YASKAWA

P1000 Bypass to FP605 Bypass

Enclosed Bypass Parameter Transition Guide

AC DRIVE BYPASS FOR FAN & PUMP APPLICATIONS

CATALOG CODE:

F6Bxxxxx

CAPACITIES:

208 V: 1 to 100 HP
240 V: 1 to 100 HP
480 V: 1 to 250 HP

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◆ Preface

This document contains details about software feature differences between the P1000 Industrial Bypass drive product and the FP605 Industrial Bypass drive product.

Overview

■ Intended Use

This document is intended to help Integrators and End Users replace the Yaskawa P1000 Industrial Bypass AC drive with the Yaskawa FP605 Industrial Bypass AC drive. This document contains software feature differences between these two drives to assist with migrating P1000 Bypass settings to the new FP605 Bypass drive. This document does not list equivalent features between these two drive products. Qualified personnel familiar with AC drive installation should conduct replacement. Follow local electrical codes during replacement and installation.

■ Feature Difference Categories

Feature differences between the P1000 Bypass and the new FP605 Bypass have four categories in this document.

- **New Features**
  The category details new FP605 Bypass features that do not have equivalents in the P1000 Bypass.

- **Enhanced Features**
  The category details FP605 Bypass features that have enhancements over similar features in the P1000 Bypass.

- **Renumbered Parameters or Modified Settings**
  The category details FP605 Bypass features that have re-assigned parameter numbers or modified settings compared to the FP605 Bypass.

- **Excluded Features**
  The category details features excluded from the FP605 Bypass, but present in the P1000 Bypass. In most cases, this is because a related FP605 enhancement negates the need for the exact same P1000 Bypass feature.

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Terminal Board Connections

This table shows the terminal board connections on the P1000 Bypass and the FP605 Bypass.

Description	FP605 Bypass		P1000 Bypass	
	Connector	Pins	Connector	Pins
Customer Digital Outputs	TB1	1 - DO7 NC	TB1	1 - DO7 NC
		2 - DO7 Common		2 - DO7 Common
		3 - DO7 NO		3 - DO7 NO
		4 - DO8 NC		4 - DO8 NC
		5 - DO8 Common		5 - DO8 Common
		6 - DO8 NO		6 - DO8 NO
		7 - DO9 NC		7 - DO9 NC
		8 - DO9 Common		8 - DO9 Common
		9 - DO9 NO		9 - DO9 NO
		10 - DO10 NC		10 - DO10 NC
		11 - DO10 Common		11 - DO10 Common
		12 - DO10 NO		12 - DO10 NO
Customer Digital Inputs	TB2	1 - DI1	TB2	1 - DI1
		2 - DI2		2 - DI2
		3 - DI3		3 - DI3
		4 - DI4		4 - DI4
		5 - DI5		5 - DI5
		6 - DI6		6 - DI6
		7 - DI7		7 - DI7
		8 - DI8		8 - DI8
		9,10 - IG		9,10 - IG
		11,12 - E(G)		11,12 - E(G)
External Serial Comms	TB3	1 - IG	TB3	1 - IG
		2 - D+		2 - D+
		3 - D-		3 - D-
		4 - Shield		4 - Shield
Customer Analog Input	TB4	1 - (+)10 VDC	NA	NA
		2 - Analog Input		
		3 - AC (Analog Common)		
Ground	TB6	1,2 E(G) (Earth Ground)	NA	NA

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Parameter Feature Differences

2.1 New FP605 Bypass Features

◆ Electronic Overload

■ New

The motor overload in the FP605 Bypass is now electronic for most models. The motor overload levels are now set using parameter (E2-01), there is no need to adjust a mechanical motor overload on those models.

Additionally, the FP605 Bypass does overload calculations on motor 1 and motor 2 independently in a motor OR configuration when the motors have the same ratings. The P1000 Bypass does not have an electronic motor overload in a motor OR configuration.

◆ Parameter Management

■ New

1. All Bypass and FP605 drive parameters are accessible on the FP605 Bypass keypad.
2. The FP605 drive does not require power to view or modify parameters provided the Bypass Control PCB remains powered. The P1000 Bypass does not display parameters when the drive is de-energized.
3. All parameter settings are stored within the memory of the Bypass Control PCB. Settings for FP605 drive replacements are easily migrated from the previous FP605 unit. This simplifies drive replacement within the Bypass.

◆ Bypass Digital Inputs

■ New

1. The FP605 Bypass Control PCB can indirectly control ALL drive digital inputs, including Digital Inputs S1 and S2. This eliminates the need to wire directly to the digital inputs of the FP605 drive unit.
2. New bypass digital input selections (Z2-xx parameters).

New Bypass Digital Input Function Selections
1 Drive S1 Passthrough
2 Drive S2 Passthrough
44 Emergency Override Drive (REV)
45 Serial Hardware Test (RS-485)
46 Low City Pressure
47 Motor Preheat

◆ Bypass Digital Outputs

■ New

The FP605 Bypass has several new digital output selections. An indication that all safeties are closed (25), along with the ability to use the bypass PCBs Form-C relay outputs to change state when the drive's digital outputs change state.

New Bypass Digital Output Function Selections
25 Safeties Closed
26 Mirror FP605 M1-M2
27 Mirror FP605 M3-M4
28 Mirror FP605 M5-M6

◆ Bypass Analog Inputs

■ New

The FP605 Bypass has an analog input on the Bypass Controller Board, eliminating the need to route analog frequency reference wiring up to the drive terminals. New Z2-30, Z2-32, Z2-33 parameters configure the input. Support is provided for 0 to 10 VDC, 0 to 20 mA, and 4 to 20 mA signal selections. A power supply is provided for use with a potentiometer (speed pot).

Parameter	FP605 Keypad Display Text	Range/Default	Notes/Changes
Z2-30	Analog Input Signal Level Select	0: 0-10 VDC 2: 4 to 20 mA 3: 0 to 20 mA Default: 0	This is a new parameter for the FP605 bypass. This parameter works the same as H3-01 to configure FP605 Bypass analog input.
Z2-32	Analog Input Gain Setting	-999.9% to 999.9% Default: 100.0%	This is a new parameter for the FP605 bypass. This parameter works the same as H3-03 to configure FP605 Bypass analog input.
Z2-33	Analog Input Bias Setting	-999.9% to 999.9% Default: 0.0%	This is a new parameter for the FP605 bypass. This parameter works the same as H3-04 to configure FP605 Bypass analog input.

◆ BACnet Network Communication

■ New

- BACnet Health Monitor UC-01, a simple indication of network connectivity
- BACnet monitors UC-02~UC-16
- BACnet functions for Read Property Multiple, Write Property Multiple, and Change of Value (COV)
- Overall improvements to network reliability

Monitor	FP605 Keypad Display Text	Description	Unit
UC-01	BN MSTP Net Health	A number representing the health of the MSTP network, depends on the number of CRC errors, token losses, token retries, and measured network deadtime. 100.0% = Good, 0% = Bad. A number between 0 and 100.0 percent	0.1 %
UC-02	BACnet Tokens Received	The number of MSTP Tokens received by the drive since drive power on	1
UC-03	BACnet Tokens Transmitted	The number of MSTP Tokens transmitted by the drive since drive power on	1
UC-04	BACnet Messages Received	The number of messages with data (non-token, non-polling) received by the drive	1
UC-05	BACnet Messages Transmitted	The number of messages with data (non-token, non-polling) transmitted by the drive	1
UC-06	MSTP Next Node Address	This is the MAC address of the next node in the MSTP loop. Tokens passed to this node.	01 Hexadecimal
UC-07	MSTP Previous Node Address	This is the MAC address of the previous node in the MSTP loop. Tokens received from this node.	01 Hexadecimal
UC-08	MSTP Max Master Found	The highest MAC address (node number) found in the local token-passing loop.	01 Hexadecimal
UC-09	MSTP Min Master Found	The lowest MAC address (node number) found in the local token-passing loop.	01 Hexadecimal
UC-10	MSTP # of Nodes on Network	The number of unique MAC addresses (nodes) that have transmitted a token on the local token-passing loop.	1
UC-11	# of BN COV Sbscrpt	The number of COV (Change Of Value) subscriptions currently served by this unit. This is limited to the number of objects that support COV subscriptions	1
UC-12	MSTP Loop Time	Amount of time between when this node transmitted the token and when it was received back. It shows how long the MSTP loop took to pass the token to all nodes on the MSTP network.	1 ms
UC-13 (Expert Access Level)	BN MSTP CRC Errors	The number of CRC errors seen by the unit since power-on	1
UC-14 (Expert Access Level)	BN MSTP Tokens Lost	This is the number of token losses seen by the unit since power-on. This is sensed by a net deadtime of greater than 500 ms.	1
UC-15 (Expert Access Level)	BN MSTP Tokens Retry	The number of token retries seen by the unit since power-on. This is sensed by two subsequent token frames seen from the same node to the same node with the same CRC.	1
UC-16 (Expert Access Level)	BN MSTP Deadtime Avg	The average net deadtime (space between active messages), averaged over a 60 packet period	1.0 ms

◆ Green Contactor Mode

■ New

The new Green Contactor Mode, parameter Z1-70 keeps contactors from closing unnecessarily when not needed. These include contactors K4, K5 (Motor 1 and Motor 2 contactors) when the motor is not running, and K2 (drive output contactor) when drive output is not active. Parameter Z1-70 enables this feature.

Parameter	FP605 Keypad Display Text	Range/Default
Z1-70	Green Contactor Mode	0 - Disable 1 - Enable Default: 0

◆ Test Mode

■ New

The FP605 Bypass package can be put in “Test Mode” which, for a 3-contactor bypass forces the drive input contactor (K1) to be closed when in bypass mode. Z1-56 is a new parameter, which enables/disables the Test Mode.

FP605 Bypass Parameter	Range
Z1-56 Test Mode	0 - Drive Power Off During Bypass 1 - Drive Power On During Bypass

2.2 Enhanced FP605 Bypass Features

◆ Keypad Display

■ Enhanced

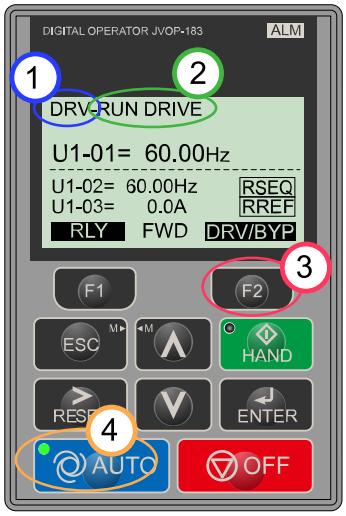
FP605 Bypass Softkeys:

- The keypad shows “DRIVE” above the F1 softkey and “BYPASS” above the F3 softkey on the keypad. The keypad display text for DRIVE or BYPASS blinks repeatedly to identify the current mode of the unit.
- The Test Mode is now in parameter Z1-56; it is no longer associated with the F1 softkey like in the P1000 Bypass.

P1000 Bypass Softkeys: The F2 softkey toggles between Drive and Bypass Modes and the current mode is displayed on the top line as “DRV” or “BYP”.

Parameter	FP605 Keypad Display Text	Range/Default	Notes/Changes
Z1-56	Test Mode	0 - Drive Power Off During Bypass 1 - Drive Power On During Bypass Default: 0	Parameter has the same function as the P1000 Bypass F1 key. There is a selection to enable/disable, with default being disable (power down drive).

Line 1 on the FP605 Bypass keypad shows HOA Mode and Bypass status.



P1000 Bypass Keypad

HV600 Bypass Keypad

1. Drive/Bypass Mode
2. System Status
3. Drive/Bypass Select
4. RUN Status

Figure 2.1 shows the FP605 keypad display in bypass mode.

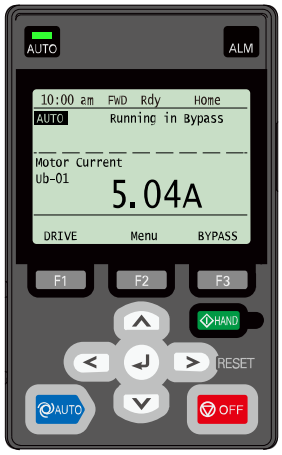


Figure 2.1 FP605 Keypad Display When in Bypass Mode "Running in Bypass"

◆ Parameter Management

■ Enhanced

1. The Copy Keypad feature is now functional for the FP605 Bypass.
2. Modified Constants / Parameters will now capture BOTH drive and bypass parameters. This is effective even when the FP605 drive is not energized while in Bypass mode.

◆ Bypass Digital Outputs

■ Enhanced

The keypad display text for settings 1-5 changed from K1..K5 to be more descriptive of their actual functions.

Enhanced Bypass Digital Output Function Selections
1 - Drive Input Contactor
2 - Drive Output Contactor
3 - Bypass Contactor
4 - Motor 1 Contactor
5 - Motor 2 Contactor

◆ Power-Up Mode

■ Enhanced

Parameter Z1-06 has an additional setting of 5-Power-up HOA Memory. This setting causes the Bypass to power up into the same mode it was when it was powered down.

The P1000 Bypass parameter Z1-06 settings for 2-HAND-DRIVE and 4-HAND-BYPASS are excluded from the FP605 Bypass to prevent triggering HAND Mode operation at power up. This prevents a potentially unsafe setting of always RUN. If RUN is desired on power-up, a wire jumper can be installed on a digital input.

The Power up Mode in the FP605 Bypass functions with serial and option communication, in addition to Drive/Bypass selection. This is in contrast to the P1000 Bypass, where the Drive/Bypass Power-up Selection can only function if parameter Z1-39 is programmed to operator.

Note:

The factory default value for FP605 Bypass parameter Z1-06 Power-up Mode is changed to 1-AUTO-DRIVE, in contrast to the P1000 Bypass setting of 0-OFF-DRIVE.

Parameter	Text (FP605 Bypass Keypad)	Range/Default	Notes/Changes
Z1-06	Power up mode	0 – OFF-DRIVE 1 – AUTO-DRIVE (default) 3 – AUTO-BYPASS 5 – Power up HOA Memory	Factory default: 1 Default changed to 1 (AUTO-DRIVE) from 0 (OFF).

◆ Safety Input Behavior

■ Enhanced

The function of Safety Digital Inputs is enhanced. FP605 Bypass Safety inputs behave like alarms, instead of faults, and resetting of a safety input is simplified.

These actions occur when the Safety input is opened while running during drive or bypass mode:

- Drive Mode: The drive stops using the stopping method programmed into parameter b1-03.
- Bypass Mode: The Bypass contactor immediately opens.
- The keypad will display the triggered safety condition according to which safety input was triggered (table below).
- The LED status ring flashes red.

Safety input opened while drive is stopped: The blue status ring LED will turn off and the keypad will display the triggered safety condition.

Resetting a safety: The FP605 resumes normal operation buy simply closing the opened safety input. No reset routine is required. The triggered safety is not logged into the fault history of the drive.

Safety Input - Programmable Digital Input Settings (Parameter Z2-0x)		
(LED) LCD	FP605 Keypad Display Text	Description
SAFE	Safety Open	Generic Safety open while run asserted
FIRE_ST	Fire Stat Open	Fire Stat Open while run asserted
FREEZ_ST	Freeze Stat Open	Freeze Stat Open while run asserted
SMK_ALRM	Smoke Alarm Active	Smoke Alarm Active while run asserted
OV_PRESS	Over Pressure Detected	Over Pressure Detected while run asserted
LOW_SUCT	Low Suction Detected	Low Suction Detected while run asserted
VBRATION	Vibration Detected	Vibration Detected while run asserted

◆ Brownout/Blackout/Restart Delay Behavior

Behaviors for Brownout, Blackout and Restart Delay are enhanced.

■ Enhanced - Brownout

This is an independent behavior from Blackout (Fault) and Restart Delay. The brownout parameters are below.

Brownout Detection Differences, P1000 Bypass and FP605 Bypass

- **P1000 Bypass Brownout Detection:** When the P1000 Bypass **detects a brownout condition**, it immediately faults the drive and declares the Brownout fault (FB08). It locally declares the Brownout fault (FB08). It then delays for the time set to parameter Z1-30 before opening the contactors.
- **FP605 Bypass Brownout Detection:** When the FP605 Bypass **detects a brownout condition**, the drive stops via the programmed stopping method set in parameter b1-03, and then opens the contactors. The FP605 Bypass does not use parameter Z1-30 as a contactor-open delay. The FP605 Bypass locally declares the Brownout Fault (FB08) and auto-resets when the brownout condition subsides.

FP605 Bypass Brownout Parameters			
Parameter	**FP605 Keypad Display Text**	**Range/Default**	**Notes/Changes**
Z1-27	Brownout Voltage Level	0 – 150 V Default: 98 V	Brownout condition will not fault the drive but instead allow drive to stop via stopping method. This functions the same as the P1000 Bypass.
Z1-28	Brownout Detection Time	1.0 s – 300.0 s Default: 3.0 s	Minimum setting value is modified to 1.0 s in the FP605 Bypass. A brownout condition causes the drive to stop via the user selected stopping method.
Z1-30 **(Excluded from FP605 Bypass)**	EF0 Fault Delay Time	0.0 – 300.0 s Default: 1.0 s	This parameter is excluded from the FP605 Bypass. Instead of waiting for a pre-programmed time, the FP605 Bypass waits for the drive output frequency to reach 0 before it opens contactors.

■ Enhanced - Blackout

This behavior pertains to parameter Z1-60 setting 0 (Fault).

Blackout (Fault) Differences, P1000 Bypass and FP605 Bypass

- **P1000 Bypass:** When the P1000 Bypass detects **AC line voltage less than the voltage programmed into Z1-29**, it immediately sends an EF0 fault to fault the drive, and a Blackout fault (FB09) is declared locally. It delays the length of time programmed into Z1-30 before opening the contactors. This fault will always occur if configured, when the bypass unit powered down. The default voltage of this behavior is set to 0 volts in Z1-29 to disable the fault.
- **FP605 Bypass:** When the FP605 Bypass detects **AC line voltage less than the voltage programmed into Z1-29**, it immediately sends an EF0 fault to fault the drive, and then opens the contactors. It does not use Z1-30 as a contactor open delay. It locally declares a Blackout fault (FB09) and auto-resets when the blackout condition subsides.

FP605 Bypass Blackout Parameters			
Parameter	**FP605 Keypad Display Text**	**Range/Default**	**Notes/Changes**
Z1-29	Blackout Voltage Level	0 – 150 V Default: 75 V	Same setting as P1000 Bypass except the default value is 75 volts in the FP605 Bypass.
Z1-30 **(Excluded from FP605 Bypass)**	EF0 Fault Delay Time	0.0 – 300.0 s Default: 1.0 s	This parameter is removed. Instead of waiting for a pre-programmed time, the FP605 bypass will wait for the drive output frequency to reach 0 when it sends an EF0 fault to the FP605 drive.
Z1-60	Blackout Operation Select	0 - Fault 1 - Restart Delay with Speed Search **(Enhanced)** 2 - Restart Delay from Zero Speed **(New setting)** 3 - Disable **(New setting)** Default: 1	The default setting for Z1-06 in the FP605 Bypass is 1 compared to 0 in the P1000 Bypass. **Setting 1 is enhanced** to force a Speed Search when the restart delay expires. A **new setting 2 - Restart Delay from Zero Speed** forces the drive to zero-speed after the restart delay expires when the drive is ramping to stop. A **new setting 3 - Disable** is provided that does not fault or cause a restart delay.
Z1-61	Restart Delay Time	1 s – 300 s Default: 10 s	This has the same settings and behavior as the P1000 Bypass.

■ Enhanced - Restart Delay

This behavior pertains to parameter Z1-60 setting 1, 2 (Restart Delay).

Restart Delay Differences, P1000 Bypass and FP605 Bypass

- **P1000 Bypass:** When the P1000 Bypass detects a **brief power loss, such as during a generator transfer test,** it removes the Run to the drive, opens the K2 contactor, and prevents the drive from running until the programmed restart delay time is expired. It allows the unit to operate in Bypass. If the drive is ramping to a stop at the end of the restart delay period, the Bypass sends an EF0 to stop the drive and clear the fault.
- **FP605 Bypass:** When the FP605 Bypass detects a **brief power loss, such as during a generator transfer test,** it forces the drive to coast to stop and opens the drive output contactor. The restart delay timer is also started when power is first interrupted. After power is restored, the unit can still be operated in Bypass, however, the drive will not run until after the programmed restart delay expires.

Parameter	FP605 Keypad Display Text	Range/Default	Notes/Changes
Z1-60	Blackout Operation Select	0 - Fault 1 - Restart Delay with Speed Search **(Enhanced)** 2 - Restart Delay from Zero Speed **(New setting)** 3 - Disable **(New setting)** Default: 1	The default setting for Z1-06 in the FP605 Bypass is 1 compared to 0 in the P1000 Bypass. **Setting 1 is enhanced** to force a Speed Search when the restart delay expires. A **new setting 2 - Restart Delay from Zero Speed** forces the drive to zero-speed after the restart delay expires when the drive is ramping to stop. A **new setting 3 - Disable** is provided that does not fault or cause a restart delay.

◆ Current Fault/Fault History

■ Enhanced

P1000 Bypass: Drive faults and bypass faults are separate. The P1000 Bypass displays the bypass-specific faults in the UB-xx monitors and displays drive faults in the U2-xx/U3-xx monitors.

FP605 Bypass: Fault values in U2-xx/U3-xx show all faults regardless of whether they are specific to the drive or the bypass. The UB-xx monitors show the values of U2-01/U3-01 respectively.

2.3 Renumbered FP605 Bypass Features

◆ Bypass Digital Inputs

■ Renumbered

1. The FP605 displays Emergency Override vs. Smoke Purge for P1000.
2. FP605 oPE03 multi-function I/O setting fault replaces the P1000 FB19 Duplicate Input Fault.

◆ External RS-485 Serial Communication Configuration

■ Renumbered

The FP605 Bypass uses H5-xx parameters instead of Z3-xx parameters. Parameters Z3-12 and Z3-13 are present as Z parameters because Z parameters are bypass-specific.

Parameter	HV600 Keypad Display Text	Range/Default	Notes/Changes
Z3-12	Network Digital Inputs	0 - Disabled 1 - Enabled Default: 0	Same selections and functions as P1000 Bypass.
Z3-13	BACnet Register Retention	0 - Disabled 1 - Restore Frequency Reference Only 2 - Restore Bypass Command Only 3 - Restore Byp Command AND Freq Ref Default: 0	Same selections and functions as P1000 Bypass.

◆ Option Card Support

■ Renumbered

F6-xx and F7-xx drive parameters replace Z4-xx parameters for option card settings and configuration. This aligns the FP605 bypass parameter numbers more closely with other standard Yaskawa drives.

◆ HOA Keypad Behavior

■ Renumbered

The FP605 Bypass does not have parameters Z1-09, Z1-38, or Z1-41. The FP605 Bypass utilizes HOA parameters in the S5-xx range.

P1000 Bypass Parameter	FP605 Bypass Parameter	FP605 Keypad Display Text	Range/Default	Notes/Changes
Z1-09 (Renumbered)	S5-05	HandMode Fref	-	The FP605 Bypass uses HV600 HOA parameters in the S5-xx range. The setting for this function is now in S5-05.
Z1-41 (Renumbered)	S5-01	Hand Speed Reference Select	-	The FP605 Bypass uses HOA parameters in the S5-xx range. The setting for this function is now in S5-01.
Z1-38 HOA Source Select (Excluded from FP605 Bypass)	Not Applicable	-	0 - Operator 1 - Bypass DI 2 - Serial/option comms	P1000 Parameter Z1-38 is not required for FP605 as the FP605 automatically utilizes the user selected Multi-function Digital Input (MFDI) for the HAND/AUTO command.

■ Excluded

Z1-38 HOA Source Select

◆ Real Time Clock

■ Renumbered

The Real Time Clock setting is now accessed from the FP605 Bypass keypad Main Menu (Menu –> Initial Setup –> Set Date/Time).

The P1000 Bypass Real Time Clock is set by parameter Z1-37.

Parameter	FP605 Keypad Display Text	Range/Default	Notes/Changes
Z1-37 **(Excluded from FP605 Bypass)**	Set Time	0 - Normal 1 - Set time	This parameter is excluded from the FP605 Bypass. Time is set from the Main Menu in the FP605 and the FP605 bypass.

◆ Password

■ Renumbered

P1000 Bypass password parameters Z1-02, Z1-03 are excluded from the FP605 Bypass. Password settings for the FP605 Bypass are set by parameter A1-04.

P1000 Parameter	P1000 Keypad Display Text	Range/Default	Notes/Changes
Z1-02	Password	-	Parameter excluded. **Use FP605 parameter A1-04, Password.**
Z1-03	Password Change		

◆ Run Sequence

■ Renumbered

The P1000 Bypass uses bypass-specific parameters Z1-07, Z1-08.

The FP605 Bypass uses parameters b1-01, b1-02 for Freq Ref and Run Command.

P1000 Bypass Parameter	FP605 Bypass Parameter	FP605 Keypad Display Text
Z1-07	b1-01	Freq Ref Select (Frequency Reference Selection 1)
Z1-08	b1-02	Run Command Sel (Run Command Selection 1)

2.4 Excluded FP605 Bypass Features

◆ Parameter Management

■ Excluded

An HOA keypad connected directly to the FP605 drive is prohibited from changing parameters. Parameter settings via the keypad are only possible when the keypad is connected to the Bypass Control PCB (factory configuration).

◆ Brownout/Blackout/Restart Delay Behavior

■ Excluded

Parameter Z1-30 is excluded from the FP605 Bypass. Refer to the **Enhanced** section of this Guide for details on Brownout/Blackout/Restart enhancements.

Parameter	HV600 Keypad Display Text	Range/Default	Notes/Changes
Z1-30 **(Excluded from FP605 Bypass)**	EF0 Fault Delay Time	0.0 – 300.0 s Default: 1.0 s	This parameter is excluded from the FP605 Bypass. Instead of waiting for a pre-programmed time, the FP605 Bypass waits for the drive output frequency to reach 0 before it opens contactors.

3

Transfer P1000 Bypass Settings to the FP605 Bypass

3.1 Transfer Settings Overview

◆ Intended Use

Use this section to transfer P1000 Bypass parameter settings to the FP605 Bypass. There are several methods to transfer parameters. Yaskawa recommends the use of DriveWizard Industrial to transfer parameters.

◆ Transfer Parameters using DriveWizard Industrial PC Software

The DriveWizard® Industrial support tool is a Windows-based PC program designed to make commissioning and troubleshooting of Yaskawa drives as simple as possible. DriveWizard® Industrial provides user-friendly tools for viewing, manipulating, and exchanging data with the drive. Data can be retrieved, changed, stored, and graphed. DriveWizard® Industrial is also used to transfer parameters from previous generation drives to new ones.

DriveWizard Industrial is compatible with the FP605, GA500, GA800, A1000, P1000, U1000, V1000, V1000 4X, J1000, D1000, R1000, F7, P7, G7 and G5 Low HP.

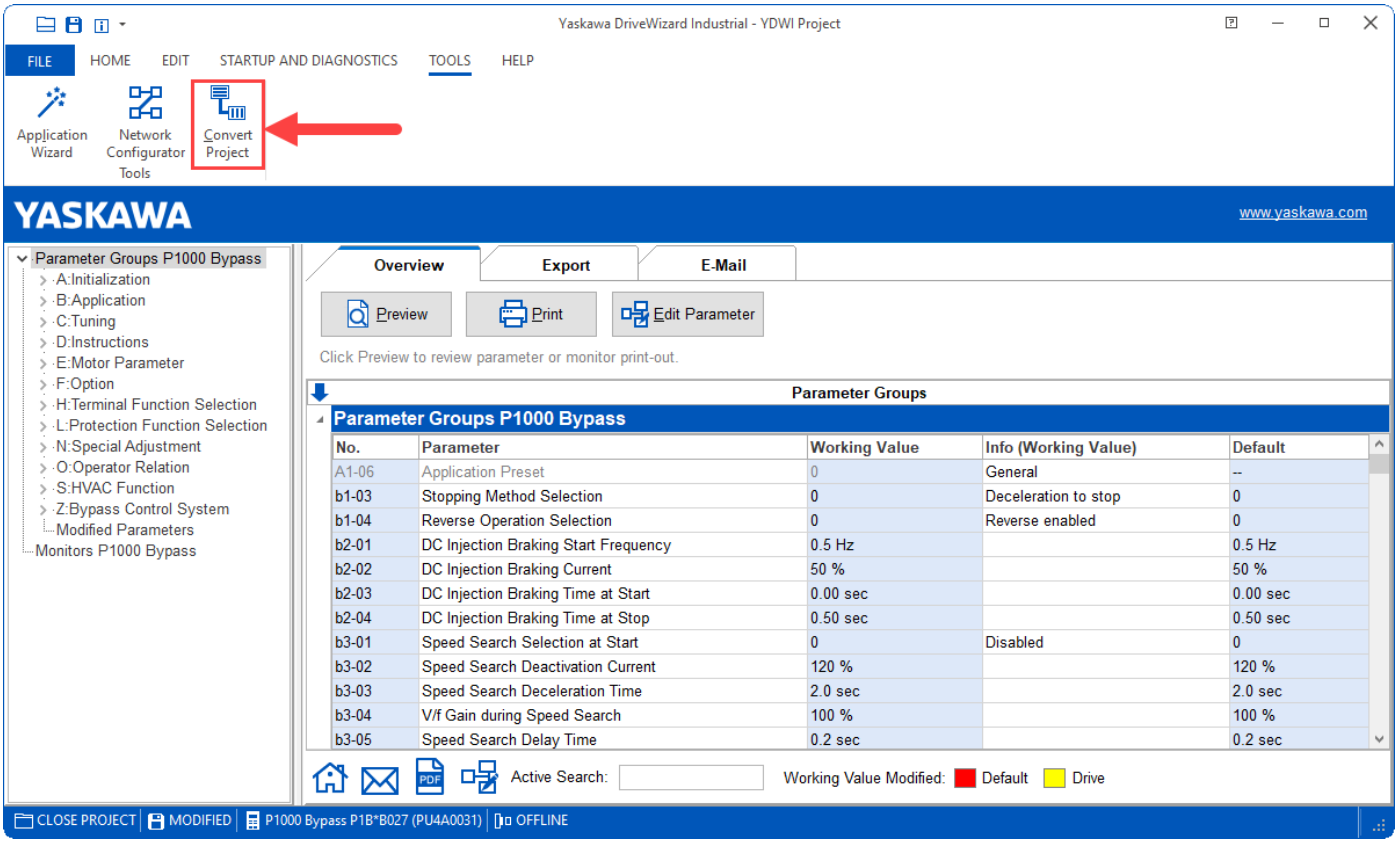
Request a free copy of DriveWizard Industrial PC software here:
https://www.yaskawa.com/ad-campaign?promoCode=drivewizard-industrial

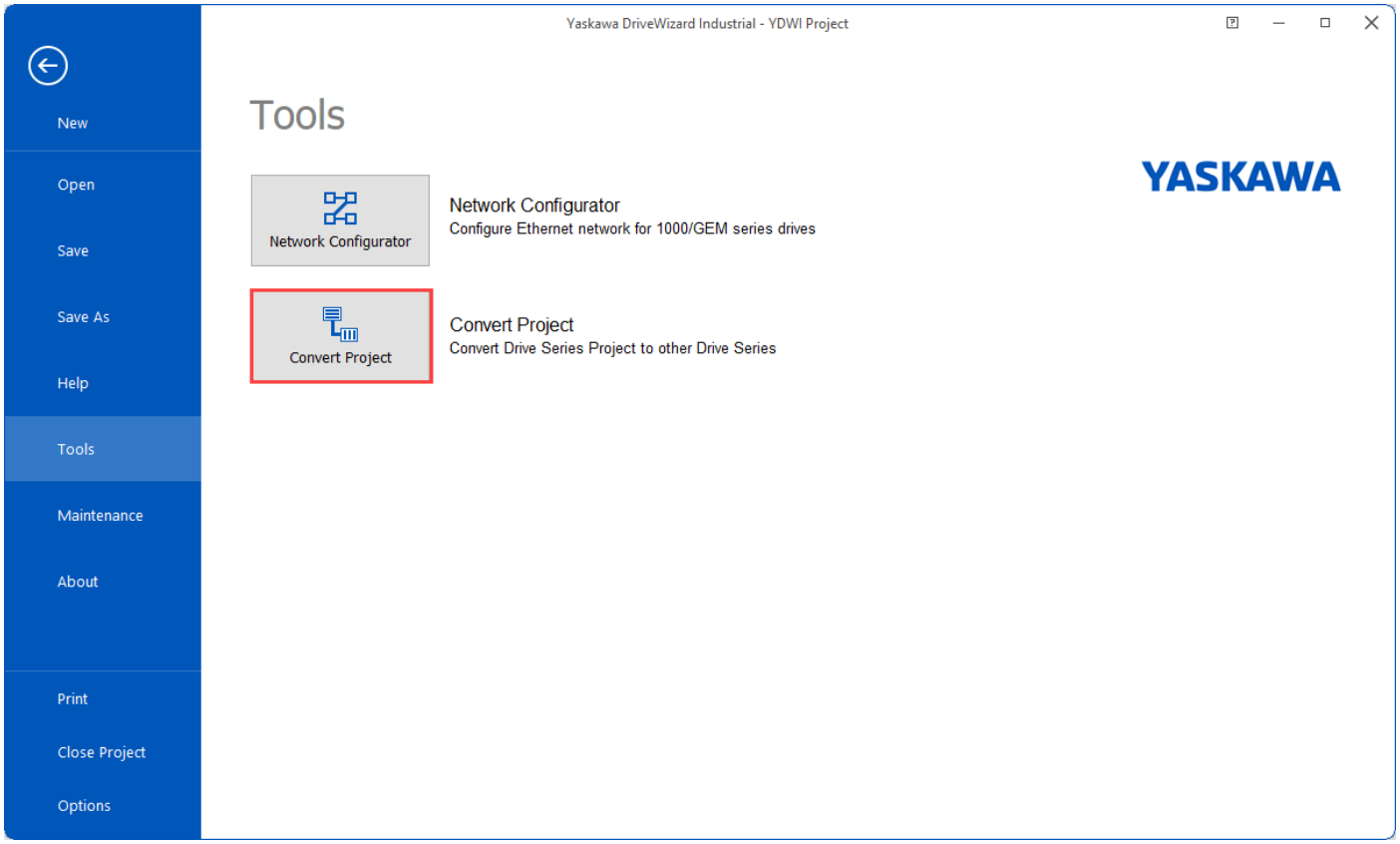
DriveWizard Industrial product page on yaskawa.com:
https://www.yaskawa.com/products/drives/industrial-ac-drives/industrial-software-tools/drivewizard-industrial

3.2 Procedure to Convert P1000 Settings to FP605 Settings

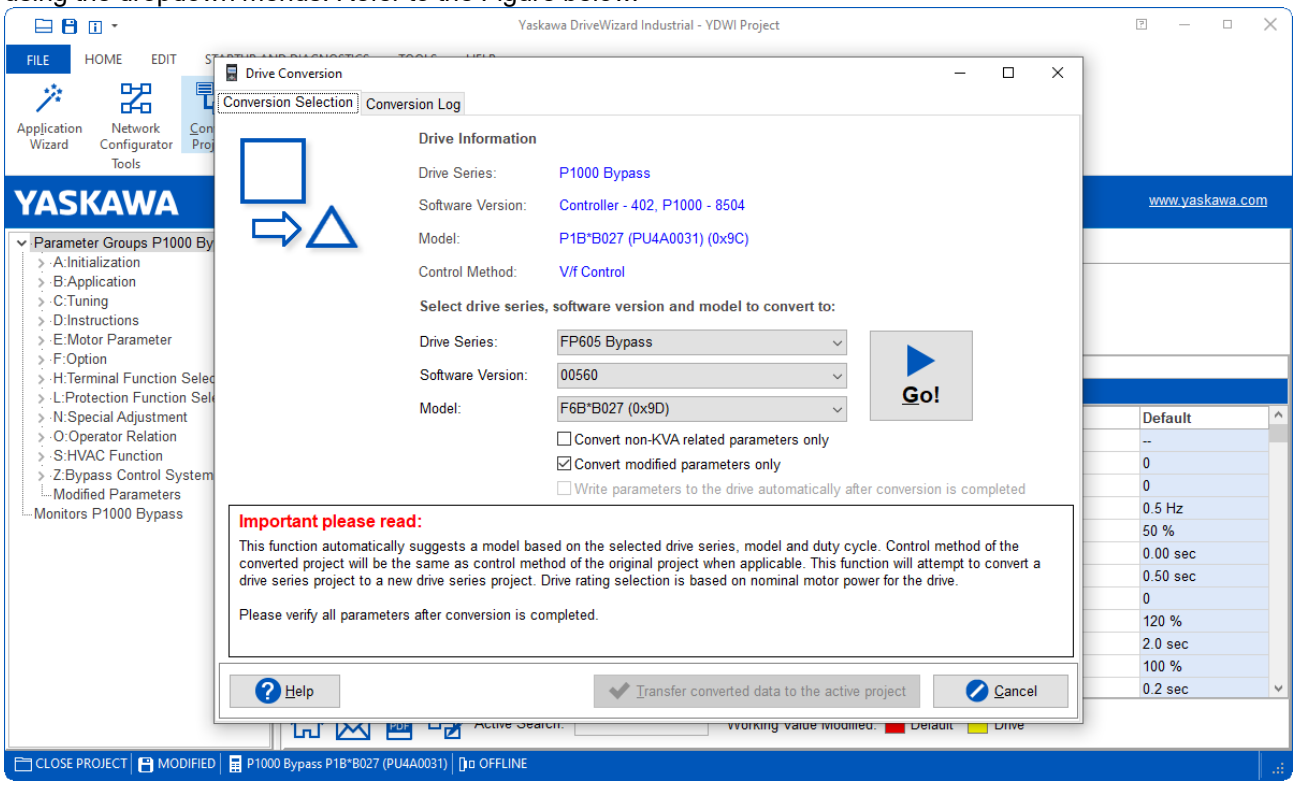
Start by connecting to the P1000 Bypass with DriveWizard and save a DriveWizard Project containing the P1000 Bypass parameter settings.

1. Open the DriveWizard Industrial software tool.
2. Choose ***Open Project*** from the DriveWizard Welcome screen.
3. Locate the directory where you saved the *.YDWIProj file from the P1000 Bypass. Select the P1000 Bypass *.YDWIProj file you saved and click ***Open***.
4. Refer to these figures to access the ***Convert Project*** feature.

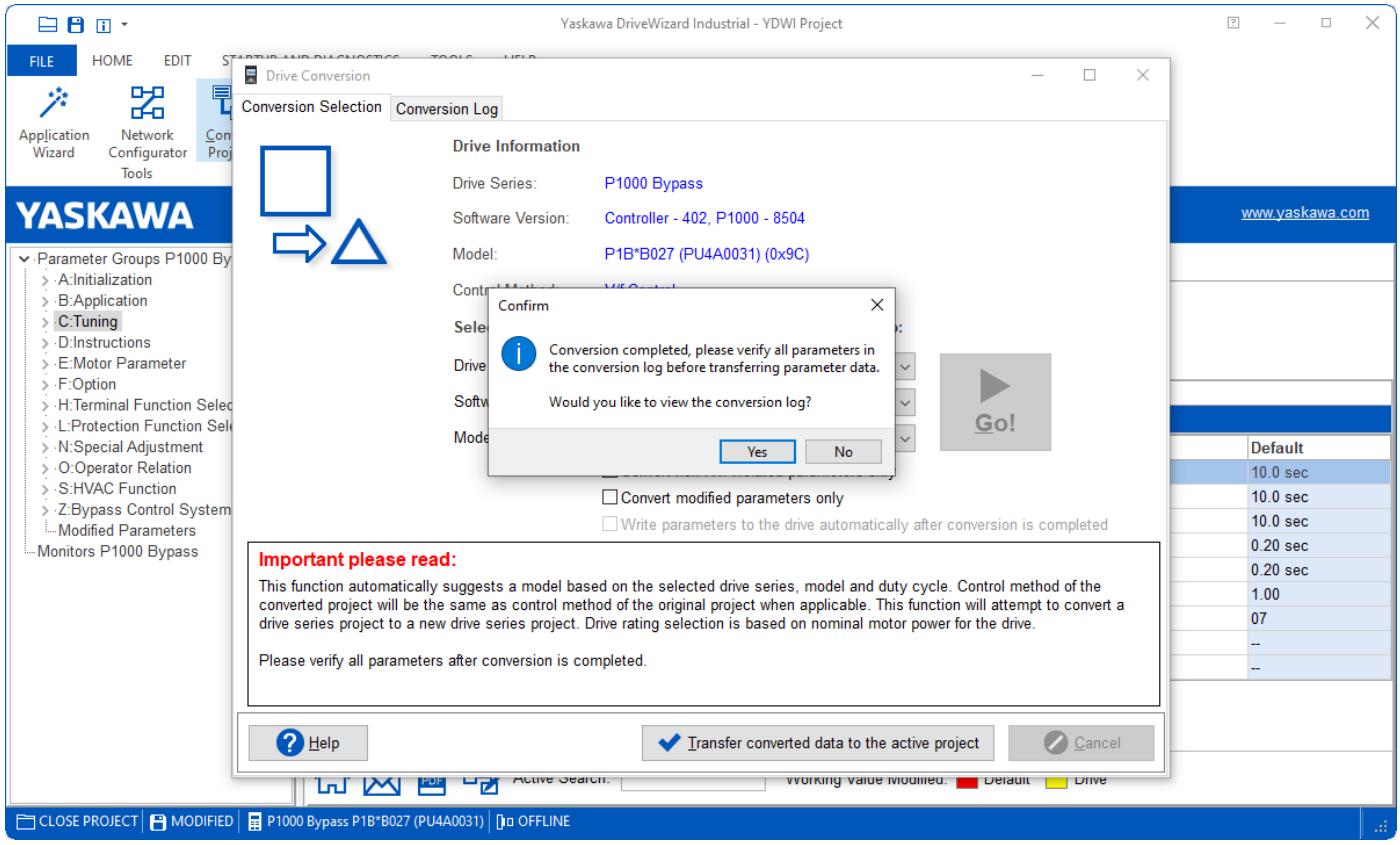




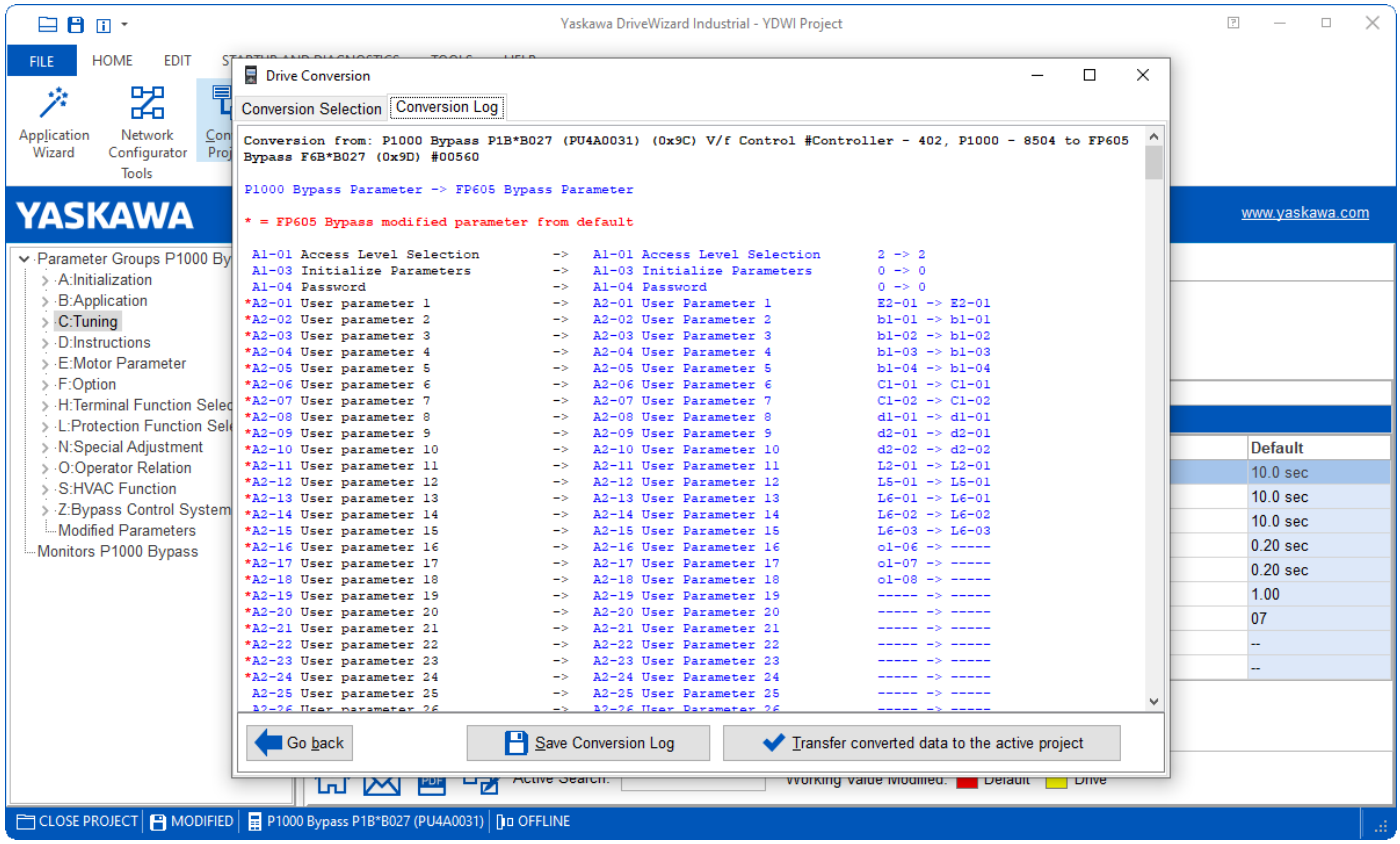
5. Click ***Convert Project*** and confirm the target the FP605 Bypass ***Drive Series***, ***Software Version***, and ***Model*** using the dropdown menus. Refer to the Figure below.



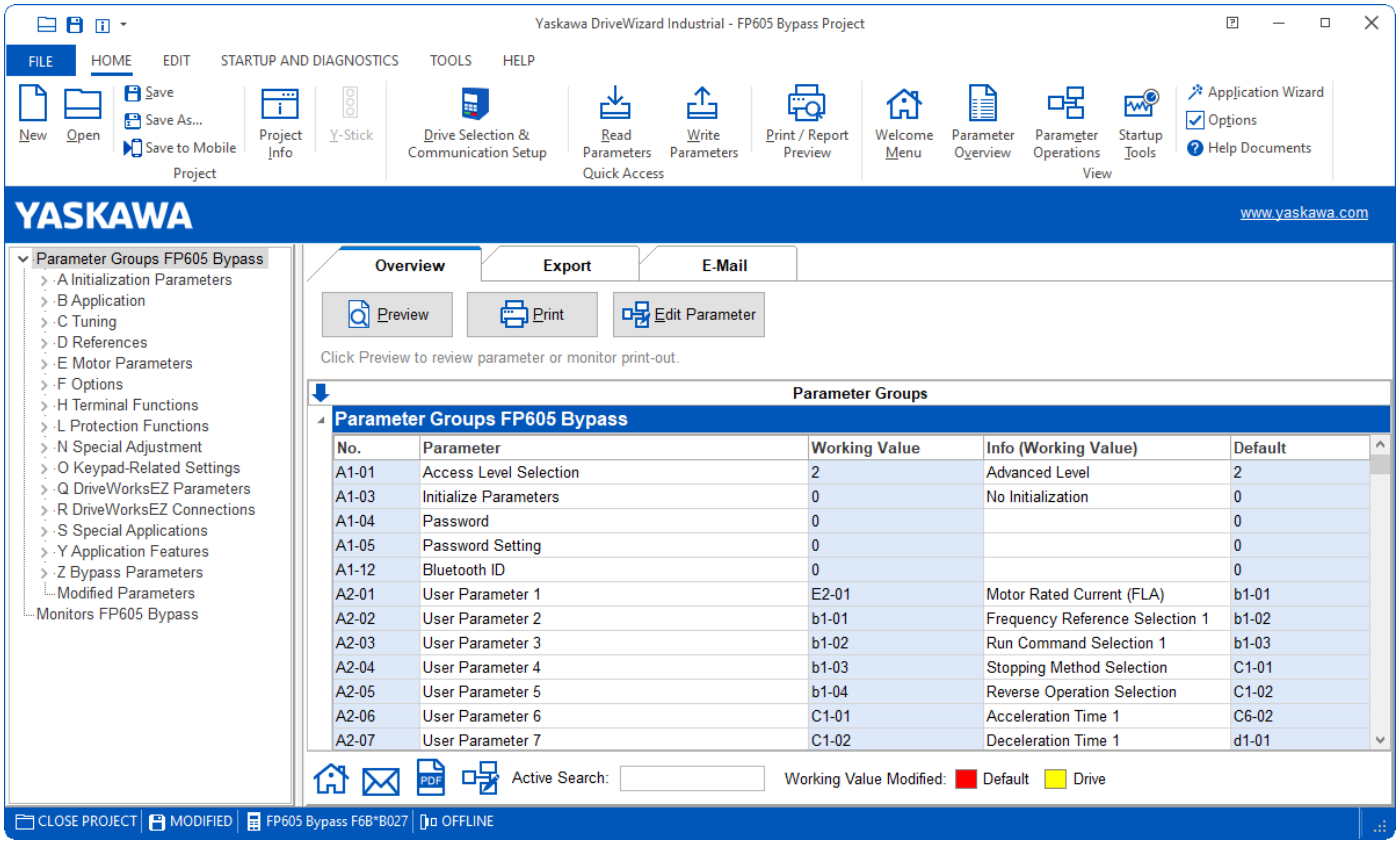
6. Click ***Go!*** in the ***Drive Conversion*** dialog to proceed.
The ***Confirm*** dialog box appears.



7. Choose ***Yes*** to display the conversion log, otherwise click ***No***.
From the ***Drive Conversion*** dialog you can choose to ***Go back***, ***Save Conversion Log***, or ***Transfer converted data to the active project***.



8. After you click ***Transfer converted data to the active project***, the P1000 Bypass parameter settings will be converted to FP605 Bypass parameter settings and you can click the ***Save*** icon on the main menu to save the DriveWizard project.



9. Next, disconnect the P1000 Bypass USB connection from your PC and connect the FP605 Bypass to your PC with the appropriate USB cable. The cable may be different.
10. Click on the ***Drive Selection & Communication Setup*** icon to begin the connection and write process to the FP605 Bypass.
11. ***Success!*** The P1000 Bypass settings are now converted and transferred to the FP605 Bypass.

4

Parameter List

4.1 Section Safety

⚠DANGER

Do not ignore the safety messages in this manual.

If you ignore the safety messages in this manual, it will cause serious injury or death. The manufacturer is not responsible for injuries or damage to equipment.

4.2 How to Read the Parameter List

◆ Terms that Identify Parameters

Icon	Description
Hex.	Hexadecimal numbers that represent MEMOBUS addresses to change parameters over network communication.
RUN	You can change the parameter setting during Run.
Expert	The parameter is available in Expert Mode only. *1

*1 Set *A1-01 = 3 [Access Level Selection = Expert Level]* to show and set Expert Mode parameters on the keypad.

4.3 Parameter Groups

Parameter Group	Name
A1	Initialization
A2	User Parameters
b1	Operation Mode Selection
b2	DC Injection Braking
b3	Speed Search
b4	Timer Function
b5	PID Control
b8	Energy Saving
C1	Accel & Decel Time
C2	S-Curve Characteristics
C3	Slip Compensation
C4	Torque Compensation
C6	Carrier Frequency
d1	Frequency Reference
d2	Reference Limits
d3	Jump Frequency
d4	Frequency Ref Up/Down & Hold
d6	Field Weakening
d7	Offset Frequency
E1	V/f Pattern for Motor 1
E2	Motor Parameters
F6	Communication Options
F7	Ethernet Options
H1	Digital Inputs
H2	Digital Outputs
H3	Analog Inputs
H4	Analog Outputs
H5	Serial Communication
H7	Virtual Inputs / Outputs
L1	Motor Protection
L2	Power Loss Ride Through
L3	Stall Prevention
L4	Speed Detection
L5	Fault Restart

Parameter Group	Name
L6	Torque Detection
L8	Drive Protection
L9	Drive Protection 2
n1	Hunting Prevention
n3	High Slip/Overexcite Braking
o1	Keypad Display
o2	Keypad Operation
o3	Copy Keypad Function
o4	Maintenance Monitors
o5	Log Function
S1	Dynamic Noise Control
S2	Sequence Run Timers
S3	PI2 Control
S5	HAND/OFF/AUTO Operation
S6	Protection
T0	Tuning Mode Selection
T1	Induction Motor Auto-Tuning
Y1	Application Basics
Y2	PID Sleep and Protection
Y4	Application Advanced
YA	Preset Setpoint
YC	Foldback Features
YF	PI Auxiliary Control
Z1	Bypass Control System
Z2	Bypass Digital Inputs/Outputs
Z3	Bypass Serial Communications
U1	Operation Status Monitors
U2	Fault Trace
U3	Fault History
U4	Maintenance Monitors
U5	PID Monitors
U6	Operation Status Monitors
Ub	Bypass Control Monitors
UC	BACnet Diagnostic Monitors

4.4 A: Initialization Parameters

◆ A1: Initialization

No. (Hex.)	Name	Description	Default (Range)
A1-00 (0100) RUN	Language Selection	Sets the language for the HOA keypad. **Note:** When you use *A1-03 [Initialize Parameters]* to initialize the drive, the drive will not reset this parameter. 0 : English 5 : Espanol	0 (0, 5)
A1-01 (0101) RUN	Access Level Selection	Sets user access to parameters. The access level controls which parameters the keypad will display and which parameters you can set. 0 : Operation Only 1 : User Parameters 2 : Advanced Level 3 : Expert Level 4 : Lock Parameters	2 (0 - 4)
A1-03 (0103)	Initialize Parameters	Sets parameters to default values. 0 : No Initialization 1110 : User Initialization 2220 : 2-Wire Initialization 9990 : EEPROM Initialization	0 (0, 1110, 2220, 9990)
A1-04 (0104)	Password	Entry point for the password set in *A1-05 [Password Setting]*. The user can view the settings of parameters that are locked without entering the password. Enter the correct password in this parameter to change parameter settings.	0000 (0000 - 9999)
A1-05 (0105)	Password Setting	Sets a password to lock parameters and prevent changes to parameter settings. Enter the correct password in *A1-04 [Password]* to unlock parameters and accept changes.	0000 (0000 - 9999)
A1-11 (111D) Expert	Firmware Update Lock	Protects the drive firmware. When you enable the protection, you cannot update the bypass controller firmware. 0 : Disabled 1 : Enabled	0 (0, 1)
A1-12 (1564)	Bluetooth ID	Sets the password necessary to use Bluetooth to control the drive with a smartphone or tablet.	- (0000 - 9999)

◆ A2: User Parameters

No. (Hex.)	Name	Description	Default (Range)
A2-01 (0106)	User Parameter 1	Sets the parameter number to be shown for number 1 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	b1-01 (A1-00 - Z3-16)
A2-02 (0107)	User Parameter 2	Sets the parameter number to be shown for number 2 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	b1-02 (A1-00 - Z3-16)
A2-03 (0108)	User Parameter 3	Sets the parameter number to be shown for number 3 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	b1-03 (A1-00 - Z3-16)
A2-04 (0109)	User Parameter 4	Sets the parameter number to be shown for number 4 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	C1-01 (A1-00 - Z3-16)
A2-05 (010A)	User Parameter 5	Sets the parameter number to be shown for number 5 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	C1-02 (A1-00 - Z3-16)
A2-06 (010B)	User Parameter 6	Sets the parameter number to be shown for number 6 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	C6-02 (A1-00 - Z3-16)
A2-07 (010C)	User Parameter 7	Sets the parameter number to be shown for number 7 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	d1-01 (A1-00 - Z3-16)
A2-08 (010D)	User Parameter 8	Sets the parameter number to be shown for number 8 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	d1-02 (A1-00 - Z3-16)

No. (Hex.)	Name	Description	Default (Range)
A2-09 (010E)	User Parameter 9	Sets the parameter number to be shown for number 9 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	d1-03 (A1-00 - Z3-16)
A2-10 (010F)	User Parameter 10	Sets the parameter number to be shown for number 10 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	d1-04 (A1-00 - Z3-16)
A2-11 (0110)	User Parameter 11	Sets the parameter number to be shown for number 11 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	d1-17 (A1-00 - Z3-16)
A2-12 (0111)	User Parameter 12	Sets the parameter number to be shown for number 12 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	E1-01 (A1-00 - Z3-16)
A2-13 (0112)	User Parameter 13	Sets the parameter number to be shown for number 13 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	E1-03 (A1-00 - Z3-16)
A2-14 (0113)	User Parameter 14	Sets the parameter number to be shown for number 14 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	E1-04 (A1-00 - Z3-16)
A2-15 (0114)	User Parameter 15	Sets the parameter number to be shown for number 15 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	E1-05 (A1-00 - Z3-16)
A2-16 (0115)	User Parameter 16	Sets the parameter number to be shown for number 16 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*.	E1-06 (A1-00 - Z3-16)
A2-17 (0116)	User Parameter 17	Sets the parameter number to be shown for number 17 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	E1-09 (A1-00 - Z3-16)
A2-18 (0117)	User Parameter 18	Sets the parameter number to be shown for number 18 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	E1-13 (A1-00 - Z3-16)
A2-19 (0118)	User Parameter 19	Sets the parameter number to be shown for number 19 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	E2-01 (A1-00 - Z3-16)
A2-20 (0119)	User Parameter 20	Sets the parameter number to be shown for number 20 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	E2-04 (A1-00 - Z3-16)
A2-21 (011A)	User Parameter 21	Sets the parameter number to be shown for number 21 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	E2-11 (A1-00 - Z3-16)
A2-22 (011B)	User Parameter 22	Sets the parameter number to be shown for number 22 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	H4-02 (A1-00 - Z3-16)
A2-23 (011C)	User Parameter 23	Sets the parameter number to be shown for number 23 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	L1-01 (A1-00 - Z3-16)
A2-24 (011D)	User Parameter 24	Sets the parameter number to be shown for number 24 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	L3-04 (A1-00 - Z3-16)
A2-25 (011E)	User Parameter 25	Sets the parameter number to be shown for number 25 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	- (A1-00 - Z3-16)
A2-26 (011F)	User Parameter 26	Sets the parameter number to be shown for number 26 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	- (A1-00 - Z3-16)
A2-27 (0120)	User Parameter 27	Sets the parameter number to be shown for number 27 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	- (A1-00 - Z3-16)
A2-28 (0121)	User Parameter 28	Sets the parameter number to be shown for number 28 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	- (A1-00 - Z3-16)

No. (Hex.)	Name	Description	Default (Range)
A2-29 (0122)	User Parameter 29	Sets the parameter number to be shown for number 29 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	- (A1-00 - Z3-16)
A2-30 (0123)	User Parameter 30	Sets the parameter number to be shown for number 30 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	- (A1-00 - Z3-16)
A2-31 (0124)	User Parameter 31	Sets the parameter number to be shown for number 31 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	- (A1-00 - Z3-16)
A2-32 (0125)	User Parameter 32	Sets the parameter number to be shown for number 32 of the [User Custom Parameters] under the main menu. You can select a maximum of 32 parameters for the drive and set them to parameters *A2-01* to *A2-32*. You can set *A2-17* to *A2-32* when *A2-33 = 0 [User Parameter Auto Selection = Disabled: Manual Entry Required]*.	- (A1-00 - Z3-16)
A2-33 (0126)	User Parameter Auto Selection	Sets the automatic save feature for changes to parameters *A2-17 to A2-32 [User Parameters 17 to 32]*. 0 : Disabled: Manual Entry Required 1 : Enabled: Auto Save Recent Parms	0 (0, 1)

4.5 b: Application

◆ b1: Operation Mode Selection

No. (Hex.)	Name	Description	Default (Range)
b1-01 (0180)	Frequency Reference Selection 1	Sets the input method for the frequency reference. 0 : Keypad 1 : Analog Input 2 : Serial Communications 3 : Option PCB	1 (0 - 3)
b1-02 (0181)	Run Command Selection 1	Sets the input method for the Run command. 0 : Keypad 1 : Digital Input 2 : Serial Communications 3 : Option PCB	7 (0 - 3)
b1-03 (0182)	Stopping Method Selection	Sets the method to stop the motor after removing a Run command or entering a Stop command. 0 : Ramp to Stop 1 : Coast to Stop 2 : DC Injection Braking to Stop 3 : Coast to Stop with Timer	1 (0 - 3)
b1-04 (0183)	Reverse Operation Selection	Sets the reverse operation function. Disable reverse operation in fan or pump applications where reverse rotation is dangerous. 0 : Reverse Enabled 1 : Reverse Disabled	1 (0, 1)
b1-08 (0187)	Run Command Select in PRG Mode	Sets the conditions for the drive to accept a Run command entered from an external source when using the keypad to set parameters. 0 : Disregard RUN while Programming 1 : Accept RUN while Programming 2 : Allow Programming Only at Stop	0 (0 - 2)
b1-11 (01DF)	Run Delay @ Stop	Sets the amount of time that the drive will not accept the Run command again after the Run command is lost. **Note:** • This parameter will operate for both AUTO Mode and HAND Mode. • This parameter will operate when the drive goes to sleep then wakes up. • The time set in this parameter does not apply for faults or Auto-Restarts. • When there is an active Run command while the time set in *b1-11* is active, the keypad will show a *[Start Delay]* message as specified by the *o1-82 [Message Screen Display]* display format.	0.0 s (0.0 - 6000.0 s)
b1-12 (01E0)	Run Delay Memory Selection	Sets how the drive saves the Run Delay Timer to the EEPROM during power loss. 0 : Disabled 1 : Only at Stop 2 : Running & Stop	2 (0 - 2)
b1-17 (01C6)	Run Command at Power Up	Sets drive response when you apply power to drive that has an external Run command. Set this parameter in applications where energizing or de-energizing the drive enables the Run command. 0 : Disregard Existing RUN Command 1 : Accept Existing RUN Command	1 (0, 1)
b1-40 (3BCF)	Deceleration Abort Time	Sets the maximum time until the drive shuts off the output to decelerate to stop. **Note:** Set this parameter to 0.0 s to disable this function.	0.0 s (0.0 - 6000.0 s)

◆ b2: DC Injection Braking

No. (Hex.)	Name	Description	Default (Range)
b2-01 (0189)	DC Injection/Zero SpeedThreshold	Sets the frequency to start DC Injection Braking. **Note:** This parameter is available when *b1-03 = 0 [Stopping Method Selection = Ramp to Stop]*.	0.5 Hz (0.0 - 10.0 Hz)
b2-02 (018A)	DC Injection Braking Current	Sets the DC Injection Braking current as a percentage of the drive rated current.	50% (0 - 100%)
b2-03 (018B)	DC Inject Braking Time at Start	Sets the DC Injection Braking Time at stop.	0.00 s (0.00 - 10.00 s)

No. (Hex.)	Name	Description	Default (Range)
b2-04 (018C)	DC Inject Braking Time at Stop	Sets the DC Injection Braking Time at stop.	0.50 s (0.00 - 10.00 s)
b2-09 (01E1)	Pre-heat Current 2	Sets the percentage of motor rated output current used for the motor pre-heat function.	5% (0 - 100%)

◆ b3: Speed Search

No. (Hex.)	Name	Description	Default (Range)
b3-01 (0191)	Speed Search at Start Selection	Sets the Speed Search at Start function where the drive will do Speed Search with each Run command. 0 : Disabled 1 : Enabled	0 (0, 1)
b3-02 (0192)	SpeedSearch Deactivation Current	Sets the current level that stops Speed Search as a percentage of the drive rated output current. Usually it is not necessary to change this setting.	120% (0 - 200%)
b3-03 (0193)	Speed Search Deceleration Time	Sets the deceleration time during Speed Search operation. Set the length of time to decelerate from the maximum output frequency to the minimum output frequency.	2.0 s (0.1 - 10.0 s)
b3-04 (0194)	V/f Gain during Speed Search	Sets the ratio used to reduce the V/f during searches to reduce the output current during speed searches.	Determined by o2-04 (10 - 100)
b3-05 (0195)	Speed Search Delay Time	Sets the Speed Search delay time to activate a magnetic contactor installed between the drive and motor.	0.2 s (0.0 - 100.0 s)
b3-06 (0196) Expert	Speed Estimation Current Level 1	Sets the level of current that flows to the motor during Speed Estimation Speed Search as a coefficient of the motor rated current. Usually it is not necessary to change this setting.	Determined by o2-04 (0.0 - 2.0)
b3-07 (0197) Expert	Speed Estimation Current Level 2	Sets the level of current that flows to the motor during Speed Estimation Speed Search as a coefficient of *E2-03 [Motor No-Load Current]*. Usually it is not necessary to change this setting.	1.0 (0.0 - 3.0)
b3-08 (0198) Expert	Speed Estimation ACR P Gain	Sets the proportional gain for the automatic current regulator during Speed Estimation Speed Search. Also adjusts speed search responsiveness. Usually it is not necessary to change this setting.	Determined by o2-04 (0.00 - 6.00)
b3-09 (0199) Expert	Speed Estimation ACR I Time	Sets the integral time for the automatic current regulator during Speed Estimation Speed Search. Also adjusts speed search responsiveness. Usually it is not necessary to change this setting.	2.0 ms (0.0 - 1000.0 ms)
b3-10 (019A) Expert	Speed Estimation Detection Gain	Sets the gain to correct estimated frequencies from Speed Estimation Speed Search.	1.05 (1.00 - 1.20)
b3-11 (019B) Expert	Spd Est Method Switch-over Level	Uses the quantity of voltage in the motor to automatically switch the search method within the type of speed measurement. **Note:** • 208/240 V at 100% = 200 V • 480 V at 100% = 400 V	5.0% (0.5 - 100.0%)
b3-12 (019C) Expert	Speed Search Current Deadband	Sets the minimum current detection level during Speed Search. If the drive does not do Speed Estimation, increase this setting in 0.1-unit increments.	determined by o2-04 (2.0 - 10.0)
b3-14 (019E)	Bi-directional Speed Search	Sets the direction of Speed Search to the direction of the frequency reference or in the motor rotation direction as detected by the drive. 0 : Disabled 1 : Enabled	0 (0, 1)
b3-17 (01F0) Expert	Speed Est Retry Current Level	Sets the current level for the search retry function in Speed Estimation Speed Search as a percentage where drive rated current is a setting value of 100%.	110% (0 - 200%)
b3-18 (01F1) Expert	Speed Est Retry Detection Time	Sets the length of time that the drive will wait to retry Speed Estimation Speed Search when too much current flow stopped the Speed Search.	0.10 s (0.00 - 1.00 s)
b3-19 (01F2)	Speed Search Restart Attempts	Sets the number of times to restart Speed Search if Speed Search does not complete.	3 times (0 - 10 times)

No. (Hex.)	Name	Description	Default (Range)
b3-24 (01C0)	Speed Search Method Selection	Sets the Speed Search method when you start the motor or when you return power after a momentary power loss. **Note:** Set *b3-24 = 1*. If *b3-24 = 2*, the drive will detect *oPE08 [Parameter Selection Error]*. 1 : Speed Estimation 2 : Current Detection 2	2 (1, 2)
b3-25 (01C8) Expert	Speed Search Wait Time	Sets the length of time the drive will wait to start the Speed Search Retry function.	0.5 s (0.0 - 30.0 s)
b3-26 (01C7) Expert	Direction Determination Level	Sets the level to find the motor rotation direction. Increase the value if the drive cannot find the direction.	1000 (40 to 60000)
b3-27 (01C9) Expert	Speed Search RUN/BB Priority	Sets the conditions necessary to start Speed Search. 0 : SS Only if RUN Applied Before BB 1 : SS Regardless of RUN/BB Sequence	0 (0, 1)
b3-31 (0BC0) Expert	Spd Search Current Reference Lvl	Sets the current level that decreases the output current during Current Detection Speed Search.	1.50 (1.50 - 3.50)
b3-32 (0BC1) Expert	Spd Search Current Complete Lvl	Sets the current level that completes Speed Search.	1.20 (0.00 - 1.49)
b3-39 (1B8F) Expert	Regen Judgement LV of Spd Search	Regen Judgement LV of Spd Search.	15% (0 - 50%)
b3-56 (3126)	InverseRotationSearch WaitTime	Sets the wait time until the drive starts inverse rotation search after it completes forward search when you do inverse rotation search during Current Detection Speed Search.	Determined by o2-04 (0.1 - 5.0 s)

◆ b4: Timer Function

No. (Hex.)	Name	Description	Default (Range)
b4-01 (01A3)	Timer Function ON-Delay Time	Sets the ON-delay time for the timer input.	0.0 s (0.0 - 3000.0 s)
b4-02 (01A4)	Timer Function OFF-Delay Time	Sets the OFF-delay time for the timer input.	0.0 s (0.0 - 3000.0 s)
b4-03 (0B30) Expert	Terminal M1-M2 ON-Delay Time	Sets the delay time to activate the contact after the function set in *H2-01* activates.	0 ms (0 - 65000 ms)
b4-04 (0B31) Expert	Terminal M1-M2 OFF-Delay Time	Sets the delay time to deactivate the contact after the function set in *H2-01* deactivates.	0 ms (0 - 65000 ms)
b4-05 (0B32) Expert	Terminal M3-M4 ON-Delay Time	Sets the delay time to activate the contact after the function set in *H2-02* activates.	0 ms (0 - 65000 ms)
b4-06 (0B33) Expert	Terminal M3-M4 OFF-Delay Time	Sets the delay time to deactivate the contact after the function set in *H2-02* deactivates.	0 ms (0 - 65000 ms)
b4-07 (0B34) Expert	Terminal MD-ME-MF ON-Delay Time	Sets the delay time to activate the contact after the function set in *H2-03* activates.	0 ms (0 - 65000 ms)
b4-08 (0B35) Expert	Terminal MD-ME-MF OFF-Delay Time	Sets the delay time to deactivate the contact after the function set in *H2-03* deactivates.	0 ms (0 - 65000 ms)

◆ b5: PID Control

No. (Hex.)	Name	Description	Default (Range)
b5-01 (01A5)	PID Mode Setting	Sets the type of PID control. 0 : Disabled 1 : Standard	0 (0, 1)
b5-02 (01A6) RUN	Proportional Gain (P)	Sets the proportional gain (P) that is applied to PID input.	1.00 (0.00 - 25.00)
b5-03 (01A7) RUN	Integral Time (I)	Sets the integral time (I) that is applied to PID input.	1.0 s (0.0 - 360.0 s)
b5-04 (01A8) RUN	Integral Limit	Sets the upper limit for integral control (I) as a percentage of the Maximum Output Frequency.	100.0% (0.0 - 100.0%)
b5-05 (01A9) RUN	Derivative Time (D)	Sets the derivative time (D) for PID control. This parameter adjusts system responsiveness.	0.00 s (0.00 - 10.00 s)
b5-06 (01AA) RUN	PID Output Limit	Sets the maximum possible output from the PID controller as a percentage of the Maximum Output Frequency.	100.0% (0.0 - 100.0%)
b5-07 (01AB) RUN	PID Offset Adjustment	Sets the offset for the PID control output as a percentage of the Maximum Output Frequency.	0.0% (-100.0 - +100.0%)
b5-08 (01AC) RUN Expert	PID Primary Delay Time Constant	Sets the primary delay time constant for the PID control output. Usually it is not necessary to change this setting.	0.00 s (0.00 - 10.00 s)
b5-09 (01AD)	PID Output Level Selection	Sets the polarity of the PID output. 0 : Normal Output (Direct Acting) 1 : Reverse Output (Reverse Acting)	0 (0, 1)
b5-10 (01AE) RUN	PID Output Gain Setting	Sets the amount of gain to apply to the PID output.	1.00 (0.00 - 25.00)
b5-11 (01AF)	PID Output Reverse Selection	Sets the function that enables and disables reverse motor rotation for negative PID control output. 0 : Lower Limit is Zero 1 : Negative Output Accepted	0 (0, 1)
b5-17 (01B5) RUN	PID Accel/Decel Time	Raises or lowers the PID setpoint using the acceleration and deceleration times set to the drive. This is a soft-starter for the PID setpoint.	0.0 s (0.0 - 6000.0 s)
b5-18 (01DC)	PID Setpoint Selection	Sets the function that enables and disables *YA-01 to YA-04 [Setpoint 1 to Setpoint 4]*. 0 : Disabled 1 : Enabled	0 (0, 1)
b5-28 (01EA)	PID Feedback Square Root Sel	Enables and disables the square root of the PID Feedback compared to the PID Setpoint to set an appropriate drive output for the correct system regulation. 0 : Disabled 1 : Enabled	0 (0, 1)
b5-29 (01EB)	PID Feedback Square Root Gain	Sets the multiplier applied to the square root of the feedback.	0.00 (0.00 - 2.00)
b5-30 (01EC)	PID Feedback Offset	Sets PID feedback Offset as a percentage of maximum frequency.	0.00% (0.00 - 100.00%)
b5-34 (019F) RUN	PID Output Lower Limit Level	Sets the output lower limit for the PID control as a percentage of the Maximum Output Frequency.	0.0% (-100.0 - +100.0%)
b5-35 (01A0) RUN	PID Input Limit Level	Sets the output upper limit for the PID control as a percentage of the Maximum Output Frequency.	1000.0% (0.0 - 1000.0%)

No. (Hex.)	Name	Description	Default (Range)
b5-38 (01FE)	PID User Unit Display Scaling	Sets the value that the drive sets or shows as the PID setpoint when at the maximum output frequency.	100.00% (0.01 - 600.00%)
b5-39 (01FF)	PID User Unit Display Digits	Sets the number of digits to set and show the PID setpoint. 0 : No Decimal Places (XXXXX) 1 : One Decimal Places (XXXX.X) 2 : Two Decimal Places (XXX.XX) 3 : Three Decimal Places (XX.XXX)	2 (0 - 3)
b5-41 (0160)	PID Output 2 Unit	Sets the display units in *U5-14 [PID Out2 Upr4 Digits]* and *U5-15 [PID Out2 Lwr4 Digits]*. 0 : "WC: inches of water column 1 : PSI: pounds per square inch 2 : GPM: gallons/min 3 : °F: Fahrenheit 4 : ft^3/min: cubic feet/min 5 : m^3/h: cubic meters/hour 6 : L/h: liters/hour 7 : L/s: liters/sec 8 : bar: bar 9 : Pa: Pascal 10 : °C: Celsius 11 : m: meters 12 : ft: feet 13 : L/min: liters/min 14 : m^3/min: cubic meters/min 15 : "Hg: Inch Mercury 16 : kPa: kilopascal 48 : %: Percent 49 : Custom(b5-68~70) 50 : None	0 (0 - 50)
b5-42 (0161) RUN	PID Output 2 Calc Mode	Sets how to calculate the original PID output. 0 : Linear 1 : Square Root 2 : Quadratic 3 : Cubic **Note:** Used for *U5-14 [PID Out2 Upr4 Digits]* and *U5-15 [PID Out2 Lwr4 Digits]* only.	0 (0 - 3)
b5-43 (0162) RUN	PID Out2 Monitor MAX Upper4 Dig	Sets the upper 4 digits of the maximum monitor value. Used with *b5-44 [PID Out2 Monitor MAX Lower4 Dig]* to set maximum monitor value of *U5-14 [PID Out2 Upr4 Digits]* and *U5-15 [PID Out2 Lwr4 Digits]* at maximum frequency. **Note:** Used for *U5-14 [PID Out2 Upr4 Digits]* and *U5-15 [PID Out2 Lwr4 Digits]* only.	0 (0 - 9999)
b5-44 (0163) RUN	PID Out2 Monitor MAX Lower4 Dig	Sets the lower 4 digits of the maximum monitor value. Used with *b5-43 [PID Out2 Monitor MAX Upper4 Dig]* to set maximum monitor value of *U5-14 [PID Out2 Upr4 Digits]* and *U5-15 [PID Out2 Lwr4 Digits]* at maximum frequency. **Note:** Used for *U5-14 [PID Out2 Upr4 Digits]* and *U5-15 [PID Out2 Lwr4 Digits]* only.	0.00 (0.00 - 99.99)
b5-45 (0164) RUN	PID Out2 Monitor MIN for Linear	Sets the minimum display value to show when at zero speed. Only effective when *b5-42 = 0 [PID Output 2 Calc Mode = Linear]*. **Note:** Used for *U5-14 [PID Out2 Upr4 Digits]* and *U5-15 [PID Out2 Lwr4 Digits]* only.	0.0 (0.0 - 999.9)

No. (Hex.)	Name	Description	Default (Range)
b5-46 (0165)	PID Unit Display Selection	Sets the units-text for the PID Display. 0 : "WC: inches of water column 1 : PSI: pounds per square inch 2 : GPM: gallons/min 3 : °F: Fahrenheit 4 : ft^3/min: cubic feet/min 5 : m^3/h: cubic meters/hour 6 : L/h: liters/hour 7 : L/s: liters/sec 8 : bar: bar 9 : Pa: Pascal 10 : °C: Celsius 11 : m: meters 12 : ft: feet 13 : L/min: liters/min 14 : m^3/min: cubic meters/min 15 : "Hg: Inch Mercury 16 : kPa: kilopascal 48 : %: Percent 49 : Custom(b5-68~70) 50 : None	48 (0 - 50)
b5-53 (0B8F) RUN	PID Integrator Ramp Limit	Sets the responsiveness of PID control when the PID feedback changes quickly.	0.0 Hz (0.0 - 10.0 Hz)
b5-68 (3C1F)	System Unit Custom Character 1	Sets the first character of the custom unit display when *b5-46 = 49 [PID Unit Display Selection = Custom (B5-68~70)]*.	41 (20 - 7A)
b5-69 (3C20)	System Unit Custom Character 2	Sets the second character of the custom unit display when *b5-46 = 49 [PID Unit Display Selection = Custom (B5-68~70)]*.	41 (20 - 7A)
b5-70 (3C21)	System Unit Custom Character 3	Sets the third character of the custom unit display when *b5-46 = 49 [PID Unit Display Selection = Custom (B5-68~70)]*.	41 (20 - 7A)
b5-71 (3C22)	Min PID Transducer Scaling	Sets the minimum PID level corresponding to the lowest analog input signal level. **Note:** • To enable this parameter, you must set *b5-71 < b5-38 [PID User Unit Display Scaling]*. If you set *b5-71 > b5-38*, the drive will disable all PID analog inputs. • Parameters *b5-46 [PID Unit Display Selection]*, *b5-38*, and *b5-39 [PID User Unit Display Digits]* set the unit, range, and resolution.	0.00 (-99.99 - +99.99)
b5-82 (31B0)	Feedback Loss 4 ~ 20mA Detect Sel	Sets the drive to do a 4 to 20 mA wire-break detection on the analog input set for PID feedback. 0 : Disabled 1 : Alarm Only 2 : Fault 3 : Run At b5-83	2 (0 - 3)
b5-83 (31B1) RUN	Feedback Loss GoTo Frequency	Sets the speed at which the drive will run if the drive detects a 4 to 20 mA wire-break on the PID Feedback and *b5-82 = 3 [Feedback Loss 4 ~ 20mA Detect Sel = Run At b5-83]*.	0.0 Hz (0.0 - 400.0 Hz)
b5-84 (31B2) RUN	Feedback Loss Loss Of Prime Lvl	Sets the level at which the drive will detect Loss of Prime in the pump. **Note:** • Loss of Prime condition occurs when the measured quantity set by *Y1-18 [Prime Loss Detection Method]* decreases to this level for the time set in *Y1-20 [Loss of Prime Time]* and the output frequency is at the *Y4-02 [Pre-Charge Frequency]* level. The drive will respond to the Loss of Prime condition as specified by *Y1-22 [Loss of Prime Selection]*. • Display unit and scaling are dependent on System Units.	0.0 A (0.0 - 1000.0 A)
b5-85 (31B3) RUN	Feedback Loss GoTo Freq Timeout	When *b5-82 = 3 [Feedback Loss 4 ~ 20mA Detect Sel = Run At b5-83]* and the Feedback signal is lost, the drive will run at the *b5-83 [Feedback Loss Goto Frequency]* speed for this length of time, after which the drive will fault on *FDBKL [WIRE Break]*. **Note:** Set this parameter to 0.0 s to disable the function.	0 s (0 - 6000 s)
b5-86 (31B4) RUN	Feedback Loss Start Delay	When you initiate an AUTO Run command, the drive will wait for this length of time before it will fault on *FDBKL [WIRE Break]* or use parameter *b5-83 [Feedback Loss Goto Frequency]*.	0.0 s (0.0 - 120.0 s)

◆ b6: Dwell Function

No. (Hex.)	Name	Description	Default (Range)
b6-01 (01B6)	Dwell Reference at Start	Sets the output frequency that the drive will hold momentarily when the motor starts.	0.0 Hz (0.0 - 400.0 Hz)
b6-02 (01B7)	Dwell Time at Start	Sets the length of time that the drive will hold the output frequency when the motor starts.	0.0 s (0.0 - 10.0 s)
b6-03 (01B8)	Dwell Reference at Stop	Sets the output frequency that the drive will hold momentarily when ramping to stop the motor.	0.0 Hz (0.0 - 400.0 Hz)
b6-04 (01B9)	Dwell Time at Stop	Sets the length of time for the drive to hold the output frequency when ramping to stop the motor.	0.0 s (0.0 - 10.0 s)

◆ b8: Energy Saving

No. (Hex.)	Name	Description	Default (Range)
b8-01 (01CC)	Energy Saving Control Selection	Sets the Energy-saving control function. 0 : Disabled 1 : Enabled	0 (0, 1)
b8-04 (01CF) Expert	Energy Saving Coefficient Value	Sets the Energy-saving control coefficient to maintain maximum motor efficiency. The default setting is for Yaskawa motors. **Note:** • When you do Rotational Auto-Tuning, the drive will automatically set the energy-saving coefficient. • The minimum values and the maximum values are different for different drive models: • 2011 to 2024, 4005 to 4008: 0.0 - 2000.0 • 2031 to 2273, 4011 to 4302: 0.00 - 655.00	Determined by E2-11 and o2-04 (0.00 - 655.00)
b8-05 (01D0) Expert	Power Detection Filter Time	Sets the time constant to measure output power.	20 ms (0 - 2000 ms)
b8-06 (01D1) Expert	Search Operation Voltage Limit	Sets the voltage limit for Search Operation as a percentage of the motor rated voltage.	0% (0 - 100%)

4.6 C: Tuning

◆ C1: Accel & Decel Time

No. (Hex.)	Name	Description	Default (Range)
C1-01 (0200) RUN	Acceleration Time 1	Sets the length of time to accelerate from zero to maximum output frequency.	10.0 s (0.0 - 6000.0 s)
C1-02 (0201) RUN	Deceleration Time 1	Sets the length of time to decelerate from maximum output frequency to zero.	10.0 s (0.0 - 6000.0 s)
C1-03 (0202) RUN	Acceleration Time 2	Sets the length of time to accelerate from zero to maximum output frequency.	10.0 s (0.0 - 6000.0 s)
C1-04 (0203) RUN	Deceleration Time 2	Sets the length of time to decelerate from maximum output frequency to zero.	10.0 s (0.0 - 6000.0 s)
C1-09 (0208) RUN	Fast Stop Time	Sets the length of time that the drive will decelerate to zero for a Fast Stop. **Note:** Decelerating too quickly can cause an *ov [Overvoltage]* fault that shuts off the drive while the motor to coasts to a stop. Set a Fast Stop time in *C1-09* that prevents motor coasting and makes sure that the motor stops quickly and safely.	10.0 s (0.0 - 6000.0 s)

◆ C2: S-Curve Characteristics

No. (Hex.)	Name	Description	Default (Range)
C2-01 (020B)	S-Curve Time @ Start of Accel	Sets the S-curve acceleration time at start.	0.20 s (0.00 - 10.00 s)
C2-02 (020C)	S-Curve Time @ End of Accel	Sets the S-curve acceleration time at completion.	0.20 s (0.00 - 10.00 s)
C2-03 (020D)	S-Curve Time @ Start of Decel	Sets the S-curve deceleration time at start.	0.20 s (0.00 - 10.00 s)
C2-04 (020E)	S-Curve Time @ End of Decel	Sets the S-curve deceleration time at completion.	0.00 s (0.00 - 10.00 s)

◆ C3: Slip Compensation

No. (Hex.)	Name	Description	Default (Range)
C3-01 (020F) RUN Expert	Slip Compensation Gain	Sets the gain for the slip compensation function. Usually it is not necessary to change this setting. **Note:** Correctly set these parameters before you change the slip compensation gain: • *E2-01 [Motor Rated Current (FLA)]* • *E2-02 [Motor Rated Slip]* • *E2-03 [Motor No-Load Current]*	0.0 (0.0 - 2.5)
C3-02 (0210) RUN Expert	Slip Compensation Delay Time	Sets the slip compensation delay time when speed is unstable or when the slip compensation response is too slow. Usually it is not necessary to change this setting.	2000 ms (0 - 10000 ms)
C3-03 (0211) Expert	Slip Compensation Limit	Sets the upper limit for the slip compensation function as a percentage of the motor rated slip.	200% (0 - 250%)
C3-04 (0212) Expert	Slip Compensation at Regen	Sets the slip compensation function during regenerative operation. 0 : Disabled 1 : Enabled Above 6Hz	0 (0, 1)

◆ C4: Torque Compensation

No. (Hex.)	Name	Description	Default (Range)
C4-01 (0215) RUN	Torque Compensation Gain	Sets the gain for the torque compensation function. Use this parameter value for motor 1 when you operate multiple motors.	1.00 (0.00 - 2.50)
C4-02 (0216) RUN	Torque Compensation Delay Time	Sets the torque compensation delay time. Usually it is not necessary to change this setting.	200 ms (0 - 60000 ms)

◆ C6: Carrier Frequency

No. (Hex.)	Name	Description	Default (Range)
C6-02 (0224)	Carrier Frequency Selection	Sets the carrier frequency for the transistors in the drive. 1 : 2.0 kHz 2 : 5.0 kHz 3 : 8.0 kHz 4 : 10.0 kHz 5 : 12.5 kHz 7 : Swing PWM1 (Audible Sound 1) 8 : Swing PWM2 (Audible Sound 2) 9 : Swing PWM3 (Audible Sound 3) A : Swing PWM4 (Audible Sound 4) B : Leakage Current Rejection PWM F : User Defined (C6-03 to C6-05) **Note:** • The carrier frequency for Swing PWM 1 to 4 is equivalent to 2.0 kHz. Swing PWM applies a special PWM pattern to decrease the audible noise. • Setting *B* uses a PWM pattern that decreases the leakage current that the drive detects over long wiring distances. This can help decrease alarm detection and decrease problems with the current monitor from leakage current over long wiring distances.	Determined by o2-04 (1 - F)
C6-03 (0225)	Carrier Frequency Upper Limit	Sets the upper limit of the carrier frequency. Set *C6-02 = F [Carrier Frequency Selection = User Defined (C6-03 to C6-05)]* to set this parameter.	Determined by C6-02 (1.0 - 12.5 kHz)
C6-04 (0226)	Carrier Frequency Lower Limit	Sets the lower limit of the carrier frequency. Set *C6-02 = F [Carrier Frequency Selection = User Defined (C6-03 to C6-05)]* to set this parameter.	Determined by C6-02 (1.0 - 12.5 kHz)
C6-05 (0227)	Carrier Freq Proportional Gain	Sets the proportional gain for the carrier frequency. Set *C6-02 = F [Carrier Frequency Selection = User Defined (C6-03 to C6-05)]* to set this parameter.	Determined by C6-02 (0 - 99)

4.7 d: Reference Settings

◆ d1: Frequency Reference

No. (Hex.)	Name	Description	Default (Range)
d1-01 (0280) RUN	Reference 1	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection*.	0.00 Hz (0.00 - 400.00 Hz)
d1-02 (0281) RUN	Reference 2	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-03 (0282) RUN	Reference 3	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-04 (0283) RUN	Reference 4	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-05 (0284) RUN	Reference 5	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-06 (0285) RUN	Reference 6	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-07 (0286) RUN	Reference 7	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-08 (0287) RUN	Reference 8	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-09 (0288)	Reference 9	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-10 (028B)	Reference 10	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-11 (028C)	Reference 11	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-12 (028D)	Reference 12	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-13 (028E)	Reference 13	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-14 (028F)	Reference 14	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-15 (0290)	Reference 15	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-16 (0291)	Reference 16	Sets the frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*.	0.00 Hz (0.00 - 400.00 Hz)
d1-17 (0292) RUN	Jog Reference	Sets the Jog frequency reference in the units from *o1-03 [Frequency Display Unit Selection]*. Set *H1-xx = 6 [MFDI Function Selection = Jog Reference Selection]* to use the Jog frequency reference.	6.00 Hz (0.00 - 400.00 Hz)

◆ d2: Reference Limits

No. (Hex.)	Name	Description	Default (Range)
d2-01 (0289)	Frequency Reference Upper Limit	Sets maximum limit for all frequency references. The maximum output frequency is 100%.	100.0% (0.0 - 110.0%)
d2-02 (028A)	Frequency Reference Lower Limit	Sets minimum limit for all frequency references. The maximum output frequency is 100%.	0.0% (0.0 - 110.0%)
d2-03 (0293)	Analog Frequency Ref Lower Limit	Sets the lower limit for the master frequency reference (the first frequency of the multi-step speed reference) as a percentage. The maximum output frequency is 100%.	0.0% (0.0 - 110.0%)

◆ d3: Jump Frequency

No. (Hex.)	Name	Description	Default (Range)
d3-01 (0294)	Jump Frequency 1	Sets the median value of the frequency band that the drive will avoid.	0.0 Hz (0.0 - 400.0 Hz)
d3-02 (0295)	Jump Frequency 2	Sets the median value of the frequency band that the drive will avoid.	0.0 Hz (0.0 - 400.0 Hz)
d3-03 (0296)	Jump Frequency 3	Sets the median value of the frequency band that the drive will avoid.	0.0 Hz (0.0 - 400.0 Hz)
d3-04 (0297)	Jump Frequency Width	Sets the width of the frequency band that the drive will avoid.	1.0 Hz (0.0 - 20.0 Hz)

◆ d4: Frequency Ref Up/Down & Hold

No. (Hex.)	Name	Description	Default (Range)
d4-01 (0298)	Freq Reference Hold Selection	Sets the function that saves the frequency reference after a Stop command or when de-energizing the drive. Set *H1-xx [MFDI Function Selection]* to one of these values to enable this parameter: • *A [Accel/Decel Ramp Hold]* • *10/11 [Up/Down Command]* 0 : Disabled 1 : Enabled	0 (0, 1)

◆ d6: Field Weakening

No. (Hex.)	Name	Description	Default (Range)
d6-01 (02A0)	Field Weakening Level	Sets the drive output voltage as a percentage of *E1-05 [Maximum Output Voltage]* when *H1-xx = 63 [Field Weakening]* is activated.	80% (0 - 100%)
d6-02 (02A1)	Field Weakening Frequency Limit	Sets the minimum output frequency to start field weakening.	0.0 Hz (0.0 - 400.0 Hz)

◆ d7: Offset Frequency

No. (Hex.)	Name	Description	Default (Range)
d7-01 (02B2) RUN	Offset Frequency 1	Uses *H1-xx = 44 [MFDI Function Select = Add Offset Frequency 1 (d7-01)]* as a percentage of the Maximum Output Frequency to add or subtract the set frequency to/from the frequency reference.	0.0% (-100.0 - +100.0%)
d7-02 (02B3) RUN	Offset Frequency 2	Uses *H1-xx = 45 [MFDI Function Select = Add Offset Frequency 2 (d7-02)]* as a percentage of the Maximum Output Frequency to add or subtract the set frequency to/from the frequency reference.	0.0% (-100.0 - +100.0%)
d7-03 (02B4) RUN	Offset Frequency 3	Uses *H1-xx = 46 [MFDI Function Select = Add Offset Frequency 3 (d7-03)]* as a percentage of the Maximum Output Frequency to add or subtract the set frequency to/from the frequency reference.	0.0% (-100.0 - +100.0%)

4.8 E: Motor Parameters

◆ E1: V/f Pattern for Motor 1

No. (Hex.)	Name	Description	Default (Range)
E1-01 (0300)	Input AC Supply Voltage	Sets the drive input voltage.	208/240 V: 240 V, 480 V: 480 V (208/240 V: 155 - 255 V, 480 V: 310 - 510 V)
E1-03 (0302)	V/f Pattern Selection	Sets the V/f pattern for the drive and motor. You can use one of the preset patterns or you can make a custom pattern. 0 : Const Trq, 50Hz base, 50Hz max 1 : Const Trq, 60Hz base, 60Hz max 2 : Const Trq, 50Hz base, 60Hz max 3 : Const Trq, 60Hz base, 72Hz max 4 : VT, 50Hz, 65% Vmid reduction 5 : VT, 50Hz, 50% Vmid reduction 6 : VT, 60 Hz, 65% Vmid reduction 7 : VT, 60Hz, 50% Vmid reduction 8 : High Trq, 50Hz, 25% Vmin boost 9 : High Trq, 50Hz, 65% Vmin boost A : High Trq, 60Hz, 25% Vmin boost B : High Trq, 60Hz, 65% Vmin boost C : High Freq, 60Hz base, 90Hz max D : High Freq, 60Hz base, 120Hz max E : High Freq, 60Hz base, 180Hz max F : Custom **Note:** • Set the correct V/f pattern for the application and operation area. An incorrect V/f pattern can decrease motor torque and increase current from overexcitation. • Parameter *A1-03 [Initialize Parameters]* will not initialize the value of *E1-03*.	F (0 - F)
E1-04 (0303)	Maximum Output Frequency	Sets the maximum output frequency for the V/f pattern.	60.0 Hz (40.0 to 400.0 Hz)
E1-05 (0304)	Maximum Output Voltage	Sets the maximum output voltage for the V/f pattern.	208/240 V: 230.0 V, 480 V: 460.0 V (208/240 V: 0.0 - 255.0 V, 480 V: 0.0 - 510.0 V)
E1-06 (0305)	Base Frequency	Sets the base frequency for the V/f pattern.	60.0 Hz (0.0 - E1-04)
E1-07 (0306)	Mid Point A Frequency	Sets a middle output frequency for the V/f pattern.	30.0 Hz (0.0 - E1-04)
E1-08 (0307)	Mid Point A Voltage	Sets a middle output voltage for the V/f pattern.	Determined by o2-04 (208/240 V: 0.0 - 255.0 V, 480 V: 0.0 - 510.0 V)
E1-09 (0308)	Minimum Output Frequency	Sets the minimum output frequency for the V/f pattern.	1.5 Hz (Determined by E1-04)
E1-10 (0309)	Minimum Output Voltage	Sets the minimum output voltage for the V/f pattern.	10.2 V (208/240 V: 0.0 - 255.0 V, 480 V: 0.0 - 510.0 V)
E1-11 (030A) Expert	Mid Point B Frequency	Sets a middle output frequency for the V/f pattern.	0.0 Hz (0.0 - E1-04)
E1-12 (030B) Expert	Mid Point B Voltage	Sets a middle point voltage for the V/f pattern.	0.0 V (208/240 V: 0.0 - 255.0 V, 480 V: 0.0 - 510.0 V)
E1-13 (030C) Expert	Base Voltage	Sets the base voltage for the V/f pattern.	0.0 V (208/240 V: 0.0 - 255.0 V, 480 V: 0.0 - 510.0 V)

◆ E2: Motor Parameters

No. (Hex.)	Name	Description	Default (Range)
E2-01 (030E)	Motor Rated Current (FLA)	Sets the motor rated current in amps.	Determined by o2-04 (10% to 200% of the drive rated current)
E2-02 (030F)	Motor Rated Slip	Sets motor rated slip.	Determined by o2-04 (0.000 - 20.000 Hz)
E2-03 (0310)	Motor No-Load Current	Sets the no-load current for the motor in amps when operating at the rated frequency and the no-load voltage.	Determined by o2-04 (0 to E2-01)
E2-04 (0311)	Motor Pole Count	Sets the number of motor poles.	4 (2 - 120)
E2-05 (0312)	Motor Line-to-Line Resistance	Sets the line-to-line resistance for the motor stator windings.	Determined by o2-04 (0.000 - 65.000 Ω)
E2-06 (0313)	Motor Leakage Inductance	Sets the voltage drop from motor leakage inductance when the motor is operating at the rated frequency and rated current. This value is a percentage of Motor Rated Voltage.	Determined by o2-04 (0.0 - 60.0%)
E2-10 (0317)	Motor Iron Loss	Sets the motor iron loss.	Determined by o2-04 (0 - 65535 W)
E2-11 (0318)	Motor Rated Power	Sets the motor rated output in the units from *o1-58 [Motor Power Unit Selection]*.	Determined by o2-04 (0.00 - 650.00 HP) (0.00 - 650.00 kW)

4.9 F: Options

◆ F4: Analog Monitor Option

No. (Hex.)	Name	Description	Default (Range)
F4-01 (0391)	Terminal V1 Function Selection	Sets the monitor signal output from terminal V1. Set the *x-xx* part of the *Ux-xx [Monitor]*. For example, set *F4-01 = 102* to monitor *U1-02 [Output Frequency]*.	102 (000 - 1299)
F4-02 (0392) RUN	Terminal V1 Gain	Sets the gain of the monitor signal that is sent from terminal V1. Sets the analog signal output level from the terminal V1 at 10 V or 20 mA as 100% when an output for monitoring items is 100%.	100.0% (-999.9 - +999.9%)
F4-03 (0393)	Terminal V2 Function Selection	Sets the monitor signal output from terminal V2. Set the *x-xx* part of the *Ux-xx [Monitor]*. For example, set *F4-03 = 103* to monitor *U1-03 [Output Current]*.	103 (000 - 1299)
F4-04 (0394) RUN	Terminal V2 Gain	Sets the gain of the monitor signal that is sent from terminal V2. Sets the analog signal output level from terminal V2 at 10 V or 20 mA as 100% when an output for monitoring items is 100%.	50.0% (-999.9 - +999.9%)
F4-05 (0395) RUN	Terminal V1 Bias	Sets the bias of the monitor signal that is sent from terminal V1. When an output for monitoring items is 0%, this parameter sets the analog signal output level from the V1 terminal as a percentage of 10 V.	0.0% (-999.9 - +999.9%)
F4-06 (0396) RUN	Terminal V2 Bias	Sets the bias of the monitor signal that is sent from terminal V2. Set the level of the analog signal sent from the V2 terminal at 10 V or 20 mA as 100% when an output for monitoring items is 0%.	0.0% (-999.9 - +999.9%)
F4-07 (0397)	Terminal V1 Signal Level	Sets the output signal level for terminal V1. 0 : 0 to 10 V 1 : -10 to 10 V	0 (0, 1)
F4-08 (0398)	Terminal V2 Signal Level	Sets the output signal level for terminal V2. 0 : 0 to 10 V 1 : -10 to 10 V	0 (0, 1)

◆ F5: Digital Output Option

No. (Hex.)	Name	Description	Default (Range)
F5-01 (0399)	Terminal P1-PC Function Select	Sets the function of terminal P1-PC on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	0 (0 - 1FF)
F5-02 (039A)	Terminal P2-PC Function Select	Sets the function of terminal P2-PC on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	1 (0 - 1FF)
F5-03 (039B)	Terminal P3-PC Function Select	Sets the function of terminal P3-PC on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	2 (0 - 1FF)
F5-04 (039C)	Terminal P4-PC Function Select	Sets the function of terminal P4-PC on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	4 (0 - 1FF)
F5-05 (039D)	Terminal P5-PC Function Select	Sets the function of terminal P5-PC on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	6 (0 - 1FF)
F5-06 (039E)	Terminal P6-PC Function Select	Sets the function of terminal P6-PC on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	37 (0 - 1FF)
F5-07 (039F)	Terminal M1-M2 Function Select	Sets the function of terminal M1-M2 on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	F (0 - 1FF)
F5-08 (03A0)	Terminal M3-M4 Function Select	Sets the function of terminal M3-M4 on the DO-A3 option. Set *F5-09 = 2 [DO-A3 Output Mode Selection = Programmable (F5-01 to F5-08)]* to enable this function.	F (0 - 1FF)
F5-09 (03A1)	DO-A3 Output Mode Selection	Sets the output mode of signals from the DO-A3 option. 0 : Predefined Individual Outputs 1 : Binary Output 2 : Programmable (F5-01 to F5-08)	0 (0 - 2)

◆ F6: Communication Options

No. (Hex.)	Name	Description	Default (Range)
F6-01 (03A2)	Communication Error Selection	Sets the method to stop the motor or let the motor continue operating when the drive detects *bUS [Option Communication Error]*. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only 4 : Alarm (Run at d1-04) 5 : Alarm - Ramp Stop	1 (0 - 5)
F6-02 (03A3)	Comm External Fault (EF0) Detect	Sets the conditions at which *EF0 [Option Card External Fault]* is detected. 0 : Always Detected 1 : Detected during RUN Only	0 (0, 1)
F6-03 (03A4)	Comm External Fault (EF0) Select	Sets the method to stop the motor or let the motor continue operating when the drive detects an *EF0 [Option Card External Fault]*. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only	1 (0 - 3)
F6-04 (03A5)	bUS Error Detection Time	Sets the delay time for the drive to detect *bUS [Option Communication Error]*. **Note:** When you install an option card in the drive, the parameter value changes to 0.0 s.	2.0 s (0.0 - 5.0 s)
F6-07 (03A8)	Multi-Step Ref @ NetRef/ ComRef	Sets the function that enables and disables the multi-step speed reference when the frequency reference source is NetRef or ComRef (communication option card or serial communications). 0 : Disable Multi-Step References 1 : Enable Multi-Step References	0 (0, 1)
F6-08 (036A)	Comm Parameter Reset @Initialize	Sets the function to initialize *F6-xx and F7-xx parameters* when the drive is initialized with *A1-03 [Initialize Parameters]*. 0 : No Reset - Parameters Retained 1 : Reset Back to Factory Default	0 (0, 1)
F6-14 (03BB)	BUS Error Auto Reset	Sets the automatic reset function for *bUS [Option Communication Errors]*. 0 : Disabled 1 : Enabled	0 (0, 1)
F6-15 (0B5B)	Comm. Option Parameters Reload	Sets the update method when you change *F6-xx, F7-xx [Communication Options]*. 0 : Reload at Next Power Cycle 1 : Reload Now 2 : Cancel Reload Request	0 (0 - 2)
F6-30 (03CB)	PROFIBUS-DP Node Address	Sets the node address for PROFIBUS-DP communication. Restart the drive after you change the parameter setting. **Note:** Be sure to set a node address that is different than all other node addresses.	0 (0 - 125)
F6-31 (03CC)	PROFIBUS-DP Clear Mode Selection	Sets what the drive will do after it receives the Clear Mode command. 0 : Reset 1 : Hold Previous State	0 (0, 1)
F6-32 (03CD)	PROFIBUS-DP Data Format Select	Sets the data format of PROFIBUS-DP communication. Restart the drive after you change the parameter setting. 0 : PPO Type 1 : Conventional 2 : PPO (bit0) 3 : PPO Type (Enter) 4 : Conventional (Enter) 5 : PPO (bit0, Enter)	0 (0 - 5)
F6-48 (02FE)	BACnet Device Object Identifier 0	Sets the Instance Identifier of the BACnet Device Object, where the *F6-48* value is the least significant word. **Note:** This parameter and *F6-49* set the Instance Identifier of the BACnet Device Object. Example 1: Set the Device Object Instance Identifier to *1234*. 1234 decimal is equal to 4D2H (hexadecimal). Set *F6-48 = 4D2H* and *F6-49 = 0*. Example 2: Set the Device Object Instance Identifier to *1234567*. 1234567 decimal is equal to 12D687H. Set *F6-48 = D687H* and *F6-49 = 12H*.	1 (0 - FFFFH)

No. (Hex.)	Name	Description	Default (Range)
F6-49 (02FF)	BACnet Device Object Identifier 1	Sets the Instance Identifier of the BACnet Device Object, where the *F6-49* value is the most significant word. **Note:** This parameter and *F6-48* set the Instance Identifier of the BACnet Device Object. Example 1: Set the Device Object Instance Identifier to *1234*. 1234 decimal is equal to 4D2H (hexadecimal). Set *F6-48 = 4D2H* and *F6-49 = 0.* Example 2: Set the Device Object Instance Identifier to *1234567*. 1234567 decimal is equal to 12D687H. Set *F6-48 = D687H* and *F6-49 = 12H.*	0 (0 - 3FH)
F6-50 (03C1)	DeviceNet MAC Address	Sets the MAC address for DeviceNet communication. Restart the drive after you change the parameter setting. **Note:** Be sure to set a MAC address that is different than all other node addresses. Do not set this parameter to 0. Incorrect parameter settings will cause *AEr [Station Address Setting Error]* errors and the MS LED on the option will flash.	64 0 (0 - 64)
F6-51 (03C2)	DeviceNet Baud Rate	Sets the DeviceNet communications speed. Restart the drive after you change the parameter setting. 0 : 125 kbps 1 : 250 kbps 2 : 500 kbps 3 : Adjustable from Network 4 : Detect Automatically	4 0 (0 - 4)
F6-52 (03C3)	DeviceNet PCA Setting	Sets the format of data that the DeviceNet communication master sends to the drive.	21 (0 - 255)
F6-53 (03C4)	DeviceNet PPA Setting	Sets the format of data that the drive sends to the DeviceNet communication master.	71 (0 - 255)
F6-54 (03C5)	Net Idle Fault Detection	Sets the function to detect *EF0 [Option Card External Fault]* when the drive does not receive data from the DeviceNet or EtherNet/IP master. 0 : Enabled 1 : Disabled, No Fault Detection 2 : Vendor Specific 3 : RUN Forward 4 : RUN Reverse	0 (0 - 4)
F6-55 (03C6)	DeviceNet Baud Rate Monitor	Sets the function to see the actual DeviceNet communications speed using the keypad. This parameter functions as a monitor only. 0 : 125 kbps 1 : 250 kbps 2 : 500 kbps	0 (0 - 2)
F6-56 (03D7)	DeviceNet Speed Scaling	Sets the speed scale for DeviceNet communication.	0 (-15 - +15)
F6-57 (03D8)	DeviceNet Current Scaling	Sets the current scale of the DeviceNet communication master.	0 (-15 - +15)
F6-58 (03D9)	DeviceNet Torque Scaling	Sets the torque scale of the DeviceNet communication master.	0 (-15 - +15)
F6-59 (03DA)	DeviceNet Power Scaling	Sets the power scale of the DeviceNet communication master.	0 (-15 - +15)
F6-60 (03DB)	DeviceNet Voltage Scaling	Sets the voltage scale of the DeviceNet communication master.	0 (-15 - +15)
F6-61 (03DC)	DeviceNet Time Scaling	Sets the time scale of the DeviceNet communication master.	0 (-15 - +15)
F6-62 (03DD)	DeviceNet Heartbeat Interval	Sets the heartbeat for DeviceNet communication. Set this parameter to 0 to disable the heartbeat function.	0 (0 - 10)
F6-63 (03DE)	DeviceNet Network MAC ID	Sets the function to see the actual DeviceNet MAC address using the keypad. This parameter functions as a monitor only.	63 0 (0 - 63)
F6-64 (03DF)	Dynamic Out Assembly 109 Param1	Sets Configurable Output 1 written to the MEMOBUS register.	0000H (0000H - FFFFH)
F6-65 (03E0)	Dynamic Out Assembly 109 Param2	Sets Configurable Output 2 written to the MEMOBUS register.	0000H (0000H - FFFFH)
F6-66 (03E1)	Dynamic Out Assembly 109 Param3	Sets Configurable Output 3 written to the MEMOBUS register.	0000H (0000H - FFFFH)

No. (Hex.)	Name	Description	Default (Range)
F6-67 (03E2)	Dynamic Out Assembly 109 Param4	Sets Configurable Output 4 written to the MEMOBUS register.	0000H (0000H - FFFFH)
F6-68 (03E3)	Dynamic In Assembly 159 Param 1	Sets Configurable Input 1 read from the MEMOBUS register.	0000H (0000H - FFFFH)
F6-69 (03E4)	Dynamic In Assembly 159 Param 2	Sets Configurable Input 2 read from the MEMOBUS register.	0000H (0000H - FFFFH)
F6-70 (03C7)	Dynamic In Assembly 159 Param 3	Sets Configurable Input 3 read from the MEMOBUS register.	0000H (0000H - FFFFH)
F6-71 (03C8)	Dynamic In Assembly 159 Param 4	Sets Configurable Input 4 read from the MEMOBUS register.	0000H (0000H - FFFFH)

◆ F7: Ethernet Options

Note:

You must cycle power or set *F6-15 = 1 [Comm. Option Parameters Reload = Reload Now]* for *F7-xx* parameters to take effect.

No. (Hex.)	Name	Description	Default (Range)
F7-01 (03E5)	IP Address 1	Sets the first octet of the IP Address for the device that is connecting to the network. Restart the drive after you change this parameter. **Note:** When *F7-13 = 0 [Address Mode at Startup = Static]*: • Use parameters *F7-01 to F7-04 [IP Address 4]* to set the IP Address. Be sure to set a different IP address for each drive on the network. • Also set parameters *F7-01 to F7-12*.	192 (0 - 255)
F7-02 (03E6)	IP Address 2	Sets the second octet of the IP Address for the device that is connecting to the network. Restart the drive after you change this parameter. **Note:** When *F7-13 = 0 [Address Mode at Startup = Static]*: • Use parameters *F7-01 to F7-04 [IP Address 4]* to set the IP Address. Be sure to set a different IP address for each drive on the network. • Also set parameters *F7-01 to F7-12*.	168 (0 - 255)
F7-03 (03E7)	IP Address 3	Sets the third octet of the IP Address for the device that is connecting to the network. Restart the drive after you change this parameter. **Note:** When *F7-13 = 0 [Address Mode at Startup = Static]*: • Use parameters *F7-01 to F7-04 [IP Address 4]* to set the IP Address. Be sure to set a different IP address for each drive on the network. • Also set parameters *F7-01 to F7-12*.	1 (0 - 255)
F7-04 (03E8)	IP Address 4	Sets the fourth octet of the IP Address for the device that is connecting to the network. Restart the drive after you change this parameter. **Note:** When *F7-13 = 0 [Address Mode at Startup = Static]*: • Use parameters *F7-01 to F7-04 [IP Address 4]* to set the IP Address. Be sure to set a different IP address for each drive on the network. • Also set parameters *F7-01 to F7-12*.	20 (0 - 255)
F7-05 (03E9)	Subnet Mask 1	Sets the first octet of the subnet mask of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	255 (0 - 255)
F7-06 (03EA)	Subnet Mask 2	Sets the second octet of the subnet mask of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	255 (0 - 255)
F7-07 (03EB)	Subnet Mask 3	Sets the third octet of the subnet mask of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	255 (0 - 255)
F7-08 (03EC)	Subnet Mask 4	Sets the fourth octet of the subnet mask of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	0 (0 - 255)
F7-09 (03ED)	Gateway Address 1	Sets the first octet of the gateway address of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	192 (0 - 255)

No. (Hex.)	Name	Description	Default (Range)
F7-10 (03EE)	Gateway Address 2	Sets the second octet of the gateway address of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	168 (0 - 255)
F7-11 (03EF)	Gateway Address 3	Sets the third octet of the gateway address of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	1 (0 - 255)
F7-12 (03F0)	Gateway Address 4	Sets the fourth octet of the gateway address of the connected network. **Note:** Set this parameter when *F7-13 = 0 [Address Mode at Startup = Static]*.	1 (0 - 255)
F7-13 (03F1)	Address Mode at Startup	Sets the method to set option card IP addresses. 0 : Static 1 : BOOTP 2 : DHCP **Note:** • The following setting values are available when using the PROFINET communication option card (SI-EP3). –0: Static (It is possible for the PLC to override this setting, if so configured) –1: BOOTP (In PROFINET, this setting does NOT use BOOTP. It uses a PROFINET-specific method, DCP). In BACnet/IP, this setting is the same as DHCP. –2: DHCP (In PROFINET, this setting does NOT use DHCP. It uses a PROFINET-specific method, DCP) • When *F7-13 = 0*, set parameters *F7-01 to F7-12 [IP Address 1 to Gateway Address 4]* to set the IP Address. Be sure to set a different IP address for each drive on the network.	2 (0 - 2)
F7-14 (03F2)	Duplex Mode Selection	Sets the duplex mode setting method. 0 : Half/Half 1 : Auto/Auto 2 : Full/Full 3 : Half/Auto 4 : Half/Full 5 : Auto/Half 6 : Auto/Full 7 : Full/Half 8 : Full/Auto	1 (0 - 8)
F7-15 (03F3)	Communication Speed Selection	Sets the communications speed. 10 : 10/10 Mbps 100 : 100/100 Mbps 101 : 10/100 Mbps 102 : 100/10 Mbps **Note:** You must set *F7-14 = 0, 2, 4, or 7* for this parameter to have an effect.	10 (10, 100 - 102)
F7-16 (03F4)	Timeout Value	Sets the detection time for a communications timeout. **Note:** Set this parameter to 0.0 to disable the connection timeout function.	0.0 s (0.0 - 30.0 s)
F7-17 (03F5)	EtherNet/IP Speed Scaling Factor	Sets the scaling factor for the speed monitor in the EtherNet/IP Class ID 2AH Object.	0 (-15 - +15)
F7-18 (03F6)	EtherNet/IP Current Scale Factor	Sets the scaling factor for the output current monitor in the EtherNet/IP Class ID 2AH Object.	0 (-15 - +15)
F7-19 (03F7)	EtherNet/IP Torque Scale Factor	Sets the scaling factor for the torque monitor in the EtherNet/IP Class ID 2AH Object.	0 (-15 - +15)
F7-20 (03F8)	EtherNet/IP Power Scaling Factor	Sets the scaling factor for the power monitor in the EtherNet/IP Class ID 2AH Object.	0 (-15 - +15)
F7-21 (03F9)	EtherNet/IP Voltage Scale Factor	Sets the scaling factor for the voltage monitor in the EtherNet/IP Class ID 2AH Object.	0 (-15 - +15)
F7-22 (03FA)	EtherNet/IP Time Scaling	Sets the scaling factor for the time monitor in the EtherNet/IP Class ID 2AH Object.	0 (-15 - +15)
F7-23 (03FB)	Dynamic Out Param 1 for CommCard	Sets Output Assembly 116 when you use an Ethernet/IP option. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0. When you use a ProfiNet option, set this parameter to set to configurable output 1.	0 (0 - FFFF)

No. (Hex.)	Name	Description	Default (Range)
F7-24 (03FC)	Dynamic Out Param 2 for CommCard	Sets Output Assembly 116 when you use an Ethernet/IP option. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0. When you use a ProfiNet option, set this parameter to set to configurable output 2.	0 (0 - FFFF)
F7-25 (03FD)	Dynamic Out Param 3 for CommCard	Sets Output Assembly 116 when you use an Ethernet/IP option. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0. When you use a ProfiNet option, set this parameter to set to configurable output 3.	0 (0 - FFFF)
F7-26 (03FE)	Dynamic Out Param 4 for CommCard	Sets Output Assembly 116 when you use an Ethernet/IP option. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0. When you use a ProfiNet option, set this parameter to set to configurable output 4.	0 (0 - FFFF)
F7-27 (03FF)	Dynamic Out Param 5 for CommCard	Sets Output Assembly 116 when you use an Ethernet/IP option. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0. When you use a ProfiNet option, set this parameter to set to configurable output 5.	0 (0 - FFFF)
F7-28 (0370)	Dynamic Out Param 6 for CommCard	Sets Output Assembly 116 when you use an Ethernet/IP option. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0.	0 (0 - FFFF)
F7-29 (0371)	Dynamic Out Param 7 for CommCard	Sets Output Assembly 116 when you use an Ethernet/IP option. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0.	0 (0 - FFFF)
F7-30 (0372)	Dynamic Out Param 8 for CommCard	Sets Output Assembly 116 when you use an Ethernet/IP option. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0.	0 (0 - FFFF)
F7-31 (0373)	Dynamic Out Param 9 for CommCard	Sets Output Assembly 116 when you use an Ethernet/IP option. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0.	0 (0 - FFFF)
F7-32 (0374)	Dynamic Out Param 10 for CommCard	Sets Output Assembly 116 when you use an Ethernet/IP option. The drive writes the values from Output Assembly 116 to the MEMOBUS/Modbus address register that is stored for each parameter. The drive will not write the values from Output Assembly 116 to the registers when the MEMOBUS/Modbus address is 0.	0 (0 - FFFF)
F7-33 (0375)	Dynamic In Param 1 for CommCard	Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined. When you use a ProfiNet option, set this parameter to set to configurable input 1.	0 (0 - FFFF)
F7-34 (0376)	Dynamic In Param 2 for CommCard	Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined. When you use a ProfiNet option, set this parameter to set to configurable input 2.	0 (0 - FFFF)
F7-35 (0377)	Dynamic In Param 3 for CommCard	Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined. When you use a ProfiNet option, set this parameter to set to configurable input 3.	0 (0 - FFFF)
F7-36 (0378)	Dynamic In Param 4 for CommCard	Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined. When you use a ProfiNet option, set this parameter to set to configurable input 4.	0 (0 - FFFF)
F7-37 (0379)	Dynamic In Param 5 for CommCard	Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined. When you use a ProfiNet option, set this parameter to set to configurable input 5.	0 (0 - FFFF)
F7-38 (037A)	Dynamic In Param 6 for CommCard	Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined.	0 (0 - FFFF)
F7-39 (037B)	Dynamic In Param 7 for CommCard	Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined.	0 (0 - FFFF)

No. (Hex.)	Name	Description	Default (Range)
F7-40 (037C)	Dynamic In Param 8 for CommCard	Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined.	0 (0 - FFFF)
F7-41 (037D)	Dynamic In Param 9 for CommCard	Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined.	0 (0 - FFFF)
F7-42 (037E)	Dynamic In Param 10 for CommCard	Sets Input Assembly 166 when you use an Ethernet/IP option. The drive sends the values from the MEMOBUS/Modbus address registers stored for each parameter to Input Assembly 166. The drive returns the default register value for the option card when the MEMOBUS/Modbus address is 0 and the value sent to Input Assembly 166 is not defined.	0 (0 - FFFF)
F7-50 (1BC1)	BACnet/IP Port	Sets the UDP port on which the drive will receive incoming BACnet messages.	47808 (1024 - 65535)
F7-51 (1BE9)	BBMD Foreign Register Addr 1	Sets the first octet of the IP Address of the BACnet Broadcast Management Device (BBMD) to which the drive will register as a foreign device.	0 (0 - 255)
F7-52 (1BEA)	BBMD Foreign Register Addr 2	Sets the second octet of the IP Address of the BACnet Broadcast Management Device (BBMD) to which the drive will register as a foreign device.	0 (0 - 255)
F7-53 (1BEB)	BBMD Foreign Register Addr 3	Sets the third octet of the IP Address of the BACnet Broadcast Management Device (BBMD) to which the drive will register as a foreign device.	0 (0 - 255)
F7-54 (1BEC)	BBMD Foreign Register Addr 4	Sets the fourth octet of the IP Address of the BACnet Broadcast Management Device (BBMD) to which the drive will register as a foreign device. .	0 (0 - 255)
F7-55 (1BED)	BBMD Foreign Register Port	Sets the UDP port of the BBMD device to which the drive will register.	47808 (1024 - 65535)
F7-56 (1BEE)	BBMD Foreign Register Time	Sets the time interval in which the drive will repeat BBMD foreign registration.	3600 s (0 - 65535 s)
F7-57 (1BEF)	BACnet/IP BUS Timeout Value	Sets the length of time that the drive will wait after it receives a Run command or frequency reference command before it detects a *bUS* fault.	3600 s (0 - 65535 s)
F7-60 (0780)	PZD1 Write (Control Word)	When you use a Profibus option, set the MEMOBUS/Modbus address for PZD1 (PPO output). PZD1 (PPO output) functions as the STW when *F7-60 = 0 to 2*.	0
F7-61 (0781)	PZD2 Write (Frequency Reference)	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD2 (PPO output). PZD2 (PPO output) functions as the HSW when *F7-61 = 0 to 2*.	0
F7-62 (0782)	PZD3 Write	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD3 (PPO output). A value of 0, 1, or 2 will disable the PZD3 (PPO output) write operation to the MEMOBUS/Modbus register.	0
F7-63 (0783)	PZD4 Write	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD4 (PPO output). A value of 0, 1, or 2 will disable the PZD4 (PPO output) write operation to the MEMOBUS/Modbus register.	0
F7-64 (0784)	PZD5 Write	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD5 (PPO output). A value of 0, 1, or 2 will disable the PZD5 (PPO output) write operation to the MEMOBUS/Modbus register.	0
F7-65 (0785)	PZD6 Write	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD6 (PPO output). A value of 0, 1, or 2 will disable the PZD6 (PPO output) write operation to the MEMOBUS/Modbus register.	0
F7-66 (0786)	PZD7 Write	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD7 (PPO output). A value of 0, 1, or 2 will disable the PZD7 (PPO output) write operation to the MEMOBUS/Modbus register.	0
F7-67 (0787)	PZD8 Write	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD8 (PPO output). A value of 0, 1, or 2 will disable the PZD8 (PPO output) write operation to the MEMOBUS/Modbus register.	0
F7-68 (0788)	PZD9 Write	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD9 (PPO output). A value of 0, 1, or 2 will disable the PZD9 (PPO output) write operation to the MEMOBUS/Modbus register.	0
F7-69 (0789)	PZD10 Write	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD10 (PPO output). A value of 0, 1, or 2 will disable the PZD10 (PPO output) write operation to the MEMOBUS/Modbus register.	0
F7-70 (078A)	PZD1 Read (Status Word)	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD1 (PPO input). PZD1 (PPO input) functions as the ZSW when *F7-70 = 0*.	0
F7-71 (078B)	PZD2 Read (Output Frequency)	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD2 (PPO input). PZD2 (PPO input) functions as the HIW when *F7-71 = 0*.	0
F7-72 (078C)	PZD3 Read	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD3 (PPO input). A value of 0 will disable the PZD3 (PPO input) load operation from the MEMOBUS/Modbus register.	0

No. (Hex.)	Name	Description	Default (Range)
F7-73 (078D)	PZD4 Read	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD4 (PPO input). A value of 0 will disable the PZD4 (PPO input) load operation from the MEMOBUS/Modbus register.	0
F7-74 (078E)	PZD5 Read	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD5 (PPO input). A value of 0 will disable the PZD5 (PPO input) load operation from the MEMOBUS/Modbus register.	0
F7-75 (078F)	PZD6 Read	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD6 (PPO input). A value of 0 will disable the PZD6 (PPO input) load operation from the MEMOBUS/Modbus register.	0
F7-76 (0790)	PZD7 Read	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD7 (PPO input). A value of 0 will disable the PZD7 (PPO input) load operation from the MEMOBUS/Modbus register.	0
F7-77 (0791)	PZD8 Read	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD8 (PPO input). A value of 0 will disable the PZD8 (PPO input) load operation from the MEMOBUS/Modbus register.	0
F7-78 (0792)	PZD9 Read	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD9 (PPO input). A value of 0 will disable the PZD9 (PPO input) load operation from the MEMOBUS/Modbus register.	0
F7-79 (0793)	PZD10 Read	When you use a Profibus option, sets the MEMOBUS/Modbus address for PZD10 (PPO input). A value of 0 will disable the PZD10 (PPO input) load operation from the MEMOBUS/Modbus register.	0

4.10 H: Terminal Functions

◆ H1: Digital Inputs

No. (Hex.)	Name	Description	Default (Range)
H1-01 (0438)	Terminal S1 Function Selection	Sets the function for MFDI terminal S1.	40 (3 to 1A8)
H1-02 (0439)	Terminal S2 Function Selection	Sets the function for MFDI terminal S2.	41 (3 to 1A8)
H1-03 (0400)	Terminal S3 Function Selection	Sets the function for MFDI terminal S3.	24 (3 to 1A8)
H1-04 (0401)	Terminal S4 Function Selection	Sets the function for MFDI terminal S4.	14 (3 to 1A8)
H1-05 (0402)	Terminal S5 Function Selection	Sets the function for MFDI terminal S5.	3 (3 to 1A8)
H1-06 (0403)	Terminal S6 Function Selection	Sets the function for MFDI terminal S6.	4 (3 to 1A8)
H1-07 (0404)	Terminal S7 Function Selection	Sets the function for MFDI terminal S7.	6 (3 to 1A8)
H1-08 (0405)	Terminal S8 Function Selection	Sets the function for MFDI terminal S8.	8 (0 - 1A8)
H1-61 (39E1) RUN	Terminal S1 On-Delay Time	Sets the length of time necessary for Terminal S1 to be closed before the drive does the programmed function.	0.00 s (0.00 - 300.00 s)
H1-62 (39E2) RUN	Terminal S2 On-Delay Time	Sets the length of time necessary for Terminal S2 to be closed before the drive does the programmed function.	0.00 s (0.00 - 300.00 s)
H1-63 (39E3) RUN	Terminal S3 On-Delay Time	Sets the length of time necessary for Terminal S3 to be closed before the drive does the programmed function.	0.00 s (0.00 - 300.00 s)
H1-64 (39E4) RUN	Terminal S4 On-Delay Time	Sets the length of time necessary for Terminal S4 to be closed before the drive does the programmed function.	0.00 s (0.00 - 300.00 s)
H1-65 (39E5) RUN	Terminal S5 On-Delay Time	Sets the length of time necessary for Terminal S5 to be closed before the drive does the programmed function.	0.00 s (0.00 - 300.00 s)
H1-66 (39E6) RUN	Terminal S6 On-Delay Time	Sets the length of time necessary for Terminal S6 to be closed before the drive does the programmed function.	0.00 s (0.00 - 300.00 s)
H1-67 (39E7) RUN	Terminal S7 On-Delay Time	Sets the length of time necessary for Terminal S7 to be closed before the drive does the programmed function.	0.00 s (0.00 - 300.00 s)
H1-68 (39E8) RUN	Terminal S8 On-Delay Time	Sets the length of time necessary for Terminal S8 to be closed before the drive does the programmed function.	0.00 s (0.00 - 300.00 s)
H1-71 (39EB) RUN	Terminal S1 Off-Delay Time	Sets the length of time necessary for Terminal S1 to be open before the drive removes the programmed function.	0.00 s (0.00 - 300.00 s)
H1-72 (39EC) RUN	Terminal S2 Off-Delay Time	Sets the length of time necessary for Terminal S2 to be open before the drive removes the programmed function.	0.00 s (0.00 - 300.00 s)
H1-73 (39ED) RUN	Terminal S3 Off-Delay Time	Sets the length of time necessary for Terminal S3 to be open before the drive removes the programmed function.	0.00 s (0.00 - 300.00 s)

No. (Hex.)	Name	Description	Default (Range)
H1-74 (39EE) RUN	Terminal S4 Off-Delay Time	Sets the length of time necessary for Terminal S4 to be open before the drive removes the programmed function.	0.00 s (0.00 - 300.00 s)
H1-75 (39EF) RUN	Terminal S5 Off-Delay Time	Sets the length of time necessary for Terminal S5 to be open before the drive removes the programmed function.	0.00 s (0.00 - 300.00 s)
H1-76 (39F0) RUN	Terminal S6 Off-Delay Time	Sets the length of time necessary for Terminal S6 to be open before the drive removes the programmed function.	0.00 s (0.00 - 300.00 s)
H1-77 (39F1) RUN	Terminal S7 Off-Delay Time	Sets the length of time necessary for Terminal S7 to be open before the drive removes the programmed function.	0.00 s (0.00 - 300.00 s)
H1-78 (39F2) RUN	Terminal S8 Off-Delay Time	Sets the length of time necessary for Terminal S8 to be open before the drive removes the programmed function.	0.00 s (0.00 - 300.00 s)

■ H1-xx: MFDI Setting Values

Setting Value	Function	Description
3	Multi-Step Speed Reference 1	Uses speed references *d1-01 to d1-08* to set a multi-step speed reference.
4	Multi-Step Speed Reference 2	Uses speed references *d1-01 to d1-08* to set a multi-step speed reference.
5	Multi-Step Speed Reference 3	Uses speed references *d1-01 to d1-08* to set a multi-step speed reference.
6	Jog Reference Selection	Sets the drive to use the JOG Frequency Reference (JOG command) set in *d1-17 [Jog Reference]*. The JOG Frequency Reference (JOG command) overrides the *d1-01 to d1-08 [References 1 to 8]* settings.
7	Accel/Decel Time Selection 1	Sets the drive to use *Acceleration/Deceleration Time 1 [C1-01, C1-02]* or *Acceleration/Deceleration Time 2 [C1-03, C1-04]*.
8	Baseblock Command (N.O.)	Sets the command that stops drive output and coasts the motor to stop when the input is ON. ON : Baseblock (drive output stop) OFF : Normal operation
9	Baseblock Command (N.C.)	Sets the command that stops drive output and coasts the motor to stop when the input terminal is OFF. ON : Normal operation OFF : Baseblock (drive output stop)
A	Accel/Decel Ramp Hold	Momentarily pauses motor acceleration and deceleration when the terminal is turned ON, retains the output frequency that was stored in the drive at the time of the pause, and restarts motor operation.
B	Overheat Alarm (oH2)	Sets the drive to display an *oH2 [Drive Overheat Warning]* alarm when the input terminal is ON. The alarm does not have an effect on drive operation.
C	Analog Terminal Enable Selection	Sets the command that enables or disables the terminals selected in *H3-14 [Analog Input Terminal Enable Sel]*. ON : Input to the terminal selected with *H3-14* is enabled OFF : Input to the terminal selected with *H3-14* is disabled
F	Not Used	Use this setting for unused terminals or to use terminals in through mode.
14	Fault Reset	Sets the command to reset the current fault when the Run command is inactive. **Note:** • The drive ignores the fault reset command when the Run command is active. Remove the Run command before trying to reset a fault. • This will only reset drive-specific faults. It will not reset bypass (*FBxx*) faults. Set *Z2-0x = 34* and a bypass digital input to reset ALL faults.
15	Fast Stop (N.O.)	Sets the command to ramp to stop in the deceleration time set in *C1-09 [Fast Stop Time]* when the input terminal is activated while the drive is operating.
17	Fast Stop (N.C.)	Sets the command to ramp to stop in the deceleration time set in *C1-09 [Fast Stop Time]* when the input terminal is activated while the drive is operating.
18	Timer Function	Sets the command to start the timer function. Use this setting with *Timer Output [H2-xx = 12]*.
19	PID Disable	Sets the command to disable PID control when *b5-01 = 1 or 3 [PID Mode Setting = Standard or Fref + PID Trim]*. ON : PID control disabled OFF : PID control enabled
1B	Programming Lockout	This setting has no effect.
1E	Reference Sample Hold	Sets the command to sample the frequency reference at terminals A1 or A2 and hold the frequency reference at that frequency.

Setting Value	Function	Description
20	External Fault (NO-Always-Ramp)	When the terminal activates, the drive ramps to stop in the selected deceleration time. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive always detects external faults whether the drive is stopped or running.
21	External Fault (NC-Always-Ramp)	When the terminal deactivates, the drive ramps to stop in the selected deceleration time. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive always detects external faults whether the drive is stopped or running.
22	External Fault (NO-@Run-Ramp)	When the terminal activates during run, the drive ramps to stop in the selected deceleration time. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive does not detect external faults while the drive is stopped.
23	External Fault (NC-@Run-Ramp)	When the terminal deactivates during run, the drive ramps to stop in the selected deceleration time. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive does not detect external faults while the drive is stopped.
24	External Fault (NO-Always-Coast)	When the terminal activates, the drive shuts off the output and the motor coasts to stop. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive always detects external faults whether the drive is stopped or running.
25	External Fault (NC-Always-Coast)	When the terminal deactivates, the drive shuts off the output and the motor coasts to stop. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive always detects external faults whether the drive is stopped or running.
26	External Fault (NO-@Run-Coast)	When the terminal activates during run, the drive shuts off the output and the motor coasts to stop. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive does not detect external faults while the drive is stopped.
27	External Fault (NC-@Run-Coast)	When the terminal deactivates during run, the drive shuts off the output and the motor coasts to stop. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive does not detect external faults while the drive is stopped.
28	External Fault (NO-Always-FStop)	When the terminal activates, the drive stops the motor in the deceleration time set to *C1-09 [Fast Stop Time]*. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive always detects external faults whether the drive is stopped or running.
29	External Fault (NC-Always-FStop)	When the terminal deactivates, the drive stops the motor in the deceleration time set to *C1-09 [Fast Stop Time]*. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive always detects external faults whether the drive is stopped or running.
2A	External Fault (NO-@Run-FStop)	When the terminal activates during run, the drive stops the motor in the deceleration time set to *C1-09 [Fast Stop Time]*. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive does not detect external faults while the drive is stopped.
2B	External Fault (NC-@Run-FStop)	When the terminal deactivates during run, the drive stops the motor in the deceleration time set to *C1-09 [Fast Stop Time]*. Fault relay output terminal MA-MC will turn ON, and MB-MC will turn OFF. The drive does not detect external faults while the drive is stopped.
2C	External Fault (NO-Always-Alarm)	When the terminal activates, the keypad shows *EFx [External Fault (Terminal Sx)]* and the output terminal set for *Alarm [H2-01 to H2-03 = 10]* activates. The drive continues operation. The drive always detects external faults whether the drive is stopped or running.
2D	External Fault (NC-Always-Alarm)	When the terminal deactivates, the keypad shows *EFx [External Fault (Terminal Sx)]* and the output terminal set for *Alarm [H2-01 to H2-03 = 10]* activates. The drive continues operation. The drive always detects external faults whether the drive is stopped or running.
2E	External Fault (NO-@Run-Alarm)	When the terminal activates during run, the keypad shows *EFx [External Fault (Terminal Sx)]* and the output terminal set for *Alarm [H2-01 to H2-03 = 10]* activates. The drive continues operation. The drive does not detect external faults while the drive is stopped.
2F	External Fault (NC-@Run-Alarm)	When the terminal deactivates during run, the keypad shows *EFx [External Fault (Terminal Sx)]* and the output terminal set for *Alarm [H2-01 to H2-03 = 10]* activates. The drive continues operation. The drive does not detect external faults while the drive is stopped.
30	PID Integrator Reset	Sets the command to reset and hold the PID control integral to 0 when the terminal is ON.
31	PID Integrator Hold	Sets the command to hold the integral value of the PID control while the terminal is activated.
32	Multi-Step Speed Reference 4	Uses speed references *d1-01 to d1-16* to set a multi-step speed reference.
34	PID Soft Starter Disable	Sets the PID soft starter function. ON : No OFF : Yes
35	PID Input (Error) Invert	Sets the command to turn the terminal ON and OFF to switch the PID input level (polarity).
3E	PID Setpoint Selection 1	Sets the function to switch the PID setpoint to *YA-02 [Setpoint 2]* or *YA-04 [Setpoint 4]*. Set this function and *H1-xx = 3F [PID Setpoint Selection 2]* at the same time. **Note:** If you use this function and one of *H1-xx = 83 to 85 [Dedicated Multi-Setpoint YA-02 to YA-04]* at the same time, the drive will detect an *oPE03 [Multi-Function Input Setting Err]*. ON : *YA-02* or *YA-04* is PID setpoint. OFF : The frequency reference, *YA-01 [Setpoint 1]*, or *YA-03 [Setpoint 3]* is PID setpoint.
3F	PID Setpoint Selection 2	Sets the function to switch the PID setpoint to *YA-03 [Setpoint 3]* or *YA-04 [Setpoint 4]*. Set this function and *H1-xx = 3E [PID Setpoint Selection 1]* at the same time. **Note:** If you use this function and one of *H1-xx = 83 to 85 [Dedicated Multi-Setpoint YA-02 to YA-04]* at the same time, the drive will detect an *oPE03 [Multi-Function Input Setting Err]*. ON : *YA-03* or *YA-04* is PID setpoint. OFF : The frequency reference, *YA-01 [Setpoint 1]*, or *YA-02 [Setpoint 2]* is PID setpoint.
40	Forward RUN (2-Wire)	Terminals assigned to this value will have no effect. Set *Z2-0x = 21* and use a bypass digital input instead.
41	Reverse RUN (2-Wire)	Terminals assigned to this value will have no effect. Set *Z2-0x = 22* and a bypass digital input instead.

Setting Value	Function	Description
44	Add Offset Frequency 1 (d7-01)	Sets the function to add the offset frequency set in *d7-01 [Offset Frequency 1]* to the frequency reference when the terminal activates.
45	Add Offset Frequency 2 (d7-02)	Sets the function to add the offset frequency set in *d7-02 [Offset Frequency 2]* to the frequency reference when the terminal activates.
46	Add Offset Frequency 3 (d7-03)	Sets the function to add the offset frequency set in *d7-03 [Offset Frequency 3]* to the frequency reference when the terminal activates.
61	Speed Search from Fmax	Sets the function to start speed search using an external reference although *b3-01 = 0 [Speed Search Selection at Start = Disabled]*. **Note:** The drive will detect *oPE03 [Multi-Function Input Setting Err]* when *H1-xx = 61 and 62* are set at the same time.
62	Speed Search from Fref	Sets the function to use an external reference to start speed search although *b3-01 = 0 [Speed Search Selection at Start = Disabled]*. **Note:** The drive will detect *oPE03 [Multi-Function Input Setting Err]* when *H1-xx = 61 and 62* are set at the same time.
63	Field Weakening	Sets the function to send the Field Weakening Level and Field Weakening Frequency Limit commands set in *d6-01 [Field Weakening Level] and d6-02 [Field Weakening Frequency Limit]* when the input terminal is activated.
68	High Slip Braking (HSB) Activate	Sets the command to use high-slip braking to stop the motor.
82	PI Switch to Aux	Sets *YF-xx [PI Auxiliary Control]* parameters as primary PI loop parameters and disables *b5-xx [PID Control]*. **Note:** When this input is active, *YF-xx [PI Auxiliary Control]* parameters will always be the primary PI loop parameters. Parameter *YF-20 [PI Aux Main PI Speed Control]* does not have an effect.
83	Dedicated Multi-Setpoint YA-02	Sets the function to set the PID setpoint to *YA-02 [Setpoint 2]*. **Note:** If you use this function and one of *H1-xx = 3E or 3F [PID Setpoint Selection 1 or 2]* at the same time, the drive will detect an *oPE03 [Multi-Function Input Setting Err]*. ON : *YA-02* is PID setpoint. OFF : *YA-01 [Setpoint 1]*, *YA-03 [Setpoint 3]*, or *YA-04 [Setpoint 4]* is PID setpoint.
84	Dedicated Multi-Setpoint YA-03	Sets the function to set the PID setpoint to *YA-03 [Setpoint 3]*. Set this function and *H1-xx = 83 [Dedicated Multi-Setpoint YA-02]* at the same time. **Note:** If you use this function and one of *H1-xx = 3E or 3F [PID Setpoint Selection 1 or 2]* at the same time, the drive will detect an *oPE03 [Multi-Function Input Setting Err]*. ON : *YA-03* is PID setpoint. OFF : *YA-01 [Setpoint 1]*, *YA-02 [Setpoint 2]*, or *YA-04 [Setpoint 4]* is PID setpoint.
85	Dedicated Multi-Setpoint YA-04	Sets the function to set the PID setpoint to *YA-04 [Setpoint 4]*. Set this function, *H1-xx = 83 [Dedicated Multi-Setpoint YA-02]*, and *H1-xx = 84 [Dedicated Multi-Setpoint YA-03]* at the same time. **Note:** If you use this function and one of *H1-xx = 3E or 3F [PID Setpoint Selection 1 or 2]* at the same time, the drive will detect an *oPE03 [Multi-Function Input Setting Err]*. ON : *YA-04* is PID setpoint. OFF : *YA-01 [Setpoint 1]*, *YA-02 [Setpoint 2]*, or *YA-03 [Setpoint 3]* is PID setpoint.
88	Thermostat Fault	Sets the drive to show the *VLTS [Thermostat Fault]* when the input terminal is ON. **Note:** This function is active when the drive is running.
A8	PI2 Control Disable	Sets the command to disable the PI2 Control function. Parameter *S3-12 [PI2 Control Disable Mode Sel]* sets the output performance. ON : Enabled OFF : Disabled
AA	PI2 Control Inverse Operation	Sets the command to change the sign of the PI2 Control input.
AB	PI2 Control Integral Reset	Sets the command to reset the PI2 Control integral value. **Note:** This input has priority over *H1-xx = AC [MFDI Function Selection = PI2 Control Integral Hold]*.
AC	PI2 Control Integral Hold	Sets the command to lock the PI2 Control integral value.
AD	Select PI2 Control PI Parameters	Sets the command to use the *S3-06 [PI2 Control Proportional Gain]* and *S3-07 [PI2 Control Integral Time]* values instead of the *b5-02 [Proportional Gain (P)]* and *b5-03 [Integral Time (I)]* values. Set *S3-01 = 0 [PI2 Control Enable Selection = Disabled]* to enable this function. **Note:** This multi-function input does not have an effect on PI2 Control. Use this input for the primary PI controller (*b5-xx*).
B9	Disable Pre-charge	Sets the command to disable the Pre-charge function. ON : Pre-charge function is disabled

Setting Value	Function	Description
188	!Thermostat Fault	Sets the drive to show the *VLTS [Thermostat Fault]* when the input terminal is OFF. **Note:** This function is active when the drive is running.
1A8	!PI2 Control Disable	Sets the command to disable the PI2 Control function. Parameter *S3-12 [PI2 Control Disable Mode Sel]* sets the output performance. ON : Disabled OFF : Enabled

◆ H2: Digital Outputs

No. (Hex.)	Name	Description	Default (Range)
H2-01 (040B)	Term M1-M2 Function Selection	Sets the function for MFDO terminal M1-M2. **Note:** Set this parameter to *F* when the terminal is not being used or to use the terminal in through mode.	0 (0 - 1FF)
H2-02 (040C)	Term M3-M4 Function Selection	Sets the function for MFDO terminal M3-M4. **Note:** Set this parameter to *F* when the terminal is not being used or to use the terminal in through mode.	1 (0 - 1FF)
H2-03 (040D)	Term MD-ME-MF Function Selection	Sets the function for MFDO terminal MD-ME-MF. **Note:** When you do not use this terminal, or when you will use the terminal in through mode, set this parameter to *F*.	2 (0 - 1C4)
H2-06 (0437)	Watt Hour Output Unit Selection	Sets the unit for the output signal when *H2-01 to H2-03 = 39 [MFDO Function Selection = Watt Hour Pulse Output]*. 0 : 0.1 kWh units 1 : 1 kWh units 2 : 10 kWh units 3 : 100 kWh units 4 : 1000 kWh units	0 (0 - 4)
H2-07 (0B3A) Expert	Modbus Register 1 Address Select	Sets the address of the MEMOBUS/Modbus register output to the MFDO terminal.	0001 (0001 - 1FFF)
H2-08 (0B3B) Expert	Modbus Register 1 Bit Select	Sets the bit of the MEMOBUS/Modbus register output to the MFDO terminal.	0000 (0000 - FFFF)
H2-09 (0B3C) Expert	Modbus Register 2 Address Select	Sets the address of the MEMOBUS/Modbus register output to the MFDO terminal.	0001 (0001 - 1FFF)
H2-10 (0B3D) Expert	Modbus Register 2 Bit Select	Sets the bit of the MEMOBUS/Modbus register output to the MFDO terminal.	0000 (0000 - FFFF)
H2-40 (0B58) Expert	Mbus Reg 15E0h bit0 Output Func	Sets the MFDO for bit 0 of MEMOBUS register 15E0 (Hex.).	F (0 - 1FF)
H2-41 (0B59) Expert	Mbus Reg 15E0h bit1 Output Func	Sets the MFDO for bit 1 of MEMOBUS register 15E0 (Hex.).	F (0 - 1FF)
H2-42 (0B5A) Expert	Mbus Reg 15E0h bit2 Output Func	Sets the MFDO for bit 2 of MEMOBUS register 15E0 (Hex.).	F (0 - 1FF)
H2-60 (1B46) Expert	Term M1-M2 Secondary Function	Sets the second function for terminal M1-M2. Outputs the logical calculation results of the terminals assigned to functions by *H2-01 [Term M1-M2 Function Selection]*.	F (0 - FF)
H2-61 (1B47) Expert	Terminal M1-M2 Logical Operation	Sets the logical operation for the functions set in *H2-01 [Term M1-M2 Function Selection]* and *H2-60 [Term M1-M2 Secondary Function]*.	0 (0 - 8)

No. (Hex.)	Name	Description	Default (Range)
H2-62 (1B48) Expert	Terminal M1-M2 Delay Time	Sets the minimum on time used to output the logical calculation results from terminal M1-M2.	0.1 s (0.0 - 25.0 s)
H2-63 (1B49) Expert	Term M3-M4 Secondary Function	Sets the second function for terminal M3-M4. Outputs the logical calculation results of the terminals assigned to functions by *H2-02 [Term M3-M4 Function Selection]*.	F (0 - FF)
H2-64 (1B4A) Expert	Terminal M3-M4 Logical Operation	Sets the logical operation for the functions set in *H2-02 [Term M3-M4 Function Selection]* and *H2-63 [Term M3-M4 Secondary Function]*.	0 (0 - 8)
H2-65 (1B4B) Expert	Terminal M3-M4 Delay Time	Sets the minimum on time used to output the logical calculation results from terminal M3-M4.	0.1 s (0.0 - 25.0 s)
H2-66 (1B4C) Expert	Term MD-ME-MF Secondary Function	Sets the second function for terminal MD-ME-MF. Outputs the logical calculation results of the terminals assigned to functions by *H2-03 [Terminal MD-ME-MF Function Select]*.	F (0 - FF)
H2-67 (1B4D) Expert	Terminal MD-ME-MF Logical Operation	Sets the logical operation for the functions set in *H2-03 [Term MD-ME-MF Function Selection]* and *H2-66 [Term MD-ME-MF Secondary Function]*.	0 (0 - 8)
H2-68 (1B4E) Expert	Terminal MD-ME-MF Delay Time	Sets the minimum on time used to output the logical calculation results from terminal MD-ME-MF.	0.1 s (0.0 - 25.0 s)

■ H2-xx: MFDO Setting Values

Note:

The functions listed here will only activate when you operate in Drive Mode. They will not activate in Bypass Mode.

Setting Value	Function	Description
0	During Run	The terminal activates when you input a Run command and when the drive is outputting voltage. ON : Drive is running OFF : Drive is stopped
1	Zero Speed	The terminal activates when the output frequency < *E1-09 [Minimum Output Frequency]*. ON : Output frequency < *E1-09*. OFF : Output frequency ≥ *E1-09*.
2	Speed Agree 1	The terminal activates when the output frequency is in the range of the frequency reference ± *L4-02 [Speed Agree Detection Width]*. **Note:** The detection function operates in the two motor rotation directions. ON : The output frequency is in the range of "frequency reference ± *L4-02*". OFF : The output frequency does not align with the frequency reference although the drive is running.
3	User-Set Speed Agree 1	The terminal activates when the output frequency is in the range of *L4-01 [Speed Agree Detection Level]* ± *L4-02 [Speed Agree Detection Width]* and in the range of the frequency reference ± *L4-02*. **Note:** The detection function operates in the two motor rotation directions. The drive uses the *L4-01* value as the forward/reverse detection level. ON : The output frequency is in the range of "*L4-01* ± *L4-02*" and the range of frequency reference ± *L4-02*. OFF : The output frequency is not in the range of "*L4-01* ± *L4-02*" or the range of frequency reference ± *L4-02*.
4	Frequency Detection 1	The terminal deactivates when the output frequency > "*L4-01 [Speed Agree Detection Level]* + *L4-02 [Speed Agree Detection Width]*". After the terminal deactivates, the terminal stays deactivated until the output frequency is at the value of *L4-01*. **Note:** The detection function operates in the two motor rotation directions. The drive uses the *L4-01* value as the forward/reverse detection level. ON : The output frequency < *L4-01*, or the output frequency ≤ "*L4-01* + *L4-02*" OFF : The output frequency > "*L4-01* + *L4-02*"
5	Frequency Detection 2	The terminal activates when the output frequency > *L4-01 [Speed Agree Detection Level]*. After the terminal activates, the terminal stays activated until the output frequency is at the value of "*L4-01* - *L4-02 [Speed Agree Detection Width]*". **Note:** The detection function operates in the two motor rotation directions. The drive uses the *L4-01* value as the forward/reverse detection level. ON : The output frequency > *L4-01* OFF : The output frequency < "*L4-01* - *L4-02*", or the output frequency ≤ *L4-01*
6	Drive Ready	The terminal activates when the drive is ready and running.

Setting Value	Function	Description
7	DC Bus Undervoltage	The terminal activates when the DC bus voltage or control circuit power supply is at the voltage set in *L2-05 [Undervoltage Detection Lvl (Uv1)]* or less. The terminal also activates when there is a fault with the DC bus voltage. ON : The DC bus voltage ≤ *L2-05* OFF : The DC bus voltage > *L2-05*
8	During Baseblock (N.O.)	The terminal activates during baseblock. When the drive is in baseblock, the drive output transistor stops switching and does not make DC bus voltage. ON : During baseblock OFF : The drive is not in baseblock.
9	Frequency Reference from Keypad	Shows the selected frequency reference source. This terminal has no effect when part of a bypass configuration.
B	Torque Detection 1 (N.O.)	The terminal activates when the drive detects overtorque or undertorque. ON : The output current/torque > *L6-02 [Torque Detection Level 1]*, or the output current/torque < *L6-02* for longer than the time set in *L6-03 [Torque Detection Time 1]*.
C	Frequency Reference Loss	The terminal activates when the drive detects a loss of frequency reference. This terminal has no effect when part of a bypass configuration.
E	Fault	The terminal activates when the drive detects a fault. **Note:** The terminal will not activate for bypass-specific faults, *CPF00*, *CPF01 [Control Circuit Error]* faults.
F	Not Used	Use this setting for unused terminals or to use terminals in through mode. Also use this setting as the PLC contact output via serial communications or the communication option. This signal does not function if signals from the PLC are not configured.
10	Alarm	The terminal activates when the drive detects a minor fault. **Note:** The terminal will not activate for bypass-specific alarms.
11	Fault Reset Command Active	The terminal activates when the drive receives the Reset command from the control circuit terminal, serial communications, or the communication option.
12	Timer Output	Use this setting when the drive uses the timer function as an output terminal.
13	Speed Agree 2	The terminal activates when the output frequency is in the range of the frequency reference ± *L4-04 [Speed Agree Detection Width (+/-)]*. **Note:** The detection function operates in the two motor rotation directions. ON : The output frequency is in the range of "frequency reference ± *L4-04*". OFF : The output frequency is not in the range of "frequency reference ± *L4-04*".
14	User-Set Speed Agree 2	The terminal activates when the output frequency is in the range of *L4-03 [Speed Agree Detection Level (+/-)]* ± *L4-04 [Speed Agree Detection Width (+/-)]* and in the range of the frequency reference ± *L4-04*. **Note:** The detection level set in *L4-03* is a signed value. The drive will only detect in one direction. ON : The output frequency is in the range of "*L4-03* ± *L4-04*" and the range of frequency reference ± *L4-04*. OFF : The output frequency is not in the range of "*L4-03* ± *L4-04*" or the range of frequency reference ± *L4-04*.
15	Frequency Detection 3	The terminal deactivates when the output frequency > "*L4-03 [Speed Agree Detection Level (+/-)]* + *L4-04 [Speed Agree Detection Width (+/-)]*". After the terminal deactivates, the terminal stays deactivated until the output frequency is at the value of *L4-03*. **Note:** The detection level set in *L4-03* is a signed value. The drive will only detect in one direction. ON : The output frequency < *L4-03*, or the output frequency ≤ *L4-03* + *L4-04*. OFF : The output frequency > "*L4-03* + *L4-04*".
16	Frequency Detection 4	The terminal activates when the output frequency > *L4-03 [Speed Agree Detection Level (+/-)]*. After the terminal activates, the terminal stays activated until the output frequency is at the value of "*L4-03* - *L4-04*". **Note:** The detection level set in *L4-03* is a signed value. The drive will only detect in one direction. ON : The output frequency > *L4-03*. OFF : The output frequency < "*L4-03* - *L4-04*", or the output frequency ≤ *L4-03*.
17	Torque Detection 1 (N.C.)	The terminal deactivates when the drive detects overtorque or undertorque. OFF : The output current/torque > *L6-02 [Torque Detection Level 1]*, or the output current/torque < *L6-02* for longer than the time set in *L6-03 [Torque Detection Time 1]*.
18	Torque Detection 2 (N.O.)	The terminal activates when the drive detects overtorque or undertorque. ON : The output current/torque > *L6-05 [Torque Detection Level 2]*, or the output current/torque < *L6-05* for longer than the time set in *L6-06 [Torque Detection Time 2]*.
19	Torque Detection 2 (N.C.)	The terminal deactivates when the drive detects overtorque or undertorque. OFF : The output current/torque > *L6-05 [Torque Detection Level 2]*, or the output current/torque < *L6-05* for longer than the time set in *L6-06 [Torque Detection Time 2]*.
1A	During Reverse	The terminal activates when the motor operates in the reverse direction. ON : The motor is operating in the reverse direction. OFF : The motor is operating in the forward direction or the motor stopped.

Setting Value	Function	Description
1B	During Baseblock (N.C.)	The terminal deactivates during baseblock. When the drive is in baseblock, the drive output transistor stops switching and does not make DC bus voltage. ON : The drive is not in baseblock. OFF : During baseblock
1E	Executing Auto-Restart	The terminal activates when the Auto Restart function is trying to restart after a fault.
1F	Motor Overload Alarm (oL1)	The terminal activates when the electronic thermal protection value of the motor overload protective function is a minimum of 90% of the detection level. **Note:** The terminal will not activate if the Motor Overload occurs when in Bypass Mode.
20	Drive Overheat Pre-Alarm (oH)	The terminal activates when the drive heatsink temperature is at the level set with *L8-02 [Overheat Alarm Level]*.
21	Safe Torque OFF	The terminal activates (safety stop state) when the safety circuit and safety diagnosis circuit are operating correctly and when terminals H1-HC and H2-HC are OFF (Open). ON : Safety stop state OFF : Safety circuit fault or RUN/READY
2F	Maintenance Notification	The terminal activates when drive components are at their estimated maintenance period. Tells the user about the maintenance period for these items: • IGBT • Cooling fan • Capacitor • Soft charge bypass relay
37	During Frequency Output	The terminal activates when the drive outputs frequency. ON : The drive outputs frequency. OFF : The drive does not output frequency.
38	Drive Enabled	This terminal activates when the *H1-xx = 6A [Drive Enable]* terminal activates.
39	Watt Hour Pulse Output	Outputs the pulse that shows the watt hours.
3A	Drive Overheat Alarm	The terminal activates when the drive heatsink temperature is at the *L8-02 [Overheat Alarm Level]* setting while *L8-03 = 4 [Overheat Pre-Alarm Selection = Operate at Reduced Speed (L8-19)]* and the drive is running.
3D	During Speed Search	The terminal activates when the drive is doing speed search.
42	Pressure Reached	The terminal activates when the drive is at the Pressure Setpoint.
4C	During Fast Stop	The terminal activates when the fast stop is in operation.
4D	oH Pre-Alarm Reduction Limit	The terminal activates when *L8-03 = 4 [Overheat Pre-Alarm Selection = Operate at Reduced Speed (L8-19)]* and *oH [Heatsink Overheat]* does not clear after the drive decreases the frequency for 10 cycles.
58	UL6 Underload Detected	The terminal activates when the drive detected *UL6 [Underload or Belt Break Detected]*.
60	Internal Cooling Fan Failure	The terminal activates when the drive detects a cooling fan failure in the drive.
62	Modbus Reg 1 Status Satisfied	The terminal activates when the bit specified by *H2-08 [Modbus Register 1 Bit Select]* for the MEMOBUS register address set with *H2-07 [Modbus Register 1 Address Select]* activates.
63	Modbus Reg 2 Status Satisfied	The terminal activates when the bit specified by *H2-10 [Modbus Register 2 Bit Select]* for the MEMOBUS register address set with *H2-09 [Modbus Register 2 Address Select]* activates.
71	Low PI2 Control Feedback Level	The terminal activates when the PI2 Control Feedback Level is less than *S3-13 [PI2 Control Low Feedback Lvl]*.
72	High PI2 Control Feedback Level	The terminal activates when the PI2 Control Feedback Level is more than *S3-15 [PI2 Control High Feedback Lvl]*.
89	Output Current Lim	The terminal activates when the output current limit is limiting the drive output speed.
94	Loss of Prime	The terminal activates when the drive is in an *LOP [Loss of Prime]* condition.
95	Thermostat Fault	The terminal activates when the terminal set for *H1-xx = 88 [MFDI Function Selection = Thermostat Fault]* is active.
96	High Feedback	The terminal activates when the drive is in a High Feedback Condition as specified by *Y1-11 [High Feedback Level]* and *Y1-12 [High Feedback Lvl Fault Dly Time]* and when the drive detects an *HFB [High Feedback Sensed]* fault or an *HIFB [High Feedback Sensed]* alarm.
97	Low Feedback	The terminal activates when the drive is in a Low Feedback Condition as specified by *Y1-08 [Low Feedback Level]* and *Y1-09 [Low Feedback Lvl Fault Dly Time]* and when the drive detects an *LFB [Low Feedback Sensed]* fault or an *LOFB [High Feedback Sensed]* alarm.
9E	Low PI Auxiliary Control Level	The terminal activates when the PI Aux Feedback Level is less than *YF-09 [PI Aux Control Low Level Detect]* or if the drive detects an *LOAUX [Low PI Aux Feedback Level]* fault.
9F	High PI Auxiliary Control Level	The terminal activates when the PI Aux Feedback Level is more than *YF-12 [PI Aux Control High Level Detect]* or if the drive detects an *HIAUX [High PI Aux Feedback Level]* fault.

Setting Value	Function	Description
A9	RELAY Operator Control	The terminal changes to OFF or ON when you push the RELAY (F3) button. When the terminal is ON, push F3 to turn it OFF. When the terminal is OFF, push F3 to turn in ON.
AB	Thrust Mode	The terminal activates when the output frequency is between 0.0 Hz and the value set in *Y4-12 [Thrust Frequency]* and the Thrust Bearing function is active.
AC	Setpoint Not Maintained	The terminal activates when the drive detects *NMS [Setpoint Not Met]* condition.
B8	Pump Fault	The terminal activates when one of these faults is active: *LFB [Low Feedback Sensed]*, *HFB [High Feedback Sensed]*, *NMS [Setpoint Not Met]*, or *EFx [External Fault (Terminal Sx)]*.
B9	Transducer Loss	The terminal activates when the current into the analog input associated with PID feedback is more than 21 mA or less than 3 mA, or an *FDBKL [WIRE Break]* Fault or an *FDBKL [Feedback Loss Wire Break]* Alarm is active.
BA	PI Auxiliary Control Active	The terminal activates when the PI Auxiliary Controller has an effect on the output speed.
BB	Differential Feedback Exceeded	The terminal activates when the difference between the PID Feedback and the value from the terminal set for *H3-xx = 2D [Differential Feedback]* is more than *Y4-18 [Differential Level]* for the time set in *Y4-19 [Differential Lvl Detection Time]*.
BC	Sleep Active	The terminal activates when the Sleep function is active and the drive is not operating. **Note:** The terminal will not activate for Sleep Boost function.
BD	Start Delay	The terminal activates when the Feedback is more than the start level or the Feedback is less than the Inverse PID and the start timer is timing. **Note:** You must set *Y1-04 [Sleep Wake-up Level]* ≠ *0* and *Y1-05 [Sleep Wake-up Level Delay Time]* ≠ *0* to use this function.
BE	Pre-Charge	The terminal activates when the drive is in Pre-Charge Mode.
C3	Main Feedback Lost	The terminal activates when the drive loses the main PID feedback.
C4	Backup Feedback Lost	The terminal activates when the drive loses the backup PID feedback.
100	!During Run	The terminal deactivates when you input a Run command and when the drive is outputting voltage. ON : Drive is stopping OFF : Drive is running
101	!Zero Speed	The terminal deactivates when the output frequency < *E1-09 [Minimum Output Frequency]*. ON : Output frequency ≥ value of *E1-09*. OFF : Output frequency < value of *E1-09*.
102	!Speed Agree 1	The terminal deactivates when the output frequency is in the range of the frequency reference ± *L4-02 [Speed Agree Detection Width]*. **Note:** The detection function operates in the two motor rotation directions. ON : The output frequency does not align with the frequency reference although the drive is running. OFF : The output frequency is in the range of "frequency reference ± *L4-02*".
103	!User-Set Speed Agree 1	The terminal deactivates when the output frequency is in the range of *L4-01 [Speed Agree Detection Level]* ± *L4-02 [Speed Agree Detection Width]* and in the range of the frequency reference ± *L4-02*. **Note:** The detection function operates in the two motor rotation directions. The drive uses the *L4-01* value as the forward/reverse detection level. ON : The output frequency is not in the range of "*L4-01* ± *L4-02*" or the range of frequency reference ± *L4-02*. OFF : The output frequency is in the range of "*L4-01* ± *L4-02*" and the range of frequency reference ± *L4-02*.
104	!Frequency Detection 1	The terminal activates when the output frequency > "*L4-01 [Speed Agree Detection Level]* + *L4-02 [Speed Agree Detection Width]*". After the terminal activates, the terminal stays activated until the output frequency is at the value of *L4-01*. **Note:** The detection function operates in the two motor rotation directions. The drive uses the *L4-01* value as the forward/reverse detection level. ON : The output frequency > "*L4-01* + *L4-02*". OFF : The output frequency < *L4-01*, or the output frequency ≤ "*L4-01* + *L4-02*"
105	!Frequency Detection 2	The terminal deactivates when the output frequency > *L4-01 [Speed Agree Detection Level]*. After the terminal deactivates, the terminal stays deactivated until the output frequency is at the value of "*L4-01* - *L4-02 [Speed Agree Detection Width]*". **Note:** The detection function operates in the two motor rotation directions. The drive uses the *L4-01* value as the forward/reverse detection level. ON : The output frequency < "*L4-01* - *L4-02*", or the output frequency ≤ *L4-01* OFF : The output frequency > *L4-01*
106	!Drive Ready	The terminal deactivates when the drive is ready and running.
107	!DC Bus Undervoltage	The terminal deactivates when the DC bus voltage or control circuit power supply is at the voltage set in *L2-05 [Undervoltage Detection Lvl (Uv1)]* or less. The terminal also deactivates when there is a fault with the DC bus voltage. ON : The DC bus voltage > *L2-05* OFF : The DC bus voltage ≤ *L2-05*

Setting Value	Function	Description
108	!During Baseblock (N.O.)	The terminal deactivates during baseblock. When the drive is in baseblock, the drive output transistor stops switching and does not make DC bus voltage. ON : The drive is not in baseblock. OFF : During baseblock.
109	!Frequency Reference from Keypad	Shows the selected frequency reference source. ON : Parameter *b1-01 [Frequency Reference Selection 1]* is the frequency reference source. OFF : The keypad is the frequency reference source.
10B	!Torque Detection 1 (N.O.)	The terminal deactivates when the drive detects overtorque or undertorque. OFF : The output current/torque > *L6-02 [Torque Detection Level 1]*, or < *L6-02* for longer than the time set with *L6-03 [Torque Detection Time 1]*.
10C	!Frequency Reference Loss	The terminal deactivates when the drive detects a loss of frequency reference.
10E	!Fault	The terminal deactivates when the drive detects a fault. **Note:** The terminal will not deactivate for *CPF00* and *CPF01 [Control Circuit Error]* faults.
110	!Alarm	The terminal deactivates when the drive detects a minor fault.
111	!Fault Reset Command Active	The terminal deactivates when the drive receives the Reset command from the control circuit terminal, serial communications, or the communication option.
112	!Timer Output	Use this setting when the drive uses the timer function as an output terminal.
113	!Speed Agree 2	The terminal deactivates when the output frequency is in the range of the frequency reference ± *L4-04 [Speed Agree Detection Width (+/-)]*. **Note:** The detection function operates in the two motor rotation directions. ON : The output frequency is not in the range of "frequency reference ± *L4-04*". OFF : The output frequency is in the range of "frequency reference ± *L4-04*".
114	!User-Set Speed Agree 2	The terminal deactivates when the output frequency is in the range of *L4-03 [Speed Agree Detection Level (+/-)]* ± *L4-04 [Speed Agree Detection Width (+/-)]* and in the range of the frequency reference ± *L4-04*. **Note:** The detection level set in *L4-03* is a signed value. The drive will only detect in one direction. ON : The output frequency is not in the range of "*L4-03* ± *L4-04*" or the range of frequency reference ± *L4-04*. OFF : The output frequency is in the range of "*L4-03* ± *L4-04*" and the range of frequency reference ± *L4-04*.
115	!Frequency Detection 3	The terminal activates when the output frequency > "*L4-03 [Speed Agree Detection Level (+/-)]* + *L4-04 [Speed Agree Detection Width (+/-)]*". After the terminal activates, the terminal stays activated until the output frequency is at the value of *L4-03*. **Note:** The detection level set in *L4-03* is a signed value. The drive will only detect in one direction. ON : The output frequency > "*L4-03* + *L4-04*" OFF : The output frequency < *L4-03*, or the output frequency ≤ "*L4-03* + *L4-04*"
116	!Frequency Detection 4	The terminal deactivates when the output frequency > *L4-03 [Speed Agree Detection Level (+/-)]*. After the terminal deactivates, the terminal stays deactivated until the output frequency is at the value of "*L4-03* - *L4-04*". **Note:** The detection level set in *L4-03* is a signed value. The drive will only detect in one direction. ON : The output frequency < "*L4-03* - *L4-04*", or the output frequency ≤ *L4-03* OFF : The output frequency > *L4-03*
117	!Torque Detection 1 (N.C.)	The terminal activates when the drive detects overtorque or undertorque. ON : The output current/torque > *L6-02 [Torque Detection Level 1]*, or the output current/torque < *L6-02* for longer than the time set in *L6-03 [Torque Detection Time 1]*.
118	!Torque Detection 2 (N.O.)	The terminal deactivates when the drive detects overtorque or undertorque. OFF : The output current/torque > *L6-05 [Torque Detection Level 2]*, or the output current/torque < *L6-05* for longer than the time set in *L6-06 [Torque Detection Time 2]*.
119	!Torque Detection 2 (N.C.)	The terminal activates when the drive detects overtorque or undertorque. ON : The output current/torque > *L6-05 [Torque Detection Level 2]*, or the output current/torque < *L6-05* for longer than the time set in *L6-06 [Torque Detection Time 2]*.
11A	!During Reverse	The terminal deactivates when the motor operates in the reverse direction. ON : The motor is operating in the forward direction or the motor stopped. OFF : The motor is operating in the reverse direction.
11B	!During Baseblock (N.C.)	The terminal activates during baseblock. When the drive is in baseblock, the drive output transistor stops switching and does not make DC bus voltage. ON : During baseblock. OFF : The drive is not in baseblock.
11E	!Executing Auto-Restart	The terminal deactivates when the Auto Restart function is trying to restart after a fault.
11F	!Motor Overload Alarm (oL1)	The terminal deactivates when the electronic thermal protection value of the motor overload protective function is a minimum of 90% of the detection level.
120	!Drive Overheat Pre-Alarm (oH)	The terminal deactivates when the drive heatsink temperature is at the level set with *L8-02 [Overheat Alarm Level]*.

Setting Value	Function	Description
121	!Safe Torque OFF	The terminal deactivates (safety stop state) when the safety circuit and safety diagnosis circuit are operating correctly and when terminals H1-HC and H2-HC are OFF (Open). ON : Safety circuit fault or RUN/READY OFF : Safety stop state
12F	!Maintenance Notification	The terminal deactivates when drive components are at their estimated maintenance period. Tells the user about the maintenance period for these items: • IGBT • Cooling fan • Capacitor • Soft charge bypass relay
137	!During Frequency Output	The terminal deactivates when the drive outputs frequency. ON : The drive does not output frequency. OFF : The drive outputs frequency.
138	!Drive Enabled	This terminal deactivates when the *H1-xx = 6A [Drive Enable]* terminal deactivates.
139	!Watt Hour Pulse Output	Outputs the pulse that shows the watt hours.
13A	!Drive Overheat Alarm	The terminal deactivates when the drive heatsink temperature is at the *L8-02 [Overheat Alarm Level]* setting while *L8-03 = 4 [Overheat Pre-Alarm Selection = Operate at Reduced Speed (L8-19)]* and the drive is running.
13D	!During Speed Search	The terminal deactivates when the drive is doing speed search.
142	!Pressure Reached	The terminal deactivates when the drive is at the Pressure Setpoint.
14C	!During Fast Stop	The terminal deactivates when the fast stop is in operation.
14D	!oH Pre-Alarm Reduction Limit	The terminal deactivates when *L8-03 = 4 [Overheat Pre-Alarm Selection = Operate at Reduced Speed (L8-19)]* and *oH [Heatsink Overheat]* does not clear after the drive decreases the frequency for 10 cycles.
158	!UL6 Underload Detected	The terminal deactivates when the drive detected *UL6 [Underload or Belt Break Detected]*.
160	!Internal Cooling Fan Failure	The terminal deactivates when the drive detects a cooling fan failure in the drive.
162	!Modbus Reg 1 Status Satisfied	The terminal deactivates when the bit specified by *H2-08 [Modbus Register 1 Bit Select]* for the MEMOBUS register address set with *H2-07 [Modbus Register 1 Address Select]* activates.
163	!Modbus Reg 2 Status Satisfied	The terminal deactivates when the bit specified by *H2-10 [Modbus Register 2 Bit Select]* for the MEMOBUS register address set with *H2-09 [Modbus Register 2 Address Select]* activates.
171	!Low PI2 Control Feedback Level	The terminal deactivates when the PI2 Control Feedback Level is less than *S3-13 [PI2 Control Low Feedback Lvl]*.
172	!High PI2 Control Feedback Level	The terminal deactivates when the PI2 Control Feedback Level is more than *S3-15 [PI2 Control High Feedback Lvl]*.
189	!Output Current Lim	The terminal deactivates when the output current limit is limiting the drive output speed.
194	!Loss of Prime	The terminal deactivates when the drive is in an *LOP [Loss of Prime]* condition.
195	!Thermostat Fault	The terminal deactivates when the terminal set for *H1-xx = 88 [MFDI Function Selection = Thermostat Fault]* is active.
196	!High Feedback	The terminal deactivates when the drive is in a High Feedback Condition as specified by *Y1-11 [High Feedback Level]* and *Y1-12 [High Feedback Lvl Fault Dly Time]* and when the drive detects an *HFB [High Feedback Sensed]* fault or an *HIFB [High Feedback Sensed]* alarm.
197	!Low Feedback	The terminal deactivates when the drive is in a Low Feedback Condition as specified by *Y1-08 [Low Feedback Level]* and *Y1-09 [Low Feedback Lvl Fault Dly Time]* and when the drive detects an *LFB [Low Feedback Sensed]* fault or an *LOFB [High Feedback Sensed]* alarm.
19E	!Low PI Auxiliary Control Level	The terminal deactivates when the PI Aux Feedback Level is less than *YF-09 [PI Aux Control Low Level Detect]* or if the drive detects an *LOAUX [Low PI Aux Feedback Level]* fault.
19F	!High PI Auxiliary Control Level	The terminal deactivates when the PI Aux Feedback Level is more than *YF-12 [PI Aux Control High Level Detect]* or if the drive detects an *HIAUX [High PI Aux Feedback Level]* fault.
1A9	!RELAY Operator Control	The terminal changes to OFF or ON when you push the RELAY (F3) button. When the terminal is ON, push F3 to turn it OFF. When the terminal is OFF, push F3 to turn in ON.
1AB	!Thrust Mode	The terminal deactivates when the output frequency is between 0.0 Hz and the value set in *Y4-12 [Thrust Frequency]* and the Thrust Bearing function is active.
1AC	!Setpoint Not Maintained	The terminal deactivates when the drive detects *NMS [Setpoint Not Met]* condition.
1B8	!Pump Fault	The terminal deactivates when one of these faults is active: *LFB [Low Feedback Sensed]*, *HFB [High Feedback Sensed]*, *NMS [Setpoint Not Met]*, or *EFx [External Fault (Terminal Sx)]*.
1B9	!Transducer Loss	The terminal deactivates when the current into the analog input associated with PID feedback is more than 21 mA or less than 3 mA, or an *FDBKL [WIRE Break]* Fault or an *FDBKL [Feedback Loss Wire Break]* Alarm is active.
1BA	!PI Auxiliary Control Active	The terminal deactivates when the PI Auxiliary Controller has an effect on the output speed.
1BB	!Differential Feedback Exceeded	The terminal deactivates when the difference between the PID Feedback and the value from the terminal set for *H3-xx = 2D [Differential Feedback]* is more than *Y4-18 [Differential Level]* for the time set in *Y4-19 [Differential Lvl Detection Time]*.

Setting Value	Function	Description
1BC	!Sleep Active	The terminal deactivates when the Sleep function is active and the drive is not operating. **Note:** The terminal will not deactivate for Sleep Boost function.
1BD	!Start Delay	The terminal deactivates when the Feedback is more than the start level or the Feedback is less than the Inverse PID and the start timer is timing. **Note:** You must set *Y1-04 [Sleep Wake-up Level]* ≠ *0* and *Y1-05 [Sleep Wake-up Level Delay Time]* ≠ *0* to use this function.
1BE	!Pre-Charge	The terminal deactivates when the drive is in Pre-Charge Mode.
1C3	!Main Feedback Lost	The terminal deactivates when the drive loses the main PID feedback.
1C4	!Backup Feedback Lost	The terminal deactivates when the drive loses the backup PID feedback.

◆ H3: Analog Inputs

No. (Hex.)	Name	Description	Default (Range)
H3-01 (0410)	Terminal A1 Signal Level Select	Sets the input signal level for MFAI terminal A1. 0 : 0 to 10V (Lower Limit at 0) 2 : 4 to 20 mA 3 : 0 to 20 mA	0 (0 - 3)
H3-02 (0434)	Terminal A1 Function Selection	Sets the function for MFAI terminal A1.	0 (0 - 31)
H3-03 (0411) RUN	Terminal A1 Gain Setting	Sets the gain of the analog signal input to MFAI terminal A1.	100.0% (-999.9 - +999.9%)
H3-04 (0412) RUN	Terminal A1 Bias Setting	Sets the bias of the analog signal input to MFAI terminal A1.	0.0% (-999.9 - +999.9%)
H3-05 (0413)	Terminal A3 Signal Level Select	Sets the input signal level for MFAI terminal A3. 0 : 0-10V (Lower Limit at 0) 2 : 4 to 20 mA 3 : 0 to 20 mA	0 (0 - 3)
H3-06 (0414)	Terminal A3 Function Selection	Sets the function for MFAI terminal A3.	2 (0 - 2D)
H3-07 (0415) RUN	Terminal A3 Gain Setting	Sets the gain of the analog signal input to MFAI terminal A3.	100.0% (-999.9 - +999.9%)
H3-08 (0416) RUN	Terminal A3 Bias Setting	Sets the bias of the analog signal input to MFAI terminal A3.	0.0% (-999.9 - +999.9%)
H3-09 (0417)	Terminal A2 Signal Level Select	Sets the input signal level for MFAI terminal A2. 0 : 0-10V (LowLim=0) 2 : 4 to 20 mA 3 : 0 to 20 mA	2 (0 - 3)
H3-10 (0418)	Terminal A2 Function Selection	Sets the function for MFAI terminal A2. **Note:** The default setting for *H3-10* changes when *b5-01 [PID Mode Setting]* changes: • *b5-01 = 0 [Disabled]*: 0 • *b5-01* ≠ *0*: B	Determined by b5-01 (0 - 31)
H3-11 (0419) RUN	Terminal A2 Gain Setting	Sets the gain of the analog signal input to MFAI terminal A2.	100.0% (-999.9 - +999.9%)
H3-12 (041A) RUN	Terminal A2 Bias Setting	Sets the bias of the analog signal input to MFAI terminal A2.	0.0% (-999.9 - +999.9%)
H3-13 (041B)	Analog Input FilterTime Constant	Sets the time constant for primary delay filters on MFAI terminals.	0.03 s (0.00 - 2.00 s)

No. (Hex.)	Name	Description	Default (Range)
H3-14 (041C)	Analog Input Terminal Enable Sel	Sets the enabled terminal or terminals when *H1-xx = C [MFDI Function Select = Analog Terminal Enable Selection]* is ON. 1 : Terminal A1 only 2 : Terminal A2 only 3 : Terminals A1 and A2 4 : Terminal A3 only 5 : Terminals A1 and A3 6 : Terminals A2 and A3 7 : Terminals A1, A2, and A3	7 (1 - 7)
H3-16 (02F0)	Terminal A1 Offset	Sets the offset level for analog signals input to terminal A1. Usually it is not necessary to change this setting.	0 (-500 - +500)
H3-17 (02F1)	Terminal A2 Offset	Sets the offset level for analog signals input to terminal A2. Usually it is not necessary to change this setting.	0 (-500 - +500)
H3-18 (02F2)	Terminal A3 Offset	Sets the offset level for analog signals input to terminal A3. Usually it is not necessary to change this setting.	0 (-500 - +500)
H3-40 (0B5C) Expert	Mbus Reg 15C1h Input Function	Sets the MEMOBUS AI1 function.	F (4 - 2E)
H3-41 (0B5F) Expert	Mbus Reg 15C2h Input Function	Sets the MEMOBUS AI2 function.	F (4 - 2E)
H3-42 (0B62) Expert	Mbus Reg 15C3h Input Function	Sets the MEMOBUS AI3 function.	F (4 - 2E)
H3-43 (117F)	Mbus Reg Inputs FilterTime Const	Sets the time constant to apply a primary delay filter to the MEMOBUS analog input register values.	0.00 s (0.00 - 2.00 s)

■ H3-xx: MFAI Setting Values

Setting Value	Function	Description
0	Frequency Reference	This selection has no effect. Use bypass analog input (TB4-2) as the frequency reference. Refer to the Bypass Controller section for more information.
1	Frequency Gain	The drive multiplies the analog frequency reference with the input value from the MFAI set with this function.
2	Auxiliary Frequency Reference 1	Sets Reference 2 through multi-step speed reference to enable the command reference (Auxiliary Frequency Reference 1) from the analog input terminal set here. This value is a percentage where the Maximum Output Frequency setting is a setting value of 100%.
3	Auxiliary Frequency Reference 2	Sets Reference 3 through multi-step speed reference to enable the command reference (Auxiliary Frequency Reference 2) from the analog input terminal set here. This value is a percentage where the Maximum Output Frequency setting is a setting value of 100%.
4	Output Voltage Bias	Set this parameter to input a bias signal and amplify the output voltage.
5	Accel/Decel Time Gain	Enters a signal to adjust the gain used for *C1-01 to C1-04 [Acceleration/Deceleration Times 1 and 2]* and *C1-09 [Fast Stop Time]* when the full scale analog signal (10 V or 20 mA) is 100%.
6	DC Injection Braking Current	Enters a signal to adjust the current level used for DC Injection Braking when the drive rated output current is 100%.
7	Torque Detection Level	Enters a signal to adjust the overtorque/undertorque detection level. **Note:** Use this function with *L6-01 [Torque Detection Selection 1]*. This parameter functions as an alternative to *L6-02 [Torque Detection Level 1]*.
8	Stall Prevent Level During Run	Enters a signal to adjust the stall prevention level during run if the drive rated current is 100%.
9	Output Frequency Lower Limit	Enters a signal to adjust the output frequency lower limit level as a percentage of the maximum output frequency.
B	PID Feedback	Enter the PID feedback value as a percentage of the maximum output frequency.
C	PID Setpoint	Enters the PID setpoint as a percentage of the maximum output frequency.
D	Frequency Bias	Enters the bias value added to the frequency reference as a percentage of the maximum output frequency.
E	Motor Temperature (PTC Input)	Uses the motor Positive Temperature Coefficient (PTC) thermistor to prevent heat damage to the motor as a percentage of the current value when the 10 V analog signal is input.
F	Not Used	Use this setting for unused terminals or to use terminals in through mode.
16	Differential PID Feedback	Enters the PID differential feedback value if the full scale analog signal (10 V or 20 mA) is 100%.

Setting Value	Function	Description
1F	Not Used	Use this setting for unused terminals or to use terminals in through mode.
24	PID Feedback Backup	Enters the PID Feedback Backup signal for the drive to use when it loses the primary PID feedback set for *H3-xx = B [PID Feedback]*. **Note:** The full-scale of the analog signal goes from *b5-71 [Min PID Transducer Scaling]* to *b5-38 [PID User Unit Display Scaling]*.
25	PI2 Control Setpoint	Enters the PI2 Control setpoint level as a percentage of the *S3-02 [PI2 Control Transducer Scale]* value. **Note:** Parameters *S3-03 [PI2 Control Decimal Place Pos]* and *S3-04 [PI2 Control Unit Selection]* set the resolution and unit.
26	PI2 Control Feedback	Enters the PI2 Control feedback level as a percentage of the *S3-02 [PI2 Control Transducer Scale]* value. **Note:** Parameters *S3-03 [PI2 Control Decimal Place Pos]* and *S3-04 [PI2 Control Unit Selection]* set the resolution and unit.
27	PI Auxiliary Control Feedback	Enters the PI Auxiliary Control feedback value when *YF-01 = 1 [PI Aux Control Selection = Enabled]*. **Note:** • The full-scale of the analog signal goes from 0% to *YF-02 [PI Aux Control Transducer Scale]*. • Parameter *YF-22 [PI Aux Level Decimal Place Pos]* sets the resolution.
2B	Emergency Override PID Feedback	This input is the PID Feedback source when Emergency Override is running in PID mode (*S6-02 = 2 or 3 [Emergency Override Ref Selection = System PID Mode or Independent PID Mode]*). **Note:** • When *S6-02 = 2 [Emergency Override Ref Selection = System PID Mode]*, the full-scale of the analog signal goes from *b5-71 [Min PID Transducer Scaling]* to *b5-38 [PID User Unit Display Scaling]*. • When *S6-02 = 3 [Independent PID Mode]*, the full-scale of the analog signal goes from *b5-71* to *S6-03 [EMOVR Independent PID Scale]*. • When you set MEMOBUS register 3A93h bit 4, register 3A95h becomes the Emergency Override Feedback source.
2C	Emergency Override PID Setpoint	This input is the PID Setpoint source when Emergency Override is running in PID mode (*S6-02 = 2 or 3 [Emergency Override Ref Selection = System PID Mode or Independent PID Mode]*). **Note:** • When *S6-02 = 2 [Emergency Override Ref Selection = System PID Mode]*, the full-scale of the analog signal goes from *b5-71 [Min PID Transducer Scaling]* to *b5-38 [PID User Unit Display Scaling]*. • When *S6-02 = 3 [Independent PID Mode]*, the full-scale of the analog signal goes from *b5-71* to *S6-03 [EMOVR Independent PID Scale]*. • When you set MEMOBUS register 3A93h bit 5, register 3A96h becomes the Emergency Override Setpoint source.
2D	Differential Level Source	Enters a feedback value to calculate the Differential Level between the *Differential Level Source* feedback and the primary *PID Feedback [H3-xx = B]*. **Note:** The full-scale of the analog signal goes from *b5-71 [Min PID Transducer Scaling]* to *b5-38 [PID User Unit Display Scaling]*.
2E	HAND Frequency Ref or Setpoint	Enters the *S5-05 [HAND Frequency Reference]* value or the *S5-06 [HAND Setpoint]* value. When *S5-01 = 0 [HAND Frequency Reference Source = HAND Analog Input]* and *S5-03 = 0 [HAND Mode PI Selection = Disabled]*, the drive enters HAND Frequency Reference. When *b5-01 ≠ 0*, *S5-01 = 0*, and *S5-03 = 1 [Enabled]*, the drive enters HAND Setpoint. **Note:** • When PID is enabled, the full-scale of the analog signal goes from *b5-71 [Min PID Transducer Scaling]* to *b5-38 [PID User Unit Display Scaling]*. • When PID is disabled, the drive enters this analog signal as the percentage of the *E1-04 [Maximum Output Frequency]* value.

◆ H4: Analog Outputs

No. (Hex.)	Name	Description	Default (Range)
H4-01 (041D)	Terminal FM Analog Output Select	Sets the monitor number to send from MFAO terminal FM. Set the *x-xx* part of the *Ux-xx [Monitor]*. For example, set *H4-01 = 102* to monitor *U1-02 [Output Frequency]*.	102 (000 - 999)
H4-02 (041E) RUN	Terminal FM Analog Output Gain	Sets the gain of the monitor signal that is sent from MFAO terminal FM. Sets the analog signal output level from the terminal FM at 10 V or 20 mA as 100% when an output for monitoring items is 100%.	100.0% (-999.9 - +999.9%)
H4-03 (041F) RUN	Terminal FM Analog Output Bias	Sets the bias of the monitor signal that is sent from MFAO terminal FM. Set the level of the analog signal sent from terminal FM at 10 V or 20 mA as 100% when an output for monitoring items is 0%.	0.0% (-999.9 - +999.9%)
H4-04 (0420)	Terminal AM Analog Output Select	Sets the monitoring number to be output from the MFAO terminal AM. Set the *x-xx* part of the *Ux-xx [Monitor]*. For example, set *H4-04 = 103* to monitor *U1-03 [Output Current]*.	103 (000 - 999)
H4-05 (0421) RUN	Terminal AM Analog Output Gain	Sets the gain of the monitor signal that is sent from MFAO terminal AM. When an output for monitoring items is 0%, this parameter sets the analog signal output level from the AM terminal at 10 V or 20 mA as 100%.	50.0% (-999.9 - +999.9%)

No. (Hex.)	Name	Description	Default (Range)
H4-06 (0422) RUN	Terminal AM Analog Output Bias	Sets the bias of the monitor signal that is sent from MFAO terminal AM. When an output for monitoring items is 0%, this parameter sets the analog signal output level from the AM terminal at 10 V or 20 mA as 0%.	0.0% (-999.9 - +999.9%)
H4-07 (0423)	Terminal FM Signal Level Select	Sets the MFAO terminal FM output signal level. **Note:** Set jumper S5 on the control circuit terminal block accordingly when you change this parameter. 0 : 0 to 10 Vdc 2 : 4 to 20 mA	0 (0, 2)
H4-08 (0424)	Terminal AM Signal Level Select	Sets the MFAO terminal AM output signal level. **Note:** Set jumper S5 on the control circuit terminal block accordingly when you change this parameter. 0 : 0 to 10 Vdc 2 : 4 to 20 mA	0 (0, 2)
H4-20 (0B53)	Analog Power Monitor 100% Level	Sets the level at 10 V when you set *U1-08 [Output Power]* for analog output.	0.00 kW (0.00 - 650.00 kW)

◆ H5: Serial Communication

Note:

H5-xx parameters affect the bypass controller RS-485 terminals, TB3 Terminals 1 to 4.

No. (Hex.)	Name	Description	Default (Range)
H5-01 (0425)	Drive Node Address	Sets the communication slave address for drives. **Note:** • Cycle power to the bypass package or set *H5-20 = 1 [Communication Parameters Reload = Reload Now]* after you change the parameter setting. • Setting 0 will not let the drive respond to serial communications.	1FH (Determined by protocol)
H5-02 (0426)	Communication Speed Selection	Sets the communications speed for serial communications. **Note:** Re-energize the drive or set *H5-20 = 1 [Communication Parameters Reload = Reload Now]* after you change the parameter setting. 0 : 1200 bps 1 : 2400 bps 2 : 4800 bps 3 : 9600 bps 4 : 19.2 kbps 5 : 38.4 kbps 6 : 57.6 kbps 7 : 76.8 kbps 8 : 115.2 kbps	3 (Determined by protocol)
H5-03 (0427)	Communication Parity Selection	Sets the communications parity used for serial communications. **Note:** Re-energize the drive or set *H5-20 = 1 [Communication Parameters Reload = Reload Now]* after you change the parameter setting. 0 : No parity 1 : Even parity 2 : Odd parity	0 (0 - 2)
H5-04 (0428)	Communication Error Stop Method	Sets the motor Stopping Method when the drive detects a serial communication Error condition. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only 4 : Run at H5-34 (CE Go-To-Freq)	3 (0 - 4)
H5-05 (0429)	Comm Fault Detection Selection	Sets the function that detects *CE [Serial Communication Error]* issues during serial communications. 0 : Disabled 1 : Enabled	1 (0, 1)
H5-06 (042A)	Drive Transmit Wait Time	Sets the time to wait to send a response message after the drive receives a command message from the master. **Note:** Restart the drive after changing the parameter setting.	5 ms (0 - 65 ms)

No. (Hex.)	Name	Description	Default (Range)
H5-08 (062D)	Communication Protocol Selection	Selects the communication protocol. 0 : Modbus/MEMOBUS 1 : Metasys/N2 2 : Apogee/P1 3 : BACnet	3 (0 - 3)
H5-09 (0435)	CE Detection Time	Sets the detection time for *CE [Serial Communication Error]* issues when communication stops.	2.0 s (0.0 - 10.0 s)
H5-10 (0436)	Modbus Register 0025H Unit Sel	Sets the unit of measure used for the serial communications monitor register 0025H (output voltage reference monitor). 0 : 0.1 V units 1 : 1 V units	0 (0, 1)
H5-11 (043C)	Comm ENTER Command Mode	Sets the function to make the Enter command necessary to change parameters through serial communications. 0 : ENTER Command Required 1 : ENTER Command Not Required	0 (0, 1)
H5-14 (310D)	BACnet Device Obj ID LOW BITS	Sets the lower bits of the BACnet device object ID as a 4-digit hexadecimal number.	0001 (0000 - FFFF)
H5-15 (310E)	BACnet Device Obj ID HIGH BITS	Sets the upper bits of the BACnet device object ID as a 4-digit hexadecimal number.	0000 (0000 - 003F)
H5-18 (11A2)	Motor Speed Filter over Comms	Sets the filter time constant used when monitoring motor speed during serial communications or with a communication option.	0 ms (0 - 100 ms)
H5-20 (0B57)	Communication Parameters Reload	Sets the function to immediately enable updated serial communications parameters. 0 : Reload at Next Power Cycle 1 : Reload Now	0 (0, 1)
H5-22 (11CF)	Speed Search from MODBUS	Enables the serial communication register Speed Search function (bit 0 of 15DFH). 0 : Disabled 1 : Enabled	0 (0, 1)
H5-23 (158D)	BACnet Max Master	Sets the maximum number of master MAC ID to scan to when the drive polls for the next node (Poll for Master).	7F (1 - 7F)
H5-24 (3DA0)	BACnet Max Info Frames	Sets the maximum number of information frames that the bypass will send per token cycle in BACnet.	3 (1 - 255)
H5-25 (1589) RUN Expert	Function 5A Register 1 Selection	Returns the contents of the specified serial communications register when responding to the master device.	0044H (U1-05) (0000H - FFFFH)
H5-26 (158A) RUN Expert	Function 5A Register 2 Selection	Returns the contents of the specified serial communications register when responding to the master device.	0045H (U1-06) (0000H - FFFFH)
H5-27 (158B) RUN Expert	Function 5A Register 3 Selection	Returns the contents of the specified serial communications register when responding to the master device.	0042H (U1-03) (0000H - FFFFH)
H5-28 (158C) RUN Expert	Function 5A Register 4 Selection	Returns the contents of the specified serial communications register when responding to the master device.	0049H (U1-10) (0000H - FFFFH)
H5-33 (3FB3)	Power-up CALL Alarm	Enables and disables *CALL [Serial Comm Transmission Error]* alarm detection. 0 : Disabled 1 : Enabled	1 (0, 1)
H5-34 (3FB4) RUN	Comm Error (CE) Go-To-Frequency	Sets the speed at which the drive will run when *H5-04 = 4 [Communication Error Stop Method = Run at H5-34]* and there is a *CE*.	0.0 Hz (0.0 - 400.0 Hz)

No. (Hex.)	Name	Description	Default (Range)
H5-35 (3FB5) RUN	Comm Error (CE) Go-To-Timeout	When *H5-04 = 4 [Communication Error Stop Method = Run at H5-34]* and a *CE* is present, the drive will run at the *H5-34 [Comm Error (CE) Go-To-Frequency]* speed for this length of time before it triggers a *CE* fault. **Note:** Set this parameter to 0 s to disable the time-out.	0 s (0 - 6000 s)
H5-36 (3FB6)	CE Fault Restart Select	Sets the drive to restart (*L5-01 [Number of Auto-Restart Attempts]*) after a *CE* fault. 0 : No Retry 1 : Retry	0 (0, 1)

◆ H6: Pulse Train Input

No. (Hex.)	Name	Description	Default (Range)
H6-01 (042C)	Terminal RP Pulse Train Function	Sets the function for pulse train input terminal RP. 0 : Not Used 1 : PID Feedback Value 2 : PID Setpoint Value	0 (0 - 2)
H6-02 (042D) RUN	Terminal RP Frequency Scaling	Sets the frequency of the pulse train input signal used when the item selected with *H6-01 [Terminal RP Pulse Train Function]* is input at 100%.	1440 Hz (100 - 32000 Hz)
H6-03 (042E) RUN	Terminal RP Function Gain	Sets the gain used when the function in *H6-01 [Terminal RP Pulse Train Function]* is input to terminal RP.	100.0% (0.0 - 1000.0%)
H6-04 (042F) RUN	Terminal RP Function Bias	Sets the bias used when the function in *H6-01 [Terminal RP Pulse Train Function]* is input to terminal RP. Sets a value at the time when the pulse train is 0 Hz.	0.0% (-100.0 - 100.0%)
H6-05 (0430) RUN	Terminal RP Filter Time	Sets the time constant for the pulse train input primary delay filters.	0.10 s (0.00 - 2.00 s)
H6-08 (043F)	Terminal RP Minimum Frequency	Sets the minimum frequency of the pulse train signal that terminal RP can detect.	0.5 Hz (0.1 - 1000.0 Hz)

◆ H7: Virtual MFIO selection

No. (Hex.)	Name	Description	Default (Range)
H7-00 (116F) Expert	Virtual MFIO selection	Sets the function to enable and disable the virtual I/O function. Set this parameter to 1 to operate the virtual I/O function. 0 : Disabled 1 : Enabled	0 (0, 1)
H7-01 (1185) Expert	Virtual Multi-Function Input 1	Sets the function that enters the virtual input set in *H7-10 [Virtual Multi-Function Output 1]*. **Note:** Settings *1B [Programming Lockout]* and *11B [!Programming Lockout]* are not available.	F (0 - 1FF)
H7-02 (1186) Expert	Virtual Multi-Function Input 2	Sets the function that enters the virtual input set in *H7-12 [Virtual Multi-Function Output 2]*. **Note:** Settings *1B [Programming Lockout]* and *11B [!Programming Lockout]* are not available.	F (0 - 1FF)
H7-03 (1187) Expert	Virtual Multi-Function Input 3	Sets the function that enters the virtual input set in *H7-14 [Virtual Multi-Function Output 3]*. **Note:** Settings *1B [Programming Lockout]* and *11B [!Programming Lockout]* are not available.	F (0 - 1FF)
H7-04 (1188) Expert	Virtual Multi-Function Input 4	Sets the function that enters the virtual input set in *H7-16 [Virtual Multi-Function Output 4]*. **Note:** Settings *1B [Programming Lockout]* and *11B [!Programming Lockout]* are not available.	F (0 - 1FF)
H7-10 (11A4) Expert	Virtual Multi-Function Output 1	Sets the function for virtual digital output 1.	F (0 - 1FF)
H7-11 (11A5) Expert	Virtual Output 1 Delay Time	Sets the minimum ON time for virtual digital output 1.	0.1 s (0.0 - 25.0 s)

No. (Hex.)	Name	Description	Default (Range)
H7-12 (11A6) Expert	Virtual Multi-Function Output 2	Sets the function for virtual digital output 2.	F (0 - 1FF)
H7-13 (11A7) Expert	Virtual Output 2 Delay Time	Sets the minimum ON time for virtual digital output 2.	0.1 s (0.0 - 25.0 s)
H7-14 (11A8) Expert	Virtual Multi-Function Output 3	Sets the function for virtual digital output 3.	F (0 - 1FF)
H7-15 (11A9) Expert	Virtual Output 3 Delay Time	Sets the minimum ON time for virtual digital output 3.	0.1 s (0.0 - 25.0 s)
H7-16 (11AA) Expert	Virtual Multi-Function Output 4	Sets the function for virtual digital output 4.	F (0 - 1FF)
H7-17 (11AB) Expert	Virtual Output 4 Delay Time	Sets the minimum ON time for virtual digital output 4.	0.1 s (0.0 - 25.0 s)
H7-30 (1177) Expert	Virtual Analog Input Selection	Sets the virtual analog input function.	F (0 - 2E)
H7-31 (1178) RUN Expert	Virtual Analog Input Gain	Sets the virtual analog input gain.	100.0% (-999.9 - 999.9%)
H7-32 (1179) RUN Expert	Virtual Analog Input Bias	Sets the virtual analog input bias.	0.0% (-999.9 - 999.9%)
H7-40 (1163) Expert	Virtual Analog Out Signal Select	Sets the signal level of the virtual analog output. 0 : 0 to 100% (Absolute Value) 1 : -100 to 100% 2 : 0 to 100% (Lower Limit at 0)	0 (0 - 2)
H7-41 (1164) Expert	Virtual Analog Output Function	Sets the monitor to be output from the virtual analog output. Set the *x-xx* part of the *Ux-xx [Monitor]*. For example, set *H7-41 = 102* to monitor *U1-02 [Output Frequency]*.	102 (0 - 1299)
H7-42 (1165) Expert	Virtual Analog Output FilterTime	Sets the time constant for a primary filter of the virtual analog output.	0.00 s (0.00 - 2.00 s)

4.11 L: Protection Functions

◆ L1: Motor Protection

No. (Hex.)	Name	Description	Default (Range)
L1-01 (0480)	Motor Overload (oL1) Protection	Sets the motor overload protection with electronic thermal protectors. 0 : Disabled 1 : Variable Torque 2 : Constant Torque 10:1 Speed Range **Note:** When you connect only one motor to a drive, set *L1-01 = 1 [Variable Torque]*. External thermal relays are not necessary in these conditions.	2 (0 - 2)
L1-02 (0481)	Motor Overload Protection Time	Sets the operation time for the electronic thermal protector of the drive to prevent damage to the motor. Usually it is not necessary to change this setting.	1.0 min (0.1 - 5.0 min)
L1-03 (0482)	Motor Thermistor oH Alarm Select	Sets drive operation when the PTC input signal entered into the drive is at the *oH3 [Motor Overheat Alarm]* detection level. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only	3 (0 - 3)
L1-04 (0483)	Motor Thermistor oH Fault Select	Sets the drive operation when the PTC input signal to the drive is at the *oH4 [Motor Overheat Fault (PTC Input)]* detection level. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09)	1 (0 - 2)
L1-05 (0484)	Motor Thermistor Filter Time	Sets the primary delay time constant for the PTC input signal entered to the drive. This parameter prevents accidental motor overheat faults.	0.20 s (0.00 - 10.00 s)
L1-08 (1103) Expert	oL1 Current Level	Sets the reference current for the motor 1 thermal overload detection. When the current level > 0.0 A, you cannot set this value < 10% of drive rated current.	0.0 A (0.0 A or 10% to 150% of the drive rated current)
L1-13 (046D)	Motor Overload Memory Selection	Sets the function that keeps the current electronic thermal protector value after power loss. 0 : Disabled 1 : Enabled 2 : Enabled, using RTC	2 (0 - 2)

◆ L2: Power Loss Ride Through

No. (Hex.)	Name	Description	Default (Range)
L2-01 (0485)	Power Loss Ride Through Select	Sets the drive operation after a momentary power loss. 0 : Disabled 1 : Enabled for L2-02 Time 2 : Enabled while CPU Power Active	2 (0 - 2)
L2-02 (0486)	Power Loss Ride Through Time	Sets the maximum time that the drive will wait until it tries to restart after power loss.	Determined by o2-04 (0.0 - 25.5 s)
L2-03 (0487)	Minimum Baseblock Time	Sets the minimum time to continue the drive output block (baseblock) after a baseblock.	Determined by o2-04 (0.1 - 5.0 s)
L2-04 (0488)	Powerloss V/f Recovery Ramp Time	Sets the time for the drive output voltage to go back to the correct voltage after it completes speed searches.	Determined by o2-04 (0.0 - 5.0 s)
L2-05 (0489)	Undervoltage Detection Lvl (Uv1)	Sets the voltage at which the drive triggers a *Uv1 [DC Bus Undervoltage]* fault. Usually it is not necessary to change this setting.	Determined by o2-04 and E1-01 (208/240 V: 150 - 220 V, 480 V: 300 - 440 V)

◆ L3: Stall Prevention

No. (Hex.)	Name	Description	Default (Range)
L3-01 (048F)	Stall Prevention during Accel	Sets the method of Stall Prevention During Acceleration. 0 : Disabled 1 : Enabled 2 : Intelligent (Ignore Decel Ramp)	1 (0 - 2)
L3-02 (0490)	Stall Prevent Level during Accel	Sets the output current level to activate the Stall Prevention function during acceleration as a percentage of the drive rated output current.	Determined by L8-38 (0 - 120%)
L3-03 (0491)	Stall Prevent Limit during Accel	Sets the lower limit for the stall prevention level used in the constant output range as a percentage of the drive rated output current.	50% (0 - 100%)
L3-04 (0492)	Stall Prevention during Decel	Sets the method that the drive will use to prevent overvoltage faults when decelerating. 0 : Disabled 1 : General Purpose 2 : Intelligent (Ignore Decel Ramp) 4 : Overexcitation/High Flux 5 : Overexcitation/High Flux 2	1 (0 - 5)
L3-05 (0493)	Stall Prevention during RUN	Sets the function to enable and disable Stall Prevention During Run. **Note:** An output frequency lower than 6 Hz will disable Stall Prevention during Run. The *L3-05* and *L3-06 [Stall Prevent Level during Run]* settings do not have an effect. 0 : Disabled 1 : Deceleration Time 1 (C1-02) 2 : Deceleration Time 2 (C1-04)	2 (0 - 2)
L3-06 (0494)	Stall Prevent Level during Run	Sets the output current level to enable the Stall Prevention function during operation as a percentage of the drive rated output current. **Note:** This parameter is applicable when *L3-05 = 1, 2 [Stall Prevention during RUN = Deceleration Time 1 (C1-02), Deceleration Time 2 (C1-04)]*.	Determined by L8-38 (5 - 120%)
L3-11 (04C7)	Overvoltage Suppression Select	Sets the overvoltage suppression function. 0 : Disabled 1 : Enabled	0 (0, 1)
L3-17 (0462)	DC Bus Regulation Level	Sets the target value for the DC bus voltage when the overvoltage suppression function and the Decel Stall Prevention function (Intelligent Stall Prevention) are active.	208/240 V: 375 V, 480 V: 750 V (208/240 V: 150 - 400 V, 480 V: 300 - 800 V)
L3-20 (0465) Expert	DC Bus Voltage Adjustment Gain	Sets the proportional gain used to control the DC bus voltage.	1.00 (0.00 - 5.00)
L3-21 (0466) Expert	OVSuppression Accel/Decel P Gain	Sets the proportional gain to calculate acceleration and deceleration rates.	1.00 (0.10 - 10.00)
L3-23 (04FD)	Stall P Reduction at Constant HP	Sets the function to automatically decrease the Stall Prevention Level during Run for constant output ranges. 0 : Use L3-06 for Entire Speed Range 1 : Automatic Reduction @ CHP Region	0 (0, 1)
L3-24 (046E) Expert	Motor Accel Time @ Rated Torque	Sets the motor acceleration time to reach the maximum frequency at the motor rated torque for stopped single-drive motors.	Determined by o2-04, E2-11 (0.001 - 10.000 s)
L3-25 (046F) Expert	Load Inertia Ratio	Sets the ratio between motor inertia and machine inertia.	1.0 (0.1 - 1000.0)
L3-26 (0455) Expert	Additional DC Bus Capacitors	Sets the capacity for external main circuit capacitors. Usually it is not necessary to change this setting.	0 µF (0 to 65000 µF)
L3-27 (0456)	Stall Prevention Detection Time	Sets a delay time between reaching the Stall Prevention level and starting the Stall Prevention function.	50 ms (0 - 5000 ms)
L3-35 (0747) Expert	Speed Agree Width for Auto Decel	Sets the width for speed agreement when *L3-04 = 2 [Decel Stall Prevention Selection = Automatic Decel Reduction]*. Usually it is not necessary to change this setting.	0.00 Hz (0.00 - 1.00 Hz)

◆ L4: Speed Detection

No. (Hex.)	Name	Description	Default (Range)
L4-01 (0499)	Speed Agree Detection Level	Sets the level to detect speed agree or motor speed when *H2-01 to H2-03 = 2, 3, 4, 5 [MFDO Function Selection = Speed Agree 1, User-set Speed Agree 1, Frequency Detection 1, Frequency Detection 2]*.	0.0 Hz (0.0 - 400.0 Hz)
L4-02 (049A)	Speed Agree Detection Width	Sets the width to detect speed agree or motor speed when *H2-01 to H2-03 = 2, 3, 4, 5 [MFDO Function Selection = Speed Agree 1, User-set Speed Agree 1, Frequency Detection 1, Frequency Detection 2]*.	2.0 Hz (0.0 - 20.0 Hz)
L4-03 (049B)	Speed Agree Detection Level (+/-)	Sets the speed agree detection level or motor speed detection level when *H2-01 to H2-03 = 13, 14, 15, 16 [MFDO Function Selection = Speed Agree 2, User-set Speed Agree 2, Frequency Detection 3, Frequency Detection 4]*.	0.0 Hz (-400.0 - +400.0 Hz)
L4-04 (049C)	Speed Agree Detection Width (+/-)	Sets the width to detect speed agree or motor speed when *H2-01 to H2-03 = 13, 14, 15, 16 [MFDO Function Selection = Speed Agree 2, User-set Speed Agree 2, Frequency Detection 3, Frequency Detection 4]*.	2.0 Hz (0.0 - 20.0 Hz)
L4-05 (049D)	Fref Loss Detection Selection	Sets the operation when the drive detects a loss of frequency reference. 0 : Stop 1 : Run at (L4-06 x Last Reference)	0 (0, 1)
L4-06 (04C2)	Frequency Reference @Loss of Ref	Sets the frequency reference as a percentage to continue drive operation after it detects a frequency reference loss. The value is a percentage of the frequency reference before the drive detected the loss.	80.0% (0.0 - 100.0%)
L4-07 (0470)	Speed Agree Detection Selection	Sets the condition that activates speed detection. 0 : No Detection during Baseblock 1 : Detection Always Enabled	0 (0, 1)

◆ L5: Fault Restart

No. (Hex.)	Name	Description	Default (Range)
L5-01 (049E)	Number of Auto-Restart Attempts	Sets the number of times that the drive will try to restart.	0 (0 - 10 times)
L5-02 (049F)	Fault Contact at Restart Select	Sets the function that sends signals to the MFDO terminal set for *Fault [H2-xx = E]* while the drive is automatically restarting. 0 : Active Only when Not Restarting 1 : Always Active	0 (0, 1)
L5-04 (046C)	Interval Method Restart Time	Sets the time interval between each Auto Restart attempt.	10.0 s (0.5 - 600.0 s)
L5-07 (0B2A)	Fault Reset Enable Select Grp1	Use these 4 digits to set the Auto Restart function for *oL1* to *oL4*. From left to right, the digits set *oL1*, *oL2*, *oL3*, and *oL4*, in order. 0000 : Disabled 0001 : Enabled (—/—/—/oL4) 0010 : Enabled (—/—/oL3/—) 0011 : Enabled (—/—/oL3/oL4) 0100 : Enabled (—/oL2/—/—) 0101 : Enabled (—/oL2/—/oL4) 0110 : Enabled (—/oL2/oL3/—) 0111 : Enabled (—/oL2/oL3/oL4) 1000 : Enabled (oL1/—/—/—) 1001 : Enabled (oL1/—/—/oL4) 1010 : Enabled (oL1/—/oL3/—) 1011 : Enabled (oL1/—/oL3/oL4) 1100 : Enabled (oL1/oL2/—/—) 1101 : Enabled (oL1/oL2/—/oL4) 1110 : Enabled (oL1/oL2/oL3/—) 1111 : Enabled (oL1/oL2/oL3/oL4)	1111 (0000 - 1111)

No. (Hex.)	Name	Description	Default (Range)
L5-08 (0B2B)	Fault Reset Enable Select Grp2	Use these 4 digits to set the Auto Restart function for *Uv1*, *ov*, *oH1*, and *GF*. From left to right, the digits set *Uv1*, *ov*, *oH1*, and *GF*, in order. 0000 : Disabled 0001 : Enabled (—/–/—/GF) 0010 : Enabled (—/–/oH1/–) 0011 : Enabled (—/–/oH1/GF) 0100 : Enabled (—/ov/—/–) 0101 : Enabled (—/ov/—/GF) 0110 : Enabled (—/ov/oH1/–) 0111 : Enabled (—/ov/oH1/GF) 1000 : Enabled (Uv1/–/—/–) 1001 : Enabled (Uv1/–/—/GF) 1010 : Enabled (Uv1/–/oH1/–) 1011 : Enabled (Uv1/–/oH1/GF) 1100 : Enabled (Uv1/ov/—/–) 1101 : Enabled (Uv1/ov/—/GF) 1110 : Enabled (Uv1/ov/oH1/–) 1111 : Enabled (Uv1/ov/oH1/GF)	1111 (0000 - 1111)
L5-40 (3670)	Low Feedback Flt Retry Selection	Sets the drive to do an Auto Restart when the drive detects an *LFB [Low Feedback Sensed]* fault. 0 : No Retry 1 : Retry	0 (0, 1)
L5-41 (3671)	Hi Feedback Flt Retry Selection	Sets the drive to do an Auto Restart when the drive detects an *HFB [High Feedback Sensed]* fault. 0 : No Retry 1 : Retry	0 (0, 1)
L5-42 (3672)	Feedback Loss Fault Retry Select	Sets the drive to try an Auto Restart when it drive detects an *FDBKL [WIRE Break]* fault. 0 : No Retry 1 : Retry	0 (0, 1)
L5-49 (3679)	Fault Retry Speed Search Select	Sets the drive to do a speed search at the start of a Fault Retry. 0 : Disabled 1 : Enabled	1 (0, 1)
L5-50 (367A)	Setpoint Not Met Fault Retry Sel	Sets the drive to try an Auto Restart when it detects an *NMS [SetPoint Not Met]* fault. 0 : No Retry 1 : Retry	0 (0, 1)
L5-51 (367B)	Loss of Prime Fault Retry Select	Sets the drive to try an Auto Restart if it detects an *LOP [Loss Of Prime]* fault. 0 : No Retry 1 : Retry	0 (0, 1)
L5-53 (3251)	Thermostat Fault Retry Selection	Sets the drive to try an Auto Restart if it detects a *VLTS [Thermostat Fault]* fault. **Note:** • To use this function, set *S5-01 ≠ 0 [HAND Frequency Reference Source ≠ HAND Analog Input]* • The drive will only restart after the Thermostat digital input de-activates and the *L5-04 [Interval Method Restart Time]* timer is expired. 0 : No Retry 1 : Retry	1 (0, 1)

◆ L6: Torque Detection

No. (Hex.)	Name	Description	Default (Range)
L6-01 (04A1)	Torque Detection Selection 1	Sets the speed range that detects overtorque and undertorque and the operation of drives (operation status) after detection. 0 : Disabled 1 : oL @ Speed Agree - Alarm only 2 : oL @ RUN - Alarm only 3 : oL @ Speed Agree - Fault 4 : oL @ RUN - Fault 5 : UL @ Speed Agree - Alarm only 6 : UL @ RUN - Alarm only 7 : UL @ Speed Agree - Fault 8 : UL @ RUN - Fault 9 : UL6 @ Speed Agree - Alarm only 10 : UL6 @ RUN - Alarm only 11 : UL6 @ Speed Agree - Fault 12 : UL6 @ RUN - Fault	0 (0 - 12)
L6-02 (04A2)	Torque Detection Level 1	Sets the detection level for Overtorque/Undertorque Detection 1. In V/f control, drive rated output current = 100% value.	15% (0 - 300%)
L6-03 (04A3)	Torque Detection Time 1	Sets the detection time for Overtorque/Undertorque Detection 1.	10.0 s (0.0 - 10.0 s)
L6-04 (04A4)	Torque Detection Selection 2	Sets the speed range that detects overtorque and undertorque and the operation of drives (operation status) after detection. 0 : Disabled 1 : oL @ Speed Agree - Alarm only 2 : oL @ RUN - Alarm only 3 : oL @ Speed Agree - Fault 4 : oL @ RUN - Fault 5 : UL @ Speed Agree - Alarm only 6 : UL @ RUN - Alarm only 7 : UL @ Speed Agree - Fault 8 : UL @ RUN - Fault	0 (0 - 8)
L6-05 (04A5)	Torque Detection Level 2	Sets the detection level for Overtorque/Undertorque Detection 2. In V/f control, drive rated output current = 100% value.	150% (0 - 300%)
L6-06 (04A6)	Torque Detection Time 2	Sets the detection time for Overtorque/Undertorque Detection 2.	0.1 s (0.0 - 10.0 s)
L6-13 (062E)	Motor Underload Curve Select	Sets the motor underload protection (*UL6 [Undertorque Detection 6]*) based on motor load and sets the level of *L6-02 [Torque Detection Level 1]* to refer to Fbase or Fmax. 0 : Base Frequency Enable 1 : Max Frequency Enable	0 (0, 1)
L6-14 (062F)	Motor Underload Level @ Min Freq	Sets the *UL6 [Undertorque Detection 6]* detection level at minimum frequency by percentage of drive rated current.	15% (0 - 300%)

◆ L8: Drive Protection

No. (Hex.)	Name	Description	Default (Range)
L8-02 (04AE)	Overheat Alarm Level	Sets the *oH* detection level temperature.	Determined by o2-04 (50 - 150 °C)
L8-03 (04AF)	Overheat Pre-Alarm Selection	Sets drive operation if it detects an *oH* alarm. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only 4 : Operate at Reduced Speed (L8-19)	3 (0 - 4)
L8-05 (04B1)	Input Phase Loss Protection Sel	Sets the function to enable and disable input phase loss detection. 0 : Disable 1 : Enabled **Note:** This parameter only affects operation in Drive Mode. Use *Z1-50 and Z1-52 [Bypass Input Phase Loss Level and Bypass Input Phase Loss Delay]* for Bypass Mode operation.	1 0 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
L8-07 (04B3)	Output Phase Loss Protection Sel	Sets the function to enable and disable output phase loss detection. The drive starts output phase loss detection when the output current decreases to less than 5% of the drive rated current. **Note:** • The drive can incorrectly start output phase loss detection when the motor rated current is very small compared to the drive rating. • This parameter only affects operation in Drive Mode. 0 : Disabled 1 : Fault when one phase is lost 2 : Fault when two phases are lost	1
L8-09 (04B5)	Output Ground Fault Detection	Sets the function to enable and disable ground fault protection. 0 : Disabled 1 : Enabled **Note:** This parameter only affects operation in Drive Mode.	Determined by o2-04 (0, 1)
L8-10 (04B6)	Heatsink Fan Operation Selection	Sets operation of the heatsink cooling fan. 0 : During Run, w/ L8-11 Off-Delay 1 : Always On 2 : On when Drive Temp Reaches L8-64	0 (0 - 2)
L8-11 (04B7)	Heatsink Fan Off-Delay Time	Sets the length of time that the drive will wait before it stops the cooling fan after it cancels the Run command when *L8-10 = 0 [Heatsink Fan Operation Selection = During Run, w/ L8-11 Off-Delay]*.	60 s (0 - 300 s)
L8-12 (04B8)	Ambient Temperature Setting	Sets the ambient temperature of the drive installation area. **Note:** The setting range changes when the *L8-35 [Installation Method Selection]* setting changes. • When *L8-35 = 0 or 2 [IP20/UL Open Type or IP20/UL Type 1]*: -10 °C ~ +60 °C • When *L8-35 = 1 or 3 [Side-by-Side Mounting or IP55/UL Type 12]*: -10 °C ~ +50 °C	40 °C (Determined by L8-35)
L8-15 (04BB)	Drive oL2 @ Low Speed Protection	Sets the function to decrease drive overload at low speeds to prevent damage to the main circuit transistor during low speed operation (at 6 Hz or slower) to prevent *oL2 [Drive Overloaded]*. **Note:** Contact Yaskawa or your nearest sales representative before disabling this function at low speeds. If you frequently operate drives with high output current in low speed ranges, it can cause heat stress and decrease the life span of drive IGBTs. 0 : Disabled (No Additional Derate) 1 : Enabled (Reduced oL2 Level)	1 (0, 1)
L8-18 (04BE)	Software Current Limit Selection	Set the software current limit selection function to prevent damage to the main circuit transistor caused by too much current. 0 : Disabled 1 : Enabled	0 (0, 1)
L8-19 (04BF)	Freq Reduction @ oH Pre-Alarm	Sets the ratio at which the drive derates the frequency reference during an *oH* alarm.	20.0% (10.0 - 100.0%)
L8-35 (04EC)	Installation Method Selection	Sets the type of drive installation. 0 : IP20/UL Open Type 1 : Side-by-Side Mounting 2 : IP20/UL Type 1 3 : IP55/UL Type 12	2 (0 - 3)
L8-38 (04EF)	Carrier Frequency Reduction	Sets the carrier frequency reduction function. The drive decreases the carrier frequency when the output current is more than a specified level. 1 : Enabled below 6 Hz 2 : Enabled for All Speeds 3 : Enable at Overload	Determined by o2-04 (1 - 3)
L8-41 (04F2)	High Current Alarm Selection	Sets the function to cause an *HCA [High Current Alarm]* when the output current is more than 150% of the drive rated current. 0 : Disabled 1 : Enabled	0 (0, 1)
L8-97 (3104)	Carrier Freq Reduce during OH	Sets the function to decrease carrier frequency during oH pre-alarm. 0 : Disabled 1 : Enabled	0 (0, 1)

◆ L9: Drive Protection 2

No. (Hex.)	Name	Description	Default (Range)
L9-16 (11DC) Expert	FAn1 Detect Time	Sets the detection time for *FAn1 [Drive Cooling Fan Fault]*. Yaskawa recommends that you do not change this parameter value.	4.0 s (0.0 - 30.0 s)

4.12 n: Special Adjustment

◆ n1: Hunting Prevention

No. (Hex.)	Name	Description	Default (Range)
n1-01 (0580)	Hunting Prevention Selection	Sets the function to prevent hunting. 0 : Disabled 1 : Enabled (Normal)	1 (0, 1)
n1-02 (0581) Expert	Hunting Prevention Gain Setting	Sets the performance of the hunting prevention function. Usually it is not necessary to change this parameter.	1.00 (0.00 - 2.50)
n1-03 (0582) Expert	Hunting Prevention Time Constant	Sets the primary delay time constant of the hunting prevention function. Usually it is not necessary to change this parameter.	Determined by o2-04 (0 - 500 ms)
n1-05 (0530) Expert	Hunting Prevent Gain in Reverse	Sets the performance of the hunting prevention function. This parameter adjusts Reverse run. Usually it is not necessary to change this parameter.	0.00 (0.00 - 2.50)
n1-13 (1B59) Expert	DC Bus Stabilization Control	Sets the oscillation suppression function for the DC bus voltage. 0 : Disabled 1 : Enabled	0 (0, 1)
n1-14 (1B5A) Expert	DC Bus Stabilization Time	Adjusts the responsiveness of the oscillation suppression function for the DC bus voltage. Set *n1-13 = 1 [DC Bus Stabilization Control = Enabled]* to enable this parameter.	100.0 ms (0.0 - 500.0 ms)

◆ n3: High Slip/Overexcite Braking

No. (Hex.)	Name	Description	Default (Range)
n3-01 (0588) Expert	HSB Deceleration Frequency Width	Sets the amount by which the output frequency is to be lowered during high-slip braking, as a percentage of *E1-04 [Maximum Output Frequency]*, which represents the 100% value.	5% (1 - 20%)
n3-02 (0589) Expert	HSB Current Limit Level	Sets the maximum current output during high-slip braking as a percentage, where *E2-01 [Motor Rated Current (FLA)]* is 100%. Also sets the current suppression to prevent exceeding drive overload tolerance.	Determined by L8-38 (0 - 200%)
n3-03 (058A) Expert	HSB Dwell Time at Stop	Sets the dwell time, a length of time when high-slip braking is ending and during which the motor speed decreases and runs at a stable speed. For a set length of time, the drive will hold the actual output frequency at the minimum output frequency set in *E1-09*.	1.0 s (0.0 - 10.0 s)
n3-04 (058B) Expert	HSB Overload Time	Sets the time used to detect *oL7 [High Slip Braking Overload]*, which occurs when the output frequency does not change during high-slip braking. Usually it is not necessary to change this parameter.	40 s (30 - 1200 s)
n3-13 (0531) Expert	OverexcitationBraking (OEB) Gain	Sets the gain value that the drive multiplies by the V/f pattern output value during overexcitation deceleration to calculate the overexcitation level.	1.10 (1.00 - 1.40)
n3-14 (0532) Expert	OEB High Frequency Injection	Sets the function that injects harmonic signals during overexcitation deceleration. 0 : Disabled 1 : Enabled	0 (0, 1)
n3-21 (0579) Expert	HSB Current Suppression Level	Sets the upper limit of the current that is suppressed at the time of overexcitation deceleration as a percentage of the drive rated current.	100% (0 - 150%)
n3-23 (057B) Expert	Overexcitation Braking Operation	Sets the direction of motor rotation where the drive will enable overexcitation. 0 : Disabled 1 : Enabled Only when Rotating FWD 2 : Enabled Only when Rotating REV	0 (0 - 2)

4.13 o: Keypad-Related Settings

◆ o1: Keypad Display

No. (Hex.)	Name	Description	Default (Range)
o1-03 (0502)	Frequency Display Unit Selection	Sets the display units for the frequency reference and output frequency. 0 : 0.01Hz units 1 : 0.01% units 2 : min^{-1} (r/min) unit 3 : User Units (o1-09 -o1-11)	0 (0 - 3)
o1-05 (0504) RUN	LCD Contrast Adjustment	Sets the contrast of the LCD display on the keypad.	5 (0 - 10)
o1-09 (051C)	Freq. Reference Display Units	Sets the unit of display for the frequency reference parameters and frequency-related monitors when *o1-03 = 3 [Frequency Display Unit Selection = User Units (o1-09 ~ o1-11)]*. 0 : “WC: inches of water column 1 : PSI: pounds per square inch 2 : GPM: gallons/min 3 : °F: Fahrenheit 4 : ft^3/min: cubic feet/min 5 : m^3/h: cubic meters/hour 6 : L/h: liters/hour 7 : L/s: liters/sec 8 : bar: bar 9 : Pa: Pascal 10 : °C: Celsius 11 : m: meters 12 : ft: feet 13 : L/min: liters/min 14 : m^3/min: cubic meters/min 15 : “Hg: Inch Mercury 16 : kPa: kilopascal 48 : %: Percent 49 : Custom(o1-13~15) 50 : None	50 (0 - 50)
o1-10 (0520)	User Units Maximum Value	Sets the value that the drive shows as the maximum output frequency.	Determined by o1-03 (1 - 60000)
o1-11 (0521)	User Units Decimal Position	Sets the number of decimal places for frequency reference and monitor values. 0 : No Decimal Places (XXXXX) 1 : One Decimal Places (XXXX.X) 2 : Two Decimal Places (XXX.XX) 3 : Three Decimal Places (XX.XXX)	Determined by o1-03 (0 - 3)
o1-13 (3105)	Freq. Reference Custom Unit 1	Sets the first character of the custom unit display when *o1-03 = 3 [Frequency Display Unit Selection = User Units]* and *o1-09 = 49 [Freq. Reference Display Units = Custom (o1-13~15)]*.	41 (20 - 7A)
o1-14 (3106)	Freq. Reference Custom Unit 2	Sets the second character of the custom unit display when *o1-03 = 3 [Frequency Display Unit Selection = User Units]* and *o1-09 = 49 [Freq. Reference Display Units = Custom (o1-13~15)]*.	41 (20 - 7A)
o1-15 (3107)	Freq. Reference Custom Unit 3	Sets the third character of the custom unit display when *o1-03 = 3 [Frequency Display Unit Selection = User Units]* and *o1-09 = 49 [Freq. Reference Display Units = Custom (o1-13~15)]*.	41 (20 - 7A)
o1-18 (310A)	User Defined Parameter 1	Lets you set values to use as reference information.	0 (0 - 999)
o1-19 (310B)	User Defined Parameter 2	Lets you set values to use as reference information.	0 (0 - 999)
o1-24 (11AD) RUN	Custom Monitor 1	Sets Custom Monitor 1. You can set a maximum of 12 monitors as user monitors. This parameter is only available on an HOA keypad.	101 (0, 31, 101 - 1201)
o1-25 (11AE) RUN	Custom Monitor 2	Sets Custom Monitor 2. You can set a maximum of 12 monitors as user monitors. This parameter is only available on an HOA keypad.	102 (0, 31, 101 - 1201)

No. (Hex.)	Name	Description	Default (Range)
o1-26 (11AF) RUN	Custom Monitor 3	Sets Custom Monitor 3. You can set a maximum of 12 monitors as user monitors. This parameter is only available on an HOA keypad. **Note:** The default setting changes when *b5-01 [PID Mode Setting]* changes: • *b5-01 = 0 [Disabled]*: 103 • *b5-01 ≠ 0*: 501	Determined by b5-01 (0, 31, 101 - 1201)
o1-27 (11B0) RUN	Custom Monitor 4	Sets Custom Monitor 4. You can set a maximum of 12 monitors as user monitors. This parameter is only available on an HOA keypad.	0 (0 - 1399)
o1-28 (11B1) RUN	Custom Monitor 5	Sets Custom Monitor 5. You can set a maximum of 12 monitors as user monitors. This parameter is only available on an HOA keypad.	0 (0 - 1399)
o1-29 (11B2) RUN	Custom Monitor 6	Sets Custom Monitor 6. You can set a maximum of 12 monitors as user monitors. This parameter is only available on an HOA keypad.	0 (0 - 1399)
o1-30 (11B3) RUN	Custom Monitor 7	Sets Custom Monitor 7. You can set a maximum of 12 monitors as user monitors. This parameter is only available on an HOA keypad.	0 (0 - 1399)
o1-31 (11B4) RUN	Custom Monitor 8	Sets Custom Monitor 8. You can set a maximum of 12 monitors as user monitors. This parameter is only available on an HOA keypad.	0 (0 - 1399)
o1-32 (11B5) RUN	Custom Monitor 9	Sets Custom Monitor 9. You can set a maximum of 12 monitors as user monitors. This parameter is only available on an HOA keypad.	0 (0 - 1399)
o1-33 (11B6) RUN	Custom Monitor 10	Sets Custom Monitor 10. You can set a maximum of 12 monitors as user monitors. This parameter is only available on an HOA keypad.	0 (0 - 1399)
o1-34 (11B7) RUN	Custom Monitor 11	Sets Custom Monitor 11. You can set a maximum of 12 monitors as user monitors. This parameter is only available on an HOA keypad.	0 (0 - 1399)
o1-35 (11B8) RUN	Custom Monitor 12	Sets Custom Monitor 12. You can set a maximum of 12 monitors as user monitors. This parameter is only available on an HOA keypad.	0 (0 - 1399)
o1-36 (11B9) RUN	LCD Backlight Brightness	Sets the intensity of the HOA keypad backlight.	5 3 (1 - 5)
o1-37 (11BA) RUN	LCD Backlight ON/OFF Selection	Sets the automatic shut off function for the LCD backlight. 0 : OFF 1 : ON	1 (0, 1)
o1-38 (11BB) RUN	LCD Backlight Off-Delay	Sets the time until the LCD backlight automatically turns off.	60 s (10 - 300 s)
o1-39 (11BC) RUN	Show Initial Setup Screen	Sets the function to show the HOA keypad initial setup screen each time you energize the drive. This parameter is only available on an HOA keypad. 0 : No 1 : Yes	1 (0, 1)
o1-40 (11BD) RUN	Home Screen Display Selection	Sets the monitor display mode for the Home screen. This parameter is only available on an HOA keypad. 0 : Custom Monitor 1 : Bar Graph 2 : Analog Gauge 3 : Trend Plot	0 (0 - 3)
o1-41 (11C1) RUN	1st Monitor Area Selection	Sets the horizontal range used to display the monitor set in *o1-24 [Custom Monitor 1]* as a bar graph. This parameter is only available on an HOA keypad. 0 : +/- Area (- o1-42 ~ o1-42) 1 : + Area (0 ~ o1-42)	0 (0 - 1)
o1-42 (11C2) RUN	1st Monitor Area Setting	Sets the horizontal axis value used to display the monitor set in *o1-24 [Custom Monitor 1]* as a bar graph. This parameter is only available on an HOA keypad.	100.0% (0.0 - 100.0%)

No. (Hex.)	Name	Description	Default (Range)
o1-43 (11C3) RUN	2nd Monitor Area Selection	Selects the horizontal range used to display the monitor set in *o1-25 [Custom Monitor 2]* as a bar graph. This parameter is only available on an HOA keypad. 0 : +/- Area (- o1-44 ~ o1-44) 1 : + Area (0 ~ o1-44)	0 (0 - 1)
o1-44 (11C4) RUN	2nd Monitor Area Setting	Sets the horizontal axis value used to display the monitor set in *o1-25 [Custom Monitor 2]* as a bar graph. This parameter is only available on an HOA keypad.	100.0% (0.0 - 100.0%)
o1-45 (11C5) RUN	3rd Monitor Area Selection	Sets the horizontal range used to display the monitor set in *o1-26 [Custom Monitor 3]* as a bar graph. This parameter is only available on an HOA keypad. 0 : +/- Area (- o1-46 ~ o1-46) 1 : + Area (0 ~ o1-46)	0 (0 - 1)
o1-46 (11C6) RUN	3rd Monitor Area Setting	Sets the horizontal axis value used to display the monitor set in *o1-26 [Custom Monitor 3]* as a bar graph. This parameter is only available on an HOA keypad.	100.0% (0.0 - 100.0%)
o1-47 (11C7) RUN	Trend Plot 1 Scale Minimum Value	Sets the horizontal axis minimum value used to display the monitor set in *o1-24 [Custom Monitor 1]* as a trend plot. This parameter is only available on an HOA keypad.	-100.0% (-300.0 - +300.0%)
o1-48 (11C8) RUN	Trend Plot 1 Scale Maximum Value	Sets the horizontal axis maximum value used to display the monitor set in *o1-24 [Custom Monitor 1]* as a trend plot. This parameter is only available on an HOA keypad.	100.0% (-300.0 - +300.0%)
o1-49 (11C9) RUN	Trend Plot 2 Scale Minimum Value	Sets the horizontal axis minimum value used to display the monitor set in *o1-25 [Custom Monitor 2]* as a trend plot. This parameter is only available on an HOA keypad.	-100.0% (-300.0 - +300.0%)
o1-50 (11CA) RUN	Trend Plot 2 Scale Maximum Value	Sets the horizontal axis maximum value used to display the monitor set in *o1-25 [Custom Monitor 2]* as a trend plot. This parameter is only available on an HOA keypad.	100.0% (-300.0 - +300.0%)
o1-51 (11CB) RUN	Trend Plot Time Scale Setting	Sets the time scale (horizontal axis) to display the trend plot. When you change this setting, the drive automatically adjusts the data sampling time. This parameter is only available on an HOA keypad.	300 s (1 - 3600 s)
o1-55 (11EE) RUN	Analog Gauge Area Selection	Sets the range used to display the monitor set in *o1-24 [Custom Monitor 1]* as an analog gauge. This parameter is only available on an HOA keypad. 0 : +/- Area (- o1-56 ~ o1-56) 1 : + Area (0 ~ o1-56)	1 (0, 1)
o1-56 (11EF) RUN	Analog Gauge Area Setting	Sets the value used to display the monitor set in *o1-24 [Custom Monitor 1]* as an analog meter. This parameter is only available on an HOA keypad.	100.0% (0.0 - 100.0%)
o1-58 (3125)	Motor Power Unit Selection	Sets the setting unit for parameters that set the motor rated power. 0 : kW 1 : HP	1 (0, 1)
o1-80 (31BA)	Fault Screen Display	Sets a full-screen display message to show on the keypad when a fault or CPF occurs. 0 : OFF 1 : ON	1 (0, 1)
o1-81 (31BB)	Alarm Screen Display	Sets a full-screen display message to show on the keypad when an alarm occurs. 0 : OFF 1 : ON	0 (0, 1)
o1-82 (31BC)	Message Screen Display	Sets a full-screen display message to show on the keypad when a status message is active. 0 : OFF 1 : ON	0 (0, 1)

◆ o2: Keypad Operation

No. (Hex.)	Name	Description	Default (Range)
o2-02 (0506)	OFF Key Function Selection	Sets the function to use OFF on the keypad to stop the drive when the Run command source for the drive is REMOTE (external) and not assigned to the keypad. 0 : Disabled 1 : Enabled	1 (0, 1)
o2-03 (0507)	User Parameter Default Value	Sets the function to keep the settings of changed parameters as user parameter defaults to use during initialization. 0 : No change 1 : Set defaults 2 : Clear all	0 (0 - 2)
o2-04 (0508)	Drive Model (KVA) Selection	This parameter is automatically read from the connected drive. Do not change this parameter.	Determined by the drive (-)
o2-05 (0509)	Home Mode Freq Ref Entry Mode	Sets the function that makes it necessary to push ↵ to use the keypad to change the frequency reference value while in Drive Mode. 0 : ENTER Key Required 1 : Immediate / MOP-style	0 (0, 1)
o2-06 (050A)	Keypad Disconnect Detection	Sets the function that stops the drive if you disconnect the keypad connection cable from the drive or if you damage the cable while the keypad is the Run command source. 0 : Disabled 1 : Enabled	1 0 (0, 1)
o2-09 (050D)	Region Code	This parameter is read-only	1 (1)
o2-19 (061F)	Parameter Write during Uv	Enables and disables the function to change parameter settings during a *Uv [DC Bus Undervoltage]* condition. 0 : Disabled 1 : Enabled	0 (0, 1)
o2-24 (11FE)	LED Light Function Selection	Sets the function to show the LED status rings and keypad LED lamps. **Note:** When you use *A1-03 [Initialize Parameters]* to initialize the drive, the drive will not reset this parameter. 0 : Enable Status Ring & Keypad LED 1 : LED Status Ring Disable 2 : Keypad LED Light Disable	0 (0 - 2)
o2-27 (1565)	bCE Detection Selection	Sets drive operation if the Bluetooth device is disconnected when you operate the drive in Bluetooth Mode. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use *C1-09*) 3 : Alarm Only 4 : No Alarm Display	3 (0 - 4)

◆ o3: Copy Keypad Function

No. (Hex.)	Name	Description	Default (Range)
o3-01 (0515)	Copy Keypad Function Selection	Sets the function that saves and copies drive parameters to a different drive with the keypad. 0 : Copy Select 1 : Backup (drive → keypad) 2 : Restore (keypad → drive) 3 : Verify (check for mismatch) 4 : Erase (backup data of keypad)	0 (0 - 4)
o3-02 (0516)	Copy Allowed Selection	Sets the copy function when *o3-01 = 1 [Copy Keypad Function Selection = Backup (drive → keypad)]*. 0 : Disabled 1 : Enabled	0 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
o3-04 (0B3E)	Select Backup/Restore Location	Sets the storage location for drive parameters when you back up and restore parameters. This parameter is only available on an HOA keypad. 0 : Memory Location 1 1 : Memory Location 2 2 : Memory Location 3 3 : Memory Location 4	0 (0 - 3)
o3-06 (0BDE)	Auto Parameter Backup Selection	Sets the function that automatically backs up parameters. This parameter is only available on an HOA keypad. 0 : Disabled 1 : Enabled	1 (0, 1)
o3-07 (0BDF)	Auto Parameter Backup Interval	Sets the interval at which the automatic parameter backup function saves parameters from the drive to the keypad. **Note:** This parameter is only available when using an LCD keypad. 0 : Every 10 minutes 1 : Every 30 minutes 2 : Every 60 minutes 3 : Every 12 hours	1 (0 - 3)

◆ o4: Maintenance Monitors

No. (Hex.)	Name	Description	Default (Range)
o4-01 (050B)	Elapsed Operating Time Setting	Sets the initial value of the cumulative drive operation time in 10-hour units.	0 h (0 - 9999 h)
o4-02 (050C)	Elapsed Operating Time Selection	Sets the condition that counts the cumulative operation time. 0 : U4-01 Shows Total Power-up Time 1 : U4-01 Shows Total RUN Time	1 (0, 1)
o4-03 (050E)	Fan Operation Time Setting	Sets the value from which to start the cumulative drive cooling fan operation time in 10-hour units.	0 h (0 - 9999 h)
o4-05 (051D)	Capacitor Maintenance Setting	Sets the *U4-05 [CapacitorMaintenance]* monitor value.	0% (0 - 150%)
o4-07 (0523)	Softcharge Relay Maintenance Set	Sets the *U4-06 [PreChargeRelayMainte]* monitor value.	0% (0 - 150%)
o4-09 (0525)	IGBT Maintenance Setting	Sets the *U4-07 [IGBT Maintenance]* monitor value.	0% (0 - 150%)
o4-11 (0510)	Fault Trace/History Init (U2/U3)	Resets the records of Monitors *U2-xx [Fault Trace]* and *U3-xx [Fault History]*. 0 : Disabled 1 : Enabled	0 (0, 1)
o4-12 (0512)	kWh Monitor Initialization	Resets the monitor values for *U4-10 [kWh, Lower 4 Digits]* and *U4-11 [kWh, Upper 5 Digits]*. 0 : No Reset 1 : Reset	0 (0, 1)
o4-13 (0528)	RUN Command Counter @ Initialize	Resets the monitor values for *U4-02 [Num of Run Commands]*, *U4-24 [Number of Runs (Low)]*, and *U4-25 [Number of Runs (High)]*. 0 : No Reset 1 : Reset	0 (0, 1)
o4-22 (154F) RUN	Time Format	Sets the time display format. This parameter is only available on an HOA keypad. 0 : 24 Hour Clock 1 : 12 Hour Clock 2 : 12 Hour JP Clock	1 0 (0 - 2)
o4-23 (1550) RUN	Date Format	Sets the date display format. This parameter is only available on an HOA keypad. 0 : YYYY/MM/DD 1 : DD/MM/YYYY 2 : MM/DD/YYYY	2 0 (0 - 2)
o4-24 (310F) RUN	bAT Detection Selection	Sets operation when the drive detects *bAT [Keypad Battery Low Voltage]* and *TiM [Keypad Time Not Set]*. 0 : Disable 1 : Enable (Alarm Detected) 2 : Enable (Fault Detected)	0 (0 - 2)

◆ o5: Log Function

No. (Hex.)	Name	Description	Default (Range)
o5-01 (1551) RUN	Log Start/Stop Selection	Sets the data log function. This parameter is only available on an HOA keypad. 0 : OFF 1 : ON **Note:** You must insert a compatible SD cart into the keypad before you enable this parameter.	0 (0 - 1)
o5-02 (1552) RUN	Log Sampling Interval	Sets the data log sampling cycle. This parameter is only available on an HOA keypad.	100 ms 1000 ms (100 - 60000 ms)
o5-03 (1553) RUN	Log Monitor Data 1	Sets the data log monitor. This parameter is only available on an HOA keypad.	101 (000 - 1299)
o5-04 (1554) RUN	Log Monitor Data 2	Sets the data log monitor. This parameter is only available on an HOA keypad.	102 (000 - 1299)
o5-05 (1555) RUN	Log Monitor Data 3	Sets the data log monitor. This parameter is only available on an HOA keypad.	103 (000 - 1299)
o5-06 (1556) RUN	Log Monitor Data 4	Sets the data log monitor. This parameter is only available on an HOA keypad.	107 (000, 101 - 1212)
o5-07 (1557) RUN	Log Monitor Data 5	Sets the data log monitor. This parameter is only available on an HOA keypad.	108 (000, 101 - 1212)
o5-08 (1558) RUN	Log Monitor Data 6	Sets the data log monitor. This parameter is only available on an HOA keypad.	0 (000, 101 - 1212)
o5-09 (1559) RUN	Log Monitor Data 7	Sets the data log monitor. This parameter is only available on an HOA keypad.	000 (000, 101 - 1212)
o5-10 (155A) RUN	Log Monitor Data 8	Sets the data log monitor. This parameter is only available on an HOA keypad.	000 (000, 101 - 1212)
o5-11 (155B) RUN	Log Monitor Data 9	Sets the data log monitor. This parameter is only available on an HOA keypad.	000 (000, 101 - 1212)
o5-12 (155C) RUN	Log Monitor Data 10	Sets the data log monitor. This parameter is only available on an HOA keypad.	000 (000, 101 - 1212)

4.14 S: Special Applications

◆ S1: Dynamic Noise Control

No. (Hex.)	Name	Description	Default (Range)
S1-01 (3200) Expert	Dynamic Noise Control	Sets the function that decreases the output voltage in variable torque applications to decrease audible noise. 0 : Disabled 1 : Enabled	0 (0, 1)
S1-02 (3201) Expert	Voltage Reduction Rate	Sets the rate at which the drive will decrease the output voltage as a percentage of the V/f pattern when operating with no load.	50.0% (50.0 - 100.0%)
S1-03 (3202) Expert	Voltage Restoration Level	Sets the level at which the drive will start to restore the voltage as a percentage of the drive rated torque.	20.0% (0.0 - 90.0%)
S1-04 (3203) Expert	Voltage Restoration Off Level	Sets the level at which voltage restoration for the V/f pattern is complete as a percentage of the drive rated torque. If the output is more than *S1-04*, the drive will control the voltage as specified by the V/f pattern setting. **Note:** The lower limit of this parameter is the value of *S1-03 [Voltage Restoration Level]* + 10.0%.	50.0% (10.0 - 100.0%)
S1-05 (3204) Expert	Volt Restore Sensitivity Time K	Sets the level of sensitivity of the output torque and LPF time constant for the voltage reduction rate. You can adjust the level of sensitivity with the load response.	1.000 s (0.000 - 3.000 s)
S1-06 (3205) Expert	Volt Restore Impact Load Time K	Sets the voltage restoration time constant when you add an impact load.	0.050 s (0.000 - 1.000 s)
S1-07 (324C) Expert	Output Phase Loss Level	Decreases the output phase loss level when Dynamic Noise control is active.	100.0% (10.0 - 100.0%)

◆ S3: PI2 Control

No. (Hex.)	Name	Description	Default (Range)
S3-01 (321A)	PI2 Control Enable Selection	Sets when the PI2 Control function is enabled: 0 : Disabled 1 : Always 2 : Drive Running 3 : Motor Running	0 (0 - 3)
S3-02 (321B) RUN	PI2 Control Transducer Scale	Sets the full scale (10 V or 20 mA) output of the pressure transducer that is connected to the analog input terminals programmed for PI2 (Setpoint or Feedback). **Note:** Parameters *S3-04 [PI2 Control Unit Selection]*, *S3-03 [PI2 Control Decimal Place Pos]*, and *S3-02 [PI2 Control Transducer Scale]* set the unit, resolution, and upper limit.	100.00 (1.00 - 600.00)
S3-03 (321C) RUN	PI2 Control Decimal Place Pos	Sets the decimal place display for secondary PI units. 0 : No Decimal Places (XXXXX) 1 : One Decimal Places (XXXX.X) 2 : Two Decimal Places (XXX.XX) 3 : Three Decimal Places (XX.XXX)	2 (0 - 3)

No. (Hex.)	Name	Description	Default (Range)
S3-04 (321D) RUN	PI2 Control Unit Selection	Sets the units displayed for the PI2 Control parameters and monitor. 0 : "WC: inches of water column 1 : PSI: pounds per square inch 2 : GPM: gallons/min 3 : °F: Fahrenheit 4 : ft^3/min: cubic feet/min 5 : m^3/h: cubic meters/hour 6 : L/h: liters/hour 7 : L/s: liters/sec 8 : bar: bar 9 : Pa: Pascal 10 : °C: Celsius 11 : m: meters 12 : ft: feet 13 : L/min: liters/min 14 : m^3/min: cubic meters/min 15 : "Hg: Inch Mercury 16 : kPa: kilopascal 48 : %: Percent 49 : Custom(S3-18~20) 50 : None	48 (0 - 50)
S3-05 (321E) RUN	PI2 Control Setpoint	Sets the PI2 Control target setpoint. **Note:** Parameters *S3-04 [PI2 Control Unit Selection]*, *S3-03 [PI2 Control Decimal Place Pos]*, and *S3-02 [PI2 Control Transducer Scale]* set the unit, resolution, and upper limit.	0.00 (0.00 - 600.00)
S3-06 (321F) RUN	PI2 Control Proportional Gain	Sets the proportional gain of the PI2 Control. Set this parameter to 0.00 to disable proportional control.	1.00 (0.00 - 25.00)
S3-07 (3220) RUN	PI2 Control Integral Time	Sets the integral time for the suction pressure control. Set this parameter to 0.00 to disable the integrator.	1.0 s (0.0 - 360.0 s)
S3-08 (3221) RUN	PI2 Control Integral Max Limit	Sets the maximum output possible from the integrator.	100.0% (0.0 - 100.0%)
S3-09 (3222) RUN	PI2 Control Output Upper Limit	Sets the maximum output possible from the PI Auxiliary Control function.	100.0% (0.0 - 100.0%)
S3-10 (3223) RUN	PI2 Control Output Lower Limit	Sets the minimum output possible from the PI Auxiliary Control function.	0.0% (-100.0 - +100.0%)
S3-11 (3224)	PI2 Control Output Level Sel	Sets the PI2 controller output direction. 0 : Direct Acting (Normal Output) 1 : Inverse Acting (Reverse Output)	0 (0, 1)
S3-12 (3225) RUN	PI2 Control Disable Mode Sel	Sets what *U5-20 [PI2 Control Output]* will output when disabled. 0 : No Output (0%) 1 : Lower Limit (S3-10) 2 : Setpoint	0 (0 - 2)
S3-13 (3226) RUN	PI2 Control Low Feedback Lvl	Sets the secondary PI low feedback detection level. **Note:** Parameters *S3-04 [PI2 Control Unit Selection]*, *S3-03 [PI2 Control Decimal Place Pos]*, and *S3-02 [PI2 Control Transducer Scale]* set the unit, resolution, and upper limit.	0.00 (0.00 - 600.00)
S3-14 (3227) RUN	PI2 Control Low Feedback Time	Sets the secondary PI low feedback detection delay time in seconds.	1.0 s (0.0 - 25.5 s)
S3-15 (3228) RUN	PI2 Control High Feedback Lvl	Sets the secondary PI high feedback detection level. **Note:** Parameters *S3-04 [PI2 Control Unit Selection]*, *S3-03 [PI2 Control Decimal Place Pos]*, and *S3-02 [PI2 Control Transducer Scale]* set the unit, resolution, and upper limit.	100.00 (0.00 - 600.00)
S3-16 (3229) RUN	PI2 Control High Feedback Time	Sets the secondary PI high feedback detection delay time in seconds.	1.0 s (0.0 - 25.5 s)

No. (Hex.)	Name	Description	Default (Range)
S3-17 (322A) RUN	PI2 Control Feedback Det Sel	Sets when the low and high feedback detection multifunction outputs (71h and 72h) for PI2 Control are active. 0 : While PI2 Control Enabled 1 : Always **Note:** Feedback level detection compares PI2 Control Feedback from analog input *H3-xx = 26 [MFAI Function Selection = PI2 Control Feedback]* to these parameters: • *S3-13 [PI2 Control Low Feedback Lvl]* for low feedback level detection • *S3-15 [PI2 Control High Feedback Lvl]* for high feedback level detection	0 (0, 1)
S3-18 (322B) RUN	PI2 Control Custom Unit 1	Sets the first character of the PI2 Control custom unit display when *S3-04 = 49 [PI2 Control Unit Selection = Custom(S3-18~20)]*.	41 (20 - 7A)
S3-19 (322C) RUN	PI2 Control Custom Unit 2	Sets the second character of the PI2 Control custom unit display when *S3-04 = 49 [PI2 Control Unit Selection = Custom(S3-18~20)]*.	41 (20 - 7A)
S3-20 (322D) RUN	PI2 Control Custom Unit 3	Sets the third character of the PI2 Control custom unit display when *S3-04 = 49 [PI2 Control Unit Selection = Custom(S3-18~20)]*.	41 (20 - 7A)

◆ S5: Hand/Off/Auto Operation

No. (Hex.)	Name	Description	Default (Range)
S5-01 (322F)	HAND Frequency Reference Source	Sets the frequency reference source when HAND Mode is active. 0 : HAND Analog Input 1 : HAND Ref S5-05 or PID SP S5-06 2 : Set by b1-01	1 (0 - 2)
S5-02 (3230)	HAND/AUTO Switchover During Run	Sets the function to enable or disable switching between HAND and AUTO Mode during run. 0 : Disabled 1 : Enabled	1 (0, 1)
S5-03 (3231) RUN	HAND Mode PID Selection	Sets the function to enable or disable PI function when HAND mode is active. 0 : Disabled 1 : Enabled **Note:** If *b5-01 = 0 [PID Mode Setting = Disabled]*, the drive disables Hand Mode PID.	0 (0, 1)
S5-05 (3233) RUN	HAND Frequency Reference	Sets the frequency reference when HAND Mode is active, PID is disabled and *S5-01 = 1 [HAND Frequency Reference Source = HAND Ref S5-05 or PID SP S5-06]*.	0.00 Hz (0.00 - 400.00 Hz)
S5-06 (3234) RUN	HAND Setpoint	Sets the System Setpoint when HAND Mode is active, PID is enabled and *S5-01 = 1 [HAND Frequency Reference Source = HAND Ref S5-05 or PID SP S5-06]*. **Note:** Parameters *b5-46 [PID Unit Display Selection]*, *b5-38 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, range, and resolution.	0.0 (0.0 - 6000.0)
S5-07 (3235)	Operation HAND Key	Sets the HAND key on the HOA keypad to let you switch between HAND Mode and AUTO Mode. 0 : Disabled 1 : Enabled	1 (0, 1)
S5-08 (3D31) RUN	HAND Reference Prime Loss Level	Sets the level at which the drive will detect the Loss of Prime in the pump. **Note:** • If these conditions occur at the same time, the drive will detect *LOP [Loss of Prime]*: –The monitor set by *Y1-18 [Prime Loss Detection Method]* ≤ *S5-08* for longer than *Y1-20 [Prime Loss Time]* –Output frequency ≥ *S5-05 [HAND Frequency Reference]* • The drive response to the Loss of Prime condition changes when the *Y1-22 [Prime Loss Selection]* setting changes. • Parameter *Y1-18 [Prime Loss Detection Method]* sets the units for this parameter.	0.0 (0.0 - 1000.0)

◆ S6: Protection

No. (Hex.)	Name	Description	Default (Range)
S6-01 (3236)	Emergency Override Speed	Sets the speed command for emergency override mode when *S6-02 = 0 [Emergency Override Ref Selection = Use S6-01 Reference]*. **Note:** Parameter default is lower-limited to *E1-09*. The default setting will automatically increase when *E1-09 > S6-01*.	1.50 Hz (1.50 - 60.00 Hz)
S6-02 (3237)	Emergency Override Ref Selection	Sets the Emergency Override Speed Source: 0 : Use S6-01 Reference 1 : Use Frequency Reference 2 : System PID Mode 3 : Independent PID Mode	0 (0 - 3)
S6-03 (323A)	EMOVR Independent PID Scale	Sets the scaling on the Emergency PID Feedback and Setpoint (if programmed) Analog Inputs. **Note:** • *S6-05 [EMOVR Independent PID Unit Digit]* sets the resolution for this parameter. • *S6-04 [EMOVR Independent PID Unit]* sets the units for this parameter.	100.00 (0.10 - 600.00)
S6-04 (323B)	EMOVR Independent PID Unit	Sets the units displayed for *S6-06 [EMOVR PID Setpoint]* when *S6-02 = 3 [Emergency Override Ref Selection = Independent PID Mode]*. 0 : “WC: inches of water column 1 : PSI: pounds per square inch 2 : GPM: gallons/min 3 : °F: Fahrenheit 4 : ft^3/min: cubic feet/min 5 : m^3/h: cubic meters/hour 6 : L/h: liters/hour 7 : L/s: liters/sec 8 : bar: bar 9 : Pa: Pascal 10 : °C: Celsius 11 : m: meters 12 : ft: feet 13 : L/min: liters/min 14 : m^3/min: cubic meters/min 15 : “Hg: Inch Mercury 16 : kPa: kilopascal 48 : %: Percent 49 : Custom(b5-68~70) 50 : None	48 (0 - 50)
S6-05 (323C)	EMOVR Independent PID Unit Digit	Sets the number of digits for *S6-06 [EMOVR PID Setpoint]* when *S6-02 = 3[Emergency Override Ref Selection = Independent PID Mode]*. 0 : No Decimal Places (XXXXX) 1 : One Decimal Places (XXXX.X) 2 : Two Decimal Places (XXX.XX) 3 : Three Decimal Places (XX.XXX)	2 (0 - 3)
S6-06 (323D) RUN	EMOVR PID Setpoint	Sets the PID Setpoint when *S6-02 = 3[Emergency Override Ref Selection = Independent PID Mode]*. **Note:** When *S6-02 = 3*: units and resolution are dependent on *S6-04 [EMOVR Independent PID Unit]* and *S6-05 [EMOVR Independent PID Unit Digit]*. Value is internally limited to 300% of *S6-03 [EMOVR Independent PID Scale]*.	0.00 (0 - 600.00)
S6-07 (323E)	EMOVR Fault Suppression Mode	Sets the drive to let Emergency Override disable faults during operation. 0 : Fault Suppression 1 : Test Mode	0 (0, 1)
S6-08 (323F)	EMOVR Drive Enable Input Mode	Sets whether the Drive Enable Input (if programmed) must be inactive (drive is disabled) for Emergency Override to function. 0 : Drive Enable Status Ignored 1 : EMOVRun Only When Drive Disabled **Note:** You must program Drive Enable to a Digital Input for this parameter to have an effect.	0 (0, 1)
S6-09 (3240)	Emergency Override Min Speed	When Emergency Override is active, the output frequency is lower-limited to this value.	0.00 Hz (0.00 - 400.00 Hz)
S6-10 (3241)	Emergency Override Max Speed	When Emergency Override is active, the output frequency is upper-limited to this value. **Note:** Set this parameter to 0.00 Hz to disable the limit.	0.00 Hz (0.00 - 400.00)

No. (Hex.)	Name	Description	Default (Range)
S6-11 (3242) Expert	EMOVR Drive Protection Fault ON	Sets the bit to enable fault detection during Emergency Override. bit 0 : Uv1 - DC Bus Undervoltage bit 1 : CoF - Current Offset Fault bit 2 : Reserved bit 3 : Err - EEPROM Write Error bit 4 : Reserved bit 5 : Reserved bit 6 : oL2 - Drive Overload bit 7 : oPr - Operator Connection bit 8 : PF - Input Phase Loss bit 9 : Reserved bit 10 : Reserved bit 11 : oH - Heatsink Overheat bit 12 : oH1 - Heatsink Overheat bit 13 : OD - Output Disconnect bit 14 : FAn1 - Cooling Fan Fault bit 15 : ov2 - DC Bus Overvoltage 2 **Note:** The drive sets the bits in Hex.	0 (0 - FFFF)
S6-12 (3243) Expert	EMOVR Motor Protection Fault ON	Sets the bit to enable fault detection during Emergency Override. bit 0 : LF - Output Phase Loss bit 1 : LF2 - Output Current Imbalance bit 2 : oH3 - Motor Overheat PTC Input bit 3 : oH4 - Motor Overheat PTC Input bit 4 : Reserved bit 5 : oL1 - Motor Overload bit 6 : oL3 - Overtorque Detection 1 bit 7 : oL4 - Overtorque Detection 2 bit 8 : oL7 - High Slip Braking Overload bit 9 : Reserved bit 10 : UL3 - Undertorque Detection 1 bit 11 : UL4 - Undertorque Detection 2 bit 12 : UL6 - Motor Underload bit 13 : Reserved bit 14 : oS - Overspeed bit 15 : dEv: Speed Deviation **Note:** The drive sets the bits in Hex.	0 (0 - FFFF)
S6-13 (3244) Expert	EMOVR Option Fault ON	Sets the bit to enable fault detection during Emergency Override. bit 0 : bUS - Option Communication bit 1 : CE - Communication Error bit 2 : E5 - SI-T3 Watch Dog Timer bit 3 : EF0 - Option Card External Fault bit 4 : PE1 - PLC Fault 1 bit 5 : PE2 - PLC Fault 2 bit 6 : nSE - Node Setup Error bit 7 to 15 : Reserved **Note:** The drive sets the bits in Hex.	0 (0 - FFFF)
S6-14 (3245) Expert	EMOVR Application 1 Fault ON	Sets the bit to enable fault detection during Emergency Override. bit 0 : EFx - External Faults bit 1 : Reserved bit 2 : HLCE - High Level Communications Error bit 3 : bAT - HOA Keypad Battery Voltage Low bit 4 : TiM - Keypad Time Not Set bit 5 : bCE - Bluetooth Communication Fault bit 6 : Reserved bit 7 : Reserved bit 8 : Reserved bit 9 : MSL - Net Master Lost bit 10 : VLTS - Thermostat Fault bit 11 to 15 : Reserved **Note:** The drive sets the bits in Hex.	0 (0 - FFFF)

No. (Hex.)	Name	Description	Default (Range)
S6-16 (3247)	EMOVR Customer Safety Mode	Sets the status for the customer safety input (when programmed) that must occur for Emergency Override to function. 0 : Customer Safety Ignored 1 : EMOVRun Only When Safety OK 2 : EMOVRun Only When Safety NOT OK **Note:** You must set one of the bypass control digital inputs to a safety *[Z2-0x = 22, 38-43]* for this parameter to have an effect.	0 (0 - 2)
S6-17 (3248)	EMOVR BAS Interlock Mode	Sets the status for the BAS Interlock input (when programmed) that must occur for Emergency Override to function. 0 : BAS Interlock Ignored 1 : EMOVRun Only When Interlock OK 2 : EMOVRun When Interlock NOT OK **Note:** You must set one of the bypass control digital inputs to Run Interlock (BAS) *[Z2-0x =23]* for this parameter to have an effect.	0 (0 - 2)
S6-20 (324B) Expert	EMOVR Bypass Fault ON	Sets the bit to enable fault detection during Emergency Override. bit 0 : FB02 bit 1 : FB03 bit 2 : FB05 bit 3 : FB06 bit 4 : FB07 bit 5 : FB08 bit 6 : FB09 bit 7 : FB10 bit 8 : FB13 bit 9 : FB15 bit 10 : FB16 bit 11 : FB17 bit 12 : FB18	0 (0 - FFFF)
S6-23 (324E)	OV2 Detect Time	Sets the detection time of *ov2 [DC Bus Overvoltage 2]* in 0.1 s increments. **Note:** Set this parameter to 0.0 s to disable *ov2* detection.	10.0 s (0.0 - 1200.0 s)

4.15 Y: Application Features

◆ Y1: Application Basics

No. (Hex.)	Name	Description	Default (Range)
Y1-04 (3C03) RUN	Sleep Wake-up Level	Sets the level that feedback must be less than for the time set in *Y1-05 [Sleep Wake-up Level Delay Time]* to start the system. This level also sets the wake up level when the drive is in Sleep Mode. When *Y1-04 < 0*, the feedback level must decrease this amount to less than the setpoint. **Note:** • When PID operates in reverse mode, the feedback value must increase to more than the start level for the time set in *Y1-05* for the system to start. • When *Y2-01 = 5 [Sleep Level Type = Output Frequency (non-PID)]*, the drive will ignore this parameter. • Set this parameter to 0.0 to disable the function. • Range is 0.00 to 99.99 with sign-bit "-" or "+" indicating Delta to Setpoint. • Display unit and scaling change when the system units change.	0.0 (-999.9 - +999.9)
Y1-05 (3C04) RUN	Sleep Wake-up Level Delay Time	Sets the drive to start the System again when the feedback decreases to less than *Y1-04 [Sleep Wake-up Level]* for the time set in this parameter.	1.0 s (0.0 - 3600.0 s)
Y1-06 (3C05) RUN	Minimum Speed	Sets the minimum frequency at which the drive will run. The drive applies this setting to HAND and AUTO modes. **Note:** The unit, decimal place, and setting range change when the *Y1-07 [Minimum Speed Units]* setting changes: • *Y1-07 = 0 [Hz]*: The setting range is 0.0 Hz to *E1-04* Hz. • *Y1-07 = 1 [RPM]*: The setting range is 0 RPM to (*E1-04* × 60) RPM.	0.0 Hz Determined by Y1-07
Y1-07 (3C06)	Minimum Speed Units	Sets the units and decimal place for *Y1-06 [Minimum Speed]*. 0 : Hz 1 : RPM **Note:** Changing *Y1-07* will set *Y1-06 [Minimum Speed]* to the default value.	0 (0, 1)
Y1-08 (3C07) RUN	Low Feedback Level	Sets the lower detection level for the PID feedback. **Note:** • Unit and decimal place change when the system units change. • Range is 0.00 to 99.99 with sign-bit "-" indicating Delta to Setpoint.	0.00% (0.00 - 99.99%)
Y1-09 (3C08) RUN	Low Feedback Lvl Fault Dly Time	Sets the delay time for the drive to detect an *LFB [Low Feedback Sensed]* fault after the feedback level decreases to less than the value set in *Y1-08 [Low Feedback Level]*. **Note:** Set *Y1-10 = 0 [Low Feedback Selection = Fault (and Digital Output)]* to enable this parameter.	10 s (0 - 3600 s)
Y1-10 (3C09)	Low Feedback Selection	Sets the drive response when the feedback decreases to less than *Y1-08 [Low Feedback Level]* for longer than the time set in *Y1-09 [Low Feedback Lvl Fault Dly Time]*. 0 : Fault (and Digital Output) 1 : Alarm (and Digital Output) 2 : Digital Output Only	2 (0 - 2)
Y1-11 (3C0A) RUN	High Feedback Level	Sets the upper detection level for the PID feedback. **Note:** • Unit and decimal place change when the system units change. • Range is 0.00 to 99.99 with sign-bit "+" indicating Delta to Setpoint.	0.00% (0.00 - 99.99%)
Y1-12 (3C0B) RUN	High Feedback Lvl Fault Dly Time	Sets the delay time between when the drive detects high feedback until the drive faults on an *HFB [High Feedback Sensed]* fault. **Note:** This parameter is effective only when *Y1-13 = 0 [High Feedback Selection = Fault (and Digital Output)]*.	5 s (0 - 3600 s)
Y1-13 (3C0C)	High Feedback Selection	Sets the drive response when the feedback increased to more than *Y1-11 [High Feedback Level]* for longer than the time set in *Y1-12 [High Feedback Lvl Fault Dly Time]*. 0 : Fault (and Digital Output) 1 : Alarm (and Digital Output) 2 : Digital Output Only	0 (0 - 2)
Y1-14 (3C0D) RUN	Feedback Hysteresis Level	Sets the hysteresis level for low and high level feedback detection. **Note:** Unit and decimal place change when the system units change.	0.0% (0.0 - 10.00%)

No. (Hex.)	Name	Description	Default (Range)
Y1-15 (3C0E) RUN	Maximum Setpoint Difference	Sets a percentage of difference between the setpoint and the feedback. The difference must be more than this value for the time set in *Y1-16 [Not Maintaining Setpoint Time]* to trigger the drive response set in *Y1-17 [Not Maintaining Setpoint Sel]*. **Note:** • Unit and decimal place change when the system units change. • If there is a fault, the drive will coast to a stop. • Set this parameter to 0.0 to disable the function. • This function is only active during run when in Auto Mode.	0.0% (0.0 - 6000.0%)
Y1-16 (3C0F) RUN	Not Maintaining Setpoint Time	Sets the delay time before a Setpoint Not Met condition occurs. The drive must detect the setpoint difference set in *Y1-15 [Maximum Setpoint Difference]* before the timer will start. **Note:** Set *Y1-15 = 0 [Maximum Setpoint Difference = 0]* to disable this function.	60 s (0 - 3600 s)
Y1-17 (3C10)	Not Maintaining Setpoint Sel	Sets the drive response when the feedback increases to more or decreases to less than the setpoint for more than the amount set in *Y1-15 [Maximum Setpoint Difference]*. 0 : Fault (and Digital Output) 1 : Alarm (and Digital Output) 2 : Digital Output Only	0 (0 - 2)
Y1-18 (3C11)	Prime Loss Detection Method	Sets the units and quantity that the drive will use to determine *LOP [Loss of Prime]*. 0 : Current (A) 1 : Power (kW) 2 : Torque (%)	0 (0 - 2)
Y1-19 (3C12) RUN	Prime Loss Level	Sets the level to detect the *LOP [Loss of Prime]* in the pump when in Auto or Sleep Boost Mode.	0.0 (0.0 - 1000.0)
Y1-20 (3C13) RUN	Prime Loss Time	Sets the delay time before the drive detects an *LOP [Loss of Prime]* condition. The timer starts when the drive detects the conditions in *Y1-18 [Prime Loss Detection Method]* and *Y1-19 [Prime Loss Level]*.	20 s (0 - 600 s)
Y1-21 (3C14)	Prime Loss Activation Freq	Sets the frequency level above which the drive enables Loss of Prime detection.	0.0 Hz (0.0 - 400.0)
Y1-22 (3C15)	Prime Loss Selection	Sets the drive response when the drive is in the Loss of Prime condition. 0 : Fault (and Digital Output) 1 : Alarm (and Digital Output) 2 : Digital Output Only	0 (0 - 2)
Y1-23 (3C16)	Prime Loss Max Restart Time	Sets the time in minutes that the drive will wait before it tries a restart after a restart fails or after it does not do a restart because of a fault.	0.2 min (0.2 - 6000.0 min)
Y1-40 (3C27) RUN	Maximum Speed	Sets the maximum speed. **Note:** This parameter is not effective when *Y1-40 = 0.0 Hz* or *Y1-40 > E1-04 [Maximum Output Frequency] × d2-01 [Frequency Reference Upper Limit]*.	0.0 Hz (0.0 - 416.0)

◆ Y2: PID Sleep and Protection

No. (Hex.)	Name	Description	Default (Range)
Y2-01 (3C64)	Sleep Level Type	Sets the data source that the drive uses to know when to activate the Sleep Function. 0 : Output Frequency 1 : Output Current 2 : Feedback 3 : Output Speed (RPM) 5 : Output Frequency (non-PID) **Note:** • Feedback depends on PID direction operation. • When the Sleep Function is active, the keypad will show the “Sleep” Alarm.	5 (0 - 5)
Y2-02 (3C65) RUN	Sleep Level	Sets the level that the level type set in *Y2-01 [Sleep Level Type]* must be at for the time set in *Y2-03 [Sleep Delay Time]* for the drive to enter Sleep Mode. **Note:** • When you set this parameter to 0.0, this function will not be active. • This function is active only when the drive operates in AUTO Mode. • When *Y2-01 = 5 [Output Frequency (non-PID)]*, the drive will disable the Sleep function when you set this parameter to 0.0. • When *Y2-01 ≠ 5*, the drive will set the sleep level to the largest value from *d2-02 [Frequency Reference Lower Limit]*, *Y1-06 [Minimum Speed]*, and *Y4-12 [Thrust Frequency]* when you set this parameter to 0.0.	0.0 (0.0 - 6000.0)

No. (Hex.)	Name	Description	Default (Range)
Y2-03 (3C66) RUN	Sleep Delay Time	Sets the delay time before the drive enters Sleep Mode when the drive is at the sleep level set in *Y2-02 [Sleep Level]*.	5 s (0 - 3600 s)
Y2-04 (3C67) RUN	Sleep Activation Level	Sets the level above which the output frequency must increase to activate the Sleep Function when *Y2-01 = 0, 3, or 5 [Sleep Level Type = Output Frequency, Output Speed (RPM), or Output Frequency (non-PID)]*. **Note:** When you set this parameter to 0.0, this function will not be active, and the Sleep Function will activate above the minimum speed (largest value from *d2-02 [Frequency Reference Lower Limit]*, *Y1-06 [Minimum Speed]*, and *Y4-12 [Thrust Frequency]*).	0.0 (0.0 - 6000.0)
Y2-05 (3C68) RUN	Sleep Boost Level	Sets the quantity of boost that the drive applies to the setpoint before it goes to sleep. **Note:** Set this parameter to 0.00 to disable Sleep Boost Function.	0.00% (0.00 - 600.00%)
Y2-06 (3C69) RUN	Sleep Boost Hold Time	Sets the length of time that the drive will keep the boosted pressure before it goes to sleep.	5.0 s (0.5 - 160.0 s)
Y2-07 (3C6A) RUN	Sleep Boost Max Time	Sets the length of time that the system (feedback) has to reach the boosted setpoint. The system must reach the boosted setpoint in the time set in this parameter, or it will go to sleep.	20.0 s (1.0 - 160.0 s)
Y2-08 (3C6B) RUN	Delta Feedback Drop Level	Sets the level of the PID Error (set-point minus feedback) to deactivate the Sleep Mode operation. **Note:** Set this parameter to 0.00 to disable the function.	0.00% (0.00 - 600.00%)
Y2-09 (3C6C) RUN	Feedback Drop Detection Time	Sets the time during which the software monitors the feedback to detect a flow/no-flow condition. Refer to *Y2-08 [Delta Feedback Drop Level]* for more information.	10.0 s (0.0 - 3600.0 s)
Y2-23 (3C7A) RUN	Anti-No-Flow Bandwidth	Sets the quantity of PI error bandwidth that the drive uses to detect an Anti- No-Flow condition. Set this parameter to 0.00% to disable Anti-No-Flow detection. **Note:** Do not set this parameter value too high, because operation can become unstable.	0.00% (0.00 - 2.00%)
Y2-24 (3C7B) RUN	Anti-No-Flow Detection Time	Sets the time delay before the drive starts the increased deceleration rate after it detects Anti-No-Flow.	10.0 s (1.0 - 60.0 s)
Y2-25 (3C7C) RUN	Anti-No-Flow Release Level	Sets the amount below the setpoint which the feedback must decrease before the drive will disengage Anti-No-Flow and return to normal PI operation. **Note:** The display unit and scaling change when the System Units change.	0.30% (0.00 - 10.00%)

◆ Y4: Application Advanced

No. (Hex.)	Name	Description	Default (Range)
Y4-01 (3CFA) RUN	Pre-Charge Level	Sets the level at which the drive will activate the pre-charge function when the drive is running at the frequency set in *Y4-02 [Pre-Charge Frequency]*. **Note:** The drive will stop when one of these conditions is true: • The feedback level increases to more than *Y4-01* • The pre-charge time set in *Y4-03 [Pre-Charge Time]* expires	0.00% (0.00 - 600.00%)
Y4-02 (3CFB) RUN	Pre-Charge Frequency	Sets the frequency at which the pre-charge function will operate.	0.0 Hz (0.0 - 400.0 Hz)
Y4-03 (3CFC) RUN	Pre-Charge Time	Sets the length of time that the Pre-Charge function will run. **Note:** Set this parameter to 0.0 to disable the function.	0.0 min (0.0 - 3600.0 min)
Y4-05 (3CFE) RUN	Pre-Charge Loss of Prime Level	Sets the level at which the drive will detect loss of prime in the pump.	0.0 A (0.0 - 1000.0 A)
Y4-11 (3D04) RUN	Thrust Acceleration Time	Sets the time at which the drive output frequency will ramp up to the reference frequency set in *Y4-12 [Thrust Frequency]*.	1.0 s (0.0 - 600.0 s)

No. (Hex.)	Name	Description	Default (Range)
Y4-12 (3D05) RUN	Thrust Frequency	Sets the Thrust Frequency that the drive will use to know which acceleration and deceleration time to use. The drive will accelerate to this frequency in the *Y4-11 [Thrust Acceleration Time]* time and decelerate from this frequency in the *Y4-13 [Thrust Deceleration Time]* time.	0.0 Hz (0.0 - 400.0 Hz)
Y4-13 (3D06) RUN	Thrust Deceleration Time	Sets the length of time necessary for the drive to go from the Thrust Frequency in *Y4-12 [Thrust Frequency]* to stop when Thrust Mode is active.	5.0 s (0.0 - 600.0 s)
Y4-18 (3D0B) RUN	Differential Level	Sets the maximum difference that the drive will allow when it subtracts the Differential Feedback from the Primary PID Feedback. **Note:** • The drive will respond as specified by the setting in *Y4-20 [Differential Level Detection Selection]* when the difference increases to more than the value set in this parameter for the time set in *Y4-19 [Differential Level Detection Time]*. • Set this parameter to 0.00 to disable Differential Feedback Detection.	0.00% (-99.99 - +99.99%)
Y4-19 (3D0C) RUN	Differential Lvl Detection Time	Sets the length of time that the difference between PID Feedback and the Differential Feedback must be more than *Y4-18 [Differential Level]* before the drive will respond as specified by *Y4-20 [Differential Level Detection Selection]*.	10 s (0 - 3600 s)
Y4-20 (3D0D) RUN	Differential Level Detection Sel	Sets the drive response during a Differential Level Detected condition. 0 : Fault (and Digital Out) 1 : Alarm (and Digital Out) 2 : Digital Out Only	0 (0 - 2)
Y4-22 (3D0F) RUN	Low City On-Delay Time	Sets the length of time that the drive will wait to stop when the drive detects a Low City Pressure condition.	10 s (1 - 1000 s)
Y4-23 (3D10) RUN	Low City Off-Delay Time	Sets the length of time that the drive will wait to start again after you clear a Low City Pressure condition.	5 s (0 - 1000 s)
Y4-24 (3D11) RUN	Low City Alarm Text	Sets the alarm message to show on the keypad when the drive detects a Low City Pressure condition. 0 : Low City Pressure 1 : Low Suction Pressure 2 : Low Water in Tank	0 (0 - 2)
Y4-36 (3D1D) RUN	Pressure Reached Exit Conditions	Sets how the digital output responds to Feedback changes after it activates. 0 : Hysteresis Above & Below 1 : Hysteresis 1-Way	1 (0, 1)
Y4-37 (3D1E) RUN	Pressure Reached Hysteresis Lvl	Sets the hysteresis level that will cause the drive to exit the Pressure Reached condition.	0.30% (0.1 - 10.00%)
Y4-38 (3D1F) RUN	Pressure Reached On Delay Time	Sets the length of time that the drive will wait before it activates the Pressure Reached condition.	1.0 s (0.1 - 60.0 s)
Y4-39 (3D20) RUN	Pressure Reached Off Delay Time	Sets the length of time that the drive will wait before it deactivates the Pressure Reached condition.	1.0 s (0.1 - 60.0 s)
Y4-40 (3D21) RUN	Pressure Reached Detection Sel	Sets the drive status that triggers the Pressure Reached Detection digital output. 0 : Always 1 : Drive Running 2 : Run Command	0 (0 - 2)
Y4-41 (3D22) RUN	Diff Lvl Src Fdbk Backup Select	Sets the function to enable or disable *Differential Level Source [H3-xx = 2D]* as the backup transducer if there is a failure with the primary PID Feedback transducer *[H3-xx = B]* and the PID Feedback Backup transducer *[H3-xx = 24]* is not available. 0 : Disabled 1 : Enabled	0 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
Y4-42 (3D23)	Output Disconnect Detection Sel	This parameter applies only when in Drive Mode. It sets the drive response if the connection between the drive and the motor is disconnected. 0 : Disabled 1 : Alarm - Speed Search 2 : Alarm - Start at Zero 3 : Fault **Note:** 1. Loss Of Load *[Z1-31 to Z1-36]*, Load Verify *[Z1-53]*, and Bypass Energy Savings *[Z1-16]* can interfere with the correct operation of Output Disconnect Detection. 2. When the Output Disconnect is active, the drive internally disables Output Phase Loss Detection of more than one phase. 3. The Output Disconnect function is not active during bypass operation.	0 (0 - 3)
Y4-43 (3D24)	Output Disconnect Inject Current	Sets the level of DC injection current during output disconnect as a percentage of the drive rated current.	30% (5 - 50%)

◆ YA: Preset Setpoint

No. (Hex.)	Name	Description	Default (Range)
YA-01 (3E58) RUN	Setpoint 1	Sets the PID Setpoint when *b1-01 = 0 [Frequency Reference Selection 1 = Keypad or Multi-Speed Selection]*. **Note:** Parameters *b5-46 [PID Unit Display Selection]*, *b5-38 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, range, and resolution.	0.00 (0.00 - 600.00)
YA-02 (3E59) RUN	Setpoint 2	Sets the PID Setpoint as specified by the Multi-Setpoint digital inputs. **Note:** Parameters *b5-46 [PID Unit Display Selection]*, *b5-38 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, range, and resolution.	0.00 (0.00 - 600.00)
YA-03 (3E5A) RUN	Setpoint 3	Sets the PID Setpoint as specified by the Multi-Setpoint digital inputs. **Note:** Parameters *b5-46 [PID Unit Display Selection]*, *b5-38 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, range, and resolution.	0.00 (0.00 - 600.00)
YA-04 (3E5B) RUN	Setpoint 4	Sets the PID Setpoint as specified by the Multi-Setpoint digital inputs. **Note:** Parameters *b5-46 [PID Unit Display Selection]*, *b5-38 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, range, and resolution.	0.00 (0.00 - 600.00)

◆ YC: Foldback Features

No. (Hex.)	Name	Description	Default (Range)
YC-01 (3EBC)	Output Current Limit Select	Sets the function to enable or disable the output current regulator. 0 : Disabled 1 : Enabled	0 (0, 1)
YC-02 (3EBD) RUN	Current Limit	Sets the current limit. **Note:** Value is internally limited to 300% of the drive rated current set in *n9-01 [Inverter Rated Current]*.	0.0 A (0.0 - 1000.0 A)
YC-10 (3EC5)	Single Phase Foldback Sel	Sets the function to enable or disable the single phase ripple regulator. 0 : Disabled 1 : Enabled	1 (0, 1)
YC-11 (3EC6)	Ripple Regulator Setpoint	Sets the ripple regulator setpoint as a percentage of the maximum amount of ripple permitted before the drive detects a *PF [Input Phase Loss]* fault.	95.0% (0.0 - 200.0%)

◆ YF: PI Auxiliary Control

No. (Hex.)	Name	Description	Default (Range)
YF-01 (3F50)	PI Aux Control Selection	Sets the PI Auxiliary Control function. 0 : Disabled 1 : Enabled	0 (0, 1)
YF-02 (3F51) RUN	PI Aux Control Transducer Scale	Sets the full scale (10 V or 20 mA) output of the pressure transducer connected to the analog input terminal programmed for *H3-xx = 27 [PI Aux Control Feedback Level]*. **Note:** Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	145.0 (1.0 - 6000.0)
YF-03 (3F52) RUN	PI Aux Control Setpoint	Sets the level to which the drive will try to regulate. **Note:** Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	20.0 PSI (0.0 - 6000.0)
YF-04 (3F53) RUN	PI Aux Control Minimum Level	Sets the level below which the drive must be for longer than *YF-05 [PI Aux Control Sleep Delay Time]* before the drive goes to sleep and turns off all lag pumps. **Note:** • Set this parameter to 0.0 to disable the function. • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	10.0 PSI (0.0 - 6000.0)
YF-05 (3F54) RUN	PI Aux Control Sleep Delay Time	Sets the length of time that the drive will delay before it goes to sleep after the level is less than *YF-04 [PI Aux Control Minimum Level]* (when *YF-23 = 1 [PI Aux Ctrl Output Level Select = Inverse Acting]*) or more than *YF-24 [PI Auxiliary Ctrl Maximum Level]* (when *YF-23 = 0 [Direct Acting]*).	5 s (0 - 3600 s)
YF-06 (3F55) RUN	PI Aux Control Wake-up Level	Sets the level to wake up the drive when the drive after *YF-04 [PI Aux Control Minimum Level]* or *YF-24 [PI Auxiliary Ctrl Maximum Level]* put the drive to sleep. **Note:** • Parameter *YF-23 [PI Aux Ctrl Output Level Select]* sets the condition to wake up the drive. – *YF-23 = 0 [Direct Acting]*: The PI Aux Feedback must be less than the level set in this parameter for longer than the time set in *YF-07* to wake up. – *YF-23 = 1 [Inverse Acting]*: The PI Aux Feedback must be more than the level set in this parameter for longer than the time set in *YF-07 [PI Aux Control Wake-up Time]* to wake up. • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	30.0 PSI (-999.9 - +999.9 PSI)
YF-07 (3F56)	PI Aux Control Wake-up Time	Sets the time to wake up the drive when the drive after *YF-04 [PI Aux Control Minimum Level]* or *YF-24 [PI Auxiliary Ctrl Maximum Level]* put the drive to sleep. **Note:** Parameter *YF-23 [PI Aux Ctrl Output Level Select]* sets the condition to wake up the drive. • *YF-23 = 0 [Direct Acting]*: The PI Aux Feedback must be less than the level set in *YF-06* for longer than the time set in *YF-07* to wake up. • *YF-23 = 1 [Inverse Acting]*: The PI Aux Feedback must be more than the level set in *YF-06 [PI Aux Control Wake-up Level]* for longer than the time set in *YF-07* to wake up.	1.0 s (0.0 - 3600.0 s)
YF-08 (3F57) RUN	PI Aux Control Minimum Speed	Sets the minimum speed at which the drive can run when the PI Auxiliary Control has an effect on the output speed. **Note:** The drive will use *Y1-06 [Minimum Speed]* and *Y4-12 [Thrust Frequency]* as the minimum speed when PI Aux Control does not have an effect on the output speed or when you set *YF-08 < Y1-06 and Y4-12*.	0.00 Hz (0.00 - 400.00 Hz)
YF-09 (3F58) RUN	PI Aux Control Low Level Detect	Sets the level below which the drive must be for longer than *YF-10 [PI Aux Control Low Lvl Det Time]* to respond as specified by *YF-11 [PI Aux Control Low Level Det Sel]*. **Note:** • Set this parameter to 0.0 to disable the function. • Parameter *YF-10* only applies to when *YF-11 = 2 and 3 [Fault and Auto-Restart (time set by YF-15)]*. • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	0.0 PSI (-999.9 - +999.9 PSI)
YF-10 (3F59) RUN	PI Aux Low Level Detection Time	Sets the length of time that the PI Aux Feedback must be less than *YF-09 [PI Aux Control Low Lvl Detection]* to trigger a drive response when *YF-11 = 2 and 3 [PI Aux Control Low Level Det Sel = Fault and Auto-Restart (time set by YF-15)]*.	0.1 s (0.0 - 300.0 s)
YF-11 (3F5A)	PI Aux Control Low Level Det Sel	Sets drive response when the PI Aux Feedback decreases to less than *YF-09 [PI Aux Control Low Lvl Detection]* for longer than *YF-10 [PI Aux Control Low Lvl Det Time]*. 0 : No Display 1 : Alarm Only 2 : Fault 3 : Auto-Restart (time set by YF-15) **Note:** • Set *YF-01 = 1 [PI Aux Control Selection = Enabled]* and *YF-09 [PI Aux Control Low Level Detect] >* 0 to enable PI Aux Low Level Detection. • Parameter *YF-10* only applies when *YF-11 = 2 or 3*.	1 (0 - 3)

No. (Hex.)	Name	Description	Default (Range)
YF-12 (3F5B) RUN	PI Aux Control High Level Detect	Sets the value above which the level must be for longer than *YF-13 [PI Aux High Level Detection Time]* to respond as specified by *YF-14 [PI Aux Hi Level Detection Select]*. **Note:** • Set this parameter to 0.0 to disable the function. • Parameter *YF-13* only applies to when *YF-14 = 2 and 3 [Fault and Auto-Restart (time set by YF-15)]*. • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	0.0 PSI (-999.9 - +999.9 PSI)
YF-13 (3F5C) RUN	PI Aux High Level Detection Time	Sets the length of time that the level must be more than *YF-12 [PI Aux Control High Level Detect]* before the drive will respond when *YF-14 = 2, 3 [PI Aux Hi Level Detection Select]*.	0.1 s (0.0 - 300.0 s)
YF-14 (3F5D)	PI Aux Control Hi Level Det Sel	Sets the drive response when the PI Aux Feedback increases to more than the *YF-12 [PI Aux Control High Level Detect]* level for longer than the time set in *YF-13 [PI Aux High Level Detection Time]*. 0 : NoDisplay (Digital Output Only) 1 : Alarm Only 2 : Fault 3 : Auto-Restart (time set by YF-15) **Note:** • Set *YF-01 = 1 [PI Aux Control Selection = Enabled]* and *YF-12 [PI Aux Control High Level Detect]* > 0 to enable PI Aux High Level Detection. • Parameter *YF-13* only applies when *YF-14 = 2 or 3*	1 (0 - 3)
YF-15 (3F5E)	PI Aux Level Detect Restart Time	Sets the length of time the drive will wait before it tries an Auto-Restart of *LOAUX [Low PI Aux Feedback Level]* or *HIAUX [High PI Aux Feedback Level]* fault.	5.0 min (0.1 - 6000.0 min)
YF-16 (3F5F) RUN	PI Auxiliary Control P Gain	Sets the proportional gain for the suction pressure control.	2.00 (0.00 - 25.00)
YF-17 (3F60) RUN	PI Auxiliary Control I Time	Sets the integral time for the suction pressure control. **Note:** Set this parameter to 0.0 to disable the integrator.	5.0 s (0.0 - 360.0 s)
YF-18 (3F61)	PI Aux Control Detect Time Unit	Sets the time unit for *YF-10 [PI Aux Control Low Lvl Det Time]* and *YF-13 [PI Aux High Level Detection Time]*. 0 : Minutes (min) 1 : Seconds (sec)	1 (0, 1)
YF-19 (3F62)	PI Aux Ctrl Feedback WireBreak	Sets how the analog input selected for PI Aux Feedback will respond when it is programmed to receive a 4 mA to 20 mA signal and the signal is lost. 0 : Disabled 1 : Alarm Only 2 : Fault (no retry, coast to stop)	2 (0 - 2)
YF-20 (3F63)	PI Aux Main PI Speed Control	Sets if the PI Auxiliary Controller has an effect on output speed. 0 : Disabled 1 : Enabled	1 (0, 1)
YF-21 (3F64)	PI Aux Ctrl Level Unit Selection	Set the units shown for the PI Aux Level parameters and monitors. 0 : “WC: inches of water column 1 : PSI: pounds per square inch 2 : GPM: gallons/min 3 : °F: Fahrenheit 4 : ft^3/min: cubic feet/min 5 : m^3/h: cubic meters/hour 6 : L/h: liters/hour 7 : L/s: liters/sec 8 : bar: bar 9 : Pa: Pascal 10 : °C: Celsius 11 : m: meters 12 : ft: feet 13 : L/min: liters/min 14 : m^3/min: cubic meters/min 15 : “Hg: Inch Mercury 16 : kPa: kilopascal 48 : %: Percent 49 : Custom (YF-32 ~ 34) 50 : None	1 (0 - 50)

No. (Hex.)	Name	Description	Default (Range)
YF-22 (3F65)	PI Aux Level Decimal Place Pos	Sets the number of decimal places for the PI Aux Level parameters and monitors. 0 : No Decimal Places (XXXXX) 1 : One Decimal Places (XXXX.X) 2 : Two Decimal Places (XXX.XX) 3 : Three Decimal Places (XX.XXX)	1 (0 - 3)
YF-23 (3F66)	PI Aux Ctrl Output Level Select	Sets the PI Auxiliary Controller to be Direct-acting or Inverse-acting. 0 : Direct Acting 1 : Inverse Acting	1 (0, 1)
YF-24 (3F67) RUN	PI Auxiliary Ctrl Maximum Level	Sets the maximum level for PI Auxiliary Control. When the level is more than this setting for longer than *YF-05 [PI Aux Control Sleep Delay Time]*, the drive will go to sleep and turn off all lag drives. **Note:** • Set this parameter to 0.0 to disable the function. • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	0.0 PSI (0.0 - 6000.0 PSI)
YF-25 (3F68) RUN	PI Aux Control Activation Level	Sets the level to activate the PI Auxiliary Control. **Note:** • The drive response changes when the *YF-23 [PI Aux Ctrl Output Level Select]* setting changes. – *YF-23 = 0 [Direct Acting]*: When the PI Aux Feedback level is more than this setting for longer than *YF-26 [PI Aux Control Activation Delay]*, the drive will activate the PI Auxiliary Control to control the output frequency. – *YF-23 = 1 [Inverse Acting]*: When the PI Aux Feedback level is less than this setting for longer than *YF-26*, the drive will activate PI Auxiliary Control to control the output frequency. • When you set this parameter to 0.0 PSI, PI Auxiliary Control is always enabled. • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	0.0 PSI (0.0 - 6000.0 PSI)
YF-26 (3F69) RUN	PI Aux Control Activation Delay	Sets the delay time to activate the PI Auxiliary Control. **Note:** • The drive response changes when the *YF-23 [PI Aux Ctrl Output Level Select]* setting changes. – *YF-23 = 0 [Direct Acting]*: When the PI Aux Feedback level is more than *YF-25 [PI Aux Control Activation Level]* for longer than this time, the drive will activate the PI Auxiliary Control to control the output frequency. – *YF-23 = 1 [Inverse Acting]*: When the PI Aux Feedback level is less than *YF-25* for longer than this time, the drive will activate PI Auxiliary Control to control the output frequency. • When you set this parameter to 0.0 PSI, PI Auxiliary Control is always enabled.	2 s (0 - 3600 s)
YF-32 (3F6F)	PI Aux Custom Unit Character 1	Sets the first character of the PI Aux custom unit display when *YF-21 = 49 [PI Aux Ctrl Level Unit Selection = Custom (YF-32 ~ 34)]*.	41 (20 - 7A)
YF-33 (3F70)	PI Aux Custom Unit Character 2	Sets the second character of the PI Aux custom unit display when *YF-21 = 49 [PI Aux Ctrl Level Unit Selection = Custom (YF-32 ~ 34)]*.	41 (20 - 7A)
YF-34 (3F71)	PI Aux Custom Unit Character 3	Sets the third character of the PI Aux custom unit display when *YF-21 = 49 [PI Aux Ctrl Level Unit Selection = Custom (YF-32 ~ 34)]*.	41 (20 - 7A)
YF-35 (3F72)	PI Aux Minimum Transducer Scale	Sets the minimum scale output of the pressure transducer that is connected to the terminal set for *H3-xx = 27 [MFAI Function Selection = PI Auxiliary Control Feedback]*. **Note:** • To enable this parameter, set it to less than *YF-02 [PI Aux Control Transducer Scale]*. If you set it to more than *YF-02*, it will disable the PI Auxiliary Feedback (set to 0). • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	0.0 PSI (-999.9 - +999.9 PSI)
YF-36 (3F73) RUN	PI Aux Lo Hi Lvl Det Hysteresis	Sets the Hysteresis Level used for low and high level detection. **Note:** • When *YF-11 = 3 [PI Aux Control Low Level Det Sel = Auto-Restart (time set by YF-15)]*, the PI Aux Feedback level must increase more than the value of *YF-09 [PI Aux Control Low Level Detect] + YF-36* before *YF-15 [PI Aux Level Detect Restart Time]* starts. • When *YF-14 = 3 [PI Aux Control Hi Level Det Sel = Auto-Restart (time set by YF-15)]*, the PI Aux Feedback Level must decrease less than the value of *YF-12 [PI Aux Control High Level Detect] – YF-36* before *YF-15* starts. • Parameters *YF-21 [PI Aux Ctrl Level Unit Selection] and YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	0.0 PSI (0.0 - 100.0 PSI)

4.16 Z: Bypass Parameters

◆ Z1: Bypass Control System

No. (Hex.)	Name	Description	Default (Range)
Z1-05 (85CA)	Auto Transfer To Bypass	When the drive is running and a there is a drive fault, operation will switch to Bypass Mode. When you remove the fault, the operation will go back to Drive Mode 0 : Disabled 1 : Enabled	0 (0, 1)
Z1-06 (85CB)	Power Up Mode	Sets the mode of bypass control at power-up. 0 : OFF-DRIVE 1 : AUTO-DRIVE 3 : AUTO-BYPASS 5 : Powerup HOA Memory	1 (0 -5)
Z1-10 (85CF)	Emergency Override Transfer	Enables and disables the function to auto transfer to EMOV bypass if the drive declares a fault when the bypass is running in EMOV drive. 0 : Disabled 1 : Enabled	1 (0, 1)
Z1-11 (85D0)	Motor AND/OR Function	- 0 : Disabled 1 : Always Motor 1 2 : Always Motor 2 3 : Always Motor 1 AND 2 4 : OR in HAND and AUTO 5 : MOTOR 1 in HAND OR in AUTO 6 : MOTOR 2 in HAND OR in AUTO 7 : AND/OR in HAND and AUTO 8 : MOTOR 1 in HAND AND/OR in AUTO 9 : MOTOR 2 in HAND AND/OR in AUTO 10 : MOTOR 1,2 in HAND AND/OR in AUTO	0 (0 - 10)
Z1-12 (85D1)	Run Delay Time	When the Run command is issued, the drive will run at speed set in *Z1-14 [Run Delay Frequency Reference]*. After the time set in this parameter, the frequency reference will return to its programmed source (*b1-01* or HAND frequency reference).	0.0 s (0.0 to 300.0 s)
Z1-13 (85D2)	Pre Interlock Run Select	Determines if the drive will run at a preset speed when the BAS Interlock Digital Input is open and a Run command is present. 0 : Disabled 1 : Enabled (DRIVE Mode) 1 : Enabled (BYPASS Mode)	0 (0, 1)
Z1-14 (85D3)	Run Delay Frequency Reference	Sets the frequency that the bypass uses when it delays the Run command.	60.00 Hz (0.00 - Max. Freq.)
Z1-15 (85D4)	Interlock Wait Time	When you enter a Run command, it asserts the damper actuator output. When you program an input for Interlock and the time set to this parameter expires before the Interlock input activates, it will trigger a fault. **Note:** Set this parameter to 0.0 s to disable this function.	0.0 s (0.0 - 300.0 s)
Z1-16 (85D5)	Energy Savings Mode	Enables the contactor-based Energy Savings function and determines which conditions must be met before the bypass will enter into Energy Savings Mode. 0 : Disabled 1 : Frequency 2 : Frequency + Current **Note:** If the motor is running in reverse, Energy Savings will not function.	0 (0 - 2)
Z1-17 (85D6)	Energy Savings Frequency Ref	Both frequency reference and output frequency must be within the window defined by this parameter, *Z1-19 [Energy Savings Fref Deadbnad]*, and *Z1-20 [Energy Savings Out Freq Deadband]* for Energy Savings operation.	60.00 Hz (0.00 - Max. Freq.)
Z1-18 (85D7)	Energy Savings Output Cur Level	Drive output current must be in the window defined by this parameter and *Z1-21 [Energy Savings Out Cur Deadband]* to enter Energy Savings Mode.	0.0% (0.0 - 100.0%)
Z1-19 (85D8)	Energy Savings Fref Deadband	Used with *Z1-17 [Energy Savings Frequency Ref]* to set when to enter and exit Energy Savings Mode. **Note:** Units, default, and range are different for different *o1-03 [Frequency Display Unit Selection]* values.	0.50 Hz (0.00 - 5.00 Hz)

No. (Hex.)	Name	Description	Default (Range)
Z1-20 (85D9)	Energy Savings Out Freq Deadband	Used with *Z1-17 [Energy Savings Frequency Ref]* to set when to enter Energy Savings Mode. **Note:** Units, default, and range are different for different *o1-03 [Frequency Display Unit Selection]* values.	0.50 Hz (0.00 - 5.00 Hz)
Z1-21 (85DA)	Energy Savings Out Cur Deadband	Used with *Z1-18 [Energy Savings Output Cur Level]* to set when to enter Energy Savings Mode.	15.0% (0.0 - 30.0%)
Z1-22 (85DB)	Energy Savings Mode Time	Sets the length of time that all conditions must be in the set limits before transferring into Energy Savings Mode.	30 s (10 - 3600 s)
Z1-23 (85DC)	Energy Savings Freq Ref Increase	Sets the value to add to the drive Frequency Reference when transferring to Bypass Energy Savings Mode. **WARNING!** *Sudden Movement Hazard. This parameter can cause operation higher than the E1-04 [Maximum Output Frequency] setting of the drive.* **Note:** Units, default, and range are different for different *o1-03 [Frequency Display Unit Selection]* values.	6.00 Hz (0.00 - 10.00 Hz)
Z1-24 (85DD)	Contactor Open Delay	Sets the time to delay after commanding the drive output contactor K2 or bypass contactor K3 or 2-Motor OR/AND contactors K4 and K5 to open to let the contacts open.	0.2 s (0.0 - 5.0 s)
Z1-25 (85DE)	Contactor Close Delay	Sets the time to delay after commanding the drive output contactor K2 or bypass contactor K3 or 2-Motor OR/AND contactors K4 and K5 to close to let the contacts close.	0.2 s (0.0 - 5.0 s)
Z1-27 (85E0)	Brownout Voltage Level	Sets the voltage level below which is a brownout condition. **Note:** Voltage level is measured on the output of the built-in 120 VAC control transformer.	98 V (0 - 150 V)
Z1-28 (85E1)	Brownout Detection Time	Sets the length of time that the Bypass voltage must be less than the Brownout Voltage Level before the Bypass will trigger a Brownout fault.	3.0 s (1.0 - 300.0 s)
Z1-29 (85E2)	Blackout Voltage Level	Sets the voltage level to determine a blackout condition. Use *Z1-60 [Blackout Operation Select]* to set power blackout behavior. **Note:** Voltage level is measured on the output of the built-in 120 VAC control transformer.	75 V (0 - 150 V)
Z1-31 (85E4)	Loss of Load Detection Select	Sets the function to detect loss of load. 0 : Disabled 1 : Enable and Fault 2 : Enable and Alarm	0 (0 - 2)
Z1-32 (85E5)	Loss of Load Drive Frequency	Sets the value to which the drive output frequency must be equal to or more than for the drive to detect a loss of load.	60.00 Hz (0.00 - Max Freq.)
Z1-33 (85E6)	Loss of Load Drive Out Current	For Drive Mode only, the drive output current must be less than this level to detect a Loss of Load condition.	0.0 A (0.0 - 999.9 A)
Z1-34 (85E7)	Loss of Load Drive Det Time	The loss of load conditions must be met for the length of time in this parameter before the bypass will detect a loss of load in Drive Mode.	1.0 s (0.0 - 300.0 s)
Z1-35 (85E8)	Loss of Load Bypass Current	For Bypass Mode only, the motor current must be less than this level to detect a Loss of Load condition.	0.0 A (0.0 - 999.9 A)
Z1-36 (85E9)	Loss of Load Bypass Det Time	The motor current must be less than the value set in *Z1-35 [Loss of Load Bypass Current]* for the length of time set in this parameter before the bypass will detect a loss of load in Bypass Mode.	1.0 s (0.0 - 300.0 s)
Z1-39 (85EC)	Drive/Bypass Source Select	Sets the function to select the Drive or the Bypass as the source of Drive/Bypass Mode selection. 0 : Keypad 1 : Digital Input 2 : Serial Communications 3 : Option PCB	0 (0 - 3)
Z1-40 (85ED)	Auto Transfer Delay Time	When you enable Auto Transfer and the bypass detects a drive fault, the bypass controller will wait for the length of time set in this parameter before it switches to bypass.	0.0 s (0.0 - 300.0 s)
Z1-42 (85EF)	Soft Starter Selection	This parameter is normally set at the factory and does not require adjustment. Sets when there is a soft starter used in bypass operation and when the soft starter will be used for a “soft stop”. 0 : Not Installed – Contactor Only 1 : Installed – Coast To Stop 2 : Installed – Ramp To Stop **Note:** When *[Z1-42 = 1 or 2]* to enable the soft starter, the bypass automatically disables welded contactor detection. Parameter *Z1-55 [Welded Contactor Detection]* does will not have an effect.	0 (0 - 2)

No. (Hex.)	Name	Description	Default (Range)
Z1-43 (85F0)	Soft Starter Delay Timer	This parameter is normally set at the factory and does not require adjustment. Sets the delay time between closing contactor K3 and energizing the soft starter. **Note:** This parameter is enabled when *Z1-42 = 1 or 2 [Soft Starter Selection = Installed - Coast To Stop or Installed - Ramp To Stop]*.	2.0 s (0.0 - 60.0 s)
Z1-44 (85F1)	Soft Starter Rampdown Timeout	Sets the maximum wait time for the current to be less than 5% of *E2-01* after removing the soft starter Run command.	15.0 s (1.0 - 60.0 s)
Z1-50 (85F7)	Bypass Input Phase Loss Level	The bypass measures the current unbalance between phases to detect input phase loss. Usually it is not necessary to change this parameter. Sets the current level between phases in Bypass Mode.	25.0% (5.0 - 50.0%)
Z1-51 (85F8)	Bypass Input Phase Loss Delay	Sets the trip time for an input phase loss condition in Bypass Mode. **Note:** When you set this parameter to 0.0, it will disable bypass phase loss detection.	5.0 s (0.0 - 30.0 s)
Z1-52 (85F9)	Input Phase Rotation Detection	Sets bypass response when the Bypass Mode phase rotation is incorrect. 0 : Disabled 1 : Alarm 2 : Fault	0 (0 - 2)
Z1-53 (85FA)	Load Verify Detection	Enables and disables verification that the motor is running when commanded to run. 0 : Disabled 1 : Enabled	0 (0, 1)
Z1-55 (85FC)	Welded Contactor Detection	Enables and disables detection of K3 “welded contactor” condition. 0 : Disabled 1 : Enabled **Note:** When *Z1-42 = 1 or 2 [Soft Starter Selection = Installed – Coast To Stop or Installed – Ramp To Stop]*, the bypass will automatically disable welded contactor detection.	0 (0, 1)
Z1-56 (85FD) RUN	Test Mode	Sets the behavior of the drive input contactor K1 during Bypass Mode. 0 : Drive Power Off during Bypass 1 : Drive Power On during Bypass	0 (0, 1)
Z1-60 (8601)	Blackout Operation Select	Sets bypass behavior when contactor voltage is less than *Z1-29 [Blackout Voltage Level]*. 0 : Fault 1 : Restart Delay with Speed Search 2 : Restart Delay from Zero Speed 3 : Disabled **Note:** Restart Delay works best when: • A keypad is connected • There is a good battery in the keypad • The date and time are set correctly in the keypad	1 (0 - 3)
Z1-61 (8602)	Power Loss Restart Delay Time	Sets the time delay for restart. This parameter works together *Z1-60 [Blackout Operation Select]*	10 s (1 - 300 s)
Z1-70 (860B)	Green Contactor Mode	Green Contactor Mode opens the output and motor contactors when the bypass unit is idle and does not have a Run command. 0 : Disabled 1 : Enabled	0 (0, 1)
Z1-94 (8623) Expert	Current Transformer Turns	This parameter will indicate to the bypass controller how many times the motor leads pass through bypass current transformers. This parameter is typically set at the Yaskawa factory and does not require adjustment. **Note:** • To display this parameter on the keypad, you must use drive model 4005. • If you set *A1-02 = 2220* to initialize, it will not reset this parameter. 0 : Automatic 1 : Force 1 Turn 2 : Force 2 Turns	0 (0 - 2)
Z1-98 (8627) Expert	Minimum Drive SW Ver	Only change this parameter under the guidance of Yaskawa technical support (1-800-YASKAWA). If you change this parameter incorrectly, it can cause incorrect operation of the bypass system. Bypass SW VST800560 : Default: 1012	Depends on software version (00000 - 65535)
Z1-99 (8628) Expert	Maximum Drive SW Ver	Only change this parameter under the guidance of Yaskawa technical support (1-800-YASKAWA). If you change this parameter incorrectly, it can cause incorrect operation of the bypass system. Bypass SW VST800560 : Default: 1012	Depends on software version (00000 - 65535)

◆ Z2: Bypass Control Input/Output

No. (Hex.)	Name	Description	Default (Range)
Z2-01 (8563)	Digital Input 1 Function (TB2-1)	Sets the function for bypass digital input 1.	21 (0 - 47)
Z2-02 (8564)	Digital Input 2 Function (TB2-2)	Sets the function for bypass digital input 2.	22 (0 - 47)
Z2-03 (8565)	Digital Input 3 Function (TB2-3)	Sets the function for bypass digital input 3.	23 (0 - 47)
Z2-04 (8566)	Digital Input 4 Function (TB2-4)	Sets the function for bypass digital input 4.	24 (0 - 47)
Z2-05 (8567)	Digital Input 5 Function (TB2-5)	Sets the function for bypass digital input 5.	25 (0 - 47)
Z2-06 (8568)	Digital Input 6 Function (TB2-6)	Sets the function for bypass digital input 6.	0 (0 - 47)
Z2-07 (8569)	Digital Input 7 Function (TB2-7)	Sets the function for bypass digital input 7.	0 (0 - 47)
Z2-08 (856A)	Digital Input 8 Function (TB2-8)	Sets the function for bypass digital input 8.	0 (0 - 47)
Z2-09 (856B)	Digital Input 1 Invert Select	Inverts the output of the function selected in Digital Input 1. 0 : Normal (Non-inverted) 1 : Inverted	0 (0, 1)
Z2-10 (856C)	Digital Input 2 Invert Select	Inverts the output of the function selected in Digital Input 2. 0 : Normal (Non-inverted) 1 : Inverted	0 (0, 1)
Z2-11 (856D)	Digital Input 3 Invert Select	Inverts the output of the function selected in Digital Input 3. 0 : Normal (Non-inverted) 1 : Inverted	0 (0, 1)
Z2-12 (856E)	Digital Input 4 Invert Select	Inverts the output of the function selected in Digital Input 4. 0 : Normal (Non-inverted) 1 : Inverted	0 (0, 1)
Z2-13 (856F)	Digital Input 5 Invert Select	Inverts the output of the function selected in Digital Input 5. 0 : Normal (Non-inverted) 1 : Inverted	0 (0, 1)
Z2-14 (8570)	Digital Input 6 Invert Select	Inverts the output of the function selected in Digital Input 6. 0 : Normal (Non-inverted) 1 : Inverted	0 (0, 1)
Z2-15 (8571)	Digital Input 7 Invert Select	Inverts the output of the function selected in Digital Input 7. 0 : Normal (Non-inverted) 1 : Inverted	0 (0, 1)
Z2-16 (8572)	Digital Input 8 Invert Select	Inverts the output of the function selected in Digital Input 8. 0 : Normal (Non-inverted) 1 : Inverted	0 (0, 1)
Z2-23 (8579)	Digital Output 7 (TB1 1~3)	Sets the function for bypass digital output 7. Normally Open: TB1 - Terminals 2 and 3 Normally Closed: TB1 - Terminals 2 and 1	7 (0 - 99)
Z2-24 (857A)	Digital Output 8 (TB1 4~6)	Sets the function for bypass digital output 8. Normally Open: TB1 - Terminals 5 and 6 Normally Closed: TB1 - Terminals 5 and 4	10 (0 - 99)
Z2-25 (857B)	Digital Output 9 (TB1 7~9)	Sets the function for bypass digital output 9. Normally Open: TB1 - Terminals 8 and 9 Normally Closed: TB1 - Terminals 8 and 7	12 (0 - 99)
Z2-26 (857C)	Digital Output 10 (TB1 10~12)	Sets the function for bypass digital output 10. Normally Open: TB1 - Terminals 11 and 12 Normally Closed: TB1 - Terminals 11 and 10	15 (0 - 99)

No. (Hex.)	Name	Description	Default (Range)
Z2-30 (8580)	Analog Input Signal Level Select	Sets the input signal level for the analog input on the bypass control board (A2) Terminal TB4-2. 0 : 0 to 10V (Lower Limit at 0) 2 : 4 to 20 mA 3 : 0 to 20 mA	0 (0 - 3)
Z2-32 (8582)	Analog Input Gain Setting	Sets the gain of the analog signal input to the analog input on the bypass control board (A2) Terminal TB4-2.	100.0% (-999.9 - +999.9%)
Z2-33 (8583)	Analog Input Bias Setting	Sets the bias of the analog signal input to the analog input on the bypass control board (A2) Terminal TB4-2.	0.0% (-999.9 - +999.9%)

■ Z2-xx: Digital Input Setting Values

Setting Value	Function	Description
0	Not Used	Use this setting for unused terminals or to use terminals in through mode.
1	Drive S1 Passthrough	Simulates a digital input on drive digital input terminal S1. Use *H1-01 [Terminal S1 Function Selection]* to program the function.
2	Drive S2 Passthrough	Simulates a digital input on drive digital input terminal S2. Use *H1-02 [Terminal S2 Function Selection]* to program the function.
3	Drive S3 Passthrough	Simulates a digital input on drive digital input terminal S3. Use *H1-03 [Terminal S3 Function Selection]* to program the function.
4	Drive S4 Passthrough	Simulates a digital input on drive digital input terminal S4. Use *H1-04 [Terminal S4 Function Selection]* to program the function.
5	Drive S5 Passthrough	Simulates a digital input on drive digital input terminal S5. Use *H1-05 [Terminal S5 Function Selection]* to program the function.
6	Drive S6 Passthrough	Simulates a digital input on drive digital input terminal S6. Use *H1-06 [Terminal S6 Function Selection]* to program the function.
7	Drive S7 Passthrough	Simulates a digital input on drive digital input terminal S7. Use *H1-07 [Terminal S7 Function Selection]* to program the function.
8	Drive S8 Passthrough	Simulates a digital input on drive digital input terminal S8. Use *H1-08 [Terminal S8 Function Selection]* to program the function.
21	Run (AUTO)	Starts and stops the bypass.
22	Run Enable - Safety (NC)	Stops the bypass. Normally closed signal. OPEN : If there is no Run command, the keypad will show *Safety Open*. If a Run command is present, the alarm LED will flash and the keypad will show *SAFE - Safety Open*. CLOSED : PID control enabled
23	Run Interlock (BAS)	Stops the drive and triggers alarm *AL02*. Normally closed signal. OPEN : When no Run command is present, the keypad does not show a message. If a Run command is present, the alarm LED will flash and the *AL02 - Interlock Open* alarm will show on the keypad. CLOSED : Normal operation
24	Remote Transfer to Bypass	Forces the bypass into Bypass Mode. OPEN : Bypass will operate in its selected mode (Drive or Bypass). CLOSED : Forces the bypass to operate in Bypass Mode. If the drive is running, it will stop the drive and switch to bypass operation.
25	Emergency Override Bypass	Forces the bypass to operate in Bypass Mode. OPEN : Normal operation CLOSED : Forces the bypass to run in Bypass Mode. Run commands and HAND/OFF/AUTO status do not have an effect. The bypass will ignore the faults and alarms set to ignore in *S6-11 to S6-20*.
26	Emergency Override Drive (FWD)	Forces the bypass to operate in the forward direction in Drive Mode. OPEN : Normal operation CLOSED : Forces the bypass run in the forward direction in Drive Mode. Run commands and HAND/OFF/AUTO status do not have an effect. The bypass will ignore the faults and alarms set to ignore in *S6-11 to S6-20*.
27	Motor OR Select	Sets the command for the bypass to operate motor 1 or motor 2. OPEN : Motor 1 is in operation. CLOSED : Motor 2 is in operation.
28	Motor AND Select	Sets the command for the bypass to operate motor 1 and motor 2 at the same time. OPEN : Motor 1 only. CLOSED : Motor 1 AND Motor 2 are in operation.
29	External Overload Motor 1 (NC)	Input for an external motor overload relay. Normally closed signal. OPEN : All operation stops. The keypad shows fault *FB06 - External Overload Motor 1*. CLOSED : Normal operation.
30	External Overload Motor 2 (NC)	Input for an external motor overload relay (Motor 2). Normally closed signal. OPEN : All operation stops. The keypad shows fault *FB07 - External Overload Motor 2*. CLOSED : Normal operation.
31	HAND Select	Selects HAND Mode from the digital inputs instead of the keypad.

Setting Value	Function	Description
32	AUTO Select	Selects AUTO Mode from the digital inputs instead of the keypad.
33	Drive/Bypass Select	Sets the bypass to operate in Bypass Mode or Drive Mode. OPEN : Drive Mode Selected CLOSED : Bypass Mode Selected
34	Fault Reset	Resets any faults that are present. OPEN : Normal operation CLOSED : Reset faults
35	External Fault (EF0)	Forces the drive into an *EF0* fault condition. OPEN : Normal operation CLOSED : Force *EF0* fault in the drive
36	External Fault (EFB)	Triggers external fault *EFB* on the bypass. OPEN : Normal operation CLOSED : Force *FB03 - External Fault Bypass* fault.
37	Run Reverse (AUTO)	Starts and stops the bypass in reverse. OPEN : Stop/Fwd operation CLOSED : Reverse drive operation
38	Fire Stat Switch (NC)	Stops the drive from running and shows “Fire Stat” on the keypad. OPEN : If there is no Run command present, the keypad will show “Fire Stat Open“. If a Run command is present, the alarm LED will flash and the keypad will show the alarm *FIRE_ST Fire Stat Open*. CLOSED : Normal operation
39	Freeze Stat Switch (NC)	Stops the drive from running and shows “Freeze Stat” on the keypad. OPEN : If there is no Run command present, the keypad will show “Smoke Alarm Active“. If a Run command is present, the alarm LED will flash and the keypad will show the alarm *SMK_ALRM - Smoke Alarm Active*. CLOSED : Normal operation
40	Smoke Alarm (NC)	Stops the drive from running and shows “Smoke Alarm Active” on the keypad. OPEN : If there is no Run command present, the keypad will show “Smoke Alarm Active“. If a Run command is present, the alarm LED will flash and the keypad will show the alarm *SMK_ALRM - Smoke Alarm Active*. CLOSED : Normal operation
41	OverPressure Switch (NC)	Stops the drive from running and shows “Over Pressure Detected” on the keypad. OPEN : If there is no Run command present, the keypad will show “Over Pressure Detected“. If a Run command is present, the alarm LED will flash and the keypad will show the alarm *OV_PRESS - Over Pressure Detected*. CLOSED : Normal operation
42	Low Suction Switch (NC)	Stops the drive from running and shows “Low Suction Detected” on the keypad. OPEN : If there is no Run command present, the keypad will show “Low Suction Detected“. If a Run command is present, the alarm LED will flash and the keypad will show the alarm *LOW_SUCT - Low Suction Detected*. CLOSED : Normal operation
43	Vibration Switch (NC)	Stops the drive from running and shows “Vibration Detected” on the keypad. OPEN : If there is no Run command present, the keypad will show “Vibration Detected“. If a Run command is present, the alarm LED will flash and the keypad will show the alarm *VIBRATION - Vibration Detected*. CLOSED : Normal operation
44	Emergency Override Drive (REV)	Forces the bypass to operate in Drive Mode in the reverse direction. OPEN : Normal operation CLOSED : Forces the bypass run in the Drive Mode in the reverse direction. Run commands and HAND/OFF/AUTO status do not have an effect. The bypass will ignore the faults and alarms set to ignore in *S6-11 to S6-20*. You must set *b1-04= 0 [Reverse Operation Selection = Reverse Enabled]* to use this function.
45	Serial Hardware Test (RS-485)	Sets the function for the bypass control to self-test the RS-485 serial communications operation. OPEN : Normal operation CLOSED : Do the communications test
46	Low City Pressure	Indicates that sufficient or insufficient pressure is present on the inlet to the pump. Used mainly for pressure booster situations. OPEN : Normal operation (operation automatically resumes) CLOSED : Low City Pressure Alarm, operation stops
47	Motor Preheat	Sets the command to apply the motor pre-heat current. Use *b2-09 [Pre-heat Current 2]* to adjust. OPEN : Normal Operation CLOSED : Motor Preheat current applied during OFF operation.

Setting Value	Function	Description
48	Low Water (NC)	This is a normally-closed signal. When the signal is open, the bypass will not run or it will stop the bypass if it is already running. OPEN : If running, drive or bypass will stop and the keypad will show the *LWL – Low Water Level* alarm. If not running, the keypad will show the *LWL – Low Water Level* status-line message and Run is prohibited. CLOSED : PID control enabled **Note:** If the "Digital Input Invert Select" parameter for this terminal is set to *[1 – Inverted]*, operation will be opposite of what is described above.
49	High Water (NC)	This is a normally-closed signal. When the signal is open, the bypass will not run or it will stop the bypass if it is already running. OPEN : If running, drive or bypass will stop and the keypad will show the *HWL – High Water Level* alarm. If not running, the keypad will show the *HWL – High Water Level* status-line message and Run is prohibited. CLOSED : Reservoir/Tank is filled to normal level – Normal operation allowed. **Note:** If the "Digital Input Invert Select" parameter for this terminal is set to *[1 – Inverted]*, operation will be opposite of what is described above.

■ Z2-xx: Digital Output Setting Values

Setting Value	Function	Description
0	Serial Communication Control	Activates when *b1-01 = 2 [Frequency Reference Selection 1 = Serial Communications]*, and/or *b1-02 = 2 or 8 [Run Command Selection 1 = Serial Communications or AUTO Command + Serial Run]* to set the bypass for control by serial communications. **Note:** This does not apply when Option PCB-based serial communications control the bypass.
1	K1 Drive Input Contactor	Active when the K1 (Drive Input Power) contactor is energized.
2	K2 Drive Output Contactor	Active when the K2 (Drive Output) contactor is energized.
3	K3 Bypass Contactor	Active when the K3 (Bypass Run) contactor is energized.
4	K4 Motor 1 Contactor	Active when the K4 (Motor 1) contactor is energized.
5	K5 Motor 2 Contactor	Active when the K5 (Motor 2) contactor is energized.
6	READY	Active when the system is ready to operate. ON : System is ready to operate OFF : System is faulted, in Programming Mode, or one of the safety digital inputs is open
7	RUN Active	Active when the system is running in Drive Mode or Bypass Mode.
8	Drive RUN active	The digital output activates when the system is in Drive Mode and the FP605 drive is running. ON : Running in Drive Mode OFF : Not running or in Bypass Mode
9	Bypass RUN active	The digital output activates when the system is in Bypass Mode and is running. Contactor K3 is closed. ON : Running in Bypass Mode OFF : Not running or in Drive Mode
10	HAND mode Active	The digital output activates when the system is running in HAND Mode during Drive Mode and Bypass Mode. ON : Running in HAND Mode OFF : Not running or in AUTO Mode
11	OFF mode Active	The digital output activates when the HAND/OFF/AUTO selection is in OFF Mode or if system is faulted. It is also active when in Emergency Override Mode. ON : System is in OFF Mode or is faulted OFF : HAND Mode, AUTO Mode (even if not running), Emergency Override.
12	Auto mode Active	The digital output activates when the HAND/OFF/AUTO selection is in AUTO Mode. It will activate when the system is running and when the system is not running and in Drive Mode and Bypass Mode. ON : System is in AUTO Mode OFF : HAND Mode, OFF Mode, Faulted, Emergency Override
13	Drive Mode Selected	The digital output activates when Drive Mode is selected. It stays active during Remote Transfer to Bypass, Emergency Override Bypass, Energy Savings, Fault condition, and when the system is not running. ON : Drive Mode is selected OFF : Bypass Mode is selected
14	Bypass Mode Selected	The digital output activates when Bypass Mode is selected. It stays active during Emergency Override Drive, Fault condition, and when the system is not running. ON : Bypass Mode is selected OFF : Drive Mode is selected
15	Fault Active	Set when there is an active Drive fault or Bypass fault.
16	Drive Fault Active	There is a fault in the FP605 drive.
17	Bypass Fault Active	There is a fault in the bypass.

Setting Value	Function	Description
18	Auto Transfer Active	There is a drive fault that activated Auto Transfer to Bypass.
19	Serial Run Active	Serial Communications is commanding a RUN.
20	Damper Actuator Output	System commanded to RUN in Drive Mode or Bypass Mode.
21	ON Always	This digital output is always active.
22	Loss of Load Detected	The motor current is less than the set value/values.
23	Run Verify Active	The digital output closes when the drive or bypass output current is more than 10% of *E2-01*. The digital output opens when the drive or bypass output current is less than 5% of *E2-01*.
24	Soft Starter Run Command	Controls the Run command to the soft starter. Use *Z1-42 to Z1-44 [Soft Starter Selection to Soft Starter Rampdown Timeout]* to configure the soft starter. Use this setting when a soft-starter is part of the bypass package.
25	Safeties Closed	All of the programmed safety digital inputs are satisfied.
26	Mirror FP605 M1-M2	The digital output activates when the FP605 drive digital output (M1-M2) is closed. ON : Digital Output M1-M2 on FP605 is closed OFF : Digital Output M1-M2 on FP605 is open
27	Mirror FP605 M3-M4	The digital output activates when the FP605 drive digital output (M3-M4) is closed. ON : Digital Output M3-M4 on FP605 is closed OFF : Digital Output M3-M4 on FP605 is open
28	Mirror FP605 MD-ME-MF	The digital output activates when the FP605 drive digital output (MD-ME-MF) is closed. ON : Digital Output MD-ME-MF on FP605 is closed OFF : Digital Output MD-ME-MF on FP605 is open
99	Not Used	This setting allows serial communications to control the output.

◆ Z3: Bypass Control Serial Comm

No. (Hex.)	Name	Description	Default (Range)
Z3-12 (850B)	Network Digital Inputs	Enables and disables control of the physical digital inputs of the bypass and the drive over a network. When this is enabled, it is not necessary to wire to the physical digital input. 0 : Disabled 1 : Enabled	0 (0, 1)
Z3-13 (850C)	BACnet Register Retention	Sets what to restore when you lose power then reapply power. **WARNING!** *Sudden Movement Hazard. Clear all personnel from the drive, motor, and machine area before you reapply power. If you set this parameter to 2 or 3, the bypass unit can start before it receives a valid network message. Failure to obey can cause injury to personnel.* 0 : Disabled 1 : Restore Frequency Reference Only 2 : Restore Commands Only 3 : Restore Commands and Freq Ref	0 (0 - 3)
Z3-16 (850F)	Apogee Run Enable LDO35	This parameter is applicable only when *H5-08 = 2 [Communication Protocol Selection = Apogee/P1]*. Sets whether the data in point LDO 35 will have an effect on the ability of the bypass to run. 0 : Disabled 1 : Enabled	0 (0, 1)

4.17 U: Monitors

◆ U1: Operation Status Monitors

No. (Hex.)	Name	Description	MFAO Signal Level
U1-01 (0040)	Frequency Reference (AI)	Shows the frequency reference value. Parameter *o1-03 [Keypad Display Unit Selection]* sets the display units. Unit: 0.01 Hz	10 V = Maximum frequency (0 V to +10 V)
U1-02 (0041)	Output Frequency	Shows the output frequency. Parameter *o1-03 [Keypad Display Unit Selection]* sets the display units. Unit: 0.01 Hz	10 V = Maximum frequency (0 V to +10 V)
U1-03 (0042)	Output Current	Shows the drive unit output current. The keypad shows the value of *U1-03* in amperes (A). When you use serial communications to show the monitor, the current is "8192 = drive rated current (A)". Use the formula: "Numerals being displayed / 8192 × drive rated current (A)" to use the serial communication current value shown in the monitor. Use monitor *Ub-01* to show output current for both Drive and Bypass Modes. Unit: Determined by the drive model. • 0.01 A: 2011 to 2046, 4005 to 4014 • 0.1 A: 2059 to 2273, 4021 to 4302	10 V = Drive rated current
U1-04 (0043)	Control Method	Shows the drive control method. 0 : V/f Control	No signal output available
U1-06 (0045)	Output Voltage Ref	Shows the output voltage reference. Unit: 0.1 V	208/240 V: 10 V = 200 Vrms 480 V: 10 V = 400 Vrms
U1-07 (0046)	DC Bus Voltage	Shows the DC bus voltage. Unit: 1 V	208/240 V: 10 V = 400 V 480 V: 10 V = 800 V
U1-08 (0047)	Output Power	Shows the internally-calculated output power. Unit: Determined by the drive model. • 0.01 kW: 2011 to 2046, 4005 to 4014 • 0.1 kW: 2059 to 2273, 4021 to 4302	10 V: Drive capacity (motor rated power) kW (-10 V to +10 V)
U1-10 (0049)	Input Terminal Status	Shows the status of the MFDI terminal where 1 = (ON) and 0 = (OFF). For example, *U1-10* shows "00000011" when terminals S1 and S2 are ON. bit0 : Terminal S1 (MFDI 1) bit1 : Terminal S2 (MFDI 2) bit2 : Terminal S3 (MFDI 3) bit3 : Terminal S4 (MFDI 4) bit4 : Terminal S5 (MFDI 5) bit5 : Terminal S6 (MFDI 6) bit6 : Terminal S7 (MFDI 7) bit7 : Terminal S8 (MFDI 8)	No signal output available
U1-11 (004A)	Output Terminal Status	Shows the status of the MFDO terminal where 1 = (ON) and 0 = (OFF). For example, *U1-11* shows "00000011" when terminals M1 and M3 are ON. **Note:** When *H2-xx = 100 to 1C4 [Inverse Output of Function]*, the monitor will show the value before inversion. bit 0 : Terminals M1-M2 bit 1 : Terminals M3-M4 bit 2 : Terminals MD-ME-MF bit 3 : Not used (normal value of 0). bit 4 : Not used (normal value of 0). bit 5 : Not used (normal value of 0). bit 6 : Not used (normal value of 0). bit 7 : Fault relay MA/MB-MC	No signal output available
U1-12 (004B)	Drive Status	Shows drive status where 1 = ON and 0 = OFF. For example, *U1-12* shows "00000101" during run with the Reverse Run command. bit0 : During Run bit1 : During zero-speed bit2 : During reverse bit3 : During fault reset signal input bit4 : During speed agreement bit5 : Drive ready bit6 : During minor fault detection bit7 : During fault detection	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U1-13 (004E)	Terminal A1 Level	Shows the signal level of terminal A1. Unit: 0.1%	10 V = 100% (0 V to +10 V)
U1-14 (004F)	Terminal A2 Level	Shows the signal level of terminal A2. Unit: 0.1%	10 V = 100% (0 V to +10 V)
U1-15 (0050)	Terminal A3 Level	Shows the signal level of terminal A3. Unit: 0.1%	10 V = 100% (0 V to +10 V)
U1-16 (0053)	SFS Output Frequency	Shows the output frequency after soft start. Shows the frequency with acceleration and deceleration times and S-curves. Parameter *o1-03 [Keypad Display Unit Selection]* sets the display units. Unit: 0.01 Hz	10 V = Maximum frequency (0 V to +10 V)
U1-18 (0061)	oPE Fault Parameter	Shows the parameter number that caused the *oPE02 [Parameter Range Setting Error]* or *oPE08 [Parameter Selection Error]*.	No signal output available
U1-19 (0066)	Serial Error Code	Shows the contents of the serial communication error where 1 = “error” and 0 = “no error”. For example, *U1-19* shows “00000001” when there is a CRC error. bit0 : CRC Error bit1 : Data Length Error bit2 : Not used (normal value of 0). bit3 : Parity Error bit4 : Overrun Error bit5 : Framing Error bit6 : Timed Out bit7 : Not used (normal value of 0).	No signal output available
U1-24 (007D)	Input Pulse Monitor	Shows the frequency to pulse train input terminal RP. Unit: 1 Hz	Determined by H6-02
U1-25 (004D)	SoftwareNumber Flash	Shows the FLASH ID.	No signal output available
U1-26 (005B)	SoftwareNumber ROM	Shows the ROM ID.	No signal output available
U1-50 (1199) Expert	Virtual Analog Input	Shows the virtual analog input value.	Determined by H7-40
U1-60 (1089)	System Setpoint	Shows the PID Setpoint. Unit: 0.01% **Note:** Parameters *b5-46 [PID Unit Display Selection]*, *b5-38 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, range, and resolution.	No signal output available
U1-61 (108A)	System Feedback	Shows the PID Feedback. Unit: 0.01% **Note:** Parameters *b5-46 [PID Unit Display Selection]*, *b5-38 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, range, and resolution.	No signal output available
U1-64 (108D)	Motor Speed	Shows the absolute value of the parameter *U1-02 [Output Frequency]* converted to RPM. Unit: 1 RPM	No signal output available
U1-99 (3BAE)	Anti-No-Flow Timer	Shows the value of the anti-no-flow timer. When this value is at the *Y2-24 [Anti-No-Flow Detection Time]* setting, the anti-no-flow feature starts to decrease the output frequency. Unit: 0.1 s	No signal output available

◆ U2: Fault Trace

No. (Hex.)	Name	Description	MFAO Signal Level
U2-01 (0080)	Current Fault	Shows the fault that the drive has when viewing the monitor.	No signal output available
U2-02 (0081)	Previous Fault	Shows the fault that occurred most recently.	No signal output available
U2-03 (0082)	Freq Reference@Fault	Shows the frequency reference at the fault that occurred most recently. Use *U1-01 [Frequency Reference]* to monitor the frequency reference value. Unit: 0.01 Hz	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U2-04 (0083)	Output Freq @ Fault	Shows the output frequency at the fault that occurred most recently. Use *U1-02 [Output Frequency]* to monitor the actual output frequency. Unit: 0.01 Hz	No signal output available
U2-05 (0084)	Output Current@Fault	Shows the motor current at the fault that occurred most recently. Use *Ub-01 [Motor Current]* to monitor the output current. The keypad shows the value of *Ub-01* in amperes (A). When you use serial communications to show the monitor, the current is "8192 = drive rated current (A)". Use the formula: "Numerals being displayed / 8192 × drive rated current (A)" to use the serial communication current value shown in the monitor. Unit: Determined by the drive model. • 0.01 A: 2011 to 2046, 4005 to 4014 • 0.1 A: 2059 to 2273, 4021 to 4302	No signal output available
U2-07 (0086)	Output Voltage@Fault	Shows the output voltage reference at the fault that occurred most recently. Use *U1-06 [Output Voltage Ref]* to monitor the output voltage reference. Unit: 0.1 V	No signal output available
U2-08 (0087)	DC Bus Voltage@Fault	Shows the DC bus voltage at the fault that occurred most recently. Use *U1-07 [DC Bus Voltage]* to monitor the DC bus voltage. Unit: 1 V	No signal output available
U2-09 (0088)	Output Power @ Fault	Shows the output power at the fault that occurred most recently. Use *U1-08 [Output Power]* to monitor the output power. Unit: 0.1 kW	No signal output available
U2-11 (008A)	Byp Inp Terminal Status @ Fault	Shows the status of the bypass digital input terminals at the most recent fault where 1 = (ON) and 0 = (OFF). For example, *U2-11* shows "00000011" when terminals TB2-1 and TB2-2 are ON. Use *Ub-02 [Bypass Digital Input Status]* to monitor the terminal status. bit 0 : Digital Input 1 (TB2-1) bit 1 : Digital Input 2 (TB2-2) bit 2 : Digital Input 3 (TB2-3) bit 3 : Digital Input 4 (TB2-4) bit 4 : Digital Input 5 (TB2-5) bit 5 : Digital Input 6 (TB2-6) bit 6 : Digital Input 7 (TB2-7) bit 7 : Digital Input 8 (TB2-8)	No signal output available
U2-12 (008B)	Byp Relay Status @ Fault	Shows the status of the bypass digital output terminals at the most recent fault where 1 = (ON) and 0 = (OFF). For example, *U2-12* shows "00000011" when terminals M1 and M3 are ON. Use *Ub-02 [Bypass Digital Output Status]* to monitor the terminal status. bit 0 : K1 (Input Contactor) bit 1 : K2 (Output Contactor) bit 2 : K3 (Bypass Contactor) bit 3 : K4 (Motor 1 Output Contactor) bit 4 : K5 (Motor 2 Output Contactor) bit 5 : Fan Output Relay bit 6 : Digital Output 7 (TB1 1~3) (Z2-23) bit 7 : Digital Output 8 (TB1 4~6) (Z2-24)	No signal output available
U2-13 (008C)	Bypass Status @ Fault	Shows the status of the bypass at the most recent fault where 1 = (ON) and 0 = (OFF). For example, *U2-13* shows "00000001" during run. Use *Ub-05 [Bypass Status 1]* to monitor the bypass. bit 0 : Hand Mode Active bit 1 : Off Mode Active bit 2 : Auto Mode Active bit 3 : Drive Mode bit 4 : Bypass Mode bit 5 : Emergency Override Bypass bit 6 : Emergency Override Drive bit 7 : Safety Open	No signal output available
U2-14 (008D)	Elapsed Time @ Fault	Shows the cumulative operation time of the drive at the fault that occurred most recently. Use *U4-01 [Cumulative Ope Time]* to monitor the cumulative operation time. Unit: 1 h	No signal output available
U2-15 (07E0)	SFS Output @ Fault	Shows the output frequency after soft start at the fault that occurred most recently. Use *U1-16 [SFS Output Frequency]* to monitor the output frequency after soft start. Unit: 0.01 Hz	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U2-16 (07E1)	q-Axis Current@Fault	Shows the q-Axis current of the motor at the fault that occurred most recently. Use *U6-01 [Iq Secondary Current]* to monitor the q-Axis current of the motor. Unit: 0.1 %	No signal output available
U2-20 (008E)	Heatsink Temp @Fault	Shows the heatsink temperature at the fault that occurred most recently. Use *U4-08 [Heatsink Temperature]* to monitor the temperature of the heatsink. Unit: 1 °C	No signal output available
U2-30 (3008)	Fault 1 YYYY	Shows the year when the most recent fault occurred.	No signal output available
U2-31 (3009)	Fault 1 MMDD	Shows the month and day when the most recent fault occurred.	No signal output available
U2-32 (300A)	Fault 1 HHMM	Shows the time when the most recent fault occurred.	No signal output available

◆ U3: Fault History

No. (Hex.)	Name	Description	MFAO Signal Level
U3-01 (0090)	1st MostRecent Fault	Shows the fault history of the most recent fault. **Note:** The drive saves this fault history to two types of registers at the same time for serial communications.	No signal output available
U3-02 (0091)	2nd MostRecent Fault	Shows the fault history of the second most recent fault. **Note:** The drive saves this fault history to two types of registers at the same time for serial communications.	No signal output available
U3-03 (0092)	3rd MostRecent Fault	Shows the fault history of the third most recent fault. **Note:** The drive saves this fault history to two types of registers at the same time for serial communications.	No signal output available
U3-04 (0093)	4th MostRecent Fault	Shows the fault history of the fourth most recent fault. **Note:** The drive saves this fault history to two types of registers at the same time for serial communications.	No signal output available
U3-05 (0804)	5th MostRecent Fault	Shows the fault history of the fifth most recent fault.	No signal output available
U3-06 (0805)	6th MostRecent Fault	Shows the fault history of the sixth most recent fault.	No signal output available
U3-07 (0806)	7th MostRecent Fault	Shows the fault history of the seventh most recent fault.	No signal output available
U3-08 (0807)	8th MostRecent Fault	Shows the fault history of the eighth most recent fault.	No signal output available
U3-09 (0808)	9th MostRecent Fault	Shows the fault history of the ninth most recent fault.	No signal output available
U3-10 (0809)	10th MostRecentFault	Shows the fault history of the tenth most recent fault.	No signal output available
U3-11 (0094)	ElapsedTime@1stFault	Shows the cumulative operation time when the most recent fault occurred. **Note:** The drive saves this cumulative operation time to two types of registers at the same time for serial communications. Unit: 1 h	No signal output available
U3-12 (0095)	ElapsedTime@2ndFault	Shows the cumulative operation time when the second most recent fault occurred. **Note:** The drive saves this cumulative operation time to two types of registers at the same time for serial communications. Unit: 1 h	No signal output available
U3-13 (0096)	ElapsedTime@3rdFault	Shows the cumulative operation time when the third most recent fault occurred. **Note:** The drive saves this cumulative operation time to two types of registers at the same time for serial communications. Unit: 1 h	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U3-14 (0097)	ElapsedTime@4thFault	Shows the cumulative operation time when the fourth most recent fault occurred. **Note:** The drive saves this cumulative operation time to two types of registers at the same time for serial communications. Unit: 1 h	No signal output available
U3-15 (080E)	ElapsedTime@5thFault	Shows the cumulative operation time when the fifth most recent fault occurred. Unit: 1 h	No signal output available
U3-16 (080F)	ElapsedTime@6thFault	Shows the cumulative operation time when the sixth most recent fault occurred. Unit: 1 h	No signal output available
U3-17 (0810)	ElapsedTime@7thFault	Shows the cumulative operation time when the seventh most recent fault occurred. Unit: 1 h	No signal output available
U3-18 (0811)	ElapsedTime@8thFault	Shows the cumulative operation time when the eighth most recent fault occurred. Unit: 1 h	No signal output available
U3-19 (0812)	ElapsedTime@9thFault	Shows the cumulative operation time when the ninth most recent fault occurred. Unit: 1 h	No signal output available
U3-20 (0813)	ElapsedTime@10 Fault	Shows the cumulative operation time when the tenth most recent fault occurred. Unit: 1 h	No signal output available
U3-21 (300B)	Fault 1 YYYY	Shows the year when the most recent fault occurred.	No signal output available
U3-22 (300C)	Fault 1 MMDD	Shows the month and day when the most recent fault occurred.	No signal output available
U3-23 (300D)	Fault 1 HHMM	Shows the time when the most recent fault occurred.	No signal output available
U3-24 (300E)	Fault 2 YYYY	Shows the year when the second most recent fault occurred.	No signal output available
U3-25 (300F)	Fault 2 MMDD	Shows the month and day when the second most recent fault occurred.	No signal output available
U3-26 (3010)	Fault 2 HHMM	Shows the time when the second most recent fault occurred.	No signal output available
U3-27 (3011)	Fault 3 YYYY	Shows the year when the third most recent fault occurred.	No signal output available
U3-28 (3012)	Fault 3 MMDD	Shows the month and day when the third most recent fault occurred.	No signal output available
U3-29 (3013)	Fault 3 HHMM	Shows the time when the third most recent fault occurred.	No signal output available
U3-30 (3014)	Fault 4 YYYY	Shows the year when the fourth most recent fault occurred.	No signal output available
U3-31 (3015)	Fault 4 MMDD	Shows the month and day when the fourth most recent fault occurred.	No signal output available
U3-32 (3016)	Fault 4 HHMM	Shows the time when the fourth most recent fault occurred.	No signal output available
U3-33 (3017)	Fault 5 YYYY	Shows the year when the fifth most recent fault occurred.	No signal output available
U3-34 (3018)	Fault 5 MMDD	Shows the month and day when the fifth most recent fault occurred.	No signal output available
U3-35 (3019)	Fault 5 HHMM	Shows the time when the fifth most recent fault occurred.	No signal output available
U3-36 (301A)	Fault 6 YYYY	Shows the year when the sixth most recent fault occurred.	No signal output available
U3-37 (301B)	Fault 6 MMDD	Shows the month and day when the sixth most recent fault occurred.	No signal output available
U3-38 (301C)	Fault 6 HHMM	Shows the time when the sixth most recent fault occurred.	No signal output available
U3-39 (301D)	Fault 7 YYYY	Shows the year when the seventh most recent fault occurred.	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U3-40 (301E)	Fault 7 MMDD	Shows the month and day when the seventh most recent fault occurred.	No signal output available
U3-41 (301F)	Fault 7 HHMM	Shows the time when the seventh most recent fault occurred.	No signal output available
U3-42 (3020)	Fault 8 YYYY	Shows the year when the eighth most recent fault occurred.	No signal output available
U3-43 (3021)	Fault 8 MMDD	Shows the month and day when the eighth most recent fault occurred.	No signal output available
U3-44 (3022)	Fault 8 HHMM	Shows the time when the eighth most recent fault occurred.	No signal output available
U3-45 (3023)	Fault 9 YYYY	Shows the year when the ninth most recent fault occurred.	No signal output available
U3-46 (3024)	Fault 9 MMDD	Shows the month and day when the ninth most recent fault occurred.	No signal output available
U3-47 (3025)	Fault 9 HHMM	Shows the time when the ninth most recent fault occurred.	No signal output available
U3-48 (3026)	Fault 10 YYYY	Shows the year when the tenth most recent fault occurred.	No signal output available
U3-49 (3027)	Fault 10 MMDD	Shows the month and day when the tenth most recent fault occurred.	No signal output available
U3-50 (3028)	Fault 10 HHMM	Shows the time when the tenth most recent fault occurred.	No signal output available

◆ U4: Maintenance Monitors

No. (Hex.)	Name	Description	MFAO Signal Level
U4-01 (004C)	Cumulative Ope Time	Shows the cumulative operation time of the drive. Use parameter *o4-01 [Elapsed Operating Time Setting]* to reset this monitor. Use parameter *o4-02 [Elapsed Operating Time Selection]* to select the cumulative operation times from: • The time from when the drive is energized until it is de-energized. • The time at which the Run command is turned ON. The maximum value that the monitor will show is *99999*. After this value is more than *99999*, the drive automatically resets it and starts to count from *0* again. Unit: 1 h **Note:** The MEMOBUS/Modbus communication data is shown in 10 h units. Use register 0099H for data in 1 h units.	10 V: 99999 h
U4-02 (0075)	Num of Run Commands	Shows how many times that the drive has received a Run command. Use parameter *o4-13 [RUN Command Counter @ Initialize]* to reset this monitor. The maximum value that the monitor will show is *65535*. After this value is more than *65535*, the drive automatically resets it and starts to count from *0* again. Unit: 1	10 V: 65535 times
U4-03 (0067)	Cooling Fan Ope Time	Shows the cumulative operation time of the cooling fans. Use parameter *o4-03 [Fan Operation Time Setting]* to reset this monitor. The maximum value that the monitor will show is *99999*. After this value is more than *99999*, the drive automatically resets it and starts to count from *0* again. Unit: 1 h **Note:** The MEMOBUS/Modbus communication data is shown in 10 h units. Use register 009BH for data in 1 h units.	10 V: 99999 h
U4-04 (007E)	Cool Fan Maintenance	Shows the cumulative operation time of the cooling fans as a percentage of the replacement life of the cooling fans. Use parameter *o4-03 [Fan Operation Time Setting]* to reset this monitor. Unit: 1% **Note:** Replace the cooling fans when this monitor is 90%.	10 V: 100%

No. (Hex.)	Name	Description	MFAO Signal Level
U4-05 (007C)	CapacitorMaintenance	Shows the operation time of the electrolytic capacitors for the main circuit and control circuit as a percentage of the replacement life of the electrolytic capacitors. Use parameter *o4-05 [Capacitor Maintenance Setting]* to reset this monitor. Unit: 1% **Note:** Replace the electrolytic capacitor when this monitor is 90%.	10 V: 100%
U4-06 (07D6)	PreChargeRelayMainte	Shows the operation time of the soft charge bypass relay as a percentage of the replacement life of the soft charge bypass relay. Use parameter *o4-07 [Softcharge Relay Maintenance Set]* to reset this monitor. Unit: 1% **Note:** Replace the drive when this monitor is 90%.	10 V: 100%
U4-07 (07D7)	IGBT Maintenance	Shows the operation time of the IGBTs as a percentage of the replacement life of the IGBTs. Set parameter *o4-09 [IGBT Maintenance Setting]* to reset this monitor. Unit: 1% **Note:** Replace the drive when this monitor is 90%.	10 V: 100%
U4-08 (0068)	Heatsink Temperature	Shows the heatsink temperature of the drive. Unit: 1 °C	10 V: 100 °C
U4-09 (005E)	LED Check	Turns on the LED Status Ring and all of the keypad LEDs to make sure that the LEDs operate correctly. 1. Set *o2-24 = 0 [LED Light Function Selection = Enable Status Ring & Keypad LED]*. 2. Push (ENTER) with *U4-09* shown on the keypad. All LEDs on the keypad and LED Status Ring will turn on. **Note:** When Safety input 2 CH is open (STo), READY will flash.	No signal output available
U4-10 (005C)	kWh, Lower 4 Digits	Shows the lower 4 digits of the watt hour value for the drive. Unit: 1 kWh **Note:** The watt hour is displayed in 9 digits. Monitor *U4-11 [kWh, Upper 5 Digits]* shows the upper 5 digits and *U4-10* shows the lower 4 digits. Example for 12345678.9 kWh: *U4-10*: *678.9 kWh* *U4-11*: *12345 MWh*	No signal output available
U4-11 (005D)	kWh, Upper 5 Digits	Shows the upper 5 digits of the watt hour value for the drive. Unit: 1 MWh **Note:** Monitor *U4-11* shows the upper 5 digits and *U4-10 [kWh, Lower 4 Digits]* shows the lower 4 digits. Example for 12345678.9 kWh: *U4-10*: 678.9 kWh *U4-11*: 12345 MWh	No signal output available
U4-13 (07CF)	Peak Hold Current	Shows the hold value of the peak value (rms) for the drive output current. Use *U4-14 [PeakHold Output Freq]* to show the drive output frequency at the time that the drive holds the output current. The drive will hold the peak hold current at the next start up and restart of the power supply. The drive keeps the held value during baseblock (during stop). The keypad shows the value of *U4-13* in amperes (A). When you use serial communications to show the monitor, the current is "8192 = drive rated current (A)." Use the formula: "Numerals being displayed / 8192 × drive rated current (A)" to use the serial communication current value shown in the monitor. Unit: Determined by the drive model. • 0.01 A: 2011 to 2046, 4005 to 4014 • 0.1 A: 2059 to 2273, 4021 to 4302	No signal output available
U4-14 (07D0)	PeakHold Output Freq	Shows the output frequency at which the peak value (rms) of the drive output current is held. The peak hold current can be monitored by *U4-13 [Peak Hold Current]*. The peak hold output frequency will be cleared at the next startup and restart of the power supply. The drive keeps the value that was under hold during baseblock (during stop). Unit: 0.01 Hz	No signal output available
U4-16 (07D8)	Motor oL1 Level	Shows the integrated value of *oL1 [Motor Overload]* as a percentage of *oL1* detection level. Unit: 0.1%	10 V: 100%

No. (Hex.)	Name	Description	MFAO Signal Level
U4-18 (07DA)	Reference Source	Shows the selected frequency reference source. The keypad shows the frequency reference source as "XY-nn" as specified by these rules: X: Frequency reference • 1: *b1-01 [Frequency Reference Selection 1]* Y-nn: Frequency reference source • 0-01: Keypad (*d1-01 [Reference 1]*) • 1-00: Analog input (unassigned) • 1-01: MFAI terminal A1 • 1-02: MFAI terminal A2 • 1-03: MFAI terminal A3 • 2-02 to 2-17: Multi-step speed reference (*d1-02 to d1-17 [Reference 2 to 16, Jog Reference]*) • 3-01: Serial communications • 4-01: Communication option card • 7-01: Reserved • 9-01: Reserved • B-00: Hand Reference 1 (Analog) • B-01: Hand Reference 1 (*S5-05 [HAND Frequency Reference]*)	No signal output available
U4-19 (07DB)	Modbus FreqRef (dec)	Shows the frequency reference sent to the drive from the MEMOBUS/Modbus communications as a decimal. Unit: 0.01%	10 V: Maximum frequency (0 V to +10 V)
U4-20 (07DC)	Option Freq Ref (dec)	Shows the frequency reference sent to the drive from the communication option as a decimal.	10 V: Maximum frequency (0 V to +10 V)
U4-21 (07DD)	Run Command Source	Shows the selected Run command source. The keypad shows the Run command source as "XY-nn" as specified by these rules: X: Run command • 0: OFF • 1: AUTO • 2: HAND • 3: JOG, Emergency Override Y: Run command source • 0: Keypad • 1: Control circuit terminal • 3: Serial communications • 4: Communication option card • 7: Reserved nn: Run command limit status data • 00: No limit status. • 01: The Run command stayed ON when the drive stopped in Programming Mode. • 03: The Run command is in standby after the drive was energized until the soft charge bypass contactor turns ON. **Note:** The drive will detect *Uv1 [DC Bus Undervoltage]* or *Uv [Undervoltage]* if the soft charge bypass contactor does not turn ON after 10 s. • 04: Will not restart after run stop. • 05: An MFDI terminal cased a Fast stop or you pushed OFF on the keypad to ramp the motor to stop. • 06: *b1-17 = 0 [Run Command at Power Up = Disregard Existing RUN Command]*. • 07: During baseblock while coast to stop with timer. • 08: Frequency reference is less than *E1-09 [Minimum Output Frequency]* during baseblock. • 09: Waiting for the Enter command from PLC.	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U4-22 (07DE)	Modbus CmdData (hex)	Shows the operation signal (register 0001H) sent to the drive from MEMOBUS/Modbus communications as a 4-digit hexadecimal number (zero suppress). The keypad shows the operation signal as specified by these rules: bit 0 : Forward run/Stop bit 1 : Reverse run/Stop bit 2 : External fault bit 3 : Fault Reset bit 4 : Multi-function input 1 bit 5 : Multi-function input 2 bit 6 : Multi-function input 3 bit 7 : Multi-function input 4 bit 8 : Multi-function input 5 bit 9 : Multi-function input 6 bit A : Multi-function input 7 bit B : Not used (normal value of 0). bit C : Not used (normal value of 0). bit D : Not used (normal value of 0). bit E : Not used (normal value of 0). bit F : Not used (normal value of 0).	No signal output available
U4-23 (07DF)	Option CmdData (hex)	Shows the operation signal (register 0001H) sent to the drive from MEMOBUS/Modbus communications as a 4-digit hexadecimal number. The keypad shows the operation signal as specified by these rules: bit 0 : Forward run/Stop bit 1 : Reverse run/Stop bit 2 : External fault bit 3 : Fault Reset bit 4 : Multi-function input 1 bit 5 : Multi-function input 2 bit 6 : Multi-function input 3 bit 7 : Multi-function input 4 bit 8 : Multi-function input 5 bit 9 : Multi-function input 6 bit A : Multi-function input 7 bit B : Not used (normal value of 0). bit C : Not used (normal value of 0). bit D : Not used (normal value of 0). bit E : Not used (normal value of 0). bit F : Not used (normal value of 0).	No signal output available
U4-24 (07E6)	Number of Runs (Low)	Shows the lower 4 digits of the drive run count. **Note:** The drive run count is an 8-digit number. Monitor *U4-25 [Number of Runs(High)]* shows the upper 4 digits and *U4-24* shows the lower 4 digits.	No signal output available
U4-25 (07E7)	Number of Runs(High)	Shows the lower 4 digits of the drive run count. **Note:** The drive run count is an 8-digit number. Monitor *U4-25* shows the upper 4 digits and *U4-24 [Number of Runs (Low)]* shows the lower 4 digits.	No signal output available
U4-61 (3096) Expert	Total EMOVR Run Time	Shows the length of time that the drive operated in Emergency Override Mode. Unit: 1 min **Note:** • The maximum value is 60,000 min. • This monitor does not accumulate operation time when *S6-07 = 1 [EMOVR Fault Suppression Mode = Test Mode]*.	No signal output available
U4-75 (1BC4)	Comm Option Type	Displays the Hex address of the communication option currently connected to the drive. 1: Modbus TCP/IP (SI-EM3) 2: EtherNet/IP (SI-EN3) or PROFINET (SI-EP3) 9: DeviceNet (SI-N3) A: PROFIBUS (SI-P3) 11: LonWorks (SI-W3) 70: No Protocol Selected (JOHB-SMP3) 71: Modbus TCP/IP (JOHB-SMP3) 72: EtherNet/IP (JOHB-SMP3) 74: EtherCAT (JOHB-SMP3) 75: BACnet/IP (JOHB-SMP3) 78: PROFINET (JOHB-SMP3) FF: No option connected	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U4-76 (1BC5)	MAC Address1 1, 2	Displays the first and second octets of MAC address 1. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-77 (1BC6)	MAC Address1 3, 4	Displays the third and fourth octets of MAC address 1. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-78 (1BC7)	MAC Address1 5, 6	Displays the fifth and sixth octets of MAC address 1. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-79 (1BC8) Expert	MAC Address2 1, 2	Displays the first and second octets of MAC address 2. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-80 (1BC9) Expert	MAC Address2 3, 4	Displays the third and fourth octets of MAC address 2. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-81 (1BCA) Expert	MAC Address2 5, 6	Displays the fifth and sixth octets of MAC address 2. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-82 (1BCB) Expert	MAC Address3 1, 2	Displays the first and second octets of MAC address 3. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-83 (1BCC) Expert	MAC Address3 3, 4	Displays the third and fourth octets of MAC address 3. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available
U4-84 (1BCD) Expert	MAC Address3 5, 6	Displays the fifth and sixth octets of MAC address 3. **Note:** When you use a communication option other than JOHB-SMP3, this monitor shows "00-00".	No signal output available

◆ U5: PID Monitors

No. (Hex.)	Name	Description	MFAO Signal Level
U5-01 (0057)	PID Feedback	Shows the PID control feedback value. Unit: 0.01% **Note:** Parameters *b5-46 [PID Unit Display Selection]*, *b5-38 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, range, and resolution.	10 V = Maximum frequency (-10 V to +10 V)
U5-02 (0063)	PID Input	Shows the change between the PID setpoint and PID feedback (the quantity of PID input) as a percentage of the maximum output frequency. Unit: 0.01%	10 V: Maximum frequency (0 V to +10 V)
U5-03 (0064)	PID Output	Shows the PID control output as a percentage of the maximum output frequency. Unit: 0.01%	10 V: Maximum frequency (0 V to +10 V)
U5-04 (0065)	PID Setpoint	Shows the PID setpoint. Unit: 0.01% **Note:** Parameters *b5-46 [PID Unit Display Selection]*, *b5-38 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, range, and resolution.	10 V = Maximum frequency (-10 V to +10 V)
U5-05 (07D2)	PID DifferentialFdbk	Shows the PID differential feedback value as a percentage of the maximum output frequency. This monitor is available after you set *H3-02 or H3-10 = 16 [Terminal A1/A2 Function Selection = Differential PID Feedback]*. Unit: 0.01%	10 V = Maximum frequency (-10 V to +10 V)
U5-06 (07D3)	PID FdbkDif PID Fdbk	Shows the difference from calculating "*U5-05 [PID DifferentialFdbk] - U5-01[PID Feedback]*". Unit: 0.01% **Note:** *U5-01 [PID Feedback] = U5-06* when *H3-02 or H3-10 ≠ 16 [Terminal A1/A2 Function Selection ≠ Differential PID Feedback]*.	10 V = Maximum frequency (-10 V to +10 V)

No. (Hex.)	Name	Description	MFAO Signal Level
U5-07 (0072)	AUTO Mode Freq Ref	Shows the Frequency reference value at AUTO Mode. Unit: 0.01 Hz **Note:** Parameter *o1-03 [Frequency Display Unit Selection]* sets the display unit.	No signal output available
U5-08 (0073)	HAND Mode Freq Ref	Shows the Frequency reference value at HAND Mode. Unit: 0.01 Hz **Note:** Parameter *o1-03 [Frequency Display Unit Selection]* sets the display unit.	No signal output available
U5-14 (086B)	PID Out2 Upr4 Digits	Shows the custom PI output. Monitor *U5-14* shows the upper four digits and *U5-15 [PID Out2 Lwr4 Digits]* shows the lower four digits. The drive uses *b5-43 [PID Out2 Monitor MAX Upper4 Dig]* and *b5-44 [PID Out2 Monitor MAX Lower4 Dig]* to scale the monitors. Unit: 1 **Note:** Parameter *b5-41 [PID Output 2 Unit]* sets the display unit.	10 V = b5-43 × 10000
U5-15 (086C)	PID Out2 Lwr4 Digits	Shows the custom PI output. Monitor *U5-14* shows the upper four digits and *U5-15 [PID Out2 Lwr4 Digits]* shows the lower four digits. The drive uses *b5-43 [PID Out2 Monitor MAX Upper4 Dig]* and *b5-44 [PID Out2 Monitor MAX Lower4 Dig]* to scale the monitors. Unit: 0.01 **Note:** Parameter *b5-41 [PID Output 2 Unit]* sets the display unit.	b5-43 > 0: 10 V = 10000 b5-43 = 0: 10 V = b5-44
U5-16 (086D)	PI Aux Ctrl Feedback	Shows the PI Auxiliary Control Feedback level from the terminal set for *H3-xx = 27 [PI Auxiliary Control Feedback]*. Unit: PSI **Note:** Parameters *YF-21 [PI Aux Ctrl Level Unit Selection]* and *YF-22 [PI Aux Level Decimal Place Pos]* set the unit and resolution.	No signal output available
U5-17 (086E)	PI2 Control Setpoint	Shows the PI2 Control setpoint. **Note:** Parameters *S3-04 [PI2 Control Unit Selection]* and *S3-03 [PI2 Control Decimal Place Pos]* set the unit and resolution.	10 V = S3-02
U5-18 (086F)	PI2 Control Feedback	Shows the PI2 Control Feedback Level from the terminal set for *H3-xx = 26 [PI2 Control Feedback]*. **Note:** Parameters *S3-04 [PI2 Control Unit Selection]* and *S3-03 [PI2 Control Decimal Place Pos]* set the unit and resolution.	10 V = S3-02
U5-19 (0870)	PI2 Control Input	Shows the PI2 Control input (deviation between PI target and feedback). **Note:** Parameters *S3-04 [PI2 Control Unit Selection]* and *S3-03 [PI2 Control Decimal Place Pos]* set the unit and resolution.	10 V = S3-02
U5-20 (0871)	PI2 Control Output	Shows the PI2 Control output. **Note:** • Parameters *S3-04 [PI2 Control Unit Selection]* and *S3-03 [PI2 Control Decimal Place Pos]* set the unit and resolution. • The drive operation while *H1-xx = A8 or 1A8 [PI2 Control Disable]* changes when the *S3-12 [PI2 Control Disable Mode Sel]* setting changes.	10 V = S3-02
U5-30 (3000)	Time Hr Min HHMM	Shows the current time (Hours and Minutes).	No signal output available
U5-31 (3001)	Date Year	Shows the current year.	No signal output available
U5-32 (3002)	Date Mo Day MMDD	Shows the current date (Month and Date).	No signal output available
U5-33 (3003)	Date Week	Shows the current date of the week. bit 0 : Sunday bit 1 : Monday bit 2 : Tuesday bit 3 : Wednesday bit 4 : Thursday bit 5 : Friday bit 6 : Saturday bit 7 : Not used (normal value of 0).	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U5-79 (3B9A)	PID Feedback Backup	Shows the *PID Feedback Backup [H3-xx = 24]* signal that the drive uses when it loses the *PID Feedback [H3-xx = B]*. Unit: 0.01% **Note:** Display unit and scaling are dependent on System Units.	No signal output available
U5-81 (3B9C)	Diff Level Source	Shows the Differential Feedback signal from the terminal set for *H3-xx = 2D [Differential Level Source]*. Unit: 0.00% **Note:** Unit and display scaling are dependent on System Units.	No signal output available
U5-99 (1599)	Setpoint	Shows the PID setpoint command. Unit: 0.01% **Note:** Parameters *b5-46 [PID Unit Display Selection]*, *b5-38 [PID User Unit Display Scaling]*, and *b5-39 [PID User Unit Display Digits]* set the unit, range, and resolution.	10 V = Maximum frequency (-10 V to +10 V)

◆ U6: Operation Status Monitors

No. (Hex.)	Name	Description	MFAO Signal Level
U6-01 (0051)	Iq Secondary Current	Shows the value calculated for the motor secondary current (q-Axis) as a percentage of the motor rated secondary current. Unit: 0.1%	10 V: Motor secondary rated current (0 V to +10 V)
U6-17 (07D1) Expert	Energy Save Coeff	Shows the total time of direction of motor rotation detections for Speed Estimation Speed Searches. This value adjusts *b3-26 [Direction Determination Level]*. **Note:** Upper limit is +32767 and lower limit is -32767.	No signal output available
U6-21 (07D5)	Offset Frequency	Shows the total value of *d7-01 to d7-03 [Offset Frequency 1 to 3]* selected with *Add Offset Frequency 1 to 3 [H1-xx = 44 to 46]*. Unit: 0.1%	10 V: Maximum Frequency
U6-31 (007B)	TorqueDetect Monitor	Monitors the torque reference or the output current after applying the filter. Unit: 0.1%	10 V:100%
U6-36 (0720) Expert	Comm Errors-Host	Shows the number of inter-CPU communication errors. When you de-energize the drive, this value resets to 0.	No signal output available
U6-37 (0721) Expert	Comm Errors-Sensor	Shows the number of inter-CPU communication errors. When you de-energize the drive, this value resets to 0.	No signal output available
U6-80 (07B0)	Option IP Address 1	Shows the currently available local IP Address (1st octet).	No signal output available
U6-81 (07B1)	Option IP Address 2	Shows the currently available local IP Address (2nd octet).	No signal output available
U6-82 (07B2)	Option IP Address 3	Shows the currently available local IP Address (3rd octet).	No signal output available
U6-83 (07B3)	Option IP Address 4	Shows the currently available local IP Address (4th octet).	No signal output available
U6-84 (07B4)	Online Subnet 1	Shows the currently available subnet mask (1st octet).	No signal output available
U6-85 (07B5)	Online Subnet 2	Shows the currently available subnet mask (2nd octet).	No signal output available
U6-86 (07B6)	Online Subnet 3	Shows the currently available subnet mask (3rd octet).	No signal output available
U6-87 (07B7)	Online Subnet 4	Shows the currently available subnet mask (4th octet).	No signal output available
U6-88 (07B8)	Online Gateway 1	Shows the currently available Gateway address (1st octet).	No signal output available
U6-89 (07B9)	Online Gateway 2	Shows the currently available Gateway address (2nd octet).	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
U6-90 (07F0)	Online Gateway 3	Shows the currently available Gateway address (3rd octet).	No signal output available
U6-91 (07F1)	Online Gateway 4	Shows the currently available Gateway address (4th octet).	No signal output available
U6-92 (07F2)	Online Speed	Shows the currently available communications speed. 10: 10 Mbps 100: 100 Mbps	No signal output available
U6-93 (07F3)	Online Duplex	Shows the currently available Duplex setting.	No signal output available
U6-98 (07F8)	First Fault	Shows the contents of the most recent communication options fault (Modbus TCP/IP, EtherNet/IP).	No signal output available
U6-99 (07F9)	Current Fault	Shows the contents of current fault from communication options (Modbus TCP/IP, EtherNet/IP).	No signal output available

◆ Ub: Bypass Control Monitors

No. (Hex.)	Name	Description	MFAO Signal Level
Ub-01 (8780)	Motor Current	Format is XXX.X amps. The number of decimal places depends on drive kVA rating. Unit: Amp	No signal output available
Ub-02 (8781)	Bypass Digital Input Status	View status of bypass digital inputs XXXXXXXX Where X = 0 (not asserted) or 1 (asserted) The right-most digit is the status of digital input 1. This monitor will show the digital input status and any digital input forced to “ON” over serial communications. Unit: - bit 0 : Digital Input 1 (TB2-1) bit 1 : Digital Input 2 (TB2-2) bit 2 : Digital Input 3 (TB2-3) bit 3 : Digital Input 4 (TB2-4) bit 4 : Digital Input 5 (TB2-5) bit 5 : Digital Input 6 (TB2-6) bit 6 : Digital Input 7 (TB2-7) bit 7 : Digital Input 8 (TB2-8)	No signal output available
Ub-03 (8782)	Bypass Digital Output Status	View status of bypass digital outputs XXXXXXXX Where X = 0 (not asserted) or 1 (asserted) The right-most digit is the status of K1 (Input Contactor). Unit: - bit 0 : K1 (Input Contactor) bit 1 : K2 (Output Contactor) bit 2 : K3 (Bypass Contactor) bit 3 : K4 (Motor 1 Output Contactor) bit 4 : K5 (Motor 2 Output Contactor) bit 5 : Fan Output Relay bit 6 : Digital Output 7 (TB1 1~3) (Z2-23) bit 7 : Digital Output 8 (TB1 4~6) (Z2-24) bit 8 : Digital Output 9 (TB1 7~9) (Z2-25) bit 9 : Digital Output 10 (TB1 10~12) (Z2-26) bit 10 and 11 : Reserved	No signal output available
Ub-04 (8783)	Bypass Dig Out Status D09/ D10	View status of bypass digital outputs XXXXXXXX Where X = 0 (not asserted) or 1 (asserted) The right-most digit is the status of digital output 9. Unit: - bit 0 : Digital Output 9 (TB1 7~9) (Z2-25) bit 1 : Digital Output 10 (TB1 10 ~ 12) (Z2-26)	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
Ub-05 (8784)	Bypass Status 1	bit 0 : HAND Mode : 0: Not in HAND : 1: In HAND Mode bit 1 : OFF Mode : 0: Not in OFF : 1: In OFF Mode bit 2 : AUTO Mode : 0: Not in AUTO : 1: In AUTO Mode bit 3 : DRIVE mode (cmnd) : 0: Drive mode not commanded : 1: Drive mode commanded bit 4 : BYPASS mode (cmnd) : 0: Bypass mode not commanded : 1: Bypass mode commanded bit 5 : Emergency override BYP Act : 0: Not active : 1: Emergency override bypass is active bit 6 : Emergency override DRV Act : 0: Not active : 1: EMOV Drive is active (Emergency override drive) bit 7 : Safety Open : 0: All programmed safeties closed : 1: At least one programmed safety open bit 8 : Alarm Active : 0: No Alarm : 1: Alarm bit 9 : Drive Run active : 0: Not running in drive : 1: Running in drive mode bit 10 : Bypass run active : 0: Not running in bypass : 1: Running in bypass mode bit 11 : Emergency override Drive REV : 0: running FWD : 1: running REV bit 12 : Drive comms active : 0: Drive comms Not active : 1: Drive comms active bit 13 : System READY : 0: Not READY : 1: READY **Note:** Bits 12 and 13 are not shown on the keypad. You can use serial communications to read them. Unit: -	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
Ub-06 (8785)	Bypass Status 2	bit 0 : Interlock Open : 0: Interlock is pen : 1: Interlock is closed bit 1 : RUN active : 0: No RUN active : 1: Bypass or Drive run active bit 2 : Fault active : 0: Fault not active : 1: Fault active bit 3 : Auto Xfer Active : 0: Auto Xfer not Active : 1: Auto Xfer Active bit 4 : Remote Xfer Active : 0: Remote Xfer not Active : 1: Remote Xfer Active bit 5 : Energy Sav Active : 0: Energy Savings not Active : 1: Energy Savings Active bit 6 : Motor 1 Selected : 0: Motor 1 not Selected : 1: Motor 1 Selected bit 7 : Motor 2 Selected : 0: Motor 2 not selected : 1: Motor 2 selected bit 8 : Run verify detected : 0: Run verify not detected : 1: Run verify detected bit 9 : Restart delay active : 0: Restart delay not active : 1: Restart delay active bit 10 to 15 : Reserved Unit: -	No signal output available
Ub-07 (8786)	Bypass Fault Status 1	bit 0 : Drive Fault bit 1 : Safety Open bit 2 : FB02-Wait For Interlock Timeout bit 3 : FB03-External Fault Bypass (EFB) bit 4 : FB13-Loss Of Load bit 5 : FB05-Motor Overload (Internal, Electronic) bit 6 : FB06-External Overload 1 bit 7 : FB07-External Overload 2 bit 8 to 11 : Reserved Unit: -	No signal output available
Ub-08 (8787)	Bypass Fault Status 2	bit 0 : FB08-Brownout Detected bit 1 : FB09-Blackout Detected bit 2 : FB10-Loss of Drive Communications bit 3 : FB15-Input Phase Loss bit 4 : FB26-Option on Drive Detected bit 5 : FB13-Loss of Load bit 6 : CE-Serial Communications Error bit 7 : FB16-Input Phase Rotation bit 8 : FB18-Welded Bypass Contactor Detected bit 9 to 11 : Reserved Unit: -	No signal output available
Ub-09 (8788)	Current Fault	Displays the current fault. Unit: -	No signal output available
Ub-10 (8789)	Current Fault YYYY	Displays the year of the current fault. Unit: -	No signal output available
Ub-11 (878A)	Current Fault MMDD	Displays the month and day of the current fault. Unit: -	No signal output available
Ub-12 (878B)	Current Fault HHMM	Displays the hour and minute of the current fault. Unit: -	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
Ub-13 (878C)	Previous Fault	Displays the previous fault. Unit: -	No signal output available
Ub-14 (878D)	Previous Fault YYYY	Displays the year of the previous fault. Unit: -	No signal output available
Ub-15 (878E)	Previous Fault MMDD	Displays the month and day of the previous fault. Unit: -	No signal output available
Ub-16 (878F)	Previous Fault HHMM	Displays the hour and minute of the previous fault. Unit: -	No signal output available
Ub-17 (8790)	Contactor Voltage	Displays the measured voltage for the power going to the contactor coils. Unit: 1 Vac	No signal output available
Ub-18 (8791)	Software Version	Displays the software version currently programmed into the bypass. Unit: -	No signal output available
Ub-19 (8792)	Date Year YYYY	Displays the current year. Unit: -	No signal output available
Ub-20 (8793)	Date Month Day MMDD	Displays the current date (Month and Date). Unit: -	No signal output available
Ub-21 (8794)	Time Hour Min HHMM	Displays the current time (Hours and Minutes). Unit: -	No signal output available
Ub-22 (8795)	Bypass Analog Input	Bypass MFAI level Unit: 0-100%	No signal output available
Ub-23 (8796)	Motor 1 Overload	Motor 1 Overload level Unit: 0-100%	No signal output available
Ub-24 (8797)	Motor 2 Overload	Motor 2 Overload level Unit: 0-100%	No signal output available
Ub-94 (87DD)	Bypass CPU Usage	Current Bypass CPU Load Unit: 0-100%	No signal output available
Ub-95 (87DE)	Line Frequency	Calculated AC line frequency Unit: Hz	No signal output available
Ub-96 (87DF)	Byp Phase Loss Level	Current Phase Loss level Unit: 0-100%	No signal output available
Ub-99 (87E2) Expert	Desired FP605 software version	Shows the latest version of FP605 software that this version of FP605 Bypass software supports. Unit: -	No signal output available

◆ UC: BACnet Diagnostic Monitors

No. (Hex.)	Name	Description	MFAO Signal Level
UC-01 (3DB0)	BN MSTP Net Health	Shows a number between 0.0% and 100.0% that identifies the health of the MSTP network. This number is dependent on the number of CRC errors, token losses, token retries, and net deadtime perceived. Unit: 0.1%	No signal output available
UC-02 (3DB1)	BACnet Tokens Rx	Shows the number of received MSTP Tokens after you energize the drive. Unit: 1	No signal output available
UC-03 (3DB2)	BACnet Tokens Tx	Shows the number of transmitted MSTP Tokens after you energize the drive. Unit: 1	No signal output available
UC-04 (3DB3)	BACnet Messages Rx	Shows the number of messages with data (non-token, non-polling) received by the drive. Unit: 1	No signal output available
UC-05 (3DB4)	BACnet Messages Tx	Shows the number of messages with data (non-token, non-polling) transmitted by the drive. Unit: 1	No signal output available
UC-06 (3DB5)	MSTP Next Node Addr	Shows the next known node in the MSTP loop. This is the node to which the drive will pass the token. Unit: Hex	No signal output available
UC-07 (3DB6)	MSTP Prev Node Addr	Shows the previous known node in the MSTP loop. This is the node from which the drive received the token. Unit: Hex	No signal output available

No. (Hex.)	Name	Description	MFAO Signal Level
UC-08 (3DB7)	MSTP H MAC Found	Shows the highest MAC address found on the network. This will report the highest value MAC address to which the token was passed by any node on the MSTP loop. Unit: Hex	No signal output available
UC-09 (3DB8)	MSTP L MAC Found	Shows the lowest MAC address found on the network. This will report the lowest value MAC address to which the token was passed by any node on the MSTP loop. Unit: Hex	No signal output available
UC-10 (3DB9)	MSTP # Nodes Found	Shows the number of unique nodes that transmitted a token on the local MSTP loop. Unit: 1	No signal output available
UC-11 (3DBA)	# of BN COV Sbscrpt	Shows the number of COV subscriptions requested by the nodes on the BACnet network. This is limited to the number of objects that support COV subscriptions. Unit: 1	No Signal output available
UC-12 (3DBB)	MSTP Loop TIme	Shows the number of milliseconds between drive transmitted token and drive token received, showing how long the MSTP loop took to pass the token to all nodes on the MSTP network. Unit: 1 ms	No signal output available
UC-13 (3DBC) Expert	BN MSTP CRC Errors	Shows the number of CRC errors detected after you energize the drive. Unit: 1	No signal output available
UC-14 (3DBD) Expert	BN MSTP Tokens Lost	Shows the number of token losses seen by the unit since power-on. This is sensed by a net deadtime of more than 500 ms. Unit: 1	No signal output available
UC-15 (3DBE) Expert	BN MSTP Tokens Retry	Shows the number of token retries seen by the unit since power-on. This is sensed by two subsequent token frames seen from the same node to the same node with the same CRC. Unit: 1	No signal output available
UC-16 (3DBF) Expert	BN MSTP Silence Avg	Shows the average net deadtime (space between active messages), averaged over a 60 packet period. Unit: 1.0 ms	No signal output available

4.18 Defaults by Bypass and Drive Model

The values for parameter *o2-04* change the default settings for the parameters in these tables:

◆ 208/240 V

No.	Name	Unit	Default								
-	Bypass Model	-	D004 D007 D010	A004 A006 A009	D016 A015	D024 A022	D030 A028	D046 A042	D059 A054	D074 A068	D088 A080
o2-04	Drive Model (KVA) Selection	Hex.	65		67	68	6A	6B	6D	6E	6F
E2-11	Motor Rated Power	HP (kW)	3 (2.2)		5 (3.7)	7.5 (5.5)	10 (7.5)	15 (11)	20 (15)	25 (18.5)	30 (22)
b3-04	V/f Gain during Speed Search	%	100		100	100	100	100	100	100	100
b3-06	Speed Estimation Current Level 1	-	0.5		0.5	0.5	0.5	0.5	0.5	0.5	0.5
b3-08	Speed Estimation ACR P Gain	-	0.50		0.50	0.50	0.50	0.50	0.50	0.50	0.50
b3-11	Spd Est Method Switch-over Level	%	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0
b3-12	Speed Search Current Deadband	-	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5
b3-26	Direction Determination Level	-	1000		1000	1000	1000	1000	1000	1000	1000
b8-04	Energy Saving Coefficient Value	-	156.8		122.9	94.80	72.69	70.44	63.13	57.87	51.79
C6-02	Carrier Frequency Selection	-	2		2	2	2	2	2	2	2
E2-01	Motor Rated Current (FLA)	A	10.6		16.7	24.2	30.8	46.2	59.4	74.8	88
E2-02	Motor Rated Slip	Hz	2.90		2.73	1.50	1.30	1.70	1.60	1.67	1.70
E2-03	Motor No-Load Current	A	3.00		4.50	5.10	8.00	11.2	15.2	15.7	18.5
E2-05	Motor Line-to-Line Resistance	Ω	1.601		0.771	0.399	0.288	0.230	0.138	0.101	0.079
E2-06	Motor Leakage Inductance	%	18.4		19.6	18.2	15.5	19.5	17.2	20.1	19.5
E2-10	Motor Iron Loss	W	77		112	172	262	245	272	505	538
L2-02	Power Loss Ride Through Time	s	0.7		0.9	1.5	1.8	2.0	2.0	2.0	2.0
L2-03	Minimum Baseblock Time	s	0.5		0.6	0.7	0.8	0.9	1	1	1
L2-04	Powerloss V/f Recovery Ramp Time	s	0.3		0.3	0.3	0.3	0.3	0.6	0.6	0.6

No.	Name	Unit	Default							
-	Bypass Model	-	D004 D007 D010	A004 A006 A009	D016 A015	D024 A022	D030 A028	D046 A042	D059 A054	D074 A068	D088 A080
o2-04	Drive Model (KVA) Selection	Hex.	65		67	68	6A	6B	6D	6E	6F
E2-11	Motor Rated Power	HP (kW)	3 (2.2)		5 (3.7)	7.5 (5.5)	10 (7.5)	15 (11)	20 (15)	25 (18.5)	30 (22)
L2-05	Undervoltage Detection Lvl (Uv1)	-	190		190	190	190	190	190	190	190
L3-24	Motor Accel Time for Inertia Cal	s	0.145		0.154	0.168	0.175	0.265	0.244	0.317	0.355
L8-02	Overheat Alarm Level	°C	95		95	125	125	125	125	115	115
L8-09	Output Ground Fault Detection	-	0		0	0	0	0	1	1	1
L8-35	Installation Method Selection	-	2		2	2	2	2	2	2	2
L8-38	Carrier Frequency Reduction	-	2		2	2	2	2	2	2	2
n1-01	Hunting Prevention Selection	-	1		1	1	1	1	1	1	1
n1-03	Hunting Prevention Time Constant	ms	10		10	10	10	10	10	10	10

No.	Name	Unit	Default				
-	Drive Model	-	D114 A104	D143 A130	D169 A154	D211 A192	D273 A248
o2-04	Drive Model (KVA) Selection	Hex.	70	72	73	74	75
E2-11	Motor Rated Power	HP (kW)	40 (30)	50 (37)	60 (45)	75 (55)	100 (75)
b3-04	V/f Gain during Speed Search	%	80	80	80	80	80
b3-06	Speed Estimation Current Level 1	-	0.5	0.5	0.5	0.5	0.7
b3-08	Speed Estimation ACR P Gain	-	0.50	0.50	0.50	0.50	0.50
b3-11	Spd Est Method Switch-over Level	%	5.0	5.0	5.0	5.0	5.0
b3-12	Speed Search Current Deadband	-	2.5	2.5	2.5	2.5	2.5
b3-26	Direction Determination Level	-	1000	1000	1000	1000	1000
b8-04	Energy Saving Coefficient Value	-	46.27	38.16	35.78	31.35	23.10
C6-02	Carrier Frequency Selection	-	2	2	2	1	1
E2-01	Motor Rated Current (FLA)	A	114	143	169	211	273
E2-02	Motor Rated Slip	Hz	1.80	1.33	1.60	1.43	1.39
E2-03	Motor No-Load Current	A	21.9	38.2	44.0	45.6	72.0
E2-05	Motor Line-to-Line Resistance	Ω	0.064	0.039	0.030	0.022	0.023

No.	Name	Unit	Default				
-	Drive Model	-	D114 A104	D143 A130	D169 A154	D211 A192	D273 A248
o2-04	Drive Model (KVA) Selection	Hex.	70	72	73	74	75
E2-11	Motor Rated Power	HP (kW)	40 (30)	50 (37)	60 (45)	75 (55)	100 (75)
E2-06	Motor Leakage Inductance	%	20.8	18.8	20.2	20.5	20.0
E2-10	Motor Iron Loss	W	699	823	852	960	1200
L2-02	Power Loss Ride Through Time	s	2.0	2.0	2.0	2.0	2.0
L2-03	Minimum Baseblock Time	s	1.1	1.1	1.2	1.3	1.5
L2-04	Powerloss V/f Recovery Ramp Time	s	0.6	0.6	1	1	1
L2-05	Undervoltage Detection Lvl (Uv1)	-	190	190	190	190	190
L3-24	Motor Accel Time for Inertia Cal	s	0.323	0.32	0.387	0.317	0.533
L8-02	Overheat Alarm Level	°C	115	110	110	105	105
L8-09	Output Ground Fault Detection	-	1	1	1	1	1
L8-35	Installation Method Selection	-	2	2	2	0	0
L8-38	Carrier Frequency Reduction	-	2	2	2	2	2
n1-01	Hunting Prevention Selection	-	1	1	1	1	1
n1-03	Hunting Prevention Time Constant	ms	10	10	10	10	10

◆ 480 V

No.	Name	Unit	Default							
-	Bypass Model	-	B002 B003 B004	B007	B011	B014	B021	B027	B034	B040
o2-04	Drive Model (KVA) Selection	Hex.	95	97 and BB	99	9A	9B	9D	9E	9F
E2-11	Motor Rated Power	HP (kW)	3 (2.2)	5 (3.7)	7.5 (5.5)	10 (7.5)	15 (11)	20 (15)	25 (18.5)	30 (22)
b3-04	V/f Gain during Speed Search	%	100	100	100	100	100	100	100	100
b3-06	Speed Estimation Current Level 1	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
b3-08	Speed Estimation ACR P Gain	-	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
b3-11	Spd Est Method Switch-over Level	%	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
b3-12	Speed Search Current Deadband	-	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

No.	Name	Unit	Default							
-	Bypass Model	-	B002 B003 B004	B007	B011	B014	B021	B027	B034	B040
o2-04	Drive Model (KVA) Selection	Hex.	95	97 and BB	99	9A	9B	9D	9E	9F
E2-11	Motor Rated Power	HP (kW)	3 (2.2)	5 (3.7)	7.5 (5.5)	10 (7.5)	15 (11)	20 (15)	25 (18.5)	30 (22)
b3-26	Direction Determination Level	-	1000	1000	1000	1000	1000	1000	1000	1000
b8-04	Energy Saving Coefficient Value	-	313.6	245.8	189.5	145.38	140.88	126.26	115.74	103.58
C6-02	Carrier Frequency Selection	-	2	2	2	2	2	2	2	2
E2-01	Motor Rated Current (FLA)	A	4.80	7.60	11.00	14.00	21.0	27.0	34.0	40.0
E2-02	Motor Rated Slip	Hz	3.00	2.70	1.50	1.30	1.70	1.60	1.67	1.70
E2-03	Motor No-Load Current	A	1.5	2.3	2.6	4	5.6	7.6	7.8	9.2
E2-05	Motor Line-to-Line Resistance	Ω	6.495	3.333	1.595	1.152	0.922	0.550	0.403	0.316
E2-06	Motor Leakage Inductance	%	18.7	19.3	18.2	15.5	19.6	17.2	20.1	23.5
E2-10	Motor Iron Loss	W	77	130	193	263	385	440	508	586
L2-02	Power Loss Ride Through Time	s	0.7	0.9	1.3	1.3	1.7	2.0	2.0	2.0
L2-03	Minimum Baseblock Time	s	0.5	0.6	0.7	0.8	0.9	1.0	1.0	1.0
L2-04	Powerloss V/f Recovery Ramp Time	s	0.3	0.3	0.3	0.3	0.3	0.6	0.6	0.6
L2-05	Undervoltage Detection Lvl (Uv1)	-	380	380	380	380	380	380	380	380
L3-24	Motor Accel Time for Inertia Cal	s	0.145	0.154	0.168	0.175	0.265	0.244	0.317	0.355
L8-02	Overheat Alarm Level	°C	115	97: 115 BB: 95	95	95	127	127	127	123
L8-09	Output Ground Fault Detection	-	0	0	0	0	0	0	0	1
L8-35	Installation Method Selection	-	2	97: 2 BB: 3	2	2	2	2	2	2
L8-38	Carrier Frequency Reduction	-	2	2	2	2	2	2	2	2
n1-01	Hunting Prevention Selection	-	1	1	1	1	1	1	1	1
n1-03	Hunting Prevention Time Constant	ms	10	10	10	10	10	10	10	10

No.	Name	Unit	Default								
-	Bypass Model	-	B052	B065	B077	B096	B124	B156	B180	B240	B302
o2-04	Drive Model (KVA) Selection	Hex.	A0	A2	A3	A4	A5	A6	A7	A8	A9
E2-11	Motor Rated Power	HP (kW)	30 (22)	40 (30)	50 (37)	60 (45)	75 (55)	100 (75)	125 (90)	150 (110)	200 (160)
b3-04	V/f Gain during Speed Search	%	100	100	100	100	80	60	60	60	60
b3-06	Speed Estimation Current Level 1	-	0.5	0.5	0.5	0.5	0.5	0.7	0.7	0.7	0.7
b3-08	Speed Estimation ACR P Gain	-	0.50	0.50	0.50	0.50	0.50	0.80	0.80	0.80	0.80
b3-11	Spd Est Method Switch-over Level	%	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
b3-12	Speed Search Current Deadband	-	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
b3-26	Direction Determination Level	-	1000	1000	1000	1000	1000	1000	1000	1000	1000
b8-04	Energy Saving Coefficient Value	-	92.54	76.32	71.56	67.2	46.2	38.91	36.23	32.79	30.57
C6-02	Carrier Frequency Selection	-	2	2	2	2	2	2	1	1	1
E2-01	Motor Rated Current (FLA)	A	52.0	65.0	77.0	96.0	124.0	156.0	180.0	240.0	302.0
E2-02	Motor Rated Slip	Hz	1.80	1.33	1.60	1.46	1.39	1.40	1.40	1.38	1.30
E2-03	Motor No-Load Current	A	10.9	19.1	22	24	36	40	49	58	81
E2-05	Motor Line-to-Line Resistance	Ω	0.269	0.155	0.122	0.088	0.092	0.056	0.046	0.035	0.025
E2-06	Motor Leakage Inductance	%	20.7	18.8	19.9	20.0	20.0	20.0	20.0	20.0	20.0
E2-10	Motor Iron Loss	W	750	925	1125	1260	1600	1760	2150	2350	3200
L2-02	Power Loss Ride Through Time	s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
L2-03	Minimum Baseblock Time	s	1.1	1.1	1.2	1.2	1.3	1.5	1.7	1.7	1.9
L2-04	Powerloss V/f Recovery Ramp Time	s	0.6	0.6	0.6	1.0	1.0	1.0	1.0	1.0	1.0
L2-05	Undervoltage Detection Lvl (Uv1)	-	380	380	380	380	380	380	380	380	380
L3-24	Motor Accel Time for Inertia Cal	s	0.323	0.320	0.387	0.317	0.533	0.592	0.646	0.673	0.864
L8-02	Overheat Alarm Level	°C	123	123	120	124	124	110	105	120	120

No.	Name	Unit	Default								
-	Bypass Model	-	B052	B065	B077	B096	B124	B156	B180	B240	B302
o2-04	Drive Model (KVA) Selection	Hex.	A0	A2	A3	A4	A5	A6	A7	A8	A9
E2-11	Motor Rated Power	HP (kW)	30 (22)	40 (30)	50 (37)	60 (45)	75 (55)	100 (75)	125 (90)	150 (110)	200 (160)
L8-09	Output Ground Fault Detection	-	1	1	1	1	1	1	1	1	1
L8-35	Installation Method Selection	-	2	2	2	2	2	2	0	0	0
L8-38	Carrier Frequency Reduction	-	2	2	2	2	2	2	2	2	2
n1-01	Hunting Prevention Selection	-	1	1	1	1	1	1	1	1	1
n1-03	Hunting Prevention Time Constant	ms	10	10	10	10	30	30	30	30	30

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YASKAWA

P1000 Bypass to FP605 Bypass

Enclosed Bypass Parameter Transition Guide

YASKAWA AMERICA, INC.
2121, Norman Drive South, Waukegan, IL
60085, U.S.A.
Phone: +1-800-YASKAWA (927-5292) or +1-847-887-7000 Fax: +1-847-887-7310
www.yaskawa.com

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