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PowerXL DM1 series VFD (Original instructions)





Supports Firmware Version Bundle: V2.02

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Safety



WARNING! DANGEROUS ELECTRICAL VOLTAGE!

Read this manual thoroughly and make sure you understand the procedures before you attempt to install, set up, operate or carry out any maintenance work on this PowerXL Adjustable Frequency Drive.

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.

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

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

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 earthed.
- Wear safety glasses whenever working on electronic controllers or rotating machinery.

A WARNING

The components in the drive's power section remain energized after the supply voltage has been switched off. After disconnecting the supply, wait at least five minutes before removing the cover to allow the intermediate circuit capacitors to discharge.

Pay attention to hazard warnings!



🛕 WARNING

Electric shock hazard—risk of injuries! Carry out wiring work only if the unit is de-energized.

WARNING

Do not perform any modifications on the AC drive when it is connected to mains.

Warnings and cautions

A WARNING

Be sure to ground the unit following the instructions in this manual. Ungrounded units may cause electric shock and/or fire.

A WARNING

This equipment should only be installed, adjusted, and serviced by qualified electrical maintenance personnel familiar with the construction and operation of this type of equipment and the hazards involved. Failure to observe this precaution could result in death or severe injury.

WARNING

Components within the drive are live when it is connected to power. Contact with this voltage is extremely dangerous and may cause death or severe injury.

A WARNING

Line terminals (L1, L2, L3), motor terminals (U, V, W) and the brake resistor terminals (R+, R-) are live when the drive is connected to power, even if the motor is not running. Contact with this voltage is extremely dangerous and may cause death or severe injury.

In a residential environment, this product may cause radio interference, in which case supplementary mitigation measures may be required.

- This type of PDS is not intended to be used on a low-voltage public network which supplies residential premises.
- Radio frequency interference is expected if used on such a network.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Even though the control I/O-terminals are isolated from line voltage, the relay outputs and other I/O-terminals may have dangerous voltage present even when the drive is disconnected from power. Contact with this voltage is extremely dangerous and may cause death or severe injury.

This equipment has a large capacitive leakage current during operation, which can cause enclosure parts to be above ground potential. Proper grounding, as described in this manual, is required. Failure to observe this precaution could result in death or severe injury.

Before applying power to this drive, make sure that the front and cable covers are closed and fastened to prevent exposure to potential electrical fault conditions. Failure to observe this precaution could result in death or severe injury.

An upstream disconnect/protective device must be provided as required by the National Electric Code[®] (NEC[®]). Failure to follow this precaution may result in death or severe injury.

A WARNING

This drive can cause a DC current in the protective earthing conductor. Where a residual current-operated protective (RCD) or monitoring (RCM) device is used for protection in case of direct or indirect contact, only an RCD or RCM of Type B is allowed on the supply side of this product.

🛕 WARNING

Carry out wiring work only after the drive has been correctly mounted and secured.

WARNING

Before opening the drive covers:

- Disconnect all power to the drive, including external control power that may be present
- Wait a minimum of five minutes after all the lights on the keypad are off. This allows time for the DC bus capacitors to discharge
- A hazard voltage may still remain in the DC bus capacitors even if the power has been turned off. Confirm that the capacitors have fully discharged by measuring their voltage using a multimeter set to measure the DC voltage

Failure to follow these precautions may cause death or severe injury.

A WARNING

The opening of the branch-circuit protective device may be an indication that a fault current has been interrupted. To reduce the risk of fire or electric shock, current-carrying parts and other components of the controller should be examined and replaced if damaged. If burnout of the current element of an overload relay occurs, the complete overload relay must be replaced.

A WARNING

Operation of this equipment requires detailed installation and operation instructions provided in the Installation/Operation manual intended for use with this product. It should be retained with this device at all times. A hard copy of this information may be ordered from literature fulfillment.

Before servicing the drive:

- Disconnect all power to the drive, including external control power that may be present.
- Place a "DO NOTTURN ON" label on the disconnect device Lock the disconnect device in the open position.

Failure to follow these precautions may cause death or severe injury.

The drive outputs (U, V, W) must not be connected to the input voltage or the utility line power as severe damage to the device may occur and there may be a risk of fire.

WARNING

The heat sink and/or outer enclosure may reach a high temperature.

Pay attention to hazard warnings!



Hot Surface-Risk of Burn. DO NOT TOUCH!

A WARNING

In a domestic environment, this product may cause radio interference, in which case supplementary mitigation measures may be required.

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.

Abbreviation	Definition
СТ	Constant torque with high overload rating (150%)
VT	Variable torque with low overload rating (110%)
IH	High overload current (150%)
I _L	Low overload current (110%)
VFD	Variable frequency drive
RTC	Real time clock

Rating label

Figure 1. Rating label.



Carton labels (U.S. and Europe)

Figure 2. Carton rating label.



Chapter 2 - Keypad overview for DM1 Pro

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 REM	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 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 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.

lcon	Button	Description
\land	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.
\checkmark		Navigation button, movement to right when editing a parameter bit by bit.
	OK	ОК:
		• 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.

Table 2. Keypad button: (Continued).

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;
 - Fault (lit)/Warning (flashing).

- 2. (Left line) The left line indicates the control source:
 IO;
 - BUS;
 - KEY.
- 3. (Middle line) The middle line is the parameter:
 - Path;
 - Value;
 - 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;
 - 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.

Left (Reset) / Right /OK key				
	→			
	M - Monitor	M1 - Standard Monitor	M1.1 - Output Frequency	
♠		M2 - IO Status		_
		M6 - PI Monitor		
Up key				
Down key	P - Parameters	P1 - Basic Parameters	P1.1 - Min. Frequency	P1.1 - Min. Frequency
			P2.1 - Basic Settings	
			P2.2 - Digital Input	
		P2 - Inputs	P2.3 - Preset Speed	
			P2.4 - AI Settings	
			P3.1 - RO1 Function	
		P3 - Outputs	P3.3 - Analog Output	
		P4 - Drive Control	P4.1 - Basic Settings	
		P5 - Motor Control	P5.1 - Basic Settings	
			P6.1 - Motor	
			P6.2 - Drive	
		P6 - Protections	P6.3 - Communications	
			P6.4 - Auto Restart	
			P7.1 - Basic Settings	
				– P7.2.1 - Standard
		P7 - PI Control	P7.2 - Setpoint	P7.2.2 - Setpoint 1
			P7.3 - Feedback 1	_
			P11.1 - Basic Settings	
			P11.2 - Modbus RTU	
			P11.3 - BACNET MSTP *	
		P11 - Serial Communications	P11.4 - SA Bus *	
			P11.5 - SWD *	
			P11.6 - Bluetooth	
			P12.1 - Basic Settings *	
		P12 - Ethernet Communications	P12.2 - Modbus TCP *	
			P12.3 - Ethernet I/P & BACNET I/P *	
			P12.4 - Web UI *	
			P13.1 - Basic Settings	
		P12 System	P13.2 - Keypad	
		P13 - System	P13.4 - Version Info.	
			P13.5 - Application Info.	
	F-Fault	F1 - Active fault		_
		F2 - History fault		
	b-Option card			
	S-Startup wizard			

* = DM1 PRO Only.

Remote keypad overview (DM1 and DM1 Pro)

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.

lcon	Button	Description
	Soft key 1, Soft key 2	Soft key 1, soft key 2: Soft keys 1 and 2 have no functionality with the DM1 device.
BACK RESET	Back/Reset	 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 REM	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 (Continued).

	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	ОК	 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.
0	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
O 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.
O Fault	Red Fault: Turns on when there is one or more active drive fault(s).
O 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/OSW/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.

P13.1.7	Parameter lock PIN				ID 624			
Minimum value:	0	Maximum value:	9999	Default value:	0			
Description:	The application selection of enabled, the user will be p	The application selection can be protected against unauthorized changes with the password function. When the password function is enabled, the user will be prompted to enter a password before application changes, parameter value changes, or password changes.						
	By default, the password function is not in use. If you want to activate the password, change the value of this parameter to any number between 1 and 9999.							
_	To deactivate the password, reset the parameter value to 0.							
P1.1 [©]	Minimum frequency				ID 101			
Minimum value:	0.00 HZ	Maximum value:	400.00 Hz	Default value:	0.00 Hz			
Description:	These define the frequenc frequency has to be below 4 mA fault preset speed, f	y limits of the frequency c the maximum frequency l ire mode speed, and brake	onverter. The max evel. These will lir speed settings.	imum value for these parameters is 4 nit other frequency parameter setting	00 Hz. The minimum js; preset speeds, jog speed,			
P1.2 ²	Maximum frequency				ID 102			
Minimum value:	0.00 HZ	Maximum value:	400.00 Hz	Default value:	MaxFreqMFG			
Description:	These define the frequency limits of the frequency converter. The maximum value for these parameters is 400 Hz. The minimum frequency lavel. These will limit other frequency parameter settings; preset speeds, jog speed, 4 mA fault preset speed, fire mode speed, and brake speed settings.							

Table 5. Start-up wizard instructions.

P1.6 ^①	Motor nominal curren	t			ID 486		
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.						
			Motor Nom. Voltage	Motor Nom. Current 0 4.0/2.3A cos \u00ftrightrightrightrightrightrightrightrigh			
P1.7 ^①	Motor nominal speed				ID 489		
Minimum value:	300 rpm	Maximum value:	20,000 rpm	Default value:	MotorNomSpeedMFG		
Description:	Motor nominal nameplate	base speed. Find this value	on the rating plate of the m	otor.			
P1.8 ¹⁾	Motor power factor				ID 490		
Minimum value:	0.30	Maximum value:	1.00	Default value:	0.85		
Description:	Motor nominal nameplate	full load power factor. Find	this value on the rating plat	e of the motor.			
P1.9 ^①	Motor nominal voltag	e			ID 487		
Minimum value:	180 V	Maximum value:	690 V	Default value:	MotorNomVoltMFG		
Description:	Motor nominal nameplate	base voltage. Find this value	ue on the rating plate of the	motor.			
P1.10 ¹⁾	Motor nominal freque	ncy			ID 488		
Minimum value:	8.00 Hz	Maximum value:	400.00 Hz	Default value:	MotorNomFreqMFG		
Description:	Motor nominal nameplate point (P5.1.5) to the same	rated frequency. Find this value.	value on the rating plate of t	he motor. This parameter s	ets 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 levels,	output frequency to acceleration time will b	ate from zero frequency to m be a fraction of the total ram	aximum frequency (P1.2). V p time.	Vhen accelerating from		

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

Table 5. Start-u	p wizard	instructions	(Continued).
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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 o different frequency levels,	utput frequency to deceler the deceleration time will	ate from maximum be a fraction of the	frequency (P1.2) to zero frequency. total deceleration time.	When decelerating from
	f _{out} (Hz Max. Frequenc ① Min. Frequenc Min. Frequenc	Accel. Time 1		tecel. Time 1 t (s)	
	The valu t ₁ = ^{(Max.}	ues for the acceleration time Frequency - Min. Frequency) × A Max. Frequency ① When setting a min the acceleration and	t_1 and the deceleration t_1 and the deceleration time 1 $t_2 = (Ma)$ $t_2 = (Ma)$ $t_2 = (Ma)$ $t_3 = (Ma)$ $t_4 = (Ma)$ $t_4 = (Ma)$ $t_5 = (Ma)$ $t_5 = (Ma)$ $t_5 = (Ma)$ $t_6 = (Ma)$ $t_6 = (Ma)$ $t_6 = (Ma)$ $t_7 = (Ma)$ $t_8 = ($	ion time t ₂ are calculated as follows: ax. Frequency - Min. Frequency) × Decel. Tir Max. Frequency ency (decal time greater than 0 Hz), of the drive is reduced to t ₁ or t ₂	me 1
P1.13 ²	Remote control place				ID 135
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = 10 terminal; 1 = Fieldbus; 3 = Keypad.				
Description:	Selects where the drive wi inputs; fieldbus would be a	II look for the start comma communication bus; and k	nd in the remote loo eypad display will i	cation: I/O terminals would be from ndicate what mode is selected	the digital hard-wired
P1.14 ¹²	Remote reference				ID 137
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = AI; 1 = Drive reference pot; 2 = AI joystick; 3 = Motor pot; 4 = Maximum frequency; 5 = PI control output; 6 = Keypad; 7 = Fieldbus reference.				
Description:	This parameter determines reference signal	the reference for remote 1	control mode. Thi	s value can be fed from an analog ir	nput, keypad, or fieldbus
P13.5.3	Keypad lock PIN (*DM	1 Pro)			ID 75
Minimum value:	0	Maximum value:	9999	Default value:	0
Description:	The keypad can be protect	ed against unauthorized ch	anges with the key	pad lock function after no keys are p	pressed after five minutes.
	When the password functi to key press except up/dov	on is enabled, the user will vn/left/right.	be prompted to en	ter a password before the keypad d	isplay parameter or response
	By default, the password f between 1 and 9999.	unction is not in use. If you	ı want to activate t	he password, change the value of the value o	nis parameter to any number
	To deactivate the passwor	d, reset the parameter valu	e to 0.		
Paramatar value can anly	he shanged ofter the drive b				

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

P11.6.1	Blue tooth enabled				ID 1895
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Disabled; 1 = Enable.				
Description:	Blue tooth enable.				

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

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

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

Chapter 4 - Standard

Introduction

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

Standard Application includes functions:

- Selectable digital input function
- Selectable digital output function
- Reference filter, scaling, inversion, offset, and range
- Output signal filter, scaling, inversion, offset, and range
- Selectable analog output function
- S curves
- Start source (Local/remote control function)
- Reference source
- Flying start
- Volts per Hertz control
- Programmable switching frequency
- Multi-preset speeds
- Emergency stop

I/O configuration graphic, refer to Table 20 at pages 47 and 48.

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.

Control I/O configuration

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

Table 6. Standard application default I/O connection.



DM1

External wiring	Terminal	Short name	Name	Default setting	Description
	1	DI1	Digital input 1	Run forward	Starts the motor in the forward direction.
	2	DI2	Digital input 2	Run reverse	Start the motor in the reverse direction.
	3	DI3	Digital input 3	External fault	Triggers a fault in the drive.
	4	DI4	Digital input 4	Fault reset	Resets active faults in the drive.
	5	CMA	DI1 to DI4 common	Grounded	Allows for sourced input.
	6	Α	RS-485 signal A	—	Fieldbus communication (Modbus RTU, BACNet).
	7	В	RS-485 signal B	—	Fieldbus communication (Modbus RTU, BACNet).
Se	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.).
<u></u>	18	R1NO	Relay 1 normally open	Run	Changes state when the drive is in the run state.
	19	R1CM	Relay 1 common		
	20	R1NC	Relay 1 normally closed		

TDM1 PRO

External wiring	Terminal	Short name	Name	Default setting	Description
	. 1	DI1	Digital input 1	Run forward	Starts the motor in the forward direction.
	2	DI2	Digital input 2	Run reverse	Start the motor in the reverse direction.
	. 3	DI3	Digital input 3	External fault	Triggers a fault in the drive.
	- 4	DI4	Digital input 4	Fault reset	Resets active faults in the drive.
	- 5	CMA	DI1 to DI4 common	Grounded	Allows for sourced input.
	. 6	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	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	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		
¥	- 21	R2N0	Relay 2 normally open	Fault	Changes state when the drive is in the fault state.
Υ	22	R2CM	Relay 2 common		

Notes:

The above wiring demonstrates a SINK configuration. The SW2 position 1 is set to ON. If a SOURCE configuration is desired, wire 24 V to CMA and close the inputs to ground. When using the +10 V for Al1, SW2 position 2 set to ON.

① Al1+ support 10 K potentiometer.

Table 7. 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:	А	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 value	s and measured motor curre	nt (%).			
M1.6	Motor power				ID 5		
Minimum value:	%	Maximum value:	%	Default value:	%		
Description:	Percent motor power calculated from nameplate values and measured motor current (%).						
M1.7	Motor voltage				ID 6		
Minimum value:	V	Maximum value:	V	Default value:	V		
Description:	Output ac motor voltage (V	/ac).					
M1.8	DC-link voltage				ID 7		
Minimum value:	V	Maximum value:	V	Default value:	V		
Description:	DC bus voltage (Vdc).						
M1.9	Unit temperature				ID 8		
Minimum value:	°C	Maximum value:	°C	Default value:	°C		
Description:	Heat sink temperature (deg	g C).					
M1.10	Motor temperature				ID 9		
Minimum value:	%	Maximum value:	%	Default value:	%		
Description:	Motor temperature value o	alculated from nameplate v	alues and measured motor c	urrent (%).			
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	e. See fault codes for the va	alue shown here.				
M1.12	Instant motor power				ID 1686		
Minimum value:	kW	Maximum value:	kW	Default value:	kW		
Description:	Instantaneous motor powe	er (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 v	Analog input 1 measured value (Vdc or Amps) selectable with dipswitch.					
M2.2	Keypad pot voltage				ID 1858		
Description:	Keypad potentiometer mea	asured value (Vdc). DM1 PR	O only.				

Table 7. Monitor (Continued).

Minimum value:	V	Maximum value:	V	Default value:	V	
M2.3	Analog output				ID 25	
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies	
Description:	Analog output 1 measured	value (Vdc or Amps) select	able 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	R01, R02				ID 557	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Description:	Relay output 1 and 2 4 sta	tus.				
M2.9	Control board DI statu	IS			ID 3214	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Description:	Control board DI Status will give the input status on control board.					

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 pro	cess units.				
M5.3	PI error value				ID 20	
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies	
Description:	PI error in process units	5.				
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; 2 = Sleep mode.					
Description:	PI status indication, ind	licates if drive is stopped, ru	nning in PI mode, or	r in PI sleep mode.		

M9 - Multi-monitoring (for remote keypad only).

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 monitorin editing the value then by go	ing values in a single screer ng values. Up and down key ping up and down.	. The values are selectable s can be used to select the	via the keypad menu. Mult row and then hitting the lef	i-monitor page could t arrow key will allow for

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

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	

Table 8. Operate mode - O (for remote keypad only).

 $\ensuremath{\textcircled{}^{\scriptsize 0}}$ Parameter value will be set to be default when changing macros.

Table 9. Basic Parameters

P1 - Basic parameters.									
P1.1 [®]	Minimum freque	ncy			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 fr 4 = MPFC master fi: 5 = Prime pump fre 6 = Prime pump fre	Defines the lowest frequency at which the drive will operate. This setting will limit other frequency parameter settings. 1 = Fire mode minimum frequency. 2 = Derag. 3 = MPFC staging frequency. 4 = MPFC master fixed frequency. 5 = Prime pump frequency. 6 = Prime pump frequency 2.							
P1.2 ^②	Maximum freque	ency			ID 102				
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	MaxFreqMFG				
Description:	Defines the highest frequency at which the drive will operate. This will limit other frequency parameter 1 = Keypad reference. 3 = Motor potentiometer. 3 = Jog speed. 4 = 2nd stage ramp frequency. 5 = Fire mode minimum frequency. 6 = Derag. 7 = MPFC staging frequency. 8 = MPFC master fixed frequency. 9 = Prime pump frequency 2. 11 = Preset speed frequency. 12 = Frequency limit value. 13 = Reference limit value. 13 = Reference limit value. 14 = Speed control_fs2. 15 = Stall frequency limit. 16 = 4 mA fault frequency. 17 = MPFC de-staging frequency. 18 = Pipe fill loss frequency low. 19 = Pipe fill loss frequency low. 19 = Pipe fill loss frequency limit.			nit other 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 re	Defines the time required for the output frequency to accelerate from zero frequency to maximum frequency.							

^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 9. Basic Parameters (Continued).

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 to	decelerate from maximum f	requency to zero frequency.	· · · · · · · · · · · · · · · · · · ·		
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:	Motor nameplate rated sp	eed. This value is found on	the rating plate of the moto	r.			
P1.8 ^①	Motor PF				ID 490		
Minimum value:	0.30	Maximum value:	1.00	Default value:	0.85		
Description:	Motor nameplate rated po	wer factor. This value is fo	und on the rating plate of th	e 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 vo	Itage. This value is found o	n the rating plate of the mot	tor.			
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 fre	equency. This value is found	I on the rating plate of the n	notor.			
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; 3 = fieldbus.						
Description:	Defines the signal location Start/Stop buttons on the	for the start command in l drive. Fieldbus would be a	ocal mode. I/O terminals wo communication bus. Keypa	ould be from the digital hard d display will indicate which	-wired inputs or keypad for mode is selected.		
P1.12 ¹²	Local reference				ID 136		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1		
Options:	0 = AI; 1 = drive ref. pot; 4 = maximum frequency;						
	6 = keypad; 7 = fieldbus ref.						
Description:	6 = keypad; 7 = fieldbus ref. Defines the signal location	n for the speed reference in	local mode.				
Description: P1.13 [©]	6 = keypad; 7 = fieldbus ref. Defines the signal location Remote control place	for the speed reference in	local mode.		ID 135		
Description: P1.13 ^② Minimum value:	4 = imaximum requency, 6 = keypad; 7 = fieldbus ref. Defines the signal location Remote control place N.A.	n for the speed reference in Maximum value:	local mode. N.A.	Default value:	ID 135 0		
Description: P1.13 [®] Minimum value: Options:	 a = Indatinuiti requercy, 6 = keypad; 7 = fieldbus ref. Defines the signal location Remote control place N.A. 0 = 10 terminal; 1 = fieldbus; 3 = keypad. 	n for the speed reference in Maximum value:	local mode. N.A.	Default value:	ID 135 0		
Description: P1.13 [®] Minimum value: Options: Description:	 a = maximum requercy, a = keypad; 7 = fieldbus ref. Defines the signal location Remote control place N.A. 0 = I0 terminal; 1 = fieldbus; 3 = keypad. Defines the signal location for Start/Stop buttons on 	n for the speed reference in Maximum value: In for the start command in r the drive. Fieldbus would b	local mode. N.A. emote mode. I/O terminals e a communication bus. Key	Default value: would be from the digital ha pad display will indicate wh	ID 135 0 rd-wired inputs or keypad ich mode is selected.		
Description: P1.13 [®] Minimum value: Options: Description: P1.14 [®]	 a = Imaximum requency, a = keypad; 7 = fieldbus ref. Defines the signal location Remote control place N.A. 0 = 10 terminal; 1 = fieldbus; 3 = keypad. Defines the signal location for Start/Stop buttons on Remote reference 	n for the speed reference in Maximum value: n for the start command in r the drive. Fieldbus would b	local mode. N.A. emote mode. I/O terminals e a communication bus. Key	Default value: would be from the digital ha pad display will indicate wh	ID 135 0 rd-wired inputs or keypad hich mode is selected. ID 137		
Description: P1.13 [©] Minimum value: Options: Description: P1.14 [©] ® Minimum value:	 a = Imaximum requercy, a = keypad; 7 = fieldbus ref. Defines the signal location Remote control place N.A. 0 = 10 terminal; 1 = fieldbus; 3 = keypad. Defines the signal location for Start/Stop buttons on for Star	n for the speed reference in Maximum value: n for the start command in r the drive. Fieldbus would b Maximum value:	local mode. N.A. emote mode. I/O terminals e a communication bus. Key N.A.	Default value: would be from the digital ha /pad display will indicate wh Default value:	ID 135 0 rd-wired inputs or keypad hich mode is selected. ID 137 0		
Description: P1.13 [®] Minimum value: Options: Description: P1.14 ^{®®} Minimum value: Options:	 a - Imaximum requercy, a - keypad; 7 - fieldbus ref. Defines the signal location Remote control place N.A. 0 = 10 terminal; 1 = fieldbus; 3 = keypad. Defines the signal location for Start/Stop buttons on Remote reference N.A. 0 = Al; 1 = drive reference pot; 4 = maximum frequency; 6 = keypad; 7 = fieldbus reference. 	n for the speed reference in Maximum value: In for the start command in r the drive. Fieldbus would b Maximum value:	local mode. N.A. emote mode. I/O terminals e a communication bus. Key N.A.	Default value: would be from the digital ha /pad display will indicate wh Default value:	ID 135 0 rrd-wired inputs or keypad hich mode is selected. ID 137 0		
Description: P1.13 [®] Minimum value: Options: Description: P1.14 ^{®®} Minimum value: Options: Description:	 a = Imaximum requercy, a = keypad; 7 = fieldbus ref. Defines the signal location Remote control place N.A. 0 = 10 terminal; 1 = fieldbus; 3 = keypad. Defines the signal location for Start/Stop buttons on Remote reference N.A. 0 = Al; 1 = drive reference pot; 4 = maximum frequency; 6 = keypad; 7 = fieldbus reference. Defines the signal location 	n for the speed reference in Maximum value: n for the start command in r the drive. Fieldbus would b Maximum value: n for the speed reference in	local mode. N.A. emote mode. I/O terminals e a communication bus. Key N.A.	Default value: would be from the digital ha /pad display will indicate wh Default value:	ID 135 0 rrd-wired inputs or keypad ich mode is selected. ID 137 0		
Description: P1.13 [®] Minimum value: Options: Description: P1.14 ^{®®} Minimum value: Options: Description: P1.15	 a = Imaximum requercy, a = keypad; 7 = fieldbus ref. Defines the signal location Remote control place N.A. 0 = 10 terminal; 1 = fieldbus; 3 = keypad. Defines the signal location for Start/Stop buttons on Remote reference N.A. 0 = Al; 1 = drive reference pot; 4 = maximum frequency; 6 = keypad; 7 = fieldbus reference. Defines the signal location Compressor table verse 	n for the speed reference in Maximum value: In for the start command in r the drive. Fieldbus would b Maximum value: In for the speed reference in sion	local mode. N.A. emote mode. I/O terminals e a communication bus. Key N.A.	Default value: would be from the digital ha /pad display will indicate wh Default value:	ID 135 0 rrd-wired inputs or keypad hich mode is selected. ID 137 0 ID 1769		
Description: P1.13 [®] Minimum value: Options: Description: P1.14 [®] Minimum value: Options: Description: P1.15 Minimum value:	 a = Imaximum requercy, a = keypad; 7 = fieldbus ref. Defines the signal location Remote control place N.A. 0 = 10 terminal; 1 = fieldbus; 3 = keypad. Defines the signal location for Start/Stop buttons on Remote reference N.A. 0 = Al; 1 = drive reference pot; 4 = maximum frequency; 6 = keypad; 7 = fieldbus reference. Defines the signal location Compressor table verse N.A. 	n for the speed reference in Maximum value: In for the start command in r the drive. Fieldbus would b Maximum value: In for the speed reference in sion Maximum value:	local mode. N.A. emote mode. I/O terminals e a communication bus. Key N.A.	Default value: would be from the digital ha /pad display will indicate wh Default value: Default value:	ID 135 0 rrd-wired inputs or keypad hich mode is selected. ID 137 0 ID 1769 0		
Description: P1.13 [®] Minimum value: Options: Description: P1.14 [®] Minimum value: Options: Description: P1.15 Minimum value: Description:	 a = Imaximum requercy, a = keypad; 7 = fieldbus ref. Defines the signal location Remote control place N.A. 0 = 10 terminal; 1 = fieldbus; 3 = keypad. Defines the signal location for Start/Stop buttons on a Remote reference N.A. 0 = Al; 1 = drive reference pot; 4 = maximum frequency; 6 = keypad; 7 = fieldbus reference. Defines the signal location Compressor table version. 	n for the speed reference in Maximum value: In for the start command in r the drive. Fieldbus would b Maximum value: In for the speed reference in sion Maximum value: It is a number to indicate th	local mode. N.A. emote mode. I/O terminals e a communication bus. Key N.A. remote mode. N.A. e version of compressor tab	Default value: would be from the digital ha pad display will indicate wh Default value: Default value:	ID 135 0 rrd-wired inputs or keypad hich mode is selected. ID 137 0 ID 1769 0		
Description: P1.13 [®] Minimum value: Options: Description: P1.14 ^{®®} Minimum value: Options: Description: P1.15 Minimum value: Description: P1.16	 a - Imaximum requercy, a - keypad; 7 - fieldbus ref. Defines the signal location Remote control place N.A. 0 - 10 terminal; 1 - fieldbus; 3 - keypad. Defines the signal location for Start/Stop buttons on Remote reference N.A. 0 = Al; 1 - drive reference pot; 4 - maximum frequency; 6 - keypad; 7 - fieldbus reference. Defines the signal location Compressor table version. Compressor type selemed 	n for the speed reference in Maximum value: n for the start command in r the drive. Fieldbus would b Maximum value: n for the speed reference in sion Maximum value: It is a number to indicate th ction	local mode. N.A. emote mode. I/O terminals e a communication bus. Key N.A. N.A. N.A. e version of compressor tab	Default value: would be from the digital ha /pad display will indicate wh Default value: Default value:	ID 135 0 rd-wired inputs or keypad hich mode is selected. ID 137 0 ID 1769 0 ID 1770		
Description: P1.13 [®] Minimum value: Options: Description: P1.14 ^{®®} Minimum value: Options: Description: P1.15 Minimum value: Description: P1.16 Minimum value:	 a - Imaximum requercy, a - keypad; 7 - fieldbus ref. Defines the signal location Remote control place N.A. 0 - 10 terminal; 1 - fieldbus; 3 - keypad. Defines the signal location for Start/Stop buttons on Remote reference N.A. 0 = Al; 1 - drive reference pot; 4 - maximum frequency; 6 - keypad; 7 - fieldbus reference. Defines the signal location Compressor table version. Compressor table version. 	a for the speed reference in Maximum value: a for the start command in r the drive. Fieldbus would b Maximum value: a for the speed reference in sion Maximum value: It is a number to indicate th ction Maximum value:	local mode. N.A. emote mode. I/O terminals e a communication bus. Key N.A. remote mode. N.A. ie version of compressor tab N.A.	Default value: would be from the digital ha /pad display will indicate wh Default value: Default value: de Default value:	ID 135 0 rd-wired inputs or keypad ich mode is selected. ID 137 0 ID 1769 0 ID 1770 0		

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

Table 10. Inputs

Р2.1 - Basic settings.	IO terminal Start/Stop	logic			ID 143
Minimum value:	N.A.	- Maximum value:	N.A.	Default value:	0
Options:	0 = Forward - Reverse, maii 1 = Start-Reverse DI closed considered 2 wire contt 2 = Start - Enable, maintain 3 = 3 Wire Control, used for stop.	ntained input on start si contact = start /open c ol with a contact on sta ed input on start signal r three wire operation, s	gnal 1 to run forward and a n ontact = stop: DI closed cont rt/stop, contact open it stop: 1 to run forward and a maint tart signal 1 uses a normally	naintained signal on start sig act = reverse / open contact s and direction on 2nd start si ained signal on start signal open start and start signal	nal 2 for reverse. = forward - This would be signal. 2 to enable the drive to run. 2 uses a normally closed
Description:	Defines the functionality fo 0 = P2.2.1: DI closed cont with either a contact	r start signal 1 and star act = start forward P2. used on the start FWD 24 V+ DIN1	t signal 2, by default start sig 2.3: DI closed contact = sta 0 or start REV commands. V 14	nal 1 is DI1 and start signal rt reverse. This would be of When contacts open, the m	2 is DI2 considered 2-wire control otor stops.
			2 101000 01 102 10 02 100		
		GND	5		
	FWD REV DIN1 DIN2 Notes: ① The first selected ② When the DIN1 cc extert to chonce	d direction has the higher	top Function <i>b Mode = Coasting</i> 1 est priority. of rotation		
	starts to change. ③ If start forward (are active simult has priority.	DIN1) and start reverse aneously the start forwa	(DIN2) signals ard signal (DIN1)		
	1 = P3.2: DI closed contac be considered 2-wire	ct = start /open contac control with a contact	t = stop P3.3: DI closed con on start/stop, contact oper	tact = reverse / open conta i it stops and direction on 2	act = forward. This would 2nd start signal.
		DIN1	1 ID1801 - Start Signal: DigIN:1	ID143 Start Stop Logic: Start Forward	
		DIN2	2 ID1803-Start Signal 2: DigIN:2	ID143 Start Stop Logic: Start Revers	se
		GND	12		

Table 10. Input. (Continued)



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.



GND

12

Table 10. Input. (Continued)



P2.2 - Digital input.

P2.2.5 ²	DI3 function				ID 1805
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	4
Options:	 0 = Not used, no act 1 = I0 terminal start by P2.1.3. 2 = I0 terminal start by P2.1.3. 3 = Reverse - when direction. 4 = Ext. fault 1 - wht 7 = Fault reset - whet 8 = Run enable - wh 9 = Preset speed B0 10 = Preset speed B 11 = Preset speed B 16 = Accel,/decel. ti 19 = Remote control 20 = Local control - v 23 = PI setpoint sele 24 = Motor interlock 29 = DC brake active 31 = Derag. enable - 	tion. signal 1 - when the control signal 2 - when the control Start/Stop logic is set to 3 en closed, ext. fault 1 will b en closed, all active faults w en closed the drive will allo - the seven preset speeds 1 - the seven preset speeds 2 - the seven preset speeds me set - when open, accel./ - when closed, the drive will when closed, the drive will when closed, the drive will when closed, the drive will et - when open, parameter 1 - when closed, DC injectio when closed. The Derag.	source is so source is so start pulse s e activated. vill be reset. w a start co are selected are selected are selected decel. time ill be forced to orce the refi- setpoint 1 is 1 be enablec n braking w cycle for pur	et to IO terminal, this input when closed will p et to IO terminal, this input when closed will p top pulse, this input will cause the drive to st mmand and be in the ready state. via three binary inputs, this is least significat d via three binary inputs, this is most significat d via three binary inputs, this is most significat 1 will be used, when closed accel./decel. time to the remote control place. the local control place. erence source to PI controller output. s active, when closed, setpoint 2 is active. i to run. ill be active. nps will be initiated.	erform the action defined erform the action defined art in the reverse nt bit in that binary input. ant bit in that binary input. e 2 will be used.
Description:	Defines the function of di	gital input 3.			

Table 10. Inputs (Continued).

P2.2.7 [®]	DI4 function	ID 1807				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	7	
Options:	 0 = Not used, no action. 1 = IO terminal start signal 1 - when the control source is set to IO terminal, this input when closed will perform the action defined by P2.1.3. 2 = IO terminal start signal 2 - when the control source is set to IO terminal, this input when closed will perform the action defined by P2.1.3. 3 = Reverse - when Start/Stop logic is set to 3 start pulse stop pulse, this input will cause the drive to start in the reverse direction. 4 = Ext. fault 1 - when closed, ext. fault 1 will be activated. 7 = Fault reset - when closed, all active faults will be reset. 8 = Run enable - when closed the drive will allow a start command and be in the ready state. 9 = Preset speed B0 - the seven preset speeds are selected via three binary inputs, this is least significant bit in that binary input. 10 = Preset speed B2 - the seven preset speeds are selected via three binary inputs, this is most significant bit in that binary input. 11 = Preset speed B2 - the seven preset speeds are selected via three binary inputs, this is most significant bit in that binary input. 16 = Accel./decel. time set - when open, accel./decel. time 1 will be used, when closed accel./decel. time 2 will be used. 19 = Remote control - when closed, the drive will be forced to the remote control place. 20 = Local control - when closed, the drive will be forced to the local control place. 21 = Pl controller - when closed, the drive will be forced to the local control place. 22 = Pl controller - when closed, motor will be enabled to run. 23 = Pl setpoint select - when closed, motor will be enabled to run. 24 = Motor interlock 1 - when closed, DC injection braking will be initiated. 23 = De trake active - when closed. DC injection braking will be initiated. 					
Description:	Defines the function of dig	ital input 4.				
P2.3 - Preset speed.	D () (10.405	
P2.3.1 ⁽²⁾	Preset speed 1	. · ·			ID 105	
Minimum value:	U.UU Hz	Maximum value:	MaxFreq Hz	Default value:	5.00 Hz	
Description:	Preset speed is selected w	Ath digital inputs using a bin	ary input.		ID 106	
P2.3.2®		Maximum values	NA	Default value:	10 00 11-	
	U.UU HZ		MaxFreq Hz		10.00 HZ	
Description:	Preset speed is selected w	/ith digital inputs using a bin	ary input.		10.440	
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 w	vith digital inputs using a bin	ary 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 selected w	vith digital inputs using a bin	ary 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 w	vith digital inputs using a bin	ary 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 w	vith digital inputs using a bin	ary 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 w	vith digital inputs using a bin	ary input.			

[©] Parameter value can only be changed after the drive has stopped. [®] Parameter value will be set to be default when changing macros.
Table 10. Inputs (Continued).

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; 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.							
	*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 +10V supply on CN5 terminals 13 , it will require DIP switches SW2 2 and 3 on to complete the current loop When doing a curren loop with an external supply, the DIP switches SW2 2 off and 3 on.							



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/0-10 1 = 20-100%/4-20 mA/2-10	V. D V.			
Description:	With this parameter you ca	an select the analog input	t 1 signal range.		
	For selection "Customized,	" see 'Al Custom Min' an	d'Al Custom Max', th	nis enables a customized signal ran	ge.
		Al Ref. Scale Max.	d Alt Signal Range = Custom		

Al1 Signal Range = 1

4 mA Al1 Custom Min. 20 mA

AI1 Custom Max.

Al Ref. Scale Mir Value



Table 11. Outputs.

P3.1 - Digital outpu	t.				
P3.1.1 ²	RO1 function				ID 152
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = Not used - No. 1 = Ready - Drive is 2 = Run - Drive is r 3 = Fault - Drive is 4 = Fault invert - D 5 = Warning - Drive 6 = Reverse - The I 7 = At Speed - The 8 = Zero Frequency 9 = Frequency limit 10 = PID supervisio 11 = Torque limit sı 12 = Reference limi 13 = Power limit sı 14 = Temp limit su 15 = Analog input sı 16 = Motor current 17 = Over heat faul 19 = Ovolt Fault Re 21 = 4 mA fault - 4 22 = external fault 23 = Motor therma 24 = STO Fault Out 25 = Control from 1 26 = Remote contr 27 = Un-requested 28 = Fire mode - D 29 = Damper contr 30 = Valve Control 31 = Jog speed - D 32 = Fieldbus input 33 = Fieldbus input 34 = DC charge sw 35 = Preheat Activ 36 = Cold weather 37 = PID sleep - PIII 38 = Znd stage ran 39 = Prime Pump A 40 = Master drive 41 = Slave Drive S' 43 = Single Drive Co 44 = Ext Brake Cor	Action s ready for operation unning faulted rive is not faulted a has a warning message Drive is outputing reverse phase I output frequency has reached th - Drive output is at zero frequen supervision - Supervision for fre on - Supervision for PID controller upervision - Supervision for torqu it supervision - Supervision for torqu pervision - Supervision for drive t supervision - Supervision for drive t supervision - Supervision for anal supervision - Supervision for more to - Over current fault has occurred ver volt fault has occurred of - Cource the super detail thas mA fault has occurred - External fault has occurred of - Loder volt warning/fault has put - Safe Torque Off input is act 0 - I/O is the selected start comr of - Remote is the control place rotation direction - The active di rive is in fire mode of - Damper control output rive is in jog mode 1 - Controled by FB control word itch close - DC precharge relay is e - Preheat Control mode is activ active - Cold weather mode is ac D controller is in a sleep state op frequency active - Accel/Dece citive - drive is running in prime p State - Indicates if the master dri tate - Indicates if the master dri tate - Indicates if the slave drive control - indicates if the slave drive control - indicates if the master dri tate - Indicates if the slave trive.	rotation le set reference cy quency limit 1 is a is activated e limit efference limit rimit empurature limit tor current limit tor current limit tor current limit irred d s occurred ivated nand location rection isn't the sa s closed ated etive l time 2 is active pump mode ive in the multi-pump rive is running in s	arctivated ame as the reference direction mp control mode is faulted control mode is faulted single drive control mode on a multi-pr	ump control
Description:	Defines the function	on associated with changing the	state of relay outp	put 1.	
-					

Table	11.	Output	(Continued)
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P3.1.4 ^②	RO2 function				ID 153
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	3
Minimum value: Options:	N.A. 0 = Not used - No Actio 1 = Ready - Drive is rea 2 = Run - Drive is runnin 3 = Fault - Drive is fault 4 = Fault invert - Drive is 5 = warning - Drive has 6 = Reverse - The Drive 7 = At Speed - The outp 8 = Zero Frequency - Dr 9 = Frequency limit supervision - S 11 = Torque limit supervision - S 12 = Reference limit supervision - S 13 = Power limit supervision - S 14 = Temp limit supervision - S 15 = Analog input supervision - S 16 = Motor current suppervision - S 17 = Over heat fault - Over vision - S 20 = Uvolt Fault - Over vision - S 21 = 4 mA fault - 4 mA 22 = External fault - Exit 23 = Motor thermal fault - C 34 = STO Fault Output - 25 = Control from 10 - I, 26 = Remote control - R 27 = Uh-requested rota 28 = Fire mode - Drive i 29 = Damper control - Val 31 = Jog speed - Drive i 32 = Fieldbus input1 - C 33 = Fieldbus input2 - C 34 = DC charge switch - 35 = Preheat Active - Pri 36 = Cold weather active 37 = PID sleep - PID corr 38 = 2nd stage ramp fre 39 = Prime Pump Active 40 = Master drive State 41 = Slave Drive State 43 = Single Drive Control- 45 = Ext Brake Inverted	Maximum value: In dy for operation 19 ed s not faulted a warning message is outputing reverse phase i pout frequency has reached thive vervision - Supervision for for pervision - Supervision for torque pervision - Supervision for torque pervision - Supervision for drive trivision - The active distance for the super control output ve control output is in jog mode ontroled by FB control word controled by FB control word contr	N.A. rotation e set reference cy quency limit 1 is is activated e limit ference limit og input limit tor current limit tor current limit f d s occurred ivated nand location rection isn't the s closed ated tive I time 2 is active ump mode ve in the multi-pum rive is running in	activated same as the reference direction ump control mode is faulted o control mode is faulted single drive control mode on a multi-pu	Imp control
Description.				put z.	
P3.3 - Analog output.					10.007
P3.3.1 [©]	AU mode				ID 227
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = 0 - 20 mA; 1 = 0 - 10 V.				
Description:	Defines the analog outp	out mode to current or voltag	je.		
P3.3.2 [®]	AO function				ID 146
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	1 = Output frequency (0 2 = Frequency reference 3 = Motor speed rpm (0 4 = Motor current (0 - n 5 = Motor torque (0 - ca 6 = Motor power (0 - ca 7 = Motor voltage (0 - n 8 = DC bus voltage (0 - 12 = Analog input (0 % -	- maximum frequency). e (0 - max frequency). - nameplate rpm). ameplate current). Iculated nominal). Iculated nominal). ameplate voltage.; 1,000 Vdc). 100%).			
Description:	Select the function desi	ired to the terminal AO1			

Table 12 Drive control

P4.1 - Basic settings	5.				
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 op 1 = Always enabled - In	eration - In this mode, the k this mode, the stop button	eypad stop will only will always stop the	operate when the control source is drive regardless of control mode.	s set to keypad.
Description:	Enabled or always enab	led keypad operation.			
P4.1.4 ^①	Reverse enabled				ID 1679
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Disabled; 1 = Enabled.				
Description:	Enables or disables the	reverse motor direction.			
P4.1.5	Change phase seque	ence motor			ID 2515
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Change disable; 1 = Change enable.				
Description:	This parameter allows f	or swapping the motor phas	e output from u, v, v	v to u, w, v.	
P4.1.6 ²	Power up local remo	ote select			ID 1685
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Hold last; 1 = Local control; 2 = Remote control.				
Description:	Selects what control pla when powered down, se	ace the drive will start at af electing Local or Remote wi	ter power is applied Il cause the drive to	. The default setting will hold the la start in that mode regardless of las	ast state that the drive was in it state.
P4.1.8 ²	Start mode				ID 252
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Ramp - The drive sta 1 = Flying start from sto last operating freque 2 = Flying start from ma the maximum opera	arts from 0 Hz and ramps to p frequency - The drive will ency as a starting point. ximum frequency - The driv ting frequency as a starting	the frequency reference catch a spinning mo e will catch a spinni point.	ence value. otor. This setting searches for the c ng motor. This setting searches for	urrent frequency using the the current frequency using
Description:	Selects the start mode	operation.			
P4.1.9 ²	Stop mode				ID 253
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Coasting - After a st 1 = Ramp - After the sto	op command, the motor coa p command, the speed of th	asts to a stop uncont ne motor is decelera	trolled by the drive. ted according to the set deceleratio	n parameters.
Description:	Selects the stop mode of	operation.			

Table 12. Drive control (Continued).

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:	The start and end of the ac gives a linear ramp shape t Setting a value from 0.10 to the slope.	cceleration and deceleratio that causes acceleration ar o 10.00 seconds for this pa	n ramps can be smoothed wi nd deceleration to react imme rameter produces an S-shap	th these parameters. Settin ediately to the changes in the ed acceleration/deceleration	ng a value of 0.00 seconds e reference signal. I at the start and stop of
		Hz Accel 1 Decel Decel Decel F S	ime 1 ime 1 ime 2 Ramp 1 Shape amp 1 nape		
P4.5: Foldback					

P4.5.1	IGBT Temperature				ID 776
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	N.A.				
Description:	IGBT Temperature				
P4.5.2	Foldback status				ID 1771
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Inactive 1 = Active 2 = On hold				
Description:	Foldback status. It is a n 0 = inactive, when IGBT 1 = active, when IGBT te 2 = on hold, when IGBT t	nonitor parameter. There are temperature is smaller thar emperature is greater than f temperature is between Re	e three values: n Recovering tempe oldback temperatur covering temperatu	rature re re and Foldback temperature	
P4.5.3	Foldback output free	quency			ID 1772
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	N.A.				
Description:	Foldback output, it is the	e frequency. It is a monitor p	parameter, unit is H	Ζ.	
P4.5.4	Foldback output spe	eed			ID 1773
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	N.A.				
Description:	Foldback output, it is the	e speed. It is a monitor para	meter,unit is rpm		
P4.5.5	Foldback enable		·		ID 1774
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled 1 = Enabled				
Description:	Foldback enable				
Table 12: Foldback					
P4.5.6	Foldback temperatu	re			ID 1775
Minimum value:	0	Maximum value:	120	Default value:	80
Options:	N.A.				
Description:	Foldback temperature. It the speed shall be reduce	t is a user-setting paramete ed at the rate "speed reduc	r. Display unit is De ce rate"	g. C. If IGBT temperature is greater t	than Foldback temperature,

P4.5.7	Recovering	temperature			ID 1776			
Minimum value:	0.	Maximum value:	120	Default value:	70			
Options:	N.A.							
Description:	Recovering ter Foldback temp	nperature. It is a user-setting parame erature, the speed shall remain the c	ter. Display unit D urrent speed.	Deg. C. If IGBT temperature is between	Recovering temperature and			
P4.5.8	Foldback sp	eed reduce rate			ID 1777			
Minimum value:	0.	Maximum value:	200	Default value:	20			
Options:	N.A.							
Description:	Foldback spee speed shall be	Foldback speed reduce rate. It is a user-setting parameter, unit is rpm/s. If IGBT temperature is greater than Foldback temperature, the speed shall be reduced at the rate "foldback speed reduce rate"						
P4.5.9	Foldback mi	nimum speed			ID 1778			
Minimum value:	0.	Maximum value:	10000	Default value:	2000			
Options:	N.A.							
Description:	Foldback fault minimum spee	trip speed. It is a user-setting parame d", this status lasts "Foldback fault ti	eter, unit is rpm. If meout", Foldback	f the drive is "foldback active" and spe fault will happen.	ed is less than "Foldback			
P4.5.10	Foldback fa	ult timeout			ID 1779			
Minimum value:	0.	Maximum value:	200	Default value:	30			
Options:	N.A.							
Description:	Foldback fault minimum spee	trip speed. It is a user-setting parame d", this status lasts "Foldback fault ti	eter, unit is rpm. If meout", Foldback	f the drive is "foldback active" and spe fault will happen.	ed is less than "Foldback			

Table 13 Motor control.

P5.1 - Basic settings.							
P5.1.1 ⁰²	Motor control mode				ID 287		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Frequency control - Output frequency is controlled directly by the frequency reference. 1 = Speed control - Output frequency is controlled by giving a frequency reference to it with slip compensation.						
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 determines Once the motor current hit	s the maximum output curre ts this level, it goes into the	nt allowed from the drive. current limiter controller an	The parameter value range d d tries to limit the output cur	iffers from size to size. rent.		
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 fu 1 = Enable torque boost fu	unction. Inction.					
Description:	Automatic torque boost - t and run at low frequencies	the voltage to the motor inc s with high loads.	reases automatically, which	assists the motor to produce	e sufficient torque to start		

Table 13 Motor control (Continued)

P5.1.4 ¹⁾²	V/Hz ratio				ID 108			
Minimum value:	N.A. Maximum	value:	N.A.	Default value:	0			
Options:	 0 = Linear - The voltage of the motor cha where the nominal voltage is supplie 1 = Squared - The voltage of the motor of weakening point where the nominal produces less torque and electromed load is proportional to the square of 3 = Linear with flux optimization - The dr Active Energy Control which will red 	nges linearly d. A linear V/ hanges follow voltage is sup chanical noise the speed. ive starts to s uce the voltage	with the frequency in the co Hz ratio should be used in co ving a squared curve with th plied. The motor runs under . A squared V/Hz ratio can b search for the minimum moto ge and current but still main	Instant flux area from 0 Hz to postant torque applications. e frequency in the area from magnetized below the field v e used in applications where or current in order to save en- tain the desired speed.	the field weakening point O Hz to the field weakening point and the torque demand of the ergy, This mode is called			
Description:	Selects the V/Hz ratio. 0 = Linear; 1 = Squared; 3 = Linear + flux optimization.	Selects the V/Hz ratio. D = Linear; 1 = Squared; 3 = Linear + flux optimization.						
		U[V]						
	Un Voltage at FWF	Default: Nor Voltage of th	ninal le Motor	Field Weakening Point				
			.inear Squared	Default: Nominal Frequency of the Motor / f [Hz] ➤				
			0 = Linear and 1 = Squar	ed.				
P5.1.10 ²	Switching frequency				ID 288			
Minimum value:	MinSwitchFreq kHz Maximum	value:	MaxSwitchFreq kHz	Default value:	DefaultSwitchFreqCT kHz			
Description:	Sets the switching frequency for the PW	'M output wa	veform.					
P5.1.16 ⁽¹⁾ 2	Identification				ID 299			
Minimum value:	N.A. Maximum	value:	N.A.	Default value:	0			
Options:	0 = Not Action 1 = Identification only stator resistor - do 2 = Identification with run - Motor stator 3 = Identification no run - Motor is suppl 4 = Identification only inertia - Identifica	bes not spin th resistor is co ied with curre tion for the sy	ne motor can be done with lo mpleted then the motor is ro int and voltage but at zero for rstem inertia only.	oad attached ın, must be completed with u equency.	inloaded motor			
Description:	This Parameter enables the drive to mak parameters to improve starting torque a will be active then set back to 0 when c tuning' is being performed. If there is an	e an motor id nd open loop ompleted. W issue with th	entification cycle of the mot vector control performance. hen a run command is issue e Motor Identification a faul	or once complete the drive w once set and a run command d the message on the keypac t message will be displayed.	ill adjust tuning d is given the operation d will indicate 'Auto			

Table 14. Protections

P6.1 - Motor.							
P6.1.4 ¹⁾	Motor therma	protection			ID 310		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2		
Options:	0 = No response 1 = Warning. 2 = Fault, stop m 3 = Fault, stop m	Iode after fault according to param Iode after fault always by coasting	eter stop mode.				
Description:	If a fault conditio calculated motor this protection, i.	n is selected, the drive will stop ar temp is based off the install powe e., setting parameter to 0, will res	nd activate the fault s er on values of the driv et the thermal stage c	tage based off the % of calculate ve and monitoring values as the du of the motor to 0%.	d motor temperature. The ive is running. Deactivating		
P6.1.5 ²	Motor therma	FO current			ID 311		
Minimum value:	0.00%	Maximum value:	150.00%	Default value:	100.00%		
Description:	The current can be set between 0 - 150.0% x InMotor. This parameter sets the value for thermal current at zero frequency. The default value is set assuming that there is no external fan cooling the motor. If an external fan is used, this parameter can be set to 90% (or even higher).						
	Note: The value is set as a percentage of the motor nameplate data, P1.6 (nominal current of the motor), not the drive's nominal output current. The motor's nominal current is the current that the motor can withstand in direct on-line use without being overheated						

If you change the parameter nominal current of motor, this parameter is automatically restored to the default value. Setting this parameter does not affect the maximum output current of the drive.



P6.2 - Drive.								
P6.2.2 ⁽¹²⁾	Input phase f	fault			ID 332			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2			
Options:	0 = No response 1 = Warning; 2 = Fault, stop r 3 = Fault, stop r 4 = Single phase	e; node after fault according to parami node after fault always by coasting; e power limit.	eter stop mode;					
Description:	The input phase	e supervision ensures that the input	phases of the freque	ency converter have approximately e	equal current draw.			
P6.2.3 ¹²	4 mA input fa	ault			ID 306			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = No response 1 = Warning. 2 = Warning, th 3 = Warning, th 4 = Fault, stop r 5 = Fault, stop r	0 = No response. 1 = Warning. 2 = Warning, the frequency from 10 seconds back is set as reference. 3 = Warning, the preset frequency P6.2.4 is set as reference. 4 = Fault, stop mode after fault according to parameter stop mode. 5 = Fault, stop mode after fault always by coasting						
Description:	A warning or a seconds, or belo	fault action and message is generat ow 0.5 mA for 0.5 seconds. The info	ed if the 4 - 20 mA r rmation can also be	eference signal is used and the sign programmed into relay outputs RO	al falls below 4 mA for 5 I and RO2.			

P6.2.4 ⁰²	4 mA fault frequency				ID 331			
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00			
Description:	When 4 mA fault happens, the output frequency of drive goes to this preset speed when P6.2.3 = 3.							
P6.2.5 ¹²	External fault				ID 307			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2			
Options:	0 = No action; 1 = Warning; 2 = Fault, stop mode after 3 = Fault, stop mode after	fault according to paramete fault always by coasting.	r stop mode.					
Description:	A warning or a fault action external fault). The status	and message is generated information can also be pro	from the external fault signa grammed into digital output	al in the programmable (digit relay outputs RO1 and RO2	al inputs function select			
P6.2.11 ²	STO fault response				ID 2427			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2			
Options:	0 = No Action - drive will stop, no indication shown, no reset required, have to cycle start command. 1 = Warning - drive indicate warning/if STO clears drive will run without reset. 2 = Fault - drive will indicate fault/require reset to start again.							
Description:	STO fault response defines the function of how the STO input will be seen on the keypad and how the drive functions to it.							
P6.2.12 ^①	PI feedback AI loss re	sponse			ID 2401			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Warning: preset freque	ency (P6.2.13).						
Description:	This parameter defines the feedback.	e function of the PI feedback	analog input loss response.	If the AI feedback is lost b	ased off the programed Al			
P6.2.13 ¹⁾²	PI feedback AI loss pr	e-frequency			ID 2402			
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz			
Description:	This parameter defines the	e frequency the master woul	d run to if a feedback is lost	and P6.2.12 was set to opti	on 3.			
P6.2.14 ²	PI feedback AI loss pi	pe fill			ID 2403			
Minimum value:	0.00 varies	Maximum value:	1000.00 varies	Default value:	0.00 varies			
Description:	Detects loss of prime in th the frequency in P6.2.13 'lo	e pump based off the measu oss of prime' occurs.	ured level. If the value drops	s below this level for the tim	e in P6.2.15 and below,			
P6.2.15 ²	PI feedback AI loss pr	e-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 pre-fre frequency in P6.2.15 for the seconds.	quency timeout - when P6.2 e time set here. After this ti	2.12 is set to 3 or 4, when the me, the drive will fault out o	e feedback signal is lost, the n 'feedback loss'. The time	drive will run at the is disabled when set to 0			

Table 14. Protections (Continued)

P6.3 - Communications.

P6.3.1 ¹²	Fieldbus fault resp	Fieldbus fault response					
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2		
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Fault, coast.						
Description:	This sets the response communication port. Each protocol has and	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 14. Protections. (Continued)

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

Table 15 PI Controller .

P7.1 - Basic setting	s.				
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 o	f the PI Controller. It adjust the s f 10% in the error value causes th	lope of the speed incr e controller output to o	rease according to the initial of th change 10%.	ne load. If this value is set to
P7.1.2 ²	PI control itime	9			ID 1295
Minimum value:	0.00 s	Maximum value:	600.00 s	Default value:	1.00 s
Description:	Defines the integr	ation time of the PI controller. Ov	er the time, the integr	al time contributes to the deviati	on between the reference

P7.1.3 ¹²	PI process unit				ID 1297
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	$\begin{array}{l} 0 = \%; \\ 1 = 1/min.; \\ 2 = rpm; \\ 3 = ppm; \\ 4 = pps; \\ 5 = l/s; \\ 6 = l/min.; \\ 7 = l/h; \\ 8 = kg/s; \\ 9 = kg/min.; \\ 10 = kg/h; \\ 11 = m3/s; \\ 12 = m3/min.; \\ 13 = m3/h; \\ 14 = m/s; \\ 15 = mbar; \\ 16 = bar; \\ 17 = Pa; \\ 18 = kPa; \\ 19 = mVS; \\ 20 = kW; \\ 21 = Deg. C; \\ 22 = GPM; \\ 23 = gal/s; \\ 24 = gal/min.; \\ 25 = gal/h; \\ 26 = lb/s; \\ 27 = lb/min.; \\ 28 = lb/h; \\ 29 = CFM; \\ 30 = ft^3/s; \\ 31 = ft^3/min.; \\ 32 = ft wg; \\ 36 = PSl; \\ 37 = lb/in.2; \\ 38 = HP; \\ 39 = Deg. F; \\ 40 = PA; \\ 41 = WC; \\ 42 = HG; \\ 43 = ft; \\ 44 = m; \\ \end{array}$				
Description:	Defines the unit type for P	l feedback unit.	,	,	
P7.1.4 ⁽²⁾	PI process unit minim	um			ID 1298
Minimum value:	-99999.99 varies	Maximum value:	PI Process Unit Max	Default value:	0.00 varies
Description:	Defines the minimum proc	ess unit value.			
P7.1.5 ^②	PI process unit maxim	um			ID 1300
Minimum value:	PI Process Unit Min	Maximum value:	99999.99 varies	Default value:	100.00 varies
Description:	Defines the maximum proc	cess 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 is 1 = Inverted - if feedback i	less than set-point, PI cont s less than set-point, PI con	roller output increases. troller output decreases.		
Description:	Defines the way the proce	ess value output reacts to th	e feedback signal.		

Table 15 PI Controller

Table 16 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 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 belo 1 = Wake-up when abo 2 = Wake-up when belo 3 = Wake-up when abo	0 = Wake-up when below wake-up level. 1 = Wake-up when above wake-up-level. 2 = Wake-up when above wake-up level % from PI setpoint. 3 = Wake-up when above wake-up level % from PI setpoint.						
Description:	This narameter 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 input 2; 7 = FB process data input 2; 8 = FB process data input 4; 9 = FB process data input 4; 10 = FB process data input 4; 11 = FB process data input 12; 12 = FB process data input 13; 13 = FB PI setpoint 1; 14 = FB PI setpoint 2;	l; 2; 3; 4; 5; 6; 7; 8;			
Description:	Defines source of the setp fieldbus message.	oint value the drive uses.	This can either be an inte	rnal preset value, keypad setpo	int, analog signal, or
P7.2.2.2 ¹	PI setpoint 1 sleep end	able			ID 1315
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				
Description:	This function will disable the re-engages when feedback	he output when the freque < rises above the wake-up	ncy drops below the slee level.	p frequency for the sleep delay	time. The output
P7.2.2.3 ²	Pl setpoint 1 sleep del	lay			ID 1317
Minimum value:	0 s	Maximum value:	3,000 s	Default value:	0 s
Description:	This parameter sets the de shut off till the wake up lev	lay time after the setpoint vel is met. It is to prevent	drops below the sleep le large fluctuations when g	vel for this amount of time and going into the sleep function to	then the drives output will save motor run time.
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:	Defines the level to enable This value is based of the ^o	e the PI output. it will be al % of feedback which can b	oove or below according t e scaled based off the Pl	o PID reference or feedback de unit min./max, values.	pend on P7.2.1.3 setting,
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 booste	ed via a multiplier value.			
-					

Table 16 Setpoint. (Continued).

P7.2.2.6 ²	PI setpoint 1 slee	p level			ID 2450				
Minimum value:	MinFreqMin Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz				
Description:	Defines the level of v delay time, it will put	Defines the level of which the unit value is used to look at to go into the sleep mode. When the unit drops below this level for the sleep delay time, it will put the drive into the sleep mode.							
P7.2.2.7 [®]	SP1 sleep mode o	SP1 sleep mode over cycle time							
Minimum value:	0	Maximum value:	10	Default value:	0				
Description:	Defines the count the 'pump over cycle' fau One cycle is defined v O value means do not	e drive come in and out of slee lt. when the drive transfers from do the sleep over cycle check	o mode. If multiple tim normal mode to sleep r and clear 'pump over c	es done in this time frame, the d node. ycle' fault.	lrive would trip on				
P7.2.2.8 ²	SP1 sleep mode n	naximum 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 17 Feedback.

P7.3.2 - Feedback 1.					
P7.3.2.1 ^①	PI feedback 1 source				ID 1332
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = Not used; 1 = Al; 2 = Drive reference pot; 3 = FB process data input 1; 11 = FB Pl feedback.				
Description:	Defines where feedback sig	nal is being fed into the dr	ive, via analog or fieldbus d	ata value.	

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

Table 18 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 MS/TP 2 = SWD 3 = SA Bus				
Description:	This parameter defines the	e communication protocol fo	r 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 the	e slave address for RS-485 c	communication.		

Table 18.	Serial	communication	(Continued).
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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; 4 = 115,200					
Description:	This parameter defines cor	mmunication speed for RS-4	85 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; 2 = Even.					
Description:	This parameter defines parity type for RS-485 communication.					
P11.2.4	Modbus RTU protocol	status			ID 588	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Options:	0 = Initial; 1 = Stopped; 2 = Operational; 3 = Faulted.					
Description:	This parameter shows the	protocol status for RS-485	communication.			
P11.2.5	Communication timeo	ut modbus RTU			ID 593	
Minimum value:	0 ms	Maximum value:	60,000 ms	Default value:	10,000 ms	
Description:	Selects the time to wait be	efore a communication fault	occurs over modbus RTU if a	a message is not received.		
P11.2.6	Modbus RTU fault resp	oonse			ID 2516	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 - Only in fieldbus control communications; if not i 1 - In all control modes. N	mode. When fieldbus is th in fieldbus control, place w o matter the control place s	e control place and fieldbus f ill not fault. etting, if communication is lo	fault is active, the drive will ost, fieldbus fault response v	fault on loss of vill occur.	
Description:	Defines the fieldbus fault of	condition for modbus RTU c	ommunication.			

P11.3 - BACnet RTU MSTP (*DM1 Pro).

P11.3.1 ^①	MSTP baud rate				ID 594	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2	
Options:	$\begin{array}{l} 0 = 9,600;\\ 1 = 19,200;\\ 2 = 38,400;\\ 3 = 76,800;\\ 4 = 115,200. \end{array}$					
Description:	This parameter defines the communication speed for RS-485 communication.					
P11.3.2 ¹⁾	MSTP device address		ID 595			
Minimum value:	0	Maximum value:	127	Default value:	1	
Description:	Defines the device address	of the drive on the BACnet	MSTP network.			
P11.3.3 ^①	MSTP instance numbe	r			ID 596	
Minimum value:	0	Maximum value:	4,194,302	Default value:	0	
Description:	Defines the instance numb	er of the drive on the BACne	et 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 be	fore a communication fault	occurs over BACnet MSTP if	f a message is not received.		

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; 2 = Faulted.						
Description:	This parameter shows th	e protocol status for BACn	et MSTP communi	ication.			
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; 3 = Baud rate fault.						
Description:	This parameter shows th	e protocol status for BACn	et MSTP commun	ication.			
P11.3.7	MSTP fault response				ID 2526		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Only in fieldbus contr communications. If r 1 = In all control modes -	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 MS	FP communication				
P11.3.8	MSTP maximum mas	ter			ID 1537		
Minimum value:	1	Maximum value:	127	Default value:	127		
Description:	Defines the maximum nu	Defines the maximum number of masters that can establish connections with the drive.					

Table 18. Serial communication (Continued).

P11.4 - SA bus (*DM1 Pro).

P11.4.1 ^①	SA bus device addres	s	·		ID 1726	
Minimum value:	204	Maximum value:	254	Default value:	204	
Description:	This parameter is used to	set the SA bus address at	which the drive will b	e located on instance node.		
P11.4.2 ^①	SA bus baud rate				ID 1727	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2	
Options:	0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; 4 = 115,200.					
Description:	This parameter defines communication speed for SA bus communication.					
P11.4.3 ^①	SA instance number	·			ID 1728	
Minimum value:	0	Maximum value:	4,194,302	Default value:	0	
Description:	Defines the instance num	ber of the drive on the SA	bus network.			
P11.4.4	SA communication ti	meout			ID 1730	
Minimum value:	0	Maximum value:	60,000	Default value:	10,000	
Description:	Selects the time to wait b	efore a communication fa	ult occurs over SA bus	if a message is not received.		
P11.4.5	SA bus protocol statu	ıs			ID 1731	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Options:	0 = Stopped; 1 = Operational; 2 = Faulted.					
Description:	This parameter shows the	e protocol status for SA bu	s communication.			

Table 18.	Serial	communication	(Continued)
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P11.4.6	SA bus fault response				ID 1732	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	 0 = Only in fieldbus control mode - when fieldbus is the control place and fieldbus fault is active. The drive will fault on loss of communications. If not in fieldbus control, place will not fault. 1 = In all control modes - no matter the control place setting, if communication is lost, fieldbus fault response will occur. 					
Description:	Defines the fieldbus fault c	ondition for SA bus commu	nication.			

P11.5 - SWD (*DM1 Pro).

P11.5.1	Parameter access				ID 2630	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1	
Options:	0 = No permission to read/ 1 = Acyclic read/write are	/write on acyclic channel. allowed on Profibus.				
Description:	PNU927 which specifies the	ne operation priority of para	ameters for acyclic communic	ation.		
P11.5.2 ^①	Parameter data acces	S			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.					
Description:	PNU928 which specifies the	ne control priority of the de	vice for cyclic communication			
P11.5.3	Fault situation counte	r			ID 2632	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Description:	PNU952 which specifies the fault situation counter. Only write of 0 is allowed, then the whole fault buffer (actual fault situation and all other fault situations) and the fault message counter (parameter 944) are erased.					
P11.5.4	Board status				ID 2609	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Description:	Status of the board. B0-DCOM communication B1-Board HW fault B2-IO1 24 volt overload fau B3-Profibus communicatio B4-fieldbus fault.	fault. ult. n fault.				
P11.5.5	Firmware version				ID 2610	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Description:	This parameter provides th	ne firmware version of the S	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; 2 = Diagnostics.					
Description:	This parameter specifies t	he 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; 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; 1 = On.				
Description:	Bluetooth Broadcast Mo	de			
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; 1 = Reset.				
Description:	Bluetooth Pairing Reset				

Table 18. Serial communication (Continued)

Table 19 Ethernet communication (*DM1 Pro).

P12.1 - Basic setting	s (*DM1 Pro).						
P12.1.1 ^①	IP address mode				ID 1500		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Static IP; 1 = DHCP with Autolf	D.					
Description:	This parameter defin	ed the IP address configuration	n mode for EIP/modbus 1	ICP.			
P12.1.2	Active IP address				ID 1507		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Description:	Reads the current act	tive IP address.					
P12.1.3	Active subnet ma	sk			ID 1509		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Description:	Reads the current act	tive subnet mask.					
P12.1.4	Active default ga	teway			ID 1511		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Description:	Reads the current act	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 MA	AC address.					
P12.1.6 ^①	Static IP address				ID 1501		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	192.168.1.254		
Description:	Defines the static IP	address.					
P12.1.7 ¹	Static subnet mas	sk			ID 1503		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	255.255.255.0		
Description:	Defines the static sul	bnet mask.					
P12.1.8 ^①	Static default gat	eway			ID 1505		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	192.168.1.1		
Description:	Defines the static de	fault gateway.					
P12.1.9	Ethernet commun	nication timeout			ID 611		
Minimum value:	0 ms	Maximum value:	60,000 ms	Default value:	10,000 ms		
Description:	Selects the time it w	aits before a communication fa	ault occurs over etherne	t.			

Table 19. Ethernet communication (*DM1 Pro)

P12.2 - Trusted IP filter (DM1 PRO only).							
P12.2.1	Trusted IP white list				ID 68		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	192.168.1.255		
Description:	Defines the IP addresses in the white list. A setting of 192.168.1.255 enables all connections on the local subnet.						
P12.2.2	Trusted IP filter enable)			ID 76		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1		
Options:	0 = Disabled; 1 = Enabled.						
Description:	Enables IP white listing. De	evices not in the white list v	vill not be able to establish (communications with the driv	/e.		

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; 1 = Enable.							
Description:	Enables Modbus TCP	communications, must be ena	bled to connect to	PC Software				
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	Maximum number of connections allowed to the drive.						
P12.3.3	Modbus TCP unit	Modbus TCP unit identifier number ID 610						
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1			
Description:	Unit identifier unit va	lue for modbus TCP.						
P12.3.4	Modbus TCP prote	ocol status			ID 612			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.			
Options:	0 = Stopped; 1 = Operational; 2 = Faulted.							
Description:	This parameter shows	s the protocol status for modb	us TCP communica	ation.				
P12.3.5	Modbus TCP fault	response			ID 2517			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Only in fieldbus co communications. 1 = In all control mode	 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 f	ault 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; 2 = BACnet IP.					
Description:	Selects the active communication protocol on the ethernet 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; 2 = Faulted.							
Description:	Indicates if etherr	Indicates if ethernet protocol is active or not.						
P12.4.3	Ethernet IP fau	Ethernet IP fault response						
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Only in fieldbu communicatio 1 = In all control n	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 fieldb	us fault condition for ethernet IP o	communication.					

Table 19. Ethernet communication (*DM1 Pro) (Continued).

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

P12.5.1 ^①	BACnet IP UDP port n	umber			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 = BAC8; 47817 = BAC9; 47819 = BAC6; 47819 = BACC; 47820 = BACC; 47821 = BACD; 47822 = BACC; 47823 = BACF.				
Description:	Defines the BACnet UDP p	ort number.			
P12.5.2 ¹⁾	BACnet IP foreign dev	ise			ID 1734
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				
Description:	Enables BACNET IP foreig	n 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 BBM	D IP address.			
P12.5.4 ^①	BACnet IP UDP port				ID 1737
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	47,808

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

Table 19. Ethernet communicati	on (*DM1 Pro) (Continued).
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Options:	47808 = BAC0; 47809 = BAC1;				
	47810 = BAC2; 47811 - BAC2;				
	47812 = BAC4;				
	47813 = BAC5; 47814 - BΔC6				
	47815 = BAC7;				
	47816 = BAC8; 47817 = BAC9 [.]				
	47818 = BACA;				
	47819 = BACB; 47820 = BACC;				
	47821 = BACD;				
	47823 = BACE, 47823 = BACF.				
Description:	Displays the BACnet	BBMD UDP port number.			
P12.5.5 ¹⁾	BACnet IP regist	ration interval			ID 1738
Minimum value:	0	Maximum value:	65,535	Default value:	10
Description:	Defines the registrat	tion interval.			
P12.5.6	BACnet IP comm	unication timeout			ID 1739
Minimum value:	0	Maximum value:	60,000	Default value:	0
Description:	Selects the time it w	vaits before a communication fa	ault occurs over BACne	et IP.	
P12.5.7	BACnet IP protoc	col status			ID 1740
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Stopped; 1 = Operational; 2 = Faulted.				
Description:	This parameter show	vs the protocol status for BACn	et IP communication.		
P12.5.8	BACnet IP fault b	pehavior			ID 1741
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Only in fieldbus o communications. 1 = In all control mod	control mode - when fieldbus is . If not in fieldbus control, plac des - no matter the control plac	the control place and e will not fault. e setting. If communio	Fieldbus fault is active, the drive	will fault on loss of nse will occur.
Description:	Defines the fieldbus	fault condition for BACnet IP co	ommunication.	· · · ·	
P12.5.9 ¹⁾	BACnet IP instan	ce number			ID 1742
Minimum value:	0	Maximum value:	4,194,302	Default value:	0
Description:	Displays the BACnet	instance number.			

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

P12.6.1	Web UI protocol status ID 2915							
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.			
Options:	0 = Off; 1 = Operational; 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 communications. If no 1 = In all control modes - n	mode - when fieldbus is the t in fieldbus control, place w o matter the control place s	e control place and fieldbus ill not fault. etting. If communication is	fault is active, the drive will lost, fieldbus fault response	fault on loss of will occur.			
Description:	Defines the fieldbus fault o	condition for web server con	nmunication.					
P12.6.3	Web UI communicatio	n timeout			ID 2919			
Minimum value:	30,000 ms	Maximum value:	60,000 ms	Default value:	60,000 ms			
Description:	Selects the time it waits b	efore a communication fault	occurs over the web server					

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

P12.6.4 ^①	Web UI enable				ID 2921			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Disabled; 1 = Enabled.							
Description:	Enables web server	configuration and monitoring pa	ige.					

Table 19. Ethernet communication (*DM1 Pro) (Continued).

P12.7 - DM1 PRO.						
P12.7.1 ^①	IOT Enable		·		ID 3001	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Disabled; 1 = Enabled.					
Description:	IOT Enable					
P12.7.2 ¹	IOT Connection State	us	·		ID 3002	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Disconnected; 1 = Connected.					
Description:	IOT Connection Status					
P12.7.3 ^①	Proxy Enable		·		ID 3003	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Disabled; 1 = Enabled.					
Description:	Proxy Enable					

P12.8 - DM1 PRO.

P12.8.1 ^①	SNTP Enable				ID 3178
Minimum value:	N.A.	Maximum value:	2.	Default value:	0
Options:	0 = Disabled; 1 = Enable By User. 2 = Enable By DHCP.				
Description:	SNTP Enable				
P12.8.2 ^①	SNTP Server Status				ID 3188
Minimum value:	N.A.	Maximum value:	3	Default value:	0
Options:	0 = Unconnected 1 = Connected_To_Server 2 = Connected_To_Server 3 = Connected_To_Server	_1 _2 _3			
Description:	SNTP Server Status				
P12.8.3 ¹²	SNTP Server 1				ID 3179
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	151. 110. 232.100
Description:	SNTP Server 1				
P12.8.4 ¹²	SNTP Server 2				ID 3181
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	151. 110. 232.100
Description:	SNTP Server 2				
P12.8.5 ¹²	SNTP Server 3				ID 3183
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	151. 110. 232.100
Description:	SNTP Server 3				

Table 20 System.

P13.1 - Basic settings.					
P13.1.1	Language				ID 340
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = English; 1 = English; 2 = English.				
Description:	This parameter offers the available language is Engli	ability to control the frequ ish only.	ency converter thro	ugh the keypad in the language of y	our 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; 3 = Multi-purpose.				
Description:	This parameter sets the ac	ctive application if multiple	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 = Reload defaults; 2 = Reload set 1; 3 = Reload set 2; 4 = Store set 1; 5 = Store set 2; 6 = Reset; 7 = Reload defaults VM.				
Description:	This parameter allows you	to reload the factory defa	ault parameter value	es, and to store and load two custom	nized parameter sets.
P13.1.4	Up to keypad (for rem	ote keypad only)			ID 620
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = No; 1 = Yes (all parameters).				
Description:	This function uploads all e	xisting parameter groups	to the keypad.		
P13.1.5 ¹⁾	Down from keypad (fo	or remote keypad only)		ID 621
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = No; 1 = All parameters; 2 = All, no motor; 3 = Application parameter	S.			
Description:	This function downloads o	one or all parameter group	s from the keypad to	the drive.	
P13.1.6	Parameter compariso	n (for remote keypad o	only)		ID 623
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.

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

Options:	0 = No; 1 = Compare with keypad; 2 = Compare with default; 3 = Compare with Set 1; 4 = Compare with Set 2.				
Description:	With the parameter compa and those loaded to the co	arison function, you can con ntrol keypad.	npare the actual parameter v	alues to the values of your o	customized parameter sets
	The actual parameter value displayed on the lowermos	es are first compared to tho st line of the keypad.	ose of the customized parame	eter Set 1. If no differences	are detected, a "O" is
	If any of the parameter val	ues differ from those of the	e Set 1 parameters, the numb	er of the deviations is displa	ayed together.
	By pressing the right arrow value on the description lin can also edit the actual val	v button, once again you wi ne (in the middle) is the defa lue by pushing the right arro	II see both the actual value a ault value, and the one on the ow button.	nd the value it was compare value line (lowermost line)	ed to. In this display, the is the edited value. You
	Actual values can also be o	compared to Set 2, factory	settings, and keypad set valu	es.	
P13.1.7	Parameter lock PIN (fo	or remote keypad only)			ID 624
Minimum value:	0	Maximum value:	9,999	Default value:	0
Description:	The application selection c enabled, the user will be p	an be protected against un rompted to enter a passwor	authorized changes with the rd before application change	password function. When s, parameter value changes,	the password function is , or password changes.
	By default, the password fibetween 1 and 9,999.	unction is not in use. If you	want to activate the passw	ord, change the value of this	s parameter to any number
	To deactivate the passwor	d, reset the parameter valu	e to O.		
P13.1.8	Keypad parameter loci	k (for remote keypad o	nly)		ID 625
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Change enable; 1 = Change disable.				
Description:	This function allows the us the display if you try to edi	er to prohibit changes to th t a parameter value.	e parameters. If the parame	ter lock is activated, the tex	xt "locked" will appear on
	Note: This function does n	ot prevent unauthorized ed	iting of parameter values.		
P13.1.9	Start-up Wizard				ID 626
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Enabled. 1 = Disabled.				
Description:	The Startup Wizard facilita and then advances parame user to go to the Main men power up of the VFD. By s Start up. If user goes into	ates commissioning the VFC sters through the start-up pa nu or default page and this p etting this parameter to Dis Start Up Wizard after comp	D. If selected Enable, the Star arameter list/Application Min parameter is set to Disabled. sable without going through to oletion or defaults drive the Start Start Start	tup Wizard prompts operat ni wizard in keypad. After co The Startup Wizard is alwa the Startup Wizard it will no Startup wizard will be Enabl	tor for application desired ompletion it allows the tys enabled for the initial to cause it to be active on ed.
P13.2 - Keypad (DM1 P	ro).				
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 d	efines the time after which	the keypad display returns t	o the Default Page.	
	Note: If the default page v	alue is 0, the timeout time	setting has no effect.		
P13.2.5	Contrast adjust				ID 630
Minimum value:	5	Maximum value:	18	Default value:	12
Description:	If the remote keypad displa	ay is not clear, you can adju	st the keypad contrast with t	his 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	s how long the backlight sta	iys on before going out.		
P13.2.7	Fan control	-	-		ID 632
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2

Table 20. System (Continued).

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

Table 20. System (Continued).

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. The fan receives a stop command when the heat sink temperature falls to 55°C. The fan runs for about a minute after receiving the stop command or switching on the power, as well as after changing the value from "Continuous" to "Temperature.". 2 = Run Follow-after power up, the fan is stopped until the run command is given and then fan runs continuously. This is mainly made for common DC-bus systems to prevent cooling fans to load charging resistors on power up moment.
Description:	This function allows you to control the VFD's cooling fan. You can set the fan to run:

P13.4 - Version information.

P13.4.1	Keypad softwar	re version			ID 640	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Description:	Keypad firmware v	version.				
P13.4.2	Motor control s	oftware 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 sof	tware version	·	·	ID 644	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Description:	MCU/application s	oftware version.				
P13.4.4	Software bundl	e version			ID 1714	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	

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 numbe	r.			
P13.5.2	Multi-monitor set	(for remote keypad only)		·	ID 627
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Change enable; 1 = Change disable.				
Description:	The keypad display ca replace the values mo	an display three actual monito onitored with other values.	red values at the	same 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:	The keypad can be pr When the password response to key press	otected against unauthorized function is enabled, the user w s except up/down/left/right.	changes with the vill be prompted t	e keypad lock function after keys are no to enter a password before the keypad o	t pressed five minutes. display parameter or
	By default, the passw between 1 and 9,999	vord function is not in use. If y	ou want to activ	ate the password, change the value of t	his parameter to any number
	To deactivate the pas	sword, reset the parameter va	alue to O.		
P13.5.4	Drive application	name			ID 2922
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
	It defines the Drive A be editable only from	pplication Name with a maxin Web UI and PC tool.	num 20 character	rs limit. It helps to identify your drive wi	thin multiple drives. It could
P13.5.5	Serial Number				ID 1758
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
	Emerson drive Serial	Number only			

Chapter 5 - Fan control application

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.

Control I/O configuration

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

Table 21 Fan application default I/O connection.



DM1

External wiring	Terminal	Short name	Name	Default setting	Description
	1	DI1	Digital input 1	Run forward	Starts the motor in the forward direction.
	2	DI2	Digital input 2	Run reverse	Start the motor in the reverse direction.
	3	DI3	Digital input 3	External fault	Triggers a fault in the drive.
	4	DI4	Digital input 4	Fault reset	Resets active faults in the drive.
	5	CMA	DI1 to DI4 common	Grounded	Allows for sourced input.
	6	А	RS-485 signal A	—	Fieldbus communication (Modbus RTU, BACNet).
	7	В	RS-485 signal B	—	Fieldbus communication (Modbus RTU, BACNet).
► Se	8	Al1+ ①	Analog input 1	0 - 10 V	Voltage speed reference (programmable to 4 mA to 20 mA).
"E	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.).
	18	R1NO	Relay 1 normally open	Run	Changes state when the drive is in the run state.
· [19	R1CM	Relay 1 common		
	20	R1NC	Relay 1 normally closed		

External wiring	Terminal	Short name	Name	Default setting	Description
	1	DI1	Digital input 1	Run forward	Starts the motor in the forward direction.
	2	DI2	Digital input 2	Run reverse	Start the motor in the reverse direction.
	3	DI3	Digital input 3	External fault	Triggers a fault in the drive.
	4	DI4	Digital input 4	Fault reset	Resets active faults in the drive.
!	5	CMA	DI1 to DI4 common	Grounded	Allows for sourced input.
	6	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	STO_com	Safe torque common	—	Safe torque Off common.
	16	STO2	Safe torque Off 2	—	Safe torque Off 2 input.
	17	ST01	Safe torque Off 1	—	Safe torque Off 1 input.
	18	R1NO	Relay 1 normally open	Run	Changes state when the drive is in the run state.
Ť	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.
٢٢	22	R2CM	Relay 2 common		

Table 21. Fan application default I/O connection (Continued).DM1 PRO

Notes:

The above wiring demonstrates a SINK configuration. The SW2 position 1 is set to ON. If a SOURCE configuration is desired, wire 24 V to CMA and close the inputs to ground. When using the +10 V for Al1, SW2 position 2 set to ON.

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 22 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:	А	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 value	es and measured motor curre	ent (%).	
M1.6	Motor power				ID 5
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Percent motor power calcu	llated from nameplate value	es and measured motor curre	nt (%).	
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).				

	or (continued).				
M1.9	Unit temperature				ID 8
Minimum value:	°C	Maximum value:	°C	Default value:	٥C
Description:	Heat sink temperature	(deg. C).			
M1.10	Motor temperature	•			ID 9
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Motor temperature val	ue calculated from nameplat	e values and measu	red 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 th	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	ower (kW).			

Table 22. Monitor (Continued)

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 v	alue (Vdc or Amps) selecta	ble with dipswitch.		
M2.2	Keypad pot voltage				ID 1858
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Keypad potentiometer mea	asured value (Vdc). With key	ypad version only.		
M2.3	Analog output				ID 25
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	Analog output 1 measured	value (Vdc or Amps) select	able 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	R01, R02				ID 557
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Relay output 1 and 2 statu	S.			
M2.9	Control board DI statu	IS			ID 3214
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Control board DI Status w	ill give the input status on c	ontrol board.		

M5 - PI monitor.

M5.1	PI setpoint				ID 16
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	PI setpoint in process units				
M5.2	PI feedback				ID 18
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	PI feedback level in proces	s units.			
M5.3	PI error value				ID 20
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	PI error in process units.				

Table 22. Monitor (Continued).

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; 2 = Sleep mode.				
Description:	PI status indication, indicat	es if drive is stopped, runni	ng in PI mode, or in PI sleep i	node.	

M9 - Multi-monitoring (for remote keypad only).

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 monitorin editing the value then by g	ing values in a single screen ng values. Up and down key oing up and down.	. The values are selectable s can be used to select the	via the keypad menu. Mult row and then hitting the lef	ti-monitor page could t arrow key will allow for

Table 23 Basic Parameters

Minimum value: Description:	0.00 Hz Defines the lowest f 1 = Fire mode minim	Maximum value:	400 00 Hz		
Description:	Defines the lowest f		400.00 112	Default value:	0.00 Hz
	2 = Derag. 3 = MPFC staging fre 4 = MPFC master fix 5 = Prime pump freq 6 = Prime pump freq	requency at which the drive wil um frequency. equency. ed frequency. juency. juency 2.	l operate. This setting	will limit other frequency paran	neter settings.
P1.2 ²	Maximum freque	ncy			ID 102
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	MaxFreqMFG
	3 = Motor potentiom 3 = Jog speed. 4 = 2nd stage ramp f 5 = Fire mode minimi 6 = Derag. 7 = MPFC staging fre 8 = MPFC master fixi 9 = Prime pump frequil 10 = Prime pump frequil 10 = Prime pump frequil 11 = Preset speed fre 12 = Frequency limit 13 = Reference limit 14 = Speed control_1 15 = Stall frequency 16 = 4 mA fault frequil 17 = MPFC de-stagin 18 = Pipe fill loss fre 19 = Pipe fill loss fre 20 = Broken pipe freu	eter. requency. um frequency. equency. defrequency. Jency. quency 2. equency. value. isiz. limit. Jency. g frequency. quency low. quency high. quency limit.			
P1.3 ²	Accel. time 1				ID 103
Minimum value:	0.1 s	Maximum value:	3,000.0 s	Default value:	20.0 s

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 to decelerate from maximum frequency to zero frequency.						
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 fu	ll load current. This value i	is found on the rating plate o	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 sp	eed. This value is found or	n 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 po	ower factor. This value is fo	ound 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 vo	ltage. This value is found o	on the rating plate of the mo	otor.			
P1.10 ^①	Motor nom. frequency	Y			ID 488		
Minimum value:	8.00 Hz	Maximum value:	400.00 Hz	Default value:	MotorNomFreqMFG Hz		
Description:	Motor nameplate rated fre	equency. This value is foun	d 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 = IO terminal; 3 = fieldbus.						
Description:	Defines the signal location Start/Stop buttons on the	n for the start command in drive. Fieldbus would be a	local mode. I/O terminals w a communication bus. Keypa	yould be from the digital harc ad display will indicate which	l-wired inputs or keypad for n mode is selected.		
P1.12 ^{①②}	Local reference				ID 136		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1		
Options:	0 = AI; 1 = drive ref. pot; 4 = maximum frequency; 5 = PID control output 6 = keypad; 7 = fieldbus ref.						
Description:	Defines the signal location	n for the speed reference ir	n local mode.				
P1.13 ²	Remote control place		ID 135				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = 10 terminal; 1 = fieldbus; 3 = keypad.						
Description:	Defines the signal location for the start command in remote mode. I/O terminals would be from the digital hard-wired inputs or keypad for Start/Stop buttons on the drive. Fieldbus would be a communication bus. Keypad display will indicate which mode is selected.						
P1.14 ^{①②}	Remote reference				ID 137		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = AI; 1 = drive reference pot; 4 = maximum frequency; 5 = PID control output 6 = keypad; 7 = fieldbus reference.						
Description:	Defines the signal location	n for the speed reference ir	n remote mode.				

Table 23. Basic Parameters (Continued)

Table 23. Basic Parameters (Continued).

P1.15	Compressor table	ID 1769						
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Description:	Compressor table ve	Compressor table version. It is a number to indicate the version of compressor table						
P1.16	Compressor type	selection			ID 1770			
P1.16 Minimum value:	Compressor type N.A.	e selection Maximum value:	N.A.	Default value:	ID 1770 0			

Table 24 Inputs .

P2.1 - Basic setting	s.						
P2.1.1 ²	Al reference scale	Al reference scale minimum value					
Minimum value:	0.00 Hz	Maximum value:	RefScaleMax Hz	Default value:	0.00 Hz		
Description:	Expected min frequen 0.00 <= Al Ref Scale I	Expected min frequency reference value for AI input . 0.00 <= AI Ref Scale Min Value <=AI Ref Scale Max Value <= 400.00.					
P2.1.2 ²	Al reference scale	Al reference scale maximim value					
Minimum value:	RefScaleMin Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz		
Description:	Expected max frequency reference value for AI input . 0.00 <= AI Ref Scale Min Value <=AI Ref Scale Max Value <= 400.00.						



P2.1.3 ¹²	IO terminal S	Start/Stop logic			ID 143
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Forward - r 1 = Start-Rever considered 2 = Start - enal 3 = 3 Wire Con stop	everse: maintained input on start sig rse DI closed contact = start /open c 2 wire control with a contact on sta ble: maintained input on start signal trol, used for three wire operation, s	nal 1 to run forw ontact = stop: DI rt/stop, contact o 1 to run forward tart signal 1 uses	ard and a maintained signal on start s closed contact = reverse / open contar ypen it stops and direction on 2nd star and a maintained signal on start signa a normally open start and start signa	gnal 2 for reverse. t = forward - This would be t signal l 2 to enable the drive to run. l 2 uses a normally closed
Description:	Defines the fur	nctionality for start signal 1 and star	t signal 2. By def	ault, start signal 1 is DI1 and start sig	nal 2 is DI2.
	0 = P3.2: IO te 2-wire cor	erminal start signal 1 = start forwa ntrol with either a contact used on	rd - P3.3: IO terr the start FWD o	ninal start signal 2 = start reverse. or start REV commands. When cont	This would be considered acts open, the motor stops.
		DIN1	1 ID1801 - Start Sign	al: DigIN:1 ID143 Start Stop Logic: Start Forward	
		DIN2	2 ID1803-Start Signa	2: DigIN:2 ID143 Start Stop Logic: Start Reverse	
		GND	5		

Table 24. Inputs (Continued).



^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 24. Inputs (Continued).

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





P2.2.1 ²	DI1 function				ID 1801
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Not used, no act 1 = I0 terminal start P2.1.3. 2 = I0 terminal start P2.1.3. 3 = Reverse, when S 4 = Ext. fault 1, whe 5 = Ext. fault 2, whe 6 = Ext. fault 2, whe 7 = Fault reset, whe 8 = Run enable, whe 9 = Preset speed B0 10 = Preset speed B0 11 = Preset speed B0 12 = Jog enable, wh 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, v 21 = Parameter 1/2 22 = PI controller, wh 23 = PI setpoint sele 24 = Motor interlocd 25 = Smoke mode, v 26 = Fire mode Ref. Ref. 2 will be a 28 = Fire mode rever be reverse. 29 = DC brake active, 31 = Derag. enable,	ion. signal 1, when the control sou signal 2, when the control sou signal 2, when the control sou Start/Stop logic is set to 3 star n closed, Ext. fault 1 will be ac n closed, Ext. fault 2 will be ac n closed, Ext. fault 2 will be ac n closed all active faults will be en closed, the drive will allow a , the seven preset speeds are 2, the seven preset speed defin e, when closed, the motor pote when closed, the motor pote ime set, when open, Accel./De rohibit, when closed, the drive will be Sel. when open, parameter set 1, when closed, the drive will be set, when open, parameter set 1, when closed, motor will be yhen closed, the fire mode will be 1/2 select, when fire mode will be 1/2 select, when fire mode is active a e, when fire mode is active a e, when closed, the preheat mod when closed, the Derag. cycle	rce is set to 10 ter rce is set to 10 ter t pulse stop pulse, tivated. tivated. tivated. e reset. start command a selected via three selected to the outp the reference so point 1 is active. Whe the reference so point 1 is active. Sective and this input nd this input is op aking will be active. for pumps will be	rminal, this input when closed will perminal, this input when closed will perminal, this input when closed will perminal, this input will cause the drive to star binary inputs. This is least significant binary inputs. This is most significant binary inputs. This is most significant binary inputs. This is most significant weride the frequency reference. will increment at the rate defined by null decrement at the rate defined by a used. When closed, Accel./Decel. the any setting in the drive. Note control place. control place. control place. In closed, parameter set 2 is active. When closed setpoint 2 is active.	rform the action defined by rform the action defined by rt in the reverse direction. It bit in that binary input. Int bit in that binary input. Notor pot ramp time. Me 2 will be used. e reference value.
Description:	Defines the function	of digital input 1			

Table 24. Inputs ((Continued).

Table 24. Inputs ((Continued).

P2.2.3 ²	DI2 function				ID 1803	
Minimum value:	N.A.	Aaximum 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 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 three 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. 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, 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 B2, the seven preset speeds are selected via three binary inputs. This is most significant bit in that binary input. 11 = Preset speed B2, the seven preset speed are selected via three binary inputs. This is most significant bit in that binary input. 12 = Jog enable, when closed, the motor potentiometer value will override the frequency reference. 13 = Accel, pot value, when closed, the motor potentiometer value will increment at the rate defined by motor pot ramp time. 					
	 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 decrement at the rate defined by motor pot ramp time. 15 = Reset pot zero, when closed, the motor potentiometer value will reset to zero. 16 = Accel./decel. time set, when open, accel/decel. time 1 will be used. When closed, accel/decel. time 2 will be used. 17 = Accel./decel. prohibit, when closed, the drive will hold the output frequency and ignore changes to the reference value. 18 = No access to param., 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 setpoint select, when open, parameter setpoint 1 is active. When closed, setpoint 2 is active. 24 = Motor interlock 1, when olesed, the motor will be active. 25 = Sinoke mode, when closed, fire mode will be active. 26 = 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 n 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 braking will be active. 29 = DC brake active, when closed, DC injection braking will be active. 20 = Dreheat active, when closed, DC injection braking will be active. 21 = Prene active, when closed, DC injection braking will be active. 22 = DC brake active, when closed, DC injection braking will be active. 					
Description:	Defines the function of digita	I input 2.				
P2.2.5 ²	DI3 function				ID 1805	
Minimum value:	N.A.	Aaximum value:	N.A.	Default value:	4	
	 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 signal 2 - when the control source is set to 10 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 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. 11 = Preset 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 = Pl controller - when closed, the drive will be forced to the local control place. 22 = Pl controller - when closed, the drive will be forced to the local control place. 23 = Pl setpoint select - when open, parameter setpoint 1 is active, when closed, setpoint 2 is active. 24 = Motor interlock 1 - when closed, motor will be anabled to run. 29 = DC brake active - when closed, DC injection braking will be active. 31 = Derag, enable - when closed. The Derag, cycle for pumps will be initiated. 					
Description:	Defines the function of digita	ıl input 3.				
Table 24. Input	uts (Continued).					
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P2.2.7 ²	DI4 function				ID 1807
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	7
Options:	0 = Not Used, not 1 = IO terminal s P2.1.3; 2 = IO terminal s P2.1.3; 3 = Reverse - wi 4 = Ext. fault 1 - 5 = Ext. fault 2 - 6 = Ext. fault 2 - 6 = Ext. fault reset - 9 = Preset speed 10 = Preset speed 10 = Preset speed 12 = Jog enable 13 = Accel. pot v 14 = Decel. pot v 15 = Reset pot z 16 = Accel./deced 17 = Accel./deced 18 = No access t 19 = Remote cor 20 = Local contrel 22 = PI controlle 23 = PI set point 24 = Motor inter 25 = Smoke mode 26 = Fire mode r 29 = DC brake aa 30 = Preheat act 31 = Derag. enal	action; tart signal 1 - when the control sou tart signal 2 - when the control sou tart signal 2 - when the control sou tart signal 2 - when the control sou then start/stop logic is set to 3 start when closed, ext. fault 1 will be ac when closed, ext. fault 2 will be ac when closed, ext. fault 3 will be ac when closed, ext. fault 3 will be ac when closed, ext. fault 3 will be ac be a start a source faults will be when closed, the drive sould allow a 180 - the 7 preset speeds are sele d B2 - the 7 preset speeds are sele calle - when closed, the motor pote ralue - when closed, the motor pote alue - when closed, the motor pote alue - when closed, the motor pote all - when closed, the drive will be for - when closed, the drive will be for - when closed, the drive will be trol - when closed, the drive will be trol - when closed, the drive will be trol - when closed, the drive will be co parameters - when closed, no cha trol - when closed, the drive will be co parameters - when closed, no cha trol - when closed, the drive will be trowen closed, the drive will be for r - when closed, the drive will be trowen closed, the drive will be for co parameter - when poen, parameter set nock 1 - when closed, motor will be e - when closed, fire mode will the eference 1/2 sel when fire mode eference 2 will be active; everse - when fire mode is active a tive - when closed, preheat mode w ple - when closed, the Derag. cycle	rce is set to IO rce is set to IO pulse stop puls tivated; tivated; tivated; e reset; start command ted via 3 binary cted via 3 binary ted via 4 binary ted vi	terminal this input when closed will peri terminal this input when closed will peri e, this input will cause the drive to start d and be in the ready state; rinputs, this is least significant bit in tha y inputs; y inputs, this is most significant bit in the loverride the frequency reference; will increment at the rate defined by m e will decrement at the rate defined by m will reset to zero; e used ; when closed accel./decel. time tput frequency and ignore changes to the ade to any setting in the drive; remote control place; cal control place; en closed parameter set 2 is active; source to PI controller output; e: when closed, set point 2 is active; is input is open, fire mode reference 1 w open, direction will be forward: when cl tive; be initiated.	form the action defined by form the action defined by in the reverse direction; t binary input; at binary input; botor pot ramp time; botor pot ramp time; 2 will be used; e reference value; ill be active: when closed, bsed, reverse;
Description:	Defines the func	tion of digital input 4.			

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 [®]	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 selected 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 24. Inputs (Continued).

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 selected with digital inputs using a binary input.				

P2.4 - Al settings.							
P2.4.1	AI mode				ID 222		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1		
Options:	0 = 0 - 20 mA; 1 = 0 - 10 V.						
Description:	Defines the analog input m parameter.	ode to current or voltage	e the DIP switch	nes on control board will need to be set t	o the same mode as this		
	CN5 terminals 8 and 9 for c	urrent or voltage, also n	eed 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 +10V supply on CN5 terminals 13 , it will require DIP switches SW2 2 and 3 on to complete the current loop. When doing a curren loop with an external supply, the DIP switches SW2 2 off and 3 on.						
			Default				
		OFF	/2 ON	1			
	CIMA ~	GND 1	011	CMA GND			
	Al50	GND 2		Al GND			

Al 4 ~ 20 mA

AI 0~10 V

P2.4.2 ²	AI signal range				ID 175
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = 0-100%/0-20 m 1 = 20-100%/4-20 r	A/0-10 V. mA/2-10 V.			
Description:	With this paramete	er, you can select the analog input	1 signal range.		
	For selection "Cust	omized," see 'Al Custom Min' and	'Al Custom Max', this ena	ables a customized signal ran	ige.
		Al Ref. Scale Max. Al Ref. Scale Max. Al Ref. Scale Min. Value	At 1 Signal Range = Custom at 1 Signal At 1 Signal Range = 1 4 mA teom C teom C teom C	astom	

Table 24. Inputs (Continued).

Chapter 5 - Fan control application

	Table	25	Outputs.
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P3.1 - Digital output.					
P3.1.1 ²	RO1 function				ID 152
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = Not used - No Action 1 = Ready - Drive is ready: 2 = Run - Drive is running 3 = fault - Drive is faulted 4 = fault invert - Drive is no 5 = warning - Drive has a v 6 = Reverse - The Drive is of 7 = At Speed - The output 8 = Zero Frequency - Drive 9 = Frequency limit supervision 10 = PID supervision - Supe 11 = torque limit supervision 12 = reference limit supervision 13 = Power limit supervision 14 = Temp limit supervision 15 = Analog input supervision 16 = Motor current supervision 17 = over heat fault - Over volt 20 = Uvolt Fault - Drive 18 = Ocurrent fault - Ver runt 21 = 4 mA fault - 4 mA fault 22 = external fault - Extern 23 = Motor thermal fault - Za 5 = Control from IO - I/O i 26 = Remote control - Rem 27 = Un-requested rotation 28 = Fire mode - Drive is in 29 = Damper control - Dam 30 = Valve Control - Valve 31 = Jog speed - Drive is in 32 = fieldbus input1 - Cont 33 = fieldbus input2 - Cont 34 = DC charge switch clos 35 = Preheat Active - Prehn 36 = Cold weather active - 37 = PID sleep - PID contro 38 = 2nd stage ramp frequ 39 = Prime Pump Active - C 40 = Master drive State - In 41 = Slave Drive State - In 41 = Stare Brive Control - ext 45 = Ext Brake Inverted-ext	for operation at faulted varning message outputing reverse phase rot frequency has reached the s output is at zero frequency ision - Supervision for frequ ervision for PID controller is on - Supervision for prover li - Supervision for prover li - Supervision for drive tem ion - Supervision for analog sion - Supervision for analog lat - Supervision for motor over heat fault has occurred fault has occurred fault has occurred Motor thermal fault has occ fe Torque Off input is activate to direction - The active direct of ire mode uper control output control output n jog mode roled by FB control word roled by FB control word fa the master drive finthe slave drive in 1 indicates if the mast	ation set reference ency limit 1 is activated activated mit ence limit ipurature limit ipurature limit current limit d ccurred ted nd location ction isn't the same as the re osed ed re me 2 is active pp mode in the multi-pump control mode e is running in single drive co	ode is faulted is faulted pontrol mode on a multi-pur	p control
Description:	Defines the function assoc	iated with changing the sta	te of relay output 1.		

Table 25.	Outputs	(Continued).
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P3.1.4 ²	RO2 function				ID 153
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	3
Options:	1 = Ready - Drive is 2 = Run - Drive is ru 3 = fault - Drive is f 4 = fault invert - Drive 5 = warning - Drive 6 = Reverse - The D 7 = At Speed - The 8 = Zero Frequency limit 10 = PID supervision 11 = torque limit su 12 = reference limit 13 = Power limit su 14 = Temp limit sup 15 = Analog input s 16 = Motor current 17 = over heat fault 18 = Ocult Fault - O 20 = Uvolt Fault - O 20 = Uvolt Fault - 4 22 = external fault 4 = STO Fault Out 25 = Control from IC 26 = Remote control 31 = Jog speed - Dr 32 = fieldbus input1 33 = fieldbus input1 34 = DC charge swi 35 = Preheat Active 36 = Cold weather a 37 = PID sleep - PID 38 = 2nd stage ram 39 = Prime Pump Ac 40 = Master drive S 41 = Stave Drive C 44 = Ext Brake Conr 45 = Ext Brake Inve	ready for operation inning aulted ive is not faulted has a warning message rive is outputing reverse phase I output frequency has reached th - Drive output is at zero frequen supervision - Supervision for frep pervision - Supervision for torqu supervision - Supervision for torqu supervision - Supervision for rep pervision - Supervision for or drive t upervision - Supervision for anal supervision - Supervision for anal - Droder cutrent fault has occurred - Controled by FB control word - Contro	rotation le set reference cy quency limit 1 is ; is activated e limit ference limit r limit og input limit tor current limit tor current limit tor current limit rred d s occurred ivated nand location rection isn't the s e closed ated ated tive l time 2 is active nump mode ve in the multi-pump rive is running in	activated ame as the reference direction ump control mode is faulted control mode is faulted single drive control mode on a multi-p	ump control
Description:	Defines the functio	n associated with changing the s	state of relay out	put 2.	
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; 1 = 0 - 10 V.				
Description:	Defines the analog	output mode to current or voltage	ie.		

Defines the analog output mode to current or voltage.

Table 25.	Outputs	(Continued)).
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P3.3.2 ²	AO function				ID 146
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	1 = Output frequency (0 ma 2 = Frequency reference (0 3 = Motor speed RPM (0 - 1 4 = Motor current (0 - name 5 = Motor torque (0 - calcul 6 = Motor voltage (0 - name 8 = DC bus voltage (0 - name 9 = PI setpoint (process uni 10 = PI error value (process 11 = PI output (process uni 12 = Analog input (0% - 10) 13 = Drive reference poten 14 = Fieldbus process data 15 = Fieldbus process data 16 = Fieldbus process data 17 = Fieldbus process data 19 = Fieldbus process data 20 = Fieldbus process data 21 = Fieldbus process data 22 = User defined output (23 = Motor torque (0% - 2C 24 = Motor power absolute	ax frequency); - max frequency); nameplate RPM); eplate current); lated nominal); lated nominal); lated nominal); eplate voltage); 0 Vdc); it minimum - process unit ma s unit minimum - process unit ma 0%); tiometer (0% - 100%); input 1 (0% - 100%); input 2 (0% - 100%); input 3 (0% - 100%); input 4 (0% - 100%); input 4 (0% - 100%); input 5 (0% - 100%); input 7 (0% - 100%); user defined minimum - user 10%); a value (0% - 100%).	aximum); t maximum); iximum); defined maximum);		
Description:	Select the function desired	to the terminal AO1			

Table 26. 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 opera 1 = Always enabled - In thi	ation - In this mode, the key is mode, the stop button wil	pad stop will only operate w I always stop the drive rega	hen the control source is se rdless of control mode.	t to keypad.
Description:	Enabled or always enabled	keypad operation.			
P4.1.4 ^①	Reverse enabled				ID 1679
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Disabled; 1 = Enabled.				
Description:	Enables or disables the rev	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; 1 = Change enable.				
Description:	This parameter allows for	swapping the motor phase o	output from u, v, w to u, w, v		

P4.1.6 ²	Power up local re	mote select			ID 1685
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Hold last; 1 = Local control; 2 = Remote control.				
Description:	Selects what control when powered down	place the drive will start at af , selecting Local or Remote wi	ter power is applie Il cause the drive t	ed. The default setting will hold the la to start in that mode regardless of las	ast state that the drive was ir t state.
P4.1.8 ²	Start mode				ID 252
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Ramp - The drive 1 = Flying start from s last operating free 2 = Flying start from r the maximum ope	starts from 0 Hz and ramps to stop frequency - The drive will quency as a starting point. naximum frequency - The driv rating frequency as a starting	the frequency refe catch a spinning r e will catch a spin point.	erence value. notor. This setting searches for the c ning motor. This setting searches for	urrent frequency using the the current frequency using
Description:	Selects the start mod	le operation.			
P4.1.9 ²	Stop mode				ID 253
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Coasting - After a 1 = Ramp - After the	stop command, the motor coa stop command, the speed of th	asts to a stop unco ne motor is decele	ontrolled by the drive. rated according to the set deceleratio	n parameters.
Description:	Selects the stop mod	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:	The start and end of t gives a linear ramp sh Setting a value from t the slope.	the acceleration and decelerat hape that causes acceleration 0.10 to 10.00 seconds for this p	ion ramps can be and deceleration t parameter produce	smoothed with these parameters. Se to react immediately to the changes in as an S-shaped acceleration/decelera	tting a value of 0.00 seconds the reference signal. tion at the start and stop of

Table 26. Drive control (Continued)



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Table 26 Drive control (Continued)

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 linear ramp shape	of the acceleration and decelera that causes acceleration and dec	tion ramps can be smo celeration to react imm	othed with these parameters. Se nediately to the changes in the re	etting a value of 0.00 gives a ference signal.		
	Setting a value from the slope.	m 0.10 to 10.00 seconds for this	parameter produces ar	n S-shaped acceleration/decelera	tion at the start and stop of		
		Hz Accel. Time 1 (Accel. Time 2	, Decel. Time 1 , Decel. Time 2) Ramp 2 Shape	amp 2 Shape			
P4.1.12 [®]	Accel. time 2				ID 249		
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 accelerate from the zero frequency to the set maximum frequency.						
	These parameters be selected with the	provide the possibility to set two ne programmable digital input.	o different acceleration	n/deceleration time sets for one a	pplication. The active set		
DA 1 12 ⁽²⁾	Decel, time 2				ID 250		

P4.1.13 [®]	Decel. time 2				ID 250		
Minimum value:	0.1 s	Maximum value:	3000.0 s	Default value:	10.0 s		
Description:	These values corr frequency.	These values correspond to the time required for the output frequency to decelerate from the set maximum frequency to the zero frequency.					
	These parameters be selected with t	provide the possibility to set two he programmable digital input.	different acceleration	n/deceleration time sets for one a	pplication. The active set can		
P4.1.14 ¹²	2nd Stage ram	p frequency			ID 2444		
Minimum value:	MinFreq.	Maximum value:	MaxFreq.	Default value:	30.00 Hz		
Description:	When 2nd stage r This then can be u	When 2nd stage ramp frequency is the frequency level at which the drive will enable the 2nd stage ramp frequency output function. This then can be used for other inputs or devices to signal a frequency level.					

P4.5: Foldback

P4.5.1	IGBT Temperature				ID 776
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	N.A.				
Description:	IGBT Temperature				

P4.5.2	Foldback status				ID 1771			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Inactive 1 = Active 2 = On hold							
Description:	Foldback status. It is a monitor parameter. There are three values: (a) active, when IGBT temperature is greater than foldback temperature (b) on hold, when IGBT temperature is between Recovering temperature and Foldback temperature (c) inactive, when IGBT temperature is smaller than Recovering temperature							
P4.5.3	Foldback output frequ	iency			ID 1772			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	N.A.							
Description:	Foldback output, it is the f	requency. It is a monitor pa	rameter, unit is Hz.					
P4.5.4	Foldback output speed	d			ID 1773			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	N.A.							
Description:	Foldback output, it is the s	peed. It is a monitor param	eter,unit is rpm					
P4.5.5	Foldback enable				ID 1774			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Disabled 1 = Enabled							
Description:	Foldback enable							
P4.5.6	Foldback temperature				ID 1775			
Minimum value:	0	Maximum value:	120	Default value:	80			
Options:	N.A.							
Description:	Foldback temperature. It is the speed shall be reduced	s a user-setting parameter. I at the rate "speed reduce	Display unit is Deg. C. If IGB rate"	temperature is greater than	n Foldback temperature,			
P4.5.7	Recovering temperatu	re			ID 1776			
Minimum value:	0.	Maximum value:	120	Default value:	70			
Options:	N.A.							
Description:	Recovering temperature. In Foldback temperature, the	t is a user-setting paramete speed shall remain the curr	r. Display unit Deg. C. If IGB rent speed.	temperature is between Re	ecovering temperature and			
P4.5.8	Foldback speed reduc	e rate			ID 1777			
Minimum value:	0.	Maximum value:	200	Default value:	20			
Options:	N.A.							
Description:	Foldback speed reduce rat speed shall be reduced at	e. It is a user-setting param the rate "foldback speed re	eter, unit is rpm/s. If IGBT to duce rate"	emperature is greater than F	oldback temperature, the			
P4.5.9	Foldback minimum sp	eed			ID 1778			
Minimum value:	0.	Maximum value:	10000	Default value:	2000			
Options:	N.A.							
Description:	Foldback fault trip speed. I minimum speed", this stat	t is a user-setting paramete us lasts "Foldback fault time	er, unit is rpm. If the drive is eout", Foldback fault will hap	"foldback active" and speed pen.	is less than "Foldback			
P4.5.10	Foldback fault timeou	t			ID 1779			
Minimum value:	0.	Maximum value:	200	Default value:	30			
Options:	N.A.							
Description:	Foldback fault trip speed. I minimum speed", this stat	t is a user-setting paramete us lasts "Foldback fault time	er, unit is rpm. If the drive is eout", Foldback fault will hap	"foldback active" and speed	is less than "Foldback			

Table 26. Drive control (Continued)

Table 27. Motor control

P5.1.2 ^①	Current limit		a)		ID 107		
Minimum value:	DriveNomCurrCT*1/10 A	Maximum value:	DriveNomCurrCT*2 A	Default value:	DriveNomCurrCT*3/2 A		
Description:	This parameter determines Once the motor current hits	the maximum output cur this level, it goes into th	rent allowed from the drive. e current limiter controller a	The parameter value range nd tries to limit the output c	differs from size to size. urrent.		
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 fu 1 = Enable torque boost fur	nction. Iction.					
Description:	Automatic torque boost - th and run at low frequencies	ne voltage to the motor ir with high loads.	creases automatically, which	h assists the motor to produ	ce 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:	 0 = Linear - the voltage of the motor changes linearly with the frequency in the constant flux area from 0 Hz to the field weakening point where the nominal voltage is supplied. A linear V/Hz ratio should be used in constant torque applications. 1 = Squared - the voltage of the motor changes following a squared curve with the frequency in the area from 0 Hz to the field weakening point where the nominal voltage is supplied. The motor runs under magnetized below the field weakening point and produces less torque and electromechanical noise. A squared V/Hz ratio can be used in applications where the torque demand of the load is proportional to the square of the speed. 3 = Linear with flux optimization - The drive starts to search for the minimum motor current in order to save energy, This mode is called Active Fearer Control who will work to use the and aurorat but still maintain the deviced accided. 						
Description:	Selects the V/Hz ratio. 0 = Linear; 1 = Squared; 3 = Linear + flux optimizatio	on.					
		Un Voltage at FWP	ominal the Motor Linear Squared 0 = Linear and 1 = Squa	Field Weakening Point Default: Nominal Frequency of the Motor f [Hz]			
P5.1.10 ²	Switching frequency				ID 288		
Minimum value:	MinSwitchFreq kHz	Maximum value:	MaxSwitchFreq kHz	Default value:	DefaultSwitchFreqCT kHz		
Description:	Sets the switching frequen	cy for the PWM output w	vaveform.				
P5.1.16 ¹⁾	Identification				ID 299		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Not Action 1 = Identification only state 2 = Identification with run - 3 = Identification no run - N 4 = Identification only inert	or resistor - does not spin Motor stator resistor is Aotor is supplied with cur ia - Identification for the	the motor can be done with completed then the motor is rent and voltage but at zero system inertia only.	load attached run, must be completed wit frequency.	h unloaded motor		
Description:	This Parameter enables the parameters to improve star will be active then set bac tuning' is being performed.	drive to make an motor ting torque and open loo k to 0 when completed. ' If there is an issue with	dentification cycle of the mo o vector control performance When a run command is issu the Motor Identification a fai	tor once complete the drive e. once set and a run comma ed the message on the keyp ult message will be displaye	will adjust tuning and is given the operation ad will indicate 'Auto d		

Table 28. Protections.

P6.1 - Motor.								
P6.1.4 ¹²	Motor thermal p	protection	·		ID 310			
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	de after fault according to param de after fault always by coasting.	eter stop mode.					
Description:	If a fault condition calculated motor te this protection, i.e.	is selected, the drive will stop an emp is based off the install powe , setting parameter to 0, will rese	d activate the fault s r on values of the driv t the thermal stage of	tage based off the % of calculated ve and monitoring values as the dr of the motor to 0%.	d motor temperature. The ive is running. Deactivating			
P6.1.5 ²	Motor thermal I	FO current	·		ID 311			
Minimum value:	0.00%	Maximum value:	150.00%	Default value:	100.00%			
Description:	The current can be The default value i 90% (or even highe	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 current. The motor	set as a percentage of the motor r's nominal current is the current	nameplate data, P1.1 that the motor can w	6 (nominal current of the motor), n ithstand in direct on-line use with	ot the drive's nominal output out being overheated.			

current. The motor's nominal current is the current that the motor can withstand in direct on-line use without being 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.



P6.2.2 ¹²	Input phase fau	ılt			ID 332				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2				
Options:	0 = No response; 1 = Warning; 2 = Fault, stop mode after fault according to parameter stop mode; 3 = Fault, stop mode after fault always by coasting; 4 = Single phase power limit.								
Description:	The input phase su	The input phase supervision ensures that the input phases of the frequency converter have approximately equal current draw.							
P6.2.3 ¹²	4 mA input fau	lt			ID 306				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0				
Options:	0 = No response. 1 = Warning. 2 = Warning, the f 3 = Warning, the p 4 = Fault, stop mo 5 = Fault, stop mo	0 = No response. 1 = Warning. 2 = Warning, the frequency from 10 seconds back is set as reference. 3 = Warning, the preset frequency P6.2.4 is set as reference. 4 = Fault, stop mode after fault according to parameter stop mode. 5 = Fault. stop mode after fault always by coasting.							
Description:	A warning or a fau seconds, or below	It action and message is generate 0.5 mA for 0.5 seconds. The info	ed if the 4 - 20 m rmation can also	A reference signal is used and the signa be programmed into relay outputs RO1	Il falls below 4 mA for 5 and RO2.				

Table 28. Protections (Continued).

P6.2.4 ¹²	4 mA fault frequency				ID 331			
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz			
Description:	When 4 mA fault happens, 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:	0 = No action; 1 = Warning; 2 = Fault, stop mode after 3 = Fault, stop mode after	fault according to paramete fault always by coasting.	r stop mode.					
Description:	A warning or a fault action external fault). The status	and message is generated information can also be pro	from the external fault signa grammed into digital output	al in the programmable (digit relay outputs RO1 and RO2	al inputs function select			
P6.2.11 ²	STO fault response				ID 2427			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2			
Options:	0 = No Action - drive will stop, no indication shown, no reset required, have to cycle start command. 1 = Warning - drive indicate warning/if STO clears drive will run without reset. 2 = Fault - drive will indicate fault/require reset to start again.							
Description:	STO fault response defines the function of how the STO input will be seen on the keypad and how the drive functions to it.							
P6.2.12 ^①	PI feedback AI loss re	sponse			ID 2401			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Warning: preset freque	ency (P6.2.13).						
Description:	This parameter defines the feedback.	e function of the PI feedback	analog input loss response.	If the AI feedback is lost b	ased off the programed Al			
P6.2.13 ¹²	PI feedback AI loss pr	e-frequency			ID 2402			
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz			
Description:	This parameter defines the	e frequency the master woul	d run to if a feedback is lost	and P6.2.12 was set to opti	on 3.			
P6.2.14 ²	PI feedback AI loss pi	pe fill			ID 2403			
Minimum value:	0.0 varies	Maximum value:	1000.0 varies	Default value:	0.0 varies			
Description:	Detects loss of prime in th the frequency in P6.2.13 "I	e pump based off the measu oss of prime" occurs.	ired level. If the value drops	s below this level for the tim	e in P6.2.15 and below,			
P6.2.15 ²	PI feedback AI loss pr	e-frequency timeout			ID 2404			
Minimum value:	0 s	Maximum value:	6,000 s	Default value:	0 s			
Description:	PI feedback AI loss pre-fre frequency in P6.2.15 for the 0 seconds.	quency timeout - when P6.2 e time set here. After this ti	.12 is set to 3 or 4, when the me, the drive will fault out o	e feedback signal is lost, the on "feedback loss". The time	drive will run at the e is disabled when set to			

P6.3 - Communications.

P6.3.1 ⁰²	Fieldbus fault respons	ID 334					
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2		
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Fault, coast.						
Description:	This sets the response mod communication port. Each protocol has another	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.					

P6.3.2 ¹²	OPT card fault respons	ID 335				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2	
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Fault, coast.					
Description:	This sets the response mode for a board slot fault caused by a missing or failed option board not communicating to the central processor.					

Table 28. Protections (Continued).

⁽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 29. PI Controller

P7.1 - Basic settings	3.					
P7.1.1 [®]	PI control itime)			ID 1294	
Minimum value:	0.00%	Maximum value:	200.00%	Default value:	100.00%	
Description:	Defines the gain of the PI Controller. It adjust the slope of the speed increase according to the initial of the load. If this value is set to 100%, a change of 10% in the error value causes the controller output to change 10%.					
P7.1.2 ²	PI control gain				ID 1295	
Minimum value:	0.00 s	Maximum value:	600.00 s	Default value:	1.00 s	
Description:	Defines the integration time of the PI controller. Over the time, the integral time contributes to the deviation between the reference and the feedback signal. If this value is set to 1.00 sec., a change of 10% in the error value causes the controller output to change by 10.00%/s.					

Chapter 5 - Fan control application

Table 29. PI Controller

Minimum value: N.A. Maximum value: N.A. Default value: 0 Options: 0 = %; 1 = 1/min.; 2 = rpm; 3 = ppm; 4 = pps; 5 = l/s; 6 = l/min.; 7 = l/h; 8 = kg/s; 9 = kg/min.; 10 = kg/h; 11 = m3/s; 12 = m3/min.; 13 = m3/b; 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.;
$13 = 110/11,$ $14 = m/s;$ $15 = mbar;$ $16 = bar;$ $17 = Pa;$ $18 = kPa;$ $19 = mVS;$ $20 = kW;$ $21 = Deg. C;$ $22 = GPM;$ $23 = gal/s;$ $24 = gal/min.;$ $25 = gal/h;$ $26 = lb/s;$ $27 = lb/min.;$ $28 = lb/h;$ $29 = CFM;$ $30 = ft^3/s;$ $31 = ft^3/min.;$ $32 = ft^3/h;$ $33 = ft/s;$ $34 = in.wg;$ $35 = ft wg;$ $36 = PSI;$ $37 = lb/in.2;$ $38 = HP;$ $39 = Deg. F;$ $40 = PA;$ $41 = WC;$ $42 = HG;$ $43 = ft;$ $44 = m;$
Description: Defines the unit type for PI feedback unit.
PT.1.4 [®] PI process unit minimum ID 1298
Ainimum value: -99999.99 varies Maximum value: PID1_ProcessUnitMax Default value: 0.00 varies varies
Description: Defines the minimum process unit value.
PI process unit maximumID 1300
Ainimum value: PID1_ProcessUnitMin Maximum value: 999999.99 varies Default value: 100.00 varies
Description: Defines the maximum process unit value.
PI error inversionID 1303
Minimum value: N.A. Maximum value: N.A. Default value: 0
Options: Options Option of the set of the
1 = Inverted - if feedback is less than set-point, PI controller output increases.

P7.1.7 ²	PI dead band				ID 1304		
Minimum value:	-99999.99 varies	Maximum value:	99999.99 varies	Default value:	0 varies		
Description:	PI dead band around setpoint in process units. This is the band where no actions occur to prevent oscillation or repeated activation/ deactivation of controller. The PI output is locked if the feedback stays within the dead band area.						
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 goe level out again.	s out of the dead band area	for the desired time delay, a	t that point the controller w	ill 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.						

Table 29. PI Controller (Continued).

Table 30. 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 value	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 value setpoint 2.					
P7.2.1.3 [®]	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	e wake-up function action.				

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 1 6 = FB process data input 3 8 = FB process data input 4 9 = FB process data input 4 9 = FB process data input 1 10 = FB process data input 1 11 = FB process data input 1 12 = FB PI setpoint 1; 14 = FB PI setpoint 2.	6; 7; 8;			
Description:	Defines source of the setpo	pint value the drive uses.	This can either be an interna	l preset value, keypad setpoi	nt, analog signal, or

fieldbus message.

Table 30. Setpoint (Continued).

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; 1 = Enabled.				
Description:	This function will disab re-engages when feed	le the output when the frequ back rises above the wake-up	ency drops below the sl b level.	leep frequency for the sleep dela	ay time. The output
P7.2.2.3 ²	PI setpoint 1 sleep	delay			ID 1317
Minimum value:	0 s	Maximum value:	3,000 s	Default value:	0 s
Description:	This parameter sets the shut off till the wake up	e delay time after the setpoir o level is met. It is to preven	nt drops below the sleep t large fluctuations whe) level for this amount of time ar n going into the sleep function 1	nd then the drives output will to save motor run time.
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:	Defines the level to ena This value is based of t	able the PI output. it will be a he % of feedback which can	above or below accordin be scaled based off the	g to PID reference or feedback o PI unit min./max, values.	depend on P7.2.1.3 setting,
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 bo	osted via a multiplier value.			
P7.2.2.6 [®]	PI setpoint 1 sleep	level			ID 2450
Minimum value:	Min Freq	Maximum value:	Max Freq	Default value:	0.00 Hz
Description:	Defines the level of wh delay time, it will put th	ich the unit value is used to ne drive into the sleep mode.	ook at to go into the sle	ep mode. When the unit drops	below this level for the sleep
P7.2.2.7 ²	SP1 sleep mode ov	er cycle time	·		ID 1842
Minimum value:	0	Maximum value:	10	Default value:	0
Description:	Defines the count the c cycle" fault. One cycle is defined wl O value means do not d	Irive come in and out of sleep nen the drive transfers from o the sleep over cycle check	o mode. If multiple time normal mode to sleep m and clear "pump over cy	s done in this time frame, the di ode. 'cle" fault.	rive would trip on "pump over
P7.2.2.8 ²	SP1 sleep mode ma	ximum cycle time			ID 1843
Minimum value:	0	Maximum value:	3,600	Default value:	0
Description:	Defines the maximum t	ime for sleep over cycle cheo	cking.		

P7.2.3 - Setpoint 2.

P7.2.3.1 ¹²	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 = Fieldbus process data ii 6 = Fieldbus process data ii 8 = Fieldbus process data ii 9 = Fieldbus process data 11 = Fieldbus process data 12 = Fieldbus process data 13 = Fieldbus PI setpoint 1; 14 = Fieldbus PI setpoint 2.	nput 1; nput 2; nput 3; nput 4; nput 5; input 6; input 7; input 8;			
Description:	Defines source of the setpo fieldbus message.	pint value the drive uses. T	his can either be an internal	preset value, keypad setpoir	nt, analog signal, or

P7.2.3.2 ⁽¹²⁾	PI setpoint 2 sleep en	able			ID 1324		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Disabled; 1 = Enabled.						
Description:	This function will disable t re-engages when feedbac	the output when the frequer k rises above the wake-up l	ncy drops below the sleep freevel.	equency for the sleep delay t	ime. The output		
P7.2.3.3 ²	PI setpoint 2 sleep de	lay			ID 1326		
Minimum value:	0 s	Maximum value:	3,000 s	Default value:	0 s		
Description:	This parameter sets the de shut off till the wake up le	elay time after the setpoint evel is met. It is to prevent l	drops below the sleep level t arge fluctuations when going	or this amount of time and t g into the sleep function to s	hen the drives output will ave motor run time.		
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:	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 boost				ID 1329		
Minimum value:	-2.00 varies	Maximum value:	2.00 varies	Default value:	1.00 varies		
Description:	The setpoint can be boost	ed via a multiplier value.					
P7.2.3.6 ²	PI setpoint 2 sleep lev	rel			ID 2452		
Minimum value:	Min Freq	Maximum value:	Max Freq	Default value:	0.00 Hz		
Description:	Defines the level of which delay time, it will put the o	the unit value is used to loo drive into the sleep mode.	ok at to go into the sleep mo	de. When the unit drops bel	ow this level for the sleep		
P7.2.3.7 [®]	SP2 sleep mode over	cycle time			ID 1844		
Minimum value:	0	Maximum value:	10	Default value:	0		
Description:	Defines the count the drive come in and out of sleep mode. If multiple times done in this time frame, the drive would trip on "pump over cycle" fault. One cycle is defined when the drive transfers from normal mode to sleep mode. O value means do not do the sleep over cycle check and clear "pump over cycle" fault.						
P7.2.3.8 ²	SP2 sleep mode maxi	mum cycle time			ID 1845		
Minimum value:	0	Maximum value:	3,600	Default value:	0		
Description:	Defines the maximum time	e for sleep over cycle checki	ng.				

Table 30. Setpoint (Continued).

Table 31 Feedback .

P7.3.1 - Standard.						
P7.3.1.1 [®]	PI feedback gain				ID 1331	
Minimum value:	-1,000.00%	Maximum value:	1,000.00%	Default value:	100.00%	
Description:	Defines gain associated with the feedback signal from the measuring device.					

Chapter 5 - Fan control application

Table 31. Feedback (Continued).

P7.3.2 - Feedback 1.								
P7.3.2.1 ⁰²	PI feedback 1 source	PI feedback 1 source ID 1332						
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2			
Options:	0 = Not used; 1 = Al; 2 = Drive reference pot; 3 = Fieldbus process data input 1; 4 = Fieldbus process data input 2; 5 = Fieldbus process data input 3; 6 = Fieldbus process data input 4; 7 = Fieldbus process data input 5; 8 = Fieldbus process data input 6; 9 = Fieldbus process data input 7; 10 = Fieldbus process data input 8; 11 = Fieldbus PI feedback.							
Description:	Defines where feedback si	gnal is being fed into the d	rive, via analog or fieldbus da	ata value.				
P7.3.2.2 ²	PI feedback 1 minimu	m			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 maximi	n			ID 1334			
Minimum value:	-200.00 %	Maximum value:	200.00%	Default value:	100.00%			
Description:	Maximim unit value for the	e feedback signal.						

Table 32. HVAC parameters.

P8.1 - Damper (*DM1 PRO).							
P8.1.1 ¹⁾²	Damper start				ID 483		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Normal; 1 = Damper start; 2 = Damper tout; 3 = Damper delay.						
Description:	This parameter determine	s the function of th damper.					
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 for is received.	r an interlocked time start, a	after which the start sequen	ce must be restarted if no ac	knowledgement 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 following a	a delay start, after which th	e frequency converter will be	e started.			

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

P8.2.1 ¹²	Fire mode prote	ection			ID 535		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Closing contac 1 = Opening conta	t initiates fire mode function. ct 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.						

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

P8.2.2 ¹²	Fire mode refere	nce select function			ID 536				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0				
Options:	0 = Fire mode minim 1 = Fire mode refere 2 = Fieldbus referen 3 = Al; 4 = Pl1 control - follo	um frequency; nce; ce - reference from fieldbus pro ows the PI control algorithm set	cess in; tings.						
Description:	This parameter allow	This parameter allows for setting the reference location for when the fire mode 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 Hz				
Description:	This parameter sets	the minimum output frequency	for fire mode. This can be	e used as a selection for refer	ence command.				
P8.2.4 ²	Fire mode freque	ency reference 1			ID 565				
Minimum value:	0.00%	Maximum value:	100.00%	Default value:	75.00%				
Description:	This parameter sets frequency (P1.2) for	This parameter sets the drive operating percentage based off the 0% being minimum frequency (P1.1) and 100% being maximum frequency (P1.2) for fire mode reference 1.							
P8.2.5 ²	Fire mode freque	ency reference 2			ID 564				
Minimum value:	0.00%	Maximum value:	100.00%	Default value:	100.00%				
Description:	This parameter sets frequency (P1.2) for	the drive operating percentage fire mode reference 2.	based off the 0% being n	ninimum frequency (P1.1) and	100% being maximum				
P8.2.6	Fire mode test e	nable			ID 2443				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.				
Options:	0 = Disabled; 1 = Enabled.								
Description:	This parameter allov run at the fire mode	vs for testing the fire mode fea speed desired but all faults are	ture. With the parameter enabled.	set to enable and fire mode in	nput enabled, the drive will				
P8.2.7 ¹²	Smoke purge fre	quency			ID 554				
Minimum value:	0.00%	Maximum value:	100.00%	Default value:	50.00%				
Description:	Frequency setting for frequency (P1.1) and	or smoke purge. Preset speed u 100% being maximum frequent	sed for a digital input sele cy (P1.2).	ection. The percentage is bas	ed off the 0% being minimum				
P8.3 - Protections (*	DM1 PRO).								
P8.3.1 ⁰²	Broken belt prot	ection			ID 317				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0				
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Fault, coast.								

Table 32 HVAC parameters (Continued)

Description:

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

If fault is set as the function, the drive will stop and activate the fault stage based on the parameter conditions and the monitoring status of the motor. If the motor torque drops below the Fnom and F0 torque levels for the time limit, the protection is enabled. Deactivating the protection by setting the parameter to 0 will reset the underload time counter to zero.





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 83. Serial communication

P11.1 - Basic settings.					
P11.1.1 ^①	Serial communication	ז			ID 586
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Modbus RTU 1 = BACnet MS/TP 2 = SWD 3 = SA Bus				
Description:	This parameter defines th	e 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	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; 4 = 115,200				
Description:	This parameter defines co	ommunication 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; 2 = Even.				
Description:	This parameter defines pa	arity type for RS-485 comm	nunication.		
P11.2.4	Modbus RTU protoco	status			ID 588
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Initial; 1 = Stopped; 2 = Operational; 3 = Faulted.				
Description:	This parameter shows the	e protocol status for RS-48	5 communication.		
P11.2.5	Communication time	out modbus RTU			ID 593
Minimum value:	0 ms	Maximum value:	60,000 ms	Default value:	10,000 ms
Description:	Selects the time to wait b	efore a communication fau	Ilt occurs over modbus	RTU if a message is not received	d.
P11.2.6	Modbus RTU fault res	ponse			ID 2516
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 - Only in fieldbus contro communications; if not 1 - In all control modes. N	I mode. When fieldbus is t in fieldbus control, place No matter the control place	the control place and f will not fault. e setting, if communica	ieldbus fault is active, the drive v ation is lost, fieldbus fault respon	vill fault on loss of se will occur.
Description:	Defines the fieldbus fault	condition for modbus RTU	communication.		

P11.3 - BACnet RTU MSTP (*DM1 Pro).

P11.3.1 ¹⁾	MSTP baud rate				ID 594
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	$\begin{array}{l} 0 = 9,600;\\ 1 = 19,200;\\ 2 = 38,400;\\ 3 = 76,800;\\ 4 = 115,200. \end{array}$				
Description:	This parameter defines the communication speed for RS-485 communication.				

Table 83.	Serial	communication	(Continued)
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P11.3.2 ^①	MSTP device address	ID 595						
Minimum value:	0	Maximum value:	127	Default value:	1			
Description:	Defines the device addres	Defines the device address of the drive on the BACnet MSTP network.						
P11.3.3 ^①	MSTP instance numbe	er			ID 596			
Minimum value:	0	Maximum value:	4,194,302	Default value:	0			
Description:	Defines the instance numb	per of the drive on the BACr	net 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 be	efore a communication faul	t occurs over BACnet MSTP i	f a message is not received.				
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; 2 = Faulted.							
Description:	This parameter shows the	protocol status for BACnet	MSTP communication.					
P11.3.6	MSTP fault code				ID 600			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.			
Options:	0 = None; 1 = Sole master; 2 = Duplicate MAC ID; 3 = Baud rate fault.							
Description:	This parameter shows the protocol status for BACnet MSTP communication.							
P11.3.7	MSTP fault response				ID 2526			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Only in fieldbus contro communications. If no 1 = In all control modes - n	l mode - when fieldbus is th t in fieldbus control, place v to matter the control place	ne control place and fieldbus will not fault. setting. If communication is	fault is active, the drive will lost, fieldbus fault response	fault on loss of will occur.			
Description:	Defines the fieldbus fault	condition for BACnet MSTP	communication.					
P11.3.8	MSTP maximum maste	er			ID 1537			
Minimum value:	1	Maximum value:	127	Default value:	127			
Description:	Defines the maximum num	ber of masters that can est	ablish connections with the	drive.				
P11.4 - SA bus (*DM1 F	Pro).							
P11.4.1 ^①	SA bus device address	5			ID 1726			
Minimum value:	204	Maximum value:	254	Default value:	204			
Description:	This parameter is used to	set the SA bus address at v	which the drive will be locate	d on instance node.				
P11.4.2 ^①	SA bus baud rate				ID 1727			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2			
Options:	$\begin{array}{l} 0 = 9,600;\\ 1 = 19,200;\\ 2 = 38,000;\\ 3 = 57,600;\\ 4 = 115,200. \end{array}$							
Description:	This parameter defines co	mmunication speed for SA I	bus communication.					
P11.4.3 ^①	SA instance number				ID 1728			
Minimum value:	0	Maximum value:	4,194,302	Default value:	0			
Description:	Defines the instance number of the drive on the SA bus network.							

P11.4.4	SA communication	on timeout			ID 1730	
Minimum value:	0	Maximum value:	60,000	Default value:	10,000	
Description:	Selects the time to v	wait before a communication fa	ult occurs over SA I	ous if a message is not received.		
P11.4.5	SA bus protocol	status			ID 1731	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Options:	0 = Stopped; 1 = Operational; 2 = Faulted.					
Description:	This parameter shov	vs the protocol status for SA bu	s communication.			
P11.4.6	SA bus fault resp	oonse			ID 1732	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	 0 = Only in fieldbus control mode - when fieldbus is the control place and fieldbus fault is active. The drive will fault on loss of communications. If not in fieldbus control, place will not fault. 1 = In all control modes - no matter the control place setting, if communication is lost, fieldbus fault response will occur. 					
Description:	Defines the fieldbus	fault condition for SA bus com	munication.			

Table 83. Serial communication (Continued)

P11.5 - SWD (*DM1 Pro).

P11.5.1	Parameter access				ID 2630		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1		
Options:	0 = No permission to read 1 = Acyclic read/write ar	0 = No permission to read/write on acyclic channel. 1 = Acyclic read/write are allowed on Profibus.					
Description:	PNU927 which specifies	the operation priority of pa	rameters for acycli	c communication.			
P11.5.2 ^①	Parameter data acce	\$\$			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.						
Description:	PNU928 which specifies the control priority of the device for cyclic communication.						
P11.5.3	Fault situation count	er			ID 2632		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Description:	PNU952 which specifies	the fault situation counter.					
	Only write of 0 is allowed (parameter 944) are eras	d, then the whole fault buff ed.	er (actual fault situ	ation and all other fault situations) ar	nd the fault message counter		
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 communicati B4-fieldbus fault.	n fault. ault. on fault.					
P11.5.5	Firmware version				ID 2610		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Description:	This parameter provides	the firmware version of the	SWD.				

P11.5.6	Protocol status				ID 2612
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Not configured; 1 = Operational; 2 = Diagnostics.				
Description:	This parameter specifies the protocol status for SWD card.				

Table 33. Serial communication. (Continued)

P11.6 - Bluetooth.

P11.6.1	Bluetooth enabled				ID 1895	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Disabled; 1 = Enabled.					
Description:	Bluetooth enabled.					
P11.6.2 ²	Bluetooth broadcast	Bluetooth broadcast mode				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Off; 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; 1 = Reset.					
Description:	Bluetooth pairing reset.					

Table 34. Ethernet communication

P12.1 - Basic settings (*DM1 Pro).							
P12.1.1 ^①	IP address mode	e (*DM1 Pro)			ID 1500		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Static IP; 1 = DHCP with Auto	IP.					
Description:	This parameter defin	ned the IP address configuratior	n mode for EIP/modb	us TCP.			
P12.1.2	Active IP addres	s			ID 1507		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Description:	Reads the current a	Reads the current active IP address.					
P12.1.3	Active subnet ma	ID 1509					
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Description:	Reads the current a	ctive subnet mask.					
P12.1.4	Active default ga	ateway			ID 1511		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Description:	Reads the current a	ctive 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 address	S			ID 1501		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	192.168.1.254		
Description:	Defines the static IF	² address.					

P12.1.7 ^①	Static subnet mask		ID 1503			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	255.255.255.0	
Description:	Defines the static subnet r					
P12.1.8 ¹⁾	Static default gateway		ID 1505			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	192.168.1.1	
Description:	Defines the static default gateway.					
P12.1.9	Ethernet communicati		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 fault occurs over ethernet.					

Table 34. Ethernet communication (Continued).

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

P12.2.1	Trusted IP white list				ID 68		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	192.168.1.255		
Description:	Defines the IP addresses in the white list. A setting of 192.168.1.255 enables all connections on the local subnet.						
P12.2.2	Trusted IP filter enable		ID 76				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1		
Options:	0 = Disabled; 1 = Enabled.						
Description:	Enables IP white listing. D	evices not in the white list v	vill not be able to establish (communications with the dri	Ve.		

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

P12.3.1 ^①	Modbus TCP en	nable	·		ID 1942		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Disable; 1 = Enable.						
Description:	Enables Modbus T	CP communications, must be ena	bled to connect to	PC Software			
P12.3.2	Modbus TCP co	onnection limit			ID 609		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5		
Description:	Maximum number	Maximum number of connections allowed to the drive.					

Table 34.	Ethernet	communication	(Continued).
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P12.3.3	Modbus TCP unit iden	tifier number			ID 610	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1	
Description:	Unit identifier unit value fo	or modbus TCP.				
P12.3.4	Modbus TCP protocol	status			ID 612	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Options:	0 = Stopped; 1 = Operational; 2 = Faulted.					
Description:	This parameter shows the	protocol status for modbus	TCP communication.			
P12.3.5	Modbus TCP fault res	ponse			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 co	ommunication.			

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

P12.4.1 ^①	Ethernet based proto	col select			ID 1997		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Disabled; 2 = BACnet IP.						
Description:	Selects the active comm	unication protocol on the eth	ernet I/P port.				
P12.4.2	Ethernet IP protocol	status			ID 608		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Options:	0 = Off; 1 = Operational; 2 = Faulted.						
Description:	Indicates if ethernet prot	ocol is active or not.					
P12.4.3	Ethernet IP fault resp	oonse			ID 2518		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	 0 = Only in fieldbus control mode - when fieldbus is the control place and Fieldbus fault is active, the drive will fault on loss of communications. If not in fieldbus control, place will not fault. 1 = In all control modes - no matter the control place setting. If communication is lost, fieldbus fault response will occur. 						
Description:	Defines the fieldbus fault	condition for ethernet IP co	mmunication.				

P12.5.1 ^①	BACnet IP UDP p	ort 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 = BACC; 47822 = BACE; 47823 = BACF.				
Description:	Defines the BACnet	UDP port number.			
P12.5.2 ¹⁾	BACnet IP foreig	n devise			ID 1734
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				
Description:	Enables BACNET IP	foreign 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	BBMD IP address.			
P12.5.4 ^①	BACnet IP UDP p	ort			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 = BAC5; 47816 = BAC8; 47817 = BAC8; 47817 = BAC8; 47818 = BACA; 47819 = BACB; 47821 = BACD; 47821 = BACD; 47822 = BACE; 47823 = BACF.				
Description:	Displays the BACnet	BBMD UDP port number.			
P12.5.5 ¹⁾	BACnet IP registi	ration interval			ID 1738
Minimum value:	0	Maximum value:	65,535	Default value:	10
Description:	Defines the registrat	tion interval.			
P12.5.6	BACnet IP comm	unication timeout			ID 1739
Minimum value:	0	Maximum value:	60,000	Default value:	0
Description:	Selects the time it w	aits before a communication fa	ault occurs over BACne	et IP.	

Table 34. Ethernet communication (Continued).

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

Table 34. Ethernet communication (Continued).

P12.5.7	BACnet IP protocol sta	ntus			ID 1740
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Stopped; 1 = Operational; 2 = Faulted.				
Description:	This parameter shows the	protocol status for BACnet	P communication.		
P12.5.8	BACnet IP fault behavi	or			ID 1741
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Only in fieldbus control communications. If not 1 = In all control modes - no	mode - when fieldbus is the in fieldbus control, place w matter the control place s	e control place and Fieldbus ill not fault. etting. If communication is l	fault is active, the drive will lost, fieldbus fault response	fault on loss of will occur.
Description:	Defines the fieldbus fault c	ondition for BACnet IP com	munication.		
P12.5.9 ¹⁾	BACnet IP instance nu	mber			ID 1742
Minimum value:	0	Maximum value:	4,194,302	Default value:	0
Description:	Displays the BACnet instan	ice number.			

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

P12.6.1	Web UI protocol s	tatus			ID 2915				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.				
Options:	0 = Off; 1 = Operational; 2 = Faulted.								
Description:	This parameter shows	s the protocol status for web s	erver communication						
P12.6.2	Web UI fault respo	onse			ID 2916				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0				
Options:	0 = Only in fieldbus co communications. 1 = In all control mode	 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 f	ault condition for web server (communication.						
P12.6.3	Web UI communic	ation timeout	a)		ID 2919				
Minimum value:	30,000 ms	Maximum value:	60,000 ms	Default value:	60,000 ms				
Description:	Selects the time it wa	its before a communication fa	ault occurs over the w	eb server.					
P12.6.4 ¹⁾	Web UI enable				ID 2921				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0				
Options:	0 = Disabled; 1 = Enabled.								
Description:	Enables web server co	onfiguration and monitoring pa	age.						

P12.7 - (DM1 PRO only).

P12.7.1 ^①	IOT Enable				ID 3001
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				
Description:	IOT Enable				
P12.7.2 ¹⁾	IOT Connection Statu	s			ID 3002
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disconnected; 1 = Connected.				
Description:	IOT Connection Status				
P12.7.3 ¹⁾	Proxy Enable				ID 3003
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				
Description:	Proxy Enable				

Table 35. System.

P13.1.1	Language				ID 340
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = English; 1 = English; 2 = English.				
Description:	This parameter offers the available language is Engli	ability to control the freque sh only.	ncy converter through the ke	ypad in the language of you	r 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; 3 = Multi-purpose.				
Description:	This parameter sets the ac	tive application if multiple	applications have been loade	d.	
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; 7 = Reload defaults VM.				
Description:	This parameter allows you	to reload the factory defau	It parameter values, and to s	tore and load two customize	ed parameter sets.
P13.1.4	Up to keypad (for rem	ote keypad only)			ID 620
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = No; 1 = Yes (all parameters).				
Description:	This function uploads all e	xisting parameter groups to	the keypad.		
P13.1.5 ¹⁾	Down from keypad (fo	r remote keypad only)			ID 621
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = No; 1 = All parameters; 2 = All, no motor; 3 = Application parameter;	5.			
Description:	This function downloads o	ne or all parameter groups	from the keypad to the drive.		
P13.1.6	Parameter comparison	1			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; 4 = Compare with Set 2.				
Description:	With the parameter compa and those loaded to the co	arison function, you can con ntrol keypad.	npare the actual parameter v	alues to the values of your c	ustomized parameter sets
	The actual parameter value displayed on the lowermost	es are first compared to the st line of the keypad.	ose of the customized parame	eter Set 1. If no differences	are detected, a "O" is
	If any of the parameter val	ues differ from those of the	e Set 1 parameters, the numb	er of the deviations is displa	ayed together.
	By pressing the right arrov value on the description lir can also edit the actual va	v button, once again you wi ne (in the middle) is the defa lue by pushing the right arro	ll see both the actual value a ault value, and the one on the ow button.	nd the value it was compare value line (lowermost line)	ed to. In this display, the is the edited value. You
	Actual values can also be	compared to Set 2, factory	settings, and keypad set valu	es.	

O Parameter value can only be changed after the drive has stopped.
O Parameter value will be set to be default when changing macros.
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Table 35. System (Continued).

P13.1.7	Parameter lock PIN (fe	or remote keypad only)		ID 624
Minimum value:	0	Maximum value:	9,999	Default value:	0
Description:	The application selection enabled, the user will be p	can be protected against up prompted to enter a passwo	nauthorized changes ord before application	with the password function. When n changes, parameter value change	n the password function is s, or password changes.
	By default, the password t between 1 and 9,999.	function is not in use. If yo	u want to activate th	ne password, change the value of the	nis parameter to any number
	To deactivate the passwo	rd, reset the parameter val	ue to O.		
P13.1.8	Keypad parameter loc	k (for remote keypad o	only)		ID 625
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Change enable; 1 = Change disable.				
Description:	This function allows the us the display if you try to ed	ser to prohibit changes to t it a parameter value.	he parameters. If th	e parameter lock is activated, the t	ext "locked" will appear on
	Note: This function does	not prevent unauthorized e	diting of parameter v	alues.	
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 Startup Wizard facilit and then advances paramuser to go to the Main me power up of the VFD. By s Start up. If user goes into	ates commissioning the VF eters through the start-up p nu or default page and this setting this parameter to D Start Up Wizard after com	D. If selected Enable parameter list/Applic parameter is set to l isable without going opletion or defaults d	, the Startup Wizard prompts oper ation Mini wizard in keypad. After Disabled. The Startup Wizard is alv through the Startup Wizard it will rive the Startup wizard will be Ena	ator for application desired completion it allows the vays enabled for the initial rot cause it to be active on bled.

P13.2 - Keypad.

P13.2.4	Timeout time				ID 629				
Minimum value:	1 s	Maximum value:	65,535 s.	Default value:	30 s				
Description:	The timeout time s	setting defines the time after whi	ch the keypad display r	eturns to the Default Page.					
	Note: If the defau	It page value is 0, the timeout tim	ne setting has no effect						
P13.2.5	Contrast adjust	t			ID 630				
Minimum value:	5	Maximum value:	18	Default value:	12				
Description:	If the remote keyp	If the remote keypad display is not clear, you can adjust the keypad contrast with this parameter.							
P13.2.6	Backlight time				ID 631				
Minimum value:	1 min.	Maximum value:	65,535 min.	Default value:	10 min.				
Description:	This parameter de	termines how long the backlight :	stays on before going o	ut.					
P13.2.7	Fan control				ID 632				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2				
Options:	0 = Continuous - fa 1 = Temperature - 60°C (140°F). minute after receiving "Temperature" 2 = Run follow - af for common DO	 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 allow	vs you to control the VFD's coolin	g fan.						

P13.4 - Version info	rmation.								
P13.4.1	Keypad software v	version			ID 640				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.				
Description:	Keypad firmware version.								
P13.4.2	Motor control soft	Motor control software version ID 642							
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.				
Description:	DSP/motor control sof	DSP/motor control software version.							
P13.4.3	Application softwa	are version			ID 644				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.				
Description:	MCU/application soft	ware version.							
P13.4.4	Software bundle v	version			ID 1714				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.				
Description:	Software bundle vers	ion.							
				'					
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	Multi-monitor set (for remote keypad only) ID 627							
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0				
Options:	0 = Change enable; 1 = Change disable.								
Description:	The keypad display ca replace the values mo	The keypad display can display three actual monitored values at the same time. This parameter determines if the operator is allowed to replace the values monitored with other values.							
P13.5.3	Keypad lock PIN				ID 75				
Minimum value:	0	Maximum value:	9,999	Default value:	0				
Description:	The keypad can be protected against unauthorized changes with the keypad lock function after keys are not pressed five minutes. When the password function is enabled, the user will be prompted to enter a password before the keypad display parameter or response to key press except up/down/left/right.								
	By default, the passw between 1 and 9,999.	ord function is not in use. If y	ou want to activat	te the password, change the value of t	his parameter to any number				
	To deactivate the pas	sword, reset the parameter va	alue to O.						
P13.5.4	Drive application	name			ID 2922				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.				
Description:	It defines the Drive A be editable only from	It defines the Drive Application Name with a maximum 20 characters limit. It helps to identify your drive within multiple drives. It could be editable only from Web UI and PC tool.							
P13.5.5	Serial Number				ID 1758				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.				
Description:	Emerson drive Serial I	Emerson drive Serial Number only.							

Table 35. System (Continued).

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

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.

Pump 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.

Control I/O configuration

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

Table 36. Pump application default I/O connection.



DM1

External wiring	Terminal	Short name	Name	Default setting	Description
	1	DI1	Digital input 1	Run forward	Starts the motor in the forward direction.
	2	DI2	Digital input 2	Run reverse	Start the motor in the reverse direction.
	3	DI3	Digital input 3	External fault	Triggers a fault in the drive.
	4	DI4	Digital input 4	Fault reset	Resets active faults in the drive.
	5	CMA	DI1 to DI4 common	Grounded	Allows for sourced input.
	6	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).
"E	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.).
	18	R1NO	Relay 1 normally open	Run	Changes state when the drive is in the run state.
L	19	R1CM	Relay 1 common		
	20	R1NC	Relay 1 normally closed		

Table 36. Pump application default I/O connection (Continued). DM1 PRO

External wiring	Terminal	Short name	Name	Default setting	Description
	- 1	DI1	Digital input 1	Run forward	Starts the motor in the forward direction.
	2	DI2	Digital input 2	Run reverse	Start the motor in the reverse direction.
	. 3	DI3	Digital input 3	External fault	Triggers a fault in the drive.
	. 4	DI4	Digital input 4	Fault reset	Resets active faults in the drive.
	- 5	СМА	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).
les l	. 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	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.
Υ΄	• 19	R1CM	Relay 1 common		
	20	R1NC	Relay 1 normally closed		
τ	- 21	R2N0	Relay 2 normally open	Fault	Changes state when the drive is in the fault state.
۲ <u>ــــــ</u>	- 22	R2CM	Relay 2 common		

Notes: The above wiring demonstrates a SINK configuration. The SW2 position 1 is set to ON. If a SOURCE configuration is desired, wire 24 V to CMA and close the inputs to ground. When using the +10 V for Al1, SW2 position 2 set to ON.

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 37. 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:	А	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 calculated from nameplate values and measured motor current (%).						
M1.6	Motor power				ID 5		
Minimum value:	%	Maximum value:	%	Default value:	%		
Description:	Percent motor power calcu	ulated from nameplate valu	les and measured motor cur	rent (%).			
M1.7	Motor voltage				ID 6		
Minimum value:	V	Maximum value:	V	Default value:	V		
Description:	Output ac motor voltage (\	/ac).					
M1.8	DC-link voltage				ID 7		
Minimum value:	V	Maximum value:	V	Default value:	V		
Description:	DC bus voltage (Vdc).						

Table 37. Monitor (Continued).

M1.9	Unit temperature				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:	%	Default value:	%				
Description:	Motor temperature value calculated from nameplate values and measured motor current (%).						
M1.11	Latest fault code ID 28						
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Description:	Last active fault code value. See fault codes for the value shown here.						
M1.12	Instant motor power		ID 1686				
Minimum value:	kW	Maximum value:	kW	Default value:	kW		
Description:	Instantaneous motor power (kW).						

M2 - I/O status.

M2.1	Analog input 1				ID 10			
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies			
Description:	Analog input 1 measu	Analog input 1 measured value (Vdc or Amps) selectable 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). With	keypad version only.					
M2.3	Analog output				ID 25			
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies			
Description:	Analog output 1 meas	Analog output 1 measured value (Vdc or Amps) selectable with parameter.						
M2.4	DI1, DI2, DI3				ID 12			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.			
Description:	Digital input 1/2/3 sta	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	R01, R02	R01, R02 ID 557						
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.			
Description:	Relay output 1 and 2 s	Relay output 1 and 2 status.						
M2.9	Control board DI s	Control board DI status ID 3214						
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.			
Description:	Control board DI Statu	is will give the input status or	n control board.					

M5 - PI monitor.

M5.1	PI setpoint				ID 16	
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies	
Description:	PI setpoint in process units.					
M5.2	PI feedback	ID 18				
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies	
Description:	PI feedback level in process units.					
M5.3	PI error value				ID 20	
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies	
------------------------------------	--	----------------	--------	----------------	----------------------	
Description:	PI error in process units.					
M5.4	PI output				ID 22	
Minimum value:	%	Maximum value:	%	Default value:	%	
Description:	PI output.					
M5.5	PI status				ID 23	
M5.5 Minimum value:	PI status N.A.	Maximum value:	N.A.	Default value:	ID 23 N.A.	
M5.5 Minimum value: Options:	PI status N.A. 0 = Stopped; 1 = Running; 2 = Sleep mode.	Maximum value:	N.A.	Default value:	ID 23 N.A.	

Table 37. Monitor (Continued).

Table 38. Multi-pump status.

M7.1 - Operation mod	e (*DM1 Pro).				
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.				
Description:	Provides the operating m	ode 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; 2 = Master drive.				
Description:	Provides the operating m	ode 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.				
Description:	Provides the operating m	ode 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; 2 = Master drive.				
Description:	Provides the operating m	ode 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; 2 = Master drive.				
Description:	Provides the operating m	ode of drive 5 while using	multi-pump mode.		

Table 38. Multi-pump status (Continued).

M7.2 - Multi-pump stat	tus (*DM1 Pro).				
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; 5 = Unknown.				
Description:	Provides the run status of	drive 1 while using the mul	ti-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; 5 = Unknown.				
Description:	Provides the run status of	drive 2 while using the mul	ti-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; 5 = Unknown.				
Description:	Provides the run status of	drive 3 while using the mul	ti-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; 5 = Unknown.				
Description:	Provides the run status of	drive 4 while using the mul	ti-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; 5 = Unknown.				
Description:	Provides the run status of	drive 5 while using the mul	ti-pump mode.		

M7.3 - Network status (*DM1 Pro).

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; 4 = No error.				
Description:	Provides the network statu	is of drive 1 while using the	multi-pump mode.		

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

Drive 2				ID 2232
N.A.	Maximum value:	N.A.	Default value:	N.A.
0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error.				
Provides the network state	us of drive 2 while using th	e multi-pump mode.		
Drive 3				ID 2244
N.A.	Maximum value:	N.A.	Default value:	N.A.
0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error.				
Provides the network state	us of drive 3 while using th	e multi-pump mode.		
Drive 4				ID 2256
N.A.	Maximum value:	N.A.	Default value:	N.A.
0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error.				
Provides the network state	us of drive 4 while using th	e multi-pump mode.		
Drive 5				ID 2268
N.A.	Maximum value:	N.A.	Default value:	N.A.
0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error.				
Provides the network state	us of drive 5 while using th	e multi-pump mode.		
	Drive 2 N.A. 0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error. Provides the network statt Drive 3 N.A. 0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error. Provides the network statt Drive 4 N.A. 0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error. Provides the network statt Drive 5 N.A. 0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error. Provides the network statt Drive 5 N.A. 0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error. Provides the network statt	Drive 2N.A.Maximum value:0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error.Provides the network status of drive 2 while using thDrive 3N.A.Maximum value:0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error.Provides the network status of drive 3 while using thDrive 4N.A.Maximum value:0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error.Provides the network status of drive 3 while using thDrive 4N.A.Maximum value:0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error.Provides the network status of drive 4 while using thDrive 5N.A.Maximum value:0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error.Provides the network status of drive 4 while using thDrive 5N.A.Maximum value:0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error.Provides the network status of drive 5 while using th	Drive 2N.A.Maximum value:N.A.0 = Disconnected;	Drive 2N.A.Maximum value:N.A.Default value:0 = Disconnected; 1 = Fault; 2 = Pump lost; 3 = Need alternation; 4 = No error.Since A and A

Table 38. Multi-pump status (Continued).

Table 39. Multi-pump measurement (*DM1 Pro).

M8.1 - Latest fault o	code (*DM1 Pro).		
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.		

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

Table 39. Multi-pump measurement (*DM1 Pro)

M8.2 - Output freque	ncy (*DM1 Pro).				·
M8.2.1	Drive 1				ID 2222
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the output freq	uency (Hz) of drive 1 while u	using the multi-pump mode.		
M8.2.2	Drive 2				ID 2234
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the output freq	uency (Hz) of drive 2 while u	using the multi-pump mode.		
M8.2.3	Drive 3			·	ID 2246
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the output freq	uency (Hz) of drive 3 while u	using the multi-pump mode.		
M8.2.4	Drive 4				ID 2258
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the output freq	uency (Hz) of drive 4 while u	using the multi-pump mode.		
M8.2.5	Drive 5				ID 2270
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the output freq	uency (Hz) of drive 5 while u	using the multi-pump mode.		

M8.3 - Motor voltage (*DM1 Pro).

M8.3.1	Drive 1				ID 2223
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Provides the motor vo	Itage (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 motor vo	Itage (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 vo	Itage (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 motor vo	Itage (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 motor vo	Itage (Vac) of drive 5 while us	ing the multi-pump) mode.	

M8.4 - Motor current (*DM1 Pro).

M8.4.1	Drive 1		·		ID 2224
Minimum value:	A	Maximum value:	A	Default value:	A
Description:	Provides the motor curre	ent (Amps) of drive 1 while	using the multi-p	ump mode.	
M8.4.2	Drive 2				ID 2236
Minimum value:	А	Maximum value:	A	Default value:	A
Description:	Provides the motor curre	ent (Amps) of drive 2 while	using the multi-p	ump mode.	
M8.4.3	Drive 3				ID 2248
Minimum value:	А	Maximum value:	A	Default value:	A
Description:	Provides the motor curre	ent (Amps) of drive 3 while	using the multi-p	ump mode.	
M8.4.4	Drive 4				ID 2260
a					

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

Table 39.	Multi-pum	p measurement	(*DM1	Pro)	(Continued).
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Minimum value:	А	Maximum value:	А	Default value:	А
Description:	Provides the motor current	(Amps) of drive 4 while usin	g 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 (*DM1 Pro).

M8.5.1	Drive 1				ID 2225
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Provides the motor	torque (%) of drive 1 while using	the multi-pump m	ode.	
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 m	ode.	
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 m	ode.	
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 m	ode.	
M8.5.5	Drive 5				ID 2273
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Provides the motor	torque (%) of drive 5 while using	the multi-pump m	ode.	

M8.6 - Motor power (*DM1 Pro).

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

M8.7 - Motor speed (*DM1 Pro).

M8.7.1	Drive 1		ID 2227		
Minimum value:	rpm	Maximum value:	rpm	Default value:	rpm
Description:	Provides the motor speed (

Table 39. Multi-pump measurement (*DM1 Pro) (Continued).

M8.7.2	Drive 2				ID 2239
Minimum value:	rpm	Maximum value:	rpm	Default value:	rpm
Description:	Provides the motor speed	(rpm) of drive 2 while using	the multi-pump mode.		
M8.7.3	Drive 3				ID 2251
Minimum value:	rpm	Maximum value:	rpm	Default value:	rpm
Description:	Provides the motor speed	(rpm) of drive 3 while using	the multi-pump mode.		
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 motor speed	(rpm) of drive 5 while using	the multi-pump mode.		

M8.8 - Run time (*DM1 Pro).

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

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

Table 40 Basic Parameters.

P1 - Basic parameters.					
P1.1 ²	Minimum frequency				ID 101
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz
Description:	Defines the lowest frequer 1 = Fire mode minimum fre 2 = Derag. 3 = MPFC staging frequenc 4 = MPFC master fixed frec 5 = Prime pump frequency 6 = Prime pump frequency	ncy at which the drive will c quency. y. quency. 2.	perate. This setting will lim	it other frequency paramete	r settings.
P1.2 ²	Maximum frequency				ID 102
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	MaxFreqMFG
Description:	Defines the highest freque 1 = Keypad reference. 2 = Motor potentiometer. 3 = Jog speed. 4 = 2nd stage ramp frequent 5 = Fire mode minimum fre 6 = Derag. 7 = MPFC staging frequence. 8 = MPFC master fixed frequence. 9 = Prime pump frequency. 10 = Prime pump frequency. 11 = Preset speed frequence. 12 = Frequency limit value. 13 = Reference limit value. 14 = Speed control_fs2. 15 = Stall frequency limit. 16 = 4 mA fault frequency. 17 = MPFC de-staging freq 18 = Pipe fill loss frequence. 19 = Pipe fill loss frequency. 20 = Broken pipe frequency.	ncy at which the drive will a ncy. quency. ;y. quency. y 2. ;y. uency. y low. y high.	operate. This will limit other	frequency parameters.	
P1.3 [®]	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 f	for the output frequency to	accelerate from zero frequen	icy to maximum frequency.	
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 f	for the output frequency to	decelerate from maximum fr	equency to zero frequency.	
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 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 spe	eed. This value is found on	the rating plate of the motor		
P1.8 ¹⁾	Motor PF				ID 490
Minimum value:	0.30	Maximum value:	1.00	Default value:	0.85
Description:	Motor nameplate rated pov	wer factor. This value is for	und on the rating plate of the	e 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 vol	tage. This value is found o	n the rating plate of the moto	Dr.	
P1.10 ^①	Motor nom. frequency				ID 488
Minimum value:	8.00 Hz	Maximum value:	400.00 Hz	Default value:	MotorNomFregMFG Hz
Description:	Motor nameplate rated fre	quency. This value is found	l on the rating plate of the m	otor.	

		-			
P1.11 [®]	Local control place				ID 1695
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = keypad; 1 = IO terminal; 3 = fieldbus.				
Description:	Defines the signal locati Start/Stop buttons on th	on for the start command in e drive. Fieldbus would be	n local mode. I/O t a communication I	erminals would be from the digital ha bus. Keypad display will indicate whi	rd-wired inputs or keypad for ch mode is selected.
P1.12 ¹²	Local reference				ID 136
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = AI; 1 = drive ref. pot; 4 = maximum frequency; 5 = PID control output 6 = keypad; 7 = fieldbus ref.				
Description:	Defines the signal locati	on for the speed reference	in local mode.		
P1.13 ²	Remote control plac	e			ID 135
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = 10 terminal; 1 = fieldbus; 3 = keypad.				
Description:	Defines the signal locati for Start/Stop buttons o	on for the start command in the drive. Fieldbus would	n remote mode. I/(d be a communicati	O terminals would be from the digital on bus. Keypad display will indicate	hard-wired inputs or keypad which mode is selected.
P1.14 ¹²	Remote reference				ID 137
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = AI; 1 = drive reference pot; 4 = maximum frequency; 5 = PID Control Output 6 = keypad; 7 = fieldbus reference.				
Description:	Defines the signal locati	on for the speed reference	in remote mode.		
P1.15	Compressor table ve	rsion			ID 1769
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Description:	Compressor table version	n. It is a number to indicate	the version of con	npressor table	
P1.16	Compressor type sel	ection			ID 1770
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Description:	Compressor type selection	on. It is a number, indicates	s compressor type.	It is more than 0, and less than 255	

Table 40. Basic Parameters (Continued).

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

Table 41. Inputs .

P2.1 - Basic settings	ş.				
P2.1.1 ²	AI reference scale	minimum value			ID 144
Minimum value:	0.00 Hz	Maximum value:	RefScaleMax Hz	Default value:	0.00 Hz
Description:	Expected min frequen 0.00 <= Al Ref Scale N	cy reference value for Al input 1in Value <=Al Ref Scale Max	Value <= 400.00.		
P2.1.2 ²	Al reference scale	maximim value			ID 145
Minimum value:	RefScaleMin Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz
Description:	Expected max frequer 0.00 <= Al Ref Scale N	cy reference value for AI input 1in Value <=AI Ref Scale Max	t . Value <= 400.00.		
	Al Refere Maximum	Value		Output Frequency Maximum Frequency	
	Al Refere Minimum	nce Scale Value Minimum Frequency 0 With Reference Sca (Reference Sca	Analog Input [V] Scaling Jing)	Minimum Frequency 0 With Reference Scaling (No scaling used (Al Reference S	Analog Input [V] 10 Scale
P2.1.3 ¹²	IO terminal Start/S	top logic			ID 143
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Forward - Reverse 1 = Start-Reverse DI c considered 2 wire 2 = Start - Enable, mai 3 = 3 Wire Control, us stop.	maintained input on start sig losed contact = start /open co control with a contact on star ntained input on start signal 1 ad for three wire operation, sta	nal 1 to run forward and ntact = stop: Dl closed c t/stop, contact open it s to run forward and a m art signal 1 uses a norm	a maintained signal on start si ontact = reverse / open contac tops and direction on 2nd start aintained signal on start signal ally open start and start signa	ignal 2 for reverse. t = forward - This would be signal. 2 to enable the drive to run. I 2 uses a normally closed
Description:	Defines the functional	ity for start signal 1 and start	signal 2. By default, sta	art signal 1 is DI1 and start sign	al 2 is DI2.
	0 = P3.2: IO terminal 2-wire control w	start signal 1 = start forwar th either a contact used on 1 24 V+	d - P3.3: IO terminal st. :he start FWD or start ¹⁴	art signal 2 = start reverse. T REV commands. When conta	his would be considered acts open, the motor stops.
	-	DIN 1	1 ID1801 - Start Signal: DigIN:1	ID143 Start Stop Logic: Start Forward	
		DIN2	2 ID1803-Start Signal 2: DigIN:2	ID143 Start Stop Logic: Start Reverse	
		CMA	5		
		GND	12		

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

Table 41. Inputs (Continued).



Table 41. Inputs (Continued).

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.





^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 41.	Inputs	(Continued)
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P2.2 - Digital Input.							
P2.2.1 ²	DI1 function				ID 1801		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1		
Minimum value: Options:	N.A. 0 = Not Used, no actio 1 = 10 terminal start si P2.1.3; 2 = 10 terminal start si P2.1.3; 3 = Reverse - when sta 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 - 1 10 = Preset speed B1 - 1 11 = Preset speed B1 - 1 12 = Jog enable - when 13 = Accel. pot value - 1 14 = Decel. pot value - 1 15 = Reset pot zero - w 16 = Accel./decel. time 17 = Accel./decel. time 19 = Remote control - v 20 = Local control - w 21 = Parameter 1/2 se 22 = PI controller - wh 23 = PI set point selec 24 = Motor interlock 1	Maximum value: n; gnal 1 - when the control sour gnal 2 - when the control sour art/stop logic is set to 3 start p closed, ext. fault 1 will be act closed, ext. fault 2 will be act closed, ext. fault 3 will be act closed, the drive faults will be closed, the drive faults will be closed, the drive select the 7 preset speeds are select the 7 preset speeds are select the 7 preset speeds are select the closed, the motor potert when closed, the motor potert is set - when open, accel./dece set - when open, parameter set en closed, the drive will be for when open, parameter set en closed, the drive will force t - when open, parameter set - when closed, motor will be for when open, parameter set - when open, parameter set - when closed, motor will be for - when closed, the drive will force - when open, parameter set - when closed, motor will be for - when closed, the drive will force - when open, parameter set - when closed, the drive will be for - when open, parameter set - when open, parameter set - when closed, the drive will be for - when closed, the drive will be for - when open, parameter set - when open, parameter set - when closed, the drive will be for - when closed, the drive will be for - when open, parameter set - when open, parameter set - when closed, the drive will be for - when open, parameter set - when open, parameter set	N.A. the is set to 10 te the is set to 10 te bulse stop pulse, ivated; ivated; ivated; ivated; e reset; start command a ed via 3 binary in ted via 3 binary ted via 1 binary d at P2.3.8 will o tiometer value will d. time 1 will be 1 will hold the oule forced to the rer reced to the Local 1 is active: where the reference so point 1 is active: anabled to run;	Default value: rminal this input when closed will per- rminal this input when closed will per- this input will cause the drive to start inputs, this is least significant bit in that inputs, this is most significant bit in the verride the frequency reference; vill decrement at the rate defined by m vill decrement at the rate defined by m I reset to zero; used ; when closed accel./decel. time ut frequency and ignore changes to the le to any setting in the drive; note control place; closed parameter set 2 is active; urce to Pl controller output; when closed, set point 2 is active;	1 form the action defined by form the action defined by in the reverse direction; at binary input; at binary input; otor pot ramp time; otor pot ramp time; otor pot ramp time; e reference value;		
	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 set when fire mode is active and this input is open, fire mode reference 1 will be active; when closed.						
	fire mode referen 28 = Fire mode reverse 29 = DC brake active - 30 = Preheat active - v 31 = Derag. enable - w	ce 2 will be active; - when fire mode is active ar when closed, DC injection bra /hen closed, preheat mode wi hen closed, the Derag. cycle f	nd this input is op Iking will be activ Il be active; or pumps will be	en, direction will be forward: when cl /e; initiated.	osed, reverse;		
Description:	Defines the function o	f digital input 1.					

Table	41.	Inputs	(Continued).

P2.2.3 [®]	DI2 function				ID 1803
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Minimum value: Options:	N.A. 0 = Not Used, no action; 1 = I0 terminal start signal P2.1.3; 2 = I0 terminal start signal P2.1.3; 3 = Reverse - when start/s 4 = Ext. fault 1 - when clos 5 = Ext. fault 2 - when clos 6 = Ext. fault 2 - when clos 8 = Run enable - when clos 9 = Preset speed B0 - the 7 10 = Preset speed B1 - the 11 = Preset speed B1 - the 12 = Jog enable - when clos 3 = Accel. pot value - when 4 = Decel. pot value - when 15 = Reset pot zero - when 16 = Accel./decel. time set 17 = Accel./decel. time set 19 = Remote control - when clos 21 = Parameter 1/2 sel when 22 = PI controller - when clos 23 = PI set point select - when 24 = Motor interlock 1 - when 26 = Fire mode - when clos 27 = Fire mode reference 1 fire mode reference 2 28 = Fire mode reverse - when 29 = DC brake active - when 20 = DC brake active - when 20 = DC brake active - when 21 = Datababababababababababababababababababa	Maximum value: 1 - when the control source 2 - when the control source top logic is set to 3 start p ed, ext. fault 1 will be acti- ed, ext. fault 2 will be acti- ed, ext. fault 3 will be acti- ed, all active faults will be ed, the drive will allow a s- preset speeds are select 7 preset speeds are select sed, the jog speed defined- en closed, the motor poten- in closed, the motor poten- in closed, the motor poten- in closed, the drive will be for- when closed, the drive will be for- when open, parameter set f osed, the drive will be for- when open, parameter set f hen open, be active; hen fire mode is active and n closed, DC injection brai-	N.A. ce is set to 10 term ce is set to 10 term ulse stop pulse, th vated; vated; vated; reset; start command and ed via 3 binary inp ted via 3 binary inp ted via 3 binary inp tat P2.3.8 will ove tiometer value will mometer value will ometer value will ometer value will forced to the utput ges can be made forced to the Local c 1 is active: when c the reference sour- voint 1 is active: when c the reference sour- voint 1 is active: when active; e; active and this input d this input is oper king will be active;	Default value: inal this input when closed will pe inal this input when closed will pe is input will cause the drive to star I be in the ready state; its, this is least significant bit in th puts; increment at the rate defined by n idecrement at the rate defined by n idecrement at the rate defined by set to zero; ad ; when closed accel./decel. time frequency and ignore changes to t to any setting in the drive; te control place; ontrol place; losed parameter set 2 is active; se to Pl controller output; nen closed, set point 2 is active; but is open, fire mode reference 1 w n, direction will be forward: when con- set or when con- set or when con- te control will be forward: when co- te control will be forward: when co- and the transmission of transmission of the transmission of transmission of the transmission o	2 rform the action defined by rform the action defined by rt in the reverse direction; hat binary input; hat binary input; notor pot ramp time; motor pot ramp time; a 2 will be used; he reference value; will be active: when closed, closed, reverse;
Description:	31 = Derag. enable - when Defines the function of dia	closed, the Derag. cycle fo	or pumps will be in	itiated.	
- 					

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

Table 41. Inputs (Continued)

P2.2.5 ^②	DI3 function				ID 1805
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	4
Minimum value: Options:	N.A. 0 = Not Used, no action; 1 = 10 terminal start signal 1 P2.1.3; 2 = 10 terminal start signal 2 P2.1.3; 3 = Reverse - when start/sto 4 = Ext. fault 1 - when close 5 = Ext. fault 2 - when close 6 = Ext. fault 3 - when close 7 = Fault reset - when close 8 = Run enable - when close 9 = Preset speed B0 - the 7 10 = Preset speed B1 - the 7 11 = Preset speed B2 - the 7 12 = Jog enable - when close 13 = Accel. pot value - when 14 = Decel. pot value - when 15 = Reset pot zero - when 16 = Accel./decel. time set - 17 = Accel./decel. prohibit - 18 = No access to paramete 19 = Remote control - when 20 = Local control - when close 21 = Parameter 1/2 sel when	Maximum value: - when the control sour - when the control sour - when the control sour plogic is set to 3 start p d, ext. fault 1 will be act d, ext. fault 2 will be act d, ext. fault 3 will be act d, ext. fault 2 will be when closed, the drive will be posed, the drive will be for losed, the drive will be for losed, the drive will be for losen open, parameter set	N.A. ce is set to 10 ter ce is set to 10 ter pulse stop pulse, ivated; ivated; ivated; start command ar ed via 3 binary in ted via 3 binary in ted via 3 binary in d at P2.3.8 will or tiometer value wi tiometer value will l. time 1 will be u vill hold the outpunges can be mad forced to the local 1 is active: when	Default value: minal this input when closed will per minal this input when closed will per this input will cause the drive to star nd be in the ready state; puts, this is least significant bit in th nputs; this is most significant bit in th verride the frequency reference; ill increment at the rate defined by n reset to zero; ised ; when closed accel./decel. time ut frequency and ignore changes to the to tany setting in the drive; note control place; control place; closed parameter set 2 is active;	4 form the action defined by form the action defined by t in the reverse direction; at binary input; nat binary input; notor pot ramp time; notor pot ramp time; 2 will be used; ne reference value;
	 22 = Pl controller - when clo 23 = Pl set point select - wh 24 = Motor interlock 1 - whee 25 = Smoke mode - when close 26 = Fire mode - when close 27 = Fire mode reference 1/2 fire mode reference 2 v 28 = Fire mode reverse - when 29 = DC brake active - when 30 = Preheat active - when close 31 = Derag. enable - when close 	sed, the drive will force : en open, parameter set p en closed, motor will be e d, fire mode will b d, fire mode will be activ 2 sel when fire mode is vill be active; en fire mode is active an closed, DC injection bra closed, preheat mode wil losed, the Derag. cycle fi	the reference sou point 1 is active: v enabled to run; e; e; s active and this i d this input is op king will be active; or pumps will be	rrce to PI controller output; when closed, set point 2 is active; input is open, fire mode reference 1 v en, direction will be forward: when c e; initiated.	vill be active: when closed, losed, reverse;
Description:	Defines the function of digit	al input 3.			
Decemptor value can only l	والمستقدمة والمستعد				

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

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Table 41.	Inputs	(Continued)
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P2.2.7 ^②	DI4 function				ID 1807
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	7
Minimum value: Options:	N.A. 0 = Not Used, no action; 1 = 10 terminal start signal P2.1.3; 2 = 10 terminal start signal P2.1.3; 3 = Reverse - when start/s 4 = Ext. fault 1 - when clos 5 = Ext. fault 2 - when closs 6 = Ext. fault 3 - when closs 7 = Fault reset - when closs 8 = Run enable - when closs 9 = Preset speed B0 - the 7 10 = Preset speed B1 - the 11 = Preset speed B2 - the 12 = Jog enable - when clo 3 = Accel. pot value - when 15 = Reset pot zero - when 16 = Accel./decel. time set 17 = Accel./decel. time set 17 = Accel./decel. time set 19 = Remote control - when clo 21 = Parameter 1/2 sel w 22 = Pl controller - when clo 23 = Pl set point select - w 24 = Motor interlock 1 - when 25 = Smoke mode - when clo 26 = Fire mode - when clo 27 = Fire mode reference 1	Maximum value: 1 - when the control source 2 - when the control source top logic is set to 3 start p ed, ext. fault 1 will be acti- ed, ext. fault 2 will be acti- ed, ext. fault 2 will be acti- ed, ext. fault 3 will be acti- ed, att active faults will be ead, the drive will allow a s 'preset speeds are selecter 7 preset speeds are selecter 7 preset speeds are selecter 7 preset speeds are selecter 7 preset speeds are selecter 9 menest spe	N.A. the is set to 10 terminal t the is set to 10 terminal t ulse stop pulse, this inp vated; vated; vated; tart command and be in d via 3 binary inputs, th ted via 3 binary inputs, th ted via 3 binary inputs, th at P2.3.8 will override tiometer value will reset t . time 1 will be used ; w ill hold the output frequ iges can be made to any forced to the remote con ced to the Local control is active: when closed he reference source to 1 oint 1 is active: when cl nabled to run; e active; e; active and this input is	Default value: his input when closed will perf his input when closed will perf ut will cause the drive to start the ready state; his is least significant bit in that the frequency reference; ment at the rate defined by m ement at the rate defined by m to zero; when closed accel./decel. time : hency and ignore changes to that y setting in the drive; htrol place; parameter set 2 is active; Pl controller output; losed, set point 2 is active; open, fire mode reference 1 w	7 orm the action defined by orm the action defined by in the reverse direction; t binary input; at binary input; otor pot ramp time; otor pot ramp time; 2 will be used; e reference value;
	28 = Fire mode reverse - w 29 = DC brake active - whe 30 = Preheat active - when 31 = Derag. enable - when	hen fire mode is active and in closed, DC injection brał i closed, preheat mode will closed, the Derag. cycle fo	d this input is open, dire king will be active; l be active; or pumps will be initiate	ction will be forward: when clo d.	osed, reverse;
Description:	Defines the function of dig	ital input 4.			

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:	10.00 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 selected 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 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 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 41. Inputs (Continued).

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 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; 1 = 0 - 10 V.					
Description:	Defines the analog i parameter.	nput mode to current or voltage	the DIP switches (on control board will need to be set t	to the same mode as this	
	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 +10V supply on CN5 terminals 13, it will require DIP switches SW2 2 and 3 on to complete the current loop. When doing a curren loop with an external supply, the DIP switches SW2 2 off and 3 on.



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/0-10 1 = 20-100%/4-20 mA/2-10	V.) V.			
Description:	With this parameter, you c	an select the analog input 1	signal range.		
	For selection "Customized,	" see 'Al Custom Min' and'A	I Custom Max', this enables	a customized signal range.	
		Al Ref. Scale Max. Al Ref. Scale Max. Al Ref. Scale Max. Value 0 0 1 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0	Alt Signal Range = Custom 0 Alt Signal Range = 1 4 mA Alt Custom Max.	20 mA	

Table 41. Inputs (Continued).

Chapter 6 - Pump control application

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$a_{1}a_{1}a_{2}a_{2}a_{2}a_{3}a_{3}a_{3}a_{3}a_{3}a_{3}a_{3}a_{3$	Table	42.	Outputs.
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P3.1 - Digital output					
P3.1.1 ²	RO1 function				ID 152
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = Not used - No A 1 = Ready - Drive is 2 = Run - Drive is ru 3 = fault - Drive is fr 4 = fault invert - Dri 5 = warning - Drive 6 = Reverse - The D 7 = At Speed - The (8 = Zero Frequency limit 10 = PID supervision 11 = torque limit sup 12 = reference limit 13 = Power limit sup 14 = Temp limit sup 15 = Analog input si 16 = Motor current - 17 = over heat fault 18 = Ocurrent Fault 19 = Ovolt Fault - Or 20 = Uvolt Fault - A 21 = 4 mA fault - 4 + 22 = external fault - 4 23 = Motor thermal 24 = STO Fault Outp 25 = Control from IC 26 = Remote contror 30 = Valve Control - 31 = Jog speed - Dri 29 = Damper controc 30 = Valve Control - 31 = Jog speed - Dri 32 = fieldbus input2 34 = DC charge swi 35 = Preheat Active 36 = Cold weather a 37 = PID sleep - PID 38 = 2nd stage ram 39 = Prime Pump Ac 40 = Master drive S 41 = Slave Drive Sta 43 = Single Drive Cc 44 = Ext Brake Cont 45 = Ext Brake Inve	ction ready for operation nning aulted ve is not faulted has a warning message rive is outputing reverse phase is output frequency has reached th - Drive output is at zero frequen supervision - Supervision for fre pervision - Supervision for torque supervision - Supervision for torque supervision - Supervision for torque supervision - Supervision for drive t upervision - Supervision for mo - Drive over heat fault has occurred fault - Motor thermal fault has occurred fault - Motor thermal fault has out - Safe Torque Off input is act) - I/O is the selected start comr I - Remote is the control place otation direction - The active di ve is in fire mode I - Damper control output Valve control output ive is in jog mode - Controled by FB control word tch close - DC precharge relay is - Preheat Control mode is active of frequency active - Accel/Dece tive - drive is running in prime p tate - Indicates if the master dri rate - Indicates if the slave drive iontrol - indicates if the slave drive iontrol - indicates if the master dri rate - Indicates if the slave drive iontrol - indicates if the master dri rate - Indicates if the master drive.	rotation e set reference cy quency limit 1 is a is activated e limit ference limit empurature limit tor current limit tor current limit red acccurred ivated nand location rection isn't the s closed ated tive l time 2 is active we in the multi-pump rive is running in s	activated ame as the reference direction imp control mode is faulted control mode is faulted single drive control mode on a multi-pr	ump control
Description:	Defines the function	n associated with changing the s	state of relay outp	out 1.	

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

Table 42.	Outputs	(Continued)).
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RO2 function				ID 153
N.A.	Maximum value:	N.A.	Default value:	3
0 = Not used - No Action 1 = Ready - Drive is ready 2 = Run - Drive is ready 3 = fault - Drive is faulted 4 = fault invert - Drive is n 5 = warning - Drive has a v 6 = Reverse - The Drive is n 7 = At Speed - The output 8 = Zero Frequency - Drive 9 = Frequency limit supervisin 12 = reference limit supervisin 12 = reference limit supervisin 15 = Analog input supervisin 15 = Analog input supervisin 16 = Motor current supervisin 17 = over heat fault - Drive 18 = Courrent Fault - Over 19 = Ovolt Fault Resp - Un 21 = 4 mA fault - 4 mA faul 22 = external fault - Extern 23 = Motor thermal fault - Zer 25 = Control from 10 - 1/0 26 = Remote control - Rem 27 = Un-requested rotation 28 = Fire mode - Drive is ir 29 = Damper control - Dam 30 = Valve Control - Valve 31 = Jog speed - Drive is ir 32 = fieldbus input 2 - Control 34 = DC charge switch clov 35 = Preheat Active - Preh 36 = Cold weather active - 37 = PID sleep - PID controc 38 = 2nd stage ramp frequ 39 = Drime Pump Active - 1 41 = Slave Drive State - 1 43 = Single Drive Control - 44 = Ext Brake Control exter- 45 = Ext Brake Inverted-exter	for operation ot faulted warning message outputing reverse phase rot frequency has reached the : output is at zero frequency ision - Supervision for frequery ision - Supervision for treque drision - Supervision for order on - Supervision for order on - Supervision for power li n - Supervision for drive tem ision - Supervision for drive tem ision - Supervision for drive tem current fault has occurred tault has occurred der volt warning/fault has oc it has occurred Motor thermal fault has occurred is the selected start comma note is the control place n direction - The active direc n fire mode nge notrol output control output control output control output control output cold weather mode is activative cold weather mode is activate (cold weather mode is activate in a sleep state uency active - Accel/Decel ti drive is running in prime pun Indicates if the master drive dicates if the slave drive in - indicates is a stive. ternal brake is inactive.	ation set reference ency limit 1 is activated activated mit ence limit nit input limit current limit d ccurred tited nd location etion isn't the same as the re osed et me 2 is active np mode in the multi-pump control mode e is running in single drive co	ference direction ode is faulted s is faulted ontrol mode on a multi-pump	o control
Defines the function assoc	clated with changing the sta	te of relay output 2.		
AO mode				ID 227
N.A.	Maximum value:	N.A.	Default value:	0
0 = 0 - 20 mA; 1 = 0 - 10 V.				
Defines the analog output	mode to current or voltage.			
	RO2 function N.A. 0 = Not used - No Action 1 = Ready - Drive is ready 2 = Run - Drive is running 3 = fault - Drive is a with the stand standard stand standard standard standard standard standard standard standard s	RO2 function N.A. Maximum value: 0 = Not used - No Action 1 = Ready - Drive is ready for operation 2 = Run - Drive is ready for operation 2 = Run - Drive is faulted 4 = fault invert - Drive is not faulted 5 = warning - Drive has a warning message 6 = Reverse - The Drive is outputing reverse phase rot 7 = At Speed - The output frequency has reached the s 8 = Zero Frequency - Drive output is at zero frequency 9 = Frequency limit supervision - Supervision for frequency 10 = PID supervision - Supervision for rDD controller is 11 = torque limit supervision - Supervision for rower limit supervision - Supervision for power limit = Analog input supervision - Supervision for motor 11 = torque limit supervision - Supervision for motor 12 = reference limit supervision - Supervision for motor 12 = reference limit supervision - Supervision for drive tem 15 = Analog input supervision - Supervision for motor 12 = remp limit supervision - Supervision for motor 14 = Temp limit supervision - Supervision for motor 13 = Power limit aut - Drive over heat fault has occurred 18 = Ocurrent Fault - Over current fault has occurred 23 = Wotor teatlat - U over outra fault has occurred 12 = external fault - Ama fault has occurred 24 = Am fault - 4 mA fault has occurred 23 = Motor thermal fault - Motor thermal fault has occurred 25 = Contol from ID - I	RO2 function N.A. Maximum value: N.A. 0 = Not used - No Action 1 Ready - Drive is ready for operation 2 = Run - Drive is rounning 3 fault - Drive is not faulted 4 = fault invert - Drive is not faulted 5 exerning - Drive has a warning message 6 = Reverse - The Drive is output ing 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 for frequency limit 1 is activated 10 = PID supervision - Supervision for rotrue limit 1 activated 11 = torque limit supervision - Supervision for rolog input limit 1 activated 13 = Power limit supervision - Supervision for molog input limit 1 bandog input supervision - Supervision for molog input limit 15 = Analog input supervision - Supervision for molor current limit 17 over heat fault - Drive over heat fault has occurred 19 = Ovolt Fault - Over volt fault has occurred 10 Our metal Fault - Ver volt fault has occurred 20 = Uvolt Fault - Safe Torque Off input is activated 12 activated 21 = 4 m A fault + 4 mA fault has occurred 12 3 Motor thermal fault - Safe Torque Off input is activated <th>RO2 function N.A. Maximum value: N.A. Default value: 0 = Not used - No Action = Ready - Drive is running = Ready - Drive is running 2 = flut - Drive is faulted 4 = fault invert - Drive is not faulted 5 = Reverse - The Drive is output ing reverse phase rotation 7 = At Speed - The output requery has reached the set reference 8 = Zero Frequency - Drive output is a zero frequency 9 = Frequency - Drive output is a zero frequency fimit 1 is activated 10 = PID supervision - Supervision for trequency limit 1 1 is activated 11 = torque limit supervision - Supervision for reference limit 1 = reference limit supervision - Supervision for motor current limit 12 = reference limit supervision - Supervision for motor current limit 1 = torque limit supervision - Supervision for motor current limit 13 = Power limit supervision - Supervision for motor current limit 1 = torque limit supervision - Supervision for motor current limit 15 = Adalog input supervision - Supervision for motor current limit 2 = oternal fault - Drive over heat fault has occurred 19 = Ovint Fault - Over current fault has occurred 2 = oternal fault - Aver active diverted 2 = oternal fault - System fault has occurred 2 = oternal fault - System fault - Aver active diverted 2 = oternal fault - System fault has occurred 2 = oternal fault - System fault - Aver act</th>	RO2 function N.A. Maximum value: N.A. Default value: 0 = Not used - No Action = Ready - Drive is running = Ready - Drive is running 2 = flut - Drive is faulted 4 = fault invert - Drive is not faulted 5 = Reverse - The Drive is output ing reverse phase rotation 7 = At Speed - The output requery has reached the set reference 8 = Zero Frequency - Drive output is a zero frequency 9 = Frequency - Drive output is a zero frequency fimit 1 is activated 10 = PID supervision - Supervision for trequency limit 1 1 is activated 11 = torque limit supervision - Supervision for reference limit 1 = reference limit supervision - Supervision for motor current limit 12 = reference limit supervision - Supervision for motor current limit 1 = torque limit supervision - Supervision for motor current limit 13 = Power limit supervision - Supervision for motor current limit 1 = torque limit supervision - Supervision for motor current limit 15 = Adalog input supervision - Supervision for motor current limit 2 = oternal fault - Drive over heat fault has occurred 19 = Ovint Fault - Over current fault has occurred 2 = oternal fault - Aver active diverted 2 = oternal fault - System fault has occurred 2 = oternal fault - System fault - Aver active diverted 2 = oternal fault - System fault has occurred 2 = oternal fault - System fault - Aver act

Table 42.	Outputs	(Continued).
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P3.3.2 ²	AO function				ID 146
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	1 = Output frequency (0 -m 2 = Frequency reference (0 3 = Motor speed RPM (0 - 1 4 = Motor current (0 - name 5 = Motor torque (0 - calcul 6 = Motor power (0 - calcul 7 = Motor voltage (0 - name 8 = DC bus voltage (0 - name 9 = PI setpoint (process uni 10 = PI error value (process 11 = PI output (process uni 12 = Analog input (0% - 10) 13 = Drive reference poten 14 = Fieldbus process data 15 = Fieldbus process data 16 = Fieldbus process data 19 = Fieldbus process data 20 = Fieldbus process data 21 = Fieldbus process data 22 = User defined output (u 23 = Motor torque (0% - 22 24 = Motor power absolute	ax frequency); - max frequency); hameplate RPM); aplate current); lated nominal); lated nominal); lated nominal); voltage); 0 Vdc); it minimum - process unit may unit minimum - process unit may 0%; tiometer (0% - 100%); input 1 (0% - 100%); input 3 (0% - 100%); input 3 (0% - 100%); input 4 (0% - 100%); input 4 (0% - 100%); input 6 (0% - 100%); input 7 (0% - 100%); unput 8 (0% - 100%); user defined minimum - user 0%); a value (0% - 100%).	aximum); t maximum); ximum); defined maximum);		
Description:	Select the function desired	to the terminal AO1			

Table 43. Drive control.

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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:	0 = Enabled - keypad op 1 = Always enabled - In	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 enab	led keypad operation.							
P4.1.4 ^①	Reverse enabled				ID 1679				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1				
Options:	0 = Disabled; 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; 1 = Change enable.								
Description:	This parameter allows f	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; 2 = Remote control.								
Description:	Selects what control pla when powered down, s	ace the drive will start at af electing Local or Remote wi	ter power is applied. Il cause the drive to s	The default setting will hold the la tart in that mode regardless of las	ast state that the drive was in t state.				

P4.1.8 ²	Start mode				ID 252	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Ramp - The c 1 = Flying start f last operatin 2 = Flying start f the maximun	drive starts from 0 Hz and ramps to rom stop frequency - The drive will g frequency as a starting point. rom maximum frequency - The drive n operating frequency as a starting	the frequency refe catch a spinning r will catch a spin point.	erence value. motor. This setting searches for the cu ning motor. This setting searches for	urrent frequency using the the current frequency using	
Description:	Selects the start	t mode operation.				
P4.1.9 ²	Stop mode				ID 253	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1	
Options:	0 = Coasting - At 1 = Ramp - After	fter a stop command, the motor coa the stop command, the speed of th	sts to a stop unco e motor is decele	ontrolled by the drive. rated according to the set deceleration	n parameters.	
Description:	Selects the stop	mode 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:	The start and end of the acceleration and deceleration ramps can be smoothed with these parameters. Setting a value of 0.00 second 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 43. Drive control (Continued).



Table 43. Drive control (Continued)

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 c linear ramp shape t	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 the slope.	m 0.10 to 10.00 seconds for this p	parameter produces	an S-shaped acceleration/decelera	tion at the start and stop of				
		ŀ	Hz						
		Accel. (Accel.	Time 1, Decel. Time Time 2, Decel. Time						
			Ramp 2 S	Ramp 2 Shape					
			-		t t				
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				
	These parameters be selected with th	provide the possibility to set two le programmable digital input.	different accelerat	ion/deceleration time sets for one a	pplication. The active set ca				
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.	spond to the time required for th	e output frequency	to decelerate from the set maximum	n frequency to the zero				
	These parameters be selected with th	provide the possibility to set two e programmable digital input.	different accelerat	ion/deceleration time sets for one a	pplication. The active set ca				
P4.1.14 ^{①②}	2nd Stage ramp	frequency			ID 2444				
Minimum value:	MinFreq.	Maximum value:	MaxFreq.	Default value:	30.00 Hz				
Description:	When 2nd stage ra This then can be us	mp frequency is the frequency le ed for other inputs or devices to	evel at which the dri signal a frequency	ve will enable the 2nd stage ramp f level.	requency output function.				

P4.5: Foldback

P4.5.1	IGBT Temperature				ID 776
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	N.A.				
Description:	IGBT Temperature				
P4.5.2	Foldback status				ID 1771

Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0					
Options:	0 = Inactive 1 = Active 2 = On hold									
Description:	Foldback status. It is a monitor parameter. There are three values: (a) active, when IGBT temperature is greater than foldback temperature (b) on hold, when IGBT temperature is between Recovering temperature and Foldback temperature (c) inactive, when IGBT temperature is smaller than Recovering temperature									
P4.5.3	Foldback output frequ	Foldback output frequency ID 1772								
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0					
Options:	N.A.									
Description:	Foldback output, it is the f	requency. It is a monitor pa	arameter, unit is Hz.							
P4.5.4	Foldback output spee	d			ID 1773					
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0					
Options:	N.A.									
Description:	Foldback output, it is the s	speed. It is a monitor param	neter,unit is rpm							
P4.5.5	Foldback enable				ID 1774					
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0					
Options:	0 = Disabled 1 = Enabled									
Description:	Foldback enable									
P4.5.6	Foldback temperature	•			ID 1775					
Minimum value:	0	Maximum value:	120	Default value:	80					
Options:	N.A.									
Description:	Foldback temperature. It is the speed shall be reduced	s a user-setting parameter. d at the rate "speed reduce	Display unit is Deg. C. If IGB rate"	T temperature is greater tha	n Foldback temperature,					
P4.5.7	Recovering temperatu	ire			ID 1776					
Minimum value:	0.	Maximum value:	120	Default value:	70					
Options:	N.A.									
Description:	Recovering temperature. I Foldback temperature, the	t is a user-setting paramete speed shall remain the cu	er. Display unit Deg. C. If IGB rrent speed.	T temperature is between Re	ecovering temperature and					
P4.5.8	Foldback speed reduc	e rate			ID 1777					
Minimum value:	0.	Maximum value:	200	Default value:	20					
Options:	N.A.									
Description:	Foldback speed reduce rat speed shall be reduced at	e. It is a user-setting parar the rate "foldback speed r	neter, unit is rpm/s. If IGBT t educe rate"	emperature is greater than F	oldback temperature, the					
P4.5.9	Foldback minimum sp	eed			ID 1778					
Minimum value:	0.	Maximum value:	10000	Default value:	2000					
Options:	N.A.									
Description:	Foldback fault trip speed. It is a user-setting parameter, unit is rpm. If the drive is "foldback active" and speed is less than "Foldback minimum speed", this status lasts "Foldback fault timeout", Foldback fault will happen.									
P4.5.10	Foldback fault timeou	t			ID 1779					
Minimum value:	0.	Maximum value:	200	Default value:	30					
Options:	N.A.									
Description:	Foldback fault trip speed. minimum speed", this stat	It is a user-setting paramet us lasts "Foldback fault tim	er, unit is rpm. If the drive is neout", Foldback fault will ha	"foldback active" and speed open.	is less than "Foldback					

Table 44. Motor control.

P5.1 - Basic settings.							
P5.1.1 ¹²	Motor control mode					ID 287	
Minimum value:	N.A.	Maximum v	alue:	N.A.	Default value:	0	
Options:	0 = Frequency control - Ou 1 = Speed control - Output	tput frequency i t frequency is co	is controlled o ontrolled by g	directly by the frequency r iving a frequency referenc	eference. e to it with slip compensat	ion.	
Description:	Selects the motor control	mode.					
P5.1.2 ^①	Current limit					ID 107	
Minimum value:	DriveNomCurrCT*1/10 A	Maximum v	alue:	DriveNomCurrCT*2 A	Default value:	DriveNomCurrCT*3/2 A	
Description:	This parameter determine Once the motor current hit	s the maximum (ts this level, it go	output currer oes into the c	nt allowed from the drive. current limiter controller a	The parameter value range nd tries to limit the output o	e differs from size to size. current.	
P5.1.3 ^{①2}	V/Hz optimization					ID 109	
Minimum value:	N.A.	Maximum v	alue:	N.A.	Default value:	0	
Options:	0 = Disable torque boost f 1 = Enable torque boost fu	unction. Inction.					
Description:	Automatic torque boost - t and run at low frequencies	the voltage to th s with high loads	ie motor incre s.	eases automatically, which	n assists the motor to produ	uce sufficient torque to start	
P5.1.4 ¹⁾	V/Hz ratio					ID 108	
Minimum value:	N.A.	Maximum v	alue:	N.A.	Default value:	0	
Description:	 point where the nominal voltage is supplied. A linear V/Hz ratio should be used in constant torque applications. 1 = Squared - The voltage of the motor changes following a squared curve with the frequency in the area from 0 Hz to the field weakening point where the nominal voltage is supplied. The motor runs under magnetized below the field weakening point and produces less torque and electromechanical noise. A squared V/Hz ratio can be used in applications where the torque demand of the load is proportional to the square of the speed. 3 = Linear with flux optimization - The drive starts to search for the minimum motor current in order to save energy, This mode is called Active Energy Control which will reduce the voltage and current but still maintain the desired speed. 						
Description.	0 = Linear; 1 = Squared; 3 = Linear + flux optimizati	ion.					
		Î	U[V]				
		Un - Voltage at FWP	Default: Nom Voltage of the	inal a Motor inear Squared	Field Weakening Point Default: Nominal Frequency of the Motor		
			\square	-	✓ f [Hz]		
				0 = Linear and 1 = Squa	red.		
P5.1.10 ²	Switching frequency					ID 288	
Minimum value:	MinSwitchFreq kHz	Maximum v	alue:	MaxSwitchFreq kHz	Default value:	DefaultSwitchFreqCT kHz	
Description:	Sets the switching freque	ncy for the PWN	/l output wav	eform.			

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

P5.1.16 ^{①②}	Identification				ID 299
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Not action. 1 = Identification only state 2 = Identification with run 3 = Identification no run - n 4 = Identification only inert	or resistor - does not spin th - motor stator resistor is cor notor is supplied with currer ia - identification for the sy	e motor. This can be done v npleted then the motor is ru nt and voltage but at zero fre stem inertia only.	vith load attached. n. This must be completed equency.	with unloaded motor.
Description:	This parameter enables the parameters to improve star will be active then set back tuning" is being performed	e drive to make an motor ide rting torque and open loop v < to 0 when completed. Wh . If there is an issue with th	ntification cycle of the moto ector control performance. en a run command is issued, e motor identification, a fau	r once complete the drive w Once set and a run comman , the message on the keypac It message will be displayed	ill adjust tuning d is given, the operation f will indicate "Auto f.

Table 45. Protections.

P6.1 - Motor.							
P6.1.4 ¹⁾	Motor thermal	protection			ID 310		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2		
Options:	0 = No response 1 = Warning. 2 = Fault, stop m 3 = Fault, stop m	Iode after fault according to param Iode after fault always by coasting	ieter stop mode.				
Description:	If a fault conditio calculated motor this protection, i.	n is selected, the drive will stop a temp is based off the install powe e., setting parameter to 0, will res	nd activate the fault st er on values of the driv et the thermal stage o	tage based off the % of calculate re and monitoring values as the d of the motor to 0%.	d motor temperature. The ive 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%		
Description:	The current can be set between 0 - 150.0% x InMotor. This parameter sets the value for thermal current at zero frequency. The default value is set assuming that there is no external fan cooling the motor. If an external fan is used, this parameter can be set to 90% (or even higher).						
	Note: The value is set as a percentage of the motor nameplate data, P1.6 (nominal current of the motor), not the drive's nominal output current. The motor's nominal current is the current that the motor can withstand in direct on-line use without being overheated.						

If you change the parameter nominal current of motor, this parameter is automatically restored to the default value. Setting this parameter does not affect the maximum output current of the drive.



P6.2 - Drive.								
P6.2.2 ¹²	Input phase f	ault			ID 332			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2			
Options:	0 = No response 1 = Warning; 2 = Fault, stop n 3 = Fault, stop n 4 = Single phase	e; node after fault according to parami node after fault always by coasting; e power limit.	eter stop mode;					
Description:	The input phase	supervision ensures that the input	phases of the freque	ency converter have approximately	equal current draw.			
P6.2.3 ¹²	4 mA input fa	ault			ID 306			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = No response. 1 = Warning. 2 = Warning, the frequency from 10 seconds back is set as reference. 3 = Warning, the preset frequency P6.2.4 is set as reference. 4 = Fault, stop mode after fault according to parameter stop mode. 5 = Fault, stop mode after fault always by coasting.							
Description:	A warning or a f seconds, or belo	A warning or a fault action and message is generated if the 4 - 20 mA reference signal is used and the signal falls below 4 mA for 5 seconds, or below 0.5 mA for 0.5 seconds. The information can also be programmed into relay outputs R01 and R02.						

P6.2.4 ¹²	4 mA fault frequency				ID 331			
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00			
Description:	When 4 mA fault happens, the output frequency of drive goes to this preset speed when P6.2.3 = 3.							
P6.2.5 ¹²	External fault				ID 307			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2			
Options:	0 = No action; 1 = Warning; 2 = Fault, stop mode after 3 = Fault, stop mode after	fault according to paramete fault always by coasting.	r stop mode.					
Description:	A warning or a fault action external fault). The status	and message is generated information can also be pro	from the external fault signa grammed into digital output	l in the programmable (digit relay outputs RO1 and RO2.	al inputs function select			
P6.2.11 ²	STO fault response				ID 2427			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2			
Options:	0 = No Action - drive will s 1 = Warning - drive indicat 2 = Fault - drive will indica	top, no indication shown, no e warning/if STO clears driv te fault/require reset to star	reset required, have to cycl e will run without reset. t again.	e start command.				
Description:	STO fault response defines	s the function of how the ST	O input will be seen on the k	keypad and how the drive fu	nctions to it.			
P6.2.12 ¹	PI feedback AI loss re	sponse			ID 2401			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Warning: preset freque	апсу (Р6.2.13).						
Description:	This parameter defines the feedback.	e function of the PI feedback	analog input loss response.	If the AI feedback is lost ba	ased off the programed Al			
P6.2.13 ¹²	PI feedback AI loss pr	e-frequency			ID 2402			
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz			
Description:	This parameter defines the	e frequency the master woul	d run to if a feedback is lost	and P6.2.12 was set to optic	on 3.			
P6.2.14 ²	PI feedback AI loss pi	pe fill			ID 2403			
Minimum value:	0.0 varies	Maximum value:	1000.0 varies	Default value:	0.0 varies			
Description:	PID Feedback AI Prime Lev the time in P6.2.15 and bel	el - Detects loss of prime in ow the frequency in P6.2.13	the pump based off the mea 'loss of Prime' occurs.	asured level. If the value dro	ops below this level for			
P6.2.15 ²	PI feedback AI loss pr	e-frequency timeout			ID 2404			
Minimum value:	0.0 s	Maximum value:	6,000.0 s	Default value:	0.0 s			
Description:	PID Feedback AI Loss PreF frequency in P6.2.15 for the Osec.	req Timeout - When P6.2.12 e time set here, after this tir	is set to 3 or 4, when the Fe ne the drive will fault out on	edback signal is lost, the dr 'Feedback Loss'. The Time	ive will run at the is disabled when set to			

Table 45. Protections (Continued).

P6.3 - Communications.

P6.3.1 ⁰²	Fieldbus fault respo	onse			ID 334		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2		
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Fault, coast.						
Description:	This sets the response communication port. Each protocol has anotl	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.					

P6.3.2 ¹²	OPT card fault respons	ID 335			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Fault, coast.				
Description:	This sets the response mod processor.	de for a board slot fault caus	sed by a missing or failed opt	tion board not communicatin	ig to the central

Table 45. Protections (Continued)

Table 46. PI Controller.

P7.1 - Basic setting	5.							
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 o	Defines the gain of the PI Controller. It adjust the slope of the speed increase according to the initial of the load. If this value is set to 100%, a change of 10% in the error value causes the controller output to change 10%.						
P7.1.2 ²	PI control itime	9			ID 1295			
Minimum value:	0.00 a	Maximum value:	600.00 a	Default value	1.00 a			
	0.00 \$	Maximum value.	000.00 \$	Delault value.	1.00 \$			

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

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P7.1.3 ¹²	PI process unit ID 1297				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	N.A. 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/s; 30 = ft ³ /s; 31 = ft ³ /min.; 32 = ft ³ /h; 33 = ft's; 34 = in.wg; 35 = ft wg; 36 = PSI; 37 = Ib/in.2; 38 = HP; 39 = Deg. F; 40 = PA; 41 = WC; 42 = HG; 43 = ft; 44 = m;	Maximum value:	<u>N.A.</u>	Default value:	
Description:	Defines the unit type for P	l feedback unit.			
P7.1.4 ⁽²⁾	PI process unit minim	um			ID 1298
Minimum value:	-99999.99 varies	Maximum value:	PI Process Unit Max	Default value:	U.UO varies
	Defines the minimum proc	ess unit value.			ID 1200
P7.1.5 [©]	PI process unit maxim				
Minimum value:	PI Process Unit Min	Maximum value:	99999.99 varies	Default value:	100.00 varies
Description:	Defines the maximum pro	cess 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 is 1 = Inverted - if feedback i	less than set-point, PI cont s less than set-point, PI con	roller output increases. troller output decreases.		
Description:	Defines the way the proce	ss value output reacts to th	e feedback signal.		
P7.1.7 ²	PI dead band				ID 1304
Minimum value:	-99999.99 varies	Maximum value:	99999.99 varies	Default value:	0 varies
Description:	PI dead band around setpo deactivation of controller.	oint in process units. This is The PI output is locked if th	the band where no actions o e feedback stays within the	occur to prevent oscillation of dead band area.	or repeated activation/

Table 46. PI Controller (Continued).

Table 46. PI Controller (Continued).

P7.1.8 ²	PI dead band d	elay			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.	alue 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 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	Defines the rising and falling ramp times for changes in the process value.					

Table 47. 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 value setpoint 1.							
P7.2.1.2 [®]	PI keypad setpoint	PI keypad setpoint 2						
Minimum value:	PI Process Unit Min	Maximum value:	PI Process Unit Max	Default value:	0.00 varies			
Description:	Keypad PI reference va	Keypad PI reference value 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:	0 = Wake-up when belo 1 = Wake-up when abo 2 = Wake-up when belo 3 = Wake-up when abo	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 actior	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 input 1; 6 = FB process data input 2; 7 = FB process data input 3; 8 = FB process data input 4; 9 = FB process data input 5; 10 = FB process data input 1; 11 = FB process data input 1; 12 = FB process data input 1; 13 = FB PI setpoint 1; 14 = FB PI setpoint 2.	6; 7; 8;			
Description:	Defines source of the setpo fieldbus message.	int value the drive uses.	his can either be an internal	preset value, keypad setpoir	nt, analog signal, or
P7.2.2.2 ^①	PI setpoint 1 sleep ena	ble			ID 1315
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				
Description:	This function will disable th re-engages when feedback	e output when the freque rises above the wake-up l	ncy drops below the sleep fre evel.	equency for the sleep delay t	ime. The output
P7.2.2.3 ²	Pl setpoint 1 sleep dela	ay			ID 1317
Minimum value:	0.00 s	Maximum value:	3,000.00 s	Default value:	0.00 s
^① Parameter value can only b	e changed after the drive ha	is stopped.			

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

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.								
PI setpoint 1 wake-up	level			ID 1318				
-99999.99 varies	Maximum value:	99999.99 varies	Default value:	0.00 varies				
Defines the level to enable This value is based of the	Defines the level to enable the PI output. it will be above or below according to PID reference or feedback depend on P7.2.1.3 setting, This value is based of the % of feedback which can be scaled based off the PI unit min./max, values.							
PI setpoint 1 boost	PI setpoint 1 boost ID 1320							
-2.00 varies	Maximum value:	2.00 varies	Default value:	1.00 varies				
The setpoint can be boost	The setpoint can be boosted via a multiplier value.							
PI setpoint 1 sleep lev	ID 2450							
PID1_ProcessUnitMin Hz	Maximum value:	PID1_ProcessUnitMax Hz	Default value:	0.00 Hz				
Defines the level of which delay time, it will put the c	the unit value is used to drive into the sleep mode.	look at to go into the sleep mo	ode. When the unit drops	below this level for the sleep				
SP1 sleep mode over o	cycle time			ID 1842				
0.00 varies	Maximum value:	10.00 varies	Default value:	0.00 varies				
Defines count drive come One cycle is defined when O value means don't do the	in and out of sleep mode, the drive transfers from e sleep over cycle check a	if mutliple times done in this normal mode to sleep mode. nd clear 'Pump Over Cycle' fa	time frame drive would tr ult.	ip on 'Pump Over Cycle' fault.				
SP1 sleep mode maxir	num cycle time			ID 1843				
0.00 s	Maximum value:	3,600.00 s	Default value:	300.00 s				
Defines the maximum time	e for sleep over cycle cheo	king.						
	This parameter sets the de shut off till the wake up le PI setpoint 1 wake-up -99999.99 varies Defines the level to enable This value is based of the PI setpoint 1 boost -2.00 varies The setpoint can be boost PI setpoint 1 sleep lev PID1_ProcessUnitMin Hz Defines the level of which delay time, it will put the of SP1 sleep mode over of 0.00 varies Defines count drive come One cycle is defined when 0 value means don't do the SP1 sleep mode maxim 0.00 s	This parameter sets the delay time after the setpoint shut off till the wake up level is met. It is to preven PI setpoint 1 wake-up level -99999.99 varies Defines the level to enable the PI output. it will be a This value is based of the % of feedback which can PI setpoint 1 boost -2.00 varies Maximum value: The setpoint 1 boost -2.00 varies Maximum value: The setpoint 1 sleep level PI setpoint 1 sleep level PID1_ProcessUnitMin Hz Maximum value: Defines the level of which the unit value is used to I delay time, it will put the drive into the sleep mode. SP1 sleep mode over cycle time 0.00 varies Maximum value: Defines count drive come in and out of sleep mode, One cycle is defined when the drive transfers from 10 value means don't do the sleep over cycle check a SP1 sleep mode maximum cycle time 0.00 s Maximum value: Defines the maximum time for sleep over cycle check	This parameter sets the delay time after the setpoint drops below the sleep level shut off till the wake up level is met. It is to prevent large fluctuations when goin PI setpoint 1 wake-up level -99999.99 varies Maximum value: 99999.99 varies Defines the level to enable the PI output. it will be above or below according to P This value is based of the % of feedback which can be scaled based off the PI un PI setpoint 1 boost -2.00 varies Xaximum value: 2.00 varies PI setpoint 1 sleep level PID1_ProcessUnitMin Hz Maximum value: PID1_ProcessUnitMax Hz Defines the level of which the unit value is used to look at to go into the sleep modelay time, it will put the drive into the sleep mode. SP1 sleep mode over cycle time 0.00 varies Maximum value: 10.00 varies Defines count drive come in and out of sleep mode, if multiple times done in this One cycle is defined when the drive transfers from normal mode to sleep mode. 0 value means don't do the sleep over cycle check and clear 'Pump Over Cycle' fa SP1 sleep mode maximum cycle time 0.00 s Maximum value: 3,600.00 s Defines the maximum time for sleep over cycle checking.	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 PI setpoint 1 wake-up level -99999.99 varies Default value: Default value: 99999.99 varies Default value: Default value: Offault value: Offault value: Offault value: PI setpoint 1 boost -2.00 varies Default value: PI setpoint 1 sloep level PID1_ProcessUnitMax Default value: PID1_ProcessUnitMax Default value: Defines the level of which the unit value is used to look at to go into the sleep mode. When the unit drops delay time, it will put the drive into the sleep mode. Default value: O.00 varies Maximum value: 10.00 varies Default value: SP1 sleep mode over cycle time O.00 varies Default value: O.00 varies Maximum value: 10.00 varies Default value: O.0				

Table 47. Setpoint (Continued).

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 input 1 6 = FB process data input 3 8 = FB process data input 4 9 = FB process data input 4 9 = FB process data input 1 10 = FB process data input 1 11 = FB process data input 1 12 = FB process data input 1 13 = FB Pl setpoint 1; 14 = FB Pl setpoint 2.	; ;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;			
Description:	Defines source of the setpo fieldbus message.	pint value the drive uses.	This can either be an internal	preset value, keypad setpoi	nt, analog signal, or
P7.2.3.2 ¹⁾	PI setpoint 2 sleep ena	able			ID 1324
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				
Description:	This function will disable th re-engages when feedback	ne output when the freque crises above the wake-up	ncy drops below the sleep fre evel.	equency for the sleep delay t	ime. The output

Table 47. Setpoint (Continued).

P7.2.3.3 ²	PI setpoint 2 sleep delay				ID 1326			
Minimum value:	0.00 s	Maximum value:	3,000.00 s	Default value:	0.00 s			
Description:	This parameter sets the de shut off till the wake up le	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-up	level			ID 1327			
Minimum value:	-99999.99 varies	Maximum value:	99999.99 varies	Default value:	0.00 varies			
Description:	Defines the level for the P feedback which can be sca	l feedback value to go above aled based off the PI unit mi	e top enable the PI output to n./max, values.	be re enabled. This value 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 boost	ed via a multiplier value.						
P7.2.3.6 ²	PI setpoint 2 sleep lev		ID 2452					
Minimum value:	PID1_ProcessUnitMin Hz	Maximum value:	PID1_ProcessUnitMax Hz	Default value:	0.00 Hz			
Description:	Defines the level of which delay time, it will put the c	the unit value is used to loo drive into the sleep mode.	k at to go into the sleep mod	le. When the unit drops bel	ow this level for the sleep			
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:	Defines the count the driv cycle" fault. One cycle is defined when O value means do not do th	e come in and out of sleep m the drive transfers from nor ne sleep over cycle check an	ode. If multiple times done mal mode to sleep mode. d clear "pump over cycle" fai	in this time frame, the drive ult.	would trip on "pump over			
P7.2.3.8 ²	SP2 sleep mode maxii	mum cycle time			ID 1845			
Minimum value:	0.00 s	Maximum value:	3,600.00 s	Default value:	300.00 s			
Description:	Defines the maximum time	e for sleep over cycle checki	ng.					

Table 48. Feedback.

P7.3.1 - Standard.								
P7.3.1.1 ²	PI feedback gain ID 1331							
Minimum value:	-1,000.00%	Maximum value:	1,000.00%	Default value:	100.00%			
Description:	Defines gain associated w	Defines gain associated with the feedback signal from the measuring device.						

P7.3.2 - Feedback 1.

P7.3.2.1 ^①	PI feedback 1 source				ID 1332		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2		
Options:	0 = Not used; 1 = AI; 2 = Drive reference pot; 3 = FB process data input 1 11 = FB PI feedback.	;					
Description:	Defines where feedback signal is being fed into the drive, via analog or fieldbus data value.						
P7.3.2.2 ²	PI feedback 1 minimu	n			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 maximin	n			ID 1334		
Minimum value:	-200.00 %	Maximum value:	200.00%	Default value:	100.00%		
Description:	Maximim unit value for the	feedback signal.					

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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 defines t	the number of cycles in the	forward/reverse directi	on for removing any debris in sy	stem.
P9.1.2 [©]	Derag at Start/Stop				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; 5 = Current.				
Description:	Defines how the derage	function will become activa	ated; start, stop, both o	r based off the digital input,mot	or current.
P9.1.3 [®]	Deragging run time				ID 2470
Minimum value:	1.00 s	Maximum value:	3,600.00 s	Default value:	0.00 s
Description:	Defines the length of tin	ne the drive will run at the o	lerag speed in the forw	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
Jeschphon.	Defines the frequency in		PI8.13	Cycle 4	9
P9.1.5 [®]	Derag off delay				ID 2472
Minimum value:	1.00 s	Maximum value:	600.00 s	Default value:	10.00 s
Description:	Defines the length of tin	ne the drive will run the der	ag function when enab	led at stop.	
P9.1.6 ¹²	Derag current				ID 1879
Minimum value:	A	Maximum value:	A	Default value:	0.00 A
	Define derag active current vaule. Motor current > Derag Current , derag is active if parameter Derag at Start/Stop(Par ID2468) set value 'current'.				

Table 49. Pump parameters .

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; 3 = Damper delay.					
Description:	This parameter determines the function of damper.					

Table 49. Pump parameters (Continued).

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 an interlocked time start, after which the start sequence must be restarted if no acknowledgement contact received.						
P9.2.3 ¹²	Valve delay				ID 1849		
Minimum 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 will be started.						
P9.2.4 ¹²	Back spin delay				ID 2423		
Minimum value:	0.00 s	Maximum value:	32,500.00 s	Default value:	0.00 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 ¹²	Minimum run tin	ne			ID 1813		
Minimum value:	0.00 s	Maximum value:	32,500.00 s	Default value:	0.00 s		
Description:	Drive minimum run t	time.					
P9.2.6 ²	Minimum freque	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 multi-drive (*DM1 PRO).

P9.3.1 ⁰²	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:	Determines the number of drives being used in the multi-pump configuration: 0 = Single drive - single drive for main motor, contactors used on other motors; 1 = Multi-drive - multi-follower sequence with multiple drives.						
P9.3.2 ⁰²	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 ⁰²	Drive ID				ID 2278
Minimum value:	0	Maximum value:	5	Default value:	0
Description:	This parameter defines the ce and can be monitored a	edrive address when using t this drive ID value in the n	mult- drive pump mode. Bas nonitor screen.	ed off this ID, the drive enab	les in the desired sequen
P9.3.4 ⁰²	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 on the been of the master.	connected with both start/s	stop signal and PID feedback	can be set up as 'Feedback',	so they will have ability
P9.3.5 [®]	PI bandwidth				ID 2458
Minimum value:	0.00 varies	Maximum value:	6,000.00 varies	Default value:	10.00 varies
Description:	Percentage based off the s	etpoint above and below w	hich defines when the auxili	ary motor will come online o	r offline.
P9.3.6 ¹²	Staging frequency				ID 2315
Minimum value:	MinFreq	Maximum value:	400.00	Default value:	50.00
Description:	Output frequency is above	stagging frequency and Pl	error is out of PI bandwidth -	motor should add to 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.

P9.3.7 ⁰²	De-staging frequency				ID 2316		
Minimum value:	0.00	Maximum value:	MaxFreq	Default value:	0.00		
Description:	Output frequency is below de-stagging frequency and PI error is out of PI bandwidth - motor should remove from system.						
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	e bandwidth, this time must	pass before motors/pumps	are added or removed from t	he system.		
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 th offline.	e drive to look at the digital	input interlocks to tell whic	ch motor is available for runni	ing or if they were brought		
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:	This parameter is for the s slave drive will stop imme	slave when multi-drive syste diately if it is set to be 'Sto	em lost master, slave drive c p'.	an continue run if it set to be	e 'Automatic', however		
P9.3.11 ²	Add/remove drive sele	ection			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 v drive's running time: add t	vill add/remove pump accor he drive that has shortest ri	ding to their drive ID, from s unning time and remove the	mall to large. The order can drive that has longest runnir	also depend on each slave ng 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 pa	rameter is enabled.				
P9.3.13 [©]	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 th	is limit, its network status v	vill be "Need Alternation".	Limit equals 0 means run tim	e 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 t	o be 1 will clear run time co	unter.				
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; 2 = Turn off.						
Description:	Defines how the master d	rive will maintain the freque	ency control when slaves are	e brought in; follow PI, fixed :	speed, or turn off.		

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

Table 49. Pump parameters (Continued).

P9.3.16 ²	Master fixed spe	ed			ID 2474			
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	50.00 Hz			
Description:	Defines the fixed sp	Defines the fixed speed frequency when the master drive mode is set for fixed speed control when slaves are brought in.						
P9.3.17 [®]	Master fixed spe	Master fixed speed delay						
Minimum value:	0.00 s	Maximum value:	1,000.00 s	Default value:	5.00 s			
Description:	Defines the delay ti	me before the master drive begi	ins running at the fixed	speed or turns off if the maste	r mode is set for fixed	speed		

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

P9.4.1 ¹²	Pipe fill loss respo	nse			ID 2410		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Fault, coast.						
Description:	Defines the response r	nethod when a 'Loss of Prime	e' condition occurs				
P9.4.2 ¹²	Pipe fill loss detect	tion method			ID 2406		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Motor current; 1 = Motor power (%); 2 = Motor torque (%).						
Description:	Defines the value for lo	ooking at a loss of prime.					
P9.4.3 ²	Pipe fill loss low le	vel			ID 2407		
Minimum value:	0.00 varies	Maximum value:	1,000.00 varies	Default value:	0.00 varies		
Description:	If the monitor value is	less than low level value and	the output frequency is r	more than low frequency, chec	ck the pipe fill loss start.		
P9.4.4 ¹⁾²	Pipe fill loss low fr	Pipe fill loss low frequency					
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz		
Description:	Defines the freqeuenc is disabled.	y point at which the drive nee	eds to be above to enable	ed the 'Loss of Prime' feature.	When set to 0 Hz protection		
P9.4.5 ²	Pipe fill loss high l	evel			ID 1851		
Minimum value:	0.00 varies	Maximum value:	1,000.00 varies	Default value:	0.00 varies		
Description:	If the monitor value is loss start.	more than high level (the higl	h level is not 0) and the o	utput frequency is more than h	nigh frequency, check pipe fill		
P9.4.6 ¹²	Pipe fill loss high f	requency			ID 1852		
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz		
Description:	Defines high freqeuend is disabled.	cy point at which the drive ne	eeds to be above to enabl	ed the 'Loss of Prime' feature.	When set to 0 Hz protection		
P9.4.7 ²	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	before a 'Loss of Prime' con	dition will occure based o	of the Dectection Method and	Prime Loss Level.		
P9.4.8 ²	Pipe fill loss attem	pts			ID 2411		
Minimum value:	0.00	Maximum value:	10.00	Default value:	1.00		
Description:	Defines the amount of temps to auto restart the the drive on an 'Prime Loss' condition.						
Table 49. Pump parameters (Continued).

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; 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 w deactivated. If the level is	hich the pre-charge functions not reached, it will switch	on will drop out. If the feed after the delay time.	back level raises above thi	s value, pre-charge becomes
P9.5.3 ²	Prime pump frequency	Y			ID 2431
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	Frequency at which the pre	e-charge function will oper	ate when enabled.		
P9.5.4 ²	Prime pump delay tim	e			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 dr	ive will run the Precharge	function on start up. When	set to 'O Hz' this functin is	not enabled.
P9.5.5 ²	Prime pump loss of pr	ime level			ID 2433
Minimum value:	0.00 varies	Maximum value:	1,000.00 varies	Default value:	0.00 varies
Description:	Selects the limit to indicat the prime loss of time sett	e a loss of prime in pump. ing, the drive will display "	If the measured current dro pre-charge loss of prime".	ps below the determined v	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 w deactivated. If the level is	hich the pre-charge functions not reached, it will switch	on will drop out. If the feed a after the delay time.	back level raises above thi	s value, pre-charge becomes
P9.5.7 ²	Prime pump frequency	y 2			ID 2436
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	Frequency at which the pre	e-charge level 2 will operat	te at when enabled.		
P9.5.8 ²	Prime pump delay tim	e 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 dr	ive will run at the 2nd Leve	el Pre Charge functon level.	When set to 'O Hz' this fu	ınctin is not enabled.
P9.5.9 ²	Prime pump loss of pr	ime 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 indicat the prime loss of time sett	e a loss of prime in pump. ing, the drive will display p	If the measured current dro re-charge loss of prime.	ps below the determined v	value for the value assigned in
P9.6 - Broken pipe (*D	M1 PRO).				
P9.6.1 ⁽¹⁾	Broken pipe fault resp	onse			ID 1853
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No action; 1 = Warning; 2 = Fault, coast; 3 = Fault.				
Description:	Broken pipe fault/warning broke pipe frequency for d	shall be triggered if the PI elay time.	feedback is less than broke	n pipe level and the drive o	output frequency is more than
P9.6.2 ²	Broken pipe level				ID 1854
Minimum value:	0.00 varies	Maximum value:	6,000.00 varies	Default value:	15 varies
Description:	Broken pipe level.				

Table 49. Pump parameters (Continued).

P9.6.3 ^②	Broken pipe frequency	ID 1856						
Minimum value:	1.00 Hz	Maximum value:	MaxFreq Hz	Default value:	25.00 Hz			
Description:	Broken pipe frequency.	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.							

Table 50. Serial communication .

P11.1 - Basic settings.									
P11.1.1 ^①	Serial communication	1			ID 586				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0				
Options:	0 = Modbus RTU 1 = BACnet MS/TP 2 = SWD 3 = SA Bus								
Description:	This parameter defines the communication protocol for RS-485.								

P11.2 - Modbus RTU.

P11.2.1 ^①	Slave address				ID 587
Minimum value:	1.00 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:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = 9,600; 1 = 19,200; 2 = 38,400; 3 = 57,600; 4 = 115,200				
Description:	This parameter define	es communication speed for R	S-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; 2 = Even.				
Description:	This parameter define	es parity type for RS-485 comr	nunication.		
P11.2.4	Modbus RTU prote	ocol status			ID 588
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Initial; 1 = Stopped; 2 = Operational; 3 = Faulted.				
Description:	This parameter shows	s the protocol status for RS-48	5 communication.		
P11.2.5	Communication ti	meout modbus RTU			ID 593
Minimum value:	0.00 ms	Maximum value:	60,000.00 ms	Default value:	10,000.00 ms
Description:	Selects the time to w	ait before a communication fa	ult occurs over modbus R	TU if a message is not receive	ed.

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

D11 2 6	Modbus PTU	Medhua PTI fault reasons							
P11.2.0									
winimum value:	N.A.	Maximum value:	N.A.	Default value:	U				
Options:	0 = Only in field communica 1 = In all contro	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 fie	Idbus fault condition for modbus RTU	communication						

Table 50. Serial communication (Continued).

P11.3 - BACnet RTU MSTP (*DM1 Pro).

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; 4 = 115,200.				
Description:	This parameter defines the	e communication speed for	RS-485 communication.		
P11.3.2 ^①	MSTP device address				ID 595
Minimum value:	0	Maximum value:	127	Default value:	1
Description:	Defines the device addres	s of the drive on the BACne	et MSTP network.		
P11.3.3 ^①	MSTP instance numbe	r			ID 596
Minimum value:	0	Maximum value:	4,194,302	Default value:	0
Description:	Defines the instance numb	per of the drive on the BAC	net 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 faul	t occurs over BACnet MSTP	if a message is not received.	
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; 2 = Faulted.				
Description:	This parameter shows the	protocol status for BACnet	MSTP communication.		
P11.3.6	MSTP fault code				ID 600
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = None; 1 = Sole master; 2 = Duplicate MAC ID; 3 = Baud rate fault.				
Description:	This parameter shows the	protocol status for BACnet	MSTP communication.		
P11.3.7	MSTP fault response				ID 2526
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Only in fieldbus contro communications. If no 1 = In all control modes - r	l mode - when fieldbus is th t in fieldbus control, place to matter the control place	ne control place and fieldbus will not fault. setting. If communication is	fault is active, the drive will lost, fieldbus fault response	fault on loss of will occur.
Description:	Defines the fieldbus fault	condition for BACnet MSTP	communication.		
P11.3.8 ^①	MSTP maximum maste	er			ID 1537
Minimum value:	1	Maximum value:	127	Default value:	127
Description:	Defines the maximum num	ber of masters that can es	tablish connections with the	drive.	

Table 50. Serial communication (Continued)

P11.4 - SA bus (*DM	11 Pro).					
P11.4.1 ¹⁾	SA bus device a	ddress			ID 1726	
Minimum value:	204	Maximum value:	254	Default value:	204	
Description:	This parameter is u	sed to set the SA bus address a	t which the drive will	be located on instance node.		
P11.4.2 ^①	SA bus baud rat	e			ID 1727	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2	
Options:	$\begin{array}{l} 0 = 9,600;\\ 1 = 19,200;\\ 2 = 38,000;\\ 3 = 57,600;\\ 4 = 115,200. \end{array}$					
Description:	This parameter defi	nes communication speed for S	A bus communication			
P11.4.4	SA communicat	SA communication timeout				
Minimum value:	0	Maximum value:	60,000	Default value:	10,000	
Description:	Selects the time to	wait before a communication fa	ult occurs over SA bu	is if a message is not received.		
P11.4.5	SA bus protocol	status			ID 1731	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Options:	0 = Stopped; 1 = Operational; 2 = Faulted.					
Description:	This parameter sho	ws the protocol status for SA bu	is communication.			
P11.4.6	SA bus fault res	ponse			ID 1732	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Only in fieldbus communications 1 = In all control mo	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	s fault condition for SA bus com	munication.			

P11.5 - SWD (*DM1 Pro).

P11.5.1	Parameter acce	\$\$			ID 2630
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = No permission 1 = Acyclic read/w	to read/write on acyclic channel. rite are allowed on Profibus.			
Description:	PNU927 which spe	cifies the operation priority of pa	rameters for acycli	c communication.	
P11.5.2 ^①	Parameter data	access			ID 2631
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	4
Options:	0 = Local control; 1 = Fieldbus; 2 = Mixed interface 4 = NET, local on fa 5 = Dual mode.	e; ault;			
Description:	PNU928 which spe	cifies the control priority of the c	levice for cyclic cor	nmunication.	
P11.5.3	Fault situation	counter		·	ID 2632
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	PNU952 which spe	cifies the fault situation counter.			
	Only write of 0 is a (parameter 944) ar	llowed, then the whole fault buff e erased.	er (actual fault situ	ation and all other fault situations)	and the fault message counter

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.	n fault. ault. ion fault.			
P11.5.5	Firmware version				ID 2610
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	This parameter provides	the firmware version of the	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; 2 = Diagnostics.				
Description:	This parameter specifies	the protocol status for SW	/D card.		
P11.6 - Bluetooth.					

Table 50. Serial communication (Continued)

P11.6.1	Bluetooth enabled				ID 1895
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				
Description:	Bluetooth Enable				
P11.6.2 ^②	Bluetooth broadcast n		ID 2920		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Off; 1 = On.				
Description:	Bluetooth broadcast mode				
P11.6.3	Bluetooth pairing rese	et			ID 2935
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Not reset; 1 = Reset.				
Description:	Bluetooth pairing reset.				

Table 51. Ethernet communication (*DM1 Pro) .

P12.1 - Basic settings (*DM1 Pro).							
P12.1.1 ^①	IP address mode				ID 1500		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Static IP; 1 = DHCP with AutoIP.						
Description:	This parameter defined the IP address configuration mode for EIP/modbus TCP.						

P12.1.2	Active IP addr	ess			ID 1507			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.			
Description:	Reads the curren	Reads the current active IP address.						
P12.1.3	Active subnet	mask			ID 1509			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.			
Description:	Reads the curren	t 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 curren	t 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 curren	t MAC address.						
P12.1.6 ¹	Static IP addre	ess			ID 1501			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	192.168.1.254			
Description:	Defines the stati	c IP address.						
P12.1.7 ^①	Static subnet	mask			ID 1503			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	255.255.255.0			
Description:	Defines the stati	c subnet mask.						
P12.1.8 ^①	Static default	gateway			ID 1505			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	192.168.1.1			
Description:	Defines the stati	c default gateway.						
P12.1.9	Ethernet com	Ethernet communication 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 51. Ethernet communication (*DM1 Pro) (Continued).

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

P12.2.1	Trusted IP white list				ID 68
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	192.168.1.255
Description:	Defines the IP addresses in	n the white list. A setting o	f 192.168.1.255 enables all c	onnections on the local subn	net.
P12.2.2	Trusted IP filter enable)			ID 76
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Disabled; 1 = Enabled.				
Description:	Enables IP white listing. D	evices not in the white list v	will not be able to establish	communications with the dri	ve.

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

P12.3.1 ^①	Modbus TCP enable	9			ID 1942	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Disable; 1 = Enable.					
Description:	Enables modbus TCP co	ommunications, must be enal	oled to connect to F	PC Software .		
P12.3.2	Modbus TCP conne	ction limit			ID 609	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5	
Description:	Maximum number of co	onnections allowed to the dri	ve.			

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

P12.3.3	Modbus TCP unit id	entifier number			ID 610	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1	
Description:	Unit identifier unit value	e for modbus TCP.				
P12.3.4	Modbus TCP protoc	ol status			ID 612	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Options:	0 = Stopped; 1 = Operational; 2 = Faulted.					
Description:	This parameter shows t	he protocol status for modb	us TCP communi	cation.		
P12.3.5	Modbus TCP fault re	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 fau	It condition for modbus TCP	communication.			

Table 51. Ethernet communication (*DM1 Pro) (Continued).

P12.4 - Ethernet IP (DM1 PRO only)

2							
P12.4.1 ⁽¹⁾	Ethernet based pro	otocol select			ID 1997		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Disabled; 2 = BACnet IP.						
Description:	Selects the active con	nmunication protocol on the e	thernet I/P port.				
P12.4.2	Ethernet IP protoc	ol status			ID 608		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Options:	0 = Off; 1 = Operational; 2 = Faulted.						
Description:	Indicates if ethernet p	rotocol is active or not.					
P12.4.3	Ethernet IP fault r	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 fieldbus f	ault condition for ethernet IP c	ommunication.				

P12.5 - BACnet IP (DM	1 PRO only).				
P12.5.1 ¹⁾	BACnet IP UDP port	number			ID 1733
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	47,808
Options:	47808 = BAC0; 47809 = BAC1; 47810 = BAC2; 47811 = BAC3; 47812 = BAC4; 47813 = BAC5; 47815 = BAC5; 47815 = BAC6; 47815 = BAC8; 47817 = BAC9; 47819 = BACB; 47819 = BACC; 47820 = BACC; 47822 = BACC; 47822 = BACE; 47823 = BACF.				
Description:	Defines the BACnet UDP	port number.			
P12.5.2 ^①	BACnet IP foreign de	evise			ID 1734
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				
Description:	Enables BACNET IP forei	gn 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 BBN	VD IP address.			
P12.5.4 ^①	BACnet IP UDP port				ID 1737
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	47,808
Options:	47808 = BAC0; 47809 = BAC1; 47810 = BAC2; 47811 = BAC3; 47812 = BAC4; 47813 = BAC5; 47815 = BAC7; 47815 = BAC7; 47816 = BAC8; 47817 = BAC9; 47817 = BAC9; 47819 = BACB; 47819 = BACC; 47820 = BACC; 47822 = BACC; 47823 = BACF.				
Description:	Displays the BACnet BBN	MD UDP port number.			
P12.5.5 ^①	BACnet IP registration	on interval			ID 1738
Minimum value:	0.00	Maximum value:	65,535	Default value:	10
Description:	Defines the registration	interval.			
P12.5.6	BACnet IP communic	cation timeout			ID 1739
Minimum value:	0.00	Maximum value:	60,000	Default value:	0
Description:	Selects the time it waits	before a communication fa	ult occurs over BACnet IP.		

Table 51. Ethernet communication (*DM1 Pro) (Continued).

P12.5.7	BACnet IP protocol status			ID 1740			
Minimum value:	N.A. Maximum valu	Ie: N.A.	Default value:	0			
Options:	0 = Stopped; 1 = Operational; 2 = Faulted.						
Description:	This parameter shows the protocol status for	r BACnet IP communicatio	on.				
P12.5.8	BACnet IP fault behavior	BACnet IP fault behavior					
Minimum value:	N.A. Maximum valu	ie: N.A.	Default value:	0			
Options:	0 = Only in fieldbus control mode - when field communications. If not in fieldbus contro 1 = In all control modes - no matter the contr	dbus is the control place a I, place will not fault. ol place setting. If comm	and Fieldbus fault is active, the drive nunication is lost, fieldbus fault respo	will fault on loss of nse will occur.			
Description:	Defines the fieldbus fault condition for BACn	et IP communication.					
P12.5.9 ^①	BACnet IP instance number			ID 1742			
Minimum value:	() Maximum valu	Je: 4,194,302	Default value:	0			
Description:	Displays the BACnet instance number.						

Table 51. Ethernet communication (*DM1 Pro) (Continued).

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

P12.6.1	Web UI protocol s	tatus			ID 2915
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Off; 1 = Operational; 2 = Faulted.				
Description:	This parameter shows	the protocol status for web s	server communication.		
P12.6.2	Web UI fault respo	onse			ID 2916
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Only in fieldbus co communications. 1 = In all control mode	ntrol mode - when fieldbus is If not in fieldbus control, plac es - no matter the control plac	the control place and e will not fault. e setting. If communi	fieldbus fault is active, the drive cation is lost, fieldbus fault respo	will fault on loss of onse will occur.
Description:	Defines the fieldbus f	ault condition for web server	communication.		
P12.6.3	Web UI communic	ation timeout			ID 2919
Minimum value:	30,000 ms	Maximum value:	60,000 ms	Default value:	60,000 ms
Description:	Selects the time it wa	its before a communication fa	ault occurs over the w	eb server.	
P12.6.4 ¹⁾	Web UI enable				ID 2921
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				

P12.7 - (DM1 PRO only).

P12.7.1 ¹	IOT Enable				ID 3001
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				
Description:	IOT Enable				
P12.7.2 ^①	IOT Connection Status	3			ID 3002
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disconnected; 1 = Connected.				
Description:	IOT Connection Status				
P12.7.3 ¹	Proxy Enable				ID 3003
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				
Description:	Proxy Enable				

Table 52. System (Continued).

P13.1.1	Language				ID 340		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = English; 1 = English; 2 = English.						
Description:	This parameter offers the a available language is Engli	ability to control the freque sh only.	ency converter through the ke	eypad in the language of you	r 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 3 = Multi-purpose.						
Description:	This parameter sets the ac	tive application if multiple	applications have been load	ed.			
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; 7 = Reload defaults VM.						
Description:	This parameter allows you	to reload the factory defai	ult parameter values, and to	store and load two customize	ed parameter sets.		
P13.1.4	Up to keypad (for rem	ote keypad only)			ID 620		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Options:	0 = No; 1 = Yes (all parameters).						
Description:	This function uploads all ex	xisting parameter groups to	o the keypad.				
P13.1.5 ¹⁾	Down from keypad (fo	r remote keypad only)			ID 621		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Options:	0 = No; 1 = All parameters; 2 = All, no motor; 3 = Application parameters;	5.					
Description:	This function downloads o	ne or all parameter groups	from the keypad to the drive				
P13.1.6	Parameter comparisor	1			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; 4 = Compare with Set 2.						
Description:	With the parameter compa and those loaded to the co The actual parameter value displayed on the lowermos If any of the parameter value	 4 = compare with Set 2. With the parameter comparison function, you can compare the actual parameter values to the values of your customized parameter sets and those loaded to the control keypad. 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 values differ from those of the Set 1 parameters, the number of the deviations is displayed together. 					
	By pressing the right arrow value on the description lir can also edit the actual va	v button, once again you w ne (in the middle) is the def lue by pushing the right arr	ill see both the actual value ault value, and the one on th ow button.	and the value it was compar e value line (lowermost line)	ed to. In this display, the is the edited value. You		
	Actual values can also be o	compared to Set 2, factory	settings, and keypad set val	ues.			

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

P13.1.7	Parameter lock Pl	N (for remote keypad onl	y)		ID 624
Minimum value:	0	Maximum value:	9,999	Default value:	0
Description:	The application selecter enabled, the user will	tion can be protected against be prompted to enter a passv	unauthorized chan vord before applic	ges with the password function. Whe ation changes, parameter value chang	en the password function is les, or password changes.
	By default, the passw between 1 and 9,999.	vord function is not in use. If y	ou want to activa	te the password, change the value of	this parameter to any number
	To deactivate the pas	sword, reset the parameter va	lue to O.		
P13.1.8	Keypad parameter	r lock (for remote keypad	only)		ID 625
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Change enable; 1 = Change disable.				
Description:	This function allows t the display if you try t	he user to prohibit changes to to edit a parameter value.	the parameters.	If the parameter lock is activated, the	text "locked" will appear on
	Note: This function d	oes not prevent unauthorized	editing of parame	ter values.	
P13.1.9	Start-up Wizard				ID 626
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Enabled. 1 = Disabled.				
Description:	The Start-up Wizard f application desired ar completion, it allows always enabled for th will not cause it to be be "Enabled".	facilitates commissioning the V nd then advances parameters the user to go to the main mer e initial power up of the VFD. active on start-up. If user go	/FD. If selected "E through the start- nu or default page By setting this pa es into Start-up W	inable", the Start-up Wizard prompts t up parameter list/Application Mini wiz and this parameter is set to "Disabled rameter to "Disable" without going th /izard after completion, or defaults dri	the operator for the card in keypad. After d". The Start-up Wizard is rough the Start-up Wizard, it ve, the Start-up Wizard will

Table 52. System (Continued).

P13.2 - Keypad.

P13.2.4	Timeout time				ID 629		
Minimum value:	1 s	Maximum value:	65.535 s.	Default value:	30 s		
Description:	The timeout time sett	ting defines the time after whi	ch the keypad display	returns to the Default Page.			
	Note: If the default p	age value is 0, the timeout tim	ie setting has no effe	ect.			
P13.2.5	Contrast adjust				ID 630		
Minimum value:	5	Maximum value:	18	Default value:	12		
Description:	If the remote keypad	display is not clear, you can ad	ljust the keypad contr	rast 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 deterr	mines how long the backlight s	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 r 1 = Temperature - bas 60°C (140°F). The minute after receiving the "Temperature". 2 = Run follow - after for common DC-bu	 0 = Continuous - fan runs continuously. 1 = Temperature - based on the temperature of the unit. The fan is switched on automatically when the heat sink temperature reaches 60°C (140°F). The fan receives a stop command when the heat sink temperature falls to 55°C (131°F). The fan runs for about a minute after receiving the stop command or switching on the power, as well as after changing the value from "Continuous" to "Temperature". 2 = Run follow - after power up, the fan is stopped until the run command is given and then fan runs continuously. This is mainly made for common DC-bus systems to prevent cooling fans to load charging resistors on power up moment 					
Description:	This function allows y	you to control the VFD's cooling	g fan.				

Table 52. System (Continued)

P13.4 - Version inform	mation.				
P13.4.1	Keypad software	e version			ID 640
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Keypad firmware ve	ersion.			
P13.4.2	Motor control so	oftware version			ID 642
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	DSP/motor control s	software version.			
P13.4.3	Application soft	ware version			ID 644
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	MCU/application sc	ftware version.			
P13.4.4	Software bundle	version			ID 1714
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Software bundle ve	rsion.			

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 (for	remote keypad only)			ID 627
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Change enable; 1 = Change disable.				
Description:	The keypad display can dis replace the values monitor	splay three actual monitored red with other values.	d values at the same time. T	his 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:	The keypad can be protect When the password functi response to key press exce By default, the password f	ted against unauthorized ch ion is enabled, the user will ept up/down/left/right. function is not in use. If you	anges with the keypad lock be prompted to enter a pass want to activate the passw	function after keys are not p sword before the keypad dis rord, change the value of this	ressed five minutes. play parameter or s parameter to any number
	To deactivate the passwor	rd, reset the parameter valu	e to 0.		
P13.5.4	Drive application nam	e			ID 2922
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	It defines the Drive Applic be editable only from Web	ation Name with a maximu UI and PC tool.	n 20 characters limit. It help	s to identify your drive with	in multiple drives. It could
P13.5.5	Serial Number				ID 1758
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Emerson drive Serial Num	ber only.			

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

Chapter 7- Multi-purpose application

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

"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.

Control I/O configuration

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

Table 53. Multi-purpose application default I/O connection.



DM1

External wiring	Terminal	Short name	Name	Default setting	Description
	1	DI1	Digital input 1	Run forward	Starts the motor in the forward direction.
	2	DI2	Digital input 2	Run reverse	Start the motor in the reverse direction.
	3	DI3	Digital input 3	External fault	Triggers a fault in the drive.
	4	DI4	Digital input 4	Fault reset	Resets active faults in the drive.
	5	СМА	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).
Se	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.).
<u></u>	18	R1NO	Relay 1 normally open	Run	Changes state when the drive is in the run state.
	19	R1CM	Relay 1 common		
	20	R1NC	Relay 1 normally closed		

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

External wiring	Terminal	Short name	Name	Default setting	Description
	. 1	DI1	Digital input 1	Run forward	Starts the motor in the forward direction.
	2	DI2	Digital input 2	Run reverse	Start the motor in the reverse direction.
	. 3	DI3	Digital input 3	External fault	Triggers a fault in the drive.
	4	DI4	Digital input 4	Fault reset	Resets active faults in the drive.
	- 5	CMA	DI1 to DI4 common	Grounded	Allows for sourced input.
	- 6	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	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	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		
τ	- 21	R2N0	Relay 2 normally open	Fault	Changes state when the drive is in the fault state.
۲ <u>ــــــ</u>	- 22	R2CM	Relay 2 common		

Table 53. Multi-purpose application default I/O connection. DM1 PRO

Notes: The above wiring demonstrates a SINK configuration. The SW2 position 1 is set to ON. If a SOURCE configuration is desired, wire 24 V to CMA and close the inputs to ground. When using the +10 V for Al1, SW2 position 2 set to ON.

① Al1+ support 10 K potentiometer.





Figure 10. Multi-pump control curve.



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







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 54. 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:	А	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 calc	ulated from nameplate value	es and measured motor curre	ent (%).	
M1.6	Motor power				ID 5
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Percent motor power calcu	lated from nameplate value	es and measured motor curre	nt (%).	
M1.7	Motor voltage				ID 6
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Output ac motor voltage (\	/ac).			
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 (de	g C).			

Table 54. Monitor (Continued).

M1 - standard (Continu	ıed).					
M1.10	Motor temperature				ID 9	
Minimum value:	%	Maximum value:	%	Default value:	%	
Description:	Motor temperature value c	alculated from nameplate	values and mea	sured 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	e. See fault codes for the	value shown he	re.		
M1.12	Instant motor power				ID 1686	
Minimum value:	kW	Maximum value:	kW	Default value:	kW	
Description:	Instantaneous motor powe	r (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) select	able with dipswitch.		
M2.2	Keypad pot voltage				ID 1858
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Keypad potentiometer me	asured value (Vdc). With k	eypad version only.		
M2.3	Analog output				ID 25
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	Analog output 1 measured	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.				
M2.6	Virtual DI1, Virtual DI	2			ID 1998
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Virtual digital output statu The virtual RO1 as virtual The virtual RO2 as virtual	ıs. Internal use, not extern DI1 input. DI2 input.	nal output.		
M2.7	Virtual RO1, Virtual R	02			ID 1817
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Virtual relay output 1 and	2 status.			
M2.8	R01, R02		·		ID 557
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Relay output 1 and 2 4 sta	tus.			
M2.9	Control board DI state	us			ID 3214
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Control board DI Status w	ill give the input status on	control board.		

Table 54 Monitor (Continued)

Table 54. Monitor	(Continued).				
M3 - Energy savings					
M3.1 ^②	Energy savings				ID 2120
Minimum value:	Varies	Maximum value:	Varies	Default value:	0.000 varies
Description:	Displays the Engergy savin	ngs of the drive comparted	to an across the line starte	r based off the standard mo	tor name plate values.
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 - FB monitor menu					
M4.1	Control board DIDO s	tatus			ID 2209
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
	Bit 1 = DI2_Status; Bit 2 = DI3_Status; Bit 3 = DI4_Status; Bit 4 = R01_Status; Bit 5 = R02_Status; Bit 6 = SlotA with board; Bit 7 = Virtual_R01_Statu Bit 8 = Virtual_R02_Statu	S; IS.			
Description:	Control board digital input	and relay output status p	rovides the status of inputs	and outputs on the control b	oard.
M4.2	Application status wo	ord			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 i Bit 3 = FB_Ref_Active; Bit 4 = MC_Stopping; Bit 5 = MC_Reverse; Bit 6 = MC_Warning or AF Bit 7 = MC_ZeroSpeed; Bit 8 = IO control indicator Bit 9 = Panel control indicator Bit 10 = Panel fieldbus cor Bit 11 = MC_DC_Brake; Bit 12 = Run enable; Bit 13 = Run bypass; Bit 14 = External brake cor Bit 15 = In bypass mode.	Trip; R-Fault; ; ator; atrol indicator; ntrol;			
Description:	Application status word w	vill provide additional statu	is 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 0 = See STD status w 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 Bit 7 = See STD status w Bit 8 - 15 = Not used.				
Description:	Standard status word is word. The options for th	defined based of the param ese bits are based off the s	neter setting in the fieldbus pr standard relay functions.	rocess data group, define	the first 8 bits of this status
M4.4	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.
Description:	PID setpoint 2 value from	n fieldbus.			

Table 54. Monitor (Continued).

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.					
M5.1	PI set point				ID 16
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	PI set point in process	s units.			
M5.2	PI feedback				ID 18
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	PI feedback level in p	rocess units.			
M5.3	PI error value			·	ID 20
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	PI error in process un	its.			
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; 2 = Sleep mode.				
Description:	PI status indication, i	ndicates if drive is stopped, ru	nning in PI mode, or in	PI sleep mode.	

M6 - User defined scale.

M6.1	Output				ID 2445
Minimum value:	Varies	Maximum value:	Varies	Default value:	Varies
Description:	User defined output va	alue that can be configured wi	ith the users desired	unit and scale.	
M6.2	Reference				ID 2447
M6.2 Minimum value:	Reference Varies	Maximum value:	Varies	Default value:	ID 2447 Varies

Table 55. Multi-pump status .

M7.1 - Operation mo	N7.1 - Operation mode (*DM1 Pro).								
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; 3 = Redundant drive.								
Description:	Provides the operating n	node 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; 2 = Master drive; 3 = Redundant drive.				
Description:	Provides the operating mo	de of drive 2 while using i	nulti-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; 3 = Redundant drive.				
Description:	Provides the operating mo	de of drive 3 while using i	nulti-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:				
	2 = Master drive; 3 = Redundant drive.				
Description:	2 = Master drive; 3 = Redundant drive. Provides the operating mod	de of drive 4 while using I	nulti-pump mode.		
Description: M7.1.5	2 = Master drive; 3 = Redundant drive. Provides the operating mo Drive 5	de of drive 4 while using I	nulti-pump mode.		ID 2266
Description: M7.1.5 Minimum value:	2 = Master drive; 3 = Redundant drive. Provides the operating mod Drive 5 N.A.	de of drive 4 while using i Maximum value:	nulti-pump mode.	Default value:	ID 2266 N.A.
Description: M7.1.5 Minimum value: Options:	2 = Master drive; 3 = Redundant drive. Provides the operating mod Drive 5 N.A. 0 = Offline; 1 = Slave drive; 2 = Master drive; 3 = Redundant drive.	de of drive 4 while using i Maximum value:	nulti-pump mode. N.A.	Default value:	ID 2266 N.A.

Table 55. Multi-pump status (Continued)

M7.2 - Multi-pump status (*DM1 Pro).

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; 5 = Unknown.				
Description:	Provides the run status of	drive 1 while using the mul	i-pump mode.		
M7 2 2					
1417.2.2	Drive 2				ID 2231
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	ID 2231 5
Minimum value: Options:	N.A. 0 = Stopped; 1 = Sleep; 2 = Regulating; 3 = Wait for CMD 4 = Following; 5 = Unknown.	Maximum value:	N.A.	Default value:	ID 2231 5

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; 5 = Unknown.				
Description:	Provides the run status 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; 5 = Unknown.				
Description:	Provides the run status 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; 5 = Unknown.				
Description:	Provides the run status of	drive 5 while using the m	ulti-pump mode.		

Table 55. Multi-pump status (Continued).

M7.3 - Network status (*DM1 Pro).

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; 4 = No error.					
Description:	Provides the network sta	atus 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; 4 = No error.					
Description:	Provides the network sta	atus 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; 4 = No error.					
Description:	Provides the network sta	atus 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; 4 = No error.				
Description:	Provides the network state	us of drive 4 while using the	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; 4 = No error.				
Description:	Provides the network state	us of drive 5 while using the	multi-pump mode.		

Table 55. Multi-pump status (Continued).

Table 56. Multi-pump measurement (*DM1 Pro).

M8.1 - Latest fault cod	e (*DM1 Pro).		
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 (*DM1 Pro).

M8.2.1	Drive 1				ID 2222
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the output freque	ncy (Hz) of drive 1 while usi	ng the multi-pump mode.		
M8.2.2	Drive 2			,	ID 2234
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the output freque	ncy (Hz) of drive 2 while usi	ng the multi-pump mode.		
M8.2.3	Drive 3				ID 2246
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz
Description:	Provides the output freque	ncy (Hz) of drive 3 while usi	ng the multi-pump mode.		

Table 56.	Multi-pump	measurement (*DM1 Pro)	(Continued)

M8.2.4	Drive 4				ID 2258	
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz	
Description:	Provides the output	requency (Hz) of drive 4 while (using the multi-pump mod	de.		
M8.2.5	Drive 5				ID 2270	
Minimum value:	Hz	Maximum value:	Hz	Default value:	Hz	

M8.3 - Motor voltage (*DM1 Pro).

M8.3.1	Drive 1				ID 2223
Minimum value:	V	Maximum value:	V	Default value:	V
Description:	Provides the motor volt	age (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 volt	age (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 volt	age (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 volt	age (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 volt	age (Vac) of drive 5 while us	ing the multi-pump mode.		

M8.4 - Motor current (*DM1 Pro).

M8.4.1	Drive 1				ID 2224
Minimum value:	A	Maximum value:	А	Default value:	А
Description:	Provides the motor curren	t (Amps) of drive 1 while us	ing the multi-pump mode.		
M8.4.2	Drive 2				ID 2236
Minimum value:	A	Maximum value:	А	Default value:	А
Description:	Provides the motor curren	t (Amps) of drive 2 while us	ing the multi-pump mode.		
M8.4.3	Drive 3				ID 2248
Minimum value:	А	Maximum value:	А	Default value:	А
Description:	Provides the motor curren	t (Amps) of drive 3 while us	ing the multi-pump mode.		
M8.4.4	Drive 4				ID 2260
Minimum value:	A	Maximum value:	A	Default value:	A
Description:	Provides the motor curren	t (Amps) of drive 4 while us	ing the multi-pump mode.		
M8.4.5	Drive 5				ID 2272
Minimum value:	A	Maximum value:	A	Default value:	A
Description:	Provides the motor curren	t (Amps) of drive 5 while us	ing the multi-pump mode.		

M8.5 - Motor torque (*DM1 Pro).

M8.5.1	Drive 1				ID 2225
Minimum value:	%	Maximum value:	%	Default value:	%
Description:	Provides the motor torque	(%) of drive 1 while using th	ne multi-pump mode.		

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

Table 56 Multi-numn measurement (*DM1 Pro) (Continued)

M8.6 - Motor power (*DM1 Pro).

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

M8.7 - Motor speed (*DM1 Pro).

M8.7.1	Drive 1				ID 2227		
Minimum value:	rpm	Maximum value:	rpm	Default value:	rpm		
Description:	Provides the motor speed	rpm) of drive 1 while using	the multi-pump mode.				
M8.7.2	Drive 2				ID 2239		
Minimum value:	rpm	Maximum value:	rpm	Default value:	rpm		
Description:	Provides the motor speed	rpm) of drive 2 while using	the multi-pump mode.				
M8.7.3	Drive 3				ID 2251		
Minimum value:	rpm	Maximum value:	rpm	Default value:	rpm		
Description:	Provides the motor speed (rpm) of drive 3 while using the multi-pump mode.						

Table 56.	Multi-pump	measurement (*	*DM1 Pro	(Continue	d)

M8.7.4	Drive 4				ID 2263			
Minimum value:	rpm	Maximum value:	rpm	Default value:	rpm			
Description:	Provides the motor speed	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 motor speed (rpm) of drive 5 while using the multi-pump mode.							

M8.8 - Run time (*DM1 Pro).

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

M9 - Multi-monitoring (for remote keypad only).

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

Table 57. Basic Parameters (Continued).

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 mini 2 = Derag. 3 = MPFC staging 4 = MPFC master 1 5 = Prime pump fr 6 = Prime pump fr	t frequency at which the drive wi imum frequency. frequency. fixed frequency. requency. requency 2.	ill operate. This setting	g will limit other frequency parar	neter settings.				

P1.2 ^②	Maximum frequency				ID 102
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	MaxFreqMFG
Description:	Defines the highest freque 1 = Keypad reference. 2 = Motor potentiometer. 3 = Jog speed. 4 = 2nd stage ramp freque 5 = Fire mode minimum fre 6 = Derag. 7 = MPFC staging frequent 9 = Prime pump frequency. 10 = Prime pump frequency. 11 = Preset speed frequent 12 = Frequency limit value. 13 = Reference limit value. 14 = Speed control_fs2. 15 = Stall frequency limit. 16 = 4 mA fault frequency. 17 = MPFC de-staging frequent 28 = Pipe fill loss frequenc 20 = Broken pipe frequenc	ency at which the drive will ency. equency. cy. quency. y 2. cy.	operate. This will limit other	frequency parameters.	
P1.3 [®]	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 to	accelerate from zero frequen	cy to maximum frequency.	
P1.4 [®]	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 to	decelerate from maximum fre	equency to zero frequency.	
P1.5 ²	Motor type selection				ID 1820
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Inverter duty; 1 = IPM; 2 = SPM.				
Description:	Defines the type of motor permanent magnet.	connected to the drive: star	idard induction motor, interna	ally mounted permanent ma	gnet, or surface mount
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 ful	Il 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 sp	eed. This value is found on	the rating plate of the motor		
P1.8 ^①	Motor PF				ID 490
Minimum value:	0.30	Maximum value:	1.00	Default value:	0.85
Description:	Motor nameplate rated po	wer factor. This value is for	und on the rating plate of 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 vo	Itage. This value is found o	n the rating plate of the moto)r.	
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 fre	equency. This value is found	on the rating plate of the m	otor.	

Table 57. Basic Parameters (Continued).

P1.11 [®]	Local control place				ID 1695
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = keypad; 1 = IO terminal; 3 = fieldbus.				
Description:	Defines the signal location Start/Stop buttons on the	n for the start command in drive. Fieldbus would be	n local mode. I/O a communication	terminals would be from the digital hard bus. Keypad display will indicate whicl	d-wired inputs or keypad for n mode is selected.
P1.12 ¹²	Local reference				ID 136
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = AI; 1 = Drive reference pot; 2 = AI joystick; 3 = Motor pot; 4 = Maximum frequency; 5 = PI control output; 6 = Keypad; 7 = Fieldbus reference.				
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 = 10 terminal; 1 = fieldbus; 3 = keypad.				
Description:	Defines the signal location for Start/Stop buttons on	n for the start command in the drive. Fieldbus would	n remote mode. I/ I be a communicat	O terminals would be from the digital hion bus. Keypad display will indicate w	ard-wired inputs or keypad hich mode is selected.
P1.14 ⁰²	Remote reference				ID 137
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = AI; 1 = Drive reference pot; 2 = AI joystick; 3 = Motor pot; 4 = Maximum frequency; 5 = PI control output; 6 = Keypad; 7 = Fieldbus reference.				
Description:	Defines the signal location	n for the speed reference	in remote mode.		
P1.15	Compressor table ver	sion			ID 1769
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Description:	Compressor table version.	It is a number to indicate	the version of cor	npressor table	
P1.16	Compressor type sele	ction			ID 1770
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Description:	Compressor type selection	n. It is a number, indicates	compressor type.	It is more than 0, and less than 255	

Table 57. Basic Parameters (Continued)

Table 58. Inputs .

P2.1 - Basic settings.									
P2.1.1 [®]	AI reference scale	Al reference scale minimum value ID 144							
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz				
Description:	Expected min frequen 0.00 <= Al Ref Scale N	cy reference value for AI inpu Ain Value <=AI Ref Scale Max	t . Value <= 400.00.						
P2.1.2 ²	AI reference scale	maximum value			ID 145				
Minimum value:	RefScaleMin Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz				
Description:	Expected max frequer	Expected max frequency reference value for Al input							

Expected max frequency reference value for AI input . 0.00 <= AI Ref Scale Min Value <= AI Ref Scale Max Value <= 400.00.





P2.1.3 ¹²	IO terminal S	tart/Stop logic			ID 143
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Forward - Re 1= Start-Revers considered 2 2 = Start - Enab 3 = 3 Wire Cont stop	everse, maintained input on start si se DI closed contact = start /open c 2 wire control with a contact on sta le, maintained input on start signal rol, used for three wire operation, s	gnal 1 to run forw ontact = stop: DI c irt/stop, contact o 1 to run forward a start signal 1 uses	ard and a maintained signal on start s closed contact = reverse / open contac pen it stops and direction on 2nd star and a maintained signal on start signa a normally open start and start signa	signal 2 for reverse ct = forward - This would be t signal. I 2 to enable the drive to run al 2 uses a normally closed
Description:	Defines the fund	ctionality for start signal 1 and star	t signal 2, by defa	ult start signal 1 is DI1 and start signa	al 2 is DI2
	0 = P3.2: 10 te 2-wire con	rminal start signal 1 = start forwa trol with either a contact used or	ard - P3.3: IO term the start FWD o	ninal start signal 2 = start reverse. r start REV commands. When conta	This would be considered acts open, the motor stops.
		DIN 1	1 ID1801 - Start Signa	I: DigIN:1 ID143 Start Stop Logic: Start Forward	
		DIN2	2 ID1803-Start Signal	2: DigIN:2 ID143 Start Stop Logic: Start Reverse	9
		GND	5		

Table 58. Inputs (Continued).



Chapter 7- Multi-purpose application

Table 58. Inputs (Continued).

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 stop.





Table 58. Inputs (Continued).

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 temperatu 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; 12 = Belt break.	Jre;			
Description:	Defines the text to be disp PowerXpert inControl, or t	layed when external fault 1 he built in web server.	NO or NC is triggered. Thi	is text will be viewable using	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 temperatu 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; 12 = Belt break.	ıre;			
Description:	Defines the text to be disp Software, or the built in w	layed when external Fault 2 ebserver.	2 NO or NC is triggered. Thi	s text will be viewable using	a remote keypad, PC
P2.1.6 ²	External fault 3 text				ID 2299
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = External fault; 1 = Vibration cutout; 2 = High motor temperatu 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; 12 = Belt break.	ıre;			
Description:	Defines the text to be disp Software, or the built in w	layed when external Fault (ebserver.	3 NO or NC is triggered. Thi	s text will be viewable using	a remote keypad, PC
P2.1.7 [©]	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 potentiom	eter reference value.		
P2.1.8 ²	Motor pot reference re	eset			ID 169
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No reset - reference st 1 = Memory reset in stop a 2 = Memory reset in powe	ays at last setting; and power down - reference r down - reference resets to	e resets to 0 when drive is s o 0 when drive is powered o	stopped or the power is cycle down only.	d to the drive;
Description:	Defines how the motor pot converter.	t reference signal is handled	d on shutting down frequen	cy converter output or power	ing down the frequency

P2.2 - Digital input.							
P2.2.1 ²	DI1 function				ID 1801		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1		
Options:	 U = Not used, no action. 1 = ID 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 = £xt. fault 1, when closed, Ext. fault 1 will be activated. 5 = £xt. fault 2, when closed, Ext. fault 3 will be activated. 6 = Ext. fault 3, when closed, I active faults will be rest. 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 B2, the seven preset speeds are selected via three binary inputs. 11 = Preset speed B2, the seven preset speeds are selected via three binary inputs. 12 = Jor value, when closed, the motor potentiometer value will increment at the rate defined by motor pot ramp time. 13 = Accel. pot value, when closed, the motor potentiometer value will decrement at the rate defined by motor pot ramp time. 14 = Becel, hot value, when closed, the motor potentiometer value will decrement at the rate defined by motor pot ramp time. 15 = Reverse to zero. When closed, the drive will hold the output frequency and ignor changes to the reference value. 18 = No acces to param, when closed, the drive will hold the output frequency and ignor changes to the reference value. 29 = Preset points elect. When closed, the drive will be forced to the remote control place. 21 = Parameter 1/2 Sel, when closed, the drive will be forced to the remote control place. 21 = Parameter 1/2 Sel, when closed, the drive wi						
Description:	Defines the function of dig	jital input 1.					
P2.2.2 ²	DI1 invert				ID 1802		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Disabled; 1 = Enabled.						
Description:	When enabled, the functio	on assigned to DI1 will be ac	tivated with the opposite sta	ate of DI1.			

Table 58. Inputs (Continued).

Table 58. Inputs (Continued)

P2.2.3 ^②	DI2 function				ID 1803		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2		
Options:	 I = to 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 2, when the control source is set to 10 terminal, this input when closed will perform the action defined by 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 direction 4 = Ext. fault 1, 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, all active faults will be reset. 8 = Run enable, when closed, the rive 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. This is least significant bit in that binary input. 11 = Preset speed B1, the seven preset speeds are selected via three binary inputs. This is most significant bit in that binary input. 12 = Jog enable, when closed, the motor potentiometer value will increment at the rate defined by motor pot ramp time. 13 = Accel, pot value, when closed, the motor potentiometer value will recervent at the rate defined by motor pot ramp time. 14 = Decel. pot value, when closed, the drive will blo the output frequency and ignore changes to the reference value. 18 = No access to param, when closed, the drive will blo forced to the local control place. 19 = Randet 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 = PI controller, when closed, the drive will be forced to the local control place. 21 = Parameter 1/2 Sel, when open, parameter						
Description:	Defines the function of dig	ital input 2.					
P2.2.4 [®]	DI2 invert				ID 1804		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Disable; 1 = Enable.						
Description:	When enabled, the function	n assigned to DI2 will be a	activated with the	opposite state of DI2.			
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 sign P2.1.3. 2 = IO terminal start sign P2 1.3	al 1, when the control sour al 2, when the control sour	rce is set to IO te rce is set to IO te	rminal, this input when closed will perf rminal, this input when closed will perf	orm the action defined by orm the action defined by		
	 a Reverse, when Start/ 4 = Ext. fault 1, when clo 5 = Ext. fault 2, when clo 6 = Ext. fault 3, when clo 7 = Fault reset, when clo 8 = Run enable, when clo 9 = Preset speed B0, the 10 = Preset speed B2, the 12 = Jog enable, when cl 13 = Accel. pot value, wh 14 = Decel. pot value, wh 15 = Reset pot zero, whei 16 = Accel./decel. time si 17 = Accel./decel. time si 17 = Accel./decel. time si 18 = No access to param. 19 = Remote control, when 21 = Parameter 1/2 Sel., 22 = PI controller, when cl 23 = Rize mode, when cl 24 = Motor interlock 1, we 25 = Smoke mode, when cl 26 = Fire mode Ref. 1/2 S Ref. 2 will be active 28 = Fire mode reverse, when al = Derag. enable, when 	'Stop logic is set to three s sed, Ext. fault 1 will be act sed, Ext. fault 2 will be act sed, Ext. fault 2 will be act sed, Ext. fault 3 will be act sed, all active faults will b used, the drive will allow a seven preset speeds are s e seven preset speeds are s e seven preset speeds are s osed, the jog speed define ten closed, the motor poten ten closed, the motor poten tet, when open, accel./dece it, when closed, the drive will be closed, the drive will be fc when open, parameter set closed, the drive will be fc when open, parameter set then closed, the motor will closed, the drive will be act sed, fire mode will be act sed, when fire mode is act is en closed, preheat mode will b sed, the Derag. cycle f	tart pulse stop p ivated. tivated. e reset. start command a elected via three selected via three selected via three selected via three d at P2.3.8 will o ntiometer value w itiometer value will but time 1 will be 1 will hold the outp can be made to forced to the rear- roced to the local 1 is active. Whe the reference soo oint 1 is active. Whe the reference soo we and this input a this input is op aking will be active.	nd be in the ready state. binary inputs. This is least significant e binary inputs. This is least significan verride the frequency reference. ill increment at the rate defined by mo ill decrement at the rate defined by mo ill decrement at the rate defined by mo ill seat to zero. used. When closed, accel./decel. time ut frequency and ignore changes to the any setting in the drive. note control place. control place. en closed, Parameter set 2 is active. urce to PI controller output. When closed, setpoint 2 is active. n. is open, fire mode Ref. 1 will be active then, the direction will be forward. Whe re. initiated.	tart in the reverse direction. bit in that binary input. t bit in that binary input. tor pot ramp time. 2 will be used. reference value.		
Description:	Defines the function of dig	gital input 3.					
P2.2.6 ^②	DI3 invert				ID 1806		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = Disable; 1 = Enable.						
Description:	When enabled, the function	on assigned to DI3 will be a	activated with the	e opposite state of DI3.			

P2.2.7 ^②	DI4 function				ID 1807
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	7
Options:	0 = Not used, no action. 1 = I0 terminal start signar P2.1.3. 2 = I0 terminal start signar P2.1.3. 3 = Reverse, when Start/ 4 = Ext. fault 1, when clos 5 = Ext. fault 2, when clos 6 = Ext. fault 2, when clos 8 = Run enable, when clos 9 = Preset speed B0, the 10 = Preset speed B1, the 11 = Preset speed B1, the 12 = Jog enable, when cl 13 = Accel. pot value, wh 14 = Decel. pot value, wh 15 = Reset pot zero, when 16 = Accel./decel. time sa 17 = Accel./decel. time sa 17 = Accel./decel. time sa 19 = Remote control, when 21 = Parameter 1/2 Sel., v 22 = PI controller, when cl 23 = PI setpoint select, w 24 = Motor interlock 1, w 25 = Smoke mode, when 26 = Fire mode Ref. 1/2 S Ref. 2 will be active, 29 = DC brake active, when 31 = Derag. enable, when	al 1, when the control sour al 3, when the control sour Stop logic is set to three s sed, Ext. fault 1 will be act sed, Ext. fault 2 will be act sed, Ext. fault 2 will be act sed, all active faults will be sed, the drive will allow a seven preset speeds are se seven preset speeds are se seven preset speeds are se seven preset speed definer en closed, the motor poten in closed, the motor poten in closed, the motor poten in closed, the drive will be closed, the drive will be closed, the drive will be fo when open, parameter set dosed, the drive will force to then closed, the drive will be closed, the drive will be fo when open, parameter set dosed, the drive will be active el., when fire mode is active an en closed, DC injection bra n closed, the Derag. cycle for the parts and the Derag. cycle for the parts and the parts and the Derag. cycle for the parts and the parts and the parts and the Derag. cycle for the parts and the parts and	ce is set to IO termina ce is set to IO termina tart pulse stop pulse, t ivated. ivated. ivated. start command and be elected via three binar elected via three bina selected via three bina selected via three bina selected via three bina tiometer value will overrid tiometer value will de ometer value will de ometer value will be cometer value will de ometer value will be cometer value will con tiometer value will con to the real to any si forced to the remote of rcced to the local contr is active. When cloc the reference source to int 1 is active. When be enabled to run. e active. re. d this input is open, the king will be active. or pumps will be initia	I, this input when closed will perf I, this input when closed will perf this input will cause the drive to s y inputs. This is least significant ry inputs. This is least significant ry inputs. This is most significant e the frequency reference. The the rate defined by mo crement at the rate defined by mo crement at the rate defined by mo t to zero. When closed, accel./decel. time quency and ignore changes to the etting in the drive. to prol place. sed, Parameter set 2 is active. o PI controller output. closed, setpoint 2 is active. en, fire mode Ref. 1 will be active ted direction will be forward. Whe	form the action defined by form the action defined by start in the reverse direction. bit in that binary input. t bit in that binary input. totor pot ramp time. otor pot ramp time. 2 will be used. e reference value.
Description:	Defines the function of dig	ital input 4.			ID 1808
P2.2.8 [©]		N/		Defeulture	
	N.A.	waximum value:	N.A.	Default value:	U
Options:	U = Disable; 1 = Enable.				
Description:	When enabled, the functio	n assigned to DI4 will be a	ctivated with the oppo	osite state of DI4.	

P2.2.9 ²	Virtual RO1 input				ID 1809			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Not used, no action. 1 = IO terminal start signa P2.1.3. 2 = IO terminal start signa P2.1.3.	 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 3, 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/3 4 = Ext. fault 1, when clos 5 = Ext. fault 2, when clos 6 = Ext. fault 3, when clos 7 = Fault reset, when clos 8 = Run enable, when clos 9 = Preset speed B0, the s 10 = Preset speed B1, the 11 = Preset speed B1, the 12 = Jog enable, when clos 9 = Accel. pot value, when 14 = Decel. pot value, when 15 = Reset pot zero, when 16 = Accel./decel. time see 17 = Accel./decel. prohibit 18 = No access to param, 19 = Remote control, when clos 21 = Pirasmeter 1/2 Sel., when clos 22 = Pl controller, when clos 23 = Pi setpoint select, will 24 = Motor interlock 1, when clos 27 = Fire mode Ref. 1/2 Sel., will be active. 28 = Fire mode Ref. 1/2 Sel. 29 = DC brake active, when 30 = Preheat active, when 	Stop logic is set to three st sed, Ext. fault 1 will be actived, Ext. fault 2 will be actived, Ext. fault 3 will be sed, the drive will allow as seven preset speeds are se seven preset speeds are su seven preset speeds are su seven, the jog speed defined en closed, the motor potentic et, when open, accel./decel t, when closed, the drive will be folosed, the drive will be for when open, parameter set 1 losed, the drive will be for when open, parameter set 1 losed, the drive will be for when fire mode will be active et, when fire mode is active and then open, be active and set, fire mode will be active et, when fire mode is active and en closed, DC injection brak a closed, DC injection brak	art pulse stop pulse, this inpr vated. vated. vated. tart command and be in the lected via three binary input elected via three binary input elected via three binary input elected via three binary input at P2.3.8 will override the fr iometer value will increment iometer value will reset to zer time 1 will be used. When ill hold the output frequency can be made to any setting i orced to the remote control cod to the local control place is active. When closed, Pa he reference source to PI cor int 1 is active. When closed, he enabled to run. active. e and this input is open, fire it this input is open, the direct ing will be active. be active.	ut will cause the drive to sta ready state. s. This is least significant bi ts. This is most significant t equency reference. : at the rate defined by moto t at the rate defined by moto t at the rate defined by moto c. closed, accel./decel. time 2 and ignore changes to the r n the drive. place. e. arameter set 2 is active. htroller output. , setpoint 2 is active. mode Ref. 1 will be active.	rt in the reverse direction. t in that binary input. bit in that binary input. r pot ramp time. or pot ramp time. will be used. eference value. When closed, fire mode closed, the direction will			
Description:	Defines the function of virt	ual RO1.						
P2.2.10 ²	Virtual RO1 invert				ID 1810			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Disable; 1 = Enable.							
Description:	When enabled, the function	n assigned to virtual RO1 in	put will be activated with th	e opposite state of virtual R	.01 input.			

Minimum value: N.A. Maximum value: N.A. Default value: 0 Options: 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 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 - Reverse, 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 2 will be activated. 5 - Ext. fault 2, when closed, Ext fault 2 will be activated. 7 - Fault reset, when closed, Ext fault 2 will be activated. 9 - Preset speed B1, the seven preset speeds are selected via three binary inputs. This is nost significant bit in that binary input. 11 - Preset speed B1, the notes of the motor potentionneter value will increment at the rate defined by motor pot ramp time. 14 - Decel, pot value, when closed, the motor potentionneter value will increment at the rate defined by motor pot ramp time. 14 - Decel, pot value, when closed, the drive will bot formed value will be control place. 10 - Accel, drivel, when closed, the drive will bot formater value will decrement at the rate defined by motor pot ramp time. 14 - Decel, pot value, when closed, the drive will bot control face. 20 will be value. 11 - Preset speed B1, when open, parameter set 1 is active. 30 - Accel, drivel, when closed, the d	P2.2.11 [®]	Virtual RO2 input				ID 1811
Options: 0 = Not used, no action. 1 = ID terminal start signal 1, when the control source is set to ID terminal, this input when closed will perform the action defined by P2.1.0. 2 = ID terminal start signal 3, when the control source is set to ID terminal, this input when closed will perform the action defined by P2.1.0. 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 direction. 4 = Ext. foult 2, when closed, Ext. fault 2, will be activated. 7 = Fault rest, when closed, the fault 2 will be activated. 8 = Rue maple, when closed, the fault 2 will be activated. 9 = Proset speed B1, the saven preset speeds are selected via three binary inputs. 10 = Preset speed B1, the saven preset speeds are selected will recement at the rate defined by motor pot ramp time. 10 = Preset speed B1, the saven preset speeds are selected will three binary inputs. 11 = Preset speed B2, the saven preset speeds are selected will three binary inputs. 12 = Jog enable, when closed, the motor potentiometer value will reset to area. 14 = Decsi, pot value, when closed, the motor potentiometer value will reset to area. 15 = Accel, for value, when closed, the motor potentiometer value will reset to area. 16 = Accel, for value, when closed, the drive will be toreed to the local control place. 17 = Accel, for value, when closed, the drive will be toreed to the local control place. 18 = Re	Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Description: Defines the function of virtual R02. P2.2.12 [®] Virtual R02 invert ID 1810 Minimum value: N.A. Maximum value: N.A. Default value: 0 Options: 0 = Disable; 1 = Enable. Image: Comparison of virtual R02 input will be activated with the opposite state of virtual R02 input. Description: When enabled, the function assigned to virtual R02 input will be activated with the opposite state of virtual R02 input.	Options:	0 = Not used, no actic 1 = I0 terminal start s P2.1.3. 2 = I0 terminal start s P2.1.3. 3 = Reverse, when St 4 = Ext. fault 1, when 5 = Ext. fault 2, when 6 = Ext. fault 2, when 7 = Fault reset, when 8 = Run enable, when 9 = Preset speed B0, 1 10 = Preset speed B2, 1 11 = Preset speed B2, 1 2 = 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./decel. tim 22 = PI controller, whe 23 = PI setpoint selecc 24 = Motor interlock 1 25 = Smoke mode, when 27 = Fire mode Ref. 1, Ref. 2 will be actic 28 = Fire mode revers be reverse. 29 = DC brake active, w 31 = Derag. enable, w	on. ignal 1, when the control sou- ignal 3, when the control sou- art/Stop logic is set to three closed, Ext. fault 1 will be a closed, Ext. fault 2 will be a closed, Ext. fault 3 will be a closed, all active faults will 1 closed, the drive will allow a the seven preset speeds are the seven preset speeds are n closed, the jog speed defin when closed, the motor poter when closed, the motor poter when closed, the motor poter when closed, the drive will be a closed, the drive will be a closed, the popen, accel./det when closed, the drive will be all, when open, parameter set l, when open, parameter set l, when open, parameter set l, when closed, the motor will ben closed, the drive will be ac- closed, fire mode will be ac- closed, fire mode will be ac- closed, fire mode will be ac- tive. e, when fire mode is active a when closed, DC injection by when closed, preheat mode will when closed, the Derag. cycle	urce is set to 10 te urce is set to 10 te start pulse stop p ctivated. ctivated. ctivated. ce reset. a start command selected via three e selected via three e at P2.3.8 will be will hold the out is can be made to e forced to the loca to the reference so point 1 is active. I be enabled to ru- be active. tive and this input is o raking will be active. for pumps will be	erminal, this input when closed will pe erminal, this input when closed will pe bulse, this input will cause the drive to and be in the ready state. binary inputs. This is least significar we binary inputs. This is least significar be binary inputs. This is most significar override the frequency reference. will increment at the rate defined by n will decrement at the rate defined by n will decrement at the rate defined by n will decrement at the rate defined by n used. When closed, accel./decel. tim out frequency and ignore changes to the ony setting in the drive. mote control place. I control place. I control place. In closed, Parameter set 2 is active. ource to Pl controller output. When closed, setpoint 2 is active. in. t is open, fire mode Ref. 1 will be active pen, the direction will be forward. Wh ve. a initiated.	rform the action defined by rform the action defined by start in the reverse direction. In this in that binary input. In this in this in that binary input. In this in this in this input. In this in this input. In thi
P2.2.12 ⁽²⁾ Virtual RO2 invert ID 1810 Minimum value: N.A. Maximum value: N.A. Options: 0 = Disable; 1 = Enable. 0 Description: When enabled, the function assigned to virtual RO2 input will be activated with the opposite state of virtual RO2 input.	Description:	Defines the function of	virtual RO2.			
Minimum value: N.A. Maximum value: N.A. Default value: 0 Options: 0 = Disable; 1 = Enable. 0	P2.2.12 ^②	Virtual RO2 invert				ID 1810
Options: 0 = Disable; 1 = Enable. Description: When enabled, the function assigned to virtual RO2 input will be activated with the opposite state of virtual RO2 input.	Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Description: When enabled, the function assigned to virtual RO2 input will be activated with the opposite state of virtual RO2 input.	Options:	0 = Disable; 1 = Enable.				
	Description:	When enabled, the fun	ction assigned to virtual RO2	input will be act	ivated with the opposite state of virtu	al RO2 input.

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 v	vith digital inputs using a b	inary 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 v	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 v	vith digital inputs using a b	inary 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 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 sele	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 sele	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 sele	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:	Defines the jogging speed set point - this speed is selected with the digital input programmed for jogging speed. When enabled, the drive starts and ramps to this speed, input removed drive stops.					

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; 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.							
	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 +10V supply on CN5 terminals 13 , it will require DIP switches SW2 2 and 3 on to complete the current loop. When doing a curren loop with an external supply, the DIP switches SW2 2 off and 3 on							
	When doing a curren lo	pop with an external supply, 1	the DIP switches	SW2 2 off and 3 on				



Table 58. Inputs	(Continued).				
P2.4.2 [®]	Al signal range			·	ID 175
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = 0-100%/0-20 mA/0- 1 = 20-100%/4-20 mA/2 2 = Customized.	-10 V. 2-10 V.			
Description:	With this parameter, yo	u can select the analog inpu	t 1 signal range.		
	For selection "Customiz	ed," see "Al Custom Min" ar	nd "Al Custom Max", this er	nables a customized signal ra	ange.
		Al Ref. Scale Max. Value Al Ref. Value Al Ref. Scale Max. Value 0	A11 Signal Range = Oustom A11 Signal Pe 0 A11 Signal Range = 1 4 mA A1 Custom Ken. Max.	от 	
P2.4.3 ²	AI custom minimum	1			ID 176
Minimum value:	0.00%	Maximum value:	Ai1CustomMax %	Default value:	0.00%
Descriptions:	Defines the minimum pe	ercentage for the input range	e to be associated with AI r	eference minimum scale.	
P2.4.4 [®]	AI custom maximim	1			ID 177
Minimum value:	Ai1CustomMin %	Maximum value:	100.00%	Default value:	100.00%
Descriptions:	Defines the minimum pe	ercentage for the input range	e to be associated with AI r	eference 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 a	pplied to the analog input si	gnal, zero equals no filterin	g.	









P2.4.7 ²	AI joystick hysteresis	ID 178			
Minimum value:	0.00%	Maximum value:	20.00%	Default value:	0.00%
Descriptions:	Defines the joystick hyster	esis - when the analog inpu	t is within this range, the dri	ve will interpret this as a ze	ro speed reference.



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

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 t the drive will transition to a	he analog input - if the anal a sleep state and restart wh	og input signal is below this en the analog input increas	level for a time greater than es above this level.	n the analog sleep delay,

Frequency Reference REVERSE 50% FORWARD 50% Reference Scaling Max Al Reference Scale Maximum Value = 70Hz Maximum Frequency = 50Hz TART STOP STOP STA Minimum Frequency = Reference Scaling Minimum Al Reference Scale Minimum Value = 0Hz Analog Input(V/mA) (0- 10V/20mA) AI Custom Maximum = 90% AI Custom Minimum = 20% AI Joystick Hysteresis = 20% AI Sleep Limit = 7%

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 fo	r the analog input sleep level.			
P2.4.10 ²	AI joystick offset	t	·		ID 133
Minimum value:	-50.00%	Maximum value:	50.00%	Default value:	0.00%
Descriptions:	Joysticks zero point reverse from this an	by default is the middle of AI ra alog input center point.	nge. Joystick offset	t defines how much the zero point is	moved in the forward or

P2.5 - Drive reference pot.

P2.5.1 ²	Pot custom minim	num			ID 1814		
Minimum value:	0.00%	Maximum value:	100.00%	Default value:	20.00%		
Description:	Defines the minimum	percentage for the input range	e to be associated with	n Al reference minimum scale.			
P2.5.2 ²	Pot custom maxin	nim			ID 1815		
Minimum value:	0.00%	Maximum value:	100.00%	Default value:	100.00%		
Description:	Defines the maximum	percentage for the input rang	e to be associated wit	h Al 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	Defines the filter time applied to the analog input signal - zero equals no filtering.					

Table 59. 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:	0 = Not used - No Action 1 = Ready - Drive is ready 2 = Run - Drive is running 3 = fault - Drive is nulted 4 = fault invert - Drive is n 5 = warning - Drive has a v 6 = Reverse - The Drive is 7 = At Speed - The output 8 = Zero Frequency - Drive 9 = Frequency limit supervisi 12 = reference limit supervisi 13 = Power limit supervisi 14 = Temp limit supervisi 15 = Analog input supervisi 16 = Motor current superv 17 = over heat fault - Drive 18 = Ocurrent Fault - Over 19 = Ovolt Fault Resp - Un 21 = 4 mA fault - 4 mA fau 22 = external fault - Extern 23 = Motor thermal fault - Zer 24 = STO Fault Output - Se 25 = Control from 10 - 1/0 26 = Remote control - Ren 27 = Un-requested rotation 28 = Fire mode - Drive is i 29 = Damper control - Dan 30 = Valve Control - Valve 31 = Jog speed - Drive is i 23 = fieldbus input 2 - Control 34 = DC charge switch clo 35 = Preheat Active - Preh 36 = Cold weather active - 37 = PID sleep - PID contror 38 = Dad per control - Valve 31 = Slave Drive State - 1 41 = Slave Drive State - 1 43 = Single Drive Control - 44 = Ext Brake Inverted-ext 45 = Ext Brake Inverted-ext 4	for operation ot faulted warning message outputing reverse phase rol frequency has reached the output is at zero frequency ision - Supervision for frequency ision - Supervision for frequency ision - Supervision for trequel or - Supervision for power I n - Supervision for power I n - Supervision for power I n - Supervision for drive ten sion - Supervision for moto e over heat fault has occurred der volt warning/fault has oc lit has occurred mal fault has occurred Motor thermal fault has oc is the selected start comma note is the control place n direction - The active dire n fire mode ner control output control output n log mode troled by FB control word se - DC precharge relay is c eat Control mode is activat · Cold weather drive in i indicates if the master drive cates if the slave drive in i indicates is active. ternal brake is inactive.	ration set reference ency limit 1 is activated activated imit ence limit impurature limit input limit r current limit ed ccurred ated nd location ction isn't the same as the reference losed ed ve im 2 is active np mode i in the multi-pump control mode e is running in single drive control	ference direction	o control
	Defines the function assoc	ciated with changing the sta	ate of relay output 1.		ID 2112
rs.1.2≌ Minimum value:		Maximum value:	320.0 c	Default value:	
Description:	Delay time for R01 relay to	n turn on after signal receiv	عدم. ۵ ک. ۵ ک. مراجع	Denduit Value.	0.0 5
P3.1.3 [®]	RO1 off delay				ID 2113
Minimum value:	0.0 s	Maximum value:	320.0 s	Default value:	0.0 s
Description:	Delay time for RO1 relay to	o turn off after signal remov	red.		

P3.1.4 ^②	RO2 function				ID 153
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	3
Options:	0 = Not used - No Action 1 = Ready - Drive is ready 2 = Run - Drive is running 3 = fault - Drive is faulted 4 = fault invert - Drive is n 5 = warning - Drive has a v 6 = Reverse - The Drive is 7 = At Speed - The output 8 = Zero Frequency - Drive 9 = Frequency limit supervisit 12 = reference limit supervisit 12 = reference limit supervisit 13 = Power limit supervisit 14 = Temp limit supervisit 15 = Analog input supervisit 16 = Motor current superv 17 = over heat fault - Drive 18 = Courrent Fault - Over 19 = Ovolt Fault Resp - Un 21 = 4 mA fault - 4 mA faul 22 = external fault - Externt 23 = Motor thermal fault - 24 = STO Fault Output - Sa 25 = Control from 10 - 1/0 26 = Remote control - Rem 27 = Un-requested rotation 28 = Fire mode - Drive is ir 29 = Damper control - Valve 31 = Jog speed - Drive is ir 32 = fieldbus input 2 - Cont 34 = DC charge switch cloo 35 = Preheat Active - Preh 36 = Cold weather active - 37 = PID sleep - PID controt 38 = Znd stage ramp frequ 39 = Prime Pump Active - (40 = Master drive State - 1 41 = Slave Drive State - 1 44 = Ext Brake Control - ext 45 = Ext Brake Inverted-ext	for operation ot faulted warning message outputing reverse phase ro frequency has reached the output is at zero frequenc ision - Supervision for freq ervision for PID controller i on - Supervision for torque vision - Supervision for torque vision - Supervision for torque on - Supervision for drive te ion - Supervision for drive te over heat fault has occurred t fault has occurred t fault has occurred Motor thermal fault has on the Torque Off input is active is the selected start comm to the start common to fire mode of fire mode of fire mode of per control output control output no by FB control word se - DC precharge relay is eat Control mode is activa cold weather mode is activa cold veather mode is activa cold is fir the master driv dicates if the master drive indicates if the slave drive in cornal brake is inactive.	tation set reference y uency limit 1 is act s activated limit mpurature limit imit or current limit red occurred vated and location ection isn't the sam closed ted ive time 2 is active mp mode e in the multi-pump co ve is running in sin	tivated ne as the reference direction p control mode is faulted ontrol mode is faulted igle drive control mode on a multi-pu	Imp control
Description:	Defines the function assoc	ciated with changing the st	ate of relay output	t 2.	
P3.1.5 ²	RO2 on delay				ID 2114
Minimum value:	0.0 s	Maximum value:	320.0 s	Default value:	0.0 s
Description:	Delay time for RO2 relay to	o turn on after signal recei	ved.		
P3.1.6 ^②	RO2 off delay				ID 2115
Minimum value:	0.0 s	Maximum value:	320.0 s	Default value:	0.0 s
Description:	Delay time for RO2 relay to	o turn off after signal remo	ved.		
P3.1.7 ²	RO2 reverse				ID 2118
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No; 1 = Yes.				
Description:	Inverts RO2 to be normally	closed on the Form A rela	у.		

Default value:

ID 2463

2

44 = Ext black control-external brake is active. 45 = Ext Brake Inverted-external brake is inactive.	Options:	 0 = Not used - No Action 1 = Ready - Drive is ready for operation 2 = Run - Drive is ready for operation 2 = Run - Drive is ready for operation 2 = Run - Drive is not faulted 4 = fault invert - Drive is not faulted 5 = warning - Drive has a warning message 6 = Reverse - 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 = PID supervision - Supervision for PID controller is activated 11 = torque limit supervision - Supervision for reference limit 12 = reference limit supervision - Supervision for reference limit 13 = Power limit supervision - Supervision for analog input limit 14 = Temp limit supervision - Supervision for analog input limit 15 = Analog input supervision - Supervision for analog input limit 16 = Motor current supervision - Supervision for analog input limit 17 = over heat fault - Drive over heat fault has occurred 18 = Ocurrent fault - Over current fault has occurred 19 = Ovolt Fault - Over out warning/fault has occurred 22 = external fault - Motor thermal fault has occurred 23 = whot of thermal fault - Motor thermal fault has occurred 24 = STO Fault Output - Sae Forque Of input is activated 25 = Control from IO - I/O is the selected start command location 26 = Remote control - Remote is the control place 27 = white Generation - The active direction isn't the same as the reference direction 28 = Drive is in fire mode 29 = Damper control output 20 = Opolt Fault Fault - Controled by FB control word 31 = fieldbus input 2 - Controled by FB control word 32 = fieldbus input 2 - Controled by FB control word 33 = fieldbus input 2 - Controled by FB control word 34 = Drive Earl
		44 = Ext Brake Control-external brake is active. 45 = Ext Brake Inverted-external brake is inactive.

Maximum value:

N.A.

Table 59. Outputs (Continued).

N.A

Virtual RO1 function

P3.1.8²

Minimum value:

Description: Defines the function associated with changing the state of virtual RO.

Table 59. Outputs	(Continued).
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P3.1.9 ²	Virtual RO2 functio	n			ID 2464
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = Not used - No Action 1 = Ready - Drive is ready 2 = Run - Drive is runni 3 = fault - Drive is fault 4 = fault invert - Drive is 5 = warning - Drive has 6 = Reverse - The Drive 7 = At Speed - The out 8 = Zero Frequency - Drive 9 = Frequency limit supervitation 10 = PID supervision - S 11 = torque limit supervitation 13 = Power limit supervitation 14 = Temp limit supervitation 15 = Analog input supervitation 16 = Motor current sup 17 = over heat fault - Over 20 = Uvolt Fault - Over 20 = Uvolt Fault - Over 21 = 4 mA fault - 4 mA 22 = external fault - Ex 23 = Motor thermal fault 24 = STO Fault Output - 25 = Control from 10 - 1 26 = Remote control - F 27 = Un-requested rotation 28 = Fire mode - Drive 29 = Damper control - Va 31 = Jog speed - Drive 32 = fieldbus input2 - C 33 = fieldbus input2 - C 34 = DC charge switch 35 = Preheat Active - P 36 = Cold weather activition 37 = PID sleep - PID con 38 = 2nd stage ramp fr 39 = Prime Pump Active 40 = Master drive State 41 = Slave Drive Control 45 = Ext Brake Lonverter 45 = Ext Brake Inverter 45 =	on ady for operation ng is dy for operation ng is not faulted is not faulted is outputing reverse phase put frequency has reached th rive output is at zero frequen ervision - Supervision for free Supervision for PID controller vision - Supervision for torque pervision - Supervision for ror vision - Supervision for drive t rvision - Supervision for anal ervision - Supervision for mo rive over heat fault has occurred Under volt warning/fault has fault has occurred Under volt warning/fault has fault has occurred Under volt warning/fault has fault has occurred Under volt warning fault has oc- sion direction - The active di is in fire mode Damper control output lve control output ve - Control output ve - Cold weather mode is activ ve - Cold weather mode is activ e - Indicates if the master dri- - Indicates if the master dri- l-ndicates if the master dri- l-acternal brake is active. H-external brake is active.	rotation le set reference cy quency limit 1 is a is activated e limit ference limit r limit empurature limit tor current limit tor current limit d s occurred ivated nand location rection isn't the sa s closed ated tive l time 2 is active pump mode we in the multi-pump rive is running in s	ictivated ame as the reference direction mp control mode is faulted control mode is faulted single drive control mode on a multi-p	ump control
Description:	Defines the function as	ssociated with changing the s	state of virtual RO	L.	

P3.2 - Supervisions.

P3.2.1 ²	Frequency limit super	rvision	,		ID 154
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No limit; 1 = Low limit supervision; 2 = High limit Supervision				
Description:	Selects how the drives fre	equency limit supervision	controller functions.		
P3.2.2 ²	Frequency limit displa	ay			ID 1821
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Enable D0; 1 = Warning (W/O S)/enal 2 = Warning (W S)/enable 3 = Fault/enable D0.	ble DO; 9 DO;			
Description:	Supervision display select	tion.			

P3.2.3 ²	Frequency limit su	pervision value			ID 155
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	Selects the frequency	value supervised by the frequ	ency limit supervision function	on.	
P3.2.4 ²	Frequency limit su	pervision hysteresis			ID 2200
Minimum value:	0.10 Hz	Maximum value:	1.00 Hz	Default value:	0.10 Hz
Description:	This value selects the l	bandwidth between when th	e output frequency supervisio	on enables and disables.	
P3.2.5 ²	Torque limit superv	vision			ID 159
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No limit; 1 = Low limit supervisi 2 = High limit supervisi	on; on.			
Description:	Supervision display sel	ection.			
		f[Hz]	RO1 Function = 9		
	Fr Su	Example: 21 R01 22 R01 23 R01	21 R01 22 R01 22 R01 23 R01 23 R01	t F	

P3.2.6 ²	Torque limit displa	ay			ID 1822	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Enable DO; 1 = Warning (W/O S)/ 2 = Warning (W S)/en 3 = Fault/enable DO.	'enable DO; able DO;				
Description:	Supervision display se	election.				
P3.2.7 ²	Torque limit super	rvision value			ID 160	
Minimum value:	-1,000.00%	Maximum value:	1,000.00%	Default value:	100.00%	
Description:	Selects the torque va	lue supervised by the torque li	mit supervision functio	n.		
P3.2.8 ²	Torque limit super	Torque limit supervision hysteresis				
Minimum value:	1.00%	Maximum value:	5.00%	Default value:	1.00%	
Description:	This value selects the	bandwidth between when th	e torque supervision en	ables and disables.		
P3.2.9 [®]	Reference limit su	Reference limit supervision				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = No limit; 1 = Low limit supervis 2 = High limit supervis	sion; sion.				
Description:	This value selects the	bandwidth between when th	e torque supervision en	ables and disables.		
P3.2.10 ²	Reference limit di	splay			ID 1823	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Enable DO; 1 = Warning (W/O S)/ 2 = Warning (W S)/en 3 = Fault/enable DO.	'enable DO; able DO;				
Description:	Supervision display se	election.				

P3.2.11 [®]	Reference limit superv		ID 162			
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz	
Description:	Selects the reference freq	uency value supervised by t	he reference frequency limit	t supervision function.		
P3.2.12 [®]	Reference limit superv	vision hysteresis			ID 12203	
Minimum value:	0.10 Hz	Maximum value:	1.00 Hz	Default value:	0.10 Hz	
Description:	This value selects the band	dwidth between when the r	eference limit supervision e	nables 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; 2 = High limit supervision.					
Description:	Selects how the drives ten	nperature limit supervision (controller functions.			
P3.2.14 ^②	Temperature limit disp	play			ID 1842	
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.	le DO; DO;				
Description:	Supervision display selecti	ion.				
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 the	drive temperature limit sup	ervision 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	dwidth between when the t	emperature limit supervisio	n enables and disables.		
P3.2.17 ²	Power limit supervisio	on			ID 167	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = No limit; 1 = Low limit supervision; 2 = High limit supervision.					
Description:	Selects how the drives pov	wer limit supervision contro	ller function.			
P3.2.18 ^②	Power limit display				ID 1825	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Enable D0; 1 = Warning (W/O S)/enable 2 = Warning (W S)/enable 3 = Fault/enable D0.	le DO; DO;				
Description:	Supervision display selecti	on.				
P3.2.19 ²	Power limit supervisio	on value			ID 168	
Minimum value:	-200.0%	Maximum value:	200.0%	Default value:	0.0%	
Description:	Selects the output power v	value supervised by the pow	ver limit supervision function	п.		
P3.2.20 ²	Power limit supervisio	on hysteresis			ID 2205	
Minimum value:	0.1%	Maximum value:	10.0%	Default value:	0.1%	
Description:	This value selects the band	s value selects the bandwidth between when the power limit supervision enables and disables.				

P3.2.21 ²	AI supervision select				ID 170	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Analog reference from 1 = Analog reference from	Al; keypad potentiometer.				
Description:	Selects analog signal to us	se for the analog input supe	rvision.			
P3.2.22 ²	AI limit supervision				ID 171	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = No limit; 1 = Low limit supervision; 2 = High limit supervision.					
Description:	Selects analog signal to us	Selects analog signal to use for the analog input supervision.				
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.	ile DO; DO;				
Description:	Supervision display selecti	ion.				
P3.2.24 [®]	Al limit supervision value				ID 172	
Minimum value:	1.00%	Maximum value:	10.00%	Default value:	0.00%	
Description:	Selects the analog referen	ice value supervised by the	analog reference limit super	vision function.		
P3.2.25 ²	AI supervision hystere	esis			ID 2198	
Minimum value:	1.00%	Maximum value:	10.00%	Default value:	1.00%	
Description:	This value selects the band	dwidth between when the A	Al supervision enables and d	lisables.		
P3.2.26 ²	Motor current supervi	sion			ID 2189	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = No limit; 1 = Low limit supervision; 2 = High limit supervision.					
Description:	Selects how the motor cur	rent limit supervision contro	oller functions.			
P3.2.27 ²	Motor current limit di	splay			ID 1827	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Enable D0; 1 = Warning (W/O S)/enable 2 = Warning (W S)/enable 3 = Fault/enable D0.	le DO; DO;				
Description:	Supervision display selecti	ion.				
P3.2.28 ²	Motor current supervi	sion value			ID 2190	
Minimum value:	0.00 A	Maximum value:	DriveNomCurrCT*2 A	Default value:	DriveNomCurrCT A	
Description:	Selects the motor current	value supervised by the mot	or current limit supervision	function.		
P3.2.29 ²	Motor current supervi	sion hysteresis			ID 2196	
Minimum value:	0.10 A	Maximum value:	1.00 A	Default value:	0.10 A	
Description:	This value selects the bandwidth between when the motor current supervision enables and disables.					

PI supervision enable				ID 1346
N.A.	Maximum value:	N.A.	Default value:	0
0 = Disabled; 1 = Enabled.				
Upper and lower limits aro delay timer will increment expires, the relay output fo	und the reference are set. When the actual value is or PI supervision will be ac	When the actual value goe within the allowed area, th tivated. This function is use	es above or below the upper e delay counter decrements ed for process value out of r	limit and lower limit, the After the delay time ange faults.
PI supervision display				ID 1828
N.A.	Maximum value:	N.A.	Default value:	0
0 = Enable D0; 1 = Warning (W/O S)/enab 2 = Warning (W S)/enable 3 = Fault/enable D0.	le DO; DO;			
Supervision display select	ion.			
PI supervision upper l	imit			ID 1347
PI Process Unit Min varies	Maximum value:	PI Process Unit Max varies	Default value:	0.00 varies
Upper limit for PI feedback	value used with the PI sup	pervision controller.		
PI supervision lower l	imit			ID 1349
PI Process Unit Min varies	Maximum value:	PI Process Unit Max varies	Default value:	0.00 varies
Lower limit for PI feedback	value used with the PI su	pervision controller.		
PI supervision delay				ID 1351
0 s	Maximum value:	3,000 s	Default value:	0 s
Defines the delay time tha	t the PI feedback value mu	st be out of range before ac	tivating the PI supervision of	output.
	PI supervision enable N.A. 0 = Disabled; 1 = Enabled. Upper and lower limits are delay timer will increment expires, the relay output for PI supervision display N.A. 0 = Enable D0; 1 = Warning (W/O S)/enable 2 = Warning (W/O S)/enable 3 = Fault/enable D0. Supervision display select PI supervision display select PI supervision lower II PI Process Unit Min varies Upper limit for PI feedback PI Process Unit Min varies Lower limit for PI feedback PI supervision delay 0 s Defines the delay time that	PI supervision enable N.A. Maximum value: 0 = Disabled; 1 = Enabled. Image: Colspan="2">Colspan="2"Colspan=	PI supervision enable N.A. Maximum value: N.A. 0 = Disabled; 1 = Enabled. N.A. Image: Colspan="2">Optimized in the actual value goe delay timer will increment. When the actual value is within the allowed area, the expires, the relay output for PI supervision will be activated. This function is use PI supervision display Maximum value: N.A. 0 = Enable D0; 1 = Warning (W/O S)/enable D0; 2 = Warning (W/O S)/enable D0; 3 = Fault/enable D0. N.A. N.A. 0 = Enable D0; 1 = Warning (W/O S)/enable D0; 3 = Fault/enable D0. N.A. N.A. 0 = Enable D0; 1 = Warning (W/O S)/enable D0; 2 = Warning (W S)/enable D0; 3 = Fault/enable D0. N.A. 0 = Enable D0; 1 = Warning (W/O S)/enable D0; 3 = Fault/enable D0. N.A. Supervision display selection. PI Process Unit Max varies PI Process Unit Min value: PI Process Unit Max varies Upper limit for PI feedback value used with the PI supervision controller. PI Process Unit Max varies PI Process Unit Min value: PI Process Unit Max varies Lower limit for PI feedback value used with the PI supervision controller. PI supervision delay 0 s Maximum value: 3,000 s Defines the delay time that the PI feedback value must be out of range before active stress of theta value before active stress of the process tress of	PI supervision enable N.A. Maximum value: N.A. Default value: 0 = Disabled; 1 = Enabled. Vertex of the section of the reference are set. When the actual value goes above or below the upper delay timer will increment. When the actual value is within the allowed area, the delay counter decrements expires, the relay output for PI supervision will be activated. This function is used for process value out of respective, the relay output for PI supervision will be activated. This function is used for process value out of respective, the relay output for PI supervision will be activated. This function is used for process value out of respective, the relay output for PI supervision will be activated. This function is used for process value out of respective, the relay output for PI supervision display PI supervision display Maximum value: N.A. Default value: 0 = Enable D0; 1 = Warning (W/O S)/enable D0; 2 = Warning (W S)/enable D0; 3 = Fault/enable D0. Vertex value Pefault value: 0 = Enable D0; 1 = Warning (W/O S)/enable D0; 3 = Fault/enable D0. Pefault value: Pefault value: 0 s Maximum value: PI Process Unit Max varies Default value: 0 upper limit for PI feedback value used with the PI supervision controller. PI Process Unit Max varies Default value: 0 s Maximum value: N.0. Default value: PI Process Unit Max varies Default value: 0 s Maximum value:

P3.3 - Analog output.

P3.3.1 [®]	AO mode				ID 227	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = 0 - 20 mA; 1 = 0 - 10 V.					
Description:	Defines the analog o	utput mode to current or voltag	Ie.			

P3.3.2 ^②	AO function				ID 146	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1	
Options:	 1 = Output frequency (0 -mMax 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 voltage (0 - nameplate voltage); 8 = DC bus voltage (0 - nameplate voltage); 8 = DC bus voltage (0 - 1000 Vdc); 9 = Pl setpoint (process unit minimum - process unit maximum); 10 = Pl error value (process unit minimum - process unit maximum); 11 = Pl output (process unit minimum - process unit maximum); 12 = Analog input (0% - 100%); 13 = Drive reference potentiometer (0% - 100%); 14 = Fieldbus process data input 1 (0% - 100%); 15 = Fieldbus process data input 2 (0% - 100%); 16 = Fieldbus process data input 3 (0% - 100%); 17 = Fieldbus process data input 4 (0% - 100%); 18 = Fieldbus process data input 5 (0% - 100%); 19 = Fieldbus process data input 4 (0% - 100%); 20 = Fieldbus process data input 4 (0% - 100%); 21 = Fieldbus process data input 5 (0% - 100%); 22 = User defined output (user defined minimum - user defined maximum); 23 = Motor roque (0% - 200%); 24 = Motor power absolute value (0% - 100%). 					
Description:	Select the function desired	d to the terminal A01.				
P3.3.3 ²	AO filter time				ID 147	
Minimum value:	0.00 s	Maximum value:	10.00 s	Default value:	1.00 s	
	Al AO 100% 63% AO Filter Time	A01 t (s)	Notes ① Analog signal with faults ② Filtered analog signal. ③ Filter time constant at 63	(unfiltered). % of the set value.		
P3.3.4 ²	AO custom minimum				ID 1863	
Minimum value:	N.A.%	Maximum value:	N.A.%	Default value:	0.00%	
Description:	Input axis start point x1, d Negative value shall be all From (x1, y1) and (x2, y2) v	efine AO function selected lowed for x1. vill get gain and offset. The	signal minimum value (percei en expected AO will calculate	nt) that user wants. Defaul e from gain and offset.	t 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:	Input axis end piont x2, de Default value is 100%. Negative value shall be all From (x1,y1) and (x2,y2) wi	fine AO function selected s lowed for x2. Il get gain and offset. Ther	ignal maximum value (percer expected AO will calculate	nt) that user wants. from gain and offset.		

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:	Start point output a Default value is 0 n From (x1,y1) and (x2	Start point output axis y1, define AO value selected by AO mode, y1 is related to x1. Default value is 0 mA. From (x1,y1) and (x2,y2) will get gain and offset. Then expected AO will calculate from gain and offset.							
P3.3.7 ²	AO value maxim	num			ID 1868				
Minimum value:	0.00 varies	Maximum value:	100.00 varies	Default value:	20.00 varies				
Description:	End point output ax Default value is 20 Erom (x1 x1) and (x2	0.00 varies Maximum value: 100.00 varies Default value: 20.00 varies End point output axis y2, define A0 value selected by A0 mode, y2 is related to x2. Default value is 20 mA. Errom (x1 y1) and (x2 y2) will get gain and offset. Then expected A0 will calculate from gain and offset. Errom (x1 y1) and (x2 y2) will get gain and offset.							

Table 60. Drive control .

P4.1 - Basic settings	3.				
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; 1 = Reverse.				
Description:	Forward - the rotation o Reverse - the rotation o	f the motor is forward or clo f the motor is reversed or co	ockwise direction, when ounter clockwise directi	the keypad is the active contro on, when the keypad is the activ	ol place. ve control place.
P4.1.3 ²	Keypad stop				ID 114
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Enabled - keypad op 1 = Always enabled - In	eration - In this mode, the k this mode, the stop button	eypad stop will only ope will always stop the driv	erate when the control source is ve regardless of control mode.	s set to keypad.
Description:	Enabled or always enab	led keypad operation.			
P4.1.4 ^①	Reverse enabled				ID 1679
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Disabled; 1 = Enabled.				
Description:	Enables or disables the	reverse motor direction.			
P4.1.5	Change phase seque	ence motor			ID 2515
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Change disable; 1 = Change enable.				
Description:	This parameter allows f	or swapping the motor phas	e output from u, v, w to	u, w, v.	
P4.1.6 ²	Power up local remo	ote select			ID 1685
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Hold last; 1 = Local control; 2 = Remote control.				
Description:	Selects what control pla when powered down, se	ace the drive will start at af electing Local or Remote wi	ter power is applied. The line of the line of the line of the drive to state	ne default setting will hold the l rt in that mode regardless of las	ast state that the drive was in state.

P4.1.8 ²	Start mode				ID 252
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Ramp - The drive star 1 = Flying start from stop last operating frequer 2 = Flying start from maxi the maximum operatin	ts from 0 Hz and ramps to frequency - The drive will icy as a starting point. mum frequency - The drive ng frequency as a starting	the frequency reference ve catch a spinning motor. Th will catch a spinning mot point.	llue. nis setting searches for the cr or. This setting searches for	urrent frequency using the the current frequency using
Description:	Selects the start mode op	peration.			
P4.1.9 ²	Stop mode				ID 253
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = Coasting - After a sto 1 = Ramp - After the stop	p command, the motor coa command, the speed of th	sts to a stop uncontrolled e motor is decelerated acc	by the drive. cording to the set deceleration	n parameters.
Description:	Selects the stop mode op	eration.			
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:	The start and end of the a gives a linear ramp shape Setting a value from 0.10 the slope.	acceleration and deceleration at that causes acceleration a to 10.00 seconds for this p	on ramps can be smoothe and deceleration to react in arameter produces an S-s	d with these parameters. Se mmediately to the changes in haped acceleration/decelerat	tting a value of 0.00 seconds the reference signal. ion at the start and stop of





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 and deceleration and deceleration and deceleration and de	ation ramps can be smoothed v eceleration to react immediatel	vith these parameters. Se y to the changes in the ref	tting a value of 0.00 gives a erence signal.
	Setting a value from 0.10 to 10.00 seconds for this the slope.	parameter produces an S-sha	ped acceleration/decelera	tion at the start and stop of
		u , ≜		
		112		
			1	
	Acce	I. Time 1, Decel. Time 1		
	(Acce	I. Time 2, Decel. Time 2)		
			Pamp 2 Shapa	
			namp z Snape	
		l ∢ → l Ramp 2 Shape		
				→ t
	Accol time 2			ID 249
P4.1.12©		2000.0 •	Default value:	10.0 0
Description:	U.I S Waximum value.	3000.0 S	Default value.	IU.U S
Description.	frequency.	The output frequency to acceler		cy to the set maximum
	These parameters provide the possibility to set tw be selected with the programmable digital input.	vo different acceleration/decel	eration time sets for one a	pplication. 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 correspond to the time required for t frequency.	he output frequency to decele	rate from the set maximum	n frequency to the zero
	These parameters provide the possibility to set tw be selected with the programmable digital input.	vo different acceleration/decel	eration time sets for one a	pplication. The active set can
P4.1.14 ¹²	2nd Stage ramp frequency			ID 2444
Minimum value:	MinFreq Hz Maximum value:	MaxFreq Hz	Default value:	30.00 Hz
Description:	When 2nd stage ramp frequency is the frequency This then can be used for other inputs or devices t	level at which the drive will er o signal a frequency level.	able the 2nd stage ramp f	requency output function.
P4.1.15 ¹²	Fult reset start			ID 2483
Minimum value:	N.A. Maximum value:	N.A.	Default value:	0
Options:	0 = Start/stop after fault reset - the run command 1 = Restart after fault reset - the run command is	has to be cycled to restart aft still active after fault the drive	er fault reset; will restart without re-ser	nding command.
Description:	Defines how the drive run command responds afte	er a fault reset command.		
P4.2 - Brake.				
P4.2.1 ⁽¹²⁾	Brake chopper enable			ID 829
Minimum value:	N.A. Maximum value:	N.A.	Default value:	0
Options:	0 = Disable - dynamic brake OFF; 1 = Enable - dynamic brake ON.			
Description:	If an external resistor is connected to the drive se through the attached resistor.	tting, this parameter to enable	d will allow excess DC bus	voltage to be bled off

P4.2.2 ¹²	DC brake curre	nt			ID 254		
Minimum value:	DriveNomCurrCT* A	15/100 Maximum value:	DriveNomCurrCT*15/10 A	Default value:	DriveNomCurrCT*1/2 A		
Description:	Defines the curren	t level injected into the motor du	ring 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		
Description:	This parameter de potentially spinnin spinning before a r	fines the time the drive injects D(g before a run command is given run command is given.	C braking current before starti or before ramping to reference	ng to ramp. This can be u e level. This is to stop mu	used to stop motors that are otors that are potentially		
P4.2.4 ⁰²	Stop DC brake	frequency			ID 262		
Minimum value:	0.10 Hz	Maximum value:	10.00 Hz	Default value:	1.50 Hz		
Description:	During a ramp to s	top, this parameter defines the o	utput frequency to be below to	o begin DC braking.			
P4.2.5 ¹²	Stop DC brake	time			ID 255		
Minimum value:	0.00 s	Maximum value:	600.00 s	Default value:	0.00 s		
Description:	Determines the ler	Determines the length of DC braking while stopping.					

0.00 = DC brake is not used;

>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.



P4.2.6 ¹²	Flux brake				ID 266
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Flux braking OFF; 1 = Flux braking ON.				
Description:	While stopping, the output brake. Unlike DC braking,	frequency is reduced and t the motor speed remains co	he flux in the motor is increa ntrolled during braking. The	sed, which in turn increases flux braking can be set ON (s the motor's capability to or OFF.
	Note: Flux braking co damage.	onverts the energy into	heat in the motor and sl	hould be used carefully	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
Description:	Defines the flux braking cu	rrent value output when flu	x brake is enabled.		

P4.3 - Skip frequency.

P4.3.1 ²	Skip range ramp facto	or			ID 264
Minimum value:	0.1	Maximum value:	10.0	Default value:	1.0
Description:	Defines the acceleration/d ramping speed (selected a 10 times shorter than outs	leceleration time when the o cceleration/deceleration tim ide the prohibit frequency ra	utput frequency is between e 1 or 2) is multiplied with t nge limits.	the selected prohibit freque his factor: e.g., value 0.1 ma	ency range limits. The kes the acceleration time



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:	Defines the acceleration/ ramping speed (selected a 10 times shorter than out	deceleration time when th acceleration/deceleration side the prohibit frequency	ne output frequency is betweer time 1 or 2) is multiplied with t y range limits.	n the selected prohibit fro his factor: e.g., value 0.1	equency range limits. The makes the acceleration time
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:	Defines the acceleration/ ramping speed (selected a 10 times shorter than out	deceleration time when th acceleration/deceleration side the prohibit frequency	ne output frequency is betweer time 1 or 2) is multiplied with t y range limits.	n the selected prohibit fro his factor: e.g., value 0.1	equency range limits. The makes the acceleration time
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:	Defines the acceleration/ ramping speed (selected a 10 times shorter than out	deceleration time when th acceleration/deceleration side the prohibit frequency	ne output frequency is betweer time 1 or 2) is multiplied with t y range limits.	n the selected prohibit fr his factor: e.g., value 0.1	equency range limits. The makes the acceleration time
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:	Defines the acceleration/ ramping speed (selected a 10 times shorter than out	deceleration time when th acceleration/deceleration side the prohibit frequency	ne output frequency is betweer time 1 or 2) is multiplied with t v range limits.	n the selected prohibit fr his factor: e.g., value 0.1	equency range limits. The makes the acceleration time

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/ ramping speed (selected a 10 times shorter than outs	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			
P4.3.7 [©] Minimum value:	Skip F3 high limit SkipRange3LowLimit HZ	Maximum value:	400.00 Hz	Default value:	ID 261 0.00 Hz			

P4.4 - Energy savings calculations.

P4.4.1 ^②	Currency				ID 2122
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	$\begin{array}{l} 0 = \$; \\ 1 = \pounds; \\ 2 = \pounds; \\ 3 = \$; \\ 4 = Rs; \\ 5 = R\$; \\ 6 = Fr; \\ 7 = kr. \end{array}$				
Description:	Sets the local currency use	ed for energy savings estima	ition.		
P4.4.2 ^②	Energy cost				ID 2123
Minimum value:	Varies	Maximum value:	Varies	Default value:	0.00 varies
Description:	Sets the local energy cost	per kW. Used for energy sa	vings 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; 4 = Yearly average.				
Description:	Selects the format to view parameter. The savings es	energy savings. The drive stimation is based on compa	takes four recordings in an h ring the drives energy usage	our and then calculates the compared to a across the l	average based off this ine 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; 1 = Reset.				
Description:	Resets the energy savings	value.			

Table 24: Foldback							
P4.5.1	IGBT Temperature				ID 776		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	N.A.						
Description:	IGBT Temperature						

Table 60.	Drive	control	(Continued).
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P4.5.2	Foldback status				ID 1771
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Inactive 1 = Active 2 = On hold				
Description:	Foldback status. It is a mo (a) active, when IGBT temp (b) on hold, when IGBT tem (c) inactive, when IGBT tem	nitor parameter. There are perature is greater than fol nperature is between Reco nperature is smaller than R	three values: dback temperature vering temperature and Foldb ecovering temperature	ack temperature	
P4.5.3	Foldback output frequ	iency			ID 1772
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	N.A.				
Description:	Foldback output, it is the f	requency. It is a monitor pa	rameter, unit is Hz.		
P4.5.4	Foldback output speed	d			ID 1773
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	N.A.				
Description:	Foldback output, it is the s	speed. It is a monitor param	eter,unit is rpm		
P4.5.5	Foldback enable				ID 1774
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled 1 = Enabled				
Description:	Foldback enable				
P4.5.6	Foldback temperature				ID 1775
Minimum value:	0	Maximum value:	120	Default value:	80
Options:	N.A.				
Description:	Foldback temperature. It is the speed shall be reduced	s a user-setting parameter. d at the rate "speed reduce	Display unit is Deg. C. If IGB rate"	l temperature is greater that	n Foldback temperature,
P4.5.7	Recovering temperatu	ire			ID 1776
Minimum value:	0.	Maximum value:	120	Default value:	70
Options:	N.A.				
Description:	Recovering temperature. It Foldback temperature, the	t is a user-setting paramete speed shall remain the cur	er. Display unit Deg. C. If IGB rent speed.	l temperature is between Re	ecovering temperature and
P4.5.8	Foldback speed reduc	e rate			ID 1777
Minimum value:	0.	Maximum value:	200	Default value:	20
Options:	N.A.				
Description:	Foldback speed reduce rat speed shall be reduced at	e. It is a user-setting paran the rate "foldback speed re	neter, unit is rpm/s. If IGBT to educe rate"	emperature is greater than F	oldback temperature, the
P4.5.9	Foldback minimum sp	eed			ID 1778
Minimum value:	0.	Maximum value:	10000	Default value:	2000
Options:	N.A.				
Description:	Foldback fault trip speed. I minimum speed", this stat	lt is a user-setting paramet us lasts "Foldback fault tim	er, unit is rpm. If the drive is eout", Foldback fault will hap	"foldback active" and speed open.	is less than "Foldback
P4.5.10	Foldback fault timeou	t			ID 1779
Minimum value:	0.	Maximum value:	200	Default value:	30
Options:	N.A.				
Description:	Foldback fault trip speed. I minimum speed", this stat	It is a user-setting paramet us lasts "Foldback fault tim	er, unit is rpm. If the drive is eout", Foldback fault will hap	"foldback active" and speed open.	is less than "Foldback

|--|

P5.1 - Basic settings.							
P5.1.1 ¹⁾²	Motor control mode					ID 287	
Minimum value:	N.A.	Maximum v	alue: N.A.		Default value:	0	
Options:	0 = Frequency control - Ou 1 = Speed control - Output 2 = Open loop vector contr identification. 3 = PM control 1 - PM mot 4 = PM control 2 - PM mot	tput frequency i t frequency is co rol - Similar to th tor control mode tor control mode	s controlled directly b ntrolled by giving a fra le standard speed con 1, used for SPM (surfa 2, used for IPM (inter	y the frequency equency referen trol mode, highe ace mounted pe nally mounted p	reference. ice to it with slip comper er performance slip calcu ermanent magnet) and it permanent magnet) and it	nsation. Jlation requires runnin also can be used for l t can not be used for l	ng a motor PM. SPM.
Description:	Selects the motor control	mode.					
P5.1.2 ^①	Current limit					ID 107	
Minimum value:	DriveNomCurrCT*1/10 A	Maximum v	alue: DriveNo	mCurrCT*2 A	Default value:	DriveNomCur	rrCT*3/2 A
Description:	This parameter determine Once the motor current hit	s the maximum (ts this level, it go	output current allowed bes into the current lin	l from the drive	. The parameter value ra and tries to limit the out	ange differs from size out current.	to size.
P5.1.3 ¹⁾²	V/Hz optimization					ID 109	
Minimum value:	N.A.	Maximum v	alue: N.A.		Default value:	0	
Options:	0 = Disable torque boost f 1 = Enable torque boost fu	unction. Inction.					
Description:	Automatic torque boost - t and run at low frequencies	the voltage to th s with high loads	e motor increases aut s.	omatically, whic	ch assists the motor to p	roduce sufficient torq	ue to start
P5.1.4 ¹²	V/Hz ratio					ID 108	
Minimum value:	N.A.	Maximum v	alue: N.A.		Default value:	0	
	weakening point w produces less torq the load is proport 2 = Programmable V/H voltage, midpoint a the application. Linear with flux op 3 = Linear with flux op called Active Ener	viere the nomina ue and electrom ional to the squa iz curve - The V/I and weakening p ptimization timization - The rgy Control whic	di voirage is supplied. echanical noise. A squ are of the speed. Hz curve can be progra point. A programmable drive starts to search h will reduce the volta	armed With thr ammed with thr b V/Hz curve can for the minimur ge and current	nicer magnetized belov can be used in applicat ee different points. Thes n be used if the other se n motor current in order but still maintain the de:	the neid weakening ions where the torque se points are the 0 fre- ttings do not satisfy t to save energy, This n sired speed.	quency he needs of node is
Description:	Selects the V/Hz ratio. 0 = Linear; 1 = Squared; 2 = Programmable; 3 = Linear + flux optimizat	ion.		<u> </u>			
		Un - Voltage at FWP	Default: Nominal Voltage of the Motor Linear	Squared	Field Weakening Point Default: Nominal Frequency of the		
					f [Hz]	

P5.1.5 ¹²	Field weakening point				ID 289
Minimum value:	8.00 Hz	Maximum value:	400.00 Hz	Default value:	FieldWeakPointMFG Hz
Description:	The field weakening point by the motor nameplate va	is the frequency at which lue.	the output voltage r	reaches the set maximum value.	This value is usually determined

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 the constant.	lefines the voltage at the field weakening point, when the output frequency exceeds the field weakening point, the voltage will remain onstant.						
P5.1.7 ¹²	V/Hz mid frequency			·	ID 291			
Minimum value:	0.00 H	Maximum value:	FieldWeakPoint Hz	Default value:	VHzCurveMidFreqMFG Hz			
Description:	If the programmable V/Hz anywhere between 0 and weakening point voltage a	curve has been selected, th the field weakening point. all the way up the curve.	nis parameter defines the m To either have a different V	idpoint frequency of the cu /Hz ramp or if set to the F\	rve. This value can be set NP, it will provide the field			
P5.1.8 ¹²	V/Hz mid voltage				ID 292			
Minimum value:	0.00%	Maximum value:	100.00%	Default value:	100.00%			
Description:	If the programmable V/Hz anywhere between zero f	curve has been selected, th requency volt and the field v	nis parameter defines the m weakening point voltage.	id-point voltage of the curv	ve. This value can be set			
P5.1.9 ¹²	Zero frequency voltag	ge			ID 293			
Minimum value:	0.00%	Maximum value:	40.00%	Default value:	0.00%			
Description:	If the programmable V/Hz	curve has been selected, th	nis parameter defines the ze	ro frequency voltage of th	e curve.			
P5.1.10 ²	Switching frequency				ID 288			
Minimum value:	MinSwitchFreq kHz	Maximum value:	MaxSwitchFreq kHz	Default value:	DefaultSwitchFreqCT kHz			
Description:	Sets the switching freque	ency for the PWM output wa	aveform.					
P5.1.11 ²	Sine filter enabled				ID 1665			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Disabled; 1 = Enabled.							
Description:	This parameter enables th automatically adjusts the	ne drive to have a fixed swit switching frequency based	ching frequency which is re on the unit temperature.	quired by some sine filters	. The drive no longer			
P5.1.12 ¹²	Over voltage controll	er			ID 294			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	3			
Options:	0 = Disable over voltage of 1 = The maximum control 2 = The maximum control 3 = The maximum control	controller; ler output frequency is the (r ler output frequency is the n ler output frequency is the (r	ramp frequency + 8 Hz); naximum frequency; maximum frequency + 8 Hz).					
Description:	The over voltage control i control the DC link voltag	s used to limit the DC link vo e below the preset limit valu	oltage below the preset limi ue by increasing the output	t value. If over voltage co frequency to allow the mot	ntrol is enabled, the drive will tor to use the energy.			
P5.1.13 ^①	Over voltage controll	er reference			ID 1874			
Minimum value:	DCLinkUnderVolt- ResumeExcursion V	Maximum value:	DCLinkOverVoltBrake- ChopperStartLimit V	Default value:	DCLinkRegenerating- EnergyControlExcursion V			
Description:	The over voltage reference	e defines the preset limit va	alue used in the overvoltage	controller.				
P5.1.14 ²	Load drooping				ID 298			
Minimum value:	0.00%	Maximum value:	100.00%	Default value:	0.00%			
Description:	The drooping function ena of the motor.	ables speed drop as a functi	on of load. This parameter	sets that amount correspo	nding to the nominal torque			
P5.1.15 ²	Droop control filter t	ime constant			ID 1630			
Minimum value:	0 ms	Maximum value:	3,000 ms	Default value:	0 ms			
Description:	Filter time when using dro	oop control.						

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

P5.1.16 ¹²	Identification				ID 299				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0				
Options:	0 = Not action. 1 = Identification only stat 2 = Identification with run 3 = Identification no run - r 4 = Identification only iner	 0 = Not action. 1 = Identification only stator resistor - does not spin the motor. This can be done with load attached. 2 = Identification with run - motor stator resistor is completed then the motor is run. This must be completed with unloaded motor. 3 = Identification norun - motor is supplied with current and voltage but at zero frequency. 4 = Identification only inertia - identification for the system inertia only. 							
Description:	This parameter enables the parameters to improve sta will be active then set bac tuning" is being performed	e drive to make an motor ide rting torque and open loop v k to 0 when completed. Wh l. If there is an issue with th	entification cycle of the moto vector control performance. nen a run command is issued motor identification, a fau	r once complete the drive w Once set and a run comman the message on the keypac It message will be displayed	vill adjust tuning d is given, the operation d will indicate "Auto d.				
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 real performing Identification (value, this value is the stato P5.1.16).	r winding resistance of the v	vindings in the motor. 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 real va (P5.1.16).	alue, this value is the rotor r	esistance of the motor. Value	e is measured when perform	ning 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:	Motor leakage inductance Value is measured when p	real value, this value is the erforming Identification (P5.	amount of magnetic inducta 1.16).	nce that does not link to a w	rinding in the motor .				
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 inductance r when performing Identifica	real value, this value is the a ation (P5.1.16).	amount of inductance betwee	en 2 sets of windings in the	motor. Value is measured				
P5.1.21 ^①	Excitation current				ID 775				
Minimum value:	0.01 A	Maximum value:	655.35 A	Default value:	Base on motor.				
Description:	Motor no-load current real motor. The value is measu	value - this value is the am ired when performing identi	ount of electrical current req fication (P5.1.16).	uired to generate a rotating	magnetic field in the				
P5.1.22 ^①	Motor inertia				ID 1881				
Minimum value:	0.000 kgm ²	Maximum value:	65.535 kgm ²	Default value:	Base on motor.				
Description:	System rotation inertia - re	eal value for speed loop para	ameter tuning. The value is	measured when performing	identification.				
P5.1.23 ^①	PM back electromotiv	e force (BEMF) voltage			ID 1882				
Minimum value:	0.0 V	Maximum value:	6553.5 V	Default value:	0.1 V				
Description:	Back electromotive force (BEMF) voltage. The value is	s measured when performing	identification.					
P5.1.24 ^①	PM d-axis stator induc	ctance			ID 1884				
Minimum value:	0.00 mh	Maximum value:	655.35 mh	Default value:	0.01 mh				
Description:	Voltage across the d-axis s to-line rms value. The value	stator inductance of the PM ue is measured when perfor	motor at the rated motor cu ming identification.	rrent and the rated motor fre	equency displayed in line-				
P5.1.25 ^①	PM q-axis stator induc	stance			ID 1883				
Minimum value:	0.00 mh	Maximum value:	655.35 mh	Default value:	0.01 mh				
Description:	Voltage across the q-axis sto-line rms value. The value	stator inductance of the PM ue is measured when perfor	motor at the rated motor cu ming identification.	rrent and the rated motor fre	equency displayed in line-				
P5.1.26	Slip compensation co	efficient	· · · · · · · · · · · · · · · · · · ·		ID 1664				
Minimum value:	0%	Maximum value:	500%	Default value:	100%				
Description:	The linear coefficient of th	e slip compensation freque	ncy, which is valid only in the	speed control mode.					

P5.1.27	VF stable Kd				ID 1888
Minimum value:	0%	Maximum value:	1,000%	Default value:	100%
Description:	The compensation coeffi	cient of the d-axis, which is	used to suppress oscillati	ion.	
P5.1.28	VF stable Kq				ID 1889
Minimum value:	0%	Maximum value:	1,000%	Default value:	100%
Description:	The compensation coeffi	cient of the q-axis, which is	used to suppress oscillati	ion.	
P5.1.29 ¹²	Over-modulation ena	ble			ID 2835
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				
Description:	The linear coefficient of	the slip compensation freque	ency, which is valid only ir	n the speed control mode.	

P5.2 - Sensorless Vector Control parameters (*DM1 Pro).

P5.2.1 ²	Speed error filter tin	ne constant			ID 1591
Minimum value:	0 ms	Maximum value:	3,000 ms	Default value:	20 ms
Description:	Filter time constant for s	peed 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 "V	/ector" control mode when i	n 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" contro	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" contro	ol mode frequency.			
P5.2.6 ²	Speed control Kp2				ID 1834
Minimum 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 "V	/ector" control mode when i	n 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 i	n the forward direction.			

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 limit in th	e reverse direction.			
P5.2.11 ²	Generator torque limi	t REV			ID 1839
Minimum value:	0.0%	Maximum value:	300.0%	Default value:	300.0%
Description:	Generation torque limit in	the reverse direction.			
P5.2.12 [®]	Motoring power limit				ID 1607
Minimum value:	0.0%	Maximum value:	300.0%	Default value:	300.0%
Description:	Motor power limit setting.				
P5.2.13 ²	Generator power limit	t			ID 1608
Minimum value:	0.0%	Maximum value:	300.0%	Default value:	300.0%
Description:	Generator power limit set	ting.			
P5.2.14 ¹⁾²	Flux reference				ID 1620
Minimum value:	0.0%	Maximum value:	500.0%	Default value:	100.0%
Description:	This parameter defines the	e amount of flux that is out	put to the motor, which is	valid only in open loop vecto	r control.
P5.2.15 ^①	PM initial selection				ID 1890
Minimum value:	N.S.	Maximum value:	N.A.	Default value:	1
Options:	0 = Align; 1 = Six pluse; 2 = HFI.				
Description:	PM initial angle detect me	ethod.			
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 detect tim	ie.			
P5.2.17 ^①	PM excited current		·		ID 1892
Minimum value:	0%	Maximum value:	200%	Default value:	20%
Description:	PM excited current during	the low speed.			
P5.2.18 ^①	PM excited current of	f frequency			ID 1893
Minimum value:	10.00%	Maximum value:	MotorNomFreq %	Default value:	20.00%
Description:	PM excited current cut off	frequency.			
P5.2.19	Observer Kp				ID 2901
Minimum value:	1%	Maximum value:	3,000%	Default value:	100%
Description:	Linear gain of the PM/IM	observer.			

Table 62. Protections .

P6.1 - Motor.						
P6.1.1 ⁰²	Output phase fau	ılt			ID 308	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2	
Options:	0 = No response; 1 = Warning; 2 = Fault - stop mode after fault according to parameter stop mode; 3 = Fault - stop mode after fault always by coasting.					
Description:	Output phase superv another, the frequen	vision of the motor ensures that cy converter will respond corres	the motor phases sponding to this se	have equal currents. If phases are 5% tting.	% difference from one	

P6.1.2 ⁽¹⁾	Ground fault				ID 309
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = No response; 1 = Warning; 2 = Fault - stop mode after 3 = Fault - stop mode after	fault according to paramete fault always by coasting.	er stop mode;		
Description:	Earth (ground) fault protec: ground fault limit that allow is always working and prot setting (see Options above	tion ensures that the sum o ws for setting the allowable tects the frequency convert .).	f the motor phase currents is ground current level based er from earth faults with hig	zero. There is a current lev off the total drive current. T h currents. Frequency conve	el setting parameter he overcurrent protection rter will correspond the
P6.1.3 ¹²	Ground fault limit				ID 2158
Minimum value:	0%	Maximum value:	30%	Default value:	15%
Description:	Sets the level of the groun output of the drive.	d fault protection. This pro	tection is based off the amo	unt of leakage current that is	s seen to ground on the
P6.1.4 ¹²	Motor thermal protect	tion			ID 310
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = No response; 1 = Warning; 2 = Fault - stop mode after 3 = Fault - stop mode after	fault according to paramet fault always by coasting.	er stop mode;		
Description:	If a fault condition is selec calculated motor temp is b this protection, i.e., setting	ted, the drive will stop and ased off the install power o parameter to 0, will reset	activate the fault stage base on values of the drive and mo the thermal stage of the mot	d off the % of calculated mo nitoring values as the drive or to 0%.	otor temperature. The is running. Deactivating
P6.1.5 ^②	Motor thermal FO curr	rent			ID 311
Minimum value:	0.00%	Maximum value:	150.00%	Default value:	100.00%
Description:	The current can be set bety The default value is set as 90% (or even higher).	ween 0 - 150.0% x InMotor. suming that there is no exte	. This parameter sets the va ernal fan cooling the motor. I	lue for thermal current at zei f an external fan is used, thi	ro frequency. s parameter can be set to
	Note: The value is set as a current. The motor's nomin lf you change the parameter Setting this parameter doe	a percentage of the motor n nal current is the current the er nominal current of motor, es not affect the maximum of	ameplate data, P1.6 (nomina at the motor can withstand i this parameter is automatic output current of the drive.	l current of the motor), not th n direct on-line use without ally restored to the default v	ne drive's nominal output being overheated. 'alue.
		PCooling	Overload Area	Ιτ	

1otor Thermal O Current = 40% f 0 f_n

P6.1.6 ⁰²	Stall protection				ID 313		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Fault, coast.						
Description:	Stall protection is a user defined of overcurrent protection. It protects the motor from short time overload situations like a stalled shaft. This is customer selectable based off of current level, frequency level, and time.						
P6.1.7 [©]	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 to 0.1–InMotor*2. For a stall stage to occur, the current must have exceeded this limit.						
	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 limi	it			ID 315
Minimum value:	1.0 s	Maximum value:	120.0 s	Default value:	15.0 s
Description:	This time can be internal up/dowr protection will ca	set between 1.0 and 120.0s. This counter based off the current beir ause a trip (see P6.1.6).	s the maximum time a g above the limit setti	Ilowed for a stall stage. The sta ing. If the stall time counter valu	Il time is counted by an e goes above this limit the
		Stall Time C	Counter		
		T Stall Time Limit	rip Area	/Warning I Protection	
		Stall No Stall		Time	

P6.1.9 [®]	Stall frequency	Stall frequency limit ID 316				
Minimum value:	1.00 Hz	Maximum value:	MaxFreq Hz	Default value:	25.00 Hz	
Description:	The frequency can be set between 1–fmax (P1.2). For a stall state to occur, the output frequency must have remained below this above the current limit for the stall time to occur.					

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

P6.1.10 ¹²	Underload pro	tection			ID 317			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = No response; 1 = Warning; 2 = Fault - stop m 3 = Fault - stop m	0 = No response; 1 = Warning; 2 = Fault - stop mode after fault according to parameter stop mode; 3 = Fault - stop mode after fault always by coasting.						
Description:	If fault is set as t status of the mot Deactivating the	If fault is set as the function, the drive will stop and activate the fault stage based on the parameter conditions and the monitoring status of the motor. If the motor torque drops below the Fnom and F0, torque levels for the time limit the protection is enabled. Deactivating the protection by setting the parameter to 0 will reset the underload time counter to zero.						
P6.1.11 ¹⁾²	Underload Fnd	om torque			ID 318			
Minimum value:	10.0%	Maximum value:	150.0%	Default value:	50.0%			
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.							



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

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

P6.1.13 ²	Underload time 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.					
		Time Counter	ea Trip/W Broker Protec	arning 1 Belt tion		
	NI= 11 Richard made				ID 2150	
P6.1.14®	Preneat mode				ID 2159	
Options:	N.A. 0 = Disable; 1 = Enable	Maximum value:	N.A.	Detault value:	U	
Description:	This parameter enables/dis the output to allow current	sables the preheat function t to flow to the motor, this is	where this is used where the typically used when the m	ne temperature being read otor is not running.	from the drive will turn on	
P6.1.15 ²	Preheat control source	e			ID 2160	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1	
Options:	0 = DI function; 1 = Drive temperature.					
Description:	Selects the source of wher could be at a different tem	re the temperature is comin perature.	g from, either digital input c	r the drive heat sink tempe	erature, which potentially	
P6.1.16 [®]	Preheat enter tempera	nture			ID 2161	
Minimum value:	-10.0°C	Maximum value:	20.0°C	Default value:	10.0°C	
Description:	Temperature when the pre some current.	heat is enabled - drive goes	into a run state to all the p	reheat voltage to flow thro	ugh the motor an create	
P6.1.17 [®]	Preheat quit temperat	ure			ID 2162	
Minimum value:	-10.0°C	Maximum value:	39.9°C	Default value:	20.0°C	
Description:	Temperature when the pre	heat is disabled - drive goe	s into a stop state if the ten	perature is above this ration	ng.	

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

P6.2 - Drive.								
P6.2.1 ²	Line start lockou	ıt			ID 750			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2			
Options:	0 = Respond to I/O (Run command I 1 = Do not respond respond. (Run c 2 = Respond to I/O maintained run 3 = Do not respond respond to a ma	 0 = Respond to I/O run command when power is applied. If in another control place and switched to I/O, control does not respond. (Run command has to be cycled.) 1 = Do not respond to I/O run command when power is applied. If in another control place and switched to I/O, control does not respond. (Run command has to be cycled.) 2 = Respond to I/O commands when power is applied. If in another control place and switched to I/O control, the drive will respond to a maintained run command. 3 = Do not respond to I/O commands when power is applied. If in another control place and switched to I/O control, the drive will respond to a maintained run command. 						
Description:	Determines the res	ponse of frequency converter go	oing to a run state cy	cle with I/O run command is still ac	tive as the control place.			
P6.2.2 ¹²	Input phase faul	t			ID 332			
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 4 = Single phase po	0 = No response; 1 = Warning; 2 = Fault, stop mode after fault according to parameter stop mode; 3 = Fault, stop mode after fault always by coasting; 4 = Single phase power limit.						
Description:	The input phase sup	The input phase supervision ensures that the input phases of the frequency converter have approximately equal current draw.						
P6.2.3 ⁰²	4 mA input fault	:			ID 306			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = No response; 1 = Warning; 2 = Warning - he fre 3 = Warning - the p 4 = Fault - stop moo 5 = Fault - stop moo	equency from 10 seconds back is reset frequency P6.2.4 is set as le after fault according to paran le after fault always by coasting	s set as reference; reference; neter stop mode; J.					
Description:	A warning or a fault seconds, or below (t action and message is generat).5 mA for 0.5 seconds. The info	ed if the 4 - 20 mA re prmation can also be	eference signal is used and the sigr programmed into relay outputs RO	nal falls below 4 mA for 5 1 and RO2.			
P6.2.4 ¹²	4 mA fault frequ	iency			ID 331			
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz			
Description:	When 4 mA fault ha	appens, the output frequency of	drive goes to this pr	eset 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:	0 = No action; 1 = Warning; 2 = Fault, stop mode 3 = Fault, stop mode	e after fault according to param e after fault always by coasting.	eter stop mode;					
Description:	A warning or a fault external fault). The	t action and message is generat status information can also be	ed from the external programmed into dig	fault signal in the programmable (c gital output relay outputs RO1 and F	ligital inputs function select 102.			
P6.2.6 ¹²	Undervoltage fa	ult 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	e after fault according to param e after fault always by coasting.	eter stop mode;					
Description:	Frequency converte the drive will respo	r monitors DC Bus voltage if it c nd corresponding to this setting	lrops below set level	(via trouble shooting guide for mor	e information on fault level),			

P6.2.7 ⁰²	Unit under temperatur	re protection			ID 1564		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2		
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Fault, coast.						
Description:	This protection sets the rea	sponse to a low frequency c	onverter temperature 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; 1 = Enabled.						
Description:	With this parameter, you are able to enable the cold weather function of the causing the frequency converter's under temp limit to drop from -10°C to -30°C. This then enables a warm-up feature when the frequency converter is between -30°C and -20°C. The motor, when given a run command, will turn on for the cold weather time-out and output the cold weather voltage at 0.5 Hz to allow the motor to warm up. If it does not warm up above -20°C, after that the time frequency converter will fault on under temp fault. If the frequency converter does go above -20°C, output will begin to follow reference.						
P6.2.10 [®]	Cold weather time out	:			ID 2128		
Minimum value:	0 min	Maximum value:	10 min	Default value:	3 min		
Description:	With this parameter, you a	re able to select the time lir	nit that the frequency conve	rter 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:	0 = No Action - drive will s 1 = Warning - drive indicat 2 = Fault - drive will indicat	top, no indication shown, no e warning/if STO clears driv te fault/require reset to star) reset required, have to cycl re will run without reset. t again.	e start command.			
Description:	STO fault response defines	s the function of how the ST	O input will be seen on the k	eypad and how the drive fu	nctions to it.		
P6.2.12 ^①	PI feedback AI loss re	sponse			ID 2401		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options: Description:	0 = No action; 1 = Warning; 2 = Fault; 3 = Warning: preset freque	ncy (P6.2.13).	analon innut loss response	If the AI feedback is lost by	ased off the programed Al		
· · · ·	feedback.						
P6.2.13 ¹²	PI feedback AI loss pr	e-frequency			ID 2402		
Minimum value:	0.00 Hz	Maximum value:	400.00 Hz	Default value:	0.00 Hz		
Description:	This parameter defines the	e frequency the master woul	d run to if a feedback is lost	and P6.2.12 was set to optio	on 3.		
P6.2.14 ²	PI feedback AI loss pi	pe 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 the frequency in P6.2.13 "le	e pump based off the measu oss of prime" occurs.	red level. If the value drops	below this level for the time	e in P6.2.15 and below,		
P6.2.15 ²	PI feedback AI loss pr	e-frequency timeout			ID 2404		
Minimum value:	0 s	Maximum value:	6,000 s	Default value:	0 s		
Description:	PI feedback AI loss pre-fre frequency in P6.2.15 for the 0 seconds.	quency timeout - when P6.2 e time set here. After this t	.12 is set to 3 or 4, when the me, the drive will fault out o	feedback signal is lost, the n "feedback loss". The time	drive will run at the e is disabled when set to		
P6.2.16 ¹²	Overvoltage controller	r response			ID 1840		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = No action; 1 = Warning (W/O S); 2 = Warning (W S).						
Description:	Display options for overvol	tage controller warning.					

P6.2.17 ¹²	Overcurrent controller	r 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).						
Description:	Display options for current limit controller warning.						
P6.2.18	Cold weather passwor		ID 2129				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Description:	This password allows acce soft keys on the keypad. P	ess to override the under ten Password should be set to 62	perature fault protection. 1 2385. This value gets reset	This parameter is seen by pre on cycle of power.	essing the left and right		
P6.2.19	Under-temperature fai	ult override			ID 2130		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = No; 1 = Yes.						
Description:	With the password set to the correct value, this parameter is enabled and will give the ability to override the under temp fault. This function gets reset when power is cycled.						

P6.3 - Communications.

P6.3.1 ⁰²	Fieldbus fault respons	ie			ID 334
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Fault, coast.				
Description:	This sets the response mo communication port. Each protocol has another	de for the fieldbus fault wi parameter to select in all o	nen a fieldbus mod control or only in fi	e is used and communication is lost b eldbus control to set fault or warning.	etween the PLC and
P6.3.2 ¹²	OPT card fault respons	e			ID 335
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Fault, coast.				
Description:	This sets the response mo processor.	de for a board slot fault ca	used by a missing	or failed option board not communicat	ing to the central
P6.3.3 ¹²	IP address confliction	response			ID 1678
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = No action; 1 = Warning; 2 = Fault - stop mode after 3 = Fault - stop mode after	r fault according to parame r fault always by coasting.	ter stop mode;		
Description:	Indicates there is a conflic address assigned	t in the IP address assigne	d to the drive, typi	cally meaning there are multiple devic	es with the same IP
P6.3.4 ¹⁾²	Keypad communicatio	on fault response			ID 2157
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Fault, coast.				
Description:	This parameter defines the	e function of the keypad co	mmunication resp	onse in the case the keypad is remove	d.

 $^{\textcircled{O}}$ Parameter value can only be changed after the drive has stopped. $^{\textcircled{O}}$ Parameter value will be set to be default when changing macros.
P6.4 - Auto restart.								
P6.4.1 [©]	AR wait time				ID 321			
Minimum value:	1.00 s	Maximum value:	300.00 s	Default value:	1.00 s			
Description:	Defines the time befor	re the frequency converter trie	s to automatically restar	rt the motor after a specific fa	ult condition has been clea			
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 f out without resetting	fault set that the drive uses th the alarm drive will fault.	e restart attempts to res	set the fault and restart the mo	otor, after this time has rur			
	P6.4.4 to P6.4.11 deter the first auto restart. becomes active. Othe single fault remains du	rmine the maximum number of If the number of faults occurri rrwise the fault is cleared afte uring the trial time, a fault stat	automatic restarts durir ng during the trial time e r the trial time has elaps e is true.	ng the trial time set by P6.4.2. exceeds the values of P6.4.4 to ed and the next fault starts th	The time count starts from P6.4.11, the fault state e trial time count again. If			
	Fault Condition		Trial Time Vait Time Wait	Time Wait Time				
	Fault Display	₹	AR Fault	≪	o Fault→			
	Run Command							
			Auto Restart Fa	ail (Try Number >2.)				
P6.4.3 ^②	AR start function				ID 323			
Vinimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Flying start from s 1 = Start according to 2 = Flying start from m	top frequency; parameter stop mode; naximum frequency.						
Description:	The start function for condition. Defines the been clear.	automatic restart is selected v a time before the frequency co	with this parameter. The nverter tries to automati	e parameter defines the start r ically restart the motor after a	node upon an auto restart specific fault condition ha			
P6.4.4 ^②	Undervoltage atte	mpts			ID 324			
Ainimum 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 resta >0 = Number of autom	0 = No automatic restart. >0 = Number of automatic restarts after undervoltage fault.						
	The fault is reset and	the drive is started automatica	ally after the DC-link volt	tage has returned to the norma	al level.			
P6.4.5 ^②	Overvoltage attem	pts			ID 325			
Minimum value:	0	Maximum value:	10	Default value:	1			
Description:	This parameter determ	nines how many automatic res	tarts can be made during	g the trial time after an overvo	Itage trip.			
	0 = No automatic restart after overvoltage fault trip. >0 = Number of automatic restarts after overvoltage fault trip.							
	U = No automatic resta >0 = Number of autom	atic restarts after overvoltage	e fault trip.					

Table 62. Protections (Continued).

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

Table 62. Protections (Continued).

P6.4.6 ²	Overcurrent attempts				ID 326				
Minimum value:	0	Maximum value:	3	Default value:	1				
Description:	This parameter determines	This parameter determines how many automatic restarts can be made during the trial time.							
	Note: An IGBT temperature	Note: An IGBT temperature fault, saturation fault, and overcurrent faults are included as part of this fault.							
	0 = No automatic restart af >0 = Number of automatic r	ter overcurrent fault trip. estarts after an overcurre	ent trip, satur	ation trip, or IGBT temperature fault.					
P6.4.7 [®]	4 mA fault attempts				ID 327				
Minimum value:	0	Maximum value:	10	Default value:	1				
Description:	This parameter determines	how many automatic rest	arts can be n	nade during the trial time.					
	0 = No automatic restart af >0 = Number of automatic r	ter reference fault trip. restarts after the analog o	current signal	(4–20 mA) has returned to the normal level	(>4 mA).				
P6.4.8 ²	Motor temperature fau	lt attempts			ID 329				
Minimum value:	0	Maximum value:	10	Default value:	1				
Description:	This parameter determines	how many automatic rest	arts can be n	nade during the trial time.					
	0 = No automatic restart af >0 = Number of automatic r	ter Motor temperature fa estarts after the motor te	ult trip. emperature h	as returned to its normal level.					
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 rest	arts can be n	nade during the trial time.					
	0 = No automatic restart af >0 = Number of automatic r								
P6.4.10 ²	Underload attempts				ID 336				
Minimum value:	0	Maximum value:	10	Default value:	1				
Description:	This parameter determines	how many automatic rest	arts can be n	nade during the trial time.					
	0 = No automatic restart af >0 = Number of automatic r	ter an underload fault trip estarts after an underloa). d fault trip.						
P6.4.11 ²	PI feedback AI loss att	empts			ID 2405				
Minimum value:	0	Maximum value:	10	Default value:	1				
Description:	This parameter sets the am	ount of tries it will try to	auto restart t	he feedback Al loss fault.					

Table 63. PI Controller .

P7.1 - Basic setting	5.				
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 o	of the PI Controller. It adjust the s f 10% in the error value causes th	lope of the speed incr e controller output to c	ease according to the initial of th change 10%.	ne load. If this value is set to
P7.1.2 ²	PI control itime	e			ID 1295
Minimum value:	0.00 s	Maximum value:	600.00 s	Default value:	1.00 s
Description:	Defines the integr	ration time of the PI controller. Ov	er the time, the integra	al time contributes to the deviat	on between the reference

P7.1.3 ¹⁾	PI process unit				ID 1297
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = %; 1 = 1/min.; 2 = rpm; 3 = ppm; 4 = pps; 5 = l/s; 6 = l/min.; 7 = l/h; 8 = kg/s; 9 = kg/min.; 10 = kg/h; 11 = m3/s; 12 = m3/min.; 13 = m3/h; 14 = m/s; 15 = mbar; 16 = bar; 17 = Pa; 18 = kPa; 19 = mVS; 20 = kW; 21 = Deg. C; 22 = GPM; 23 = gal/s; 24 = gal/min.; 25 = gal/h; 26 = lb/s; 27 = lb/min.; 28 = lb/h; 29 = CFM; 30 = ft ³ /s; 31 = ft ³ /min.; 32 = ft ³ /h; 33 = ft/s; 34 = in. wg; 35 = ft wg; 36 = PSI; 37 = lb/in.2; 38 = HP; 39 = Deg. F; 40 = PA; 41 = WC; 42 = HG; 43 = ft; 44 = m.				
Description:	Defines the unit type for P	l feedback unit.			
P7.1.4 ^②	PI process unit minim	um			ID 1298
Minimum value:	-99999.99 varies	Maximum value:	PI Process Unit Max varies	Default value:	0.00 varies
Description:	Defines the minimum proc	ess unit value.			
P7.1.5 ^②	PI process unit maxim	um			ID 1300
Minimum value:	PI Process Unit Min	Maximum value:	99999.99 varies	Default value:	100.00 varies
Description:	Defines the maximum proc	cess 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 is 1 = Inverted - if feedback is	less than set-point, PI cont s less than set-point, PI con	roller output increases. troller output decreases.		
Description:	Defines the way the proce	ss value output reacts to th	e feedback signal.		

Table 63. PI Controller (Continued).

Table 63. PI Controller (Continued).

P7.1.7 ²	PI dead band				ID 1304				
Minimum value:	-99999.99 varies	Maximum value:	99999.99 varies	Default value:	0 varies				
Description:	PI dead band around setpo deactivation of controller.	I dead band around setpoint in process units. This is the band where no actions occur to prevent oscillation or repeated activation/ Jeactivation of controller. The PI output is locked if the feedback stays within the dead band area.							
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 goe level out again.	s out of the dead band area	for the desired time delay, a	t that point the controller w	ill 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 falli	ng ramp times for changes i	n the process value.						

Table 64. Setpoint

P7.2.1 - Standard.								
P7.2.1.1 [®]	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 2	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:	0 = Wake-up when belo 1 = Wake-up when abov 2 = Wake-up when belo 3 = Wake-up when abov	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	l.					

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 input 1 6 = FB process data input 2 7 = FB process data input 4 9 = FB process data input 4 9 = FB process data input 1 10 = FB process data input 1 11 = FB process data input 1 12 = FB process data input 1 13 = FB PI setpoint 1; 14 = FB PI setpoint 2.	6; 7;			
Description:	Defines source of the setpo fieldbus message.	pint value the drive uses. 1	his can either be an internal	preset value, keypad setpoir	nt, analog signal, or

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

P7.2.2.2 ¹⁾	PI setpoint 1 sleep en	able			ID 1315
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				
Description:	This function will disable t re-engages when feedbac	he output when the freque k rises above the wake-up	ncy drops below the slee level.	p frequency for the sleep dela	ay time. The output
P7.2.2.3 ²	PI setpoint 1 sleep del	lay			ID 1317
Minimum value:	0 s	Maximum value:	3,000 s	Default value:	0 s
Description:	This parameter sets the de shut off till the wake up le	elay time after the setpoint vel is met. It is to prevent	drops below the sleep le large fluctuations when g	vel for this amount of time an joing into the sleep function t	nd then the drives output will to save motor run time.
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:	Defines the level to enable This value is based of the	e the PI output. it will be ab % of feedback which can b	ove or below according t e scaled based off the Pl	o PID reference or feedback c unit min./max, values.	lepend on P7.2.1.3 setting,
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 boost	ed via a multiplier value.			
P7.2.2.6 ²	PI setpoint 1 sleep lev	rel			ID 2450
Minimum value:	MinFreq Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	Defines the level of which delay time, it will put the c	the unit value is used to lo Irive into the sleep mode.	ok at to go into the sleep	mode. When the unit drops	below this level for the sleep
P7.2.2.7 ²	SP1 sleep mode over o	cycle time			ID 1842
Minimum value:	0	Maximum value:	10	Default value:	0
Description:	Defines the count the drive cycle" fault. One cycle is defined when O value means do not do th	e come in and out of sleep the drive transfers from no he sleep over cycle check a	mode. If multiple times d ormal mode to sleep mode nd clear "pump over cycle	one in this time frame, the dr e. ″ fault.	ive would trip on "pump over
P7.2.2.8 ^②	SP1 sleep mode maxin	num cycle time			ID 1843
Minimum value:	0 s	Maximum value:	3,600 s	Default value:	300 s
Description:	Defines the maximum time	e for sleep over cycle check	ing.		

Table 64. Setpoint (Continued).

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 = Al; 4 = Drive reference pot; 5 = FB process data input 1; 6 = FB process data input 3; 8 = FB process data input 4; 9 = FB process data input 4; 10 = FB process data input 5; 10 = FB process data input 1; 11 = FB process data input 1; 12 = FB PI setpoint 1; 14 = FB PI setpoint 2.	6; 7; 8;			
Description:	Defines source of the setpo fieldbus message.	int value the drive uses. T	his can either be an internal	preset value, keypad setpoir	nt, analog signal, or
P7.2.3.2 ^①	PI setpoint 2 sleep ena	ble			ID 1324
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0

Options:	0 = Disabled; 1 = Enabled.								
Description:	This function will disal re-engages when feed	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:	This parameter sets th shut off till the wake u	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	-up level		·	ID 1327				
Minimum value:	-99999.99 varies	Maximum value:	99999.99 varies	Default value:	0.00 varies				
Description:	Defines the level for the feedback which can be	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 boost	t			ID 1329				
Minimum value:	-2.00 varies	Maximum value:	2.00 varies	Default value:	1.00 varies				
Description:	The setpoint can be bo	oosted 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:	Defines the level of w delay time, it will put t	hich the unit value is used to he drive into the sleep mode.	look at to go into the sleep	mode. When the unit drops	below this level for the sleep				
P7.2.3.7 ²	SP2 sleep mode ov	ver cycle time			ID 1844				
Minimum value:	0	Maximum value:	10	Default value:	0				
Description:	Defines the count the cycle" fault. One cycle is defined w O value means do not d	drive come in and out of sleep then the drive transfers from do the sleep over cycle check	o mode. If multiple times of normal mode to sleep mod and clear "pump over cycl	done in this time frame, the c e. e″ fault.	Irive would trip on "pump over				
P7.2.3.8 ²	SP2 sleep mode m	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 chee	cking.						

Table 64. Setpoint (Continued).

Table 65. Feedback .

P7.3.1 - Standard.						
P7.3.1.1 ²	PI feedback gai	n			ID 1331	
Minimum value:	-1,000.0%	Maximum value:	1,000.0%	Default value:	100.0%	
Description:	Defines gain assoc	iated with the feedback signal fr	om the measuring devi	ce.		

P7.3.2 - Feedback 1.

P7.3.2.1 ^①	PI feedback 1 sour	ce			ID 1332	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2	
Options:	0 = Not used; 1 = Al; 2 = Drive reference pot 3 = FB process data inp 4 = FB Process Data Inp 5 = FB Process Data Inp 6 = FB Process Data Inp 8 = FB Process Data Inp 9 = FB Process Data Inp 10 = FB Process Data Inp 11 = FB PI feedback.	; jut 1; jut 2; jut 3; jut 3; jut 4; jut 5; jut 5; jut 5; jut 7; iput 8; or				
Description:	Defines where feedbac	k signal is being fed into the	drive, via analog or	fieldbus data value.		
P7.3.2.2 ²	PI feedback 1 mini	mum			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 maxi	mim			ID 1334	
Minimum value:	-200.00 %	Maximum value:	200.00%	Default value:	100.00%	
Description:	Maximim unit value for	the feedback signal.				

Table 66. HVAC parameters.

P8.1 - Damper (*DM1 PRO).						
P8.1.1 ⁰²	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 system, such 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 determines	the function of the dampe				
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 for an interlocked time start, after which the start sequence must be restarted if no acknowledgement contact is received.					
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 following a	delay start, after which the	e frequency converter will be	started.		

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

Table 66. HVAC parameters (Continued).

P8-2-1 ⁰²	Fire mode proted	ction			ID 535			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Closing contact 1 = Opening contact	initiates fire mode function. t initiates fire mode function.						
Description:	This parameter dete input function selec	This parameter determines whether the fire mode function is determined by a contact closure or contact opening on the desired dig input function select fire mode.						
	Note: When fire m this is enabled and	node is enabled, this causes the the drive causes issues to the sy	drive to ignore any faul vstem.	t and run till its death. Warrant	y will be non-valid in the case			
P8.2.2 ¹⁾²	Fire mode refere	Fire mode reference select function ID 536						
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Fire mode minim 1 = Fire mode refere 2 = Fieldbus referen 3 = AI; 4 = PI1 control - foll	0 = Fire mode minimum frequency; 1 = Fire mode reference; 2 = Fieldbus reference - reference from fieldbus process in; 3 = Al; 4 = PI1 control - follows the PI control algorithm settings.						
Description:	This parameter allo	This parameter allows for setting the reference location for when the fire mode is enabled.						
P8.2.3 ²	Fire mode minim	Fire mode minimum frequency						
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	be used as a selection for refer	ence command.			
P8.2.4 [®]	Fire mode freque	ency reference 1			ID 565			
Minimum value:	0.0%	Maximum value:	100.0%	Default value:	75.0%			
Description:	This parameter sets frequency (P1.2) for	the drive operating percentage fire mode reference 1.	based off the 0% being	g minimum frequency (P1.1) and 1	100% being maximum			
P8.2.5 ²	Fire mode freque	ency reference 2			ID 564			
Minimum value:	0.0%	Maximum value:	100.0%	Default value:	100.0%			
Description:	This parameter sets frequency (P1.2) for	the drive operating percentage fire mode reference 2.	based off the 0% being	g minimum frequency (P1.1) and 1	100% being maximum			
P8.2.6	Fire mode test e	nable			ID 2443			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.			
Options:	0 = Disabled; 1 = Enabled.							
Description:	This parameter allow run at the fire mode	ws for testing the fire mode feat speed desired but all faults are	ure. With the paramet enabled.	er set to enable and fire mode ir	put enabled, the drive will			
P8.2.7 ¹²	Smoke purge fre	quency			ID 554			
Minimum value:	0.0%	Maximum value:	100.0%	Default value:	50.0%			
Description:	Frequency setting for frequency (P1.1) and	or smoke purge. Preset speed u I 100% being maximum frequenc	sed for a digital input so cy (P1.2).	election. The percentage is base	ed off the 0% being minimum			

P8.3 - Protections (*DM1 PRO).

P8.3.1 ⁰²	Broken belt protection	ID 317					
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0		
Options:	0 = No action; 1 = Warning; 2 = Fault - stop mode after fault according to parameter stop mode; 3 = Fault - stop mode after fault always by coasting.						
Description:	If fault is set as the function status of the motor. If the Deactivating the protection	If fault is set as the function, the drive will stop and activate the fault stage based on the parameter conditions and the monitoring status of the motor. If the motor torque drops below the Fnom and F0 torque levels for the time limit, the protection is enabled.					



	nequency: n yea						
P8.3.4 ²	Broken belt tin	Broken belt time limit					
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 67. P	ump parameters	•
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P9.1 - Derag (*DM1 PRO).						
P9.1.1 ²	Derag cycles				ID 2468	
Minimum value:	0	Maximum value:	10	Default value:	3	
Description:	This parameter defines the	e number of cycles in the f	orward/reverse direction for	removing any debris in syste	m.	
P9.1.2 ²	Derag at Start/Stop				ID 2469	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	$\begin{array}{l} 0 = Off;\\ 1 = Start;\\ 2 = Stop;\\ 3 = Start and stop;\\ 4 = Digital input;\\ 5 = Current. \end{array}$					
Description:	Defines how the derage fu	inction will become activa	ted; start, stop, both or based	d off the digital input,motor o	current.	
P9.1.3 ²	Deragging run time	Deragging run time				
Minimum value:	1 s Maximum value: 3,600 s Default value:				0 s	
Description:	Defines the length of time	the drive will run at the d	erag speed in the forward an	d 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 for	ward/reverse direction when	in the derag mode.		
	PI8.1.11 Frequency (Hz) Cycle 2 Cycle 3 Cycle 4 P18.1.14 Time (sed) Time (sed)					
P9.1.5 ²	Derag off delay				ID 2472	
Minimum value:	1 s	Maximum value:	600 s	Default value:	10 s	
Description:	Defines the length of time	the drive will run the dera	ag function when enabled at s	stop.		
P9.1.6 ¹²	Derag current				ID 1879	
Minimum value:	N.A. A	Maximum value:	N.A. A	Default value:	0.00 A	
	Define derag active currer value "current".	it vaule. Motor current > D	erag Current , derag is active	if parameter Derag at Start	/Stop(Par ID2468) select	

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; 3 = Damper delay.					
Description:	This parameter determines 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 for received.	an interlocked time start, a	fter which the start sequenc	e must be restarted if no ac	knowledgement contact is	
P9.2.3 ¹⁾²	Valve delay				ID 1849	
Minimum value:	1 s	Maximum value:	32,500 s	Default value:	5 s	
Description:	The delay time following a	a delay start, after which th	e frequency converter will be	e started.		

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 the run signal is given. It i Control places.	sets the time required for s ignored until the time ha	the drive to wait before anotl s expired upon which it will t	her run command can be rec hen start. This is true for ke	eived. During this time, eypad, I/O, or Fieldbus	
P9.2.5 ¹²	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 ra	amp 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 multi-drive (*DM1 PRO).

P9.3.1 ⁰²	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:	Determines the number of 0 = Disabled - single drive 1 = Multi-drive - multi-follo	Determines the number of drives being used in the multi-pump configuration: D = Disabled - single drive for motor; 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 active at one time. By set	f drives active when doing ting value to above one, it	the multi-drive pump an allows for bringing in ad	d fan scheme. By default, the ditional drives to maintain the	re will be always one drive 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; 1 = PI controller.							
Description:	For drives that have been of to be the master.	connected with both start	/stop signal and PI feedb	ack - can be set up as "Feedba	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 the s	setpoint above and below	which defines when the	auxiliary motor will come onlir	ne or offline.			
P9.3.6 ¹²	Staging frequency				ID 2315			
Minimum value:	MinFreq	Maximum value:	400.00	Default value:	50.00			
Description:	Output frequency is above	stagging frequency and P	l error is out of PI bandw	ridth - motor should add to sys	tem.			
P9.3.7 ⁰²	De-staging frequency				ID 2316			
Minimum value:	0.00	Maximum value:	MaxFreq	Default value:	0.00			
Description:	Output frequency is below	de-stagging frequency ar	nd PI error is out of PI bar	ndwidth - motor should remove	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:	With feedback outside the	bandwidth, this time mus	st pass before motors/pu	mps are added or removed fro	m the system.			

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

Table 67.	Pump	parameters	(Continued).
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P9.3.9 ²	Interlock enabled ID 350							
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Disabled; 1 = Enabled.							
Description:	This parameter enables the 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; 1 = Stop.							
Description:	This parameter is for the s However, the slave drive w	lave when multi-drive syste vill stop immediately if it is	em lost the master. The slave set to be "Stop".	e drive can continue run if it	set to be "Automatic".			
P9.3.11 ²	Add/remove drive sele	ction			ID 2311			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0			
Options:	0 = Drive ID; 1 = Run time.							
Description:	In default, MPFC system will add/remove pump according to their drive ID, from small to large; and the order can also depend on each slave drive's running time: add the drive has shortest running time and remove the drive has longest running 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; 1 = Enabled.							
Description:	The run time counter will s	start counting only if this pa	rameter 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 thi	s limit, its network status v	vill be "Need Alternation". L	imit equals 0 means run tim	e 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; 1 = Reset.							
Description:	One-time parameter, set to	o be 1 will clear run time co	unter.					
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; 2 = Turn off.							
Description:	Defines how the master dr	rive will maintain the freque	ency control when slaves are	brought in; follow PI, fixed s	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 fre	equency when the master d	rive mode is set for fixed spe	eed control when slaves are	brought in.			
P9.3.17 ²	Master fixed speed de	lay			ID 2475			
Minimum value:	0 s	Maximum value:	1,000 s	Default value:	5 s			
Description:	Defines the delay time bef or turn off.	Defines the delay time before the master drive begins running at the fixed speed or turns off if the master mode is set for fixed speed or turn off.						

P9.4 - Pipe fill (Loss	of prime) (*DM1 PRO).				
P9.4.1 ¹²	Pipe fill loss respor	ıse			ID 2410
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No action; 1 = Warning; 2 = Fault; 3 = Fault, coast.				
Description:	Defines the response n	nethod when a "Loss of Prim	e" condition occurs		
P9.4.2 ¹²	Pipe fill loss detect	ion method			ID 2406
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Motor current; 1 = Motor power (%); 2 = Motor torque (%).				
Description:	Defines the value for lo	ooking at a loss of prime.			
P9.4.3 ²	Pipe fill loss low le	vel			ID 2407
Minimum value:	0.00 varies	Maximum value:	1,000.00 varies	Default value:	0.00 varies
Description:	If the monitor value is I	ess than low level value and	I the output frequency is	s more than low frequency, chec	k the pipe fill loss start.
P9.4.4 ⁰²	Pipe fill loss low fre	equency			ID 2409
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	Defines the freqeuency is disabled.	point at which the drive nee	eds to be above to enab	led the "Loss of Prime" feature.	When set to 0 Hz protection
P9.4.5 ^②	Pipe fill loss high le	evel			ID 1851
Minimum value:	0.0 varies	Maximum value:	1,000.0 varies	Default value:	0.0 varies
Description:	If the monitor value is r loss start.	nore than high level (the hig	h level is not 0) and the	output frequency is more than h	igh frequency, check pipe fill
P9.4.6 ⁰²	Pipe fill loss high f	requency			ID 1852
Minimum value:	0.00 Hz	Maximum value:	MaxFreq Hz	Default value:	0.00 Hz
Description:	Defines high frequency is disabled.	point at which the drive nee	eds to be above to enabl	led the "loss of prime" feature.	When set to 0 Hz, protection
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	before a "loss of prime" con	dition will occur based o	of the detection method and prin	ne loss level.
P9.4.8 ²	Pipe fill loss attem	pts			ID 2411
Minimum value:	0	Maximum value:	10	Default value:	1
Description:	Defines the amount of	attemps to auto restart the	drive on a "prime loss" c	ondition.	

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; 1 = Enabled.				
Description:	Prime pump enable.				

P9.5.2 ²	Prime pump leve	1			ID 2429
Minimum value:	0.00 varies	Maximum value:	6,000.00 varies	Default value:	0.00 varies
Description:	This defines the leve becomes deactivate	el at which the prime pump func d. If the level is not reached, it	tion will drop out. If the f will switch after the dela	eedback level raises above tl y time.	nis 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:	Selects the limit to i the prime loss of tim	ndicate a loss of prime in pump ne setting, the drive will display	. If the measured current "pipe fill loss".	drops below the determined	value for the value assigned in
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 leve becomes deactivate	el at which the prime pump func d. If the level is not reached, it	tion will drop out. If the f will switch after the dela	eedback level raises above tl y time.	nis 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	el 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:	Selects the limit to i the prime loss of tim	ndicate a loss of prime in pump ne setting, the drive will display	. If the measured current pipe fill loss.	drops below the determined	value for the value assigned in

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

P9.6.1 ⁰²	Broken pipe fault resp		ID 1853		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = No action; 1 = Warning; 2 = Fault, coast; 3 = Fault.				
Description:	Broken pipe fault/warning broke pipe frequency for d	shall be triggered if the PI t elay time.	feedback is less than broken	pipe level and the drive out	out 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 frequency	V			ID 1856
Minimum value:	1.00 Hz	Maximum value:	MaxFreq Hz	Default value:	25.00 Hz
Description:	Broken pipe frequency.				

P9.6.4 ² Br	roken pipe delay				ID 1855
Minimum value: 1.0	0 s	Maximum value:	120.0 s	Default value:	15.0 s
Description: Bro	roken 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.

Table 68. Fieldbus (FB) status .

P10.1 - FB process da	ta input selection.			
P10.1.1 ^②	FB process data input 1 selection			ID 2533
Minimum value:	0 Maximum value:	12,464	Default value:	0
Description:	With the Fieldbus Data Input Selections, parameter Fieldbus Network Word for Process Data. Any drive	r/monitor ids can be e parameter with an	assigned to these registers and ther ID can be read over these values.	read over the desired
	Default Values for Process Data In Process Data IN1 = NULL = ID 0 Process Data IN2 = FB PID Set Point1= ID 2542 Process Data IN3 = FB PID Feedback1= ID 2550 Process Data IN4 = Acceleration time 1= ID 103 Process Data IN5 = Deceleration time 1= ID 104 Process Data IN6 = Current limit= ID 107 Process Data IN7 = NULL= ID 0 Process Data IN8 = NULL= ID 0			
P10.1.2 ²	FB process data input 2 selection			ID 2534
Minimum value:	0 Maximum value:	12,464	Default value:	2,542
Description:	With the fieldbus data output selections, paramete fieldbus network word for process data. Any drive 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; Process data IN6 = Current limit= ID 107; Process data IN7 = NULL= ID 0; Process data IN8 = NULL= ID 0.	r/monitor IDs can be parameter with an	e assigned to these registers and the ID can be read over these values.	n read over the desired
P10.1.3 ²	FB process data input 3 selection			ID 2535
Minimum value:	0 Maximum value:	12,464	Default value:	2,550
Description:	With the Fieldbus Data Input Selections, parameter Fieldbus Network Word for Process Data. Any drive Default Values for Process Data In: Process Data IN1 = NULL = ID 0; Process Data IN2 = FB PID Set Point1= ID 2542; Process Data IN3 = FB PID Feedback1= ID 2550; Process Data IN4 = Acceleration time 1= ID 103; Process Data IN5 = Deceleration time 1= ID 104; Process Data IN6 = Current limit= ID 107; Process Data IN7 = NULL= ID 0; Process Data IN8 = NULL= ID 0;	r/monitor ids can be a parameter with an	assigned to these registers and ther ID can be read over these values.	read over the desired

Table 68. 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:	With the fieldbus data output selections, paramete fieldbus network word for process data. Any drive	r/monitor IDs can be a parameter with an ID	assigned to these registers and the can be read over these values.	n read over the desired
	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; Process data IN6 = Current limit= ID 107; Process data IN7 = NULL= ID 0; Process data IN8 = NULL= ID 0.			
P10.1.5 ²	FB process data input 5 selection			ID 2537
Minimum value:	0 Maximum value:	12,464	Default value:	104
Description:	With the fieldbus data output selections, paramete fieldbus network word for process data. Any drive	r/monitor IDs can be a parameter with an ID	assigned to these registers and the can be read over these values.	n read over the desired
	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; Process data IN6 = Current limit= ID 107; Process data IN7 = NULL= ID 0; Process data IN8 = NULL= ID 0.			
P10.1.6 ²	FB process data input 6 selection			ID 2538
Minimum value:	0 Maximum value:	12,464	Default value:	107
Description:	With the fieldbus data output selections, paramete fieldbus network word for process data. Any drive 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; Process data IN6 = Current limit= ID 107; Process data IN7 = NULL= ID 0; Process data IN8 = NULL= ID 0.	r/monitor IDs can be a parameter with an ID	assigned to these registers and the can be read over these values.	n 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:	With the fieldbus data output selections, paramete fieldbus network word for process data. Any drive 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; Process data IN6 = Current limit= ID 107; Process data IN8 = NULL= ID 0; Process data IN8 = NULL= ID 0;	r/monitor IDs can be a parameter with an ID	assigned to these registers and the can be read over these values.	n read over the desired

P10.1.8 ²	FB process data inpu	ID 2540			
Minimum value:	0	Maximum value:	12,464	Default value:	0
Description:	With the fieldbus data or fieldbus network word for Default values for process Process data IN1 = NULL Process data IN2 = FB PI Process data IN3 = FB PI Process data IN4 = Acce Process data IN5 = Dece Process data IN5 = Dece Process data IN7 = NULL Process data IN8 = NULL	utput selections, paramete process data. Any drive ss data in: = ID 0; Set Point1= ID 2542; Feedback1= ID 2550; leration time 1= ID 103; leration time 1= ID 104; ent limit= ID 107; = ID 0; = ID 0.	/monitor IDs can b parameter with an	e assigned to these registers and then ID can be read over these values.	read over the desired

Table 68. Fieldbus (FB) status (Continued).

P10.2 - FB process data output selection.

P10.2.1 ²	FB process data outpu	ıt 1 selection			ID 1556
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Description:	With the fieldbus data out fieldbus network word for	put selections, parameter/ process data. Any drive p	monitor IDs can be assig arameter with an ID can	gned to these registers and then I be read over these values.	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 Out5 = Moto Process data Out6 = Moto Process data Out7 = DC lin Process data Out8 = Lates	data out in fieldbus (build ut frequency = ID 1; r speed = ID 2; r current = ID 3; r torque = ID 4; r power = ID 5; r voltage = ID 6; k voltage = ID 7; t fault code = ID 28.	table for below values):		
P10.2.2 ^②	FB process data outpu	It 2 selection			ID 1557
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2
Description:	With the fieldbus data out fieldbus network word for 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 Out5 = Moto Process data Out6 = Moto Process data Out7 = DC lin Process data Out8 = Lates	put selections, parameter/ process data. Any drive p data out in fieldbus (build ut frequency = ID 1; r speed = ID 2; r current = ID 3; r torque = ID 4; r power = ID 5; r voltage = ID 6; ik voltage = ID 7; t fault code = ID 28.	monitor IUs can be assi arameter with an ID can table for below values):	gned to these registers and then be read over these values.	read over the desired
P10.2.3 ^②	FB process data outpu	ıt 3 selection			ID 1558
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	3
Description:	With the fieldbus data out fieldbus network word for 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 Out5 = Moto Process data Out6 = Moto Process data Out7 = DC lin Process data Out8 = Lates	put selections, parameter/ process data. Any drive p data out in fieldbus (build it frequency = ID 1; r speed = ID 2; r current = ID 3; r torque = ID 4; r power = ID 5; r voltage = ID 6; ik voltage = ID 7; t fault code = ID 28.	monitor IDs can be assi arameter with an ID can table for below values):	gned to these registers and then be read over these values.	read over the desired

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

Table 68. Fieldbus (FB) status (Continued).

P10.2.4 ²	FB process data output	4 selection			ID 1559
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	4
Description:	With the fieldbus data outpu fieldbus network word for p	it selections, parameter ocess data. Any drive j	/monitor IDs can be a parameter with an ID	ssigned to these registers and the can be read over these values.	n read over the desired
	Default values for process d Process data Out1 = Output Process data Out2 = Motor s Process data Out3 = Motor o Process data Out5 = Motor o Process data Out5 = Motor o Process data Out6 = Motor o Process data Out7 = DC link Process data Out8 = Latest f	ata out in fieldbus (build frequency = ID 1; speed = ID 2; surrent = ID 3; orque = ID 4; power = ID 5; roltage = ID 6; voltage = ID 7; ault code = ID 28.	l table for below value	35):	
P10.2.5 ²	FB process data output	5 selection			ID 1560
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Description:	With the fieldbus data outpu fieldbus network word for p	it selections, parameter ocess data. Any drive j	/monitor IDs can be a parameter with an ID	ssigned to these registers and the can be read over these values.	n read over the desired
	Default values for process d Process data Out1 = Output Process data Out2 = Motor s Process data Out3 = Motor o Process data Out4 = Motor o Process data Out5 = Motor o Process data Out6 = Motor o Process data Out7 = DC link Process data Out8 = Latest d	ata out in fieldbus (build frequency = ID 1; speed = ID 2; urrent = ID 3; orque = ID 4; power = ID 5; roltage = ID 6; voltage = ID 7; 'ault code = ID 28.	l table for below value	25):	
P10.2.6 ²	FB process data output	6 selection			ID 1561
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	6
Description:	With the fieldbus data outpu fieldbus network word for pr Default values for process d Process data Out1 = Output Process data Out2 = Motor of Process data Out3 = Motor of Process data Out4 = Motor t Process data Out5 = Motor of Process data Out5 = Motor of Process data Out7 = DC link Process data Out8 = Latest f	It selections, parameter rocess data. Any drive p ata out in fieldbus (build frequency = ID 1; speed = ID 2; surrent = ID 3; orque = ID 4; solvage = ID 6; voltage = ID 6; voltage = ID 7; ault code = ID 28.	/monitor IDs can be a parameter with an ID I table for below value	ssigned to these registers and the can be read over these values. as):	n read over the desired
P10.2.7 ²	FB process data output	7 selection			ID 1562
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	7
Description:	With the fieldbus data outpu fieldbus network word for pr Default values for process d Process data Out1 = Output Process data Out2 = Motor s Process data Out3 = Motor t Process data Out4 = Motor t Process data Out5 = Motor y Process data Out6 = Motor y Process data Out7 = DC link	It selections, parameter rocess data. Any drive p ata out in fieldbus (build frequency = ID 1; speed = ID 2; current = ID 3; orque = ID 4; power = ID 5; roltage = ID 5; voltage = ID 7; isult and e. ID 29	/monitor IDs can be a parameter with an ID I table for below value	ssigned to these registers and the can be read over these values. as):	n read over the desired

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

P10.2.8 ²	FB process d	ID 1563			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	28
Description:	With the fieldb fieldbus netwo Process data 0 Process data 0	us data output selections, paramete rk word for process data. Any drive for process data out in fieldbus (build ut1 = Output frequency = ID 1; ut2 = Motor speed = ID 2; ut3 = Motor current = ID 3; ut4 = Motor torque = ID 4; ut5 = Motor roltage = ID 5; ut6 = Motor voltage = ID 6; ut7 = DC link voltage = ID 7; ut8 = Latest fault code = ID 28.	r/monitor IDs car parameter with a d table for below	be assigned to these registers and then n ID can be read over these values. values):	read over the desired

Table 68. Fieldbus (FB) status (Continued).

P10.3 - Standard status word.

P10.3.1 ²	Standard status word Bit0 function s	ID 2415		
Minimum value:	N.A. Maximum val	lue: N.A.	Default value:	1
Options:	0 = Not used; 1 = Ready; 2 = Run; 3 = 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; 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 = Znd stage ramp frequency active; 39 = Prime pump active; 40 = Master drive state; 41 = Slave drive state; 43 = Single drive control.			
Description:	This parameter allows for setting one of the status word. This also can be viewed in the	e RO functions to a status we	ord that then can be read over the	communication standard

Table 68.	Fieldbus	(FB) sta	tus (Con	tinued).
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P10.3.2 ²	Standard status word Bit 1 function select					
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	2	
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 supervisio; 10 = Pl supervision; 11 = Torque limit supervisio; 12 = Reference limit supervisio; 13 = Power limit supervisio; 14 = Temperature limit supervisio; 15 = Analog input supervisi; 16 = Motor current supervisi; 17 = Over heat fault; 18 = Overcurrent regular; 20 = Undervoltage regular; 21 = 4 mA reference fault/, 22 = External fault/warning; 23 = Motor thermal protect; 24 = STO fault output; 25 = Control from I/O; 26 = Remote control; 27 = Un-requested rotation; 28 = Diamper control; 31 = Jog speed select; 32 = Fieldbus digital input 12; 33 = Fieldbus digital input 12; 34 = DC charge switch clos; 35 = Preheat active; 36 = Cold weather active; 37 = PI Sleep 38 = 2nd stage ramp freque; 49 = Master drive state; 41 = Single drive control; 29 = Damper control; 21 = Jog speed select; 23 = Prime pump active; 40 = Master drive state; 41 = Single drive control; 43 = Single drive control; 44 = DC charge state; 45 = Cold weather active; 45 = Cold weather active; 46 = Master drive state; 47 = Single drive control; 47 = Single drive control; 48 = DC charge state; 49 = Prime pump active; 40 = Master drive state; 41 = Single drive control; 45 = Cold weather active; 46 = Master drive state; 47 = Single drive control; 40 = Master drive state; 41 = Single drive control; 40 = Master drive state; 41 = Single drive control; 41 = Single drive control; 42 = Stor state; 43 = Single drive control; 44 = Control; 45 = Control; 45 = Control; 45 = Control; 46 = Control; 47 = Control; 48 = Control; 48 = Control; 48 = Control; 49 = Control; 40 = Con	sion; n; ision; n; ervision; on; sion; warning; ; ; on; direction; ; ; e; ency active;				
Description:	status word. This also can	be viewed in the keypad n	nonitor value M5.3.	en can be read over the comr	nunication 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.

P10.3.3 ²	Standard status word	ID 2417			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	3
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 supervisio; 11 = Torque limit supervisio; 12 = Reference limit supervisio; 13 = Power limit supervisio; 14 = Temperature limit supervisio; 15 = Analog input supervisi; 16 = Motor current supervisi; 17 = Over heat fault; 18 = Overcurrent regular; 20 = Undervoltage regular; 20 = Undervoltage regular; 20 = Undervoltage regular; 21 = 4 mA reference fault/v22 = External fault/warning; 23 = Motor thermal protect; 24 = STO fault output; 25 = Control from I/O; 26 = Remote control; 30 = Valve control; 30 = Valve control; 31 = Jog speed select; 32 = Fieldbus digital input 2; 34 = DC charge switch clos; 35 = Preheat active; 36 = Cold weather active; 37 = PI Sleep 38 = 2nd stage ramp freque; 39 = Prime pump active; 40 = Master drive state; 41 = Slave drive state; 43 = Single drive control.	sion; n; rision; n; ervision; ion; sion; warning; g; tion; direction; 1; 2; ;e; ency active;			
Description:	This parameter allows for s status word. This also can	setting one of the RO functi be viewed in the keypad m	ons to a status word that the nonitor value M5.3.	en can be read over the com	munication standard

Table 68. Fieldbus (FB) status (Continued).

P10.3.4 ^②	Standard status word Bit 3 function select ID 2418					
Minimum value:	N.A.	Maximum value:	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 supervisio; 10 = Pl supervision; 11 = Torque limit supervisio; 12 = Reference limit supervisio; 13 = Power limit supervisio; 14 = Temperature limit supervisio; 15 = Analog input supervisi; 16 = Motor current supervisi; 17 = Over heat fault; 18 = Overcurrent regular; 20 = Undervoltage regular; 21 = 4 mA reference fault/, 22 = External fault/warning; 23 = Motor thermal protect; 24 = STO fault output; 25 = Control from I/O; 26 = Remote control; 27 = Un-requested rotation; 28 = Diamper control; 31 = Jog speed select; 32 = Fieldbus digital input 12; 33 = Fieldbus digital input 12; 34 = DC charge switch clos; 35 = Preheat active; 36 = Cold weather active; 37 = PI Sleep 38 = 2nd stage ramp freque; 40 = Master drive state; 41 = Single drive control.	sion; n; ision; n; ervision; on; sion; warning; ; ; on; direction; ; ; e; ency active;				
Description:	status word. This also can	be viewed in the keypad n	nonitor value M5.3.	en can de read over the Comr	numication 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.

P10.3.5 ²	Standard status word Bit 4 function select				ID 2419
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	5
Options:	0 = Not used; 1 = Ready; 2 = Run; 3 = Fault; 4 = Fault invert; 5 = Warning; 6 = Reversed; 7 = At speed; 8 = Zero frequency limit supervi 10 = Pl supervision; 11 = Torque limit supervisio; 12 = Reference limit supervisio; 13 = Power limit supervisio; 14 = Temperature limit supervisio; 15 = Analog input supervisi; 16 = Motor current supervisi; 17 = Over heat fault; 18 = Overcurrent regular; 20 = Undervoltage regular; 20 = Undervoltage regular; 20 = Undervoltage regular; 21 = 4 mA reference fault/ 22 = External fault/warnin; 23 = Motor thermal protec; 24 = STO fault output; 25 = Control from I/O; 26 = Remote control; 30 = Valve control; 31 = Jog speed select; 32 = Fieldbus digital input 1; 33 = Fieldbus digital input 1; 34 = DC charge switch clos 35 = Preheat active; 36 = Cold weather active; 37 = PI Sleep 38 = 2nd stage ramp frequu 39 = Prime pump active; 40 = Master drive state; 41 = Slave drive state; 43 = Single drive control.	sion; n; rision; n; ervision; ion; sion; warning; g; tion; h direction; 1; 2; se; ency active;			
Description:	This parameter allows for s status word. This also can	setting one of the RO funct be viewed in the keypad m	ions to a status word that the nonitor value M5.3.	en can be read over the com	munication standard

Table 68. Fieldbus (FB) status (Continued).

Table 68.	Fieldbus (FB) status	(Continued).
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P10.3.6 ^②	Standard status wor	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 superi 10 = Pl supervision; 11 = Torque limit 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; 22 = External fault/warn; 23 = Motor thermal prote; 24 = STO fault output; 25 = Control from I/O; 26 = Remote control; 27 = Un-requested rotati 28 = Fire mode; 29 = Damper control; 31 = Jog speed select; 32 = Fieldbus digital inpu; 33 = Fieldbus digital inpu; 34 = DC charge switch ci 35 = Preheat active; 36 = Cold weather active; 37 = PI Sleep; 38 = 2nd stage ramp free; 39 = Prime pump active; 40 = Master drive state; 41 = Single drive control; 42 = Stage drive state; 43 = Single drive control; 44 = Single drive control; 45 = Control free pump active; 45 = Control free pump active; 45 = Control free pump active; 45 = Single drive control; 45 = Control; 46 = Control; 47 = Control; 48 = Control; 48 = Control; 48 = Control; 40 = Control;	vision; sion; pervision; ion; ipervision; ision; vision; fr; t/warning; ing; pection; on direction; t 1; t 2; ose; ; juency active;			
Description:	status word. This also c	r setting one of the RU fund an be viewed in the keypad	monitor value M5.	/ord that then can be read over the c 3.	ommunication 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.

P10.3.7 ²	Standard status word Bit 6 function select ID				
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	7
Options:	0 = Not used; 1 = Ready; 2 = Run; 3 = Fault; 4 = Fault invert; 5 = Warning; 6 = Reversed; 7 = At speed; 8 = Zero frequency; imit supervision; 11 = Torque limit supervision; 11 = Torque limit 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; 20 = Undervoltage regular; 21 = 4 mA reference fault/v22 = External fault/warning; 23 = Motor thermal protect; 24 = STO fault output; 25 = Control from I/O; 26 = Remote control; 30 = Valve control; 30 = Valve control; 31 = Jog speed select; 32 = Fieldbus digital input 7; 33 = Fieldbus digital input 7; 34 = DC charge switch closs 35 = Preheat active; 36 = Cold weather active; 37 = PI Sleep 38 = 2nd stage ramp freques; 39 = Prime pump active; 40 = Master drive state; 41 = Slave drive state; 43 = Single drive control.	sion; n; rision; n; ervision; ion; sion; warning; g; tion; direction; 1; 2; se; ency active;			
Description:	This parameter allows for s status word. This also can	setting one of the RO functi be viewed in the keypad m	ons to a status word that the nonitor value M5.3.	en can be read over the com	munication standard

Table 68. Fieldbus (FB) status (Continued).

P10.3.8 ²	Standard status w	ID 2422			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	8
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 supe 12 = Reference limit supe 13 = Power limit supe 14 = Temperature limit 15 = Analog input sup 16 = Motor current sup 17 = Over heat fault; 18 = Overcurrent regu 19 = Overvoltage regu 20 = Undervoltage regu 20 = Undervoltage regu 21 = 4 mA reference f 22 = External fault/va 23 = Motor thermal pr 24 = STO fault output; 25 = Control from 1/0; 26 = Remote control; 27 = Un-requested rot 28 = Fire mode; 29 = Damper control; 31 = Jog speed select 32 = Fieldbus digital ir 33 = Fieldbus digital ir 34 = DC charge switcl 35 = Preheat active; 36 = Cold weather act 37 = PI Sleep 38 = 2nd stage ramp f 39 = Prime pump activ 40 = Master drive stat 41 = Slave drive cont	pervision; vision; ipervision; vision; ervision; ervision; ar; lar; ular; ault/warning; rring; otection; ation direction; ation direction; ive; requency active; e; e; ol.			
Description:	status word. This also	for setting one of the RU fun can be viewed in the keypad	monitor value M5.	vord that then can be read over the c 3.	ommunication standard

Table 68. Fieldbus (FB) status (Continued).

Table 69. Serial communication.

P11.1 - Basic settings	•				
P11.1.1 ^①	Serial communicati	on			ID 586
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Modbus RTU 1 = BACnet MS/TP 2 = SWD 3 = SA Bus				
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	Maximum value:	247	Default value:	1
Description:	This parameter defines the slave address for RS-485 communication.				

P11.2.2 ^①	Baud rate				ID 584
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	$\begin{array}{l} 0 = 9,600;\\ 1 = 19,200;\\ 2 = 38,400;\\ 3 = 57,600;\\ 4 = 115,200 \end{array}$				
Description:	This parameter defines cor	mmunication speed for RS-4	185 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; 2 = Even.				
Description:	This parameter defines par	rity type for RS-485 commu	nication.		
P11.2.4	Modbus RTU protocol	status			ID 588
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Initial; 1 = Stopped; 2 = Operational; 3 = Faulted.				
Description:	This parameter shows the	protocol status for RS-485	communication.		
P11.2.5	Communication timeo	ut modbus RTU			ID 593
Minimum value:	0 ms	Maximum value:	60,000 ms	Default value:	10,000 ms
Description:	Selects the time to wait be	efore a communication fault	coccurs over modbus RTU if	a message is not received.	
P11.2.6	Modbus RTU fault resp	ponse			ID 2516
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 - Only in fieldbus control communications; if not 1 - In all control modes. N	mode. When fieldbus is th in fieldbus control, place w o matter the control place s	e control place and fieldbus ill not fault. setting, if communication is l	fault is active, the drive will ost, fieldbus fault response v	fault on loss of will occur.
Description:	Defines the fieldbus fault of	condition for modbus RTU c	ommunication.		

P11.3 - BACnet MSTP (*DM1 Pro).

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; 4 = 115,200.				
Description:	This parameter defines th	e communication speed for F	RS-485 communication.		
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 BACnet	MSTP network.		
P11.3.3 ^①	MSTP instance number	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 BACn	et MSTP network.		
P11.3.4	MSTP communication	n 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 fault	occurs over BACnet MSTP i	f a message is not received.	

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; 2 = Faulted.				
Description:	This parameter shows the	protocol status for BACn	et MSTP commun	nication.	
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; 3 = Baud rate fault.				
Description:	This parameter shows the	protocol status for BACn	et MSTP commun	nication.	
P11.3.7	MSTP fault response				ID 2526
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Only in fieldbus contro communications. If no 1 = In all control modes - r	l mode - when fieldbus is it in fieldbus control, plac no matter the control plac	the control place e will not fault. e setting. If com	e and fieldbus fault is active, the drive w munication is lost, fieldbus fault respon	ill fault on loss of se will occur.
Description:	Defines the fieldbus fault	condition for BACnet MS	TP communicatior	n.	
P11.3.8	MSTP maximum mast	er			ID 1537
Minimum value:	1	Maximum value:	127	Default value:	127
Description:	Defines the maximum nun	nber of masters that can e	establish connecti	ions with the drive.	

P11.4 - SA bus (*DM1 Pro).

Minimum value: 204 Maximum value: 254 Default value: 204 Description: This parameter is used to set the SA bus address at which the drive will be located on instance node. ID 1727 P11.4.2 ^① SA bus baud rate ID 1727 Minimum value: N.A. Maximum value: N.A. Default value: 2 Options: 0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; 4 = 115,200. ID 1720 Description: This parameter defines communication speed for SA bus communication. ID 1730	; ID '	A bus device address	SA bus device address	P11.4.1 ^①
Description: This parameter is used to set the SA bus address at which the drive will be located on instance node. P11.4.2 ^① SA bus baud rate ID 1727 Minimum value: N.A. Default value: 2 Options: 0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; 4 = 115,200. ID 1727 Description: This parameter defines communication speed for SA bus communication. ID 1727 P11.4.4 SA communication timeout ID 1727	Maximum value:254Default value:204	04 Maximum value: 254	204 Maximum va	Minimum value:
P11.4.2 [®] SA bus baud rate ID 1727 Minimum value: N.A. Maximum value: N.A. Default value: 2 Options: 0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; 4 = 115,200. Image: Comparison of the comparison of	set the SA bus address at which the drive will be located on instance node.	Description:		
Minimum value: N.A. Maximum value: N.A. Default value: 2 Options: 0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; 4 = 115,200. Image: Comparison of the second sec	ID	A bus baud rate	SA bus baud rate	P11.4.2 ¹⁾
Options: 0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; 4 = 115,200. Description: This parameter defines communication speed for SA bus communication. P11.4.4 SA communication timeout	Maximum value:N.A.Default value:2	I.A. Maximum value: N.A.	N.A. Maximum va	Minimum value:
Description: This parameter defines communication speed for SA bus communication. P11.4.4 SA communication timeout		= 9,600; = 19,200; = 38,000; = 57,600; = 115,200.	0 = 9,600; 1 = 19,200; 2 = 38,000; 3 = 57,600; 4 = 115,200.	Options:
P11.4.4 SA communication timeout ID 1730	nmunication speed for SA bus communication.	his parameter defines communication speed for SA bus comm	This parameter defines communication spec	Description:
	neout ID	A communication timeout	SA communication timeout	P11.4.4
Minimum value:0Maximum value:60,000Default value:10,000	Maximum value:60,000Default value:10,0	Maximum value: 60,000	0 Maximum va	Minimum value:
Description: Selects the time to wait before a communication fault occurs over SA bus if a message is not received.	ofore a communication fault occurs over SA bus if a message is not received.	elects the time to wait before a communication fault occurs o	Selects the time to wait before a communic	Description:
P11.4.5 SA bus protocol status ID 1731	s ID	A bus protocol status	SA bus protocol status	P11.4.5
Minimum value:N.A.Maximum value:N.A.Default value:N.A.	Maximum value: N.A. Default value: N.A	I.A. Maximum value: N.A.	N.A. Maximum va	Minimum value:
Options: 0 = Stopped; 1 = Operational; 2 = Faulted.		= Stopped; = Operational; = Faulted.	0 = Stopped; 1 = Operational; 2 = Faulted.	Options:
Description: This parameter shows the protocol status for SA bus communication.	protocol status for SA bus communication.	his parameter shows the protocol status for SA bus communi	This parameter shows the protocol status f	Description:
P11.4.6 SA bus fault response ID 1732	ID [,]	A bus fault response	SA bus fault response	P11.4.6
Minimum value: N.A. Maximum value: N.A. Default value: 0	Maximum value:N.A.Default value:0	I.A. Maximum value: N.A.	N.A. Maximum va	Minimum value:
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.	mode - when fieldbus is the control place and fieldbus fault is active. The drive will fault t in fieldbus control, place will not fault. o matter the control place setting, if communication is lost, fieldbus fault response will o	 Only in fieldbus control mode - when fieldbus is the contro communications. If not in fieldbus control, place will not fa = In all control modes - no matter the control place setting, it 	0 = Only in fieldbus control mode - when fieldbus control mode - when fieldbus control 1 = In all control modes - no matter the control modes - no matter th	Options:
Description: Defines the fieldbus fault condition for SA bus communication.	condition for SA bus communication.	efines the fieldbus fault condition for SA bus communication.	Defines the fieldbus fault condition for SA b	Description:

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

P11.5 - SWD (*DM1	Pro).	·			
P11.5.1	Parameter access				ID 2630
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1
Options:	0 = No permission to rea 1 = Acyclic read/write a	ad/write on acyclic channel; re allowed on Profibus.			
Description:	PNU927 which specifies	s the operation priority of pa	rameters for acyc	lic communication.	
P11.5.2 ¹⁾	Parameter data acco	ess			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.				
Description:	PNU928 which specifies	s the control priority of the d	evice for cyclic co	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 era	s the fault situation counter. ed, then the whole fault buff sed.	er (actual fault sit	uation and all other fault situations) a	nd the fault message counter
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; B2-101 24 volt overload B3-Profibus communica B4-fieldbus fault.	on fault; fault; tion fault;			
P11.5.5	Firmware version				ID 2610
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	This parameter provides	the firmware version of the	SWD.		
P11.5.6	Protocol status				ID 2612
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Not configured; 1 = Operational; 2 = Diagnostics.				
Description:	This parameter specifie	s 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; 1 = Enabled.				
Description:	Bluetooth enabled.				
P11.6.2 ²	Bluetooth broadcast	mode	-	-	ID 2920
P11.6.2 ^② Minimum value:	Bluetooth broadcast N.A.	mode Maximum value:	N.A.	Default value:	ID 2920
P11.6.2 [®] Minimum value: Options:	Bluetooth broadcast i N.A. 0 = Off; 1 = On.	mode Maximum value:	N.A.	Default value:	ID 2920 0

P11.6.3	Bluetooth pairing rese	ID 2935			
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Not reset; 1 = Reset.				
Description:	Bluetooth pairing reset.				

Table 70. Ethernet communication (*DM1 Pro).

P12.1 - Basic settings	(*DM1 Pro).				
P12.1.1 ^①	IP address mode		·		ID 1500
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Static IP; 1 = DHCP with AutoIP.				
Description:	This parameter defined the	IP address configuration	mode for EIP/modbus TCP.		
P12.1.2	Active IP address				ID 1507
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Reads the current active IP	address.			
P12.1.3	Active subnet mask				ID 1509
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Reads the current active su	bnet 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 de	efault 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 add	dress.			
P12.1.6 ^①	Static IP address		·		ID 1501
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	192.168.1.254
Description:	Defines the static IP addres	SS.			
P12.1.7 ^①	Static subnet mask				ID 1503
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	255.255.255.0
Description:	Defines the static subnet m	nask.			
P12.1.8 ^①	Static default gateway	,			ID 1505
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	192.168.1.1
Description:	Defines the static default g	ateway.			
P12.1.9	Ethernet communication	on timeout			ID 611
Minimum value:	0 ms	Maximum value:	60,000 ms	Default value:	10,000 ms
Description:	Selects the time it waits be	efore a communication fa	ult occurs over ethernet.		

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

P12.2.1	Trusted IP white list				ID 68		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	192.168.1.255		
Description:	Defines the IP addresses ir	Defines the IP addresses in the white list. A setting of 192.168.1.255 enables all connections on the local subnet.					

P12.2.2	Trusted IP filter enable	e			ID 76		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1		
Options:	0 = Disabled; 1 = Enabled.						
Description:	Enables IP white listing. D	nables IP white listing. Devices not in the white list will not be able to establish communications with the drive.					

P12 3 - Modbus TCP (DM1 PBO only)

P12.3 - Wodbus TCF	(Divit PRO only).				
P12.3.1 ^①	Modbus TCP enal	ble			ID 1942
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disable; 1 = Enable.				
Description:	Enables Modbus TCF	communications, must be ena	bled to connect to	PC Software	
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	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 va	alue for modbus TCP.			
P12.3.4	Modbus TCP prot	ocol status			ID 612
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = Stopped; 1 = Operational; 2 = Faulted.				
Description:	This parameter show	vs the protocol status for modb	us TCP communicat	tion.	
P12.3.5	Modbus TCP faul	t response			ID 2517
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Only in fieldbus c communications. 1 = In all control mod	ontrol mode - when fieldbus is If not in fieldbus control, plac les - no matter the control plac	the control place a e will not fault. e setting, if commu	nd fieldbus fault is active, the drive	will fault on loss of nse 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	otocol select			ID 1997	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0	
Options:	0 = Disabled; 2 = BACnet IP.					
Description:	Selects the active com	nmunication protocol on the e	thernet I/P port.			
P12.4.2	Ethernet IP protoc	ol status			ID 608	
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.	
Options:	0 = Off; 1 = Operational; 2 = Faulted.					
Description:	Indicates if ethernet p	rotocol is active or not.				
P12.4.3	Ethernet IP fault re	esponse			ID 2518	

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

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 faul	t condition for ethernet IP c	ommunication			

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

P12.5.1 ^①	BACnet IP UDP port	number			ID 1733
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	47,808
Options:	47808 = BAC0; 47809 = BAC1; 47810 = BAC2; 47811 = BAC3; 47812 = BAC4; 47813 = BAC5; 47815 = BAC5; 47815 = BAC6; 47815 = BAC8; 47817 = BAC8; 47817 = BAC8; 47819 = BACB; 47819 = BACC; 47820 = BACC; 47821 = BACD; 47822 = BACE; 47823 = BACF.				
Description:	Defines the BACnet UDP	port number.			
P12.5.2 ^①	BACnet IP foreign de	evise			ID 1734
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				
Description:	Enables BACNET IP forei	gn 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 BBN	VD IP address.			
P12.5.4 ^①	BACnet IP UDP port				ID 1737
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	47,808
Options:	47808 = BAC0; 47809 = BAC1; 47810 = BAC2; 47811 = BAC3; 47812 = BAC4; 47813 = BAC5; 47815 = BAC5; 47815 = BAC6; 47815 = BAC8; 47817 = BAC9; 47818 = BAC8; 47819 = BACB; 47819 = BACC; 47820 = BACC; 47821 = BACD; 47822 = BACC; 47823 = BACF.				
Description:	Displays the BACnet BBN	MD UDP port number.			

BACnet IP registra	tion interval			ID 1738	
			Defendensland	10	
U	Maximum value:	65,535	Default value:	10	
Defines the registration	on interval.				
BACnet IP commu	nication timeout			ID 1739	
0 ms	Maximum value:	60,000 ms	Default value:	0 ms	
Selects the time it waits before a communication fault occurs over BACnet IP.					
BACnet IP protoco	ol status		· · · · · · · · · · · · · · · · · · ·	ID 1740	
N.A.	Maximum value:	N.A.	Default value:	0	
0 = Stopped; 1 = Operational; 2 = Faulted.					
This parameter shows	the protocol status for BACn	et IP communication.			
BACnet IP fault be	havior		·	ID 1741	
N.A.	Maximum value:	N.A.	Default value:	0	
 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. 					
Defines the fieldbus f	ault condition for BACnet IP co	mmunication.			
BACnet IP instanc	e number			ID 1742	
0	Maximum value:	4,194,302	Default value:	0	
Displays the BACnet i	nstance number.				
	BACnet IP registration 0 Defines the registration BACnet IP communation 0 ms Selects the time it was BACnet IP protocol N.A. 0 = Stopped; 1 = Operational; 2 = Faulted. This parameter shows BACnet IP fault be N.A. 0 = Only in fieldbus concommunications. 1 = In all control mode Defines the fieldbus fie	BACnet IP registration interval 0 Maximum value: Defines the registration interval. BACnet IP communication timeout 0 ms Maximum value: Selects the time it waits before a communication fa BACnet IP protocol status N.A. 0 = Stopped; 1 = Operational; 2 = Faulted. This parameter shows the protocol status for BACnet BACnet IP fault behavior N.A. Maximum value: 0 = Only in fieldbus control mode - when fieldbus is communications. If not in fieldbus control, place 1 = In all control modes - no matter the control place Defines the fieldbus fault condition for BACnet IP co BACnet IP instance number 0 Maximum value: Displays the BACnet instance number.	BACnet IP registration interval 0 Maximum value: 65,535 Defines the registration interval. BACnet IP communication timeout 0 ms Maximum value: 60,000 ms Selects the time it waits before a communication fault occurs over BACr BACnet IP protocol status N.A. Maximum value: N.A. 0 = Stopped; 1 = Operational; 2 2 = Faulted. This parameter shows the protocol status for BACnet IP communication. BACnet IP fault behavior N.A. Maximum value: N.A. 0 = Only in fieldbus control mode - when fieldbus is the control place and communications. If not in fieldbus control, place will not fault. 1 = In all control modes - no matter the control place setting. If communication. BACnet IP instance number 0 Maximum value: 4,194,302 Displays the BACnet instance number.	BACnet IP registration interval 0 Maximum value: 65,535 Default value: Defines the registration interval. BACnet IP communication timeout 0 ms Maximum value: 60,000 ms Default value: 0 ms Maximum value: 60,000 ms Default value: Selects the time it waits before a communication fault occurs over BACnet IP. BACnet IP protocol status N.A. Maximum value: N.A. Default value: 0 = Stopped; 1 = Operational; 2 Faulted. This parameter shows the protocol status for BACnet IP communication. BACnet IP fault behavior N.A. Default value: O = Only in fieldbus control mode - when fieldbus is the control place and Fieldbus fault is active, the drive or 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 responder the fieldbus fault condition for BACnet IP communication. BACnet IP instance number 0 Maximum value: 4,194,302 Default value: Displays the BACnet instance number. 4,194,302 Default value:	

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

NO UIIIY/.					
Web UI protocol st	tatus			ID 2915	
N.A.	Maximum value:	N.A.	Default value:	N.A.	
0 = Off; 1 = Operational; 2 = Faulted.					
This parameter shows	s the protocol status for web s	erver communication			
Web UI fault respo	onse		·	ID 2916	
N.A.	Maximum value:	N.A.	Default value:	0	
 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. 					
Web III communic	ation timeout			ID 2919	
30,000 ms	Maximum value:	60,000 ms	Default value:	60,000 ms	
Selects the time it wa	its before a communication fa	ult occurs over the w	veb server.		
Web UI enable				ID 2921	
N.A.	Maximum value:	N.A.	Default value:	0	
0 = Disabled; 1 = Enabled.					
Enables web server of	and in the second se				
	Web UI protocol s N.A. 0 = Off; 1 = Operational; 2 = Faulted. This parameter shows Web UI fault responses N.A. 0 = Only in fieldbus cc communications. 1 = In all control mode Defines the fieldbus f Web UI communications 30,000 ms Selects the time it was Web UI enable N.A. 0 = Disabled; 1 = Enabled.	Web UI protocol status N.A. Maximum value: 0 = Off; 1 = Operational; 2 = Faulted. This parameter shows the protocol status for web s Web UI fault response N.A. Maximum value: 0 = Only in fieldbus control mode - when fieldbus is communications. If not in fieldbus control place 1 = In all control modes - no matter the control place Defines the fieldbus fault condition for web server of Web UI communication timeout 30,000 ms Maximum value: Selects the time it waits before a communication fa Web UI enable N.A. Maximum value: 0 = Disabled; 1 = Enabled. 5 = black 5 = black	Web UI protocol status N.A. Maximum value: N.A. 0 = Off; 1 = Operational; 2 = Faulted. This parameter shows the protocol status for web server communication Web UI fault response N.A. Maximum value: N.A. 0 = Only in fieldbus control mode - when fieldbus is the control place and communications. If not in fieldbus control, place will not fault. 1 = In all control modes - no matter the control place setting. If commun Defines the fieldbus fault condition for web server communication. Web UI communication timeout 30,000 ms Maximum value: 60,000 ms Selects the time it waits before a communication fault occurs over the w Web UI enable N.A. N.A. Maximum value: N.A. 0 = Disabled; 1 = Enabled.	Web UI protocol status N.A. Maximum value: N.A. Default value: 0 = Off; 1 = Operational; 2 = Faulted. This parameter shows the protocol status for web server communication. Web UI fault response N.A. Maximum value: N.A. Default value: 0 = Only in fieldbus control mode - when fieldbus is the control place and fieldbus fault is active, the drive remmunications. 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 respo Defines the fieldbus fault condition for web server communication. Web UI communication timeout 30,000 ms Maximum value: 60,000 ms Default value: Selects the time it waits before a communication fault occurs over the web server. Web UI enable N.A. Default value: N.A. Maximum value: N.A. Default value: Default value: Selects the time it waits before a communication fault occurs over the web server. Web UI enable Default value: Default value: N.A. Maximum value: N.A. Default value: Default value: Default value: 0 = Disabled; 1 = Enabled. Enabled. Default value: Default value: Default valu	

P12.7 - (DM1 PRO only).

-					
P12.7.1 ^①	IOT Enable				ID 3001
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disabled; 1 = Enabled.				
Description:	IOT Enable				
P12.7.2 ¹⁾	IOT Connection Statu	s			ID 3002
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Disconnected; 1 = Connected.				
Description:	IOT Connection Status				
-					

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

Table 71. System.

P13.1 - Basic settings.					
P13.1.1	Language				ID 340
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = English; 1 = English; 2 = English.				
Description:	This parameter offers the available language is Engl	ability to control the frequ ish only.	ency converter throu	gh the keypad in the language of y	our 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; 3 = Multi-purpose.				
Description:	This parameter sets the ad	ctive application if multiple	e applications have be	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 = Load factory default particular 2 = Reload set 1; 3 = Reload set 2; 4 = Store parameter set 1; 5 = Store parameter set 2; 6 = Reset; 7 = Reload defaults VM.	arameters;			
Description:	This parameter allows you	to reload the factory defa	ult parameter values	, and to store and load two custon	nized parameter sets.
P13.1.4	Up to keypad (for rem	ote keypad only)			ID 620
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = No; 1 = Yes (all parameters).				
Description:	This function uploads all e	xisting parameter groups	to the keypad.		
P13.1.5 ^①	Down from keypad (fo	or remote keypad only)		ID 621
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Options:	0 = No; 1 = All parameters; 2 = All, no motor; 3 = Application parameter	S.			
Description:	This function downloads o	ne or all parameter groups	s from the keypad to t	the drive.	

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

P13.1.6	Parameter comparison	(for remote keypad or	nly)		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; 4 = Compare with Set 2.				
Description:	With the parameter compa and those loaded to the co	rison function, you can con ntrol keypad.	npare the actual parameter v	alues to the values of your	customized parameter sets
	The actual parameter value displayed on the lowermos	es are first compared to the t line of the keypad.	se of the customized param	eter Set 1. If no differences	s are detected, a "O" is
	If any of the parameter val	ues differ from those of the	e Set 1 parameters, the numb	per of the deviations is disp	layed together.
	By pressing the right arrow, value on the description lin can also edit the actual val	/ button, once again you wi le (in the middle) is the defa lue by pushing the right arro	ll see both the actual value a ault value, and the one on the ow button.	and the value it was compar e value line (lowermost line)	red to. In this display, the) is the edited value. You
	Actual values can also be o	compared to Set 2, factory	settings, and keypad set valu	Jes.	
P13.1.7	Parameter lock PIN (fo	or remote keypad only)			ID 624
Minimum value:	0	Maximum value:	9,999	Default value:	0
Description:	The application selection c enabled, the user will be p By default, the password fi between 1 and 9,999. To deactivate the password	an be protected against un rompted to enter a passwo unction is not in use. If you d, reset the parameter valu	authorized changes with the rd before application change I want to activate the passw e to 0.	password function. When s, parameter value changes rord, change the value of thi	the password function is s, or password changes. is parameter to any number
P13.1.8	Keypad parameter loci	k (for remote keypad o	nly)		ID 625
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Change enable; 1 = Change disable.				
Description:	This function allows the us the display if you try to edi	er to prohibit changes to th t a parameter value.	e parameters. If the parame	eter lock is activated, the te	ext "locked" will appear on
	Note: This function does n	ot prevent unauthorized ed	iting of parameter values.		
P13.1.9	Start-up Wizard	<u> </u>			ID 626
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Enabled. 1 = Disabled.				
Description:	The Startup Wizard facilita and then advances parame user to go to the Main men power up of the VFD. By s Start up. If user goes into	ates commissioning the VFE ters through the start-up p nu or default page and this etting this parameter to Dis Start Up Wizard after com	 If selected Enable, the Sta arameter list/Application Mi parameter is set to Disabled sable without going through pletion or defaults drive the 	rtup Wizard prompts opera ni wizard in keypad. After c . The Startup Wizard is alwa the Startup Wizard it will n Startup wizard will be Enab	tor for application desired ompletion it allows the ays enabled for the initial ot cause it to be active on led.

Table 71. System (Continued).

P13.2 - Keypad.

Local default page				ID 1875	
N.A.	Maximum value:	N.A.	Default value:	0	
0 = None; 1 = Monitor.					
Local default page sele	ection.				
Local monitor para	meter set			ID 1876	
N.A.	Maximum value:	N.A.	Default value:	1,1,0	
Local monitor paramet	er path. Default path is M1.1				
	Local default page N.A. 0 = None; 1 = Monitor. Local default page sele Local monitor para N.A. Local monitor parameter	Local default page N.A. Maximum value: 0 = None; 1 = Monitor. Local default page selection. Local monitor parameter set N.A. Maximum value: Local monitor parameter path. Default path is M1.1	Local default page N.A. Maximum value: N.A. 0 = None; 1 = Monitor. Local default page selection. Local default page selection. Local monitor parameter set N.A. Maximum value: N.A. Local monitor parameter path. Default path is M1.1.	Local default page N.A. Maximum value: N.A. Default value: 0 = None; 1 = Monitor. Local default page selection. Local default page selection. Local monitor parameter set N.A. Default value: N.A. Maximum value: N.A. Local monitor parameter path. Default value:	Local default page ID 1875 N.A. Maximum value: N.A. Default value: 0 0 = None; 1 = Monitor.

Table 71. System (Continued).

P13.2.3	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; 4 = Keypad reference.						
Description:	This parameter sets the vie switched on.	ew to which the display a	utomatically moves as th	e timeout time expires or wher	n the keypad power is		
	If the default page value is	0, the function is not act	ivated: i.e., the last displ	ayed page remains on the keyp	ad display.		
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 d	efines the time after whic	ch the keypad display ret	urns to the Default Page.			
	Note: If the default page v	alue is 0, the timeout tim	e setting has no effect.				
P13.2.5	Contrast adjust		5		ID 630		
Minimum value:	5	Maximum value:	18	Default value:	12		
Description:	If the remote keypad displa	ay is not clear, you can ad	just the keypad contrast	with this parameter.			
P13.2.6	Backlight time	· · · · ·			ID 631		
Minimum value:	1 min.	Maximum value:	65,535 min.	Default value:	10 min.		
Description:	This parameter determines	s how long the backlight s	tays on before going out				
P13.2.7	Fan control				ID 632		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	1		
Options:	0 = Continuous - fan runs c 1 = Temperature - based or 60°C (140°F). The fan minute after receiving the stop "Temperature". 2 = Run follow - after powe for common DC-bus sys	ontinuously. n the temperature of the u receives a stop command o command or switching o er up, the fan is stopped u stems to prevent cooling f	unit. The fan is switched when the heat sink temp on the power, as well as a until the run command is fans to load charging resi	on automatically when the her perature falls to 55°C (131°F). after changing the value from "I given and then fan runs continu stors on power up moment.	at sink temperature reaches The fan runs for about a Continuous" to Jously. This is mainly made		
Description:	This function allows you to	control the cooling fan.	You can set the fan to ru	n as stated in the options.			
P13.2.8	Keypad ACK timeout				ID 633		
Minimum value:	200 ms	Maximum value:	5,000 ms	Default value:	200 ms		
Description:	This function allows the us between the control modu keypad to delay message t	er to change the timeout le and the keypad. This w imeouts.	of the keypad acknowled vould be adjusted when u	Igement time. This is the comr Ising long communication cable	nunication performed es between drive and a		
	Example: = Transfer delay between t = The value of HMI acknow = The corresponding settin	the frequency converter a vledge timeout is set to 12 g shall be entered in the	nd the PC = 600.00 ms. 200.00 ms (2 x 600.00, se [Misc]-part of the file.	ending delay + receiving delay).			
	It must also be considered monitoring.	that intervals shorter tha	n the HMI acknowledge	timeout time cannot be used in	frequency converter drive		
P13.2.9	Keypad retry number				ID 634		
Minimum value:	1	Maximum value:	10	Default value:	5		
Description:	With this parameter you ca within the acknowledgeme	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 - User display.							
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P13.3.1 ²	Output display unit				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 = I/s; 6 = I/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; 23 = gal/s; 24 = gal/min; 25 = gal/h; 30 = ft3/s; 31 = ft3/min; 32 = ft3/h; 33 = ft/s; 34 = in wg; 35 = ft wg; 36 = PSI; 37 = Ib/in2; 38 = HP; 39 = Deg. F; 40 = PA; 41 = WC; 42 = HG; 43 = ft; 44 = m; 45 = Hz; 46 = strokes/min.						
Description:	Allows for changing the M will allow setting a minimu	1.1 and M1.2 value to a desi um/maximum limit for the va	red unit that will reflect the lue to display desired outpu	application. From there wit t.	h P13.3.2 and P13.3.3, it		
P13.3.29			Output Direct 11 1114	Default uslow			
Minimum value:	-60,000.00 varies	Maximum value:	UutputDisplayUnitMax varies	Default value:	U.UU varies		
Description:	Sets the minimum scaled v	value when changing the dis	play unit to a value other the	an the default Hz.			
P13.3.3 [®]	Output display unit m	aximum			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 di	play unit to a value other th	an the default Hz.			

Table 71. System (Continued).

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

Table 71. System (Continued).

P13.4 - Version information.							
P13.4.1	Keypad software versi	Keypad software version (for remote Keypad only) ID 640					
Minimum 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 software version ID 644						
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Description:	MCU/application software	version.					
P13.4.4	Software bundle version ID 1714				ID 1714		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Description:	Software bundle version.						

P13.5 - Application information.

P13.5.1	Serial number				ID 648
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Product serial number.				
P13.5.2	Multi-monitor set (fe	or remote keypad only)			ID 627
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Change enable; 1 = Change disable.				
Description:	The keypad display can replace the values moni	display three actual monitor tored with other values.	ed values at the	same 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:	The keypad can be prote When the password fun response to key press e	ected against unauthorized o iction is enabled, the user w xcept up/down/left/right.	changes with the ill be prompted t	keypad lock function after keys are not o enter a password before the keypad di	pressed five minutes. splay parameter or
	By default, the passwor between 1 and 9,999.	d function is not in use. If y	ou want to activ	ate the password, change the value of th	is parameter to any number
	To deactivate the passw	vord, reset the parameter va	lue to O.		
P13.5.4	Drive application na	ime			ID 2922
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
	It defines the Drive App be editable only from W	lication Name with a maxim 'eb UI and PC tool.	um 20 character	s limit. It helps to identify your drive wit	nin multiple drives. It could
P13.5.5	Serial Number				ID 1758
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
	Emerson drive Serial Nu	imber only.			

P13.6 - User information.

P13.6.1	Total MWh count	t			ID 601		
Minimum value:	N.A. MWh	Maximum value:	N.A. MWh	Default value:	N.A. MWh		
Description:	Megawatt hours tot	Megawatt hours total operation time counter of the drive output active.					
P13.6.2	Total power day	count			ID 603		
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.		
Description:	Number of days the	drive has been supplied with po	wer.				
P13.6.3	Total power hou	r 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 power.						

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

P13 6 4	Total motor hou	r count			ID 1872
F 13.0.4					10 1072
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	h
Description:	Number of hours th	e VFD has been running a motor			
P13.6.5	Trip MWh count				ID 604
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	MWh
Description:	Megawatts hours o	of the drive output active since la	ist reset.		
P13.6.6	TClear trip MWh	count			ID 639
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	0
Options:	0 = Not reset; 1 = Clear trip MWh 2 = Clear trip powe	count; r count.			
Description:	Resets the day and	hour motor or drive running cou	nter and resets the	motor run time in the menu.	
P13.6.7	Trip power day o	count			ID 636
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Number of days sin	ce the last reset.			
P13.6.8	Trip power hour	count			ID 637
Minimum value:	N.A.	Maximum value:	N.A.	Default value:	N.A.
Description:	Number of hours th	e VFD has been running a motor	since the last rese	et.	

Table 71. System (Continued).

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

Faults and warning codes

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

Table 72. 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 73. 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.

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 Mismatch Fault	Fault		ST01 and ST02 inputs mismatch fault 1. Drive internal circuit fault. 2. The 2 ST0 input signals are not consistent within 200ms.	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; 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	Al < 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	Fault	Configurable	STO triggered; STO input is open.	Reset STO trigger and verify wiring. Reset fault after input is enabled.
67	Current limit control	Warning		The output current has reached the current limit value.	Check the load. Set the acceleration time longer.

Fault code	Fault name/ description	Fault type	Default configuration	Possible cause	Remedy
68	Over voltage control	Warning		The DC link voltage has reached its voltage limit value.	Check the input voltage. Set the acceleration/deceleration time longer.
70	System fault	Fault		MCU sending wrong parameters to DSP.	Restart the drive again. Should the fault re-occur, contact the distributor nearest to you.
80	Fieldbus fault	Fault	Configurable	BACnet IP fieldbus fault.	Check the fieldbus communication wiring. Verify drive parameters are set correctly. Check BACnet master programming to verify proper addressing.
81	Fieldbus fault	Fault	Configurable	SA bus fieldbus fault.	Check the fieldbus communication wiring on A/B terminal. Verify drive parameters are set correctly. Check SA bus master programming to verify proper addressing.
83	Fieldbus fault	Fault	Configurable	 (1) DCI_ubRTUBacNetFaultBehavior parameter's value is 0, loss of communication with modbus RTU, and the fieldbus reference is the remote reference or the fieldbus control place is the remote control place ,and the fault protection is not "NO action"; (2) DCI_ubRTUBacNetFaultBehavior parameter's value is 1, 	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 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 communication wiring. Verify drive parameters are set correctly. Check Profibus/Canopen master configuration programming to verify proper addressing.
90	Drive under temp. (Cold weather drive under temp.)	Warning		 Cold weather mode is not enabled, and unit temperature is less than -10°C. Cold weather mode is enabled and Under Temp Fault Override is not set, unit temperature is less than -30°C. Cold weather mode is enabled and Under Temp Fault Override is not set, unit temperature is -20 ~ -30°C. The temp <-20°C when cold weather start time out. 	If unit temp -20 ~ -10°C, start motor in cold weather mode. If unit temp <-20°C, warm up unit above -20°C for proper operation using cold weather mode. If still < -20°C when cold weather mode time out, try higher output voltage in cold weather mode.
92	External fault (External fault 2)	Fault	Configurable	Digital input is activated for external fault input.	Check digital input settings and verify input level, could be an external device causing fault.
93	External fault (External fault 3)	Fault	Configurable	Digital input is activated for external fault input.	Check digital input settings and verify input level, could be an external device causing fault.
97	Pipe fill loss (Prime loss)	No action	Configurable	 In single drive control mode of MPFC, include FC, interlock enable, and all interlock signals lost. In single drive control mode of MPFC, not include FC, interlock enable, and interlock 1 lost. In multi drive network mode of MPFC, interlock enable, and interlock 1 lost. 	Check digital inputs for interlock.
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 AI value and check the setting of AI supervision limit.
131	Motor current supv. (Motor current limit)	No action		The motor current exceeds the range of current supervision limit	Check the motor current and check the setting of current supervision limit.
132	PI superv.	No action		The PI1 feedback exceeds the range of PI1 supervision limit.	Check the PI1 feedback and check the setting of PI1 supervision limit.
133	Fieldbus fault (Fieldbus web UI fault)	Fault	Configurable	FieldBus web UI fault.	Check the web connection with RJ45 connector. Verify drive parameters are set correctly. Check the web UI tool to know if there is proper request going to drive or not.

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

Description			
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.			
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.
	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.
	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].

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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