fix	ed speed, or turn off.			
P9.3.16 ^②	Master fixed speed				ID 2474			
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	50.00 Hz			
Description:	Defines the fixed speed frequency when the master drive mode is set for fixed speed control when slaves are brought in.							
P9.3.17 ^②	Master fixed speed delay ID 2475							
Minimum value:	0 s	Maximum value:	1,000 s	Default value:	5 s			
Description:	Defines the delay time be or turn off.	efore the master drive begi	ns running at the fixed :	speed or turns off if the master	mode is set for fixed speed			

Table 66. Pump parameters (Cont.).

•	of prime) (*DM1 PRO)		,		ID 0440		
P9.4.1 ^{©2}	Pipe fill loss respo				ID 2410		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = No action; 1 = Warning; 2 = Fault; or 3 = Fault, coast.						
Description:	Defines the response	method when a "loss of prime	condition occurs.				
P9.4.2 ^{①②}	Pipe fill loss detec	ction method	'	,	ID 2406		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Motor current; 1 = Motor power (%); 2 = Motor torque (%).	or					
Description:	Defines the value for	looking at a loss of prime.					
P9.4.3 ^②	Pipe fill loss low l	evel			ID 2407		
Minimum value:	0.00 varies	Maximum value:	1,000.00 varies	Default value:	0.00 varies		
Description:	If the monitor value is	If the monitor value is less than low level value and the output frequency is more than low frequency, check the pipe fill loss start.					
P9.4.4 ^{©©}	Pipe fill loss low f	requency	'		ID 2409		
Vinimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz		
Description:	Defines the frequency point at which the drive needs to be above to enable the "loss of prime" feature. When set to 0 Hz, protection is disabled.						
P9.4.5 ^②	Pipe fill loss high	level	,	,	ID 1851		
Minimum value:	0.0 varies	Maximum value:	1,000.0 varies	Default value:	0.0 varies		
Description:	If the monitor value is more than high level (the high level is not 0) and the output frequency is more than high frequency, check pipe fil loss start.						
P9.4.6 ^{©©}	Pipe fill loss high	frequency	'		ID 1852		
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz		
Description:	Defines high frequency point at which the drive needs to be above to enabled the "loss of prime" feature. When set to 0 Hz, protection is disabled.						
P9.4.7 ^②	Pipe fill loss time	'		,	ID 2408		
Minimum value:	0 s	Maximum value:	600 s	Default value:	0 s		
Description:	Defines the delay time	e before a "loss of prime" cond	dition will occur based of t	the detection method and prir	ne loss level.		
P9.4.8 ^②	Pipe fill loss atten	npts			ID 2411		
Minimum value:	0	Maximum value:	10	Default value:	1		
Description:	Defines the amount o	f attemps to auto restart the o	drive on a "prime loss" con	ndition.			
P9.5 - Prime pump (P9.5.1 ^②	*DM1 PRO). Prime pump enabl	/e			ID 2428		
Minimum value	NI A	Mavimum value	NI A	Default value	0		

P9.5.1 ^②	Prime pump enable	ID 2428			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; or 1 = Enabled.				
Description:	Prime pump enable.				

Table 66. Pump parameters (Cont.).

P9.5.2 ^②	Prime pump leve	I			ID 2429
Minimum value:	0.00 varies	Maximum value:	6,000.00 varies	Default value:	0.00 varies
Description:		el at which the prime pump fund d. If the level is not reached, it			his value, prime pump
P9.5.3 ^②	Prime pump freq	uency			ID 2431
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	Frequency at which	the prime pump function will op	erate when enabled.		
P9.5.4 ^②	Prime pump dela	y time			ID 2432
Minimum value:	0 min.	Maximum value:	3,600 min.	Default value:	0 min.
Description:	This is the time that	the drive will run the pre-charg	e function on start up.		
P9.5.5 ^②	Prime pump loss	of prime level			ID 2433
Minimum value:	0.00 varies	Maximum value:	1,000.00 varies	Default value:	0.00 varies
Description:		ndicate a loss of prime in pump ne setting, the drive will display		drops below the determined	value for the value assigned i
P9.5.6 ^②	Prime pump leve	12	'	'	ID 2434
Minimum value:	0.00 varies	Maximum value:	6,000.00 varies	Default value:	0.00 varies
Description:	This defines the level becomes deactivate	el at which the prime pump fund d. If the level is not reached, it	tion will drop out. If the f will switch after the delay	eedback level raises above the time.	his value, prime pump
P9.5.7 ^②	Prime pump freq	uency 2			ID 2436
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	Frequency at which	the prime pump level 2 will ope	rate at when enabled.		
P9.5.8 ^②	Prime pump dela	y time 2			ID 2437
Minimum value:	0.0 min	Maximum value:	3,600.0 min	Default value:	0.0 min
Description:	This is the time that	the drive will run at the 2nd lev	vel prime pump function le	vel.	
P9.5.9 ^②	Prime pump loss	of prime level 2			ID 2438
Minimum value:	0.00 varies	Maximum value:	1,000.00 varies	Default value:	0.00 varies
Description:		ndicate a loss of prime in pump ne setting, the drive will display		drops below the determined	value for the value assigned i

P9.6 - Broken pipe (*DM1 PRO).

P9.6.1 ^{①②}	Broken pipe fault re	sponse			ID 1853
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No action; 1 = Warning; 2 = Fault, coast; or 3 = Fault.				
Description:	Broken pipe fault/warni broke pipe frequency fo	ng shall be triggered if the I r delay time.	PI feedback is less than b	roken pipe level and the drive	output frequency is more than
P9.6.2 ^②	Broken pipe level				ID 1854
Minimum value:	0.0 varies	Maximum value:	6,000.0 varies	Default value:	15.0 varies
Description:	Broken pipe level.				
P9.6.3 ^②	Broken pipe frequer	ıcy			ID 1856
				,	
Minimum value:	1.00 Hz	Maximum value:	MaxFreq Hz	Default value:	25.00 Hz

Table 66. Pump parameters (Cont.).

P9.6.4 ^②	Broken pipe delay				ID 1855
Minimum value:	1.0 s	Maximum value:	120.0 s	Default value:	15.0 s
Description:	Broken pipe delay time.				

^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 67. Fieldbus (FB) status.

P10.1 - FB process of	lata input selection	1.			
P10.1.1 ^②	FB process date	ta input 1 selection	,	,	ID 2533
Minimum value:	0	Maximum value:	12,464	Default value:	0
Description:		data output selections, paramete word for process data. Any drive			en read over the desired
	Process data IN3 Process data IN4 Process data IN5	= NULL = ID 0; = FB PI Set Point1= ID 2542; = FB PI Feedback1= ID 2550; = Acceleration time 1= ID 103; = Deceleration time 1= ID 104; = Current limit= ID 107; = NULL= ID 0; or			
P10.1.2 ^②	FB process dat	ta input 2 selection	,	,	ID 2534
Minimum value:	0	Maximum value:	12,464	Default value:	2,542
	Process data IN3 Process data IN4 Process data IN5	= FB PI Set Point1= ID 2542; = FB PI Feedback1= ID 2550; = Acceleration time 1= ID 103; = Deceleration time 1= ID 104; = Current limit= ID 107; = NULL= ID 0; or			
P10.1.3 ^②	FB process dat	ta input 3 selection			ID 2535
Minimum value:	0	Maximum value:	12,464	Default value:	2,550
Description:		data output selections, parameter word for process data. Any drive			en read over the desired
		·			

Table 67. Fieldbus (FB) status (Cont.).

P10.1.4 ^②	FB process data	input 4 selection			ID 2536
Minimum value:	0	Maximum value:	12,464	Default value:	103
Description:				assigned to these registers and th O can be read over these values.	en read over the desired
	Process data IN3 = Process data IN4 = Process data IN5 =	NULL = ID 0; FB PI Set Point1= ID 2542; FB PI Feedback1= ID 2550; Acceleration time 1= ID 103; Deceleration time 1= ID 104; Current limit= ID 107; NULL= ID 0; or			
P10.1.5 ^②	FB process data	input 5 selection			ID 2537
Minimum value:	0	Maximum value:	12,464	Default value:	104
Description:				assigned to these registers and th O can be read over these values.	en read over the desired
	Process data IN3 = Process data IN4 = Process data IN5 =	NULL = ID 0; FB PI Set Point1= ID 2542; FB PI Feedback1= ID 2550; Acceleration time 1= ID 103; Deceleration time 1= ID 104; Current limit= ID 107; NULL= ID 0; or			
P10.1.6 ^②	FB process data	input 6 selection			ID 2538
Minimum value:	0	Maximum value:	12,464	Default value:	107
Description:	fieldbus network w Default values for p Process data IN1 = Process data IN2 = Process data IN3 = Process data IN4 = Process data IN5 =	ord for process data. Any drive rocess data in: NULL = ID 0; FB PI Set Point1= ID 2542; FB PI Feedback1= ID 2550; Acceleration time 1= ID 103; Deceleration time 1= ID 104; Current limit= ID 107; NULL= ID 0; or		assigned to these registers and th O can be read over these values.	en read over the desired
P10.1.7 ^②	FB process data	input 7 selection			ID 2539
Minimum value:	0	Maximum value:	12,464	Default value:	0
Description:	fieldbus network w Default values for p Process data IN1 = Process data IN2 = Process data IN3 = Process data IN4 =	ord for process data. Any drive rocess data in:		assigned to these registers and th O can be read over these values.	en read over the desired

Table 67. Fieldbus (FB) status (Cont.).

FB process data input 8 selection	1	ID 2540
0 Maximum	value: 12,464	Default value: ()
fieldbus network word for process data Default values for process data in: Process data IN1 = NULL = ID 0; Process data IN2 = FB PI Set Point1= ID Process data IN3 = FB PI Feedback1= IE Process data IN4 = Acceleration time 1	2542; 2550; 1D 103; = ID 104;	
	0 Maximum With the fieldbus data output selection: fieldbus network word for process data Default values for process data in: Process data IN1 = NULL = ID 0; Process data IN2 = FB PI Set Point1= ID Process data IN3 = FB PI Feedback1= ID Process data IN4 = Acceleration time 1= Process data IN5 = Deceleration time 1=	With the fieldbus data output selections, parameter/monitor IDs can be fieldbus network word for process data. Any drive parameter with an Default values for process data in: Process data IN1 = NULL = ID 0; Process data IN2 = FB PI Set Point1= ID 2542; Process data IN3 = FB PI Feedback1= ID 2550; Process data IN4 = Acceleration time 1= ID 103; Process data IN5 = Deceleration time 1= ID 104;

P10.2.1 ²	FB process data	output 1 selection			ID 1556
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Description:		ata output selections, parameter ord for process data. Any drive			en read over the desired
	Process data Out1 = Process data Out2 = Process data Out3 = Process data Out4 = Process data Out5 = Process data Out6 =	rocess data out in fieldbus (build: Output frequency = ID 1; Motor speed = ID 2; Motor current = ID 3; Motor torque = ID 4; Motor power = ID 5; Motor voltage = ID 6;	d table for below values):	
		DC link voltage = ID 7; or Latest fault code = ID 28.			
P10.2.2 ²	FB process data	output 2 selection	,	1	ID 1557
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
	Process data Out1 = Process data Out2 = Process data Out3 = Process data Out4 = Process data Out5 = Process data Out6 = Process data Out7 =	rocess data out in fieldbus (build: Output frequency = ID 1; Motor speed = ID 2; Motor current = ID 3; Motor torque = ID 4; Motor power = ID 5; Motor voltage = ID 6; DC link voltage = ID 7; or Latest fault code = ID 28.	d table for below values):	
P10.2.3 ^②	FB process data	output 3 selection			ID 1558
P10.2.3®	N.A.	Maximum value:	N.A.	Default value:	3
Minimum value:		ata output coloctions, paramoto	r/monitor IDs can be ass	signed to these registers and th	en read over the desire
		ord for process data. Any drive		in be read over these values.	

Table 67. Fieldbus (FB) status (Cont.).

P10.2.4 ^②	FB process data outpu	ut 4 selection			ID 1559
Vinimum value:	N.A.	Maximum value:	N.A.	Default value:	4
Description:				gned to these registers and the be read over these values.	n read over the desired
	Default values for process Process data Out1 = Outpl Process data Out2 = Moto Process data Out3 = Moto Process data Out4 = Moto Process data Out5 = Moto Process data Out6 = Moto Process data Out7 = DC lin Process data Out8 = Lates	ut frequency = ID 1; ir speed = ID 2; ir current = ID 3; ir current = ID 3; ir torque = ID 4; ir power = ID 5; ir voltage = ID 6; nk voltage = ID 7; or	d table for below values):		
P10.2.5 ^②	FB process data outpu	ut 5 selection			ID 1560
Viinimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Description:				gned to these registers and the be read over these values.	n read over the desired
	Default values for process Process data Out1 = Outpu Process data Out2 = Moto Process data Out3 = Moto Process data Out4 = Moto Process data Out5 = Moto Process data Out6 = Moto Process data Out7 = DC lin Process data Out8 = Lates	ut frequency = ID 1; or speed = ID 2; or current = ID 3; or current = ID 3; or torque = ID 4; or power = ID 5; or voltage = ID 6; ok voltage = ID 7; or	d table for below values):		
P10.2.6 ^②	FB process data outpu	ut 6 selection		'	ID 1561
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	6
Description:		process data. Any drive data out in fieldbus (built frequency = ID 1; fr speed = ID 2; fr current = ID 3; fr torque = ID 4; fr power = ID 5; fr voltage = ID 6; fr voltage = ID 7; fr voltage = ID 7;	parameter with an ID can	ned to these registers and the be read over these values.	n read over the desired
P10.2.7 ^②	FB process data outpu	ut 7 selection			ID 1562
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	7
Description:		process data. Any drive data out in fieldbus (built frequency = ID 1; fr speed = ID 2; fr current = ID 3; fr torque = ID 4; fr power = ID 5; fr voltage = ID 6; fk voltage = ID 7; or	parameter with an ID can	ned to these registers and the be read over these values.	n read over the desired

Table 67. Fieldbus (FB) status (Cont.).

P10.2.8 ^②	FB process date	a output 8 selection			ID 1563
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	28
Description:	fieldbus network v Default values for Process data Out1 Process data Out2 Process data Out3 Process data Out4 Process data Out5 Process data Out5		parameter with an	ne assigned to these registers and the ID can be read over these values. alues):	n read over the desired

P10.3 - Standard status word.

P10.3.1 ^②	Standard status word	l Bit0 function select			ID 2415
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Not used; 1 = Ready; 2 = Run; 3 = Fault; 4 = Fault invert; 5 = Warning; 6 = Reversed; 7 = At speed; 8 = Zero frequency; 9 = Frequency limit super 10 = Pl supervision; 11 = Torque limit supervisi 12 = Reference limit supervisi 14 = Temperature limit supervisi 15 = Analog input supervisi 16 = Motor current super 17 = Over heat fault; 18 = Overcurrent regular; 19 = Overvoltage regular; 20 = Undervoltage regular; 20 = Undervoltage regular; 21 = 4 mA reference fault; 22 = External fault/warn; 23 = Motor thermal prote; 24 = STO fault output; 25 = Control from I/O; 26 = Remote control; 27 = Un-requested rotatic; 28 = Fire mode; 29 = Damper control; 30 = Valve control; 31 = Jog speed select; 32 = Fieldbus digital input 33 = Fieldbus digital input 34 = DC charge switch clud 35 = Preheat active; 36 = Cold weather active; 37 = Pl Sleep 38 = 2nd stage ramp freq 39 = Prime pump active; 40 = Master drive state; 41 = Slave drive state; or 43 = Single drive control.	sion; rvision; ion; pervision; ision; vision; r; r; //warning; ng; ction; on direction; t 1; t 2; ose;			
Description:	This parameter allows fo status word. This also ca			rd that then can be read over the	communication standard

Table 67. Fieldbus (FB) status (Cont.).

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Table 67. Fieldbus (FB) status (Cont.).

Minimum value: N.A. Maximum value: N.A. Default value: 3
1 = Ready, 2 = Run, 3 = Fault; 4 = Fault invert; 5 = Warning; 6 = Reversed; 7 = At speed; 8 = Zero frequency; 9 = Frequency limit supervision; 10 = Pl supervision; 11 = Torque limit supervision; 12 = Reference limit supervision; 13 = Power limit supervision; 14 = Temperature limit supervision; 15 = Analog input supervision; 16 = Motor current supervision; 17 = Over heat fault; 18 = Overcurrent supervision; 19 = Overvoltage regular; 20 = Undervoltage regular; 21 = 4 mA reference fault/warning; 22 = External fault/warning; 23 = Motor thermal protection; 24 = STO fault output; 25 = Control from I/O; 26 = Remote control; 37 = Un-requested rotation direction; 28 = Fire mode; 29 = Damper control; 30 = Valve control; 31 = Jog speed select;
33 = Fieldbus digital input 2; 34 = DC charge switch close; 35 = Preheat active; 36 = Cold weather active; 37 = PI Sleep 38 = 2nd stage ramp frequency active; 39 = Prime pump active; 40 = Master drive state; 41 = Slave drive state; or 43 = Single drive control.

Table 67. Fieldbus (FB) status (Cont.).

P10.3.4 ²	Standard status word Bit 3 function s	ID 2418		
Minimum value:	N.A. Maximum valu	e: N.A.	Default value:	4
Options:	0 = Not used; 1 = Ready; 2 = Run; 3 = Fault; 4 = Fault invert; 5 = Warning; 6 = Reversed; 7 = At speed; 8 = Zero frequency; 9 = Frequency limit supervision; 10 = Pl supervision; 11 = Torque limit supervision; 12 = Reference limit supervision; 13 = Power limit supervision; 14 = Temperature limit supervision; 15 = Analog input supervision; 16 = Motor current supervision; 17 = Over heat fault; 18 = Overcurrent regular; 19 = Overvoltage regular; 20 = Undervoltage regular; 21 = 4 mA reference fault/warning; 22 = External fault/warning; 23 = Motor thermal protection; 24 = STO fault output; 25 = Control from I/O; 26 = Remote control; 27 = Un-requested rotation direction; 28 = Fire mode; 29 = Damper control; 30 = Valve control; 31 = Jog speed select; 32 = Fieldbus digital input 1; 33 = Fieldbus digital input 2; 34 = DC charge switch close; 35 = Preheat active; 36 = Cold weather active; 37 = Pl Sleep 38 = 2nd stage ramp frequency active; 39 = Prime pump active; 40 = Master drive state; 41 = Slave drive state; or 43 = Single drive control.			
Description:	This parameter allows for setting one of the F status word. This also can be viewed in the k	RO functions to a status v	word that then can be read over the	communication standard

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Table 67. Fieldbus (FB) status (Cont.).

Minimum value: N.A. Default value: 5
1 = Ready, 2 = Run, 3 = Fault, 4 = Fault invert; 5 = Warning; 6 = Reversed; 7 = At speed; 8 = Zero frequency; 9 = Frequency limit supervision; 10 = Pl supervision; 11 = Torque limit supervision; 12 = Reference limit supervision; 13 = Power limit supervision; 14 = Temperature limit supervision; 15 = Analog input supervision; 16 = Motor current supervision; 17 = Over heat fault; 18 = Overcurrent regular; 19 = Overcurrent regular; 20 = Undervoltage regular; 21 = 4 mA reference fault/warning; 22 = External fault/warning; 23 = Motor thermal protection; 24 = STO fault output; 25 = Control from I/O; 26 = Remote control; 27 = Un-requested rotation direction; 28 = Fire mode; 29 = Damper control; 30 = Valve control; 31 = Jog speed select; 32 = Fieldbus digital input 1; 33 = Fieldbus digital input 2; 34 = DC charge switch close; 35 = Preheat active; 36 = Cold weather active; 37 = PI Sleep
38 = 2nd stage ramp frequency active; 39 = Prime pump active; 40 = Master drive state; 41 = Slave drive state; or 43 = Single drive control.

Table 67. Fieldbus (FB) status (Cont.).

P10.3.6 ^②	Standard status word Bit 5 function select	ID 2420		
Minimum value:	N.A. Maximum value:	N.A.	Default value:	6
Options:	0 = Not used; 1 = Ready; 2 = Run; 3 = Fault; 4 = Fault invert; 5 = Warning; 6 = Reversed; 7 = At speed; 8 = Zero frequency; 9 = Frequency limit supervision; 10 = Pl supervision; 11 = Torque limit supervision; 12 = Reference limit supervision; 13 = Power limit supervision; 14 = Temperature limit supervision; 15 = Analog input supervision; 16 = Motor current supervision; 17 = Over heat fault; 18 = Overcurrent regular; 19 = Overvoltage regular; 20 = Undervoltage regular; 21 = 4 mA reference fault/warning; 22 = External fault/warning; 23 = Motor thermal protection; 24 = STO fault output; 25 = Control from I/O; 26 = Remote control; 27 = Un-requested rotation direction; 28 = Fire mode; 29 = Damper control; 30 = Valve control; 31 = Jog speed select; 32 = Fieldbus digital input 1; 33 = Fieldbus digital input 2; 34 = DC charge switch close; 35 = Preheat active; 36 = Cold weather active; 37 = PI Sleep 38 = 2nd stage ramp frequency active; 39 = Prime pump active; 40 = Master drive state; 41 = Slave drive state; 41 = Slave drive state; 41 = Slave drive state;			
Description:	This parameter allows for setting one of the RO fur status word. This also can be viewed in the keypa	octions to a status v	vord that then can be read over the	communication standard

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Table 67. Fieldbus (FB) status (Cont.).

P10.3.7 ^②	Stanuaru status	Standard status word Bit 6 function select				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	7	
ptions:	0 = Not used; 1 = Ready; 2 = Run; 3 = Fault; 4 = Fault invert; 5 = Warning; 6 = Reversed; 7 = At speed; 8 = Zero frequency 9 = Frequency limit 10 = Pl supervision 11 = Torque limit s: 12 = Reference limit 13 = Power limit s: 14 = Temperature l 15 = Analog input : 16 = Motor current 17 = Over heat fau 18 = Overcurrent r 19 = Overvoltage r 20 = Undervoltage 21 = 4 mA referent 22 = External fault 23 = Motor therma 24 = STO fault out 25 = Control from l 26 = Remote contr 27 = Un-requested 28 = Fire mode; 29 = Damper contr 30 = Valve control; 31 = Jog speed sel 32 = Fieldbus digit 33 = Fieldbus digit 34 = DC charge sw. 35 = Preheat activ. 36 = Cold weather 37 = Pl Sleep 38 = 2nd stage ran 39 = Prime pump a 40 = Master drive 41 = Slave drive st 43 = Single drive corters.	supervision; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;				
Description:			ctions to a status we	ord that then can be read over the o	enmunication standard	

Table 67. Fieldbus (FB) status (Cont.).

210.3.8 ^②	Standard status	ID 2422			
linimum value:	N.A.	Maximum value:	N.A.	Default value:	8
otions:	0 = Not used; 1 = Ready; 2 = Run; 3 = Fault; 4 = Fault invert; 5 = Warning; 6 = Reversed; 7 = At speed; 8 = Zero frequency 9 = Frequency limit 10 = Pl supervision 11 = Torque limit st 12 = Reference limit 13 = Power limit st 14 = Temperature l 15 = Analog input st 16 = Motor current 17 = Over heat fau 18 = Overcurrent re 19 = Overvoltage r 20 = Undervoltage 21 = 4 mA reference 22 = External fault 23 = Motor therma 24 = STO fault out 25 = Control from l 26 = Remote contr 27 = Un-requested 28 = Fire mode; 29 = Damper contr 30 = Valve control; 31 = Jog speed sel 32 = Fieldbus digit: 33 = Fieldbus digit: 34 = DC charge sw 35 = Preheat active 36 = Cold weather 37 = Pl Sleep 38 = 2nd stage ran 39 = Prime pump a 40 = Master drive 41 = Slave drive st 43 = Single drive c	supervision; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;			
escription:		ows for setting one of the RO fun also can be viewed in the keypad		rd that then can be read over the	communication standard

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 68. Serial communication.

P11.1 - Basic settings.								
P11.1.1 ^①	Serial communication		,	,	ID 586			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Modbus RTU; 1 = BACnet MSTP (*DM1 PR 2 = SWD (*DM1 PR0).	O); or						
Description:	This parameter defines the communication protocol for RS-485.							
P11.2 - Modbus RTU.								
P11.2.1 ^①	Slave address				ID 587			
Minimum value:	1 1	Maximum value:	247	Default value:	1			
Description:	This parameter defines the slave address for RS-485 communication.							

Table 68. Serial communication (Cont.).

P11.2.2 ^①	Baud rate				ID 584		
linimum value:	N.A.	laximum 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 comm	unication speed for RS	G-485 communication.				
P11.2.3 ^①	Parity type		,	,	ID 585		
Minimum value:	N.A.	laximum value:	N.A.	Default value:	2		
Options:	0 = None; 1 = Odd; or 2 = Even.						
Description:	This parameter defines parity	type for RS-485 comm	nunication.				
P11.2.4	Modbus RTU protocol sta	atus			ID 588		
Minimum value:	N.A.	laximum value:	N.A.	Default value:	N.A.		
Options:	0 = Initial; 1 = Stopped; 2 = Operational; or 3 = Faulted.						
Description:	This parameter shows the pro	otocol status for RS-48	5 communication.				
P11.2.5	Communication timeout	modbus RTU			ID 593		
Minimum value:	0 ms	laximum value:	60,000 ms	Default value:	10,000 ms		
Description:	Selects the time to wait before	re a communication fa	ult occurs over modbus	RTU if a message is not receive	d.		
P11.2.6	Modbus RTU fault respon	nse			ID 2516		
Minimum value:	N.A.	laximum value:	N.A.	Default value:	0		
Options:	communications; if not in f	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 con	dition for modbus RTU	communication.				
D44.0 DA0 : 500							
P11.3 - BACnet MST	Р.						
P11.3 - BACnet MST P11.3.1 ^①	P. MSTP baud rate				ID 594		
	MSTP baud rate	faximum value:	N.A.	Default value:	ID 594		
P11.3.1 ^①	MSTP baud rate	laximum value:	N.A.	Default value:			
P11.3.1 ^① Minimum value:	MSTP baud rate N.A. 0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or						
P11.3.1 [©] Minimum value: Options:	N.A. N 0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200.						
P11.3.1 [©] Minimum value: Options: Description: P11.3.2 [©]	N.A. N 0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200. This parameter defines the co				2		
P11.3.1 [©] Minimum value: Options: Description: P11.3.2 [©] Minimum value:	N.A. N 0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200. This parameter defines the co	ommunication speed fo	or RS-485 communicatio 127	on.	2 ID 595		
P11.3.1 [©] Minimum value: Options: Description:	N.A. N 0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200. This parameter defines the co	ommunication speed fo	or RS-485 communicatio 127	on.	2 ID 595		
P11.3.1 [©] Minimum value: Options: Description: P11.3.2 [©] Minimum value: Description:	N.A. N 0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200. This parameter defines the company of t	ommunication speed fo	or RS-485 communicatio 127	on.	2 ID 595		
P11.3.1 [©] Minimum value: Options: Description: P11.3.2 [©] Minimum value: Description: P11.3.3 [©]	N.A. N 0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200. This parameter defines the company of t	ommunication speed for Maximum value: f the drive on the BACr Maximum value:	or RS-485 communication 127 net MSTP network. 4,194,302	on. Default value:	1 D 595 1 1 D 596		
P11.3.1 [©] Minimum value: Options: Description: P11.3.2 [©] Minimum value: Description: P11.3.3 [©] Minimum value:	N.A. N 0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200. This parameter defines the company of t	ommunication speed for Maximum value: f the drive on the BACr Maximum value: of the drive on the BA	or RS-485 communication 127 net MSTP network. 4,194,302	on. Default value:	1D 595 1		
P11.3.1 [®] Minimum value: Options: Description: P11.3.2 [®] Minimum value: Description: P11.3.3 [®] Minimum value: Description:	N.A. 0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 76,800; or 4 = 115,200. This parameter defines the company of the device address 0 Note that Defines the device address of the de	ommunication speed for Maximum value: If the drive on the BACr Maximum value: of the drive on the BA	or RS-485 communication 127 net MSTP network. 4,194,302	on. Default value:	1D 595 1 1D 596		

Table 68. Serial communication (Cont.).

P11.3.5	MSTP protocol statu	s			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 th	ne protocol status for BACno	et MSTP communic	cation.				
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.	r						
Description:	This parameter shows th	ne protocol status for BACno	et MSTP communic	cation.				
P11.3.7	MSTP fault response	1			ID 2526			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	communications. If r	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 faul	t condition for BACnet MS1	P communication.					
P11.3.8	MSTP maximum mas	ter			ID 1537			
Minimum value:	1	Maximum value:	127	Default value:	127			
Description:	Defines the maximum nu	ımber of masters that can e	stablish connection	ns with the drive.				
Minimum value: Options:	N.A. 0 = No permission to rea 1 = Acyclic read/write ar	Maximum value: d/write on acyclic channel;	N.A.	Default value:	1			
Description:		the operation priority of pa	ramotors for acycl	ic communication				
P11.5.2 ^①	Parameter data acce		- Idilieters for acycl	- Communication.	ID 2631			
Minimum value:		Maximum value:	NI A	Default value:				
Options:	N.A. 0 = Local control; 1 = Fieldbus; 2 = Mixed interface; 4 = NET, local on fault; o 5 = Dual mode.		N.A.	Delauit value:	4			
Description:	PNU928 which specifies	the control priority of the d	levice for cyclic cor	mmunication.				
P11.5.3	Fault situation coun	ter			ID 2632			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.			
Description:	PNU952 which specifies Only write of 0 is allowe (parameter 944) are eras		er (actual fault situ	uation and all other fault situations) a	and the fault message counte			
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 communicatio B1-Board HW fault; B2-IO1 24 volt overload f B3-Profibus communicat B4-fieldbus fault.	ault;						

Table 68. Serial communication (Cont.).

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	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.				
P11.6.2 ^②	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 mod	le.			
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.				

 $^{^{\}scriptsize \textcircled{0}}$ Parameter value can only be changed after the drive has stopped. $^{\scriptsize \textcircled{0}}$ Parameter value will be set to be default when changing macros.

Table 69. Ethernet communication.

P12.1 - Basic settings.							
P12.1.1 ^①	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/modbu	us 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 activ	e IP address.					
P12.1.3	Active subnet mask	Active subnet mask ID 1509					
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Description:	Reads the current activ	Reads the current active subnet mask.					
P12.1.4	Active default gate	way			ID 1511		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Description:	Reads the current activ	e default gateway.					

Table 69.	Ethernet	communication	Cont.).

MAC address				ID 1513
N.A.	Maximum value:	N.A.	Default value:	N.A.
Reads the current	MAC address.			
Static IP addre	ess			ID 1501
N.A.	Maximum value:	N.A.	Default value:	192.168.1.254
Defines the static	: IP address.			
Static subnet r	nask			ID 1503
N.A.	Maximum value:	N.A.	Default value:	255.255.255.0
Defines the static	subnet mask.			
Static default (gateway			ID 1505
N.A.	Maximum value:	N.A.	Default value:	192.168.1.1
Defines the static	default gateway.			
Ethernet comm	nunication timeout			ID 611
0 ms	Maximum value:	60,000 ms	Default value:	10,000 ms
Selects the time i	t waits before a communication fa	ult occurs over etherne	t.	
	N.A. Reads the current Static IP addre N.A. Defines the static Static subnet I N.A. Defines the static Static default s N.A. Defines the static Ethernet common of ms	N.A. Maximum value: Reads the current MAC address. Static IP address N.A. Maximum value: Defines the static IP address. Static subnet mask N.A. Maximum value: Defines the static subnet mask. Static default gateway N.A. Maximum value: Defines the static default gateway. Ethernet communication timeout 0 ms Maximum value:	N.A. Maximum value: N.A. Reads the current MAC address. Static IP address N.A. Maximum value: N.A. Defines the static IP address. Static subnet mask N.A. Maximum value: N.A. Defines the static subnet mask. Static default gateway N.A. Maximum value: N.A. Defines the static default gateway Ethernet communication timeout 0 ms Maximum value: 60,000 ms	N.A. Maximum value: N.A. Default value: Reads the current MAC address. Static IP address N.A. Maximum value: N.A. Default value: Defines the static IP address. Static subnet mask N.A. Maximum value: N.A. Default value: Defines the static subnet mask. Static default gateway N.A. Maximum value: N.A. Default value: Defines the static default gateway. Ethernet communication timeout

P12.2 - Trusted IP filter (DM1 PRO only).

P12.2.1	Trusted IP white lis	st			ID 68	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0.0.0.0 0.0.0.0 192.168.1.255	
Description:	Defines the IP address	es in the white list. A setting	g of 192.168.1.255 e	nables all connections on the local	subnet.	
P12.2.2	Trusted IP filter en	able		'	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).

P12.3.1 ^①	Modbus TCP enable	е			ID 1942
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disable; or 1 = Enable.				
Description:	Enables modbus TCP c	ommunications, must be enal	oled to connect to Po	ower Xpert inControl.	
P12.3.2	Modbus TCP conne	ection limit			ID 609
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Description:	Maximum number of c	onnections allowed to the dri	ve.		
P12.3.3	Modbus TCP unit id	dentifier number			ID 610
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Description:	Unit identifier unit valu	ie for modbus TCP.			
P12.3.4	Modbus TCP proto	col 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 modb	ic TCD communication	on.	

Table 69. Ethernet communication (Cont.).

P12.3.5	Modbus TCP fault response			ID 2517	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	communication	ns. If not in fieldbus control, place	e will not fault.	nd fieldbus fault is active, the drive nication is lost, fieldbus fault respo	
Description:	Defines the fieldh	us fault condition for modbus TCP	communication		

P12.4 - Ethernet IP (DM1 PRO only).

P12.4.1 ^①	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 e	hernet I/P port.				
P12.4.2	Ethernet IP pro	tocol 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 etherno	et protocol is active or not.					
P12.4.3	Ethernet IP faul	t response		'	ID 2518		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	communication	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 fieldbu	s fault condition for ethernet IP o	ommunication.				

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

P12.5.1 ^①	BACnet IP UDP po	rt number			ID 1733
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	47,808
Options:	47808 = BACO; 47809 = BAC1; 47810 = BAC2; 47811 = BAC3; 47812 = BAC4; 47813 = BAC5; 47814 = BAC6; 47815 = BAC7; 47816 = BAC8; 47817 = BAC9; 47819 = BACB; 47820 = BACC; 47821 = BACD; 47822 = BACE; or 47823 = BACF.				
Description:	Defines the BACnet U	IDP port number.			
P12.5.2 ^①	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 fo	oreign device configuration.			

Table 69. Ethernet communication (Cont.).

P12.5.3 ^①	BACnet IP BBMD I	P			ID 1735
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0.0.0.0
Description:	Displays the BACnet E	BBMD IP address.			
P12.5.4 ^①	BACnet IP UDP po	rt			ID 1737
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	47,808
Options:	47808 = BACO; 47809 = BAC1; 47810 = BAC2; 47811 = BAC3; 47812 = BAC4; 47813 = BAC5; 47814 = BAC6; 47815 = BAC7; 47816 = BAC8; 47817 = BAC9; 47818 = BACA; 47819 = BACC; 47821 = BACC; 47821 = BACC; 47821 = BACE; 47822 = BACE; or 47823 = BACF.				
Description:		BBMD UDP port number.			
P12.5.5 ^①	BACnet IP registra	ntion interval	,	,	ID 1738
Minimum value:	0	Maximum value:	65,535	Default value:	10
Description:	Defines the registration	on interval.			
P12.5.6	BACnet IP commu	nication timeout			ID 1739
Minimum value:	0 ms	Maximum value:	60,000 ms	Default value:	0 ms
Description:	Selects the time it wa	its before a communication fa	ult occurs over BACnet I	P	
P12.5.7	BACnet IP protoco	ol 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 BACn	et IP communication.		
P12.5.8	BACnet IP fault be	ehavior			ID 1741
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	communications.	If not in fieldbus control, place	e will not fault.	eldbus fault is active, the drive ion is lost, fieldbus fault respo	
Description:	Defines the fieldbus f	ault condition for BACnet IP co	ommunication.		
P12.5.9 ^①	BACnet IP instanc	e number			ID 1742
Minimum value:	0	Maximum value:	4,194,302	Default value:	0
Description:	Displays the BACnet i	nstance number			

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

P12.6.1	Web UI protocol st	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.						

Table 69. Ethernet communication (Cont.).

P12.6.2	Web UI fault resp	onse			ID 2916
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	communications.	If not in fieldbus control, place	e will not fault.	ieldbus fault is active, the drive ation is lost, fieldbus fault respo	
Description:	Defines the fieldbus	fault condition for web server	communication.		
P12.6.3	Web UI communi	cation timeout			ID 2919
Minimum value:	30,000 ms	Maximum value:	60,000 ms	Default value:	60,000 ms
Description:	Selects the time it w	vaits before a communication fa	ult occurs over the we	b server.	
P12.6.4 ^①	Web UI enable				ID 2921
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; or 1 = Enabled.				
Description:	Enables web server	configuration and monitoring pa	age.		

[©] Parameter value can only be changed after the drive has stopped. © Parameter value will be set to be default when changing macros.

Table 70. System .

			-		
P13.1 - Basic setting	gs.	'			,
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 available language is E		uency converter thro	ough the keypad in the language of	your choice. Currently
P13.1.2 ^①	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 th	e active application if multip	e applications have	been loaded.	
P13.1.3 ^①	Parameter sets				ID 619
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = No; 1 = Load factory defau 2 = Reload set 1; 3 = Reload set 2; 4 = Store parameter se 5 = Store parameter se 6 = Reset; or 7 = Reload defaults VN	et 1; et 2;			
Description:	This parameter allows	you to reload the factory def	ault parameter value	es, and to store and load two custo	mized 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	5).			
Description:	This function uploads	all existing parameter groups	to the keypad.		

Table 70. System (Cont.).

P13.1.5 ^①	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 parameter	S.								
Description:	This function downloads o	ne or all parameter group	s from the keypa	d to the drive.						
P13.1.6	Parameter comparison	n			ID 623					
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.					
Options:	0 = No; 1 = Compare with keypad; 2 = Compare with default; 3 = Compare with Set 1; o 4 = Compare with Set 2.									
Description:	With the parameter comparand those loaded to the co		ompare the actua	al parameter values to the values of you	ur customized parameter set					
		The actual parameter values are first compared to those of the customized parameter Set 1. If no differences are detected, a "0" is displayed on the lowermost line of the keypad.								
	If any of the parameter va	If any of the parameter values differ from those of the Set 1 parameters, the number of the deviations is displayed together.								
	By pressing the right arrow button, once again you will see both the actual value and the value it was compared to. In this display, the value on the description line (in the middle) is the default value, and the one on the value line (lowermost line) is the edited value. You can also edit the actual value by pushing the right arrow button.									
	Actual values can also be	compared to Set 2, factor	y settings, and ke	eypad set values.						
P13.1.7	Parameter lock PIN	,		,	ID 624					
Minimum value:	0	Maximum value:	9,999	Default value:	0					
Description:	enabled, the user will be p	prompted to enter a passw function is not in use. If y	ord before applic ou want to activa	nges with the password function. Who cation changes, parameter value chang ate the password, change the value of	es, or password changes.					
P13.1.8	Keypad parameter loc	•		,	ID 625					
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0					
Options:	0 = Change enable; or 1 = Change disable.		14.71.		· ·					
Description:	the display if you try to ed	it a parameter value.		If the parameter lock is activated, the	text "locked" will appear on					
	Note: This function does r	not prevent unauthorized (editing of parame	eter 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 application desired and completion, it allows the u always enabled for the ini	d then advances parametouser to go to the main mer tial power up of the DM1	ers through the s ou or default page PRO. By setting	cted "Enable", the Start-up Wizard pro tart-up parameter list/Application Mini e and this parameter is set to "Disableo this parameter to "Disable" without go Start-up Wizard after completion, or d	wizard in keypad. After d". The Start-up Wizard is ing through the Start-up					

Table 70. System (Cont.).

P13.2 - Keypad.	1			,					
P13.2.1	Local default page				ID 1875				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0				
Options:	0 = None; or 1 = Monitor.								
Description:	Local default page selecti	on.							
13.2.2	Local monitor parame	eter set			ID 1876				
/linimum value:	N.A.	Maximum value:	N.A.	Default value:	1,1,0				
Description:	Local monitor parameter (oath. Default path is M1.1							
13.2.3	Default page			'	ID 628				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0				
Options:	0 = None; 1 = Main menu; 2 = Multi-monitor; 3 = Favorite menu; or 4 = Keypad reference.								
Description:	switched on.		·	the timeout time expires or whe					
P13.2.4	Timeout time	s o, the function is not act	ivateu. i.e., the last dis	played page remains on the key	ID 629				
713.2.4 Minimum value:		Maximum value	CE EQE -	Default value:					
	1 s	Maximum value:	65,535 s.		30 s				
Description:	The timeout time setting	defines the time after whi	ch the keypad display ri	eturns to the Default Page.					
	Note: If the default page	value is 0, the timeout tim	e setting has no effect						
213.2.5	Contrast adjust				ID 630				
/linimum value:	5	Maximum value:	18	Default value:	12				
Description:	If the remote keypad disp	lay is not clear, you can ad	ljust the keypad contras	t 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 determine	s how long the backlight s	stays on before going or	ıt.					
213.2.7	Fan control				ID 632				
/linimum value:	N.A.	Maximum value:	N.A.	Default value:	1				
Options:	60°C (140°F). The far minute	on the temperature of the receives a stop command	I when the heat sink ter	ed on automatically when the he nperature falls to 55°C (131°F).	The fan runs for about a				
	"Temperature". 2 = Run follow - after pow	ver up, the fan is stopped u	until the run command i	s after changing the value from ' s given and then fan runs contin					
				sistors on power up moment.					
Description:		o control the DM1 PRO's o	cooling fan. You can se	t the fan to run as stated in the	•				
P13.2.8	Keypad ACK timeout				ID 633				
Viinimum value:	200 ms	Maximum value:	5,000 ms	Default value:	200 ms				
Description:	between the control mode keypad to delay message	This function allows the user to change the timeout of the keypad acknowledgement time. This is the communication performed between the control module and the keypad. This would be adjusted when using long communication cables between drive and a keypad to delay message timeouts.							
	= The value of HMI ackno	the frequency converter a wledge timeout is set to 1 ng shall be entered in the	200.00 ms (2 x 600.00,	sending delay + receiving delay).				
	la accesa al calle a caracidada a	والمراجعة والمراوات والمراوع والمراو	at tinat to the	and the same of th	n frequency converter drive				

Table 70. System (Cont.).

P13.2.9	Keypad retry	number number			ID 634	
Minimum value:	1	Maximum value:	10	Default value:	5	
Description:	With this parameter you can set the number of times the drive will try to receive acknowledgement when it has not been received within the acknowledgement time (HMI acknowledge timeout) or if the received acknowledgement is faulty.					

P13.3.1 ^②	Output display unit	t			ID 2424
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	45
Options:	0 = %;				
	1 = 1/min;				
	2 = rpm;				
	3 = ppm;				
	4 = pps;				
	5 = l/s; 6 = l/min;				
	7 = I/h;				
	8 = kg/s;				
	9 = kg/min;				
	10 = kg/h;				
	11 = m3/s;				
	12 = m3/min;				
	13 = m3/h;				
	14 = m/s; 15 = mbar;				
	16 = bar;				
	17 = Pa;				
	18 = kPa;				
	19 = mVS;				
	20 = kW;				
	21 = Deg. C;				
	22 = GPM;				
	23 = gal/s;				
	24 = gal/min; 25 = gal/h;				
	26 = lb/s;				
	27 = lb/min;				
	28 = lb/h;				
	29 = CFM;				
	30 = ft3/s;				
	31 = ft3/min;				
	32 = ft3/h;				
	33 = ft/s;				
	34 = in wg; 35 = ft wg;				
	36 = PSI;				
	37 = lb/in2;				
	38 = HP;				
	39 = Deg. F;				
	40 = PA;				
	41 = WC;				
	42 = HG;				
	43 = ft; 44 = m;				
	44 = 111, 45 = Hz;				
	46 = strokes/min.				
escription:			esired unit that will reflect the		with P13.3.2 and P13.3.3,
13.3.2 ^②		Output display unit minimum			
/linimum value:	-60,000.00 varies	Maximum value:	OutputDisplayUnitMax	Default value:	0.00 varies

Table	70.	System	(Cont.)	١.

P13.3.3 ^②	Output display unit r	naximum	'	'	ID 2425
Minimum value:	OutputDisplayUnitMin varies	Maximum value:	60,000.00 varies	Default value:	MotorNomFreqMFG varies
Description:	Sets the maximum scaled value when changing the display unit to a value other than the default Hz.				

P13.4 - Version information.

P13.4.1	Keypad softwa	are 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.					
P13.4.3	Application so	oftware version			ID 644	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Description:	MCU/application	software version.				
P13.4.4	Software bund	Software bundle version				
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:		display three actual monitor itored with other values.	ed values at the sar	me time. This parameter determine	s if the operator is allowed to			
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 passy	vord, reset the parameter va	lue to 0.					
P13.5.4	Drive application na	ame			ID 2922			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.			

P13.6 - User information.

P13.6.1	Total MWh count				ID 601
Minimum value:	N.A. MWh	Maximum value:	N.A. MWh	Default value:	N.A. MWh
Description:	Megawatt hours total operation time counter of the drive output active.				

Table 70. System (Cont.).

P13.6.2	Total power da	ay count			ID 603
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Number of days t	the drive has been supplied with po	ower.		
P13.6.3	Total power he	our count			ID 606
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Number of hours	the drive has been supplied with p	ower.		
P13.6.4	Total motor ho	our count		·	ID 1872
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	h
Description:	Number of hours	the DM1 PRO has been running a	motor.		
P13.6.5	Trip MWh coul	nt			ID 604
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	MWh
Description:	Megawatts hour	s of the drive output active since la	ast reset.		
P13.6.6	TClear trip MV	Vh count		'	ID 639
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Not reset; 1 = Clear trip MV 2 = Clear trip pov				
Description:	Resets the day a	nd hour motor or drive running cou	nter and resets the r	motor run time in the menu.	
P13.6.7	Trip power day	y count			ID 636
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Number of days	since the last reset.			
P13.6.8	Trip power ho	ur count			ID 637
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Number of hours	the DM1 PRO has been running a	motor since the last	reset.	

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

Application notes

Faults and warning codes

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

Table 71. 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 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 active faults submenu shows the list of faults. Select the fault and push DETAIL to see the fault data.	The memory of active faults can store the maximum of 10 faults in the order of appearance.

Table 72. 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 Al1 or Al2, 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.

Application notes

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,	Check RS485 communication wiring. Verify drive parameters are set correctly. Check master programming to verify proper addressing.
84	Fieldbus fault	Fault	Configurable	loss of communication with modbus RTU. (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 \sim -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.
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 Al. The Al signal range is 1 (20-100%/2-10 V/4-20m A). The Al value is out of range (Al mode: 0~20 mA, Al < 4 mA or Al > 20 mA, Al mode: 0~10 V, Al < 2 V or Al > 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).

Fault code	Fault name/ description	Fault type	Default configuration	Possible cause	Remedy
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.
103	Drive over temperature	Warning		Drive degree greater than (DCI_wDriveOverTempThreshold value - 10 degree) and less than DCI_wDriveOverTempThreshold value,report drive over temperature warning.	Check the drive degree.
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	Al limit supv. (Al limit)	No action		The AI value exceeds the range of AI supervision limit.	Check the Al value and check the setting of Al 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 Ul 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.

Recommended secure hardening guidelines

Introduction

This section "secure configuration" or "hardening" guidelines provide information to the users to securely deploy and maintain this product to adequately minimize the cybersecurity risks to their system.

Eaton is committed to minimizing the Cybersecurity risk in its products and deploys cybersecurity best practices and latest cybersecurity technologies in its products and solutions; making them more secure, reliable and competitive for our customers. Eaton also offers Cybersecurity Best Practices whitepapers to its customers that can be referenced at www.eaton.com/cybersecurity

PowerXL - secure configuration guidelines

Category	Description		
Asset identification and Inventory	Keeping track of all the devices in the system is a pre-requisite for effective management of Cybersecurity of a system. Ensure you maintain an inventory of all the components in your system in a manner in which you uniquely identify each component. To facilitate this PowerXL Series VFD supports the following identifying information - manufacturer, type, serial number, f/w version number, and location.		
	Customers/users can read following information from product label		
	Model Number		
	Serial Number		
	Device Name		
	Information specific to communication protocols is available form parameter menu as below		
	IP Address Mode		
	Active IP Address		
	MAC Address		
	See application manual for these parameter locations.		
Restrict Physical access	Industrial Control Protocols don't offer cryptographic protections at protocol level leaving them exposed to Cybersecurity risk. Physical security is an important layer of defense in such cases. PowerXL Series VFD is designed with the consideration that it would be deployed and operated in a physically secure location.		
	 Eaton suggests that physical access to cabinets and/or enclosures containing PowerXL Series VFD and the associated system should be restricted, monitored and logged at all times. 		
	 Physical access to the communication lines should be restricted to prevent any attempts of wiretapping, sabotage. It's a best practice to use metal conduits for the communication lines running between one cabinet to another cabinet. 		
	 Attacker with unauthorized physical access to the device could cause serious disruption of the device functionality. A combination of physical access controls to the location should be used, such as locks, card readers, and/or guards etc. 		
	 PowerXL Series VFD supports the following physical access ports, 		
	 RJ45 connector for removable keypad as well as Modbus RTU communications 		
	 RJ45 for EtherNet IP/Modbus TCP communications 		
	 Terminal block for Modbus RTU and other Digital IOs 		
	Eaton suggests access to above physical ports need to be restricted.		

Category

Description

Restrict logical access to PowerXL series drive

It is extremely important to securely configure the logical access mechanisms provided in PowerXL Series VFD to safeguard the device from unauthorized access. PowerXL Series VFD provides various types of administrative, operational, configuration privilege levels. Eaton recommends that the available access control mechanisms be used properly to ensure that access to the system is restricted to legitimate users only. And, such users are restricted to only the privilege levels necessary to complete their job roles/functions.

Eaton recommends below best practices to be followed to ensure adequate cybersecurity of the setup/system

- Default credentials are changed upon first login. PowerXL Series VFD should not be commissioned for
 production with Default credentials, it's a serious Cybersecurity flaw as the default credentials are published
 in the manuals. Restrict administrative privileges Threat actors are increasingly focused on gaining control
 of legitimate credentials, especially those associated with highly privileged accounts. Limit privileges to
 only those needed for a user's duties. Make sure that the password used in the device is only available to
 authorized users like Configuring Engineers and not shared among all operational users.
- Perform periodic account maintenance to make sure that password is changed whenever there is personnel change.
- Change passwords and other system access credentials as appropriate
- PowerXL Series VFD is provided with data/access protection mechanism on keypad, follow below steps to
 utilize it

PowerXL Series VFD provides four levels of data protection for users to ensure the security:

- Lock parameters on keypad. User can lock the parameters through DI or disable change, in which way all the parameters cannot be edited.
- 2. Lock parameters while motor running. Motor control parameters can only be modified when motor is in stop mode. In which way to enhance the motor security. The parameters are listed in the application manual.
- 3. Through Power Xpert inControl tool, facility to hide parameters on keypad is available. User can hide the parameters he/she thinks are significant for himself/herself. Such as IP address and so on.
- 4. Password on keypad.
 - 0000 means no password, which is the default.
 - Password range is 0001 ~ 9999.
 - With password, user can monitor parameters value but need enter password if he/she wants to edit parameters.
 - User needs to re-enter the password if there is no key operation in 1 min after enter the password.
 - User needs to enter the old password if he/she wants to change to a new one.

Restrict network access

PowerXL Series VFD provides network access to facilitate communication with other devices in the systems and configuration. But this capability could open up a big security hole if it's not configured securely.

Eaton recommends segmentation of networks into logical enclaves and restrict the communication to host-to-host paths. This helps protect sensitive information and critical services and limits damage from network perimeter breaches. At a minimum, a utility Industrial Control Systems network should be segmented into a three-tiered architecture (as recommended by NIST SP800-82[R3]) for better security control.

Deploy adequate network protection devices like Firewalls, Intrusion Detection / Protection devices,

Below are the protocols and their port details available on PowerXL Series VFD. Use below information for configuring the firewalls.

PowerXL Series VFD provides below communication protocols -

- EtherNet IP protocols on RJ45 connector enabled by default on port 44818 and 2222
- Modbus TCP protocol on RJ45 connector enabled by default on port 502
- Modbus RTU on RS485 physical layer enabled by default
- BACnet MS/TP on RS485 physical layer disabled by default, when this is enabled, Modbus RTU is disabled.

All the protocols have dedicated menu structure, and details are described in User's Manual for how to activate or configure them.

 Eaton has published detailed information about various Network level protection strategies in Eaton Cybersecurity Considerations for Electrical Distribution Systems [R1].

Application notes

Category	Description		
Logging and event management	Best practices		
	 PowerXL Series VFD provides parameters change log and fault log functions for user, to help diagnose the drive 		
	1. Parameters change log:		
	 PowerXL Series VFD will log the parameter information in FRAM when the parameter changes. The max number of 66 items can be logged. New log will rewrite the old one. User cannot clear this fault information. 		
	2. Fault log:		
	 PowerXL Series VFD will log the drive information in FRAM when fault occurs. The max number of 10 items can be logged. New log will rewrite the old one. User can clear the history fault by pressing OK key more than 5 Sec. 		
	 PowerXL Series VFD will log the fault information in FRAM when fault occurs. The max number of 50 items can be logged. New log will rewrite the old one. User cannot clear this fault information. 		
Secure maintenance	Best practices		
	Apply firmware updates and patches regularly		
	Due to rapidly increasing Cyber Threats in Industrial Control Systems, Eaton implements a comprehensive patch and update process for its products. Users are encouraged to maintain a consistent process to promptly monitor for fresh firmware updates and apply the update whenever required.		
	 The latest firmware can be acquired from the www.eaton.com/drives website. There will be separate link for PowerXL Series VFD FR0 to FR6 and PowerXL Series VFD FR7 & FR8 		
	 Users can also sign up on our website to get emails when new material is released to the site if desired. 		
	 Using the PC Tool or verifying on the keypad the current version of firmware can be verified. 		
	 For additional information or technical support on Eaton's Variable frequency drive products contact us at TRCDrives@eaton.com or by phone at 800-386-2273 for US customers. For European customers contact us at AfterSalesEGBonn@eaton.com or by phone at +49 (0) 228602-3640 		
	Eaton also has a robust vulnerability response process. In the event of any security vulnerability getting discovered in its products, Eaton patches the vulnerability and releases information bulletin through its cybersecurity website - http://www.eaton.com/cybersecurity and patches through www.eaton.com/drives.		

References

[R1] Cybersecurity Considerations for Electrical Distribution Systems (WP152002EN):

 $http://www.eaton.com/ecm/groups/public/@pub/@eaton/@corp/documents/content/pct_1603172.pdf$

[R2] Cybersecurity Best Practices Checklist Reminder (WP910003EN):

 $http://www.cooperindustries.com/content/dam/public/powersystems/resources/library/1100_EAS/WP910003EN.pdf$

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