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PowerFlex 700H AC Drive

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PROGRAMMING MANUAL

Firmware Versions x.xxx - 4.001

ALLEN-BRADLEY • ROCKWELL SOFTWARE

Rockwell Automation

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. *Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls* (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at **http://www.rockwellautomation.com/literature**) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Throughout this manual, when necessary we use notes to make you aware of safety considerations.

WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

Important: Identifies information that is critical for successful application and understanding of the product.

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequences.

Shock Hazard labels may be located on or inside the equipment (e.g., drive or motor) to alert people that dangerous voltage may be present.

Burn Hazard labels may be located on or inside the equipment (e.g., drive or motor) to alert people that surfaces may be at dangerous temperatures.

Appendix A HIM Overview

Appendix B Application Notes

Index

Manual Updates

This information summarizes the changes to the *Programming Manual - PowerFlex 700H Adjustable Frequency AC Drive - High Power*, publication 20C-PM001…, since the July 2007 release.

Change	See page...
Updated “How Parameters are Organized” to include new parameters.	2-3
Added parameter 24 [Commanded Torque].	2-7
Changed the maximum value of parameter 49 [Motor Poles] from 12 to 18.	2-8
Added parameter 465 [Fan Control] to allow for the ability to stop the fans when the drive is stopped and the heatsink temperature is below 55° C.	2-18
Added bit 1 “Manual Mode” to parameter 192 [Save HIM Ref].	2-22
Added parameters 204 [Dyn UserSet Cnfg], 205 [Dyn UserSet Sel] and 206 [Dyn UserSet Actv] to allow for dynamic selection of User Sets.	2-24
Bit 6 “Heatsink Temp” of parameter 211 [Drive Alarm 1] now implemented.	2-25
Changed bit 0 from “DigIn Test” to “DigIn CflctA” and added bit 11 “UserSetCflct” to parameter 212 [Drive Alarm 2].	2-25
Added parameters 543-557 [Fault x Subcode] to display fault subcodes.	2-29
Add parameters 234 [Testpoint 1 Sel], 235 [Testpoint 1 Data], 236 [Testpoint 2 Sel], and 237 [Testpoint 2 Data] for future use.	2-28
Added parameters 595 [Port Mask Act], 596 [write Mask Cfg], 597 [Write Mask Act] and 598 [Logic Mask Act] to provide write access protection for individual communication ports in the drive and whether network security is controlling the ports.	2-34
Added the following options to parameters 361-366 [Digital Inx Sel]: • 41 “UserSet Sel1” and 42 “UserSet Sel2”, to allow for dynamic selection of User Sets. • 44 “RunFwd Level” and 45 “RunRev Level”, to allow the drive to start and run forward or run reverse without transitioning a “Run” command after certain drive conditions are met.	2-39
Updated the “Parameter Cross Reference” charts to reflect the addition of all new parameters	2-42
Added new Type 2 Alarm 139 “UserSetCflct” to support the dynamic User Sets feature.	3-3
Added new fault subcode descriptions to further define faults and alarms.	3-12
Updated the “Coast” stop mode description.	B-17

This information summarizes the changes to the *Programming Manual - PowerFlex 700H Adjustable Frequency AC Drive - High Power*, publication 20C-PM001…, since the January 2007 release.

Change	See page...
Updated “How Parameters are Organized” to include new parameters	2-3
Added note that parameter 46 [Mtr NP Pwr Units] does not get changed with “Reset to Defaults”.	2-8
Added parameter 050 [Motor OL Mode]	2-8
Added parameter 056 [Compensation]	2-8
Added note that parameter 79 [Speed Units] does not get changed with “Reset to Defaults”.	2-10
Added parameter 116 [Trim % Setpoint]	2-13
Added bit 2 “Add or %” to parameter 118 [Trim Out Select]	2-13
Added bit 9 “% of Ref” to parameter 124 [PI Configuration]	2-14
Added parameter 464 [PI Output Gain]	2-15
Added parameter 145 [DB While Stopped]	2-16
Added parameter 189 [Shear Pin Time]	2-21
Changed bits 7, 8, and 14 to “Reserved” for parameter 211 [Drive Alarm 1]	2-25
Changed bits 8 and 11 to “Reserved” for parameter 212 [Drive Alarm 2]	2-25

Change	See page...
Changed bit 14 to “Reserved” for parameter 214 [Start Inhibits]	2-26
Changed bits 7, 8, and 14 to “Reserved” for parameter 229 [Alarm 1 @ Fault]	2-27
Added bits 2 “Motor Stall” and 11 “Shear PNO Ac” to parameter 238 [Fault Config 1]	2-28
Changed bits 7, 8, and 14 to “Reserved” for parameter 259 [Alarm Config 1]	2-29
Changed the minimum value from 4.000mA to 0.000mA for parameters 322, 323, 325, 326, 343, 344, 346, & 347	2-35
Added options 43 “Run Level” and 46 “Run w Comm” to the digital input selections (Pars 361-366).	2-39
Updated the “Parameter Cross Reference” charts to reflect the addition of all new parameters	2-42

This information summarizes the changes to the *Programming Manual - PowerFlex 700H Adjustable Frequency AC Drive - High Power*, publication 20C-PM001…, since the February 2004 release.

Change	See page...
Updated “How Parameters are Organized” to include parameters 358 and 359	2-3
New value 2 - “Invert” added to parameter 178 [Sleep Wake Mode]	2-20
Updated parameter 211 [Drive Alarm 1] for new Gate Disable function	2-25
Updated parameter 212 [Drive Alarm 2] for new Gate Disable function	2-25
Updated parameter 214 [Start Inhibits] for the new Gate Disable function	2-26
Updated parameter 229 [Alarm 1 @ Fault] for new Gate Disable function	2-27
Updated parameter 230 [Alarm 2 @ Fault] for new Gate Disable function	2-28
Updated parameter 238 [Fault Config 1] for new Gate Disable function	2-28
Updated parameter 259 [Alarm Config 1] for new Gate Disable function	2-29
Added parameter 358 [20C-DG1 Remove] for Gate Disable function	2-38
Added parameter 359 [20C-DG1 Status] for Gate Disable function	2-38
Updated the “Parameter Cross Reference” charts to reflect the addition of parameters 358 and 359	2-42
Added a “Solution” for Faults 15, 16, 47, and 65	3-5
Added Fault 31 “IGBT Temp HW”	3-6
Updated the “Fault & Alarm Descriptions” table to reflect the addition of new faults 59 “Gate Disable” and 60 “Hrdwr Term”	3-7
Updated the “Fault/Alarm Cross Reference” tables to include the new items	3-11
Added additional “Technical Support” information	3-21
Updated the “Sleep/Wake Mode” function to reflect the new “Invert” mode	B-14

Overview

The purpose of this manual is to provide you with the basic information needed to start-up, program and troubleshoot the PowerFlex 700H Adjustable Frequency AC Drive.

Who Should Use this Manual?

This manual is intended for qualified personnel. You must be able to program and operate Adjustable Frequency AC Drive devices. In addition, you must have an understanding of the parameter settings and functions.

What Is Not in this Manual

The *PowerFlex 700H Programming Manual* is designed to provide basic start-up, programming and fault information. For installation information, refer to the *PowerFlex 700S/700H Adjustable Frequency AC Drives Installation Instructions*, publication PFLEX-IN006…. Detailed drive information can be found in the *PowerFlex Reference Manual*, publication PFLEX-RM001…

Reference Materials

The following manuals are recommended for general drive information:

Title	Publication	Available Online at . . .
Industrial Automation Wiring and Grounding Guidelines	1770-4.1	www.rockwellautomation.com/literature
Preventive Maintenance of Industrial Control and Drive System Equipment	DRIVES-TD001…	
Safety Guidelines for the Application, Installation and Maintenance of Solid State Control	SGI-1.1	
A Global Reference Guide for Reading Schematic Diagrams	100-2.10	
Guarding Against Electrostatic Damage	8000-4.5.2	

For detailed PowerFlex 700H information:

Title	Publication	Available Online at . . .
PowerFlex Reference Manual	PFLEX-RM001…	www.rockwellautomation.com/literature
PowerFlex 700H/700S Installation Instructions	PFLEX-IN006…	

For Allen-Bradley Drives Technical Support:

Title	Online at . . .
Allen-Bradley Drives Technical Support	**www.ab.com/support/abdrives**

Manual Conventions

- In this manual we refer to the PowerFlex 700H Adjustable Frequency AC Drive as; drive, PowerFlex 700H or PowerFlex 700H Drive.
- To help differentiate parameter names and LCD display text from other text, the following conventions will be used:
  - Parameter Names will appear in [brackets].
    For example: [DC Bus Voltage].
  - Display Text will appear in “quotes.” For example: “Enabled.”
- The following words are used throughout the manual to describe an action:

Word	Meaning
Can	Possible, able to do something
Cannot	Not possible, not able to do something
May	Permitted, allowed
Must	Unavoidable, you must do this
Shall	Required and necessary
Should	Recommended
Should Not	Not recommended

General Precautions

ATTENTION: This drive contains ESD (Electrostatic Discharge) sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing or repairing this assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, reference A-B publication 8000-4.5.2, “Guarding Against Electrostatic Damage” or any other applicable ESD protection handbook.

ATTENTION: An incorrectly applied or installed drive can result in component damage or a reduction in product life. Wiring or application errors, such as, undersizing the motor, incorrect or inadequate AC supply, or excessive ambient temperatures may result in malfunction of the system.

ATTENTION: Only qualified personnel familiar with adjustable frequency AC drives and associated machinery should plan or implement the installation, start-up and subsequent maintenance of the system. Failure to comply may result in personal injury and/or equipment damage.

ATTENTION: To avoid an electric shock hazard, verify that the voltage on the bus capacitors has discharged completely before servicing. Check the DC bus voltage at the Power Terminal Block by measuring between the +DC and -DC terminals, between the +DC terminal and the chassis, and between the -DC terminal and the chassis. The voltage must be zero for all three measurements.

ATTENTION: Risk of injury or equipment damage exists. DPI host products must not be directly connected together via 1202 cables. Unpredictable behavior can result if two or more devices are connected in this manner.

ATTENTION: The sheet metal cover and mounting screws on the ASIC Board located on the power structure are energized at (-) DC bus potential high voltage. Risk of electrical shock, injury, or death exists if someone comes in contact with the assembly.

ATTENTION: The “adjust freq” portion of the bus regulator function is extremely useful for preventing nuisance overvoltage faults resulting from aggressive decelerations, overhauling loads, and eccentric loads. It forces the output frequency to be greater than commanded frequency while the drive's bus voltage is increasing towards levels that would otherwise cause a fault. However, it can also cause either of the following two conditions to occur.

1. Fast positive changes in input voltage (more than a 10% increase within 6 minutes) can cause uncommanded positive speed changes. However an “OverSpeed Limit” fault will occur if the speed reaches [Max Speed] + [Overspeed Limit]. If this condition is unacceptable, action should be taken to 1) limit supply voltages within the specification of the drive and, 2) limit fast positive input voltage changes to less than 10%. Without taking such actions, if this operation is unacceptable, the “adjust freq” portion of the bus regulator function must be disabled (see parameters 161 and 162).

2. Actual deceleration times can be longer than commanded deceleration times. However, a “Decel Inhibit” fault is generated if the drive stops decelerating altogether. If this condition is unacceptable, the “adjust freq” portion of the bus regulator must be disabled (see parameters 161 and 162). In addition, installing a properly sized dynamic brake resistor will provide equal or better performance in most cases.

   Important: These faults are not instantaneous. Test results have shown that they can take between 2-12 seconds to occur.

Notes

Start Up

This chapter describes how you start up the PowerFlex 700H Drive. Refer to Appendix A for a brief description of the LCD HIM (Human Interface Module).

ATTENTION: Power must be applied to the drive to perform the following start-up procedure. Some of the voltages present are at incoming line potential. To avoid electric shock hazard or damage to equipment, only qualified service personnel should perform the following procedure. Thoroughly read and understand the procedure before beginning. If an event does not occur while performing this procedure, **Do Not Proceed**. **Remove Power** including user supplied control voltages. User supplied voltages may exist even when main AC power is not applied to then drive. Correct the malfunction before continuing.

Prepare For Drive Start-Up

Before Applying Power to the Drive

❑ **1.** Confirm that all inputs are connected to the correct terminals and are secure.

❑ **2.** Verify that AC line power at the disconnect device is within the rated value of the drive.

❑ **3.** Verify that control power voltage is correct.

The remainder of this procedure requires that a HIM be installed. If an operator interface is not available, remote devices should be used to start up the drive.

Applying Power to the Drive

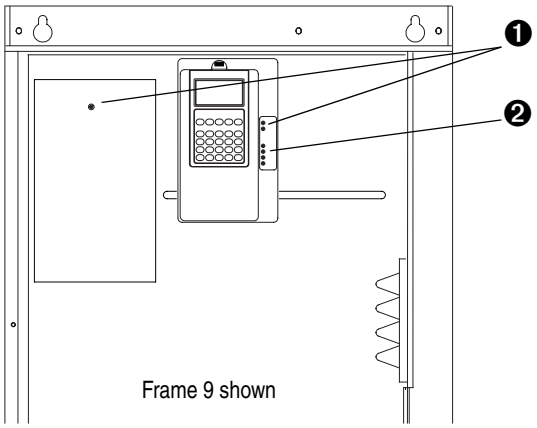
❑ **4.** Apply AC power and control voltages to the drive.

If any of the six digital inputs are configured to "Stop – CF" (CF = Clear Fault) or "Enable," verify that signals are present or reconfigure [Digital Inx Sel]. If an I/O option is not installed (i.e. no I/O terminal block), verify that [Digital Inx Sel] is not configured to "Stop – CF" or "Enable." If this is not done, the drive will not start. Refer to Fault and Alarm Descriptions on page 3-3 for a list of potential digital input conflicts. If a fault code appears, refer to Chapter 3.

❑ **5.** Proceed to Start-Up Routines.

Status Indicators

Figure 1.1 Drive Status Indicators



#	Name	Color	State	Description
❶	PWR (Power)	Green	Steady	Illuminates when power is applied to the drive.
❷	PORT	Green	–	Status of DPI port internal communications (if present).
	MOD	Yellow	–	Status of communications module (when installed).
	NET A	Red	–	Status of network (if connected).
	NET B	Red	–	Status of secondary network (if connected).

Start-Up Routines

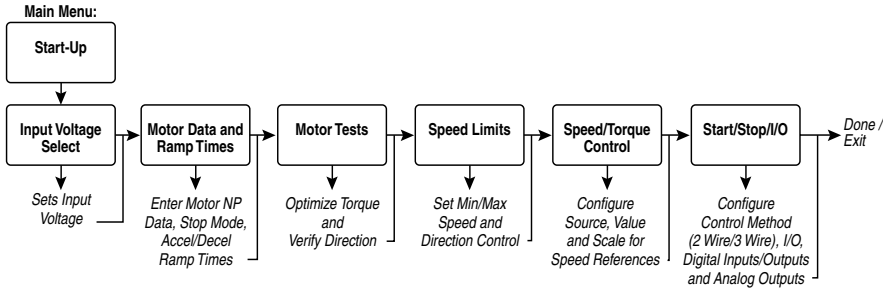
The PowerFlex 700H is designed so that start up is simple and efficient. If you have an LCD HIM, two start-up methods are provided, allowing the user to select the desired level needed for the application.

- **S.M.A.R.T. Start**
  This routine allows you to quickly set up the drive by programming values for the most commonly used functions (see below).
- **Assisted Start Up**
  This routine prompts you for information that is needed to start up a drive for most applications, such as line and motor data, commonly adjusted parameters and I/O.

Important Information

Power must be applied to the drive when viewing or changing parameters. Previous programming may affect the drive status and operation when power is applied.

Figure 1.2 PowerFlex 700H Start Up Menu



Running S.M.A.R.T. Start

During a Start Up, the majority of applications require changes to only a few parameters. The LCD HIM on a PowerFlex 700H drive offers S.M.A.R.T. start, which displays the most commonly changed parameters. With these parameters, you can set the following functions:

S - Start Source and Stop Mode
M - Minimum and Maximum Speed
A - Accel Time 1 and Decel Time 1
R - Reference Source
T - Thermal Motor Overload

To run a S.M.A.R.T. start routine:

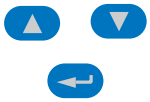
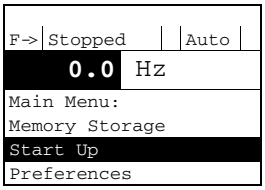
1. Press ALT and then Esc (S.M.A.R.T.). The S.M.A.R.T. start screen appears. 2. View and change parameter values as desired. For HIM information, see Appendix A. 3. Press Esc to exit the S.M.A.R.T. start.	ALT Esc Esc	F-> Stopped Auto SMART List: Digital In2 Sel Stop Mode A Minimum Speed

Running an Assisted Start Up

Important: This start-up routine requires an LCD HIM.

The Assisted start-up routine asks simple yes or no questions and prompts you to input required information. Access Assisted Start Up by selecting "Start Up" from the Main Menu.

To perform an Assisted Start-Up

1. In the Main Menu, press the Up Arrow or Down Arrow to scroll to "Start Up". 2. Press Enter.		

Programming and Parameters

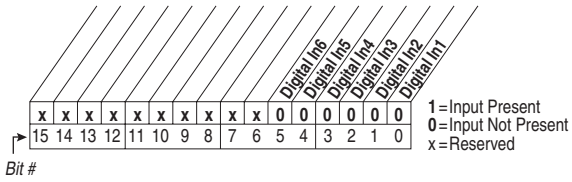
This chapter provides a complete list and description of the PowerFlex 700H parameters. The parameters can be programmed (viewed/edited) using an LCD HIM (Human Interface Module). As an alternative, programming can also be performed using DriveExplorer™ or DriveExecutive™ software and a personal computer. Refer to HIM Overview on page A-1 for a brief description of the LCD HIM.

About Parameters

To configure a drive to operate in a specific way, drive parameters may have to be set. Three types of parameters exist:

- **ENUM Parameters**
  ENUM parameters allow a selection from a list of items. The LCD HIM will display a text message for each item.
- **Bit Parameters**
  Bit parameters have individual bits associated with features or conditions. If the bit is 0, the feature is off or the condition is false. If the bit is 1, the feature is on or the condition is true.
- **Numeric Parameters**
  These parameters have a single numerical value (i.e. 0.1 Volts).

The example on the following page shows how each parameter type is presented in this manual.

❶ File	❷ Group	❸ No.	❹ Parameter Name & Description	❺ Values	❻ Related
UTILITY	Drive . . .	198	**[Load Frm Usr Set]** Loads a previously saved set of parameter values from a selected user set location in drive nonvolatile memory to active drive memory.	Default: 0 "Ready" Options: 0 "Ready" 1 "User Set 1" 2 "User Set 2" 3 "User Set 3"	199
	Diagnostics	216	**[Dig In Status]** Status of the digital inputs. 	Read Only	361 thru 366
MOTOR . . .	Motor Data	044	**[Motor NP RPM]** Set to the motor nameplate rated RPM.	Default: 1750.0 RPM Min/Max: 60.0/19200.0 RPM Units: 1.0 RPM	

No.	Description		
❶	**File** – Lists the major parameter file category.		
❷	**Group** – Lists the parameter group within a file.		
❸	**No.** – Parameter number. = Parameter value can not be changed until drive is stopped.		
❹	**Parameter Name & Description** – Parameter name as it appears on an LCD HIM, with a brief description of the parameters function.		
❺	**Values** – Defines the various operating characteristics of the parameter. Three types exist.		
	ENUM	Default:	Lists the value assigned at the factory. "Read Only" = no default.
		Options:	Displays the programming selections available.
	Bit	Bit:	Lists the bit place holder and definition for each bit.
	Numeric	Default:	Lists the value assigned at the factory. "Read Only" = no default.
		Min/Max: Units:	The range (lowest and highest setting) possible for the parameter. Unit of measure and resolution as shown on the LCD HIM.
		Important: Some parameters will have two unit values: • Analog inputs can be set for current or voltage with [Anlg In Config], param. 320. • Setting [Speed Units], parameter 79 selects Hz or RPM.	
		Important: When sending values through DPI ports, simply remove the decimal point to arrive at the correct value (i.e. to send "5.00 Hz," use "500").	
❻	**Related** – Lists parameters (if any) that interact with the selected parameter. The symbol "" indicates that additional parameter information is available in Appendix B.		

How Parameters are Organized

The LCD HIM displays parameters in a **File-Group-Parameter** or **Numbered List** view order. To switch display mode, access the Main Menu, press ALT, then Sel while cursor is on the parameter selection. In addition, using [Param Access Lvl], the user has the option to display *all* parameters, commonly used parameters or diagnostic parameters.

File-Group-Parameter Order

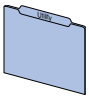
This simplifies programming by grouping parameters that are used for similar functions. The parameters are organized into 6 files in Basic Parameter view or 7 files in Advanced Parameter view. Each file is divided into groups, and each parameter is an element in a group. By default, the LCD HIM displays parameters by File-Group-Parameter view.

Numbered List View

All parameters are in numerical order.

Basic Parameter View

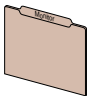
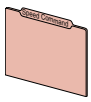
Parameter 196 [Param Access Lvl] set to option 0 “Basic.”

File	Group	Parameters					
Monitor 	Metering	Output Freq Commanded Speed Speed Reference	001 002 023	Commanded Torque Output Current Torque Current	024 003 004	DC Bus Voltage	012
Motor Control 	Motor Data	Motor NP Volts Motor NP FLA Motor NP Hertz	041 042 043	Motor NP RPM Motor NP Power Mtr NP Pwr Units	044 045 046	Motor OL Hertz Motor Poles	047 049
	Torq Attributes	Motor Cntl Sel	053	Maximum Freq	055	Autotune	061
Speed Command 	Spd Mode/ Limits	Speed Units Feedback Select	079 080	Minimum Speed Maximum Speed	081 082	Rev Speed Limit	454
	Speed References	Speed Ref A Sel Speed Ref A Hi Speed Ref A Lo	090 091 092	Speed Ref B Sel Speed Ref B Hi Speed Ref B Lo	093 094 095	TB Man Ref Sel TB Man Ref Hi TB Man Ref Lo	096 097 098
	Discrete Speeds	Jog Speed 1 Preset Speed 1 Preset Speed 2	100 101 102	Preset Speed 3 Preset Speed 4 Preset Speed 5	103 104 105	Preset Speed 6 Preset Speed 7 Jog Speed 2	106 107 108
Dynamic Control 	Ramp Rates	Accel Time 1 Accel Time 2	140 141	Decel Time 1 Decel Time 2	142 143	S-Curve %	146
	Load Limits	Current Lmt Sel	147	Current Lmt Val	148		
	Stop/Brake Modes	Stop/Brk Mode A Stop/Brk Mode B DC Brk Lvl Sel	155 156 157	DC Brake Level DC Brake Time Bus Reg Mode A	158 159 161	Bus Reg Mode B DB Resistor Type	162 163
	Restart Modes	Start At PowerUp	168	Auto Rstrt Tries	174	Auto Rstrt Delay	175
	Power Loss	Power Loss Mode	184	Power Loss Time	185	Power Loss Volts	186
Utility 	Direction Config	Direction Mode	190				
	Drive Memory	Param Access Lvl Reset To Defalts	196 197	Load Frm Usr Set Save To User Set	198 199	Language	201
	Diagnostics	Start Inhibits	214	Dig In Status	216	Dig Out Status	217
	Faults	Fault Config 1	238				
	Alarms	Alarm Config 1	259				

File	Group	Parameters					
Inputs/Outputs 	Analog Inputs	Anlg In Config	320	Analog In1 Lo	323	Analog In2 Lo	326
		Analog In1 Hi	322	Analog In2 Hi	325		
	Analog Outputs	Analog Out1, 2 Sel	342	Analog Out1, 2 Lo	344	Analog Out2 Hi	346
		Analog Out1 Hi	343	Analog Out1, 2 Sel	345	Analog Out1, 2 Lo	347
	Digital Inputs	Digital In1 Sel	361	Digital In4 Sel	364	20C-DG1 Remove	358
		Digital In2 Sel	362	Digital In5 Sel	365	20C-DG1 Status	359
		Digital In3 Sel	363	Digital In6 Sel	366		
	Digital Outputs	Digital Out1 Sel	380	Digital Out3 Sel	388	Dig Out2 Level	385
		Digital Out2 Sel	384	Dig Out1 Level	381	Dig Out3 Level	389

Advanced Parameter View

Parameter 196 [Param Access Lvl] set to option 1 “Advanced.”

File	Group	Parameters					
Monitor 	Metering	Output Freq	001	Flux Current	005	DC Bus Voltage	012
		Commanded Speed	002	Output Voltage	006	DC Bus Memory	013
		Ramped Speed	022	Output Power	007	Analog In1 Value	016
		Speed Reference	023	Output Powr Fctr	008	Analog In2 Value	017
		Commanded Torque	024	Elapsed MWh	009	Speed Reference	023
		Output Current	003	Elapsed Run Time	010	Speed Feedback	025
		Torque Current	004	MOP Reference	011		
	Drive Data	Rated kW	026	Rated Amps	028	Control SW Ver	029
		Rated Volts	027				
Motor Control 	Motor Data	Motor Type	040	Motor NP RPM	044	Motor OL Factor	048
		Motor NP Volts	041	Motor NP Power	045	Motor Poles	049
		Motor NP FLA	042	Mtr NP Pwr Units	046	Motor OL Mode	050
		Motor NP Hertz	043	Motor OL Hertz	047		
	Torq Attributes	Motor Cntl Sel	053	Flux Up Time	058	IR Voltage Drop	062
		Maximum Freq	055	SV Boost Filter	059	Flux Current Ref	063
		Flux Up Mode	057	Autotune	061	Compensation	056
	Volts per Hertz	Start/Acc Boost	069	Break Voltage	071	Break Frequency	072
Speed Command 	Spd Mode/ Limits	Speed Units	079	Overspeed Limit	083	Skip Freq Band	087
		Feedback Select	080	Skip Frequency 1	084	Speed/Torque Mod	088
		Minimum Speed	081	Skip Frequency 2	085	Rev Speed Limit	454
		Maximum Speed	082	Skip Frequency 3	086		
	Speed References	Speed Ref A Sel	090	Speed Ref B Sel	093	TB Man Ref Sel	096
		Speed Ref A Hi	091	Speed Ref B Hi	094	TB Man Ref Hi	097
		Speed Ref A Lo	092	Speed Ref B Lo	095	TB Man Ref Lo	098
	Discrete Speeds	Jog Speed 1	100	Preset Speed 3	103	Preset Speed 6	106
		Preset Speed 1	101	Preset Speed 4	104	Preset Speed 7	107
		Preset Speed 2	102	Preset Speed 5	105	Jog Speed 2	108
	Speed Trim	Trim In Select	117	Trim Hi	119	Trim % Setpoint	116
		Trim Out Select	118	Trim Lo	120		
	Slip Comp	Slip RPM @ FLA	121	Slip RPM Meter	123		
	Process PI	PI Configuration	124	PI Lower Limit	131	PI Output Meter	138
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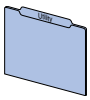	HIM Ref Config	Save HIM Ref	192	Man Ref Preload	193		
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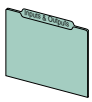		Anlg In Sqr Root	321	Analog In1 Lo	323	Analog In2 Loss	327
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		Digital Out2 Sel	384	Dig Out3 Level	389		

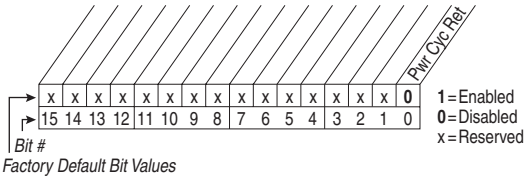
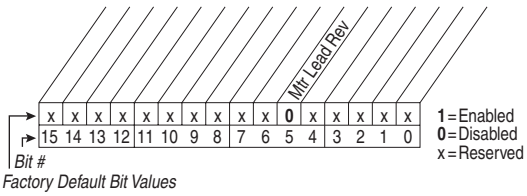
Monitor File

File	Group	No.	Parameter Name & Description	Values		Related
MONITOR	Metering	001	**[Output Freq]** Output frequency present at U/T1, V/T2 & W/T3.	Default: Min/Max: Units:	Read Only –/+[Maximum Freq] 0.1 Hz	
		002	**[Commanded Speed]** Value of the active Speed/Frequency Reference. Displayed in Hz or RPM, depending on value of [Speed Units].	Default: Min/Max: Units:	Read Only –/+[Maximum Speed] 0.1 Hz 0.1 RPM	079
		003	**[Output Current]** The total output current present at U/T1, V/T2 & W/T3.	Default: Min/Max: Units:	Read Only 0.0/Drive Rated Amps x 2 0.1 Amps	
		004	**[Torque Current]** Based on the motor, the amount of current that is in phase with the fundamental voltage component.	Default: Min/Max: Units:	Read Only Drive Rating x –2/+2 0.1 Amps	
		005	**[Flux Current]** Amount of current that is out of phase with the fundamental voltage component.	Default: Min/Max: Units:	Read Only Drive Rating x –2/+2 0.1 Amps	
		006	**[Output Voltage]** Output voltage present at terminals U/T1, V/T2 & W/T3.	Default: Min/Max: Units:	Read Only 0.0/Drive Rated Volts 0.1 VAC	
		007	**[Output Power]** Output power present at U/T1, V/T2 & W/T3.	Default: Min/Max: Units:	Read Only 0.0/Drive Rated kW x 2 0.1 kW	
		008	**[Output Powr Fctr]** Output power factor.	Default: Min/Max: Units:	Read Only 0.00/1.00 0.01	
		009	**[Elapsed MWh]** Accumulated output energy of the drive.	Default: Min/Max: Units:	Read Only 0.0/429496729.5 MWh 0.1 MWh	
		010	**[Elapsed Run Time]** Accumulated time drive is outputting power.	Default: Min/Max: Units:	Read Only 0.0/214748364.0 Hrs 0.1 Hrs	
		011	**[MOP Reference]** Value of the signal at MOP (Motor Operated Potentiometer).	Default: Min/Max: Units:	Read Only –/+[Maximum Speed] 0.1 Hz 0.1 RPM	079
		012	**[DC Bus Voltage]** Present DC bus voltage level.	Default: Min/Max: Units:	Read Only 0.0/Based on Drive Rating 0.1 VDC	
		013	**[DC Bus Memory]** Approximate full load DC bus voltage level.	Default: Min/Max: Units:	Read Only 0.0/Based on Drive Rating 0.1 VDC	
		016 017	**[Analog In1 Value]** **[Analog In2 Value]** Value of the signal at the analog inputs.	Default: Min/Max: Units:	Read Only 0.000/20.000 mA –/+10.000V 0.001 mA 0.001 Volt	
		022	**[Ramped Speed]** Value of commanded speed after Accel/Decel, and S-Curve are applied.	Default: Min/Max: Units:	Read Only –/+320.0 Hz –/+19200.0 RPM 0.1 Hz 0.1 RPM	079

File	Group	No.	Parameter Name & Description	Values		Related
MONITOR	Metering	023	**[Speed Reference]** Summed value of ramped speed, process PI and droop.	Default: Min/Max: Units:	Read Only –/+320.0 Hz –/+19200.0 RPM 0.1 Hz 0.1 RPM	079
		024	**[Commanded Torque]** Final torque reference value after limits and filtering are applied. Percent of motor rated torque. Note: Added for firmware version 4.001.	Default: Min/Max: Units:	Read Only –/+800.0% 0.1%	053
		025	**[Speed Feedback]** This parameter displays the estimated value of actual motor speed.	Default: Min/Max: Units:	Read Only –/+320.0 Hz –/+19200.0 RPM 0.1 Hz 0.1 RPM	
	Drive Data	026	**[Rated kW]** Drive power rating.	Default: Min/Max: Units:	Read Only 0.00/3000.00 kW 0.01 kW	
		027	**[Rated Volts]** The drive input voltage class (208, 240, 400 etc.).	Default: Min/Max: Units:	Read Only 0.0/690.0 VAC 0.1 VAC	
		028	**[Rated Amps]** The drive rated output current.	Default: Min/Max: Units:	Read Only 0.0/6553.5 Amps 0.1 Amps	
		029	**[Control SW Ver]** Main Control Board software version.	Default: Min/Max: Units:	Read Only 0.000/255.255 0.001	

Motor Control File

File	Group	No.	Parameter Name & Description	Values		Related
MOTOR CONTROL	Motor Data	040	**[Motor Type]** Set to match the type of motor connected.	Default: Options:	0 "Induction" 0 "Induction"	053
		041	**[Motor NP Volts]** Set to the motor nameplate rated volts.	Default: Min/Max: Units:	Based on Drive Rating 0.0/[Rated Volts] 0.1 VAC	
		042	**[Motor NP FLA]** Set to the motor nameplate rated full load amps.	Default: Min/Max: Units:	Based on Drive Rating 0.0/[Rated Amps] × 2 0.1 Amps	047 048
		043	**[Motor NP Hertz]** Set to the motor nameplate rated frequency.	Default: Min/Max: Units:	Based on Drive Cat. No. 5.0/320.0 Hz 0.1 Hz	
		044	**[Motor NP RPM]** Set to the motor nameplate rated RPM.	Default: Min/Max: Units:	1750.0 RPM 60.0/19200.0 RPM 1.0 RPM	
		045	**[Motor NP Power]** Set to the motor nameplate rated power.	Default: Min/Max: Units:	Based on Drive Rating 0.00/5000.00 0.01 kW/HP See [Mtr NP Pwr Units]	046

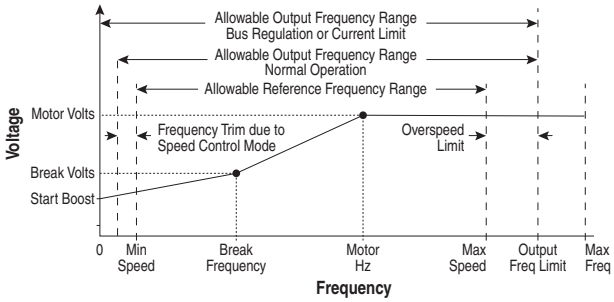
File	Group	No.	Parameter Name & Description	Values			Related
MOTOR CONTROL	Motor Data	046	**[Mtr NP Pwr Units]** Selects the motor power units to be used. "Convert HP" = converts all power units to Horsepower. "Convert kW" = converts all power units to kilowatts. Note: This parameter does not get changed with a "Reset to Defaults".	Default: Options:	 0 1 2 3	Drive Rating Based "Horsepower" "kiloWatts" "Convert HP" "Convert kW"	
		047	**[Motor OL Hertz]** Selects the output frequency below which the motor operating current is derated. The motor thermal overload will generate a fault at lower levels of current below this output frequency.	Default: Min/Max: Units:	Motor NP Hz/3 0.0/Motor NP Hz 0.1 Hz		042 220
		048	**[Motor OL Factor]** Sets the operating level for the motor overload. Motor FLA x OL Factor = Operating Level	Default: Min/Max: Units:	1.00 0.20/2.00 0.01		042 220
		049	**[Motor Poles]** Defines the number of poles in the motor. Note: Maximum value changed from 12 to 18 for firmware version 4.001.	Default: Min/Max: Units:	4 2/18 1 Pole		
		050	**[Motor OL Mode]** "Pwr Cyc Ret" - If "0", the value of parameter 220 [Motor OL Count] is reset to zero by a drive reset or power cycle. If "1", the value of parameter 220 [Motor OL Count] is maintained. A "1" to "0" transition resets parameter 220 [Motor OL Count] to zero. Note: Added for firmware version 3.001.  *Factory Default Bit Values*				220
	Torq Attributes	053	**[Motor Cntl Sel]** Sets the method of motor control used in the drive.	Default: Options:	0 0 1 2 3	"Sensrls Vect" "Sensrls Vect" "SV Economize" "Custom V/Hz" "Fan/Pmp V/Hz"	
		055	**[Maximum Freq]** Sets the highest frequency the drive will output. Refer to parameter 083 [Overspeed Limit].	Default: Min/Max: Units:	60.0 or 70.0 Hz 5.0/320.0 Hz 0.1 Hz		083
		056	**[Compensation]** "Mtr Lead Rev" - If "1", reverses the phase rotation of the applied voltage, effectively reversing the motor leads. Notes: Not retained when the parameters are reset to defaults. Added for firmware version 3.001.  *Factory Default Bit Values*				

File	Group	No.	Parameter Name & Description	Values			Related
MOTOR CONTROL	Torq Attributes	057	**[Flux Up Mode]** Flux is established for [Flux Up Time] before acceleration.	Default: Options:	0 0	"Manual" "Manual"	053 058
		058	**[Flux Up Time]** Sets the amount of time the drive will use to try and achieve full motor stator flux. When a Start command is issued, DC current at current limit level is used to build stator flux before accelerating. This will occur unless [Rated Amps] is less than [Motor NP FLA], then only 81% of drive rated current is used.	Default: Min/Max: Units:	0.2 Secs 0.0/5.0 Secs 0.1 Secs		053 058
		059	**[SV Boost Filter]** Sets the amount of filtering used to boost voltage during Sensorless Vector operation.	Default: Min/Max: Units:	55 0/32767 1		
		061	**[Autotune]** Provides a manual or automatic method for setting [IR Voltage Drop], and [Flux Current Ref]. Note: Program parameter 053 [Motor Cntl Sel] prior to running an autotune.	Default: Options:	3 0 1 2 3	"Calculate" "Ready" "Static Tune" "Rotate Tune" "Calculate"	053 062
			"Ready" (0) = Parameter returns to this setting following a "Static Tune" or "Rotate Tune." It also permits manually setting [IR Voltage Drop], [Ixo Voltage Drop] and [Flux Current Ref]. "Static Tune" (1) = A temporary command that initiates a non-rotational motor stator resistance test for the best possible automatic setting of [IR Voltage Drop], [Break Voltage] and [Break Frequency] in all modes. A start command is required within 20 seconds following initiation of this setting. The parameter returns to "Ready" (0) following the test, at which time another start transition is required to operate the drive in normal mode. Used when motor cannot be rotated. "Rotate Tune" (2) = A temporary command that initiates a "Static Tune" followed by a rotational test for the best possible automatic setting of [Flux Current Ref] and [Start Boost]. A start command is required following initiation of this setting. The parameter returns to "Ready" (0) following the test, at which time another start transition is required to operate the drive in normal mode. **Important:** Used when motor is uncoupled from the load. Results may not be valid if a load is coupled to the motor during this procedure. **ATTENTION:** Rotation of the motor in an undesired direction can occur during this procedure. To guard against possible injury and/or equipment damage, it is recommended that the motor be disconnected from the load before proceeding. "Calculate" (3) = This setting uses motor nameplate data to automatically set [IR Voltage Drop], [Flux Current Ref] and [Slip RPM @ FLA].				
		062	**[IR Voltage Drop]** Value of voltage drop across the resistance of the motor stator at rated motor current.	Default: Min/Max: Units:	Based on Drive Rating 0.0/[Motor NP Volts]×0.50 0.1 VAC		053 061
		063	**[Flux Current Ref]** Value of amps for full motor flux.	Default: Min/Max: Units:	Based on Drive Rating 0.00/[Motor NP FLA] 0.01 Amps		053 061

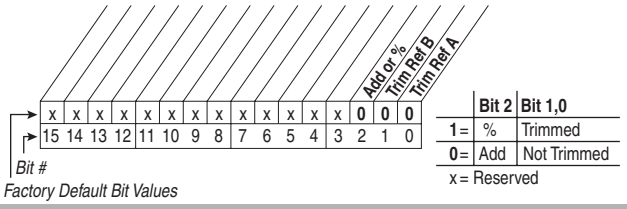
File	Group	No.	Parameter Name & Description	Values		Related
MOTOR CONTROL	Volts per Hertz	069	**[Start Boost]** Sets the voltage boost level for starting and acceleration. Refer to parameter 083 [Overspeed Limit].	Default: Min/Max: Units:	Based on Drive Rating 0.0/[Motor NP Volts] × 0.25 0.1 VAC	053
		071	**[Break Voltage]** Sets the voltage the drive will output at [Break Frequency]. Refer to parameter 083 [Overspeed Limit].	Default: Min/Max: Units:	[Motor NP Volts] × 0.25 0.0/[Motor NP Volts] 0.1 VAC	053 072
		072	**[Break Frequency]** Sets the frequency the drive will output at [Break Voltage]. Refer to parameter 083.	Default: Min/Max: Units:	[Motor NP Hz] × 0.25 0.0/[Maximum Freq] 0.1 Hz	053 071

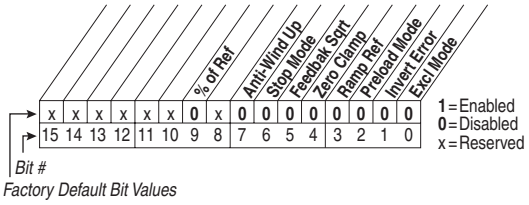
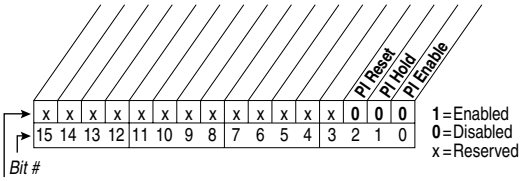
Speed Command File

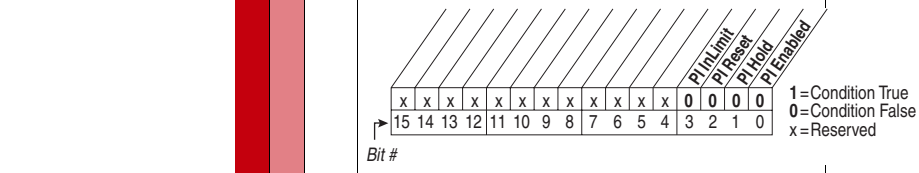
File	Group	No.	Parameter Name & Description	Values			Related
SPEED COMMAND	Spd Mode/Limits	079	**[Speed Units]** Selects the units to be used for all speed related parameters. Options 0 & 1 indicate status only. Options 2 & 3 will convert/configure the drive for that selection. "Convert Hz" (2) - converts all speed based parameters to Hz, and changes the value proportionately (i.e. 1800 RPM = 60 Hz). "Convert RPM" (3) - converts all speed based parameters to RPM, and changes the value proportionately. Note: This parameter does not get changed with a "Reset to Defaults".	Default: Options:	0 0 1 2 3	"Hz" "Hz" "RPM" "Convert Hz" "Convert RPM"	
		080	**[Feedback Select]** Selects the source for motor speed feedback. "Open Loop" (0) - no encoder is present, and slip compensation is not needed. "Slip Comp" (1) - tight speed control is needed, and encoder is not present.	Default: Options:	0 0 1	"Open Loop" "Open Loop" "Slip Comp"	152
		081	**[Minimum Speed]** Sets the low limit for speed reference after scaling is applied. Refer to parameter 083 [Overspeed Limit].	Default: Min/Max: Units:	0.0 0.0/[Maximum Speed] 0.1 Hz 0.1 RPM		079 083 092 095
		082	**[Maximum Speed]** Sets the high limit for speed reference after scaling is applied. Refer to parameter 083 [Overspeed Limit].	Default: Min/Max: Units:	50.0 or 60.0 Hz (volt class) [Motor NP RPM] 5.0/320.0 Hz 75.0/19200.0 RPM 0.1 Hz 0.1 RPM		055 079 083 091 094

File	Group	No.	Parameter Name & Description	Values		Related
SPEED COMMAND	Spd Mode/Limits	083	**[Overspeed Limit]** Sets the incremental amount of the output frequency (above [Maximum Speed]) allowable for functions such as slip compensation. [Maximum Speed] + [Overspeed Limit] must be ≤[Maximum Freq]	Default: Min/Max: Units:	10.0 Hz 300.0 RPM 0.0/20.0 Hz 0.0/600.0 RPM 0.1 Hz 0.1 RPM	055 079 082
						
		084 085 086	**[Skip Frequency 1]** **[Skip Frequency 2]** **[Skip Frequency 3]** Sets a frequency at which the drive will not operate. [Skip Frequency 1-3] and [Skip Frequency Band] must not equal 0.	Default: Default: Default: Min/Max: Units:	0.0 Hz 0.0 Hz 0.0 Hz –/+[Maximum Speed] 0.1 Hz	087
		087	**[Skip Freq Band]** Determines the bandwidth around a skip frequency. [Skip Freq Band] is split, applying 1/2 above and 1/2 below the actual skip frequency. The same bandwidth applies to all skip frequencies.	Default: Min/Max: Units:	0.0 Hz 0.0/30.0 Hz 0.1 Hz	084 085 086
		088	**[Speed/Torque Mod]** Selects the torque reference source. "Speed Reg" (1) - drive operates as a speed regulator.	Default: Options:	1 "Speed Reg" 1 "Speed Reg"	053
		454	**[Rev Speed Limit]** Sets a limit on speed in the negative direction. Used in bipolar mode only. A value of zero disables this parameter and uses [Min Speed] for minimum speed.	Default: Min/Max: Units:	0.0 RPM –[Max Speed]/0.0 Hz –[Max Speed]/0.0 RPM 0.0 Hz 0.0 RPM	
	Speed References	090	**[Speed Ref A Sel]** Selects the source of the speed reference to the drive unless [Speed Ref B Sel] or [Preset Speed 1-7] is selected. (1) See Installation Manual for DPI port locations.	Default: Options:	2 "Analog In 2" 1 "Analog In 1" 2 "Analog In 2" 3-8 "Reserved" 9 "MOP Level" 10 "Reserved" 11 "Preset Spd1" 12 "Preset Spd2" 13 "Preset Spd3" 14 "Preset Spd4" 15 "Preset Spd5" 16 "Preset Spd6" 17 "Preset Spd7" 18 "DPI Port 1"(1) 19 "DPI Port 2"(1) 20 "DPI Port 3"(1) 21 "DPI Port 4"(1) 22 "DPI Port 5"(1)	002 091 thru 093 101 thru 107 117 thru 120 192 thru 194 213 272 273 320 361 thru 366

File	Group	No.	Parameter Name & Description	Values		Related
SPEED COMMAND	Speed References	091	**[Speed Ref A Hi]** Scales the upper value of the [Speed Ref A Sel] selection when the source is an analog input.	Default: Min/Max: Units:	[Maximum Speed] –/+[Maximum Speed] 0.1 Hz 0.01 RPM	079 082
		092	**[Speed Ref A Lo]** Scales the lower value of the [Speed Ref A Sel] selection when the source is an analog input.	Default: Min/Max: Units:	0.0 –/+[Maximum Speed] 0.1 Hz 0.01 RPM	079 081
		093	**[Speed Ref B Sel]** See [Speed Ref A Sel].	Default: Options:	11 "Preset Spd1" See [Speed Ref A Sel]	090
		094	**[Speed Ref B Hi]** Scales the upper value of the [Speed Ref B Sel] selection when the source is an analog input.	Default: Min/Max: Units:	[Maximum Speed] –/+[Maximum Speed] 0.1 Hz 0.01 RPM	079 093
		095	**[Speed Ref B Lo]** Scales the lower value of the [Speed Ref B Sel] selection when the source is an analog input.	Default: Min/Max: Units:	0.0 –/+[Maximum Speed] 0.1 Hz 0.01 RPM	079 090 093
		096	**[TB Man Ref Sel]** Sets the manual speed reference source when a digital input is configured for "Auto/Manual." (1) "Analog In 2" is not a valid selection if it was selected for any of the following: - [Trim In Select] - [PI Feedback Sel] - [PI Reference Sel] - [Current Lmt Sel] - [Sleep Wake Ref]	Default: Options:	1 "Analog In 1" 1 "Analog In 1" 2 "Analog In 2"(1) 3-8 "Reserved" 9 "MOP Level"	097 098
		097	**[TB Man Ref Hi]** Scales the upper value of the [TB Man Ref Sel] selection when the source is an analog input.	Default: Min/Max: Units:	[Maximum Speed] –/+[Maximum Speed] 0.1 Hz 0.01 RPM	079 096
		098	**[TB Man Ref Lo]** Scales the lower value of the [TB Man Ref Sel] selection when the source is an analog input.	Default: Min/Max: Units:	0.0 –/+[Maximum Speed] 0.1 Hz 0.01 RPM	079 096
	Discrete Speeds	100	**[Jog Speed 1]** Sets the output frequency when Jog Speed 1 is selected.	Default: Min/Max: Units:	10.0 Hz 300.0 RPM –/+[Maximum Speed] 0.1 Hz 1 RPM	079
		101 102 103 104 105 106 107	**[Preset Speed 1]** **[Preset Speed 2]** **[Preset Speed 3]** **[Preset Speed 4]** **[Preset Speed 5]** **[Preset Speed 6]** **[Preset Speed 7]** Provides an internal fixed speed command value. In bipolar mode direction is commanded by the sign of the reference.	Default: Min/Max: Units:	5.0 Hz/150 RPM 10.0 Hz/300 RPM 20.0 Hz/600 RPM 30.0 Hz/900 RPM 40.0 Hz/1200 RPM 50.0 Hz/1500 RPM 60.0 Hz/1800 RPM –/+[Maximum Speed] 0.1 Hz 1 RPM	079 090 093

File	Group	No.	Parameter Name & Description	Values		Related
SPEED COMMAND	Discrete Speeds	108	**[Jog Speed 2]** Sets the output frequency when Jog Speed 2 is selected.	Default: Min/Max: Units:	10.0 Hz 300.0 RPM –/+[Maximum Speed] 0.1 Hz 1 RPM	
	Speed Trim	116	**[Trim % Setpoint]** Adds or subtracts a percentage of the speed reference or maximum speed. Dependent on the setting of parameter 118 [Trim Out Select]. Note: Added for firmware version 3.001.	Default: Min/Max: Units:	0.0% –/+200% 0.1%	118
		117	**[Trim In Select]** Specifies which analog input signal is being used as a trim input. (1) See Installation Manual for DPI port locations.	Default: Options:	2 "Analog In 2" 0 "Setpoint" 1 "Analog In 1" 2 "Analog In 2" 3-8 "Reserved" 9 "MOP Level" 10 "Reserved" 11 "Preset Spd1" 12 "Preset Spd2" 13 "Preset Spd3" 14 "Preset Spd4" 15 "Preset Spd5" 16 "Preset Spd6" 17 "Preset Spd7" 18 "DPI Port 1"(1) 19 "DPI Port 2"(1) 20 "DPI Port 3"(1) 21 "DPI Port 4"(1) 22 "DPI Port 5"(1)	090 093
		118	**[Trim Out Select]** Specifies which speed references are to be trimmed and allows you to trim the speed reference based on a percentage or the frequency of the input signal. Note: Added bit 2 "Add or %" for firmware version 3.001.  		117 119 120
		119	**[Trim Hi]** Scales the upper value of the [Trim In Select] selection when the source is an analog input.	Default: Min/Max: Units:	60.0 Hz –/+[Maximum Speed] 0.1 Hz 1 RPM	079 082 117
		120	**[Trim Lo]** Scales the lower value of the [Trim In Select] selection when the source is an analog input.	Default: Min/Max: Units:	0.0 Hz –/+[Maximum Speed] 0.1 Hz 1 RPM	079 117
	Slip Comp		**Important:** Parameters in the Slip Comp Group are used to enable and tune the Slip Compensation Regulator. In order to allow the Slip Compensation Regulator to control drive operation, parameter 080 [Feedback Select] must be set to 1 "Slip Comp".			
		121	**[Slip RPM @ FLA]** Sets the amount of compensation to drive output at motor FLA.	Default: Min/Max: Units:	Based on [Motor NP RPM] 0.0/1200.0 RPM 0.1 RPM	061 080 123

File	Group	No.	Parameter Name & Description	Values			Related
SPEED COMMAND	Slip Comp	123	**[Slip RPM Meter]** Displays the present amount of adjustment being applied as slip compensation.	Default: Min/Max: Units:	Read Only –/+300.0 RPM 0.1 RPM		080 121
	Process PI	124	**[PI Configuration]** Sets configuration of the PI regulator. Note: Added bit 9 "% of Ref" for firmware version 3.001.  *Factory Default Bit Values*				124 thru 138
		125	**[PI Control]** Controls the PI regulator.  *Factory Default Bit Values*				080
		126	**[PI Reference Sel]** Selects the source of the PI reference.	Default: Options:	0 0 1 2 3-8 9 10 11-17 18-22	"PI Setpoint" "PI Setpoint" "Analog In 1" "Analog In 2" "Reserved" "MOP Level" "Master Ref" "Preset Spd1-7" "DPI Port 1-5"	124 thru 138
		127	**[PI Setpoint]** Provides an internal fixed value for process setpoint when [PI Reference Sel] is set to "PI Setpoint."	Default: Min/Max: Units:	50.0% –/+100.0% of Maximum Process Value 0.1%		124 thru 138
		128	**[PI Feedback Sel]** Selects the source of the PI feedback.	Default: Options:	2 	"Analog In 2" See [PI Reference Sel].	124 thru 138
		129	**[PI Integral Time]** Time required for the integral component to reach 100% of [PI Error Meter]. Not functional when the PI Hold bit of [PI Control] = "1" (enabled).	Default: Min/Max: Units:	2.0 Secs 0.00/100.00 Secs 0.01 Secs		124 thru 138
		130	**[PI Prop Gain]** Sets the value for the PI proportional component. PI Error x PI Prop Gain = PI Output	Default: Min/Max: Units:	1.0 0.00/100.00 0.01		124 thru 138
		131	**[PI Lower Limit]** Sets the lower limit of the PI output.	Default: Min/Max: Units:	–[Maximum Freq] 100% –/+800.0% 0.1%		079 124 thru 138

File	Group	No.	Parameter Name & Description	Values		Related
SPEED COMMAND	Process PI	132	**[PI Upper Limit]** Sets the upper limit of the PI output.	Default: Min/Max: Units:	+[Maximum Freq] 100% –/+800.0% 0.1%	079 124 thru 138
		133	**[PI Preload]** Sets the value used to preload the integral component on start or enable.	Default: Min/Max: Units:	0.0 Hz 100% –/+800.0% 0.1%	079 124 thru 138
		134	**[PI Status]** Status of the Process PI regulator. 	Read Only		124 thru 138
		135	**[PI Ref Meter]** Present value of the PI reference signal.	Default: Min/Max: Units:	Read Only –/+100.0% 0.1%	124 thru 138
		136	**[PI Fdback Meter]** Present value of the PI feedback signal.	Default: Min/Max: Units:	Read Only –/+100.0% 0.1%	124 thru 138
		137	**[PI Error Meter]** Present value of the PI error.	Default: Min/Max: Units:	Read Only –/+100.0% 0.1%	124 thru 138
		138	**[PI Output Meter]** Present value of the PI output.	Default: Min/Max: Units:	Read Only –/+100.0 Hz –/+100.0% 0.1 Hz 0.1%	124 thru 138
		460	**[PI Reference Hi]** Scales the upper value of [PI Reference Sel] of the source.	Default: Min/Max: Units:	100.0% –/+100.0% 0.1%	
		461	**[PI Reference Lo]** Scales the lower value of [PI Reference Sel] of the source.	Default: Min/Max: Units:	–100.0% –/+100.0% 0.1%	
		462	**[PI Feedback Hi]** Scales the upper value of [PI Feedback] of the source.	Default: Min/Max: Units:	100.0% –/+100.0% 0.1%	
		463	**[PI Feedback Lo]** Scales the lower value of [PI Feedback] of the source.	Default: Min/Max: Units:	0.0% –/+100.0% 0.1%	
		464	**[PI Output Gain]** Sets the gain factor for [PI Output Meter]. Note: Added for firmware version 3.001.	Default: Min/Max: Units:	1.000 –/+8.000 0.001	138

Dynamic Control File

File	Group	No.	Parameter Name & Description	Values			Related
DYNAMIC CONTROL	Ramp Rates	140 141	**[Accel Time 1]** **[Accel Time 2]** Sets rate of accel for all speed increases. $\frac{\text{Max Speed}}{\text{Accel Time}}$ = Accel Rate	Default: Min/Max: Units:	10.0 Secs 10.0 Secs 0.1/3276.7 Secs 0.1 Secs		142 143 146 361 thru 366
		142 143	**[Decel Time 1]** **[Decel Time 2]** Sets rate of decel for all speed decreases. $\frac{\text{Max Speed}}{\text{Decel Time}}$ = Decel Rate	Default: Min/Max: Units:	10.0 Secs 10.0 Secs 0.1/3276.7 Secs 0.1 Secs		140 141 146 361 thru 366
		146	**[S Curve %]** Sets the percentage of accel or decel time that is applied to the ramp as S Curve. Time is added, 1/2 at the beginning and 1/2 at the end of the ramp.	Default: Min/Max: Units:	0% 0/100% 1%		140 thru 143
	Load Limits	147	**[Current Lmt Sel]** Selects the source for the adjustment of current limit (i.e. parameter, analog input, etc.).	Default: Options:	0 0 1 2	"Cur Lim Val" "Cur Lim Val" "Analog In 1" "Analog In 2"	146 149
		148	**[Current Lmt Val]** Defines the current limit value when [Current Lmt Sel] = "Cur Lim Val."	Default: Min/Max: Units:	[Rated Amps] × 1.5 (Equation yields approximate default value.) Based on Drive Rating 0.1 Amps		147 149
		149	**[Current Lmt Gain]** Sets the responsiveness of the current limit.	Default: Min/Max: Units:	10000 0/32767 1		147 148
		150	**[Drive OL Mode]** Selects drive response to increasing drive temperature.	Default: Options:	3 0 1 2 3	"Both-PWM 1st" "Reserved" "Reduce Clim" "Reserved" "Both-PWM 1st"	
		151	**[PWM Frequency]** Sets the carrier frequency for the PWM output. Drive derating may occur at higher carrier frequencies.	Default: Min/Max: Units:	1.5 kHz or 2 kHz based on Drive Rating 1/Based on Drive Rating 1 kHz		
		152	**[Droop RPM @ FLA]** Selects amount of droop that the speed reference is reduced when at full load torque. Zero disables the droop function. **Important:** Selecting "Slip Comp" with param. 080 in conjunction with parameter 152, may produce undesirable results.	Default: Min/Max: Units:	0.0 RPM 0.0/200.0 RPM 0.1 RPM		
	Stop/Brake Modes	145	**[DB While Stopped]** Enables/disables dynamic brake operation when drive is stopped. DB may operate if input voltage becomes too high. Disabled = DB will not operate when the drive is stopped. Enabled = DB may operate whenever drive is energized. Note: Added for firmware version 3.001.	Default: Options:	0 0 1	"Disabled" "Disabled" "Enabled"	

File	Group	No.	Parameter Name & Description	Values			Related
DYNAMIC CONTROL	Stop/Brake Modes	155 156	**[Stop/Brk Mode A]** **[Stop/Brk Mode B]** Active stop mode. [Stop Mode A] is active unless [Stop Mode B] is selected by inputs. (1) Refer to Stop Modes on page B-17 for important information. (2) When using options 1 or 2, refer to the Attention statements at [DC Brake Level].	Default: Default: Options:	1 0 0 1 2 3	"Ramp" "Coast"(1) "Coast"(1) "Ramp"(2) "Ramp to Hold"(2) "DC Brake"	157 158 159 i
		157	**[DC Brake Lvl Sel]** Selects the source for [DC Brake Level].	Default: Options:	0 0 1 2	"DC Brake Lvl" "DC Brake Lvl" "Analog In 1" "Analog In 2"	155 156 158 159
		158	**[DC Brake Level]** Defines the DC brake current level injected into the motor when "DC Brake" is selected as a stop mode. The DC braking voltage used in this function is created by a PWM algorithm and may not generate the smooth holding force needed for some applications.	Default: Min/Max: Units:	[Rated Amps] 0/[Rated Amps] 0.1 Amps		
			ATTENTION: If a hazard of injury due to movement of equipment or material exists, an auxiliary mechanical braking device must be used. **ATTENTION:** This feature should not be used with synchronous or permanent magnet motors. Motors may be demagnetized during braking.				
		159	**[DC Brake Time]** Sets the amount of time DC brake current is "injected" into the motor.	Default: Min/Max: Units:	0.0 Secs 0.0/90.0 Secs 0.1 Secs		155 thru 158 i
		160	**[Bus Reg Ki]** Sets the responsiveness of the bus regulator.	Default: Min/Max: Units:	30 0/5000 1		161 162

File	Group	No.	Parameter Name & Description	Values			Related
DYNAMIC CONTROL	Stop/Brake Modes	161 162	**[Bus Reg Mode A]** **[Bus Reg Mode B]**	Default:	1 0	"Adjust Freq" "Disabled"	160 163
			Sets the method and sequence of the DC bus voltage regulator. Choices are dynamic brake, frequency adjust or both. Options 2 & 3 only appear when a dynamic brake is installed in the drive. Dynamic Brake Setup If a dynamic brake resistor is connected to the drive, both of these parameters must be set to either option 2 or 3. Refer to the Attention statement on page P-3 for important information on bus regulation.	Options:	0 1 2 3	"Disabled" "Adjust Freq" "Dynamic Brak" "Both-DB 1st"	
			ATTENTION: The drive does not offer protection for externally mounted brake resistors. A risk of fire exists if external braking resistors are not protected. External resistor packages must be self-protected from over temperature or the protective circuit shown in Figure B.2 on page B-7 (or equivalent) must be supplied.				
		163	**[DB Resistor Type]** Selects whether an external DB resistor will be used. Note: Used for frame 9 drives only.	Default: Options:	0 0 1	"None" "None" "External Res"	161 162
		164	**[Bus Reg Kp]** Proportional gain for the bus regulator. Used to adjust regulator response.	Default: Min/Max: Units:	610 0/10000 1		
		165	**[Bus Reg Kd]** Derivative gain for the bus regulator. Used to control regulator overshoot.	Default: Min/Max: Units:	122 0/10000 1		
		465	**[Fan Control]** Enables/Disables the drive cooling fan control. "Disabled" = Drive cooling fan control off - fan(s) always runs "Enabled" = Drive cooling fan control on - the cooling fan(s) stops if the drive is stopped and the heatsink temperature is below 55° C for 60 seconds Note: Added for firmware version 4.001.	Default: Options:	0 0 1	"Disabled" "Disabled" "Enabled"	
	Restart Modes	167	**[Powerup Delay]** Defines the programmed delay time, in seconds, before a start command is accepted after a power up.	Default: Min/Max: Units:	0.0 Secs 0.0/30.0 Secs 0.1 Secs		
		168	**[Start At PowerUp]** Enables/disables a feature to issue a Start or Run command and automatically resume running at commanded speed after drive input power is restored. Requires a digital input configured for Run or Start and a valid start contact.	Default: Options:	0 0 1	"Disabled" "Disabled" "Enabled"	

File	Group	No.	Parameter Name & Description	Values			Related
DYNAMIC CONTROL	Restart Modes		**ATTENTION:** Equipment damage and/or personal injury may result if this parameter is used in an inappropriate application. Do not use this function without considering applicable local, national and international codes, standards, regulations or industry guidelines.				
		169	**[Flying Start En]** Enables/disables the function which reconnects to a spinning motor at actual RPM when a start command is issued.	Default: Options:	0 0 1	"Disabled" "Disabled" "Enabled"	
		174	**[Auto Rstrt Tries]** Sets the maximum number of times the drive attempts to reset a fault and restart.	Default: Min/Max: Units:	0 0/9 1		175
			ATTENTION: Equipment damage and/or personal injury may result if this parameter is used in an inappropriate application. Do not use this function without considering applicable local, national and international codes, standards, regulations or industry guidelines.				
		175	**[Auto Rstrt Delay]** Sets the time between restart attempts when [Auto Rstrt Tries] is set to a value other than zero.	Default: Min/Max: Units:	1.0 Secs 0.5/30.0 Secs 0.1 Secs		174

File	Group	No.	Parameter Name & Description	Values			Related
DYNAMIC CONTROL	Restart Modes	178	**[Sleep Wake Mode]** Enables/disables the Sleep/Wake function. **Important:** When enabled, the following conditions must be met: • A proper minimum value must be programmed for [Sleep Level]. • A speed reference must be selected in [Speed Ref A Sel]. • At least one of the following must be programmed (and input closed) in [Digital Inx Sel]; "Enable," "Stop=CF," "Run," "Run Forward," "Run Reverse." Note: Option 2 was added for firmware version 2.001.	Default: Options:	0 0 1 2	"Disabled" "Disabled" "Direct" (Enabled) "Invert"	168
		179	**[Sleep Wake Ref]** Selects the source of the input controlling the Sleep Wake function.	Default: Options:	2 1 2 3-6	"Analog In 2" "Analog In 1" "Analog In 2" "Reserved"	
		180	**[Wake Level]** Defines the analog input level that will start the drive.	Default: Min/Max: Units:	6.000 mA, 6.000 Volts [Sleep Level]/20.000 mA 10.000 Volts 0.001 mA 0.001 Volts		181
		181	**[Wake Time]** Defines the amount of time at or above [Wake Level] before a Start is issued.	Default: Min/Max: Units:	0.0 Secs 0.0/1000.0 Secs 0.1 Secs		180

ATTENTION: Enabling the Sleep Wake function can cause unexpected machine operation during the Wake mode. Equipment damage and/or personal injury can result if this parameter is used in an inappropriate application. Do Not use this function without considering the table below and applicable local, national & international codes, standards, regulations or industry guidelines.

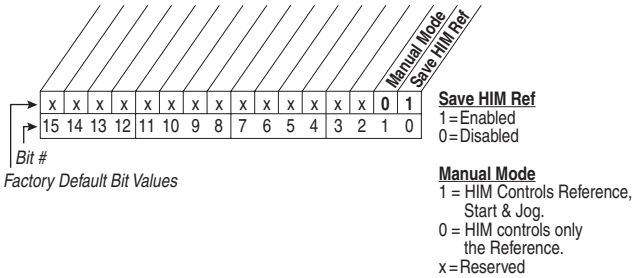
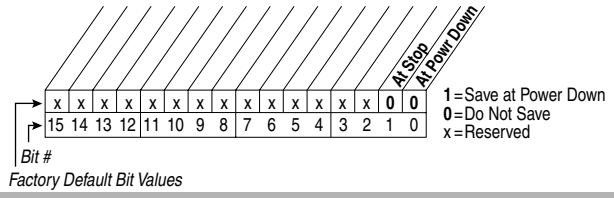
Conditions Required to Start Drive (1)(2)(3)

Input	After Power-Up	After a Drive Fault		After a Stop Command
		Reset by Stop-CF, HIM or TB	*Reset by Clear Faults (TB)*	*HIM or TB*
Stop	Stop Closed Wake Signal	Stop Closed Wake Signal New Start or Run Cmd. (4)	Stop Closed Wake Signal	Stop Closed Analog Sig. > Sleep Level (6) New Start or Run Cmd. (4)
Enable	Enable Closed Wake Signal (4)	Enable Closed Wake Signal New Start or Run Cmd. (4)	Enable Closed Wake Signal	Enable Closed Analog Sig. > Sleep Level (6) New Start or Run Cmd. (4)
Run Run For. Run Rev.	Run Closed Wake Signal	New Run Cmd. (5) Wake Signal	Run Closed Wake Signal	New Run Cmd. (5) Wake Signal

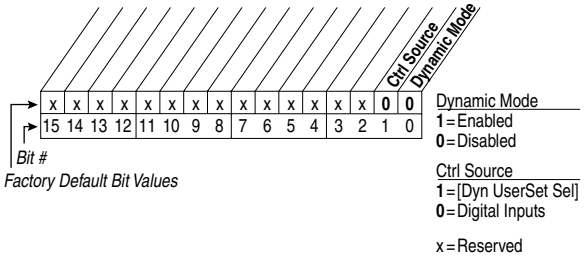
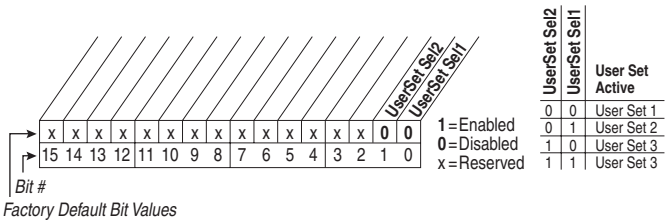
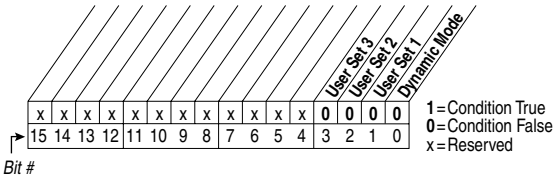
(1) When power is cycled, if all conditions are present after power is restored, restart will occur.
(2) The drive only starts after Sleep Wake Mode is "enabled" and a valid signal is received.
(3) The active speed reference is determined as explained in "Reference Control" in the Installation Manual. The Sleep/Wake function and the speed reference may be assigned to the same input.
(4) Command must be issued from HIM, TB or network.
(5) Run Command must be cycled.
(6) Signal does not need to be greater than wake level.

File	Group	No.	Parameter Name & Description	Values			Related
DYNAMIC CONTROL	Restart Modes	182	**[Sleep Level]** Defines the analog input level that will stop the drive.	Default: Min/Max: Units:	5.000 mA, 5.000 Volts 4.000 mA/[Wake Level] 0.000 Volts/[Wake Level] 0.001 mA 0.001 Volts		183
		183	**[Sleep Time]** Defines the amount of time at or below [Sleep Level] before a Stop is issued.	Default: Min/Max: Units:	0.0 Secs 0.0/1000.0 Secs 0.1 Secs		182
	Power Loss	184	**[Power Loss Mode]** Sets the reaction to a loss of input power. Power loss is recognized when: • DC bus voltage is ≤73% of [DC Bus Memory] and [Power Loss Mode] is set to "Coast". • DC bus voltage is ≤82% of [DC Bus Memory] and [Power Loss Mode] is set to "Decel".	Default: Options:	0 0 1 2	"Coast" "Coast" "Decel" "Continue"	013 185
		185	**[Power Loss Time]** Sets the time that the drive will remain in power loss mode before a fault is issued.	Default: Min/Max: Units:	0.5 Secs 0.0/60.0 Secs 0.1 Secs		184
		186	**[Power Loss Volts]** Sets the level at which the [Power Loss Mode] selection will occur.	Default: Min/Max: Units:	Based on Drive Rated Volts 170.0/780.0 VDC 0.1 VDC		
			The drive can use the percentages referenced in [Power Loss Mode] or a trigger point can be set at [Power Loss Volts]. A digital input (programmed to "29, Pwr Loss Lvl") is used to toggle between fixed percentages and the [Power Loss Volts] level. **ATTENTION:** Drive damage can occur if proper input impedance is not provided as explained below. If the value for [Power Loss Volts] is less than 82% of the nominal DC bus voltage, the user must provide a minimum line impedance to limit inrush current when the power line recovers. The input impedance should be equal to or greater than the equivalent of a 5% transformer with a VA rating 5 times the drives input VA rating.				
		189	**[Shear Pin Time]** Sets the time that the drive is at or above current limit before a fault occurs. Zero disables this feature. Note: Added for firmware version 3.001.	Default: Min/Max: Units:	0.0 Secs 0.0/30.0 Secs 0.1 Secs		238

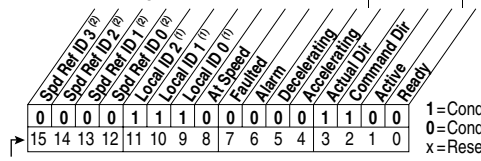
Utility File

File	Group	No.	Parameter Name & Description	Values			Related
UTILITY	Direction Config	190	**[Direction Mode]** Selects the method for changing drive direction. Mode: Unipolar — Direction Change: Drive Logic; Bipolar — Sign of Reference; Reverse Dis — Not Changeable	Default: Options:	0 0 1 2	"Unipolar" "Unipolar" "Bipolar" "Reverse Dis"	320 thru 327, 361 thru 366
	HIM Ref Config	192	**[Save HIM Ref]** • Bit 0 "Save HIM Ref" enables a feature to save the present frequency reference value issued by the HIM to Drive memory on power loss. Value is restored to the HIM on power up. • Bit 1 " Manual Mode" enables the HIM to control the Speed Reference only or the Speed Reference, Start and Jog in Manual mode, including two-wire control. Note: Bit 1 " Manual Mode" was added for firmware version 4.001.  				
		193	**[Man Ref Preload]** Enables/disables a feature to automatically load the present "Auto" frequency reference value into the HIM when "Manual" is selected. Allows smooth speed transition from "Auto" to "Manual."	Default: Options:	0 0 1	"Disabled" "Disabled" "Enabled"	
	MOP Config	194	**[Save MOP Ref]** Enables/disables the feature that saves the present MOP frequency reference at power down or at stop.  				
		195	**[MOP Rate]** Sets rate of change of the MOP reference in response to a digital input.	Default: Min/Max: Units:	1.0 Hz/s 30.0 RPM/s 0.2/[Maximum Speed] 6.0/[Maximum Speed] 0.1 Hz/s 0.1 RPM/s		
	Drive Memory	196	**[Param Access Lvl]** Selects the parameter display level viewable on the HIM. Basic = Reduced param. set Advanced = Full param. set	Default: Options:	0 0 1 2	"Basic" "Basic" "Advanced" "Reserved"	

File	Group	No.	Parameter Name & Description	Values			Related
UTILITY	Drive Memory	197	**[Reset To Defalts]** Resets parameters to the factory defaults except parameters [Mtr NP Pwr Units], [Speed Units], [Language], and [Param Access Lvl] (parameters 46, 79, 196 and 201). **Important:** The drive will reset after a reset to defaults. • 1 "Ready" - resets all affected parameters to the factory default based on the value of [Voltage Class]. • 2 "Low Voltage" and 3 "High Voltage" will set [Voltage Class] to "low" or "high" voltage setting, respectively, then reset the parameters to the factory default based on the value of [Voltage Class].	Default: Options:	0 0 1 2 3	"Ready" "Ready" "Factory" "Low Voltage" "High Voltage"	041 thru 045 047 055 062 063 069 thru 072 082 148 158 202
		198	**[Load Frm Usr Set]** Loads a previously saved set of parameter values from a selected user set location in drive nonvolatile memory to active drive memory.	Default: Options:	0 0 1 2 3	"Ready" "Ready" "User Set 1" "User Set 2" "User Set 3"	199
		199	**[Save To User Set]** Saves the parameter values in active drive memory to a user set in drive nonvolatile memory.	Default: Options:	0 0 1 2 3	"Ready" "Ready" "User Set 1" "User Set 2" "User Set 3"	198
		200	**[Reset Meters]** Resets selected meters to zero.	Default: Options:	0 0 1 2	"Ready" "Ready" "MWh" "Elapsed Time"	
		201	**[Language]** Selects the display language when using an LCD HIM. This parameter is not functional with an LED HIM. Options 6, 8 and 9 are "Reserved."	Default: Options:	0 0 1 2 3 4 5 7 10	"Not Selected" "Not Selected" "English" "Francais" "Español" "Italiano" "Deutsch" "Português" "Nederlands"	
		202	**[Voltage Class]** Displays the last "Reset to Defaults" operation.	Default: Options:	 0 1	Read Only "Low Voltage" "High Voltage"	
		203	**[Drive Checksum]** Provides a checksum value that indicates whether or not a change in drive programming has occurred.	Default: Min/Max: Units:	Read Only 0/65535 1		

File	Group	No.	Parameter Name & Description	Values	Related
UTILITY	Drive Memory	204	**[Dyn UsrSet Cnfg]** Enables/Disables dynamic selection of user parameter sets. **Important:** In dynamic mode, changes to the parameters are not saved to nonvolatile storage. Switching user sets restores the values last saved before enabling dynamic mode. Note: Added for firmware version 4.001.		
		205	**[Dyn UsrSet Sel]** Selects user set if [Dyn UsrSet Cnfg] = xxxx xx11. **Important:** All digital input selections (parameters 361-366) must be identical in all three user sets for proper Dynamic User Set operation (even if only two sets are used). Note: Added for firmware version 4.001.		
		206	**[Dyn UserSet Actv]** Indicates the active user set and if the operation is dynamic or normal. Note: Added for firmware version 4.001.		

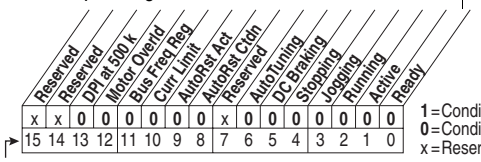
File	Group	No.	Parameter Name & Description	Values	Related
UTILITY	Diagnostics	209	**[Drive Status 1]** Present operating condition of the drive.	Read Only	210



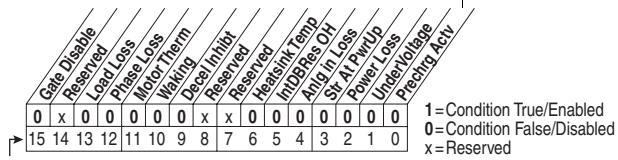
Bits (2)				
15	14	13	12	Description
0	0	0	0	Ref A Auto
0	0	0	1	Ref B Auto
0	0	1	0	Preset 2 Auto
0	0	1	1	Preset 3 Auto
0	1	0	0	Preset 4 Auto
0	1	0	1	Preset 5 Auto
0	1	1	0	Preset 6 Auto
0	1	1	1	Preset 7 Auto
1	0	0	0	TB Manual
1	0	0	1	Port 1 Manual
1	0	1	0	Port 2 Manual
1	0	1	1	Port 3 Manual
1	1	0	0	Port 4 Manual
1	1	0	1	Port 5 Manual
1	1	1	0	Port 6 Manual
1	1	1	1	Jog Ref

Bits (1)			
11	10	9	Description
0	0	0	Port 0 (TB)
0	0	1	Port 1
0	1	0	Port 2
0	1	1	Port 3
1	0	0	Port 4
1	0	1	Port 5
1	1	0	Port 6
1	1	1	No Local Control

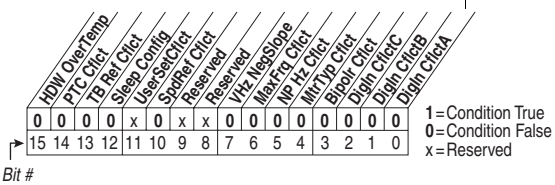
UTILITY	Diagnostics	210	**[Drive Status 2]** Present operating condition of the drive.	Read Only	209

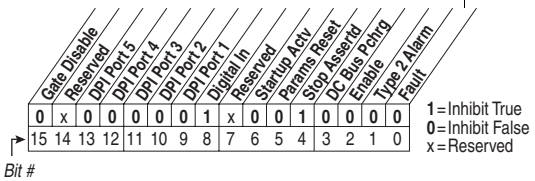
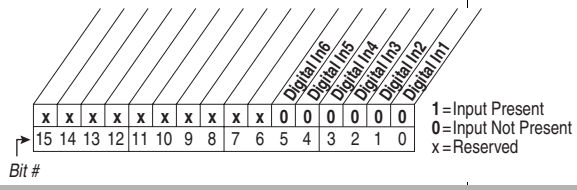
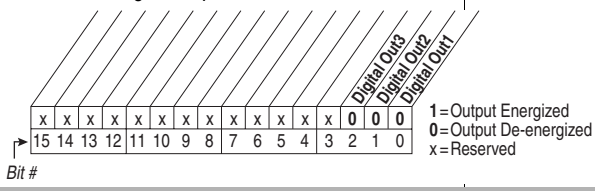


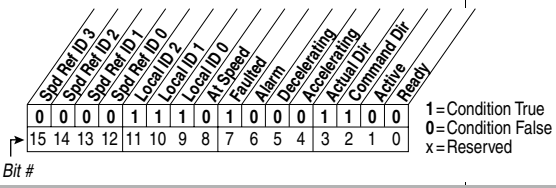
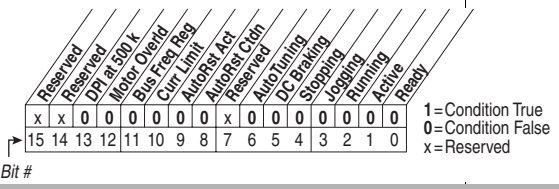
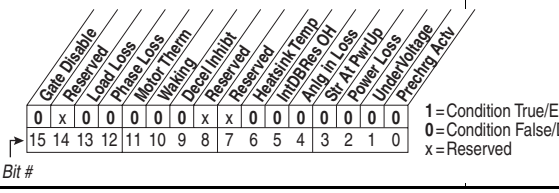
UTILITY	Diagnostics	211	**[Drive Alarm 1]** Alarm conditions that currently exist in the drive. Notes: Bit 15 was added for firmware version 2.001. Bits 7, 8 and 14 were changed to “Reserved” for firmware version 3.001.	Read Only	212

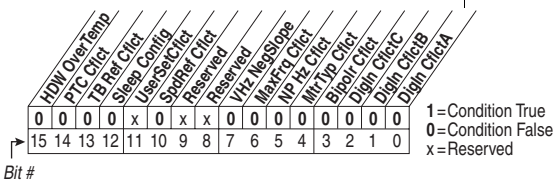
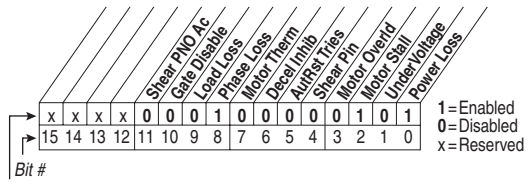


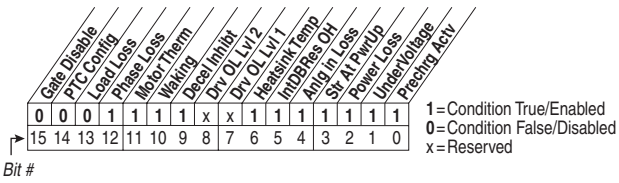
UTILITY	Diagnostics	212	**[Drive Alarm 2]** Alarm conditions that currently exist in the drive. Notes: Bits 14 and 15 were added for firmware version 2.001. Bits 8, 9 and 11 were changed to “Reserved” for firmware version 3.001. Bit 0 was changed from “DigIn Test” to “DigIn CflctA” and bit 11 “UserSetCflct” was added for firmware version 4.001.	Read Only	211



File	Group	No.	Parameter Name & Description	Values			Related
UTILITY	Diagnostics	213	**[Speed Ref Source]** Displays the source of the speed reference to the drive.	Default: Options:	 0 1 2 3-8 9 10 11-17 18-22 23 24 25	Read Only "PI Output" "Analog In 1" "Analog In 2" "Reserved" "MOP Level" "Jog Speed 1" "Preset Spd1-7" "DPI Port 1-5" ""Reserved" "Auto Tune" "Jog Speed 2"	090 093 096 101
		214	**[Start Inhibits]** Displays the inputs currently preventing the drive from starting. Notes: Bit 15 was added for firmware version 2.001. Bit 14 was changed to "Reserved" for firmware version 3.001.  	Read Only			
		215	**[Last Stop Source]** Displays the source that initiated the most recent stop sequence. It will be cleared (set to 0) during the next start sequence.	Default: Options:	 0 1-5 6 7 8 9 10 11 12 13	Read Only "Pwr Removed" "DPI Port 1-5" "Reserved" "Digital In" "Fault" "Not Enabled" "Sleep" "Jog" "Autotune" "Precharge"	361 362 363 364 365 366
		216	**[Dig In Status]** Status of the digital inputs.  	Read Only			361 thru 366
		217	**[Dig Out Status]** Status of the digital outputs.  	Read Only			380 384 388 thru 380 384 388
		218	**[Drive Temp]** Present operating temperature of the drive power section.	Default: Min/Max: Units:		Read Only 0.0/100.0% 0.1%	

File	Group	No.	Parameter Name & Description	Values		Related
UTILITY	Diagnostics	220	**[Motor OL Count]** Accumulated percentage of motor overload. Continuously operating the motor over 100% of the motor overload setting will increase this value to 100% and cause a drive fault.	Default: Min/Max: Units:	Read Only 0.0/100.0% 0.1%	047 048
		224	**[Fault Frequency]** Captures and displays the output speed of the drive at the time of the last fault.	Default: Min/Max: Units:	Read Only 0.0/+[Maximum Freq] 0.1 Hz	079 225 thru 230
		225	**[Fault Amps]** Captures and displays motor amps at the time of the last fault.	Default: Min/Max: Units:	Read Only 0.0/[Rated Amps] × 2 0.1 Amps	224 thru 230
		226	**[Fault Bus Volts]** Captures and displays the DC bus voltage of the drive at the time of the last fault.	Default: Min/Max: Units:	Read Only 0.0/Max Bus Volts 0.1 VDC	224 thru 230
		227	**[Status 1 @ Fault]** Captures and displays [Drive Status 1] bit pattern at the time of the last fault. 	Read Only	209 224 thru 230
		228	**[Status 2 @ Fault]** Captures and displays [Drive Status 2] bit pattern at the time of the last fault. 	Read Only	210 224 thru 230
		229	**[Alarm 1 @ Fault]** Captures and displays [Drive Alarm 1] at the time of the last fault. Notes: Bit 15 was added for firmware version 2.001. Bits 7, 8 and 14 were changed to “Reserved” for firmware version 3.001. 	Read Only	211 224 thru 230

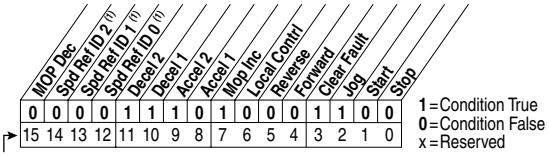
File	Group	No.	Parameter Name & Description	Values			Related
UTILITY	Diagnostics	230	**[Alarm 2 @ Fault]** Captures and displays [Drive Alarm 2] at the time of the last fault. Note: Bits 14 and 15 were added for firmware version 2.001.  				212 224 thru 230
		234 236	**[Testpoint 1 Sel]** **[Testpoint 2 Sel]** Selects the function whose value is displayed in [Testpoint x Data]. These are internal values that are not accessible through parameters. Note: These parameters were added for future use in firmware version 4.001.	Default: Min/Max: Units:	499 0/65535 1		
		235 237	**[Testpoint 1 Data]** **[Testpoint 2 Data]** The present value of the function selected in [Testpoint x Sel]. Note: These parameters were added for future use in firmware version 4.001.	Default: Min/Max: Units:	Read Only -/+32767 1		
	Faults	238	**[Fault Config 1]** Enables/disables annunciation of the listed faults. Notes: Bit 9 “Load Loss” should not be changed from “0”. Bit 10 was added for firmware version 2.001. Bits 2 “Motor Stall” and 11 “Shear PNO Ac” were added for firmware version 3.001.  *Factory Default Bit Values*				
		240	**[Fault Clear]** Resets a fault and clears the fault queue.	Default: Options:	0 0 1 2	“Ready” “Ready” “Clear Faults” “Clr Flt Que”	
		241	**[Fault Clear Mode]** Enables/disables a fault reset (clear faults) attempt from any source. This does not apply to fault codes which are cleared indirectly via other actions.	Default: Options:	1 0 1	“Enabled” “Disabled” “Enabled”	
		242	**[Power Up Marker]** Elapsed hours since initial drive power up. This value will rollover to 0 after the drive has been powered on for more than the max value shown. For relevance to most recent power up see [Fault x Time].	Default: Min/Max: Units:	Read Only 0.0000/429496.7295 Hr 0.1 Hr		244 246 248 250 252 254 256 258

File	Group	No.	Parameter Name & Description	Values		Related
UTILITY	Faults	243 245 247 249 251 253 255 257	**[Fault 1 Code]** **[Fault 2 Code]** **[Fault 3 Code]** **[Fault 4 Code]** **[Fault 5 Code]** **[Fault 6 Code]** **[Fault 7 Code]** **[Fault 8 Code]** A code that represents the fault that tripped the drive. The codes will appear in these parameters in the order they occur ([Fault 1 Code] = the most recent fault). See Fault and Alarm Descriptions on page 3-3 for a list of fault and alarm codes and the corresponding descriptions and possible actions.	Default: Min/Max: Units:	Read Only 0/65535 0	
		244 246 248 250 252 254 256 258	**[Fault 1 Time]** **[Fault 2 Time]** **[Fault 3 Time]** **[Fault 4 Time]** **[Fault 5 Time]** **[Fault 6 Time]** **[Fault 7 Time]** **[Fault 8 Time]** The time between **initial** drive power up and the occurrence of the associated trip fault. Can be compared to [Power Up Marker] for the time from the most recent power up. [Fault x Time] – [Power Up Marker] = Time difference to the most recent power up. A negative value indicates fault occurred before most recent power up. A positive value indicates fault occurred after most recent power up.	Default: Min/Max: Units:	Read Only 0.0000/429496.7295 Hr 0.0001 Hr	242
		543 545 547 549 551 553 555 557	**[Fault 1 Subcode]** **[Fault 2 Subcode]** **[Fault 3 Subcode]** **[Fault 4 Subcode]** **[Fault 5 Subcode]** **[Fault 6 Subcode]** **[Fault 7 Subcode]** **[Fault 8 Subcode]** Fault subcode. Provides additional information for certain faults. Refer to Fault and Alarm Descriptions on page 3-3. Note: Added for firmware version 4.001.	Default: Min/Max: Units:	Read Only 0/65535 1	
	Alarms	259	**[Alarm Config 1]** Enables/disables alarm conditions that will initiate an active drive alarm. Note: Bits 14 and 15 were added for firmware version 2.001.  			

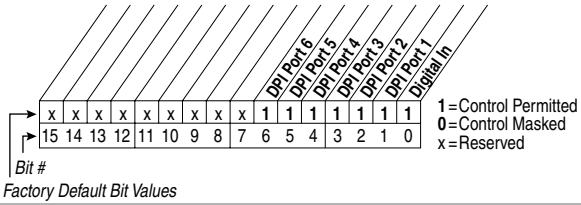
File	Group	No.	Parameter Name & Description	Values			Related
UTILITY	Alarms	261	**[Alarm Clear]** Resets all [Alarm 1-8 Code] parameters to zero.	Default: Options:	0 0 1	"Ready" "Ready" "Clr Alrm Que"	262 263 264 265 266 267 268 269
		262 263 264 265 266 267 268 269	**[Alarm 1 Code]** **[Alarm 2 Code]** **[Alarm 3 Code]** **[Alarm 4 Code]** **[Alarm 5 Code]** **[Alarm 6 Code]** **[Alarm 7 Code]** **[Alarm 8 Code]** A code that represents a drive alarm. The codes will appear in the order they occur (first 4 alarms in – first 4 out alarm queue). A time stamp is not available with alarms.	Default: Min/Max: Units:	Read Only 0/255 1		261

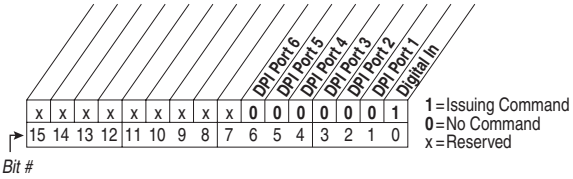
Communication File

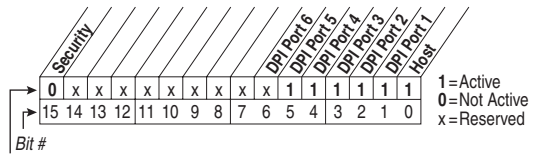
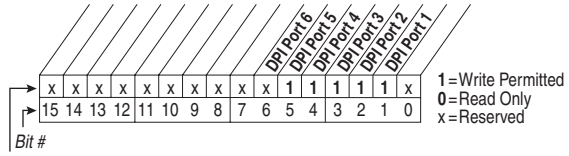
File	Group	No.	Parameter Name & Description	Values		Related
COMMUNICATION	Comm Control	271	**[Drive Logic Rslt]** The final logic command resulting from the combination of all DPI and discrete inputs. This parameter has the same structure as the product-specific logic command received via DPI and is used in peer to peer communications.		Read Only	
		272	**[Drive Ref Rslt]** Present frequency reference scaled as a DPI reference for peer to peer communications. The value shown is the value prior to the accel/decel ramp and the corrections supplied by slip comp, PI, etc.	Default: Min/Max: Units:	Read Only –/+32767 1	
		273	**[Drive Ramp Rslt]** Present frequency reference scaled as a DPI reference for peer to peer communications. The value shown is the value after the accel/decel ramp, but prior to any corrections supplied by slip comp, PI, etc.	Default: Min/Max: Units:	Read Only –/+32767 1	

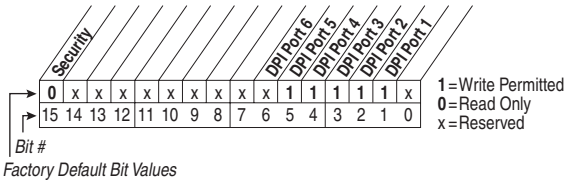
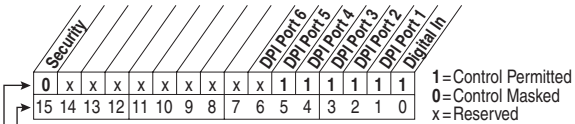


Bits(1)			
14	13	12	Description
0	0	0	No Command - Man. Mode
0	0	1	Ref A Auto
0	1	0	Ref B Auto
0	1	1	Preset 3 Auto
1	0	0	Preset 4 Auto
1	0	1	Preset 5 Auto
1	1	0	Preset 6 Auto
1	1	1	Preset 7 Auto

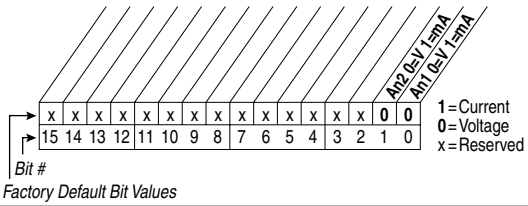
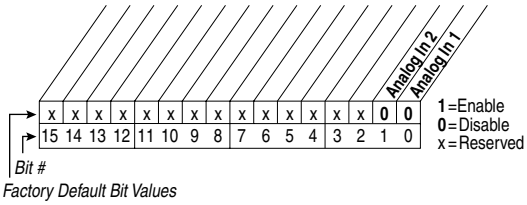
File	Group	No.	Parameter Name & Description	Values			Related
COMMUNICATION	Comm Control	274	**[DPI Port Sel]** Selects which DPI port reference value will appear in [DPI Port Value].	Default: Options:	 1 2 3 4 5	"DPI Port 1" "DPI Port 1" "DPI Port 2" "DPI Port 3" "DPI Port 4" "DPI Port 5"	
		275	**[DPI Port Value]** Value of the DPI reference selected in [DPI Port Sel].	Default: Min/Max: Units:	Read Only –/+32767 1		
	Masks/Owners	276	**[Logic Mask]** Determines which adapters can control the drive. If the bit for an adapter is set to "0," the adapter will have no control functions except for stop.  *Factory Default Bit Values*				288 thru 297
		277	**[Start Mask]** Controls which adapters can issue start commands.		See [Logic Mask].		288 thru 297
		278	**[Jog Mask]** Controls which adapters can issue jog commands.		See [Logic Mask].		288 thru 297
		279	**[Direction Mask]** Controls which adapters can issue forward/reverse direction commands.		See [Logic Mask].		288 thru 297
		280	**[Reference Mask]** Controls which adapters can select an alternate reference; [Speed Ref A, B Sel] or [Preset Speed 1-7].		See [Logic Mask].		288 thru 297
		281	**[Accel Mask]** Controls which adapters can select [Accel Time 1, 2].		See [Logic Mask].		288 thru 297
		282	**[Decel Mask]** Controls which adapters can select [Decel Time 1, 2].		See [Logic Mask].		288 thru 297
		283	**[Fault Clr Mask]** Controls which adapters can clear a fault.		See [Logic Mask].		288 thru 297
		284	**[MOP Mask]** Controls which adapters can issue MOP commands to the drive.		See [Logic Mask].		288 thru 297
		285	**[Local Mask]** Controls which adapters are allowed to take exclusive control of drive logic commands (except stop). Exclusive "local" control can only be taken while the drive is stopped.		See [Logic Mask].		288 thru 297

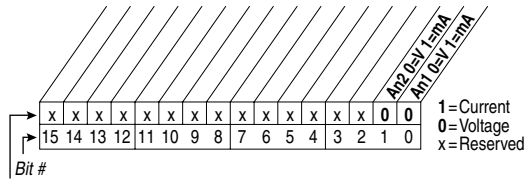
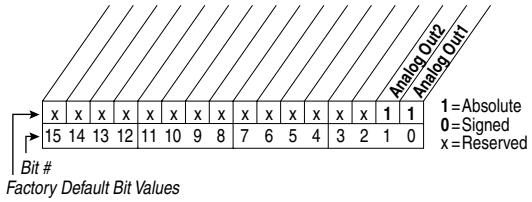
File	Group	No.	Parameter Name & Description	Values	Related
COMMUNICATION	Masks/Owners	288	**[Stop Owner]** Adapters that are presently issuing a valid stop command.  	Read Only	276 thru 285
		289	**[Start Owner]** Adapters that are presently issuing a valid start command.	See [Stop Owner].	276 thru 285
		290	**[Jog Owner]** Adapters that are presently issuing a valid jog command.	See [Stop Owner].	276 thru 285
		291	**[Direction Owner]** Adapter that currently has exclusive control of direction changes.	See [Stop Owner].	276 thru 285
		292	**[Reference Owner]** Adapter that has the exclusive control of the command frequency source selection.	See [Stop Owner].	276 thru 285
		293	**[Accel Owner]** Adapter that has exclusive control of selecting [Accel Time 1, 2].	See [Stop Owner].	140 276 thru 285
		294	**[Decel Owner]** Adapter that has exclusive control of selecting [Decel Time 1, 2].	See [Stop Owner].	142 276 thru 285
		295	**[Fault Clr Owner]** Adapter that is presently clearing a fault.	See [Stop Owner].	276 thru 285
		296	**[MOP Owner]** Adapters that are currently issuing increases or decreases in MOP command frequency.	See [Stop Owner].	276 thru 285
		297	**[Local Owner]** Adapter that has requested exclusive control of all drive logic functions. If an adapter is in local lockout, all other functions (except stop) on all other adapters are locked out and non-functional. Local control can only be obtained when the drive is not running.	See [Stop Owner].	276 thru 285
	Datalinks	300 301	**[Data In A1] - Link A Word 1** **[Data In A2] - Link A Word 2** Parameter number whose value will be written from a communications device data table. Value will not be updated until drive is stopped. Refer to your communications option manual for datalink information.	Default: 0 (0 = “Disabled”) Min/Max: 0/486 Units: 1	
		302 303	**[Data In B1] - Link B Word 1** **[Data In B2] - Link B Word 2**	See [Data In A1] - Link A Word 1 [Data In A2] - Link A Word 2.	

File	Group	No.	Parameter Name & Description	Values	Related
COMMUNICATIONS	Datalinks	304 305	**[Data In C1] - Link C Word 1** **[Data In C2] - Link C Word 2**	See [Data In A1] - Link A Word 1 [Data In A2] - Link A Word 2.	
		306 307	**[Data In D1] - Link D Word 1** **[Data In D2] - Link D Word 2**	See [Data In A1] - Link A Word 1 [Data In A2] - Link A Word 2.	
		310 311	**[Data Out A1] - Link A Word 1** **[Data Out A2] - Link A Word 2** Parameter number whose value will be written to a communications device data table.	Default: 0 (0 = "Disabled") Min/Max: 0/544 Units: 1	
		312 313	**[Data Out B1] - Link B Word 1** **[Data Out B2] - Link B Word 2**	See [Data Out A1] - Link A Word 1 [Data Out A2] - Link A Word 2.	
		314 315	**[Data Out C1] - Link C Word 1** **[Data Out C2] - Link C Word 2**	See [Data Out A1] - Link A Word 1 [Data Out A2] - Link A Word 2.	
		316 317	**[Data Out D1] - Link D Word 1** **[Data Out D2] - Link D Word 2**	See [Data Out A1] - Link A Word 1 [Data Out A2] - Link A Word 2.	
	Security	595	**[Port Mask Act]** Bits 0-6 indicate status for DPI port communication. Bit 15 indicates when security software is controlling the parameter. Note: Added for firmware version 4.001  *Factory Default Bit Values*	Read Only	
		596	**[Write Mask Cfg]** Enables/disables write access (parameters, links, etc.) for DPI ports. Changes to this parameter only become effective when power is cycled, the drive is reset or bit 15 of parameter 597 [Write Mask Act], transitions from "1" to "0." Note: Added for firmware version 4.001  *Factory Default Bit Values*		

File	Group	No.	Parameter Name & Description	Values	Related
COMMUNICATIONS	Security	597	**[Write Mask Act]** Status of write access for DPI ports. When bit 15 is set, network security is controlling the write mask instead of parameter 596 [Write Mask Cfg]. Note: Added for firmware version 4.001	Read Only	
			 *Factory Default Bit Values*	
		598	**[Logic Mask Act]** Indicates status of the logic mask for DPI ports. When bit 15 is set, network security is controlling the logic mask instead of parameter 276 [Logic Mask]. Note: Added for firmware version 4.001	Read Only	
			 *Factory Default Bit Values*	

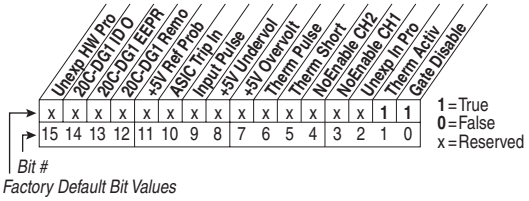
Inputs/Outputs File

File	Group	No.	Parameter Name & Description	Values		Related
INPUTS/OUTPUTS	Analog Inputs	320	**[Anlg In Config]** Selects the mode for the analog inputs.			322 325 323 326
			 *Factory Default Bit Values*			
		321	**[Anlg In Sqr Root]** Enables/disables the square root function for each input.			
			 *Factory Default Bit Values*			
		322 325	**[Analog In1 Hi]** **[Analog In2 Hi]** Sets the highest input value to the analog input x scaling block. [Anlg In Config], parameter 320 defines if this input will be –/+10V or 0-20 mA. Note: The Min. value was changed from 4.000mA to 0.000mA for firmware version 3.001.	Default: Min/Max: Units:	10.000 Volt 10.000 Volt 0.000/20.000mA –/+10.000V 0.000/10.000V 0.001 mA 0.001 Volt	091 092

File	Group	No.	Parameter Name & Description	Values			Related
INPUTS/OUTPUTS	Analog Inputs	323 326	**[Analog In1 Lo]** **[Analog In2 Lo]** Sets the lowest input value to the analog input x scaling block. [Anlg In Config], parameter 320 defines if this input will be –/+10V or 0-20 mA. Note: The Min. value was changed from 4.000mA to 0.000mA for firmware version 3.001.	Default: Min/Max: Units:	0.000 Volt 0.000 Volt 0.000/20.000mA –/+10.000V 0.000/10.000V 0.001 mA 0.001 Volt		091 092
		324 327	**[Analog In1 Loss]** **[Analog In2 Loss]** Selects drive action when an analog signal loss is detected. Signal loss is defined as an analog signal less than 1V or 2mA. The signal loss event ends and normal operation resumes when the input signal level is greater than or equal to 1.5V or 3mA.	Default: Options:	0 0 0 1 2 3 4 5 6	"Disabled" "Disabled" "Disabled" "Fault" "Hold Input" "Set Input Lo" "Set Input Hi" "Goto Preset1" "Hold OutFreq"	091 092
	Analog Outputs	340	**[Anlg Out Config]** Selects the mode for the analog outputs. .  *Factory Default Bit Values*				
		341	**[Anlg Out Absolut]** Selects whether the signed value or absolute value of a parameter is used before being scaled to drive the analog output.  *Factory Default Bit Values*				
		342 345	**[Analog Out1 Sel]** **[Analog Out2 Sel]** Selects the source of the value that drives the analog output.	Default: Options:	0 See Table	"Output Freq"	001 002 003 004 005 007 006 012 135 136 137 138 220

Options		[Analog Out1 Lo] Value: Param. 341 = Signed	[Analog Out1 Lo] Value: Param. 341 = Absolute	[Analog Out1 Hi] Value
0	"Output Freq"	–[Maximum Speed]	0 Hz	+[Maximum Speed]
1	"Command Spd"	–[Maximum Speed]	0 Hz/RPM	+[Maximum Speed]
2	"Output Amps"	0 Amps	0 Amps	200% Rated
3	"Torque Amps"	–200% Rated	0 Amps	200% Rated
4	"Flux Amps"	0 Amps	0 Amps	200% Rated
5	"Output Power"	0 kW	0 kW	200% Rated
6	"Output Volts"	0 Volts	0 Volts	120% Rated Input Volts
7	"DC Bus Volts"	0 Volts	0 Volts	200% Rated Input Volts
8	"PI Reference"	–100%	0%	100%
9	"PI Feedback"	–100%	0%	100%
10	"PI Error"	–100%	0%	100%
11	"PI Output"	–100%	0%	100%
12	"%Motor OL"	0%	0%	100%
13-15	"Reserved"	–	–	–
16	"Speed Ref"	–[Maximum Speed]	0 Hz	+[Maximum Speed]
17-23	"Reserved"	–	–	–
24	"Param Cntl"			

File	Group	No.	Parameter Name & Description	Values		Related
INPUTS/OUTPUTS	Analog Outputs	343 346	**[Analog Out1 Hi]** **[Analog Out2 Hi]** Sets the analog output value when the source value is at maximum. Note: The Min. value was changed from 4.000mA to 0.000mA for firmware version 3.001.	Default: Min/Max: Units:	20.000 mA, 10.000 Volts 0.000/20.000mA –/+10.000V 0.000/10.000V 0.001 mA 0.001 Volt	340 342 345
		344 347	**[Analog Out1 Lo]** **[Analog Out2 Lo]** Sets the analog output value when the source value is at minimum. Note: The Min. value was changed from 4.000mA to 0.000mA for firmware version 3.001.	Default: Min/Max: Units:	0.000 mA, 0.000 Volts 0.000/20.000mA –/+10.000V 0.000/10.000V 0.001 mA 0.001 Volt	340 342 345
		354 355	**[Anlg Out1 Scale]** **[Anlg Out2 Scale]** Sets the high value for the range of analog out scale. Entering 0.0 will disable this scale and max scale will be used. Example: If [Analog Out Sel] = “Commanded Trq,” a value of 150 = 150% scale in place of the default 800%.	Default: Min/Max: Units:	0.0 [Analog Out1 Sel] 0.1	342 345
		377 378	**[Anlg1 Out Setpt]** **[Anlg2 Out Setpt]** Sets the analog output value from a communication device. Example: Set [Data In Ax] to “377” (value from communication device). Then set [Analog Outx Sel] to “Param Cntl.”	Default: Min/Max: Units:	0.000 mA, 0.000 Volts 0.000/20.000mA –/+10.000V 0.001 mA 0.001 Volt	342 345

File	Group	No.	Parameter Name & Description	Values			Related
INPUTS/OUTPUTS	Digital Inputs	358	**[20C-DG1 Remove]** Clears an F10 "System Fault" issued when the drive has recognized that the 20C-DG1 option board has been removed for service and has not been re-installed. The drive is designed to generate a non-resettable fault, F10 "System Fault", if the option board is removed from the drive's control. You must manually set this parameter to 1"Remove" and then back to 0 "Ready" to clear and acknowledge the fault. Once maintenance or service is completed and the 20C-DG1 option card has been reinstalled, the drive will recognize the option card on power-up. Note: This parameter was added for firmware version 2.001. Please refer to the *PowerFlex 700S/H High Power Drives Installation Manual (Frame 9-13)*, publication PFLEX-IN006... for more information on the 20C-DG1 option board.	Default: Options:	0 0 1	"Ready" "Ready" "Remove"	359
		359	**[20C-DG1 Status]** Displays the status of the Gate Disable option board (20C-DG1) functions. Bit 0 = Gate Disable active Bit 1 = Thermistor input active Bit 2 = Unexpected problem in Gate Disable circuitry / inputs Bit 3 = No Gate Enable input on channel 1 Bit 4 = No Gate Enable input on channel 2 Bit 5 = Thermistor short circuit detected Bit 6 = The test pulse detected a problem in the thermistor input Bit 7 = +5V overvoltage detected on the 20C-DG1 option board Bit 8 = +5V undervoltage detected on the 20C-DG1 option board Bit 9 = The test pulse detected a problem in the Gate Disable inputs Bit 10 = ASIC trip input ETR not set, even if the Gate Disable inputs are active Bit 11 = +5V or REF voltage problem detected on the 20C-DG1 option board Bit 12 = The 20C-DG1 option board has been removed Bit 13 = The 20C-DG1 option board has an EEPROM error Bit 14 = The 20C-DG1 option board has been found by identification software Bit 15 = A system fault (unexpected hardware problem) has been generated and cannot be cleared Note: This parameter was added for firmware version 2.001.  *Factory Default Bit Values*				358

File	Group	No.	Parameter Name & Description	Values			Related
INPUTS/OUTPUTS	Digital Inputs	361	**[Digital In1 Sel]**	Default:	4	"Stop – CF"	
		362	**[Digital In2 Sel]**	Default:	5	"Start"	
		363	**[Digital In3 Sel]**	Default:	18	"Auto/ Manual"	
		364	**[Digital In4 Sel]**	Default:	15	"Speed Sel 1"	
		365	**[Digital In5 Sel]**	Default:	16	"Speed Sel 2"	
		366	**[Digital In6 Sel]** (9)	Default:	17	"Speed Sel 3"	
			Selects the function for the digital inputs. Notes: Options 36-42 are "Reserved". Added options 43 and 46 for firmware version 3.001. Added options 41, 42, 44 and 45 for firmware version 4.001.	Options:	0	"Not Used"	
					1	"Enable" (6) (8)	
					2	"Clear Faults"(CF) (2)	
					3	"Aux Fault"	
					4	"Stop – CF" (8)	
					5	"Start" (3) (7)	
					6	"Fwd/ Reverse" (3)	
					7	"Run" (4) (8)	
					8	"Run Forward" (4)	
					9	"Run Reverse" (4)	
					10	"Jog1" (3)	100
					11	"Jog Forward" (4)	
					12	"Jog Reverse" (4)	
					13	"Stop Mode B"	156
					14	"Bus Reg Md B"	162
					15-17	"Speed Sel 1-3" (1)	
					18	"Auto/ Manual" (5)	096
					19	"Local"	
					20	"Acc2 & Dec2"	
					21	"Accel 2"	141
					22	"Decel 2"	143
					23	"MOP Inc" (10)	195
					24	"MOP Dec" (10)	
					25	"Excl Link" (10)	
					26	"PI Enable"	194
					27	"PI Hold"	
					28	"PI Reset"	
					29	"Pwr Loss Lvl"	124
					30-33	Reserved	
					34	"Jog 2"	
					35	"PI Invert"	
					36-40	"Reserved"	
					41-42	"UserSet Sel1-2" (10)	
					43	"Run Level" (11)	
					44	"RunFwd Level" (11)	
					45	"RunRev Level" (11)	
					46	"Run w/Comm" (11)	

(1) Speed Select Inputs.

3	2	1	Auto Reference Source
0	0	0	Reference A
0	0	1	Reference B
0	1	0	Preset Speed 2
0	1	1	Preset Speed 3
1	0	0	Preset Speed 4
1	0	1	Preset Speed 5
1	1	0	Preset Speed 6
1	1	1	Preset Speed 7

To access Preset Speed 1, set [Speed Ref x Sel] to "Preset Speed 1".

Type 2 Alarms - Some digital input programming may cause conflicts that will result in a Type 2 alarm. Example: [Digital In1 Sel] set to "5, Start" in 3-wire control and [Digital In2 Sel] set to 7 "Run" in2-wire.

Refer to Table 3.A for information on resolving this type of conflict.

(2) When [Digital Inx Sel] is set to option 2 "Clear Faults" the Stop button cannot be used to clear a fault condition.

(3) Typical 3-Wire Inputs - Requires that only 3-wire functions are chosen. Including 2-wire selections will cause a type 2 alarm.

(4) Typical 2-Wire Inputs - Requires that only 2-wire functions are chosen. Including 3-wire selections will cause a type 2 alarm. See Table 3.A for conflicts.

(5) Auto/Manual - Refer to the Installation Manual for details.

(6) Opening an "Enable" input will cause the motor to coast-to-stop, ignoring any programmed Stop modes.

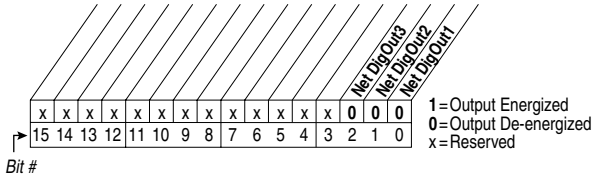
(7) A "Dig In ConflictB" alarm will occur if a "Start" input is programmed without a "Stop" input.

(8) Refer to the Sleep Wake Mode Attention statement on page 2-20.

(9) A dedicated hardware enable input is available via a jumper selection. Refer to Installation Manual for further information.

(10) Refer to [Dyn UsrSet Sel] on page 2-24 for selection information.

(11) Refer to Selected Option Definitions – [Analog Outx Sel], [Digital Inx Sel], [Digital Outx Sel] on page 2-41.

File	Group	No.	Parameter Name & Description	Values			Related
INPUTS/OUTPUTS	Digital Outputs	379	**[Dig Out Setpt]** Sets the digital output value from a communication device. Example Set [Data In B1] to "379." The first three bits of this value will determine the setting of [Digital Outx Sel] which should be set to value 30 "Param Cntl."  				380 384 388
		380 384 388	**[Digital Out1 Sel]** **[Digital Out2 Sel]** **[Digital Out3 Sel]** Selects the drive status that will energize a (CRx) output relay. (1) Any relay programmed as Fault or Alarm will energize (pick up) when power is applied to drive and deenergize (drop out) when a fault or alarm exists. Relays selected for other functions will energize only when that condition exists and will deenergize when condition is removed. (2) Activation level is defined in [Dig Outx Level] below. (3) Refer to Option Definitions on page 2-41.	Default: Options:	1 4 4 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21-26 27 28 29 30	"Fault" "Run" "Run" "Fault"(1) "Alarm"(1) "Ready" "Run" "Forward Run" "Reverse Run" "Auto Restart" "Powerup Run" "At Speed" "At Freq"(2) "At Current"(2) "At Torque" "At Temp"(2) "At Bus Volts"(2) "At PI Error"(2) "DC Braking" "Curr Limit" "Reserved" "Motor Overld" "Power Loss" "Input 1-6 Link" "PI Enable" "PI Hold" "Reserved" "Param Cntl"(3)	381 385 389 382 386 390 383 002 001 003 004 218 012 137 157 147 053 048 184

File	Group	No.	Parameter Name & Description	Values		Related
INPUTS/OUTPUTS	Digital Outputs		**Selected Option Definitions – [Analog Outx Sel], [Digital Inx Sel], [Digital Outx Sel]**			

Option	Description	Related
At Speed	Relay changes state when drive has reached commanded speed.	380 384 388
Excl Link	Links digital input to a digital output if the output is set to "Input 1-6 Link." This does not need to be selected in the Vector option.	361 - 366
Input 1-6 Link	When Digital Output 1 is set to one of these (i.e. Input 3 Link) in conjunction with Digital Input 3 set to "Excl Link," the Digital Input 3 state (on/off) is echoed in the Digital Output 1.	380 384 388
MOP Dec	Decrements speed reference as long as input is closed.	361 - 366
MOP Inc	Increments speed reference as long as input is closed.	361 - 366
Param Cntl (A.O.)	Parameter controlled analog output allows PLC to control analog outputs through data links. Set in [AnlgX Out Setpt], par. 377-378.	342 345
Param Cntl (D.O.)	Parameter controlled digital output allows PLC to control digital outputs through data links. Set in [Dig Out Setpt], parameter 379.	380 384 388
PI Reference	Reference for PI block (see page B-8).	342 345
Run Level RunFwd Level RunRev Level	Provides a run level input. A run level input does not require a transition for enable or fault, but does require a transition for a stop. If a "Stop" input is used to reset faults the run level input must be transitioned when the 24V DC internal supply is used.	361 - 366
Run w/Comm	Allows the Comms start bit to operate like a run with the run input on the terminal block. Ownership rules apply.	361 - 366

381 385 389	**[Dig Out1 Level]** **[Dig Out2 Level]** **[Dig Out3 Level]**	Default:	0.0 0.0 0.0	380 384 388
	Sets the relay activation level for options 10 – 15 in [Digital Outx Sel]. Units are assumed to match the above selection (i.e. "At Freq" = Hz, "At Torque" = Amps).	Min/Max: Units:	0.0/1500.0 0.1	
382 386 390	**[Dig Out1 OnTime]** **[Dig Out2 OnTime]** **[Dig Out3 OnTime]**	Default:	0.00 Secs 0.00 Secs 0.00 Secs	380 384 388
	Sets the "ON Delay" time for the digital outputs. This is the time between the occurrence of a condition and activation of the relay.	Min/Max: Units:	0.00/163.00 Secs 0.01 Secs	
383 387 391	**[Dig Out1 OffTime]** **[Dig Out2 OffTime]** **[Dig Out3 OffTime]**	Default:	0.00 Secs 0.00 Secs 0.00 Secs	380 384 388
	Sets the "OFF Delay" time for the digital outputs. This is the time between the disappearance of a condition and de-activation of the relay.	Min/Max: Units:	0.00/163.00 Secs 0.01 Secs	

Parameter Cross Reference – by Name

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Notes

Troubleshooting

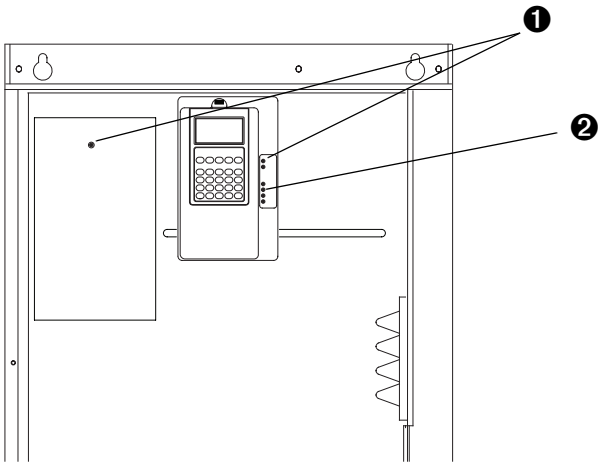
This chapter provides information to guide you in troubleshooting the PowerFlex 700H. Included is a listing and description of drive faults (with possible solutions, when applicable) and alarms.

Drive Status

The condition or state of your drive is constantly monitored. Any changes will be indicated through the LEDs and/or the HIM (if present).

Front Panel LED Indications

Figure 3.1 Drive Status Indicators

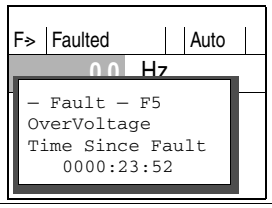
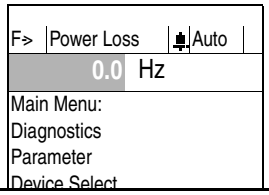


#	Name	Color	State	Description
❶	PWR (Power)	Green	Steady	Illuminates when power is applied to the drive.
❷	PORT(1)	Green	–	Status of DPI port internal communications (if present).
	MOD(1)	Yellow	–	Status of communications module (when installed).
	NET A(1)	Red	–	Status of network (if connected).
	NET B(1)	Red	–	Status of secondary network (if connected).

(1) Refer to the appropriate Communication Option User Manual for details.

HIM Indication

The LCD HIM also provides visual notification of a fault or alarm condition.

Drive is indicating a fault. The LCD HIM immediately reports the fault condition by displaying the following. • "Faulted" appears in the status line • Fault number • Fault name • Time that has passed since fault occurred Press Esc to regain HIM control.	
Drive is indicating an alarm. The LCD HIM immediately reports the alarm condition by displaying the following. • Alarm name (Type 2 alarms only) • Alarm bell graphic	

Faults and Alarms

A fault is a condition that stops the drive. There are three fault types.

Type	Fault Description	
①	Auto-Reset Run	When this type of fault occurs, and [Auto Rstrt Tries] (see page 2-19) is set to a value greater than "0," a user-configurable timer, [Auto Rstrt Delay] (see page 2-19) begins. When the timer reaches zero, the drive attempts to automatically reset the fault. If the condition that caused the fault is no longer present, the fault will be reset and the drive will be restarted.
②	Non-Resettable	This type of fault normally requires drive or motor repair. The cause of the fault must be corrected before the fault can be cleared. The fault will be reset on power up after repair.
③	User Configurable	These faults can be enabled/disabled to annunciate or ignore a fault condition.

An alarm is a condition that, if left untreated, may stop the drive. There are two alarm types.

Type	Alarm Description	
❶	User Configurable	These alarms can be enabled or disabled through [Alarm Config 1] on page 2-29.
❷	Non-Configurable	These alarms are always enabled.

See Fault and Alarm Descriptions on page 3-3.

Manually Clearing Faults

1. Press Esc to acknowledge the fault. The fault information will be removed so that you can use the HIM.	Esc
2. Address the condition that caused the fault. The cause must be corrected before the fault can be cleared.	
3. After corrective action has been taken, clear the fault by **one** of these methods. • Press Stop • Cycle drive power • Set parameter 240 [Fault Clear] to "1." • "Clear Faults" on the HIM Diagnostic menu.	

Fault and Alarm Descriptions

Table 3.A Fault/Alarm Types, Descriptions and Actions

No.	Name	Fault	Alarm	Description	Action *(if appropriate)*
1	PrechargeActv		❶	The drive received a start command while in the DC bus precharge state. See Table 3.C, "Precharge Active Fault (F1) Subcodes," on page 12 for more information on this fault.	–
2	Auxiliary In	①		The auxiliary input interlock is open.	Check all remote wiring.
3	Power Loss	① ③	❶	The DC bus voltage remained below the value set in parameter 186 [Power Loss Volts] for longer than the time specified in parameter 185 [Power Loss Time]. You can enable/disable this fault with parameter 238 [Fault Config 1] (page 2-28).	Monitor the incoming AC line for low voltage or line power interruption.
4	UnderVoltage	① ③	❶	The DC bus voltage fell below the minimum value of 333V for 400/480V drives and 461V for 600/ 690V drives. You can enable/disable this fault with parameter 238 [Fault Config 1] (page 2-28). See Table 3.D, "Under Voltage Fault (F4) Subcodes," on page 12 for more information on this fault.	Monitor the incoming AC line for low voltage or power interruption.
5	OverVoltage	①		The DC bus voltage exceeded the maximum value. See Table 3.E, "Over Voltage Fault (F5) Subcodes," on page 12 for more information on this fault.	Monitor the AC line for high line voltage or transient conditions. Bus overvoltage can also be caused by motor regeneration. Extend the decel time or install a dynamic brake option.

No.	Name	Fault	Alarm	Description	Action *(if appropriate)*
6	Motor Stall	②		The motor is operating at high current and low frequency and is not accelerating. See Table 3.F, "Motor Stall Fault (F6) Subcode," on page 12 for more information on this fault.	1. Run an Autotune. 2. Reduce the Load.
7	MotorOverload	① ③		Internal electronic overload trip. You can enable/disable this fault with parameter 238 [Fault Config 1] (page 2-28).	1. Run an Autotune. 2. Verify the settings of parameters 48 [Motor OL Factor] and 47 [Motor OL Hertz]. 3. Reduce the load so that the drive output current does not exceed the current set by the value in parameter 42 [Motor NP FLA].
8	HeatsinkOvrTp	②	❶	The heatsink temperature has exceeded the maximum allowable value. 85 degrees C = Alarm 90 degrees C = Fault See Table 3.G, "Heatsink Over Temperature Fault (F8) Subcodes," on page 12 for more information on this fault.	1. Verify that the maximum ambient temperature has not been exceeded. 2. Check the fans (including the ASIC board on frame 10 and higher drives). 3. Check for an excess load. 4. Check the carrier frequency.
9	IGBT OverTemp	①		The output transistors have exceeded their maximum operating temperature due to an excessive load. See Table 3.H, "IGBT Over Temperature Fault (F9) Subcode," on page 13 for more information on this fault.	1. Verify that the maximum ambient temperature has not been exceeded. 2. Check the fan(s). 3. Check for an excess load.
10	System Fault	②		A hardware problem exists in the power structure. See Table 3.I, "System Fault (F10) Subcodes," on page 13 for more information on this fault.	1. Cycle the power. 2. Verify the fiber optic connections. 3. Contact Technical Support. See Technical Support Options on page 3-21 for more information. 4. If the problem persists, replace the drive.
12	OverCurrent	①		The drive output current has exceeded the hardware current limit. See Table 3.J, "Over Current Fault (F12) Subcodes," on page 14 for more information on this fault.	Check programming for an excess load, improper DC boost setting, DC brake voltage set too high or other causes of excess current. Check for shorted motor leads or a shorted motor.
13	Ground Fault	①		A current path to earth ground exists that is greater than 50% of the drive's heavy duty rating. The current must appear for 800ms before the drive will fault. See Table 3.K, "Ground Fault (F13) Subcode," on page 14 for more information on this fault.	Check the motor and external wiring to the drive output terminals for a grounded condition.

No.	Name	Fault	Alarm	Description	Action *(if appropriate)*
14	InverterFault	②		A hardware problem exists in the power structure.	1. Cycle the power. 2. Contact Technical Support. See Technical Support Options on page 3-21 for more information. 3. If the problem persists, replace the drive.
15	Load Loss	③	❶	Do not use this fault in PowerFlex 700H applications. See Table 3.L, "Load Loss Fault (F15) Subcode," on page 14 for more information on this fault.	Config 1] / bit 0 "Power Loss" and parameter 259 [Alarm Config 1] / bit 13 "Load Loss" are set to zero.
16	Motor Therm	③	❶	The option board thermistor input is greater than the limit.	1. Check to ensure that the motor is cooling properly. 2. Check for an excess load. 3. Verify the thermistor connection. If the thermistor connection on the option board is not used, it must be shorted.
17	Input Phase	③	❶	One input line phase is missing. See Table 3.M, "Input Phase Fault (F17) Subcodes," on page 15 for more information on this fault.	1. Check all user-supplied fuses 2. Check the AC input line voltage.
19	Unbalanced	②		An imbalance between the power modules exists (paralleled units - frames 12 & 14 only).	1. Check for DC voltage imbalance between the power modules. 2. Check for current output imbalance between the power modules.
21	OutPhasMissng	②		There is zero current in one of the output motor phases. See Table 3.N, "Output Phase Missing Fault (F21) Subcode," on page 15 for more information on this fault.	1. Check the motor wiring. 2. Check the motor for an open phase.
22	NP Hz Cnflct		❷	The "fan/pump" mode is selected in [Motor Cntl Sel] and the ratio of parameter 43 [Motor NP Hertz] to 55 [Maximum Freq] is greater than 26.	
23	MaxFreqCnflct		❷	The sum of parameters 82 [Maximum Speed] and 83 [Overspeed Limit] exceeds 55 [Maximum Freq]. Raise [Maximum Freq] or lower [Maximum Speed] and/or [Overspeed Limit] so that the sum is less than or equal to [Maximum Freq].	
24	Decel Inhibit	③	❶	The drive cannot follow the commanded decel due to bus limiting.	1. Verify that the input voltage is within the specified limits. 2. Verify that the system ground impedance follows the proper grounding techniques. 3. Disable bus regulation and/or add a dynamic brake resistor and/or extend the deceleration time.
25	OverSpd Limit	①		Functions such as Slip Compensation or Bus Regulation have attempted to add an output frequency adjustment greater than the value programmed in parameter 83 [Overspeed Limit].	Remove the excessive load or overhauling conditions or increase the value in [Overspeed Limit].

No.	Name	Fault	Alarm	Description	Action *(if appropriate)*
26	VHz Neg Slope		❷	Parameter 53 [Motor Cntl Sel] = "Custom V/Hz" & the V/Hz slope is negative.	
27	SpdRef Cnflct		❷	[Speed Ref x Sel] or [PI Reference Sel] is set to "Reserved".	
28	BrakResMissing	②		No brake resistor has been detected. See Table 3.O, "Brake Resistor Missing Fault (F28) Subcodes," on page 15 for more information on this fault.	1. Program [Bus Reg Mode x] to not use the brake option. 2. Install a brake resistor and set parameter 163 [DB Resistor Type] to 1 "External Res" (frame 9 drives only).
29	Anlg In Loss	① ③	❶	An analog input is configured to fault on a signal loss. A signal loss has occurred. Configure this fault with [Anlg In x Loss] on page 2-36.	1. Check parameter settings. 2. Check for broken/loose connections at the inputs.
30	MicroWatchdog	②		A microprocessor watchdog timeout has occurred. See Table 3.P, "Microprocessor Watchdog Fault (F30) Subcode," on page 15 for more information on this fault.	1. Cycle the power. 2. Replace the Main Control board.
31	IGBT Temp HW	②		The drive output current has exceeded the instantaneous current limit. See Table 3.Q, "IGBT Temperature Hardware Fault (F31) Subcodes," on page 15 for more information on this fault.	1. Check for an excess load. 2. Raise the value set in either [Accel Time x] parameters. 3. Parameter 53 [Motor Cntl Sel] may need to be set to "Custom V/Hz". 4. Verify the values set in parameters 62 [IR Voltage Drop] and 63 [Flux Current Ref]. 5. Contact Technical Support. See Technical Support Options on page 3-21 for more information.
32	Fan Cooling	②		Fan is not energized at start command. See Table 3.R, "Fan Cooling Fault (F32) Subcodes," on page 15 for more information on this fault.	1. Check the status LEDs on the fan inverter(s). 2. Check the fan(s).
33	AutoReset Lim	③		The drive unsuccessfully attempted to reset a fault and resumed running for the programmed number of [Auto Rstrt Tries]. You can enable/disable this fault with parameter 238 [Fault Config 1] (page 2-28).	Correct the cause and manually clear the fault.
34	CAN Bus Flt	②		A sent message was not acknowledged. See Table 3.S, "Communication Bus Fault (F34) Subcode," on page 16 for more information on this fault.	1. Cycle the power. 2. Replace the Main Control board.
37	HeatsinkUndTp	①		The ambient temperature is too low. See Table 3.T, "Heatsink Under Temperature Fault (F37) Subcodes," on page 16 for more information on this fault.	Raise the ambient temperature.

No.	Name	Fault	Alarm	Description	Action *(if appropriate)*
44	Device Change	②		The new power unit or option board installed is a different type. See Table 3.U, "Device Change (F44), Device Added (F45), I/O Option Board Removed (F65), Power Board Checksum (F104), New I/O Option Board (F107) and I/O Option Board Change (F120) Fault Subcodes," on page 16 for more information on this fault.	Clear the fault and reset the drive to the factory defaults.
45	Device Add	②		A new option board was added. See Table 3.U, "Device Change (F44), Device Added (F45), I/O Option Board Removed (F65), Power Board Checksum (F104), New I/O Option Board (F107) and I/O Option Board Change (F120) Fault Subcodes," on page 16 for more information on this fault.	Clear the fault.
47	NvsReadChksum	②		There was an error reading parameters 9 [Elapsed MWh] and 10 [Elapsed Run Time] from EEPROM. See Table 3.V, "NVS Read Checksum Fault (F47) Subcode," on page 17 for more information on this fault.	1. Cycle the power. 2. Replace the Main Control board.
48	ParamsDefault	②		The drive was commanded to write default values to EEPROM.	1. Clear the fault or cycle power to the drive. 2. Program the drive parameters as needed.
54	Zero Divide	②		This event occurred because a mathematical function had a dividend of zero.	1. Cycle the power. 2. Replace the main Control board.
59	Gate Disable	③	❶	Both of the digital gate disable inputs (SD-1 and SD-2) are not enabled on the 20C-DG1 option board.	1. Check the motor. 2. Verify that the option board is properly wired. 3. Replace the option board. See Appendix E - "Instructions for ATEX Approved PowerFlex 700H Drives in Group II Category (2) Applications with ATEX Approved Motors" in the *PowerFlex 700H/S High Power Drives Installation Manual*, publication PFLEX-IN006… for information on installing this option board.
60	Hrdwr Therm	③	❶	The thermistor input is activated (>4 kΩ) on the 20C-DG1 option board.	1. Check the motor. 2. The resistance of the thermistor input must go below 2 kΩ before the drive can be reset.

No.	Name	Fault	Alarm	Description	Action *(if appropriate)*
63	Shear Pin	③		The value programmed in parameter 148 [Current Lmt Val] has been exceeded. You can enable/disable this fault with parameter 238 [Fault Config 1] (page 2-28).	Check the load requirements and the value in [Current Lmt Val].
65	I/O Removed	②		An I/O option board has been removed.	Clear the fault.
70	Power Unit	②		One or more of the output transistors were operating in the active region instead of desaturation. This can be caused by excessive transistor current or insufficient base drive voltage. See Table 3.X, "Power Unit Fault (F70) Subcodes," on page 17 for more information on this fault.	Clear the fault.
71	Periph Loss	②		The communications card has a fault on the network side.	1. Check the DPI device event queue and corresponding fault information for the device.
81	Port DPI Loss	②		The DPI port has stopped communicating. A SCANport device was connected to a drive operating DPI devices at 500k baud.	1. If the adapter was not intentionally disconnected, check the wiring to the port. Replace the wiring, port expander, adapters, Main control board or complete drive as required. 2. Check the HIM connection. 3. If an adapter was intentionally disconnected and the [Logic Mask] bit for that adapter is set to "1", this fault will occur. To disable this fault, set the bit in parameter 276 [Logic Mask] for the adapter to "0".
94	Hardware Enbl			An enable signal is missing from the control terminal block. See Table 3.Y, "Hardware Enable Fault (F94) Subcode," on page 17 for more information on this fault.	1. Check the control wiring. 2. Check the position of the hardware enable jumper. 3. Check the digital input programming.
95	AutoT Rs Stat	②		The Autotune Rs Static Test has failed.	1. Verify that the motor is not rotating when autotune is enabled. 2. Check the motor connections.
96	AutoT Lm Rot	②		The Autotune Lm rotate test has failed.	1. Check the motor nameplate data. 2. Check the motor connections. 3. Verify that the Accel Time < (Base Speed/40) x 33 sec. Note: 33 sec. = time limit to bring motor to 40 Hz.
97	AutoT MagRot	②		The Autotune magnetizing current rotate test has failed.	1. Check the motor nameplate data. 2. Check the motor connections. 3. Verify that the Accel Time < (Base Speed/40) x 33 sec. (see above).
98	AutoT Saturat	②		The Autotune saturation curve test has failed.	1. Check the motor nameplate data. 2. Check the motor connections.
99	UserSet Timer	②		A User Set load or save was not completed in less than 5 seconds.	Attempt to save the User Set again. If this error occurs again, replace the Main Control board.

No.	Name	Fault	Alarm	Description	Action *(if appropriate)*
100	Param Chksum	②		The checksum read from the Main Control board does not match the checksum calculated. See Table 3.Z, "Parameter Checksum Fault (F100) Subcodes," on page 18 for more information on this fault.	1. Restore the drive to the factory defaults. 2. Cycle the power. 3. Reload User Set if used.
104	PwrBrd Chksum	②		The checksum read from the EEPROM does not match the checksum calculated from the EEPROM data. See Table 3.U, "Device Change (F44), Device Added (F45), I/O Option Board Removed (F65), Power Board Checksum (F104), New I/O Option Board (F107) and I/O Option Board Change (F120) Fault Subcodes," on page 16 for more information on this fault.	1. Cycle the power. 2. Contact Technical Support. See Technical Support Options on page 3-21 for more information. 3. If the problem persists, replace the drive.
106	MCB-PB Config	②		The drive rating information stored on the power board is incompatible with the Main Control board. See Table 3.AA, "Main Control Board - Power Board Configuration Fault (F106) Subcode," on page 18 for more information on this fault.	1. Reset the fault or cycle the power. 2. Replace the Main Control board.
107	New IO Option	②		A New option board was added to the Main Control board. See Table 3.U, "Device Change (F44), Device Added (F45), I/O Option Board Removed (F65), Power Board Checksum (F104), New I/O Option Board (F107) and I/O Option Board Change (F120) Fault Subcodes," on page 16 for more information on this fault.	1. Restore the drive to the factory defaults. 2. Reprogram parameters as necessary.
113	Fatal App	②		A Fatal Application error has occurred.	1. Replace the Main Control board.
114	AutoT Enable	②		Autotune is enabled but has not started.	Press the Start key within 20 seconds of enabling autotune.
120	I/O Change	②		An option board has been replaced. See Table 3.U, "Device Change (F44), Device Added (F45), I/O Option Board Removed (F65), Power Board Checksum (F104), New I/O Option Board (F107) and I/O Option Board Change (F120) Fault Subcodes," on page 16 for more information on this fault.	Reset the fault.

<table>
<tr><th>No.</th><th>Name</th><th>Fault</th><th>Alarm</th><th>Description</th><th>Action (if appropriate)</th></tr>
<tr><td>121</td><td>I/O Comm Loss</td><td>②</td><td></td><td>An I/O Board lost communications with the Main Control board.</td><td>1. Check the connector.
2. Check for induced noise.
3. Replace I/O board or Main Control board.</td></tr>
<tr><td>133</td><td>DigIn CnflctA</td><td></td><td>❷</td><td colspan="2">Digital input functions are in conflict. Combinations marked with a “▲” will cause an alarm.
* Jog 1 and Jog 2
<table>
<tr><th></th><th>Acc2/ Dec2</th><th>Accel 2</th><th>Decel 2</th><th>Jog*</th><th>Jog Fwd</th><th>Jog Rev</th><th>Fwd/ Rev</th></tr>
<tr><td>Acc2 / Dec2</td><td></td><td>▲</td><td>▲</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Accel 2</td><td>▲</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Decel 2</td><td>▲</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Jog*</td><td></td><td></td><td></td><td></td><td>▲</td><td>▲</td><td></td></tr>
<tr><td>Jog Fwd</td><td></td><td></td><td></td><td>▲</td><td></td><td></td><td>▲</td></tr>
<tr><td>Jog Rev</td><td></td><td></td><td></td><td>▲</td><td></td><td></td><td>▲</td></tr>
<tr><td>Fwd/Rev</td><td></td><td></td><td></td><td></td><td>▲</td><td>▲</td><td></td></tr>
</table></td></tr>
<tr><td>134</td><td>DigIn CnflctB</td><td></td><td>❷</td><td colspan="2">A digital Start input has been configured without a Stop input or other functions are in conflict. Combinations that conflict are marked with a “▲” and will cause an alarm.
* Jog 1 and Jog 2
<table>
<tr><th></th><th>Start</th><th>Stop-CF</th><th>Run</th><th>Run Fwd</th><th>Run Rev</th><th>Jog*</th><th>Jog Fwd</th><th>Jog Rev</th><th>Fwd/ Rev</th></tr>
<tr><td>Start</td><td></td><td></td><td>▲</td><td>▲</td><td>▲</td><td></td><td>▲</td><td>▲</td><td></td></tr>
<tr><td>Stop-CF</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Run</td><td>▲</td><td></td><td></td><td>▲</td><td>▲</td><td></td><td>▲</td><td>▲</td><td></td></tr>
<tr><td>Run Fwd</td><td>▲</td><td></td><td>▲</td><td></td><td></td><td>▲</td><td></td><td></td><td>▲</td></tr>
<tr><td>Run Rev</td><td>▲</td><td></td><td>▲</td><td></td><td></td><td>▲</td><td></td><td></td><td>▲</td></tr>
<tr><td>Jog*</td><td></td><td></td><td></td><td>▲</td><td>▲</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Jog Fwd</td><td>▲</td><td></td><td>▲</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Jog Rev</td><td>▲</td><td></td><td>▲</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Fwd/Rev</td><td></td><td></td><td></td><td>▲</td><td>▲</td><td></td><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>135</td><td>DigIn CnflctC</td><td></td><td>❷</td><td colspan="2">More than one physical input has been configured to the same input function. Multiple configurations are not allowed for the following input functions.
Forward/Reverse, Speed Select 1, Speed Select 2, Speed Select 3, Run Forward, Run Reverse, Jog Forward, Jog Reverse, Run, Stop Mode B, Bus Regulation Mode B, Acc2 / Dec2, Accel 2, Decel 2</td></tr>
<tr><td>136</td><td>BipolarCnflct</td><td></td><td>❷</td><td colspan="2">Parameter [Direction Mode] is set to “Bipolar” or “Reverse Dis” and one or more of the following digital input functions is configured: “Fwd/Reverse,” “Run Forward,” “Run Reverse,” “Jog Forward” or “Jog Reverse.”</td></tr>
<tr><td>139</td><td>UserSetCflct</td><td></td><td>❷</td><td colspan="2">Not all digital inputs and datalinks in the user set you are saving are the same. All user sets must be saved with the same settings for parameters 361-366, 300-307 and 310-317.</td></tr>
<tr><td>143</td><td>TB Man Conflict</td><td></td><td>❷</td><td>Parameter 96 [TB Man Ref Sel] is using an analog input that is programmed for another function.</td><td>Check the parameter settings to avoid problem.</td></tr>
<tr><td>147</td><td>Start AtPwrUp</td><td></td><td>❶</td><td colspan="2">Parameter 168 [Start At PowerUp] is enabled. The drive may start at any time within 10 seconds of drive powerup.</td></tr>
<tr><td>148</td><td>IntDB OvrHeat</td><td></td><td>❶</td><td colspan="2">The drive has temporarily disabled the DB regulator because the resistor temperature has exceeded a predetermined value.</td></tr>
<tr><td>149</td><td>Waking</td><td></td><td>❶</td><td colspan="2">The Wake timer is counting toward a value that will start the drive.</td></tr>
</table>

No.	Name	Fault	Alarm	Description	Action *(if appropriate)*
150	Sleep Config		❷	Sleep/Wake configuration error. With parameter 178 [Sleep Wake Mode] = "Direct," possible causes include: drive is stopped and parameter 180 [Wake Level] < parameter 182 [Sleep Level]. "Stop=CF," "Run," "Run Forward," or "Run Reverse" is not configured in [Digital Inx Sel].	

Table 3.B Fault/Alarm Cross Reference

Name	No.	Fault	Alarm
Anlg In Loss	29	✔	✔
AutoReset Lim	33	✔	
AutoT Enable	114	✔	
AutoT Lm Rot	96	✔	
AutoT MagRot	97	✔	
AutoT Rs Stat	95	✔	
AutoT Saturat	98	✔	
Auxiliary In	2	✔	
BipolarCnflct	136		✔
BrakResMissng	28	✔	
CAN Bus Flt	34	✔	
Decel Inhibit	24	✔	✔
Device Add	45	✔	
Device Change	44	✔	
DigIn CnflctA	133		✔
DigIn CnflctB	134		✔
DigIn CnflctC	135		✔
Fan Cooling	32	✔	
Fatal App	113	✔	
Gate Disable	59	✔	✔
Ground Fault	13		
Hardware Enbl	94	✔	
HeatsinkOvrTp	8	✔	
HeatsinkUndTp	37	✔	
Hrdwr Therm	60	✔	
I/O Change	120	✔	
I/O Comm Loss	121	✔	
I/O Removed	65	✔	
IGBT OverTemp	9	✔	
IGBT Temp Hw	31	✔	
Input Phase	17	✔	✔
IntDB OvrHeat	148		✔
InverterFault	14	✔	
Load Loss	15	✔	✔

Name	No.	Fault	Alarm
MaxFreqCnflct	23		✔
MCB-PB Config	106	✔	
MicroWatchdog	30	✔	
Motor Stall	6	✔	
Motor Therm	16	✔	✔
MotorCalcData	50	✔	
MotorOverload	7	✔	
New IO Option	107	✔	
NP Hz Cnflct	22		✔
NvsReadChksum	47	✔	
OutPhasMissng	21	✔	
OverCurrent	12	✔	
OverSpd Limit	25	✔	
OverVoltage	5	✔	
Param Chksum	100	✔	
ParamsDefault	48	✔	
Periph Loss	71	✔	
Port DPI Loss	81	✔	
Power Loss	3	✔	✔
Power Unit	70	✔	
PrechargeActv	1		✔
PwrBrd Chksum	104	✔	
Shear Pin	63	✔	
Sleep Config	150		✔
SpdRef Cnflct	27		✔
Start AtPwrUp	147		✔
System Fault	10	✔	
TB Man Conflict	143		✔
UnderVoltage	4	✔	✔
UserSetCflct	139		✔
UserSet Timer	99	✔	
VHz Neg Slope	26		✔
Waking	149		✔
Zero Divide	54	✔	

Fault Subcodes

Fault Subcodes can be viewed in parameters 543, 545, 547, 549, 551, 553, 555, 557 [Fault x Subcode]. Each of these parameters corresponds with parameters 243, 245, 247, 249, 251, 253, 255, 257 [Fault x Code]. For example, if parameter 243 [Fault 1 Code] displays "5" and parameter 543 [Fault 1 Subcode] displays "273", an over voltage fault (F5) has occurred in the power unit of the drive.

Table 3.C Precharge Active Fault (F1) Subcodes

Subcode	Description
273	The precharge circuit in the power unit is active
289	The precharge circuit in power unit 1 is active
305	The precharge circuit in power unit 2 is active

Table 3.D Under Voltage Fault (F4) Subcodes

Subcode	Description
273	The DC Bus voltage in the power unit is too low while the drive is in a run state
529	The DC Bus voltage in the power unit is too low while the drive is in a run state
545	The DC Bus voltage in power unit 1 is too low while the drive is in a run state
561	The DC Bus voltage in power unit 2 is too low while the drive is in a run state
785	The DC Bus voltage in the power unit fell too low during a fast stop

Table 3.E Over Voltage Fault (F5) Subcodes

Subcode	Description
273	There is an over voltage in the power unit
289	There is an over voltage in power unit 1
276	There is an over voltage in power unit 2
277	There is an over voltage in the power unit

Table 3.F Motor Stall Fault (F6) Subcode

Subcode	Description
400	The motor is operating at high current and low frequency and is not accelerating

Table 3.G Heatsink Over Temperature Fault (F8) Subcodes

Subcode	Description
272, 273	There is a heatsink over temperature in the power unit
274	There is a heatsink over temperature on the Power board of the power unit
275	There is a heatsink over temperature in the U phase of the power unit (Frame 11 and 13 drives only)
276	There is a heatsink over temperature in the V phase of the power unit (Frame 11 and 13 drives only)
277	There is a heatsink over temperature in the W phase of the power unit (Frame 11 and 13 drives only)
288, 289	There is a heatsink over temperature in power unit 1 (Frame 12 and 14 drives only)
290	There is a heatsink over temperature on the Power board of power unit 1 (Frame 12 and 14 drives only)
291	There is a heatsink over temperature in the U phase of power unit 1 (Frame 12 and 14 drives only)
292	There is a heatsink over temperature in the V phase of power unit 1 (Frame 12 and 14 drives only)
293	There is a heatsink over temperature in the W phase of power unit 1 (Frame 12 and 14 drives only)
304, 305	There is a heatsink over temperature in power unit 2 (Frame 12 and 14 drives only)
306	There is a heatsink over temperature on the Power board of power unit 2 (Frame 12 and 14 drives only)
307	There is a heatsink over temperature in the U phase of power unit 2 (Frame 12 and 14 drives only)
308	There is a heatsink over temperature in the V phase of power unit 2 (Frame 12 and 14 drives only)
309	There is a heatsink over temperature in the W phase of power unit 2 (Frame 12 and 14 drives only)
530	There is a Thermistor over temperature on the Power board (Frame 12 and 14 drives only)

Table 3.H IGBT Over Temperature Fault (F9) Subcode

Subcode	Description
273	The output transistors have exceeded their maximum operating temperature due to an excessive load

Table 3.I System Fault (F10) Subcodes

Subcode	Description	Action
273	There is an output phase feedback fault from the motor cables	
275	There is an output phase feedback fault from the U phase motor cable (Frame 11 and 13 drives only)	
276	There is an output phase feedback fault from the V phase motor cable (Frame 11 and 13 drives only)	
277	There is an output phase feedback fault from the W phase motor cable (Frame 11 and 13 drives only)	
1042	There is a disturbance at the ASIC fault-input of the Power board - ribbon cable/software	
1058	There is a disturbance at the ASIC fault-input of the Power board in power unit 1 - ribbon cable/software (Frame 12 and 14 drives only)	
1074	There is a disturbance at the ASIC fault-input of the Power board in power unit 2 - ribbon cable/software (Frame 12 and 14 drives only)	
1090	There is a disturbance at the ASIC fault-input of the Control board - application software	
1298	There is too much disturbance in system bus traffic on the Power board	
1314	There is too much disturbance in system bus traffic on the Power board in power unit 1 (Frame 12 and 14 drives only)	
1330	There is too much disturbance in system bus traffic on the Power board in power unit 2 (Frame 12 and 14 drives only)	
1553	The charging relay feedback is not working	
1810	The charging relay control is not set on the Power board	
1826	The charging relay control is not set on the Power board on power unit 1 (Frame 12 and 14 drives only)	
1827	The charging relay control is not set configured on the Power board on power unit 2 (Frame 12 and 14 drives only)	
2065	The Gate Driver board is without auxiliary voltage (Power ASIC-TRIN)	
2067	The Gate Driver board for the U phase is without auxiliary voltage (Frame 11 and 13 drives only)	
2068	The Gate Driver board for the V phase is without auxiliary voltage (Frame 11 and 13 drives only)	
2069	The Gate Driver board for the W phase is without auxiliary voltage (Frame 11 and 13 drives only)	
2081	The Gate Driver board in power unit 1 is without auxiliary voltage (Frame 12 and 14 drives only)	
2083	The Gate Driver board for the U phase in power unit 1 is without auxiliary voltage (Frame 14 drives only)	
2084	The Gate Driver board for the V phase in power unit 1 is without auxiliary voltage (Frame 14 drives only)	
2085	The Gate Driver board for the W phase in power unit 1 is without auxiliary voltage (Frame 14 drives only)	
2097	The Gate Driver board in power unit 2 is without auxiliary voltage (Frame 12 and 14 drives only)	
2099	The Gate Driver board for the U phase in power unit 2 is without auxiliary voltage (Frame 14 drives only)	
2100	The Gate Driver board for the V phase in power unit 2 is without auxiliary voltage (Frame 14 drives only)	
2101	The Gate Driver board for the W phase in power unit 2 is without auxiliary voltage (Frame 14 drives only)	
2370	The TX fiber optic cable connected to H6 on the 700H Control board is broken	
2594	The fiber optic cable connected to TRIP on the Star Coupler board for power unit 1 is broken (Frame 12 and 14 drives only)	
2610	The fiber optic cable connected to TRIP on the Star Coupler board for power unit 2 is broken (Frame 12 and 14 drives only)	
2834	The fiber optic cable connected to H5 on the ASIC board is broken	
7767	The safe disable inputs on the 20C-DG1 option board have been in a different state for more than 5 seconds.	• Verify all connections to the 20C-DG01 option board • If this fault and subcode occurs again, replace the 20C-DG1 option board
8023	A thermistor short circuit has been detected on the 20C-DG1 option board.	• Verify the thermistor connections and correct if necessary • Verify that the jumper at X10 is in the correct position
8279	The 20C-DG1 option board has been removed.	Set parameter 359 [20C-DG1 Status] to 1"Remove" and then back to 0 "Ready".
8535	There is an EEPROM error on the 20C-DG1 option board.	Replace the 20C-DG1 option board
8791	A supply voltage hardware problem has been detected on the 20C-DG1 option board.	Replace the 20C-DG1 option board
9047	A supply voltage hardware problem has been detected on the 20C-DG1 option board.	Replace the 20C-DG1 option board
9303	A supply voltage hardware problem has been detected on the 20C-DG1 option board.	Replace the 20C-DG1 option board
9559	A single hardware problem has been detected in the safe disable inputs on the 20C-DG1 option board.	Replace the 20C-DG1 option board. If this fault occurs again, replace the Main Control board.
9815	A single hardware problem has been detected in the safe disable inputs on the 20C-DG1 option board.	Replace the 20C-DG1 option board. If this fault occurs again, replace the Main Control board.

Subcode	Description	Action
10071	A single hardware problem has been detected in the safe disable inputs on the 20C-DG1 option board.	Replace the 20C-DG1 option board. If this fault occurs again, replace the Main Control board.
10327	A single hardware problem has been detected in the safe disable inputs on the 20C-DG1 option board.	Replace the 20C-DG1 option board. If this fault occurs again, replace the Main Control board.
10583	A single hardware problem has been detected in the thermistor input on the 20C-DG1 option board.	Replace the 20C-DG1 option board
10839	A single hardware problem has been detected in the thermistor input on the 20C-DG1 option board.	Replace the 20C-DG1 option board
11096	A single hardware problem has been detected in the thermistor input on the 20C-DG1 option board.	Replace the 20C-DG1 option board
11351	A single hardware problem has been detected in the safe disable inputs or in the thermistor input on the 20C-DG1 option board.	Replace the 20C-DG1 option board. If this fault occurs again, replace the Main Control board.
11607	A single hardware problem has been detected in the safe disable inputs or in the thermistor input on the 20C-DG1 option board.	Replace the 20C-DG1 option board. If this fault occurs again, replace the Main Control board.
11863	A single hardware problem has been detected in the safe disable inputs or in the thermistor input on the 20C-DG1 option board.	Replace the 20C-DG1 option board. If this fault occurs again, replace the Main Control board.
12119	The 20C-DG1 option board has been mounted in an incompatible Main Control board that is not equipped with the Safe Disable function.	Replace the Main Control board.
12376	Parameter expander board, slot B, Therm Trip is set to OFF even if the jumper X12 is not cut.	

Table 3.J Over Current Fault (F12) Subcodes

Subcode	Description
272, 273	There is an over current in the power unit
275	There is an over current in the U phase of the power unit (Frame 11 and 13 drives only)
276	There is an over current in the V phase of the power unit (Frame 11 and 13 drives only)
277	There is an over current in the W phase of the power unit (Frame 11 and 13 drives only)
288, 289	There is an over current in power unit 1 (Frame 12 drives only)
291	There is an over current in the U phase of power unit 1 (Frame 14 drives only)
292	There is an over current in the V phase of power unit 1 (Frame 14 drives only)
293	There is an over current in the W phase of power unit 1 (Frame 14 drives only)
304, 305	There is an over current in power unit 2 (Frame 12 drives only)
307	There is an over current in the U phase of power unit 2 (Frame 14 drives only)
308	There is an over current in the V phase of power unit 2 (Frame 14 drives only)
309	There is an over current in the W phase of power unit 2 (Frame 14 drives only)

Table 3.K Ground Fault (F13) Subcode

Subcode	Description
273	There is a ground fault in the power unit

Table 3.L Load Loss Fault (F15) Subcode

Subcode	Description
400	The motor underload protection has tripped

Table 3.M Input Phase Fault (F17) Subcodes

Subcode	Description
273	One input line phase in the power unit is missing
289	One input line phase in power unit 1 is missing
305	One input line phase in power unit 2 is missing
529	One input line phase in a regenerative power unit is missing

Table 3.N Output Phase Missing Fault (F21) Subcode

Subcode	Description
273	There is zero current in one of the output motor phases in the power unit

Table 3.O Brake Resistor Missing Fault (F28) Subcodes

Subcode	Description
273	No brake resistor has been detected (Frame 9 drives only)

Table 3.P Microprocessor Watchdog Fault (F30) Subcode

Subcode	Description
322	A microprocessor watchdog timeout has occurred on the Control board

Table 3.Q IGBT Temperature Hardware Fault (F31) Subcodes

Subcode	Description
272, 273	The output current has exceeded the instantaneous current limit in the power unit
275	The output current has exceeded the instantaneous current limit in the U phase of the power unit (Frame 11 and 13 drives only)
276	The output current has exceeded the instantaneous current limit in the V phase of the power unit (Frame 11 and 13 drives only)
277	The output current has exceeded the instantaneous current limit in the W phase of the power unit (Frame 11 and 13 drives only)
288, 289	The output current has exceeded the instantaneous current limit in power unit 1 (Frame 12 and 14 drives only)
291	The output current has exceeded the instantaneous current limit in the U phase of power unit 1 (Frame 14 drives only)
292	The output current has exceeded the instantaneous current limit in the V phase of power unit 1 (Frame 14 drives only)
293	The output current has exceeded the instantaneous current limit in the W phase of power unit 1 (Frame 14 drives only)
304, 305	The output current has exceeded the instantaneous current limit in power unit 2 (Frame 12 and 14 drives only)
307	The output current has exceeded the instantaneous current limit in the U phase of power unit 2 (Frame 14 drives only)
308	The output current has exceeded the instantaneous current limit in the V phase of power unit 2 (Frame 14 drives only)
309	The output current has exceeded the instantaneous current limit in the W phase of power unit 2 (Frame 14 drives only)

Table 3.R Fan Cooling Fault (F32) Subcodes

Subcode	Description
273	The fan(s) in the power unit does not work according to feedback information
289	The fans in power unit 1 does not work according to feedback information (Frame 12 and 14 drives only)
305	The fans in power unit 2 does not work according to feedback information (Frame 12 and 14 drives only)

Table 3.S Communication Bus Fault (F34) Subcode

Subcode	Description
338	A sent message was not acknowledged.

Table 3.T Heatsink Under Temperature Fault (F37) Subcodes

Subcode	Description
272, 273	There is a heatsink under temperature in the power unit
275	There is a heatsink under temperature in the U phase of the power unit (Frame 11 and 13 drives only)
276	There is a heatsink under temperature in the V phase of the power unit (Frame 11 and 13 drives only)
277	There is a heatsink under temperature in the W phase of the power unit (Frame 11 and 13 drives only)
288, 289	There is a heatsink under temperature in power unit 1 (Frame 12 and 14 drives only)
291	There is a heatsink under temperature in the U phase of power unit 1 (Frame 14 drives only)
292	There is a heatsink under temperature in the V phase of power unit 1 (Frame 14 drives only)
293	There is a heatsink under temperature in the W phase of power unit 1 (Frame 14 drives only)
304, 305	There is a heatsink under temperature in power unit 2 (Frame 12 and 14 drives only)
307	There is a heatsink under temperature in the U phase of power unit 2 (Frame 14 drives only)
308	There is a heatsink under temperature in the V phase of power unit 2 (Frame 14 drives only)
309	There is a heatsink under temperature in the W phase of power unit 2 (Frame 14 drives only)

Table 3.U Device Change (F44), Device Added (F45), I/O Option Board Removed (F65), Power Board Checksum (F104), New I/O Option Board (F107) and I/O Option Board Change (F120) Fault Subcodes

Subcode	Description
273	The power unit has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged.
274	The Power board has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged.
278	The circuit board in Slot A of the control unit has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged.
279	The circuit board in Slot B of the control unit has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged.
282	The circuit board in Slot E of the control unit has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged.
289	A device or circuit board in power unit 1 has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged. (Frame 12 and 14 drives only)
290	The Power board in power unit 1 has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged. (Frame 12 and 14 drives only)
294	The circuit board in Slot A of the control unit has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged. (Frame 12 and 14 drives only)
295	The circuit board in Slot B of the control unit has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged. (Frame 12 and 14 drives only)
298	The circuit board in Slot E of the control unit has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged. (Frame 12 and 14 drives only)
305	A device or circuit board in power unit 2 has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged.

Subcode	Description
321	A device or circuit board has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged.
322	The Control board has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged.
326	The circuit board in Slot A of the control unit has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged.
327	The circuit board in Slot B of the control unit has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged.
330	The circuit board in Slot E of the control unit has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged.
369	The Star Coupler board on the control unit has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged. (Frame 12 and 14 drives only)
370	The Star Coupler board has been changed, added, removed, has experienced a checksum error, or is new and the parameters for the device/board remain unchanged. (Frame 12 and 14 drives only)
561	The power level in power unit 2 is not equal to the power level in power unit 1 after a microprocessor reset. (Frame 12 and 14 drives only)

Table 3.V NVS Read Checksum Fault (F47) Subcode

Subcode	Description
322	An operating time or energy counter checksum error has occurred on the Control board

Table 3.W Motor Over Temperature Fault (F16) Subcode

Subcode	Description
400	The motor is operating at high current and low frequency and is not accelerating

Table 3.X Power Unit Fault (F70) Subcodes

Subcode	Description
272, 273	There is saturation in the power unit
275	There is saturation in the U phase of the power unit (Frame 11 and 13 drives only)
276	There is saturation in the V phase of the power unit (Frame 11 and 13 drives only)
277	There is saturation in the W phase of the power unit (Frame 11 and 13 drives only)
288, 289	There is saturation in power unit 1 (Frame 12 and 14 drives only)
291	There is saturation in the U phase of power unit 1 (Frame 14 drives only)
292	There is saturation in the V phase of power unit 1 (Frame 14 drives only)
293	There is saturation in the W phase of power unit 1 (Frame 14 drives only)
304, 305	There is saturation in power unit 2 (Frame 12 and 14 drives only)
307	There is saturation in the U phase of power unit 2 (Frame 14 drives only)
308	There is saturation in the V phase of power unit 2 (Frame 14 drives only)
309	There is saturation in the W phase of power unit 2 (Frame 14 drives only)

Table 3.Y Hardware Enable Fault (F94) Subcode

Subcode	Description
338	An hardware enable signal is missing from the control terminal block

Table 3.Z Parameter Checksum Fault (F100) Subcodes

Subcode	Description
322	A firmware interface powerdown variable checksum error has occurred on the Control board
578	A firmware interface variable checksum error has occurred on the Control board
834	A system powerdown variable checksum error (panel menu index, fault history pointer) has occurred on the Control board
1090	A system parameter checksum error (multimonitor, panel default pages) has occurred on the Control board
1346	An application defined powerdown, variable checksum error has occurred on the Control board
1602	An application defined powerdown, variable checksum error has occurred on the Control board
2626	A system parameter checksum error (fault history entries, device valid, system menu parameters) has occurred on the Control board

Table 3.AA Main Control Board - Power Board Configuration Fault (F106) Subcode

Subcode	Description
385	The software and the power unit are incompatible

Clearing Alarms

Alarms are automatically cleared when the condition that caused the alarm is no longer present.

Common Symptoms and Corrective Actions

Drive does not Start from Start or Run Inputs wired to the terminal block.

Cause(s)	Indication	Corrective Action
Drive is Faulted	Flashing red status light	Clear fault. • Press Stop • Cycle power • Set [Fault Clear] to 1 (See page 2-28) • "Clear Faults" on the HIM Diagnostic menu.
Incorrect input wiring. See pages Installation Manual for wiring examples. • 2 wire control requires Run, Run Forward, Run Reverse or Jog input. • 3 wire control requires Start and Stop inputs. • Jumper from terminal 17 to 20 is required when using the 24V DC internal supply.	None	Wire inputs correctly and/or install jumper.
Incorrect digital input programming. • Mutually exclusive choices have been made (i.e., Jog and Jog Forward). • 2 wire and 3 wire programming may be conflicting. • Exclusive functions (i.e, direction control) may have multiple inputs configured. • Stop is factory default and is not wired.	None	Program [Digital Inx Sel] for correct inputs. (See page 2-39) Start or Run programming may be missing.
	Flashing yellow status light and "DigIn CflctB" indication on LCD HIM. [Drive Status 2] shows type 2 alarm(s).	Program [Digital Inx Sel] to resolve conflicts. (See page 2-39) Remove multiple selections for the same function. Install stop button to apply a signal at stop terminal.

Drive does not Start from HIM.

Cause(s)	Indication	Corrective Action
Drive is programmed for 2 wire control. HIM Start button is disabled for 2 wire control.	None	If 2 wire control is required, no action needed. If 3 wire control is required, program [Digital Inx Sel] for correct inputs. (See page 2-39)

Drive does not respond to changes in speed command.

Cause(s)	Indication	Corrective Action
No value is coming from the source of the command.	LCD HIM Status Line indicates “At Speed” and output is 0 Hz.	1. If the source is an analog input, check wiring and use a meter to check for presence of signal. 2. Check [Commanded Speed] for correct source. (See page 2-6)
Incorrect reference source has been programmed.	None	3. Check [Speed Ref Source] for the source of the speed reference. (See page 2-26) 4. Reprogram [Speed Ref A Sel] for correct source. (See page 2-11)
Incorrect Reference source is being selected via remote device or digital inputs.	None	5. Check [Drive Status 1], page 2-25, bits 12 and 13 for unexpected source selections. 6. Check [Dig In Status], page 2-26 to see if inputs are selecting an alternate source. 7. Reprogram digital inputs to correct “Speed Sel x” option. (See page 2-39)

Motor and/or drive will not accelerate to commanded speed.

Cause(s)	Indication	Corrective Action
Acceleration time is excessive.	None	Reprogram [Accel Time x]. (See page 2-16)
Excess load or short acceleration times force the drive into current limit, slowing or stopping acceleration.	None	Check [Drive Status 2], bit 10 to see if the drive is in Current Limit. (See page 2-25) Remove excess load or reprogram [Accel Time x].(See page 2-16)
Speed command source or value is not as expected.	None	Check for the proper Speed Command using Steps 1 through 7 above.
Programming is preventing the drive output from exceeding limiting values.	None	Check [Maximum Speed] (See page 2-10) and [Maximum Freq] (See page 2-8) to assure that speed is not limited by programming.

Motor operation is unstable.

Cause(s)	Indication	Corrective Action
Motor data was incorrectly entered or Autotune was not performed.	None	1. Correctly enter motor nameplate data. 2. Perform “Static” or “Rotate” Autotune procedure. (Param #061, page 2-9) 3. Set gain parameters to default values.

Drive will not reverse motor direction.

Cause(s)	Indication	Corrective Action
Digital input is not selected for reversing control.	None	Check [Digital Inx Sel], page 2-39. Choose correct input and program for reversing mode.
Digital input is incorrectly wired.	None	Check input wiring.
Direction mode parameter is incorrectly programmed.	None	Reprogram [Direction Mode], page 2-22 for analog "Bipolar" or digital "Unipolar" control.
Motor wiring is improperly phased for reverse.	None	Check for single phasing on the output of the drive.
A bipolar analog speed command input is incorrectly wired or signal is absent.	None	1. Use meter to check that an analog input voltage is present. 2. Check wiring. Positive voltage commands forward direction. Negative voltage commands reverse direction.

Stopping the drive results in a Decel Inhibit fault.

Cause(s)	Indication	Corrective Action
The bus regulation feature is enabled and is halting deceleration due to excessive bus voltage. Excess bus voltage is normally due to excessive regenerated energy or unstable AC line input voltages. Internal timer has halted drive operation.	Decel Inhibit fault screen. LCD Status Line indicates "Faulted".	1. See Attention statement on page P-3. 2. Reprogram parameters 161/162 to eliminate any "Adjust Freq" selection. 3. Disable bus regulation (parameters 161 & 162) and add a dynamic brake. 4. Correct AC input line instability or add an isolation transformer. 5. Reset drive.

Technical Support Options

Technical Support Wizards

If you are connected to a drive via DriveExplorer™ or DriveExecutive™, you can run a Tech Support wizard to gather information that will help diagnose problems with your drive and/or peripheral device. The information gathered by the wizard is saved as a text file and can be emailed to your remote technical support contact. (See What You Need When You Call Tech Support on page 3-22 for more information.)

To run a Tech Support wizard in DriveExplorer, select **Wizards** from the **Actions** menu. In DriveExecutive, select **Wizards** from the **Tools** menu. Or, click the  button. Follow the prompts to complete the wizard.

What You Need When You Call Tech Support

When you contact Technical Support, please be prepared to provide the following information:

- Order number
- Product catalog number and drives series number (if applicable)
- Product serial number
- Firmware revision level
- Most recent fault code
- Your application

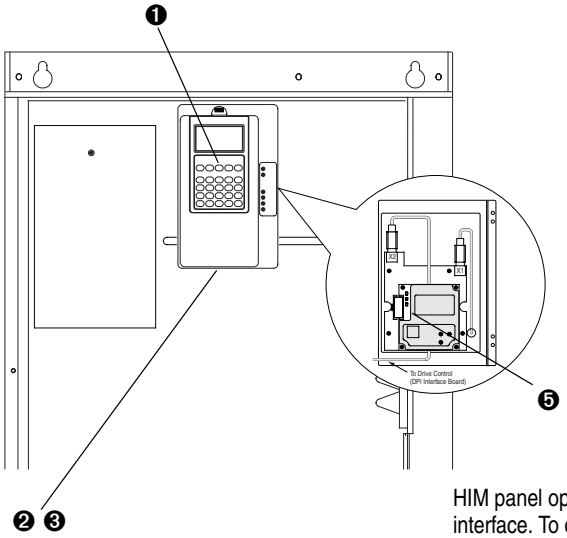
The data contained in the following parameters will help in initial troubleshooting of a faulted drive. You can use the table below to record the data provided in each parameter listed.

Parameter(s)	Name	Description	Parameter Data
224	Fault Frequency	Captures and displays the output speed of drive at time of last fault.	
225	Fault Amps	Captures and displays motor amps at time of last fault.	
226	Fault Bus Volts	Captures and displays the DC bus voltage of drive at time of last fault.	
227	Status 1 @ Fault	Captures and displays [Drive Status 1] bit pattern at time of last fault.	
228	Status 2 @ Fault	Captures and displays [Drive Status 2] bit pattern at time of last fault.	
229	Alarm 1 @ Fault	Captures and displays [Drive Alarm 1] bit pattern at time of last fault.	
230	Alarm 2 @ Fault	Captures and displays [Drive Alarm 2] bit pattern at time of last fault.	
243	Fault 1 Code	A code that represents the fault that tripped the drive.	
245	Fault 2 Code		
247	Fault 3 Code		
249	Fault 4 Code		
251	Fault 5 Code		
253	Fault 6 Code		
255	Fault 7 Code		
257	Fault 8 Code		
244	Fault 1 Time	Time stamp of the fault occurrence.	
246	Fault 2 Time		
248	Fault 3 Time		
250	Fault 4 Time		
252	Fault 5 Time		
254	Fault 6 Time		
256	Fault 7 Time		
258	Fault 8 Time		
543	Fault 1 Subcode	The subcode for the corresponding fault identified in [Fault x Code]	
545	Fault 2 Subcode		
547	Fault 3 Subcode		
549	Fault 4 Subcode		
551	Fault 5 Subcode		
553	Fault 6 Subcode		
555	Fault 7 Subcode		
557	Fault 8 Subcode		
262-269	Alarm Code 1-8	A code that represents a drive alarm. No time stamp available.	

HIM Overview

External and Internal Connections

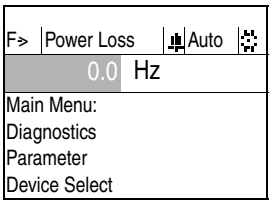
The PowerFlex 700H provides a number of cable connection points



HIM panel opens to allow access to DPI interface. To open panel, remove screws on left side of HIM panel and swing open.

No.	Connector	Description
❶	DPI Port 1	HIM connection when installed in drive.
❷	DPI Port 2	Cable connection for handheld and remote options.
❸	DPI Port 3 or 2	Splitter cable connected to DPI Port 2 provides additional port.
❹	DPI Port 4	Not available.
❺	DPI Port 5	Cable connection for communications adapter.

LCD Display Elements

Display	Description
	Direction | Drive Status | Alarm | Auto/Man | Information Commanded or Output Frequency Programming / Monitoring / Troubleshooting

ALT Functions

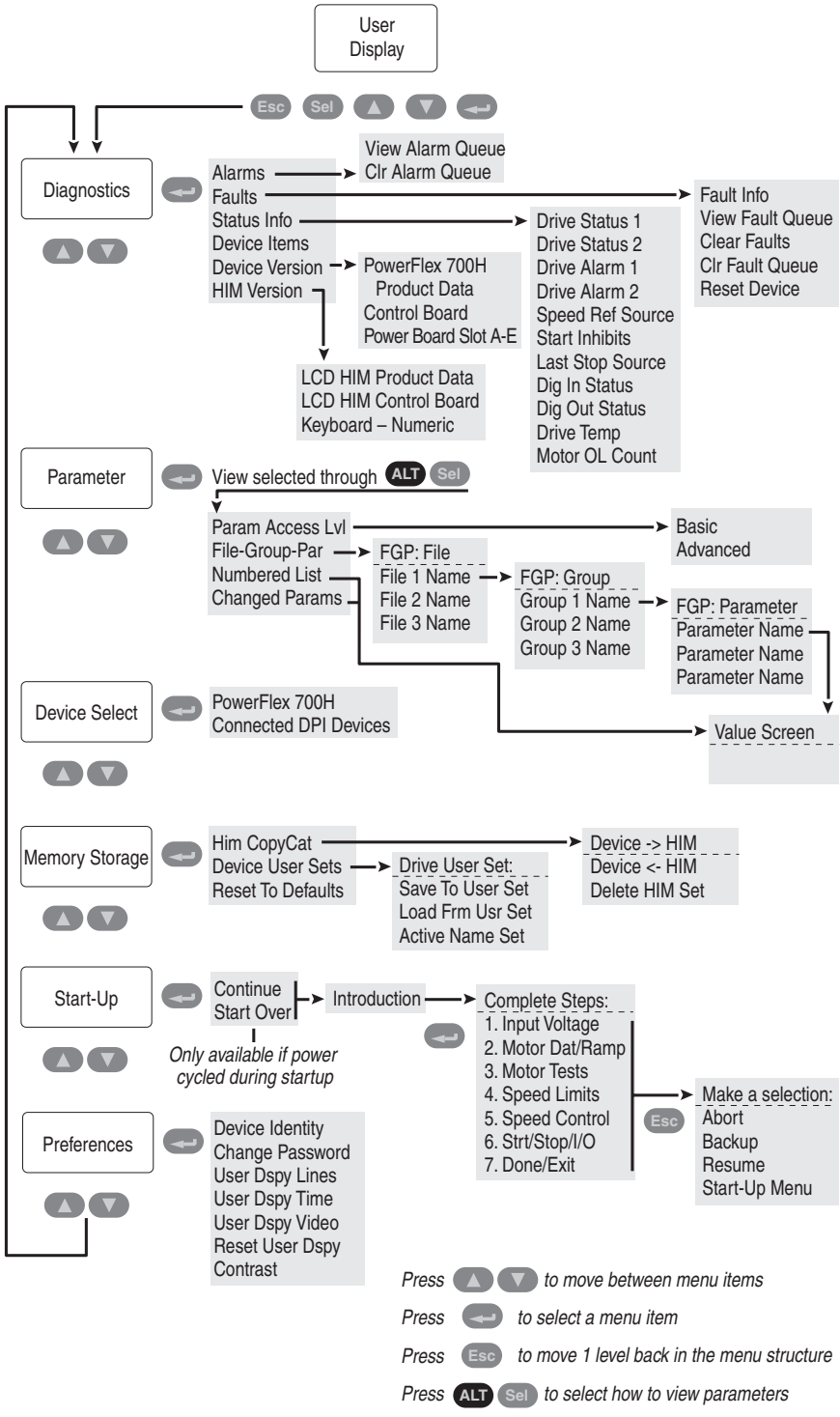
To use an ALT function, press the ALT key, release it, then press the programming key associated with one of the following functions:

Table A.A ALT Key Functions

ALT Key and then …			Performs this function …
ALT	Esc	S.M.A.R.T.	Displays the S.M.A.R.T. screen.
	Sel	View	Allows the selection of how parameters will be viewed or detailed information about a parameter or component.
	▲	Lang	Displays the language selection screen.
	▼	Auto / Man	Switches between Auto and Manual Modes.
	↵	Remove	Allows HIM removal without causing a fault if the HIM is not the last controlling device and does not have Manual control of the drive.
	.	Exp	Allows value to be entered as an exponent. (Not available on PowerFlex 700.)
	+/–	Param #	Allows entry of a parameter number for viewing/editing.

Menu Structure

Figure A.1 HIM Menu Structure



Diagnostics Menu

When a fault trips the drive, use this menu to access detailed data about the drive.

Option	Description
Faults	View fault queue or fault information, clear faults or reset drive.
Status Info	View parameters that display status information about the drive.
Device Version	View the firmware version and hardware series of components.
HIM Version	View the firmware version and hardware series of the HIM.

Parameter Menu

See Viewing and Editing Parameters on page A-5.

Device Select Menu

Use this menu to access parameters in connected peripheral devices.

Memory Storage Menu

Drive data can be saved to, or recalled from, User and HIM sets.
User sets are files stored in permanent nonvolatile drive memory.
HIM sets are files stored in permanent nonvolatile HIM memory.

Option	Description
HIM Copycat Device -> HIM Device <- HIM	Save data to a HIM set, load data from a HIM set to active drive memory or delete a HIM set.
Device User Sets	Save data to a User set, load data from a User set to active drive memory or name a User set.
Reset To Defaults	Restore the drive to its factory-default settings.

Start Up Menu

See Chapter 1.

Preferences Menu

The HIM and drive have features that you can customize.

Option	Description
Drive Identity	Add text to identify the drive.
Change Password	Enable/disable or modify the password.
User Dspy Lines	Select the display, parameter, scale and text for the User Display. The User Display is two lines of user-defined data that appears when the HIM is not being used for programming.
User Dspy Time	Set the wait time for the User Display or enable/disable it.
User Dspy Video	Select Reverse or Normal video for the Frequency and User Display lines.
Reset User Dspy	Return all the options for the User Display to factory default values.

The PowerFlex 700H drive is initially set to Basic Parameter View. To view all parameters, set parameter 196 [Param Access Lvl] to option 1 “Advanced”.

Viewing and Editing Parameters

LCD HIM

Step	Key(s)	Example Displays
1. In the Main Menu, press the Up Arrow or Down Arrow to scroll to "Parameter."	▲ or ▼	
2. Press Enter. "FGP File" appears on the top line and the first three files appear below it.	↵	FGP: File Monitor **Motor Control** Speed Reference
3. Press the Up Arrow or Down Arrow to scroll through the files.	▲ or ▼	
4. Press Enter to select a file. The groups in the file are displayed under it.	↵	F P: Group Motor Data **Torq Attributes** Volts per Hertz
5. Repeat steps 3 and 4 to select a group and then a parameter. The parameter value screen will appear.		FG : Parameter Maximum Voltage **Maximum Freq** Compensation
6. Press Enter to edit the parameter.	↵	
7. Press the Up Arrow or Down Arrow to change the value. If desired, press Sel to move from digit to digit, letter to letter, or bit to bit. The digit or bit that you can change will be highlighted.	▲ or ▼ Sel	FGP: Par 55 Maximum Freq **60.00** Hz 25 <> 400.00
8. Press Enter to save the value. If you want to cancel a change, press Esc.	↵	
9. Press the Up Arrow or Down Arrow to scroll through the parameters in the group, or press Esc to return to the group list.	▲ or ▼ Esc	FGP: Par 55 **Maximum Freq** 90.00 Hz 25 <> 400.00

Numeric Keypad Shortcut

If using a HIM with a numeric keypad, press the ALT key and the +/– key to access the parameter by typing its number.

Removing/Installing the HIM

The HIM can be removed or installed while the drive is powered.

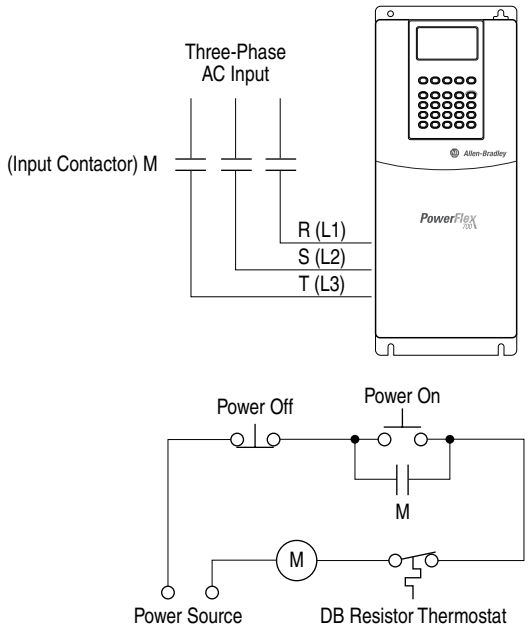
Important: HIM removal is only permissible in Auto mode. If the HIM is removed while in Manual mode or the HIM is the only remaining control device, a fault will occur.

Step	Key(s)	Example Displays
To remove the HIM . . .		
1. Press ALT and then Enter (Remove). The Remove HIM confirmation screen appears.	ALT + ↵	- Remove HIM - Do you wish to continue? Press Enter
2. Press Enter to confirm that you want to remove the HIM.		
3. Remove the HIM from the drive.		
To install HIM . . .		
1. Insert into drive or connect cable.		

Application Notes

External Brake Resistor

Figure B.1 External Brake Resistor Circuitry



Minimum Speed

See Reverse Speed Limit on page B-11

Motor Control Technology

Within the PowerFlex family there are several motor control technologies:

- Torque Producers
- Torque Controllers
- Speed Regulators

Torque Producers

Volts/Hertz

This technology follows a specific pattern of voltage and frequency output to the motor, regardless of the motor being used. The shape of the V/Hz curve can be controlled a limited amount, but once the shape is determined, the drive output is fixed to those values. Given the fixed values, each motor will react based on its own speed/torque characteristics.

This technology is good for basic centrifugal fan/pump operation and for most multi-motor applications. Torque production is generally good.

Sensorless Vector

This technology combines the basic Volts/Hertz concept with known motor parameters such as Rated FLA, HP, Voltage, stator resistance and flux producing current. Knowledge of the individual motor attached to the drive allows the drive to adjust the output pattern to the motor and load conditions. By identifying motor parameters, the drive can maximize the torque produced in the motor and extend the speed range at which that torque can be produced.

This technology is excellent for applications that require a wider speed range and applications that need maximum possible torque for breakaway, acceleration or overload. Centrifuges, extruders, conveyors and others are candidates.

Torque Controllers

Vector

This technology differs from the two above, because it actually controls or regulates torque. Rather than allowing the motor and load to actually determine the amount of torque produced, Vector technology allows the drive to regulate the torque to a defined value. By independently identifying and controlling both flux and torque currents in the motor, true control of torque is achieved. High bandwidth current regulators remain active with or without encoder feedback to produce outstanding results.

This technology is excellent for those applications where torque control, rather than mere torque production, is key to the success of the process. These include web handling, demanding extruders and lifting applications such as hoists or material handling.

Vector Control can operate in one of two configurations:

1. Encoderless

   Not to be confused with Sensorless Vector above, Encoderless Vector based on Allen-Bradley's patented Field Oriented Control technology means that a feedback device is not required. Torque control can be achieved across a significant speed range without feedback.

2. Closed Loop (with Encoder)

   Vector Control with encoder feedback utilizes Allen-Bradley's Force Technology™. This industry leading technology allows the drive to control torque over the entire speed range, including zero speed. For those applications that require smooth torque regulation at very low speeds or full torque at zero speed, Closed Loop Vector Control is the answer.

Speed Regulators

Any of the PowerFlex drives, regardless of their motor control technology (Volts/Hz, Sensorless Vector or Vector) can be set up to regulate speed. Speed regulation and torque regulation must be separated to understand drive operation.

The PowerFlex 70/700 with Standard Control and the PowerFlex 700H can be programmed to regulate speed using the slip compensation feature. Slip compensation reacts to load changes by adjusting the drive output frequency to maintain motor speed. Torque production operates independently. This feature produces speed regulation of about 0.5% of base speed over a specified speed range (40:1 for V/Hz and 80:1 for Sensorless Vector). These drives do not have the capability to extend the speed range or tighten the speed regulation below 0.5% because they do not have connections for a feedback device.

Motor Overload

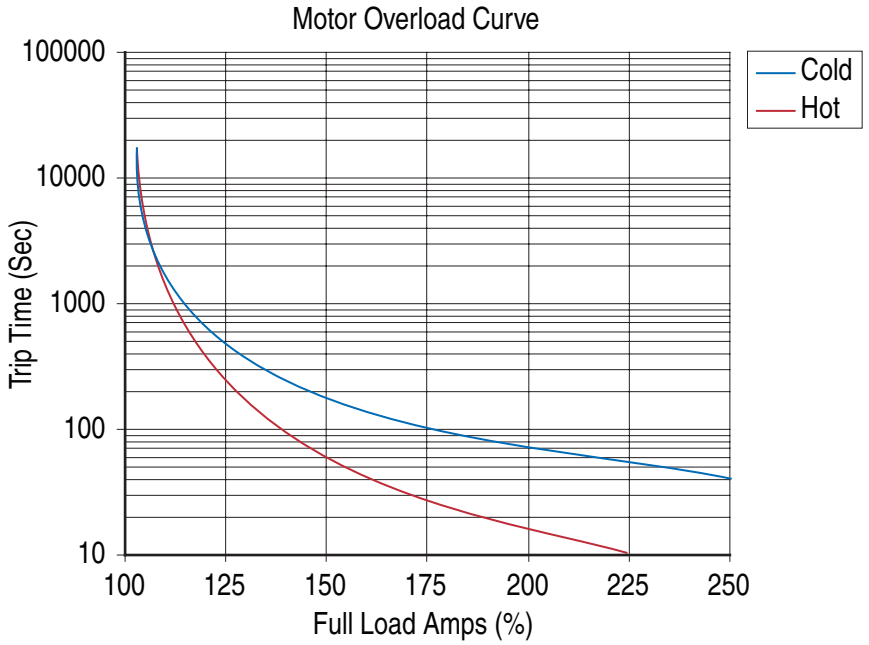
For single motor applications the drive can be programmed to protect the motor from overload conditions. An electronic thermal overload I^2T function emulates a thermal overload relay. This operation is based on three parameters; [Motor NP FLA], [Motor OL Factor] and [Motor OL Hertz] (parameters 042, 048 and 047, respectively).

[Motor NP FLA] is multiplied by [Motor OL Factor] to allow the user to define the continuous level of current allowed by the motor thermal overload. [Motor OL Hertz] is used to allow the user to adjust the frequency below which the motor overload is derated.

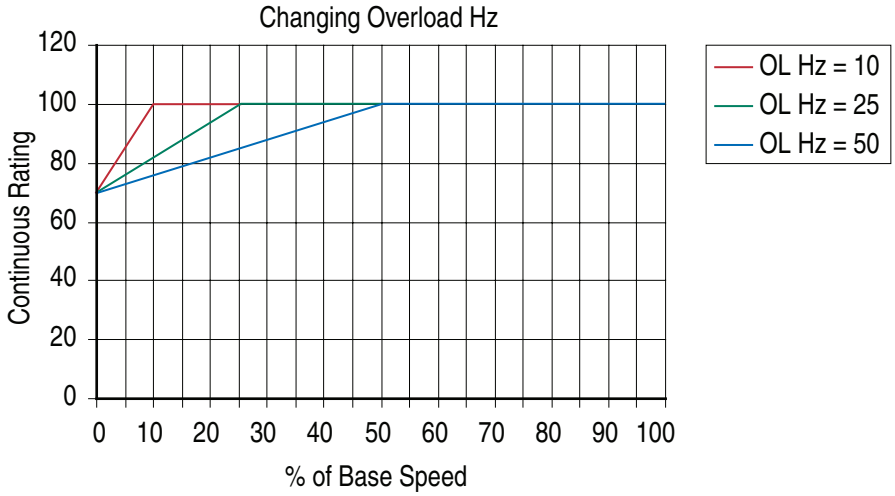
The motor can operate up to 102% of FLA continuously. If the drive had just been activated, it will run at 150% of FLA for 180 seconds. If the motor had been operating at 100% for over 30 minutes, the drive will run at 150%

of FLA for 60 seconds. These values assume the drive is operating above [Motor OL Hertz], and that [Motor OL Factor] is set to 1.00.

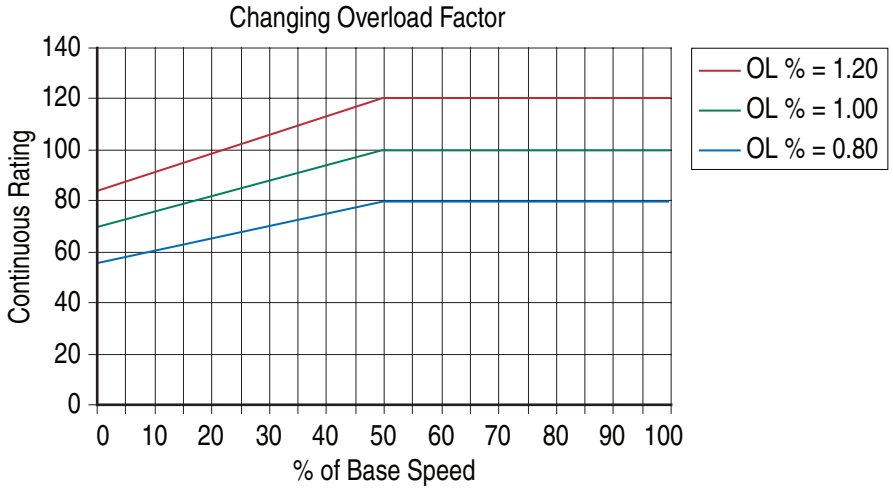
Operation below 100% current causes the temperature calculation to account for motor cooling.



[Motor OL Hertz] defines the frequency where motor overload capacity derate should begin. The motor overload capacity is reduced when operating below [Motor OL Hertz]. For all settings of [Motor OL Hertz] other than zero, the overload capacity is reduced to 70% at an output frequency of zero.



[Motor NP FLA] is multiplied by [Motor OL Factor] to select the rated current for the motor thermal overload. This can be used to raise or lower the level of current that will cause the motor thermal overload to trip. The effective overload factor is a combination of [Motor OL Hertz] and [Motor OL Factor].



Note: This graph represents a motor with a speed range of 2:1.

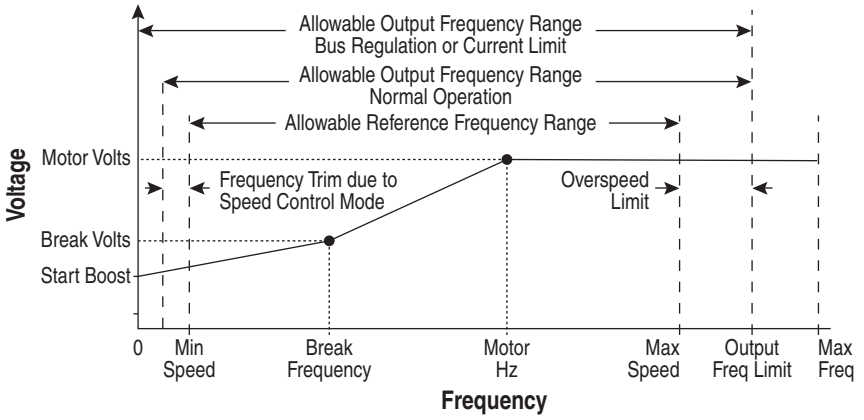
Overspeed

Overspeed Limit is a user programmable value that allows operation at maximum speed, but also provides an “overspeed band” that will allow a speed regulator such as slip compensation to increase the output frequency above maximum speed in order to maintain maximum motor speed.

The figure below illustrates a typical Custom V/Hz profile. Minimum Speed is entered in Hertz and determines the lower speed reference limit during normal operation. Maximum Speed is entered in Hertz and determines the upper speed reference limit. The two “Speed” parameters only limit the speed reference and not the output frequency.

The actual output frequency at maximum speed reference is the sum of the speed reference plus “speed adder” components from functions such as slip compensation.

The Overspeed Limit is entered in Hertz and added to Maximum Speed and the sum of the two (Speed Limit) limit the output frequency. This sum (Speed Limit) must is compared to Maximum Frequency and an alarm is initiated which prevents operation if the Speed Limit exceeds Maximum Frequency.



Power Loss Ride Through

When AC input power is lost, energy is being supplied to the motor from the DC bus capacitors. The energy from the capacitors is not being replaced (via the AC line), thus, the DC bus voltage will fall rapidly. The drive must detect this fall and react according to the way it is programmed.

There are three possible methods of dealing with low bus voltages:

1. "Coast" – Disable the transistors and allow the motor to coast.

2. "Decel" – Decelerate the motor at just the correct rate so that the energy absorbed from the mechanical load balances the losses.

3. "Continue" – Allow the drive to power the motor down to the undervoltage trip level.

Two parameters display DC bus voltage:

- [DC Bus Voltage] – displays the instantaneous value.
- [DC Bus Memory] – displays an estimate of the full-load DC bus voltage.

All drive reactions to power loss are based on either a fixed percentage of [DC Bus Memory], a fixed DC bus voltage, or a user-programmable DC bus voltage. The selected power loss mode determines which trigger levels are available, and the choice of voltage levels is made by "toggling" a digital input programmed to "Pwr Loss Lvl."

If "Continue" is selected, the drive will ignore a loss of DC bus voltage and continue to run the motor until the drive trips on an Undervoltage Fault (F004).

If "Decel" is selected, there is a choice of two levels for recognizing a power loss. If a digital input is programmed for "Pwr Loss Lvl" but is not

energized, or no input is programmed, the drive will recognize a power loss at 80% of [DC Bus Memory]. If a digital input is programmed for “Pwr Loss Lvl” and the input is energized, a power loss will be recognized at the value of [Power Loss Volts].

If “Coast” is selected, there is a choice of two levels for recognizing a power loss. If a digital input is programmed for “Pwr Loss Lvl” but is not energized, or no input is programmed, the drive will recognize a power loss at 73% of [DC Bus Memory]. If a digital input is programmed for “Power Loss Lvl” and the input is energized, a power loss will be recognized at the value of [Power Loss Volts].

Figure B.2 Power Loss Mode = Coast

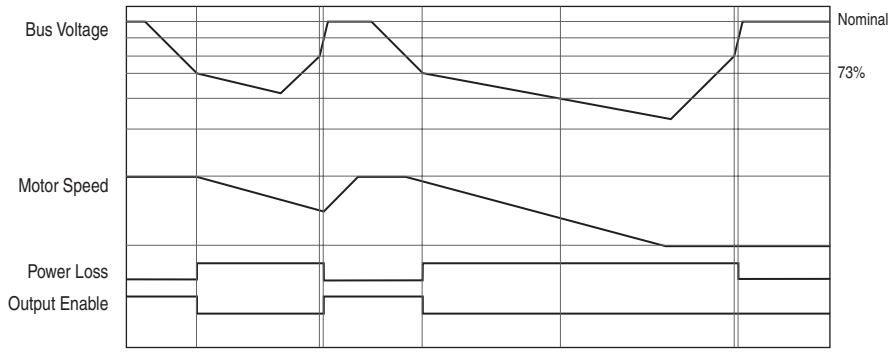
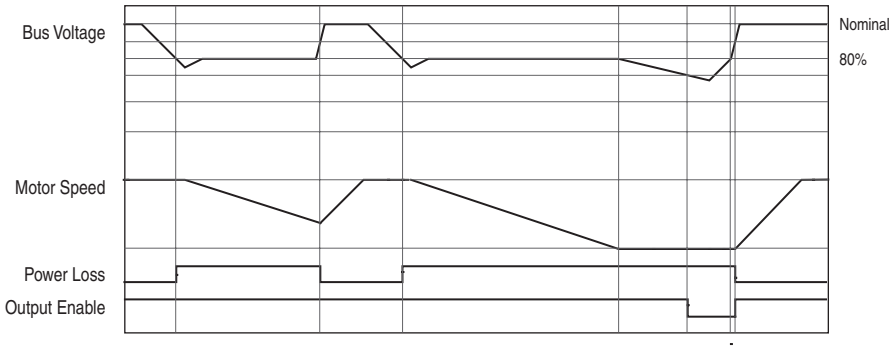
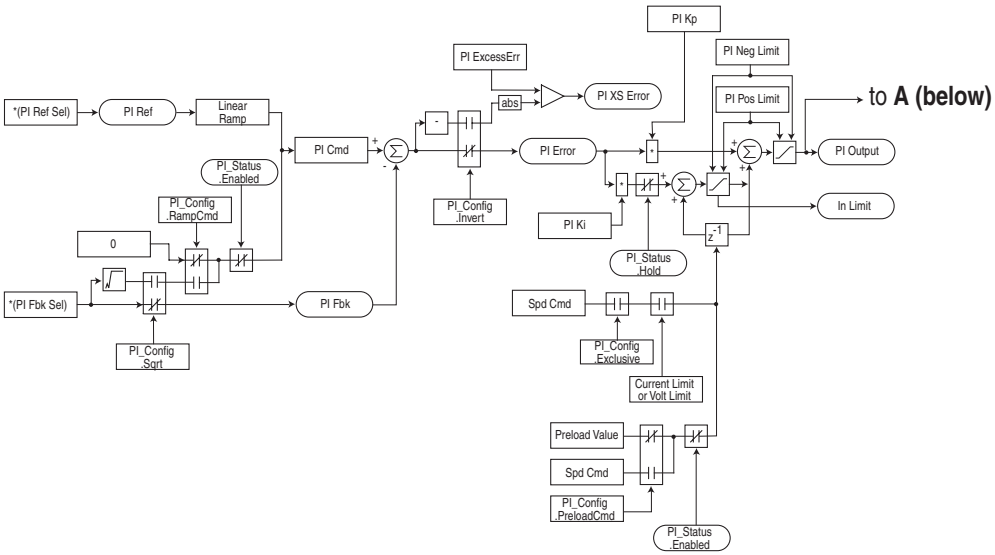


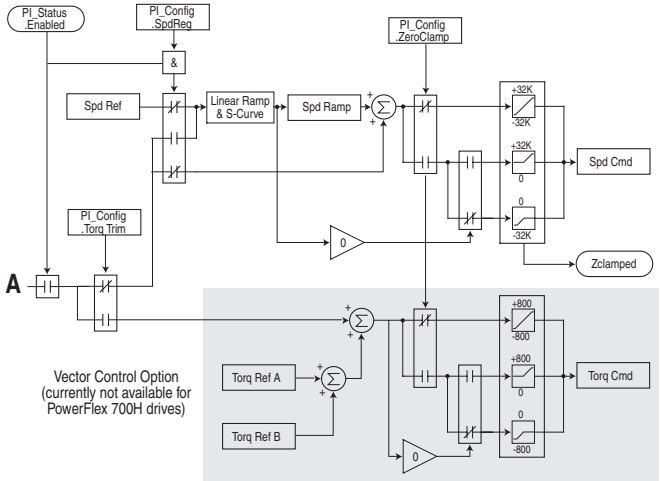
Figure B.3 Power Loss Mode = Decel



Process PI

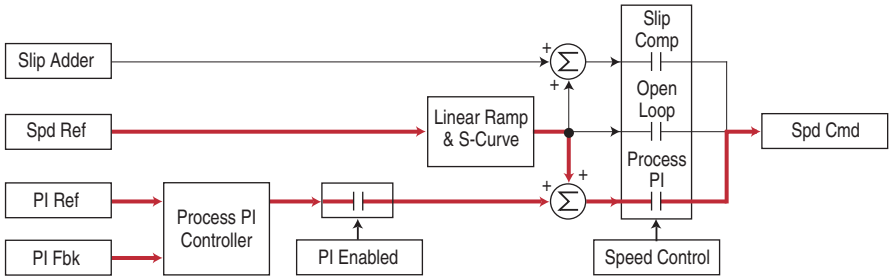
The internal PI function of the PowerFlex 700H provides closed loop process control with proportional and integral control action. The function is designed for use in applications that require simple control of a process without external control devices. The PI function allows the microprocessor of the drive to follow a single process control loop.



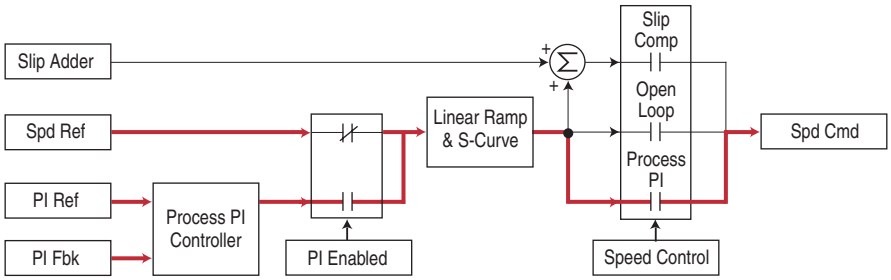


The PI function reads a process variable input to the drive and compares it to a desired setpoint stored in the drive. The algorithm will then adjust the output of the PI regulator, changing drive output frequency to try and make the process variable equal the setpoint.

It can operate as trim mode by summing the PI loop output with a master speed reference.

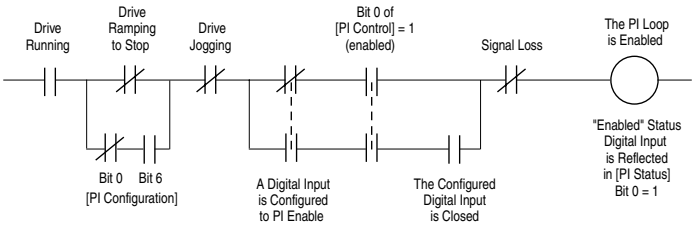


Or, it can operate as control mode by supplying the entire speed reference. This method is identified as “exclusive mode”



PI Enable

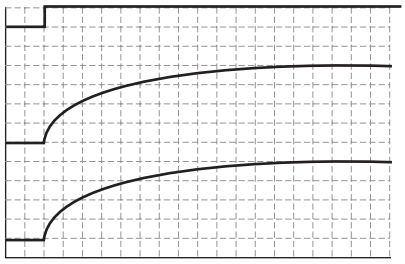
The output of the PI loop can be turned on (enabled) or turned off (disabled). This control allows the user to determine when the PI loop is providing part or all of the commanded speed. The logic for enabling the PI loop is shown below.



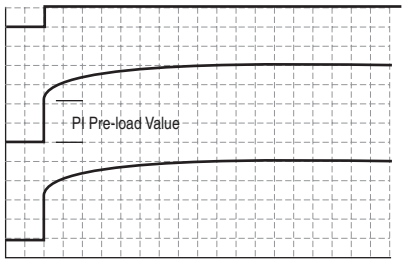
The drive must be running for the PI loop to be enabled. The loop will be disabled when the drive is ramping to a stop (unless “Stop Mode” is configured in [PI Configuration]), jogging or the signal loss protection for the analog input(s) is sensing a loss of signal.

If a digital input has been configured to “PI Enable,” two events are required to enable the loop: the digital input must be closed AND bit 0 of the PI Control parameter must be = 1.

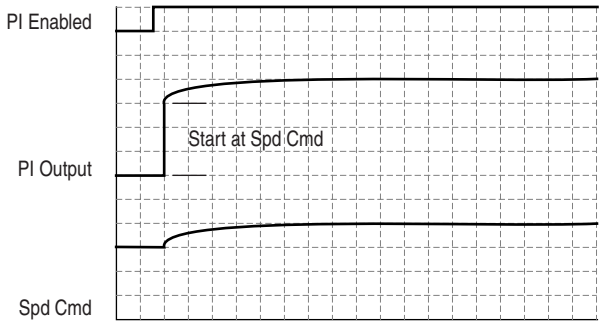
If no digital input is configured to “PI Enable,” then only the Bit 0 = 1 condition must be met. If the bit is permanently set to a “1”, then the loop will become enabled as soon as the drive goes into “run”.



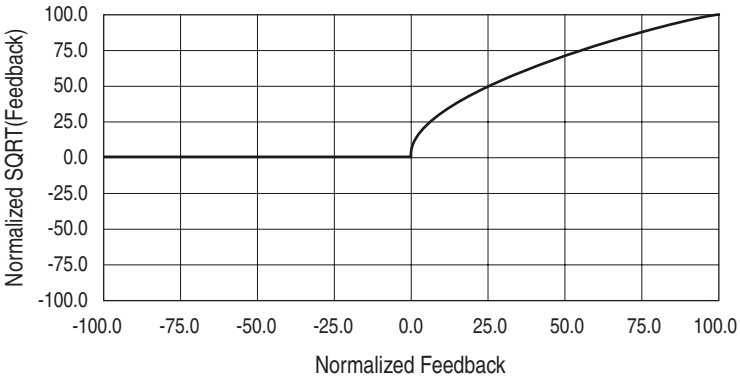
PI Pre-load Value = 0



PI Pre-load Value > 0



Pre-load to Command Speed



Reverse Speed Limit

Figure B.4 [Rev Speed Limit], parameter 454 set to zero

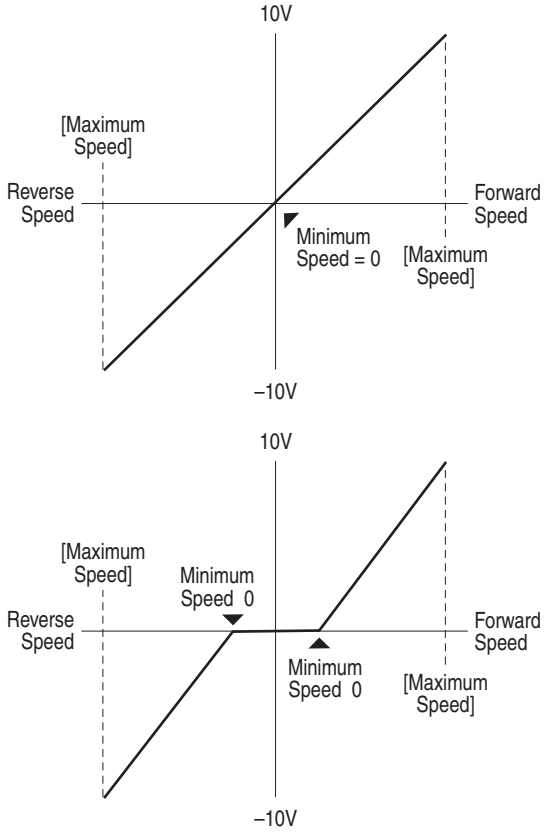
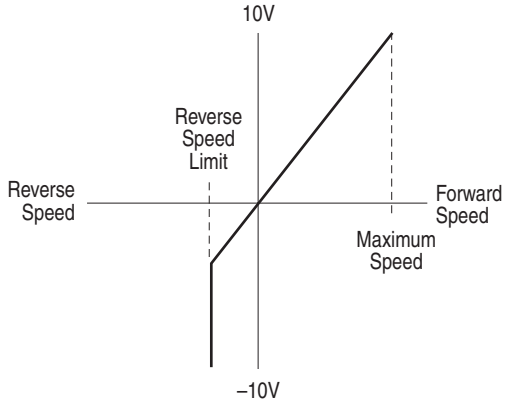


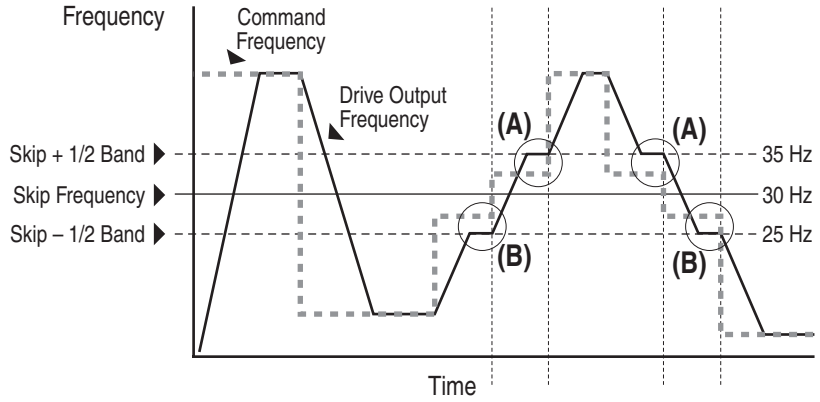
Figure B.5 [Rev Speed Limit], parameter 454 set to a non-zero Value



Note: Minimum speed is not used when Reverse Speed Limit is set to a non-zero value.

Skip Frequency

Figure B.6 Skip Frequency



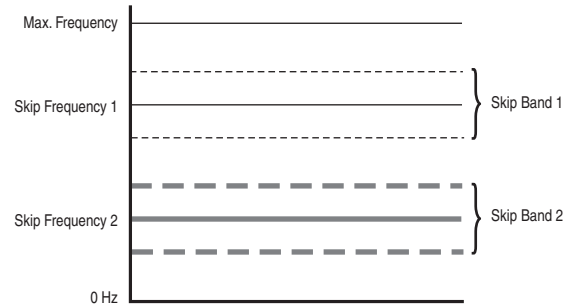
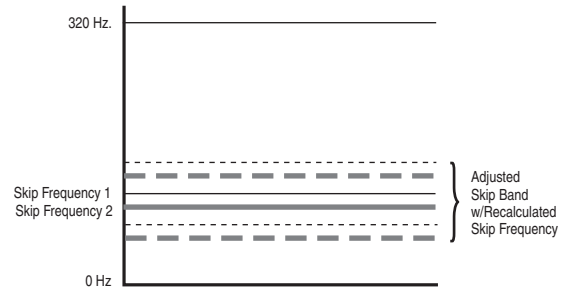
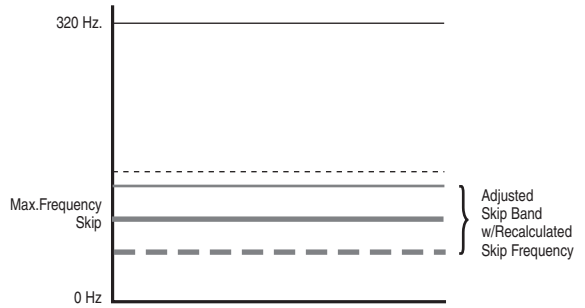
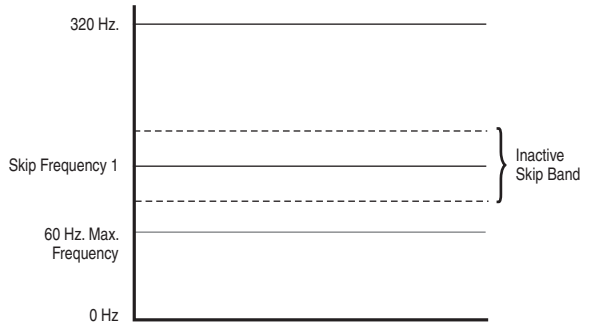
Some machinery may have a resonant operating frequency that must be avoided to minimize the risk of equipment damage. To assure that the motor cannot continuously operate at one or more of the points, skip frequencies are used. Parameters 084-086, ([Skip Frequency 1-3]) are available to set the frequencies to be avoided.

The value programmed into the skip frequency parameters sets the center point for an entire “skip band” of frequencies. The width of the band (range of frequency around the center point) is determined by parameter 87, [Skip Freq Band]. The range is split, half above and half below the skip frequency parameter.

If the commanded frequency of the drive is greater than or equal to the skip (center) frequency and less than or equal to the high value of the band (skip plus 1/2 band), the drive will set the output frequency to the high value of the band. See (A) in Figure B.6.

If the commanded frequency is less than the skip (center) frequency and greater than or equal to the low value of the band (skip minus 1/2 band), the drive will set the output frequency to the low value of the band. See (B) in Figure B.6.

Acceleration and deceleration are not affected by the skip frequencies. Normal accel/decel will proceed through the band once the commanded frequency is greater than the skip frequency. See (A) & (B) in Figure B.6. This function affects only continuous operation within the band.

Skip Frequency Examples	
The skip frequency will have hysteresis so the output does not toggle between high and low values. Three distinct bands can be programmed. If none of the skip bands touch or overlap, each band has its own high/low limit.	
If skip bands overlap or touch, the center frequency is recalculated based on the highest and lowest band values.	
If a skip band(s) extend beyond the max frequency limits, the highest band value will be clamped at the max frequency limit. The center frequency is recalculated based on the highest and lowest band values.	
If the band is outside the limits, the skip band is inactive.	

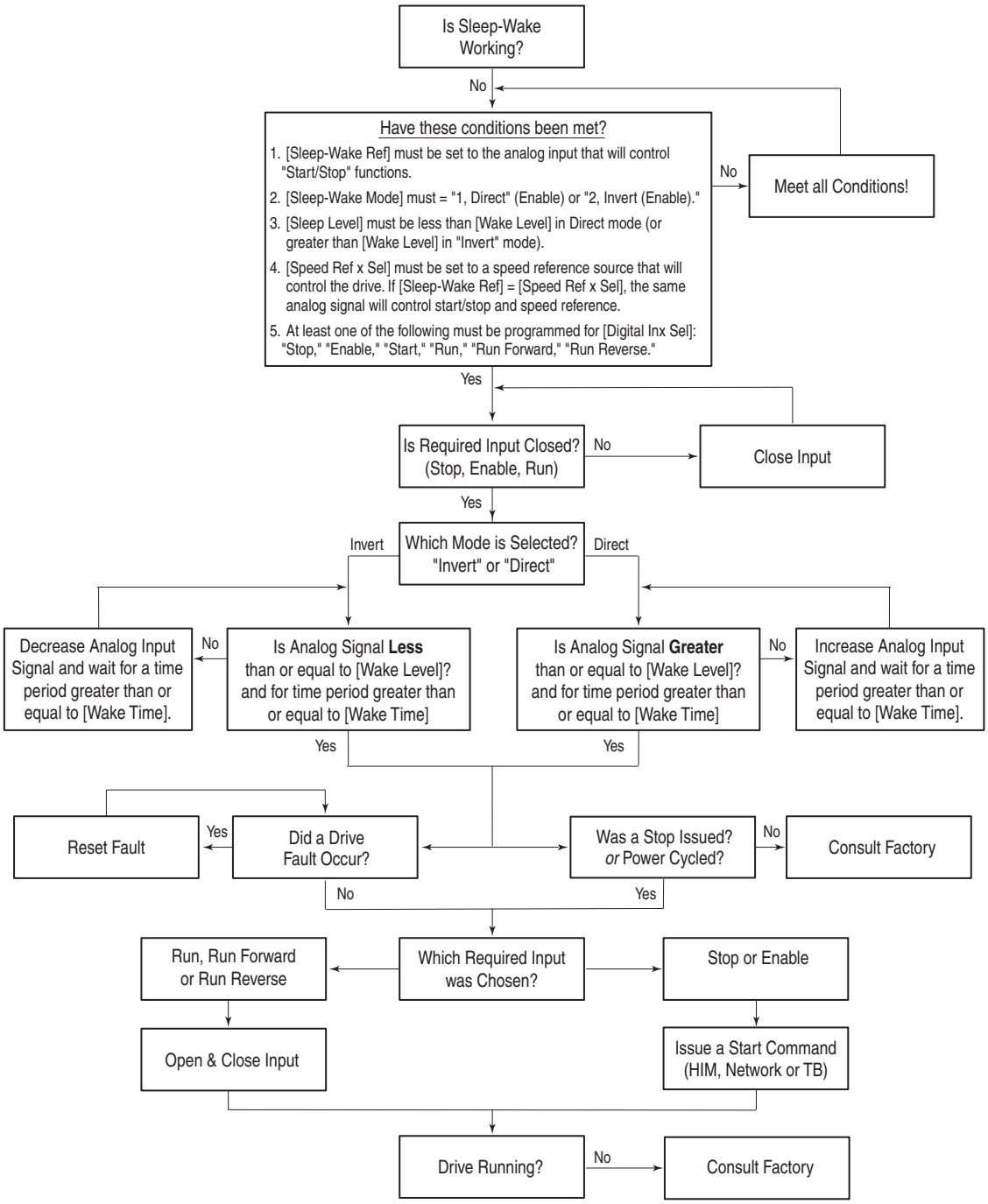
Sleep Wake Mode

This function stops (sleep) and starts (wake) the drive based on separately configurable analog input levels rather than discrete start and stop signals. by default, this function is disabled. The following Sleep/Wake modes are available:

- 1 “Direct” - In this mode, the drive will start (wake) when the analog input signal is greater than or equal to the value set in [Wake Level] and the drive will stop (sleep) when the analog input signal is less than or equal to the value in [Sleep Level].
- 2 “Invert” - In this mode, the analog input signal used by the [Wake Level] and [Sleep Level] parameters is inverted. In this mode, the drive will start (wake) when the analog input signal is less than or equal to the value set in [Wake Level] and the drive will stop (sleep) when the analog input signal is greater than or equal to the value in [Sleep Level].

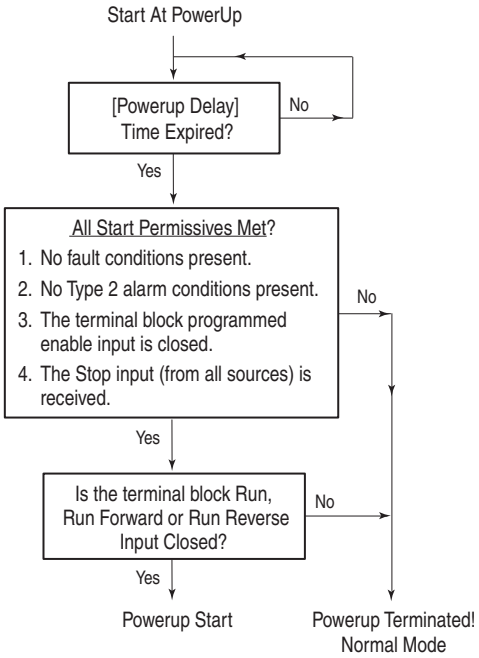
Definitions

- Wake - A start command generated when the analog input value remains above [Wake Level] for a time greater than [Wake Time].
- Sleep - A Stop command generated when the analog input value remains below [Sleep Level] for a time greater than [Sleep Time].
- Speed Reference – The active speed command to the drive as selected by drive logic and [Speed Ref x Sel].
- Start Command - A command generated by pressing the Start button on the HIM, closing a digital input programmed for Start, Run, Run Forward or Run Reverse.

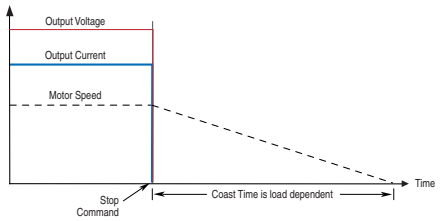
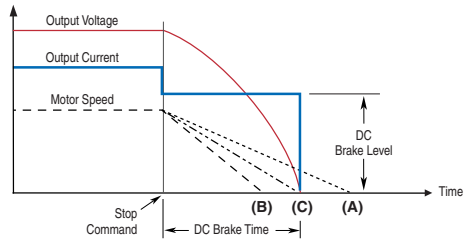

Is Sleep-Wake Working?
No
Have these conditions been met?
1. [Sleep-Wake Ref] must be set to the analog input that will control "Start/Stop" functions.
2. [Sleep-Wake Mode] must = "1, Direct" (Enable) or "2, Invert (Enable)."
3. [Sleep Level] must be less than [Wake Level] in Direct mode (or greater than [Wake Level] in "Invert" mode).
4. [Speed Ref x Sel] must be set to a speed reference source that will control the drive. If [Sleep-Wake Ref] = [Speed Ref x Sel], the same analog signal will control start/stop and speed reference.
5. At least one of the following must be programmed for [Digital Inx Sel]: "Stop," "Enable," "Start," "Run," "Run Forward," "Run Reverse."
No
Meet all Conditions!
Yes
Is Required Input Closed? (Stop, Enable, Run)
No
Close Input
Yes
Which Mode is Selected? "Invert" or "Direct"
Invert
Direct
Decrease Analog Input Signal and wait for a time period greater than or equal to [Wake Time].
No
Is Analog Signal **Less** than or equal to [Wake Level]? and for time period greater than or equal to [Wake Time]
Is Analog Signal **Greater** than or equal to [Wake Level]? and for time period greater than or equal to [Wake Time]
No
Increase Analog Input Signal and wait for a time period greater than or equal to [Wake Time].
Yes
Yes
Reset Fault
Yes
Did a Drive Fault Occur?
Was a Stop Issued? *or* Power Cycled?
No
Consult Factory
No
Yes
Run, Run Forward or Run Reverse
Which Required Input was Chosen?
Stop or Enable
Open & Close Input
Issue a Start Command (HIM, Network or TB)
Drive Running?
No
Consult Factory

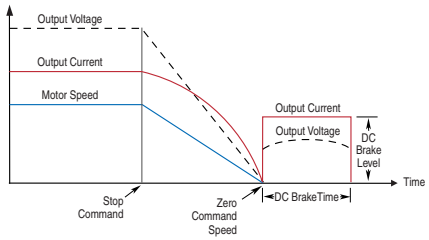
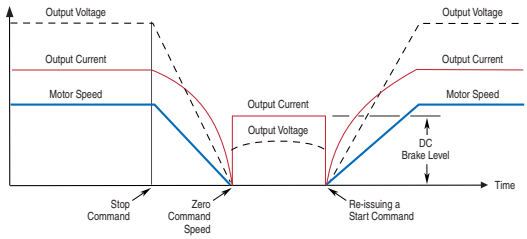
Start At PowerUp

A powerup delay time of up to 30 seconds can be programmed through [Powerup Delay], parameter 167. After the time expires, the drive will start if all of the start permissive conditions are met. Before that time, restart is not possible.



Stop Modes

Mode	Description
Coast	 This method releases the motor and allows the load to stop by friction. 1. On Stop, the drive output goes immediately to zero (off). 2. No further power is supplied to the motor. The drive has released control. 3. The motor will coast for a time that is dependent on the mechanics of the system (inertia, friction, etc). **Important:** When a "Coast" stop is performed, the drive requires that the motor flux be completely dissipated before a re-start command will take affect. The amount of time it takes for the motor flux to dissipate depends upon the size of the drive and motor. If a Start command is issued before the motor flux has completely dissipated, the HIM will continue to display "Stopped" and the drive will start the motor after the motor flux has completely dissipated.
DC Brake	 This method uses DC injection of the motor to Stop and/or hold the load. 1. On Stop, 3 phase drive output goes to zero (off) 2. Drive outputs DC voltage on the last used phase at the level programmed in [DC Brake Level] Par 158. This voltage causes a "stopping" brake torque. If the voltage is applied for a time that is longer than the actual possible stopping time, the remaining time will be used to attempt to hold the motor at zero speed. 3. DC voltage to the motor continues for the amount of time programmed in [DC Brake Time] Par 159. Braking ceases after this time expires. 4. After the DC Braking ceases, no further power is supplied to the motor. The motor may or may not be stopped. The drive has released control. 5. The motor, if rotating, will coast from its present speed for a time that is dependent on the mechanics of the system (inertia, friction, etc).

Mode	Description
Ramp	 This method uses drive output reduction to stop the load. 1. On Stop, drive output will decrease according to the programmed pattern from its present value to zero. The pattern may be linear or squared. The output will decrease to zero at the rate determined by the programmed [Maximum Freq] and the programmed active [Decel Time x] 2. The reduction in output can be limited by other drive factors such as such as bus or current regulation. 3. When the output reaches zero the output is shut off. 4. DC voltage is applied to the motor for a time equal to [DC Brake Time] at [DC Brake Level].
Hold	 This method combines two of the methods above. It uses drive output reduction to stop the load and DC injection to hold the load at zero speed once it has stopped. 1. On Stop, drive output will decrease according to the programmed pattern from its present value to zero. The pattern may be linear or squared. The output will decrease to zero at the rate determined by the programmed [Maximum Freq] and the programmed active [Decel Time x] 2. The reduction in output can be limited by other drive factors such as bus or current regulation. 3. When the output reaches zero 3 phase drive output goes to zero (off) and the drive outputs DC voltage on the last used phase at the level programmed in [DC Brake Level] Par 158. This voltage causes a “holding” brake torque. 4. DC voltage to the motor continues until a Start command is reissued or the drive is disabled. 5. If a Start command is reissued, DC Braking ceases and he drive returns to normal AC operation. If an Enable command is removed, the drive enters a “not ready” state until the enable is restored.

Numerics

A

B

C

D

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F

G

H

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J

L

M

R

S

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