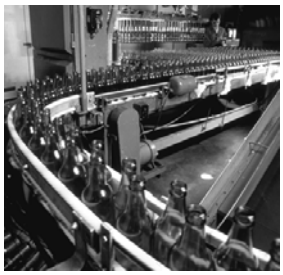
LISTEN.
THINK.
SOLVE.®

PowerFlex 700L
Active Converter Power Module



USER MANUAL

Firmware Version 3.xxx

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.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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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.

The information below summarizes the changes resulting from the firmware v3.001 upgrade to this manual since its last release (June, 2006):

Description of New or Updated Information	Page(s)
To all pages, added a new footer containing: • Publication description (1st line). • Publication number hyperlink underlined in blue (2nd line) linking to the date of the publication on the back cover. The back cover publication date line hyperlinks to the newest version of the publication on Rockwell Automation's Literature Library web site.	Throughout Manual
Added new information about the Active Converter operating as a Coupled unit (DPI SLAVE) or as a Stand Alone unit (DPI MASTER).	1-6
Changed the following for Parameter 051 - [Option Select]: • Bit 6 changed from "Reserved" to "VC Inverter." • Bit 7 changed from "Reserved" to "Prechg Cntrl." • The default changed from "xxxx xxxx xx00 0001" to "xxxx xxxx 0000 0001."	3-6
Added new Parameter 105 - [Regen I Lmt].	3-9
Changed Parameter 153 - [CML Bandwidth] maximum value from "3000 Rad/sec" to "4000 Rad/sec."	3-11
Changed the description for Parameter 157 - [PF Bandwidth] to include that it should be used only when unbalanced voltage compensation is enabled in Parameter 051 - [Option Select].	3-11
Changed Parameter 162 - [Capacitance] maximum value from "32767 µF" to "65535 µF."	3-12
Added new Parameter 170 - [Bus Capacitance].	3-12
Added new Bit 11 (High DC Link) to Parameter 214 - [Start Inhibit].	3-14
Changed Parameter 238 - [Fault Config] default from "xxxx xxx1 1110 1100" to "xxxx xxx1 0110 1100."	3-15
Added two new parameter groups which are only displayed and available in the Communication File when the Converter is operated as a Stand Alone unit: • Masks and Owners Group – Parameter 340 - [Logic Mask] – Parameter 341 - [Start Mask] – Parameter 342 - [Fault Clr Mask] – Parameter 343 - [Stop Owner] – Parameter 344 - [Start Owner] – Parameter 345 - [Fault Clr Owner] • Security Group – Parameter 346 - [Port Mask Act] – Parameter 347 - [Write Mask Cfg] – Parameter 348 - [Write Mask Act] – Parameter 349 - [Logic Mask Act]	3-18
Added the following new fault codes: • 70 – FiltCap Contactr • 71 – Port 1 Adapter • 72 – Port 2 Adapter • 73 – Port 3 Adapter • 74 – Port 4 Adapter • 75 – Port 5 Adapter • 76 – Port 6 Adapter • 81 – Port 1 DPI Loss • 82 – Port 2 DPI Loss • 83 – Port 3 DPI Loss • 84 – Port 4 DPI Loss • 85 – Port 5 DPI Loss • 86 – Port 6 DPI Loss	4-3

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Overview

The purpose of this manual is to provide you with the basic information needed to wire and operate the PowerFlex 700 Active Converter Power Module.

For information on ...	See page ...
Who Should Use this Manual?	P-1
What Is Not in this Manual	P-1
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Who Should Use this Manual?

This manual is intended for qualified personnel. You must be able to wire 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

This manual is designed to provide only basic active converter I/O wiring, start-up, programming, and other related information.

LPM20 Liquid-Cooled AC Drive Installation

For information on installing LPM20 Liquid-Cooled AC drives, please refer to *LPM20 Liquid-Cooled Adjustable Frequency AC Drive Installation Manual* — (Publication No. 20N-IN001…).

PowerFlex 700L Liquid-Cooled AC Drive Information

For information on installing PowerFlex 700L Liquid-Cooled AC drives, please refer to *PowerFlex 700L Liquid-Cooled Adjustable Frequency AC Drive User Manual* — (Publication No. 20L-UM001…).

PowerFlex 700 Vector Control Information (standard)

For PowerFlex Liquid-Cooled AC drives equipped with standard PowerFlex 700 Vector Control, please refer to the *PowerFlex 700 Adjustable Frequency AC Drive User Manual — Series B* (Publication No. 20B-UM002…) which provides I/O wiring, start-up, programming, and vector control encoder information.

PowerFlex 700S Phase II Control Information (optional)

For PowerFlex Liquid-Cooled AC drives equipped with optional PowerFlex 700S Phase II Control, please refer to the *PowerFlex 700S High Performance AC Drive — Phase II Control User Manual* (Publication No. 20D-UM006…) which provides I/O wiring, start-up, programming, and other related information.

Reference Materials

Publications

Publications can be obtained online at http://www.rockwellautomation.com/literature.

The following manuals are recommended for general drive information:

Title	Publication
Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives	DRIVES-IN001…
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	0100-2.10
Guarding Against Electrostatic Damage	8000-4.5.2

Allen-Bradley Drives Technical Support

Online: www.ab.com/support/abdrives

Manual Conventions

- In this manual we refer also to the PowerFlex 700 Active Converter Power Module as Active Converter, converter or PowerFlex 700AC.
- 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, refer to Allen-Bradley 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 before performing any work on the drive. After removing power to the drive, wait 5 minutes for the bus capacitors to discharge. Refer to the:

- *LPM20 Liquid-Cooled Adjustable Frequency AC Drive Installation Manual* (Publication No. 20N-IN001…), Figure 4.2, and measure the DC bus voltage at the locations shown. The voltage must be zero.
- *PowerFlex 700L Liquid-Cooled Adjustable Frequency AC Drive User Manual* (Publication No. 20L-UM001…), and measure the DC bus voltage at the DC POSITIVE and DC NEGATIVE test point sockets located on the front of the power module. The voltage must be zero.

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.

Notes:

Installation/Wiring

This chapter provides information on installing and wiring the PowerFlex 700 Active Converter Power Module.

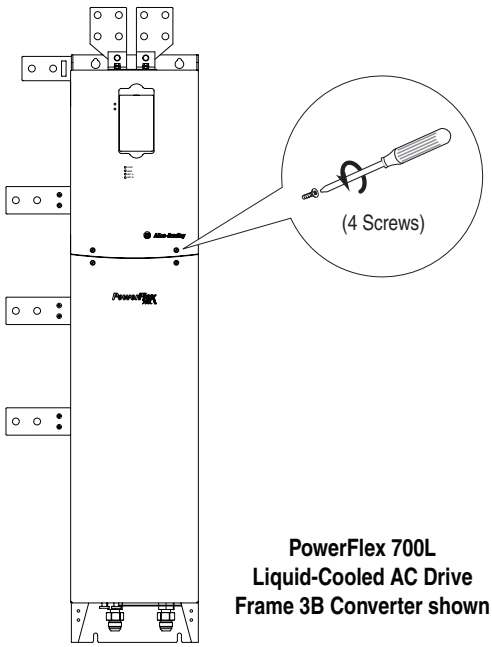
For information on...	See page...
Removing the Active Converter Power Module Covers	1-2
Removing the Active Converter Control Cassette	1-2
Wiring the Active Converter Control Cassette I/O Terminals	1-4

Most start-up difficulties are the result of incorrect wiring. Every precaution must be taken to assure that the wiring is done as instructed. All items must be read and understood before the actual installation begins.

ATTENTION: The following information is merely a guide for proper installation. Rockwell Automation, Inc. cannot assume responsibility for the compliance or the noncompliance to any code, national, local or otherwise for the proper installation of this drive or associated equipment. A hazard of personal injury and/or equipment damage exists if codes are ignored during installation.

Removing the Active Converter Power Module Covers

All converter covers, regardless of drive frame size, are similarly removed by unfastening the screws. A Frame 3B converter is shown as an example.



PowerFlex 700L
Liquid-Cooled AC Drive
Frame 3B Converter shown

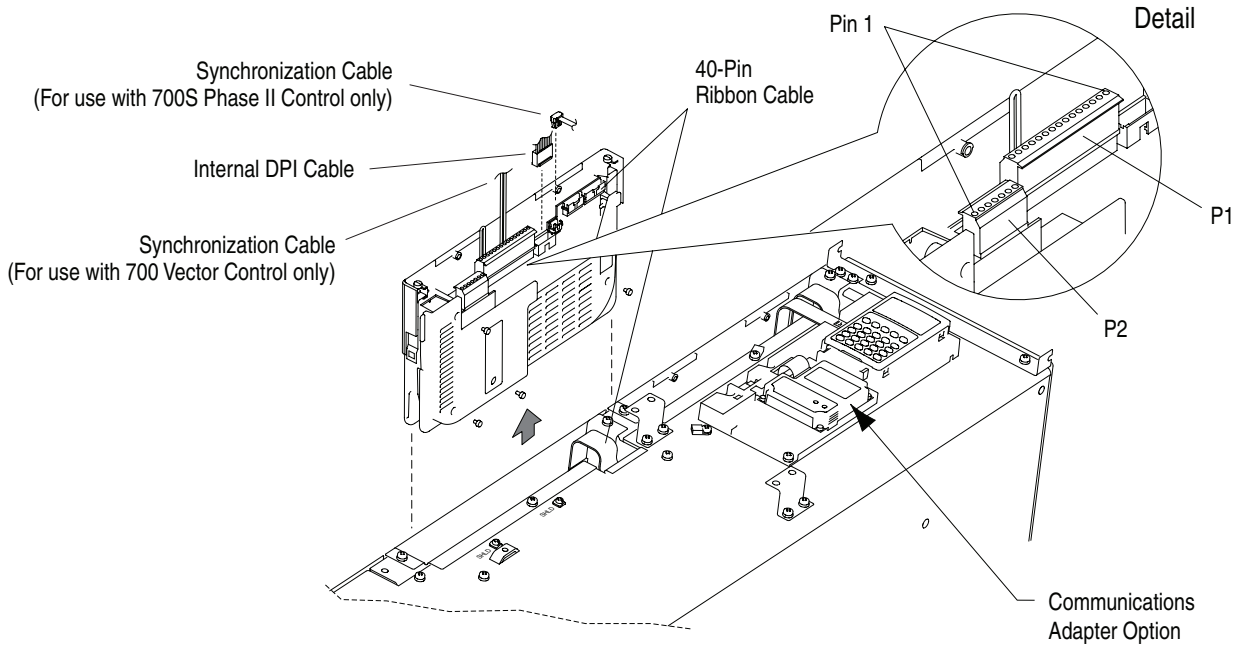
Removing the Active Converter Control Cassette

Regenerative PowerFlex 700L Liquid-Cooled AC drives use an Active Converter Power Module equipped with a converter control cassette.

Frame 2 and 3A Drives

PowerFlex 700L Liquid-Cooled Frame 2 and 3A drives combine the Active Converter and Inverter into a single Power Module. Figure 1.1 shows the location and removal of the Active Converter control cassette to access its terminal blocks for control wiring. (The Inverter control cassette is located just above the Active Converter control cassette.)

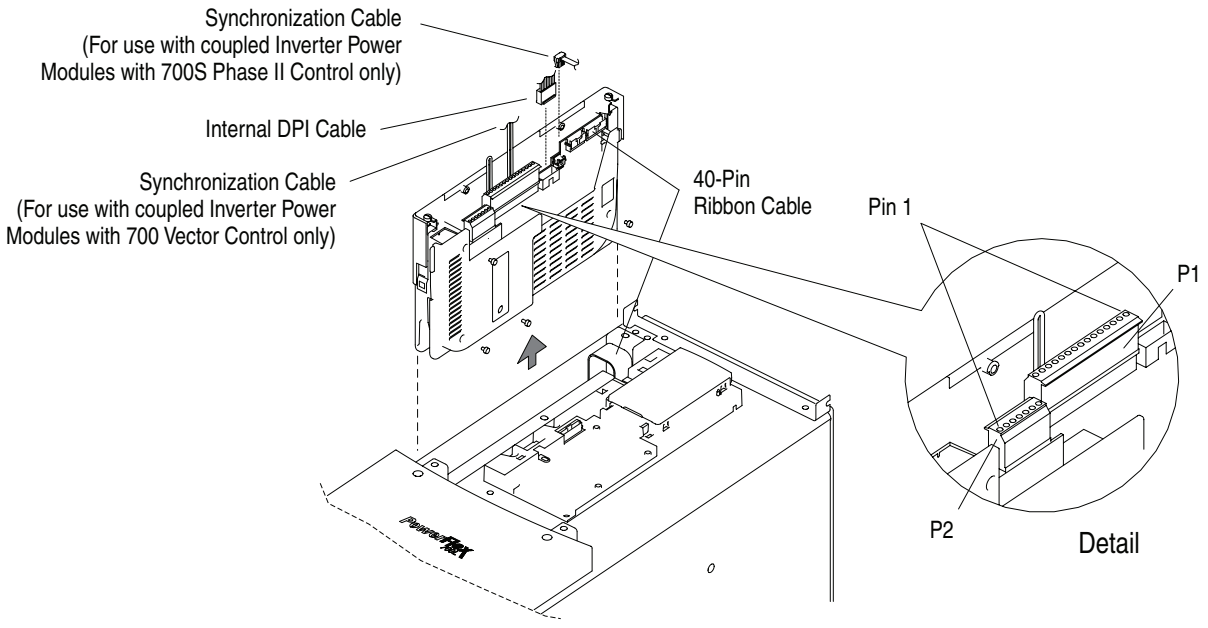
Figure 1.1 Removing the Frame 2 and 3A Active Converter Control Cassette



Frame 3B Drives

Figure 1.2 shows the location and removal of the Active Converter control cassette to access its terminal blocks for control wiring. Frame 3B drives have separate Converter Power Modules and Inverter Power Modules.

Figure 1.2 Removing the Frame 3B Active Converter Control Cassette



Wiring the Active Converter Control Cassette I/O Terminals

All wiring should be installed in conformance with the applicable local, national, and international codes (e.g., NEC/CEC). Signal wiring, control wiring, and power wiring must be routed in separate conduits to prevent interference with drive operation. Use grommets, when hubs are not provided, to guard against wire chafing.

ATTENTION: Do not route signal and control wiring with power wiring in the same conduit. This can cause interference with drive operation. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

Important points to remember about I/O wiring:

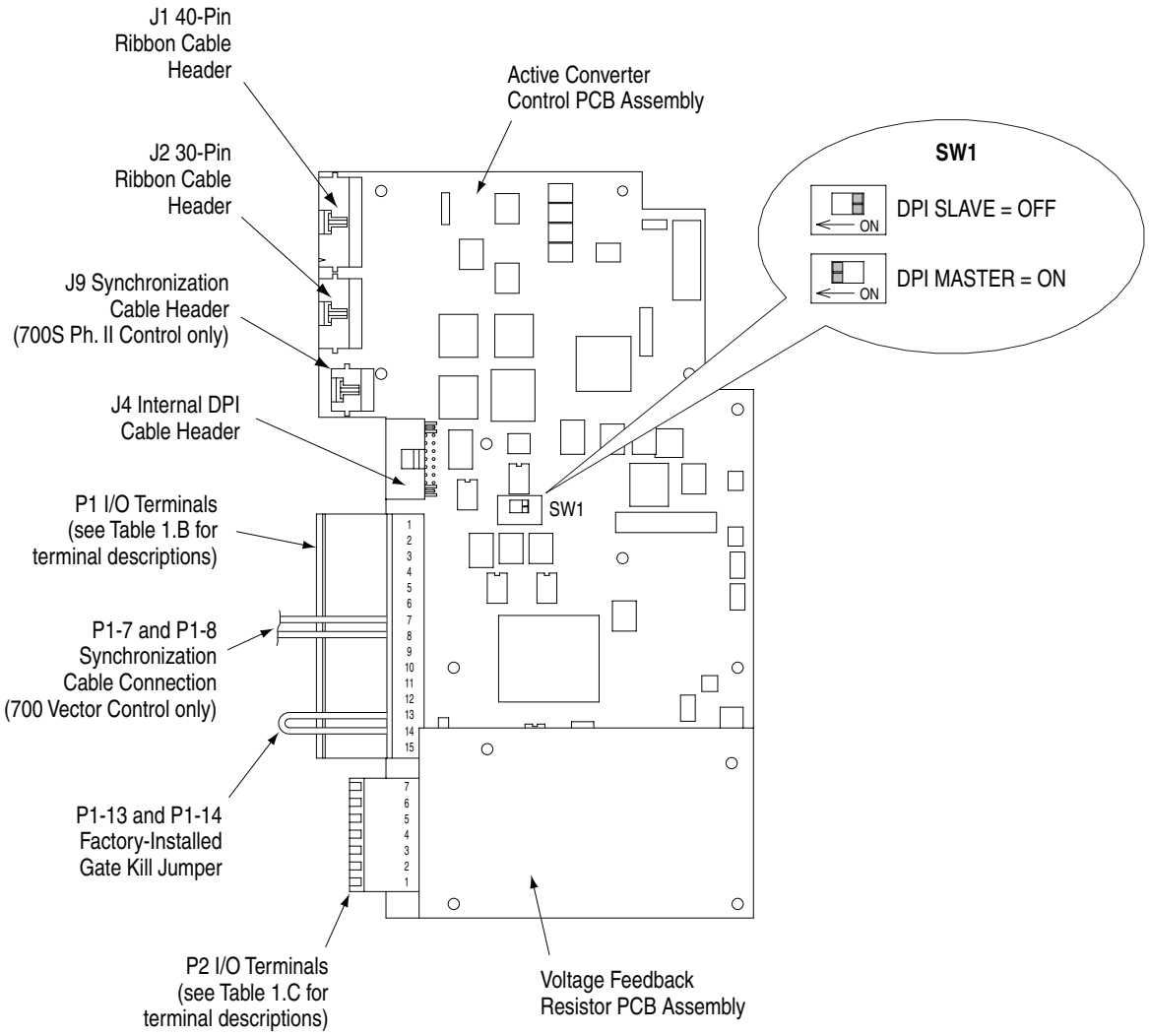
- Use Copper wire only. Wire gauge requirements and recommendations are based on 75 degrees C. Do not reduce wire gauge when using higher temperature wire.
- Wire with an insulation rating of 600V or greater is recommended.
- Control and signal wires should be separated from power wires by at least 0.3 meters (1 foot).

Important: I/O terminals labeled "(–)" or "Common" are not referenced to earth ground and are designed to greatly reduce common mode interference. Grounding these terminals can cause signal noise.

Terminal blocks P1 and P2, shown in Figure 1.1 and Figure 1.3, contain connection points for all inputs, outputs, and power connections to the Active Converter control cassette.

1. Remove the terminal block plug from the socket, and make connections.
2. Reinstall the terminal block plug when wiring is complete. The terminal blocks have keys, which make it difficult to insert a terminal block plug into the wrong socket.

Figure 1.3 Active Converter Control Cassette I/O Terminal, Cable Connection, and DPI SLAVE/MASTER Switch SW1 Locations



I/O Terminal Blocks

Table 1.A Active Converter Control Board I/O Terminal Block Specifications

Name	Description	Wire Size Range[1]		Torque	
		Maximum	Minimum	Maximum	Recommended
I/O Blocks	Signal and power connections	1.5 mm^2 (16 AWG)	0.14 mm^2 (28 AWG)	0.25 N-m (2.2 lb.-in.)	0.22 N-m (1.9 lb.-in.)

(1) Maximum/minimum that the terminal block will accept - these are not recommendations.

Table 1.B Active Converter Control PCB Assembly P1 Terminal Descriptions

Pin	Description
1	Comm Out +
2	Comm Out -
3	SOC Out +
4	SOC Out -
5	Comm In +
6	Comm In -
7	SOC In +
8	SOC In -
9	Aux Out N.O.
10	Aux Out Common
11	Analog In Signal
12	Analog In Common
13	Gate Enable
14	24 Vdc
15	Aux Input

Table 1.C Voltage Feedback Resistor PCB Assembly P2 Terminal Descriptions

Pin	Description
7	L3
4	L2
1	L1

Specific pins on P1 and P2 terminals require control wiring connections to the Input Filter Bay. For wiring information, please refer to the *PowerFlex 700L Liquid-Cooled Adjustable Frequency AC Drive User Manual* (Publication No. 20L-UM001…).

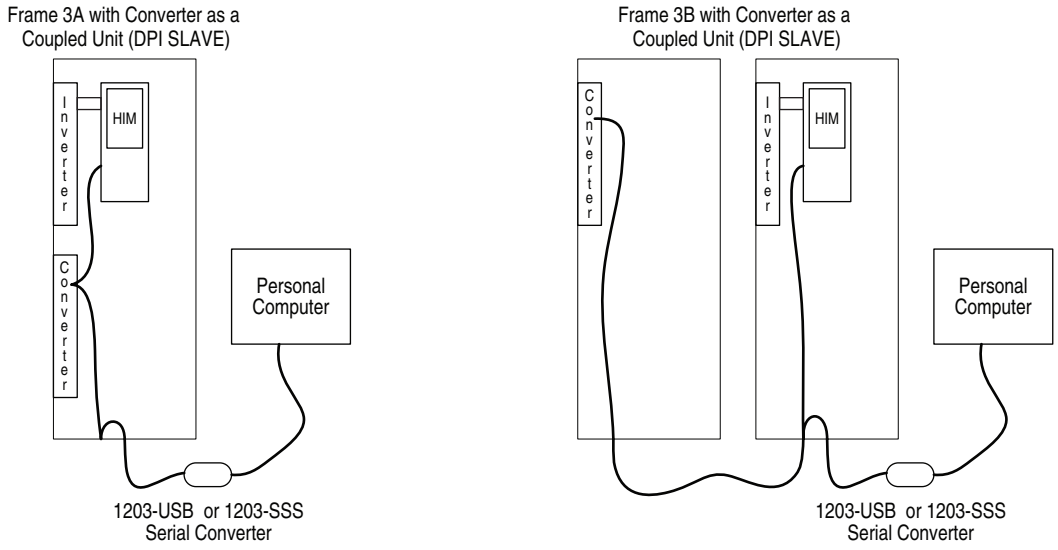
Using the Active Converter as a Coupled Unit vs. Standalone Unit

Frame 3B converter power structures may be ordered as a unit Coupled to an inverter (DPI SLAVE), or as a Stand Alone unit (DPI MASTER). Frame 2 and Frame 3A power structures are always wired for the converter to be a Coupled unit.

Coupled

Figure 1.4 shows the Active Converter wired to operate as a Coupled unit (DPI SLAVE). In this configuration, the Converter is connected to a PowerFlex 700L Inverter through DPI Port 6. When configured for "Run On Start," the Converter is able to start and stop automatically as the Inverter is started and stopped.

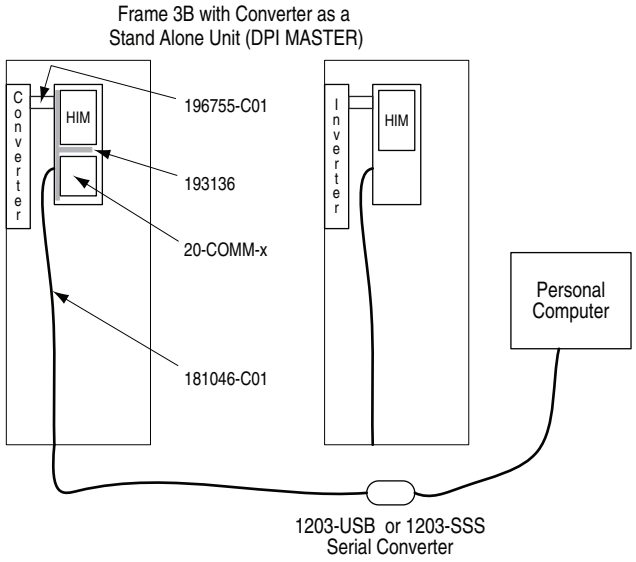
Figure 1.4 Active Converter Operating as a Coupled Unit (DPI SLAVE)



Stand Alone

Figure 1.5 shows the Active Converter wired to operate as a Stand Alone unit (DPI MASTER). In this configuration, the Converter may have a HIM or any PowerFlex 7-Class network communication adapter (20-COMM-x) connected. This may be preferred when the converter is to supply the DC bus for a set of common bus inverters. When configured for "Run On Start," the precharge bypass contactor may be configured to close when the power is turned on and the DC Bus voltage is stable (see Parameter 51 - [Option Select]). The Converter starts and stops with commands from the HIM, the 1203-USB or 1203-SSS serial converter, or a 20-COMM-x network communication adapter.

Figure 1.5 Active Converter Operating as a Stand Alone Unit (DPI MASTER)



The Frame 3B Active Converter power module is ordered as a Stand Alone unit (DPI SLAVE) by specifying equipment type P in the catalog number (refer to the catalog number explanation in the *PowerFlex 700L User Manual*).

The Stand Alone (DPI SLAVE) Active Converter is supported with Active Converter firmware revision 3.001 (or higher).

To operate the Frame 3B Active Converter as a Stand Alone unit (DPI SLAVE) the DPI MASTER/SLAVE switch (SW1) on the Active Converter control board must be properly set. Refer to Setting the DPI MASTER/ SLAVE Switch (SW1) below for details.

Setting the DPI MASTER/SLAVE Switch (SW1)

Active Converters with version 2.006 (or lower) firmware are always operated as a peripheral on DPI port 6. In this case, switch SW1 on the Active Converter control PCB assembly (Figure 1.3) is set to OFF (DPI SLAVE). Do not use the ON setting. For Active Converters with version 3.001 (or higher) firmware, switch SW1 is used to select between converter operation as a Coupled unit (DPI SLAVE position) or as a Stand Alone unit (DPI MASTER position).

Connecting an Active Converter Power Module to an Inverter Power Module

Frame 2 and 3A Drives

Coupling a Frame 2 or 3A Power Module is achieved by using two cables: a DPI cable and a control synchronization cable. These cables are factory installed.

Frame 3B Drives

Coupling a Frame 3B Active Converter Power Module to a Frame 3B Inverter Power Module is achieved by using two cables: a DPI cable and a control synchronization cable. For the Complete Drive equipment type, these cables are factory installed. When Power Modules are purchased separately, these cables are user installed. For information regarding these cables and their installation, please refer to the *PowerFlex 700L Liquid-Cooled Adjustable Frequency AC Drive User Manual* (Publication No. 20L-UM001…), Chapter 3 in the “Synchronization Connections for Frame B” section.

Start Up

The start-up procedure built into the HIM addresses only the start up of the inverter. This chapter describes how to start up the PowerFlex 700 Active Converter Power Module.

For information on...	See page...
Establishing Communication as a Coupled Unit	2-1
Establishing Communication as a Stand Alone Unit	2-8
Converter Sequencing	2-12
Control Setup	2-14
Converter Faults	2-17

Establishing Communication as a Coupled Unit

When the Converter is set to operate as a Coupled unit (DPI SLAVE), the first step after turning on power is to verify that you are able to communicate with the unit and that it properly displays selected data.

Data is exchanged between the Inverter Power Module and Active Converter Power Module to pass control and status information.

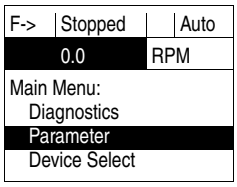
An example is given for how to communicate with the Active Converter Power Module using a CIP message from a ControlLogix controller.

Accessing Active Converter Power Module Parameters

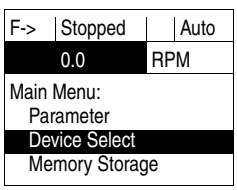
The Active Converter operates as a DPI peripheral on port 6. This section describes how to access parameters in the Active Converter.

Using the HIM

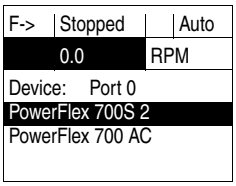
1. On power up, the HIM displays the main menu and communicates with the Inverter.



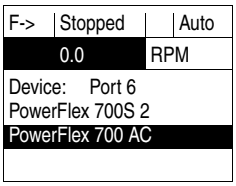
2. As you scroll down to “Device Select,” the HIM shows the following indication. With “Device Select” highlighted, press the Enter key.



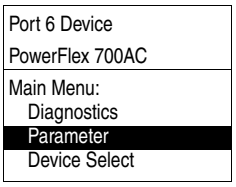
3. The HIM displays that it is currently communicating with the Inverter on DPI Port 0.



4. Press the Down arrow to scroll to “PowerFlex 700 AC.”



5. With “PowerFlex 700 AC” highlighted as shown in Step 4, press the Enter key to start communicating with the Active Converter on DPI Port 6.

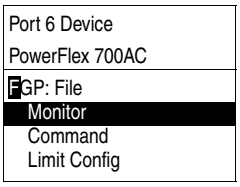


   – To examine the fault queue in the Active Converter, press the Up Arrow to scroll to “Diagnostics” and press the Enter key.

   – To begin examining parameters (with “Parameters” highlighted), press the Enter key.

   – To resume communication with the Inverter, press the Down Arrow to scroll to “Device Select” and press the Enter key.

6. After accessing the Parameter menu, the display shows the File menu. Press the Up or Down Arrow to select the desired file and press the Enter key.



7. The display then shows the groups of parameters in the selected file. Press the Up or Down Arrow to select the desired group and press the Enter key.

Port 6 Device
PowerFlex 700AC
FGP: Group
Current
Voltage
Power & Time

8. The display then shows the parameters in the selected group. Press the Up or Down Arrow to select the desired parameter and press the Enter key.

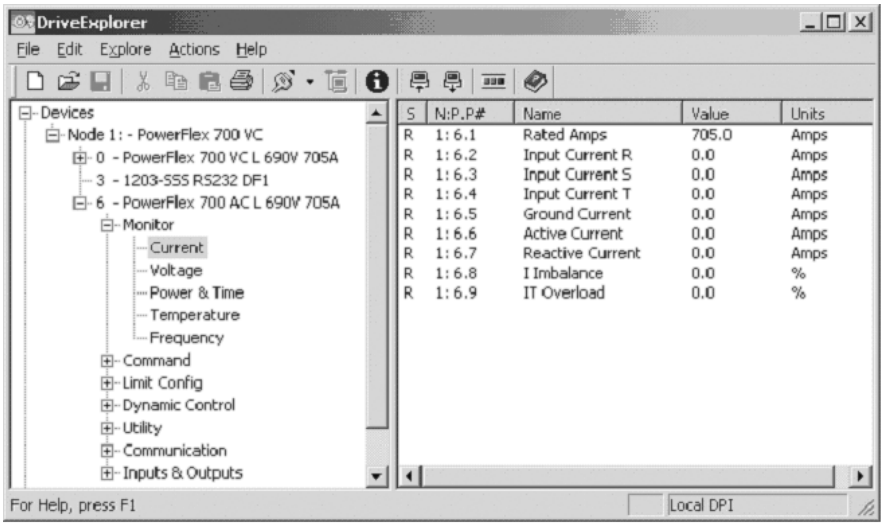
Port 6 Device
PowerFlex 700AC
FGP: Parameter
Rated Amps
Input Current R
Input Current S

9. The display then shows the value of the selected parameter and allows for entry of a new value for parameters that are read/write.

Port 6 Device
PowerFlex 700AC
FGP: Par 1
Rated Amps
705.0 Amps
[Alt] [View] - > Limits

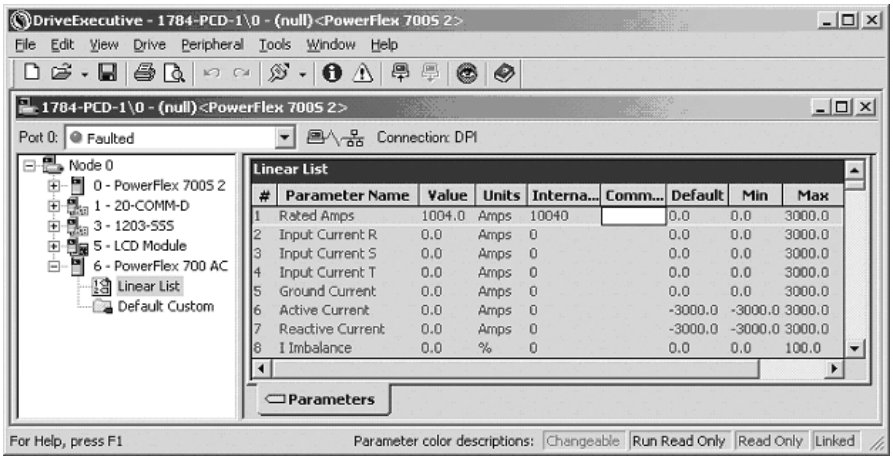
Using DriveExplorer

When using DriveExplorer, the window shows the files and groups for the Active Converter (left pane) and the parameters for the selected group (right pane). Double-click a parameter in the right pane to edit it



Using DriveExecutive

When using DriveExecutive, the Active Converter parameters are displayed in a linear list. Uploading reads parameter values from all DPI peripherals but downloading parameters only write to the Inverter. To download parameter values to the Active Converter, you must first select the Converter.



Verifying Feedback Parameters

Using the HIM, DriveExplorer or DriveExecutive, verify that reasonable values are displayed for the following parameters in the Active Converter Power Module:

- Line to Line Voltage – Verify converter parameters 11 - [Input Voltage RS], 12 - [Input Voltage ST], and 13 - [Input Voltage TR] display a reasonable Line to Line RMS Voltage. Verify the voltage imbalance displayed in parameter 16 - [V Imbalance] does not exceed 5.0%.
- DC Link Voltage – Verify converter parameter 14 - [DcLink Voltage] displays a reasonable DC Link Voltage.
- AC Line Frequency – Verify converter parameter 40 - [Line Frequency] displays a reasonable AC Line Frequency.
- Ambient Temperatures – Verify converter parameter 30 - [Ambient Temp] displays a reasonable ambient temperature. Verify parameter 32 - [IGBT Junction Temp] displays the temperature of the liquid being pumped through the coldplate.

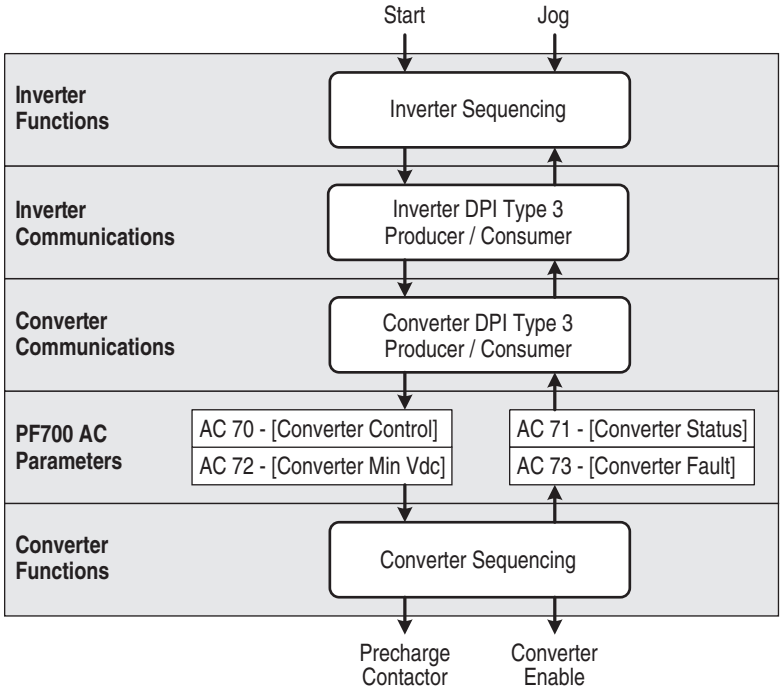
Exchanging Data

DPI Type 3 communication is used to exchange control and status information between the Inverter and the Converter. This provides a mechanism to start and stop the Converter as the Inverter is started and stopped. It also transfers the minimum DC Link voltage required for the given motor voltage to the Converter, and any Converter fault codes back to the Inverter so all faults are maintained in the Inverter's fault queue. The data exchanged is displayed in these Active Converter parameters:

- 70 - [Converter Control]
- 71 - [Converter Status]
- 72 - [Converter Min Vdc]
- 73 - [Converter Fault]

No setup is required to configure the Type 3 communication. The Converter requests a Type 3 connection at power up and, when the connection is complete, Converter parameter 320 - [Connect Status] shows which communication types are active. The use of Type 3 communication for exchange of data is important in that none of the normal data links are used for this communication. By default, all four sets of DPI data links remain available for use in a 20-COMM-* adapter.

The automatic starting and stopping of the Active Converter requires the Converter to be configured for "0 = Run On Start" using Converter parameter 50 - [Start Config]. In this case, when the Inverter is started or jogged, the Converter is enabled and the Inverter sequencing delays running the Inverter for up to 500 milliseconds, allowing the Converter to close the precharge bypass contactor. When the Inverter is stopped, the Converter continues to run for the time configured in Converter parameter 53- [Turn Off Delay]. On a subsequent start or jog, the Inverter does not need to wait for the precharge to close if the Converter is still running.



In addition to Type 3 communication, the 700S may optionally use DPI data links to control the sequencing of the Converter from a Logix processor as shown below. This requires the Converter to be configured for Manual Control in Converter parameter 50 - [Start Config]. The reference for the voltage loop may also be controlled by a Logix processor when Converter parameter 160 - [Voltage Loop Sel] is set to Manual Ref.

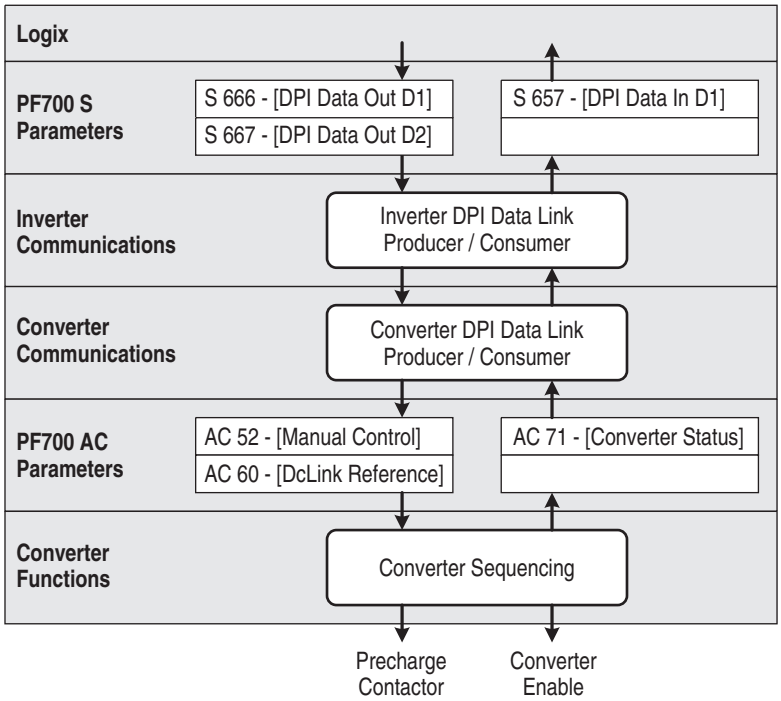
The DPI data links between the Inverter and Converter are enabled by setting Converter parameters 300 - [Data In A1] through 317 - [Data Out D2] to the parameter number of the data to send or receive. When a DPI data link is used by the Converter, that channel cannot be used by a different communication card. The following example illustrates using DPI data links between the Inverter and Converter.

Suppose Inverter parameter 666 is linked to Converter parameter 52 - [Manual Control], Inverter parameter 667 is linked to Converter parameter 60 - [DcLink Reference], and Converter parameter 71 - [Converter Status] is linked to Inverter parameter 657. This requires Converter data links to be configured as follows:

- Active Converter parameter 306 [Data In D1] = 52
- Active Converter parameter 307 [Data In D2] = 60
- Active Converter parameter 316 [Data Out D1] = 71

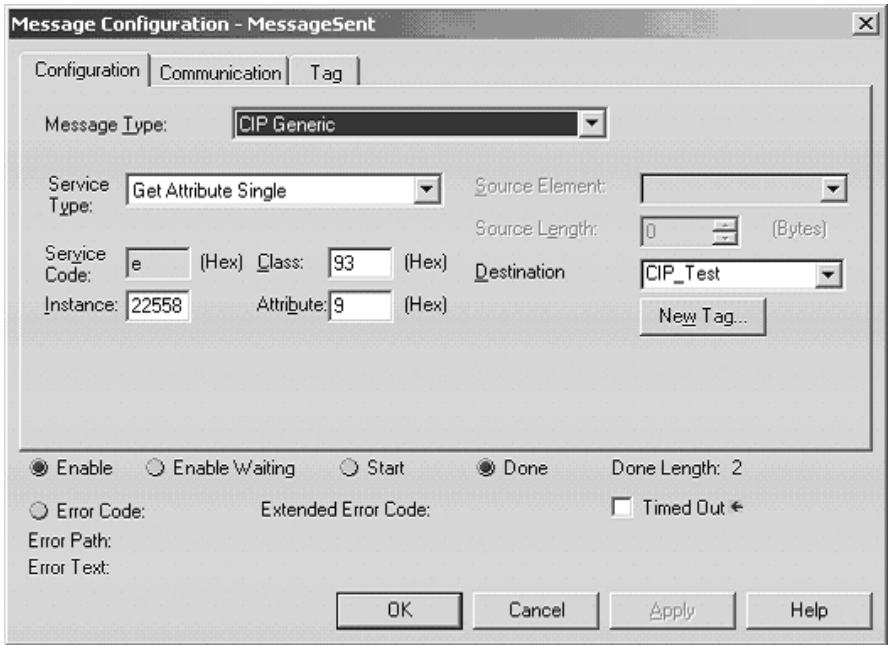
This example shows Data Link D being used to communicate with the Converter. The Converter supports DPI Data Links A, B, C, and D so any group could be used as needed.

All the options for starting and stopping the Converter are explained in greater detail in Converter Sequencing on page 2-12.



CIP Messages

Parameters in the Converter may be accessed by a Logix processor using a CIP message block. To read or write a parameter value you must respectively perform a Get Attribute Single or Set Attribute Single message to the DPI Parameter Object (Class 0x93). The Converter is in DPI Port 6, so the instance is 22528 plus the parameter number. The value of the parameter is accessed through Attribute 0x9 or 0xA. The example shown below reads the value of Converter parameter 30 - [Ambient Temp].



Class Code

Hexadecimal	Decimal
0x93	147

Instances

Instances (Hex.)	(Dec.)	Device
0x0000 – 0x3FFF	0 – 16383	Host
0x4000 – 0x43FF	16384 – 17407	Adapter
0x4400 – 0x47FF	17408 – 18431	DPI Port 1
0x4800 – 0x4BFF	18432 – 19455	DPI Port 2
0x4C00 – 0x4FFF	19456 – 20479	DPI Port 3
0x5000 – 0x53FF	20480 – 21503	DPI Port 4
0x5400 – 0x57FF	21504 – 22527	DPI Port 5
0x5800 – 0x5BFF	22528 – 23551	DPI Port 6

Attributes

ID	Rule	Name	Data Type	Description
0x9	Get/Set	Parameter Value	Various	Value in NVS
0xA	Get/Set	Parameter Value	Various	Value in RAM

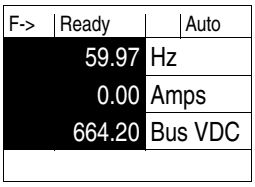
Establishing Communication as a Stand Alone Unit

When the Converter is set to operate as a Stand Alone unit (DPI MASTER), the first step after turning on power is to verify that you are able to communicate with the unit and that it properly displays selected data.

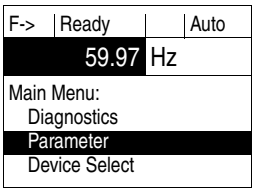
Accessing Active Converter Power Module Parameters

Using the HIM

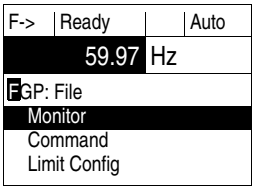
1. On power up, the HIM displays the AC Line Frequency, the Active Current, and the DC Bus Voltage. The status text will display one of five indications: Faulted, Start Inhibit, Ready, Running or Ride Through.

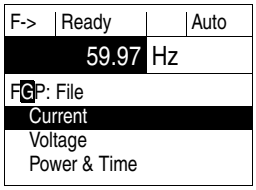


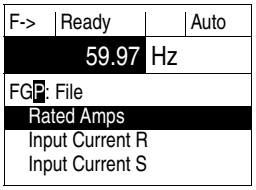
2. Access the parameters of the Converter by selecting Parameter on the Main Menu.



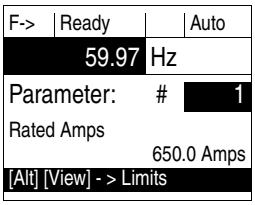
3. Parameters may then be accessed with the File, Group, Parameter menu,







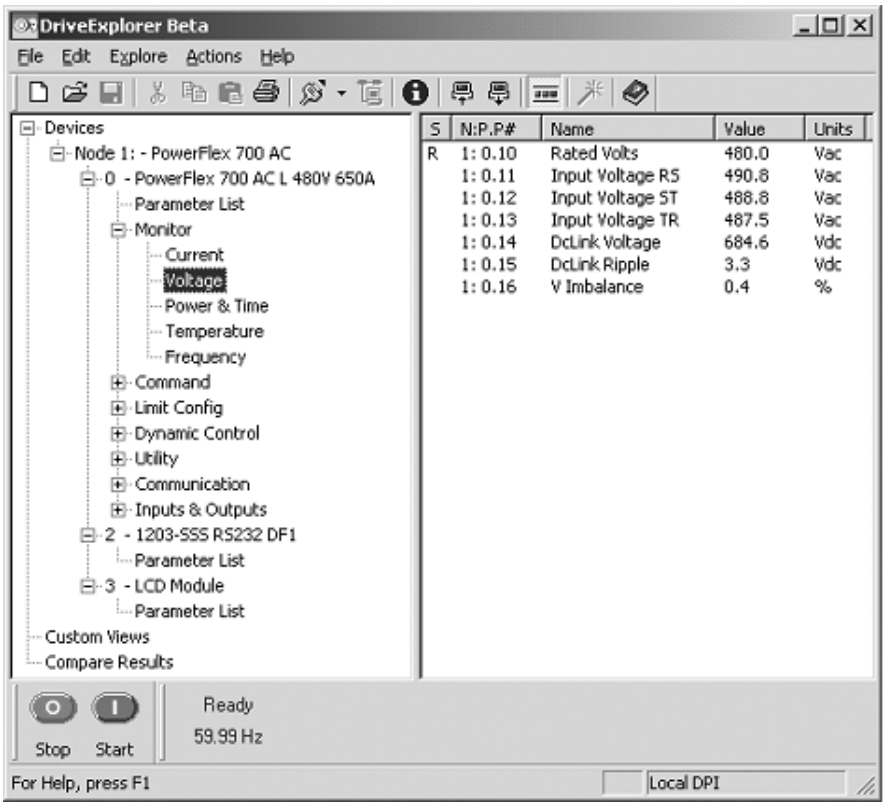
or with a Numbered List.



The start and stop buttons may start and stop the Converter. The stop button may also be used to reset a fault in the Converter. The speed, jog, forward/reverse, and auto/manual buttons are not functional.

Using DriveExplorer or DriveExecutive

When using DriveExplorer or DriveExecutive, the Converter parameters are displayed under Port 0 and are organized into the normal menu of Files, Groups, and Parameters. The control bar can be opened to show a stop and start push button.



Verifying Feedback Parameters

Using the HIM, DriveExplorer or DriveExecutive, verify that reasonable values are displayed for the following parameters in the Active Converter Power Module:

- Line to Line Voltage – Verify converter parameters 11 - [Input Voltage RS], 12 - [Input Voltage ST], and 13 - [Input Voltage TR] display a reasonable Line to Line RMS Voltage. Verify the voltage imbalance displayed in parameter 16 - [V Imbalance] does not exceed 5.0%.
- DC Link Voltage – Verify converter parameter 14 - [DcLink Voltage] displays a reasonable DC Link Voltage.
- AC Line Frequency – Verify converter parameter 40 - [Line Frequency] displays a reasonable AC Line Frequency.
- Ambient Temperatures – Verify converter parameter 30 - [Ambient Temp] displays a reasonable ambient temperature. Verify parameter 32 - [IGBT Junction Temp] displays the temperature of the liquid being pumped through the coldplate.

Using a 20-COMM-x Adapter

When a 20-COMM-x network communication adapter is connected to the Converter, the Product Logic Command bits may be used to start and stop the Converter and to reset a fault. All other bits are reserved. The Product Logic Status bits may be used to determine the state of the Converter.

Converter Logic Command Word

Logic Bits																Command	Description
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
															x	Stop	0 = Not Stop 1 = Stop
														x		Start	0 = Not Start 1 = Start
													x			Reserved	
												x				Fault Reset	0 = Not Fault Reset 1 = Fault Reset
											x					Reserved	
										x						Reserved	
									x							Reserved	
								x								Reserved	
							x									Reserved	
						x										Reserved	
					x											Reserved	
				x												Reserved	
			x													Reserved	
		x														Reserved	
	x															Reserved	
x																Reserved	

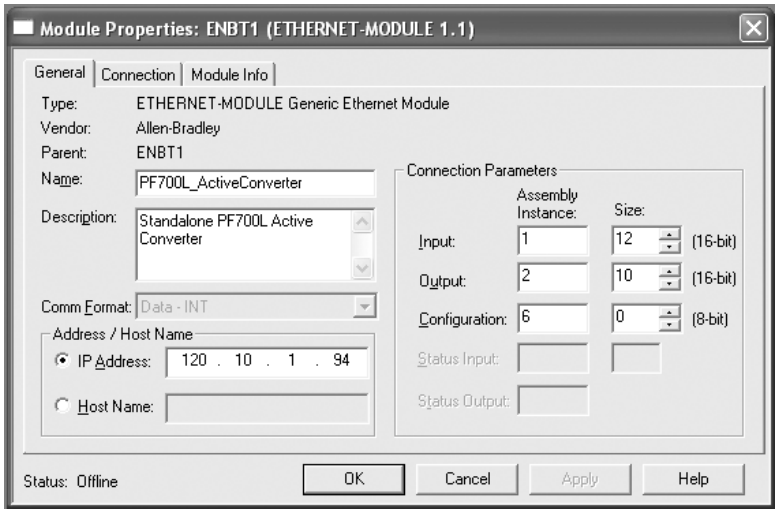
Converter Logic Status Word

Logic Bits																Status	Description
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
															x	Ready	0 = Not Ready 1 = Ready
														x		Running	0 = Not Running 1 = Running
													x			Reserved	
												x				Reserved	
											x					Reserved	
										x						Reserved	
									x							Alarm	0 = No Alarm 1 = Alarm
								x								Fault	0 = No Fault 1 = Fault
							x									Reserved	
						x										Reserved	
					x											Reserved	
				x												Reserved	
			x													Reserved	
		x														Reserved	
	x															Reserved	
x																Reserved	

The reference value from the 20-COMM-x adapter that is often used to select the speed is not used in the Converter. The Converter is always

synchronized to the AC line frequency and does not have a speed reference. The feedback value sent to the 20-COMM-x adapter is the measured AC line frequency, where a value of 32767 corresponds to 100.00 Hz.

The Converter supports 16-bit data links so if all data links are configured in the 20-COMM-x then the Connection Parameters in the Logix Processor must be setup as shown here. This defines twelve 16-bit words sent from the 20-COMM-x to the Logix, and ten 16-bits words sent from the Logix to the 20-COMM-x.



The data is utilized as shown below:

Logix to 20-COMM-x

Word	Output I/O
1	Logic Command
2	Reference (not used)
3	Datalink In A1
4	Datalink In A2
5	Datalink In B1
6	Datalink In B2
7	Datalink In C1
8	Datalink In C2
9	Datalink In D1
10	Datalink In D2

20-COMM-x to Logix

Word	Input I/O
1	Not Used
2	Not Used
3	Logic Status
4	Feedback (AC line frequency)
5	Datalink Out A1
6	Datalink Out A2
7	Datalink Out B1
8	Datalink Out B2
9	Datalink Out C1
10	Datalink Out C2
11	Datalink Out D1
12	Datalink Out D2

Converter Sequencing

The condition when to start and stop the Converter must be configured in parameter 50 - [Start Config]. There are three ways to operate the Converter: Run On Start, Run On Power Up, and Manual Control. This also configures how the precharge bypass contactor operates.

Run On Start

When Converter parameter 50 - [Start Config] is set to “0 = Run On Start,” the operation changes when the Converter is set as a Coupled unit (DPI SLAVE) or a Stand Alone unit (DPI MASTER) using SW1 (Figure 1.3).

Coupled Unit (DPI SLAVE Setting)

When set as a Coupled unit (DPI SLAVE) and Run on Start is selected, then starting and stopping the Converter is coordinated with starting and stopping the Inverter. When the Inverter is started or jogged, the Converter is enabled to turn on. When the Inverter is stopped or jog is released, the Converter is stopped.

Stand Alone Unit (DPI MASTER Setting)

When set as a Stand Alone unit (DPI MASTER) and Run on Start is selected, then the Converter may be started and stopped from the buttons on a HIM, or by the Logic Command bits transmitted by a 20-COMM-x adapter or 1203-USB or 1203-SSS device. The logic masks determine which DPI ports are allowed to take control.

Precharge Bypass Operation

In Run On Start, the precharge can be configured to operate in one of two ways as selected by parameter 51 - [Option Select], Bit 7 (Precharge Control). By default, this option bit is turned off so the precharge bypass contactor will be commanded to close at the time the Converter is commanded to start, and the bypass contactor opens after the Converter is commanded to stop. If the option bit is set, then the bypass contactor is closed at power up after the DC bus is at steady state.

If there is a fault in the Converter, the precharge bypass contactor will open. If the option bit is set, the bypass contactor is closed when the fault is reset.

The option bit also selects how long the Converter continues to run after it is commanded to stop. If the option bit is turned off, then parameter 53 - [Turn Off Delay] selects the time delay between the stop command and the time when the converter is stopped and the bypass is opened. If the option bit is turned on, then the Converter stops without a delay.

As a Coupled unit (DPI SLAVE), Run On Start with the precharge option bit turned off is recommended for applications where the drive is left powered up but the drive is not run for extended periods of time. With the precharge bypass contactor open, the fan cooling the input reactor is turned off.

Run On PwrUp

When Converter parameter 50 - [Start Config] is set to "1 = Run On PwrUp," the precharge bypass contactor is automatically closed and the Converter is enabled shortly after power is turned on.

The precharge will close as soon as the DC Link voltage is above the minimum required level and it has reached steady state. The precharge will remain closed when there is a fault in the Converter. When the fault is reset, the Converter will go back into run. In this configuration, the coolant circulating loop must be enabled when the Converter is enabled, even if the Inverter is not in run. The auxiliary contacts on the precharge bypass could be used to enable the circulating pump.

This mode of operation is recommended for applications where the drive is powered down when it is to be stopped for an extended period of time.

Manual Cntrl

When Converter parameter 50 - [Start Config] is set to "2 = Manual Cntrl," the operation of the precharge bypass contactor and enabling of the Converter is controlled by two bits in Converter parameter 52 - [Manual Control]. The bits are normally level sensitive. Turning the bits on closes the bypass contactor and enables the Converter. Turning the bits off opens the bypass contactor and disables the Converter.

The exception is that if there is a fault, the bypass contactor is not allowed to close. After a fault, the fault must be reset, and then a rising edge on bit 1 in parameter 52 - [Manual Control] is required to re-enable the Converter. The value in parameter 52 is not retentive; it is reset to zero on power up.

When operating as a Coupled unit (DPI SLAVE), the Inverter is not allowed to start with the precharge open and the Inverter will fault if it started with the Converter stopped. When operating as a Stand Alone unit (DPI MASTER), the value in parameter 52 - [Manual Control] may be written by a datalink and the value in parameter 72 - [Converter Status] may be read with a datalink and used as part of the interlocks with Inverters.

Start Inhibit

If the Converter does not start when expected, refer to Converter parameter 214 - [Start Inhibit] to display the Start Inhibit conditions.

Sequencing Precautions

When operating as a Coupled unit (DPI SLAVE) that is supplying power to a single Inverter, the built-in interlocks will not allow the Inverter to start unless the Converter is running, and the Converter will not stop when the Inverter is running. However, when the Converter is operated as a Stand

Alone unit (DPI MASTER) and is supplying power to a common bus, extra precaution must be taken.

ATTENTION: When operating as a Stand Alone unit (DPI MASTER) or supplying power to a common bus, external logic must be used to make sure the precharge bypass contactor is closed and the Converter is running before running an Inverter. Likewise, all Inverters must stop if the precharge opens or the Converter stops.

Operating an Inverter with the precharge bypass open will overheat the precharge resisters. Operating an Inverter with the Converter stopped will draw non-sinusoidal current with peak current greater than rated and will have significant harmonic distortion.

Control Setup

The following topics discuss parameters that should be reviewed when starting up an Active Converter.

Current Limits

Converter parameter 100 - [Active I Lmt] defines the limit on active current. This parameter defaults to 150% of Converter rated current. Current limit for regeneration is set in parameter 105 - [Regen I Lmt]. This defaults to -150% of Converter rated current. When in current limit, the Converter is unable to regulate the DC link voltage. If the drive is motoring and the Converter is in current limit, then the DC link will drop to the peak of the AC line. If the drive is regenerating and the Converter is in current limit, the DC link will rise and it is up to the Inverter to limit its regenerating current to avoid a high bus fault.

The Converter parameter 71 - [Converter Status] word bit 4 (Bus Reg Ena) turns on when the Converter is in current limit to command the Inverter to enable its bus voltage regulators. When the Converter is active and Bus Reg Ena is turned off, the bus voltage regulators in the Inverter are turned off.

Line Voltage Limits

The limits on line voltage may need to be adjusted to indicate abnormal conditions. At low line voltages, the Converter will deliver greater amps to produce the same power. If the possible range of input voltage would result in a condition that would exceed the rated current, then the voltage limits must be set to guard against this condition. The low voltage and high voltage limits have timers associated with each limit to allow brief excursions outside of normal operating conditions. See Converter parameters 112 -[Low Vac Lmt] through 115 - [High Vac Time].

Frequency Limits

The PWM Carrier Frequency is fixed at 4 kHz and cannot be changed.

If operating on a generator, the normal range of acceptable AC line frequencies may need to be expanded. The limit of the rate of change may also need to be adjusted to allow the line synchronization to properly track the changes in frequency. See Converter parameters 131 - [AC Low Freq Lmt] through 135 - [AC Maximum dF/dt].

Voltage Loop

The voltage major loop uses Vdc Reference and Vdc Feedback to calculate the required active current to maintain a constant DC bus voltage.

Voltage Reference Selection

Converter parameter 160 - [Voltage Loop Sel] selects the value used for the DC Link voltage reference. One of two values may be chosen at this time; “0 = Optimized Ref” and “1 = Manual Ref.” The Regen Only option is reserved for future enhancements, and the Open Loop option is reserved for manufacturing tests. A password must be entered to use the Open Loop option.

When “0 = Optimize Ref” is selected, the value for the DC Link reference is calculated as the minimum value for the given operating condition to reduce switching losses and increase efficiency. The base value for DC Link reference is 1.44 times the RMS AC line. For a 480 volt line, the DC link reference starts at 692 Vdc. This is 2% above the peak of the AC line. In applications where the maximum motor voltage is greater than the AC line, the Converter can boost the DC link to a higher level. The Inverter calculates the minimum required DC link for the present motor voltage and transmits that value to Converter parameter 72 - [Converter Min Vdc]. As the line voltage goes up and down and as the Inverter’s motor voltage goes up and down, the DC Link reference goes up and down to match the operating conditions.

This option is most useful when there are significant changes in the line voltage. This option is not recommended for common bus applications where multiple Inverters operate at different speeds.

When “1 = Manual Ref” is selected, the value for DC Link reference is the value in parameter 60 - [DcLink Reference]. If the peak of the AC line becomes greater than the entered value, then the AC line will over-ride to keep the DC link reference at least 1.44 times the RMS AC line. This option is intended for operating at a specific DC Link voltage, or in situations were the Converter is regulating a common bus for multiple Inverters and an external controlling device is calculating the required DC Link voltage.

The currently commanded DC Link voltage is displayed in parameter 161 - [DcLink Command].

Voltage Loop Tuning

The tuning of the voltage loop is a function of Converter parameter 162 - [Capacitance], parameter 163 - [VML bandwidth], and parameter 164 - [VML Damping]. In most cases, the default values for these three parameters should not need to be adjusted. When multiple Inverters are on a common bus, the combined DC link capacitance of the additional inverters must be entered into parameter 170 - [Bus Capacitance].

Current Loop

The current minor loops regulate the active current as requested by the voltage major loop, and the reactive current to produce the desired kVAR.

kVAR Control

KVAR Control can be used for power factor compensation.

When parameter 61- [kVAR Reference] is set to zero, the Converter will regulate reactive current to maintain unity power factor. When a nonzero value is entered, it requests the amount of kVAR to command. Negative values are a lagging power factor and positive values are a leading power factor. When no real current is being delivered by the Converter, the full current rating of the Converter may be used to produce kVAR. As real current increases, motoring or regenerating, the reactive current limit is automatically reduced. The reactive current limit is displayed in parameter 158- [Reactive I Lmt]. The reactive current that is being commanded is displayed in parameter 159- [Reactive I Cmd].

Current Loop Tuning

The tuning of the current loop is a function of Converter parameter 152 - [Inductance], parameter 153 - [CML Bandwidth], and parameter 154 - [CML Damping]. In most cases, the default values for these three parameters should not need to be adjusted. If a non-standard input filter is used, the new inductance needs to be entered. When the AC line voltage has greater than 5% impedance, the CML bandwidth may need to be reduced.

PWM Carrier Synchronization

The converter has the option to synchronize its PWM carrier frequency to the PWM carrier frequency of the inverter to reduce the common mode voltage on the motor. This requires the Inverter carrier frequency to be set to 4 kHz.

PWM carrier synchronization is enabled by setting parameter 51- [Option Select] bit 3 (PWM SyncRecv). After carrier synchronization is completed, the Converter sets parameter 71 - [Converter Status] bit 9 (PWM SyncLock). When PWM SyncRecv is set and sync is not locked, the Converter is inhibited from starting. If sync is lost while the Converter is in

run, a fault is generated. This fault can be disabled in parameter 238 - [Fault Config] bit 7 (PWM SyncLost).

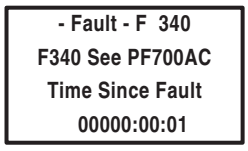
When operating as a Stand Alone unit (DPI MASTER) and PWM Carrier Synchronization is enabled, the Converter needs to know if it should synchronize to a 700VC or a 700S. This selection is done in parameter 51 - [Option Select] Bit 6 (700VC Invtr). This bit must be set for a 700VC and cleared for a 700S. PWM carrier synchronization can only be done with one inverter, so any other inverters on the common bus will have higher common mode voltage.

Converter Faults

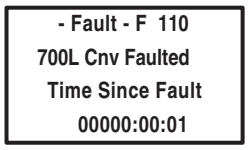
When set to operate as a Coupled unit (DPI SLAVE), any fault in the Converter is passed to the Inverter so all the faults are recorded in the Inverter fault queue. When set to operate as a Stand Alone unit (DPI MASTER), the Converter maintains its own fault queue.

Converter Faults as a Coupled Unit (DPI SLAVE)

When using PowerFlex 700 Vector Control, the fault from the Converter is added to a base number of 300, so all the Converter faults are numbered 301 to 399. The pop-up window on the HIM alerts the user to look at the fault log in the PF700AC to get the specific fault text.



When using PowerFlex 700S Phase II Control, the faults from the Converter are all combined into one fault code (F110) in the Inverter. The pop-up window on the HIM alerts the user to look at the fault log in the PF700AC to get the specific fault text.

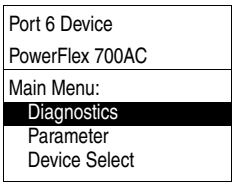


For a complete listing of Converter faults, descriptions, and actions, please refer to Fault Descriptions on page 4-1.

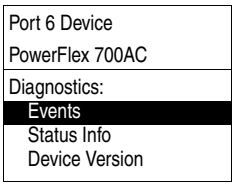
Displaying the Fault Text

To view the fault queue in the Converter with a HIM, begin by using the Device Select menu as described in Accessing Active Converter Power Module Parameters on page 2-1.

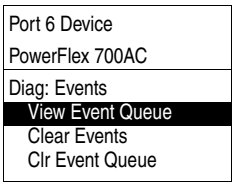
1. Rather than selecting Parameters, use the Up arrow to select “Diagnostics” and press the Enter key.



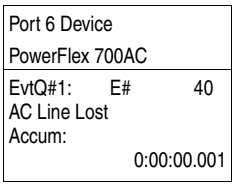
2. The HIM then displays the Diagnostics menu. With “Events” selected, press the Enter key.



3. The HIM then displays the Diag: Events menu. With “View Event Queue” selected, press the Enter key.



4. The HIM then displays the Event queue where the specific fault text is displayed. In this example screen, the Converter faulted because the AC was lost and power dip ride through was not enabled.



Resetting Converter Faults

In most cases, faults in the Converter are reset by resetting the Inverter. If the condition causing the fault is still present, then a second fault is generated and recorded in the fault queue. The only exception is a checksum fault in the Converter. A checksum fault in the Converter is reset by doing a reset defaults in the Converter, and then reset the fault in the Inverter.

Clearing the fault queue in the Inverter does not affect the event queue in the Converter. The Converter event queue is cleared independently of the Inverter fault queue.

Programming and Parameters

This chapter provides a complete listing and description of the Active Converter Power Module parameters. The parameters can be configured (viewed/edited) using an LCD HIM (Human Interface Module). As a convenient alternative, programming can also be performed using DriveExecutive™ or DriveExplorer™ software and a personal computer.

For information on...	See page...
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About Parameters

To configure the Active Converter Power Module to operate in a specific way, parameters may have to be set. Three types of parameters exist:

- **ENUM Parameters**
  ENUM parameters allow a selection from 2 or more 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 numeric 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
LIMIT...	Current	100	**[Active I Lmt]]** Sets the current limit used when the IGBT overload is less than 90% of the IT fault threshold.	Default: Rated Amps*1.5 Min/Max: Rated ÷ 4/Rated*1.5 Amps Units: 0.1 Amps
UTILITY	Drive...	197	**[Reset to Defaults]** Resets all values in the Converter to the factory defaults. "Ready" = A new value may be entered. "Factory" = Parameters are reset.	Default: 0 "Ready" Options: 0 "Ready" 1 "Factory"
	Fault Queue	238	**[Fault Config]** A set of bits that select which conditions may generate faults.	

Bit Definition								Inverter Flt	PWM SyncLost	V Imbalance	I Imbalance	High dFdt	Ac High Freq	Ac Low Freq	Ac High Volt	Ac Low Volt
Default	x	x	x	x	x	x	x	1	0	1	1	0	1	1	0	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

0 = Disabled
1 = Enabled
x = Reserved

- Bit 0 (Ac Low Volt) – When this bit is set, Low AC Line Voltage will generate a fault.
- Bit 1 (Ac High Volt) – When this bit is set, High AC Line Voltage will generate a fault.
- Bit 2 (Ac Low Freq) – When this bit is set, Low AC Line Frequency will generate a fault.
- Bit 3 (Ac High Freq) – When this bit is set, High AC Line Frequency will generate a fault.
- Bit 4 (High dFdt) – When this bit is set, High dF/dt will generate a fault.
- Bit 5 (I Imbalance) – When this bit is set, high current imbalance will generate a fault.
- Bit 6 (V Imbalance) – When this bit is set, high voltage imbalance will generate a fault.
- Bit 7 (PWM SyncLost) - When this bit is set, loss of PWM synchronization will generate a fault.
- Bit 8 (Inverter Flt) - When this bit is set, the Converter will fault when the Inverter faults.

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 cannot be changed until Converter 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: Options:	Lists the value assigned at the factory. "Read Only" = no default. Displays the programming selections available.
	Bit	Bit:	Lists the bit place holder and definition for each bit.
	Numeric	Default: Min/Max: Units:	Lists the value assigned at the factory. "Read Only" = no default. The range (lowest and highest setting) possible for the parameter. Unit of measure and resolution as shown on the LCD HIM.

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.

File-Group-Parameter Order

This simplifies programming by grouping parameters that are used for similar functions. The parameters are organized into 7 files. Each file is divided into groups, and each group contains a set of parameters related to a specific purpose.

File	Group	Parameters							
Monitor	Current	Rated Amps	001	Input Current T	004	Reactive Current	007		
		Input Current R	002	Ground Current	005	I Imbalance	008		
		Input Current S	003	Active Current	006	IT Overload	009		
	Voltage	Rated Volts	010	Input Voltage ST	012	DcLink Voltage	014	V Imbalance	016
		Input Voltage RS	011	Input Voltage TR	013	DcLink Ripple	015		
	Power & Time	Rated Power	020	Regen kWh	023	Life Run Time	026		
		AC Line kW	021	Lifetime kWh	024	Life Power Time	027		
		Motoring kWh	022	Elapsed Run Time	025	Life Pwr Cycles	028		
	Temperature	Ambient Temp	030	IGBT Base Temp	031	IGBT Junct Temp	032		
	Frequency	Line Frequency	040	Max Line Freq	042	Change Line Freq	044		
		Min Line Freq	041	Min Max Persist	043				
Command	Start/Stop	Start Config	050	Option Select	051	Manual Control	052	Turn Off Delay	053
	Setpoints	DcLink Reference	060	Extern Cml Ref	062	Modulation Freq	064		
		kVAR Reference	061	Modulation Index	063				
	Data Exchange	Converter Control	070	Converter Status	071	Converter Min Vdc	072	Converter Fault	073
Limit Config	Current	Active I Lmt	100	Reactive RateLmt	102	I Imbalance Time	104		
		Active OL I Lmt	101	I Imbalance Lmt	103	Regen I Lmt	105		
	AC Line Voltage	Ride Through Ena	110	Low Vac Lmt	112	High Vac Lmt	114	V Imbalance Lmt	116
		Ride Through Sec	111	Low Vac Time	113	High Vac Time	115	V Imbalance Time	117
	Temperature	Ambnt Temp Alrm	120	Base Temp Alrm	122	Junct Temp Alrm	124	CldPlt Temp Alrm	126
		Ambnt Temp Trip	121	Base Temp Trip	123	Junct Temp Trip	125		
	Frequency	PWM Frequency	130	AC Low Freq Time	132	AC High Freq Time	134		
		AC Low Freq Lmt	131	AC High Freq Lmt	133	AC Maximum dF/dt	135		
Dynamic Control	Current Loop	Reduce Ilmt Sel	150	CML Bandwidth	153	CML Kp	156	Reactive I Cmd	159
		Active I Cmd	151	CML Damping	154	PF Bandwidth	157		
		Inductance	152	CML Ki	155	Reactive I Lmt	158		
	Voltage Loop	Voltage Loop Sel	160	VML Bandwidth	163	VML Kp	166	Parallel Config	169
		DcLink Command	161	VML Damping	164	VML Kf	167	Bus Capacitance	170
		Capacitance	162	VML Ki	165	VML Reset Level	168		
Utility	Drive Memory	Param Access Lvl	196	Reset Meters	200	Drive Checksum	203	Password	205
		Reset to Defaults	197	Language	201	Control SW Ver	204		
	Diagnostics	Alarm Status	211	Fault Amps T	223	Fault VoltsTR	228	Testpoint 2 Sel	236
		Start Inhibit	214	Fault Amps Q	224	Fault Volts Vdc	229	Testpoint 2 Data	237
		Fault Frequency	220	Fault Amps D	225	Fault Base Temp	230		
		Fault Amps R	221	Fault Volts RS	226	Testpoint 1 Sel	234		
		Fault Amps S	222	Fault Volts ST	227	Testpoint 1 Data	235		
	Fault Queue	Fault Config	238	Fault 1 Code	243	Fault 2 Time	246	Fault 4 Code	249
		Fault Clear	239	Fault 1 Time	244	Fault 3 Code	247	Fault 4 Time	250
		Power Up Marker	242	Fault 2 Code	245	Fault 3 Time	248	Alarm Config	260
Communication	Datalinks	Data In A1	300	Data In C1	304	Data Out A1	310	Data Out C1	314
		Data In A2	301	Data In C2	305	Data Out A2	311	Data Out C2	315
		Data In B1	302	Data In D1	306	Data Out B1	312	Data Out D1	316
		Data In B2	303	Data In D2	307	Data Out B2	313	Data Out D2	317
	DPI Status	Connect Status	320	CS Msg Tx Cnt	323	PC Msg Rx Cnt	326	CAN Bus Off Cnt	329
		DPI Error Out	321	CS Timeout Cnt	324	PC Msg Tx Cnt	327		
		CS Msg Rx Cnt	322	CS Msg Bad Cnt	325	PC Timeout Cnt	328		
	Masks & Owners	Logic Mask	340	Fault Clr Mask	342	Start Owner	344		
		Start Mask	341	Stop Owner	343	Fault Clr Owner	345		
	Security	Port Mask Act	346	Write Mask Cfg	347	Write Mask Act	348	Logic Mask Act	349
Inputs & Outputs	Mux'ed Temps	IGBT NTC Temp1	330	IGBT NTC Temp4	333	IGBT NTC Temp6	336	Coldplate Temp2	339
		IGBT NTC Temp2	331	Coldplate Temp1	334	IGBT NTC Temp7	337		
		IGBT NTC Temp3	332	IGBT NTC Temp5	335	IGBT NTC Temp8	338		
	Digital Inputs	Dig In Status	350	Dig In Frc Mask	351	Dig In Frc Data	352		
	Digital Outputs	Dig Out Status	360	Dig Out Frc Mask	361	Dig Out Frc Data	362		

Numbered List View

All parameters are in numerical order.

Monitor File

File	Group	No.	Parameter Name & Description	Values
MONITOR	Current	001	**[Rated Amps]** When operating as a Coupled unit, displays the same rated current as the inverter as the voltage class is changed.	Default: Read Only Min/Max: 0.0/3000.0 Units: 0.1 Amps
		002 003 004	**[Input Current R]** **[Input Current S]** **[Input Current T]** Displays the measured RMS phase currents.	Default: Read Only Min/Max: 0.0/3000.0 Units: 0.1 Amps
		005	**[Ground Current]** Displays the measured ground current.	Default: Read Only Min/Max: 0.0/3000.0 Units: 0.1 Amps
		006	**[Active Current]** Displays the measured active current. Positive values are motoring, negative values are regeneration.	Default: Read Only Min/Max: -3000.0/+3000.0 Units: 0.1 Amps
		007	**[Reactive Current]** Displays the measured reactive current. Positive is lagging, negative is leading power factor.	Default: Read Only Min/Max: -3000.0/+3000.0 Units: 0.1 Amps
		008	**[I Imbalance]** Displays the current imbalance calculated between phases R, S, and T.	Default: Read Only Min/Max: 0.0/100.0 Units: 0.1%
		009	**[IT Overload]** Displays the accumulated IT overload. The Converter allows 110% for 60 seconds and 150% for 3 seconds. Operating beyond these ratings will result in this accumulator counting up to 100.0% and the generation of a fault. An alarm is turned on when this parameter reaches 90.0 %, at which time the current limit can be reduced until this parameter integrates down to 50.0%.	Default: Read Only Min/Max: 0.0/100.0 Units: 0.1%
	Voltage	010	**[Rated Volts]** When operating as a Coupled unit, displays the same rated voltage as the inverter as the voltage class is changed.	Default: Read Only Min/Max: 0.0/690.0 Units: 0.1 Vac
		011 012 013	**[Input Voltage RS]** **[Input Voltage ST]** **[Input Voltage TR]** Displays the measured AC line-to-line RMS voltage.	Default: Read Only Min/Max: 0.0/760.0 Units: 0.1 Vac
		014	**[DcLink Voltage]** Displays the measured DC Link Voltage.	Default: Read Only Min/Max: 0.0/1225.0 Units: 0.1 Vdc
		015	**[DcLink Ripple]** Displays the measured voltage ripple on the DC Link.	Default: Read Only Min/Max: 0.0/1225.0 Units: 0.1 Vdc
		016	**[V Imbalance]** Displays the voltage imbalance calculated between phases R, S, and T.	Default: Read Only Min/Max: 0.0/100.0 Units: 0.1%
	Power & Time	020	**[Rated Power]** Displays the Converter's rated power.	Default: Read Only Min/Max: 0.00/3000.00 Units: 0.01 kW
		021	**[AC Line kW]** Displays the power flowing to and from the AC Line. Positive values indicate power is from the line. Negative values indicate power is returned to the line.	Default: Read Only Min/Max: -3000.0/+3000.0 Units: 0.1 kW
		022	**[Motoring kWh]** Displays the accumulated positive kWh. This parameter may be reset with parameter 200 - [Reset Meters].	Default: Read Only/Reset Min/Max: 0.0/429496729.5 Units: 0.1 kWh
		023	**[Regen kWh]** Displays the accumulated negative kWh. This parameter may be reset with parameter 200 - [Reset Meters].	Default: Read Only/Reset Min/Max: 0.0/429496729.5 Units: 0.1 kWh

File	Group	No.	Parameter Name & Description	Values	
MONITOR	Power & Time	024	**[Life Time kWh]** Displays the lifetime accumulated kWh. This parameter cannot be reset.	Default: Min/Max: Units:	Read Only 0.0/429496729.5 0.1 kWh
		025	**[Elapsed Run Time]** Displays the accumulated amount of time the Converter has been in run. This parameter can be reset with parameter 200 - [Reset Meters].	Default: Min/Max: Units:	Read Only/Reset 0.0000/429496.7295 0.0001 Hr
		026	**[Life Run Time]** Displays the accumulated amount of time the Converter has been in run. This parameter cannot be reset.	Default: Min/Max: Units:	Read Only 0.0000/429496.7295 0.0001 Hr
		027	**[Life Power Time]** Displays the accumulated amount of time the Converter has been powered up. This parameter cannot be reset to zero.	Default: Min/Max: Units:	Read Only 0.0000/429496.7295 0.0001 Hr
		028	**[Life Pwr Cycles]** Displays the accumulated number of times the Converter has been powered up. This parameter cannot be reset to zero.	Default: Min/Max: Units:	Read Only 0/4294967295 None
	Temperature	030	**[Ambient Temp]** Displays the measured ambient temperature of the Converter.	Default: Min/Max: Units:	Read Only -40.0/+150.0 0.1°C
		031	**[IGBT Base Temp]** Displays the measured IGBT base temperature.	Default: Min/Max: Units:	Read Only -40.0/+150.0 0.1°C
		032	**[IGBT Junction Temp]** Displays the calculated IGBT junction temperature.	Default: Min/Max: Units:	Read Only -40.0/+150.0 0.1°C
	Frequency	040	**[Line Frequency]** Displays the measured line frequency.	Default: Min/Max: Units:	Read Only 0.0/90.0 0.1 Hz
		041	**[Min Line Freq]** Latches and displays the minimum measured line frequency. The minimum is held for the time set with parameter 43 - [Min Max Persist].	Default: Min/Max: Units:	Read Only 0.0/90.0 0.1 Hz
		042	**[Max Line Freq]** Latches and displays the maximum measured line frequency. The maximum is held for the time set with parameter 43 - [Min Max Persist].	Default: Min/Max: Units:	Read Only 0.0/90.0 0.1 Hz
		043	**[Min Max Persist]** Sets the persistence time of the minimum and maximum measured line frequency. A value of zero results in the minimum and maximum never being reset.	Default: Min/Max: Units:	10.0 Sec 0.0/60.0 Sec 0.1 Sec
		044	**[Change Line Freq]** Displays the measured change in line frequency in Hz/sec.	Default: Min/Max: Units:	Read Only 0.0/20.0 0.1 Hz/s

Command File

File	Group	No.	Parameter Name & Description	Values
COMMAND	Start / Stop	050	**[Start Config]** Selects the method by which the Active Converter is started. "Run On Start" = The Converter is started when the Inverter is put into run or jogged. The Enable Converter Bit 0 in parameter 70 - [Converter Control] is used to operate the precharge and enable the Converter. "Run On PwrUp" = The precharge is closed and the Converter is automatically enabled as soon as power is turned on and synchronization has been completed. "Manual Cntrl" = The bits in parameter 52 - [Manual Control] are used to operate the precharge bypass contactor and enable the Converter.	Default: 0 "Run On Start" Options: 0 "Run On Start" 1 "Run On PwrUp" 2 "Manual Cntrl"
		051	**[Option Select]** A set of bits to enable and disable features in the Converter.	
		052	**[Manual Control]** A set of bits to manual start and stop the Converter. These bits are used only when parameter 50 - [Start Config] is set to "2" (Manual Cntrl).	

051 [Option Select]

Bit Definition									Prechg Cntrl	VC Inverter	Sim ModFreq	Sim ModIndex	PWM SyncRecv	PWM SyncXmit	Unbal V Comp	AutoPhaseRot
Default	x	x	x	x	x	x	x	x	0	0	0	0	0	0	0	1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

0 = Disabled
1 = Enabled
x = Reserved

- Bit 0 (AutoPhaseRot) – Enables the Converter to adapt to ABC or ACB phase rotation. When this bit is cleared the Converter requires ABC rotation.
- Bit 1 (Unbal V Comp) – Enables unbalanced voltage compensation.
- Bit 2 (PWM SyncXmit) – Enables the Converter to transmit its PWM synchronization signal to other Converters.
- Bit 3 (PWM SyncRecv) – Enables the Converter to receive a PWM synchronization signal. This bit must be turned off if no PWM synchronization cable is installed. When synchronization is completed, a bit is set in parameter 071 - [Converter Status]. If synchronization is not completed, a bit is set in parameter 214 - [Start Inhibit]. If synchronization is ever lost, an alarm is turned on in parameter 211 - [Alarm Status]. Loss of synchronization may be configured to result in a fault if enabled in parameter 238 - [Fault Config].
- Bit 4 (Sim ModIndex) – Enables the Converter modulation test. This feature requires a password to operate.
- Bit 5 (Sim Mod Freq) – Enables the Converter frequency simulator. This feature requires a password to operate.
- Bit 6 (VC Inverter) – This bit is used only when the Converter is operating as a Stand Alone unit and Bit 3 (PWM SyncRecv) is enabled. This bit selects between synchronizing to an inverter with PowerFlex 700 Vector Control or PowerFlex 700S Phase II Control. This bit must be set if the inverter has PowerFlex 700 Vector Control or must remain off if the inverter has PowerFlex 700S Phase II Control. This bit is not used when the Converter is operating as a Coupled unit.
- Bit 7 (Prechg Cntrl) – When Run On Start is selected in parameter 50 [Start Config] and this bit is turned off, then the precharge bypass contactor is closed when the unit is put into run. When Run On Start is selected and this bit is turned on, then the precharge bypass contactor is closed at power up after the DC link has reached steady state. This reduces the time delay between putting the unit in run and the DC link reaching its regulated level.

052 [Manual Control]

Bit Definition															Enable Cnvtr	Close Prechg
Default	x	x	x	x	x	x	x	x	x	x	x	x	x	x	0	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

0 = Disabled
1 = Enabled
x = Reserved

- Bit 0 (Close Prechg) – Closes the precharge bypass contactor.
- Bit 1 (Enable Cnvtr) – Enables the converter voltage and current loops.

File	Group	No.	Parameter Name & Description	Values
COMMAND	Start / Stop	053	**[Turn Off Delay]** This parameter is used when parameter 50 - [Start Config] is set to "0" (Run On Start) to select how long to keep the Converter enabled after the Inverter is stopped.	Default: 5.0 Sec Min/Max: 1.0/60.0 Sec Units: 0.1 Sec
	Setpoints	060	**[DcLink Reference]** Sets the reference for the DC Link voltage when parameter 160 - [Voltage Loop Sel] is set to "1" (Manual Ref).	Default: Rated*1.46 Vdc Min/Max: 300.0/1100.0 Vdc Units: 0.1 Vdc
		061	**[kVAR Reference]** Sets the reference for the kVAR to produce. Positive values are a leading power factor and negative values are a lagging power factor.	Default: 0.0 KVAR Min/Max: –3000.0/+3000.0 KVAR Units: 0.1 KVAR
		062	**[Extern Cml Ref]** Sets the current reference as calculated by an external voltage loop. Values are scaled so 4096 corresponds to Converter rated current.	Default: 0 Min/Max: –8192/+8192 Units: None
		063	**[Modulation Index]** Sets the modulation duty cycle when parameter 51 - [Option Select] Bit 4 Sim ModIndex is enabled and the Converter is started.	Default: 0.0% Min/Max: 0.0/100.0% Units: 0.1%
		064	**[Modulation Freq]** Sets the simulated line frequency when parameter 51 - [Option Select] Bit 5 Sim ModFreq is enabled and the Converter is started.	Default: 0.0 Hz Min/Max: 0.0/60.0 Hz Units: 0.1 Hz
	Data Exchange	070	**[Converter Control]** A set of bits sent from the Inverter to control the Converter.	

Bit Definition															700VC Invtr	Enable Cnvtr
Default	x	x	x	x	x	x	x	x	x	x	x	x	x	x	0	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

0 = Disabled
1 = Enabled
x = Reserved

- Bit 0 (Enable Cnvtr) – This bit is set by the Inverter when the drive is started. When parameter 50 - [Start Config] is set to "0" (Run on Start), setting this bit closes the precharge bypass and enables the Converter voltage and current loops.
- Bit 1 (700VC Invtr) – This bit is set when the Active Converter is communicating with an Inverter that has 700 Vector Control. It is cleared when communicating with an Inverter that has 700S Phase II Control.

File	Group	No.	Parameter Name & Description	Values
COMMAND	Data Exchange	071	**[Converter Status]** A set of bits sent from the Converter to the Inverter to indicate status.	Read Only

Bit Definition	Cnvtr Fault	Cnvtr Alarm			Abort Decel	CML Comm Ok	PWM SyncLock	Regenerating	KVAR Lmt	Active I Lmt	Ac Ride Thru	Bus Reg Ena	Cnvtr Active	Prechg Closed	Ac Line Sync	Cnvtr Ready
Default	0	0	x	x	0	0	0	0	0	0	0	0	0	0	0	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

0 = Disabled
1 = Enabled
x = Reserved

- Bit 0 (Cnvtr Ready) is set by the Converter when all inhibits are cleared.
- Bit 1 (Ac Line Sync) is set by the Converter when it is synchronized to the AC line.
- Bit 2 (Pchg Closed) indicates the status of the precharge bypass contactor.
- Bit 3 (Cnvtr Active) is set by the Converter when it is regulating.
- Bit 4 (Bus Reg Ena) is set by the Converter to enable the Inverter bus voltage regulator.
- Bit 5 (Ac Ride Thru) is set by the Converter during a power dip ride through.
- Bit 6 (Active I Lmt) is set by the Converter when active current is limited.
- Bit 7 (kVAR Lmt) is set by the Converter when the requested KVAR is limited.
- Bit 8 (Regenerating) is set by the Converter when it is regenerating power to the AC line.
- Bit 9 (PWM SyncLock) is set by the Converter when the PWM carrier is locked to the external synchronization signal.
- Bit 10 (CML Comm Ok) is set by the Converter when a valid External CML reference is received.
- Bit 11 (Abort Decel) is set when the DC link drops below the voltage when the precharge must open. This signals the Inverter to stop regulating the bus voltage by decelerating the motor and beginning a coast to stop.
- Bit 14 (Cnvtr Alarm) is set by the Converter when it has detected an alarm.
- Bit 15 (Cnvtr Fault) is set by the Converter when it has detected a fault.

	072	**[Converter Min Vdc]** Sets the minimum DC Link voltage required by the Inverter for the present operating conditions. This value is calculated as (motor voltage * 1.44) and then transferred to the Converter by Type 3 communication. This is used when the voltage to the motor needs to be greater than the peak of the AC line voltage. Under low line conditions, the Converter can boost the DC Link voltage above the peak of the AC line.	Default: 0.0 Vdc Min/Max: 0.0/1225.0 Vdc Units: 0.1 Vdc
	073	**[Converter Fault]** This parameter is used to pass a fault code from the Converter to the Inverter so all Converter fault codes are logged in the Inverter's fault queue.	Default: 0 Min/Max: 0/399 Units: None

Limit Config File

File	Group	No.	Parameter Name & Description	Values
LIMIT CONFIG	Current	100	**[Active I Lmt]** Sets the current limit used when the IGBT overload is less than 90% of the IT fault threshold.	Default: Rated * 1.5 Amps Min/Max: Rated ÷ 4/Rated*1.5 Amps Units: 0.1 Amps
		101	**[Active OL I Lmt]** Sets the current limit used when the IGBT overload is more than 90% of the IT fault threshold, and parameter 150 - [Reduce Ilmt Sel] is set to "1" (enabled).	Default: Rated * 0.9 Amps Min/Max: Rated ÷ 4/Rated*1.5 Amps Units: 0.1 Amps
		102	**[Reactive RateLmt]** Sets how fast reactive current will change.	Default: 100.0 A/sec Min/Max: 10.0/3000.0 A/sec Units: 0.1 A/sec
		103	**[I Imbalance Lmt]** Sets the limit on phase current imbalance. A fault is generated if the calculated imbalance is greater than this limit for the time defined in parameter 104 - [I Imbalance Time].	Default: 30.0% Min/Max: 1.0/90.0% Units: 0.1%
		104	**[I Imbalance Time]** Sets the time delay in faulting on current imbalance between phases. A fault is generated if the calculated imbalance is greater than the limit set by parameter 103 - [I Imbalance Lmt] for this amount of time.	Default: 10.0 Sec Min/Max: 1.0/10.0 Sec Units: 0.1 Sec
		105	**[Regen I Lmt]** Sets the maximum phase current the unit will request when regenerating. Values are entered as a percent of converter rated current. When the converter goes into current limit while regenerating, the DC link will go up and the unit may fault on DC Over Voltage if the condition is not externally corrected.	Default: -150.0% Min/Max: -150.0/0.0% Units: 0.1%
	AC Line Voltage	110	**[Ride Through Ena]** Selects the options for power dip ride through. "Disabled" = The Converter will fault on loss of AC line voltage and will not automatically attempt to restart when power returns. "Enabled" = The Converter will enter Standby Mode, and wait for the AC line voltage to return, and then automatically resume operation. If power is not restored within the time defined in parameter 111 - [Ride Through Sec], a fault is generated.	Default: 0 "Disabled" Options: 0 "Disabled" 1 "Enabled"
		111	**[Ride Through Sec]** Selects the longest power dip that will be allowed providing DC link voltage can be maintained.	Default: 10.0 Sec Min/Max: 0.1/600.0 Sec Units: 0.1 Sec
		112	**[Low Vac Lmt]** Sets the low limit on AC Line voltage. A fault or alarm may be generated when the AC Line voltage is less than this limit for the time set by parameter 113 - [Low Vac Time].	Default: 340.0 Vac Min/Max: 200.0/800.0 Vac Units: 0.1 Vac
		113	**[Low Vac Time]** Sets the time delay in detecting low AC Line voltage. A fault or alarm may be generated when the AC Line voltage is less than the limit set by parameter 112 - [Low Vac Lmt] for this amount of time.	Default: 5.0 Sec Min/Max: 0.1/30.0 Sec Units: 0.1 Sec
		114	**[High Vac Lmt]** Sets the high limit on AC Line voltage. A fault or alarm may be generated when the AC Line voltage is greater than this limit for the time set by parameter 115 - [High Vac Time].	Default: Rated*1.1 Vac Min/Max: 400.0/810.0 Vac Units: 0.1 Vac
		115	**[High Vac Time]** Sets the time delay in detecting high AC Line voltage. A fault or alarm may be generated when the AC Line voltage is greater than the limit set by parameter 114 - [High Vac Lmt] for this amount of time.	Default: 5.0 Sec Min/Max: 0.1/30.0 Sec Units: 0.1 Sec
		116	**[V Imbalance Lmt]** Sets the limit on voltage imbalance between phases. A fault or alarm may be generated if the calculated imbalance is greater than this limit for the time set by parameter 117 - [V Imbalance Time].	Default: 10.0% Min/Max: 1.0/20.0% Units: 0.1%

File	Group	No.	Parameter Name & Description	Values
LIMIT CONFIG	AC Line Voltage	117	**[V Imbalance Time]** Sets the time delay in detecting a voltage imbalance between phases. A fault or alarm may be generated if the calculated imbalance is greater than the limit set by parameter 116 - [V Imbalance Limit] for this amount of time.	Default: 1.0 Sec Min/Max: 1.0/10.0 Sec Units: 0.1 Sec
	Temperature	120	**[Ambnt Temp Alrm]** Sets the alarm threshold for the maximum ambient temperature.	Default: 60.0°C Min/Max: 30.0/105.0°C Units: 0.1°C
		121	**[Ambnt Temp Trip]** Displays the fault threshold for the maximum ambient temperature.	Default: Read Only Min/Max: 40.0/150.0 Units: 0.1°C
		122	**[Base Temp Alrm]** Sets the alarm threshold for the maximum IGBT base temperature.	Default: 70.0°C Min/Max: 30.0/125.0°C Units: 0.1°C
		123	**[Base Temp Trip]** Displays the fault threshold for the maximum IGBT base temperature.	Default: Read Only Min/Max: 75.0/160.0 Units: 0.1°C
		124	**[Junct Temp Alrm]** Sets the alarm threshold for the maximum IGBT junction temperature.	Default: 85.0°C Min/Max: 75.0/150.0°C Units: 0.1°C
		125	**[Junct Temp Trip]** Displays the fault threshold for the maximum IGBT junction temperature.	Default: Read Only Min/Max: 75.0/175.0 Units: 0.1°C
		126	**[CldPlt Temp Alrm]** Sets the alarm threshold for the minimum coldplate temperature.	Default: 40.0°C Min/Max: 10.0/80.0°C Units: 0.1°C
	Frequency	130	**[PWM Frequency]** Sets the PWM carrier frequency. The value is entered in kHz. When the power structure allows more than one setting for the carrier frequency, the power must be cycled off/on to have the new value take effect.	Default: Rated kHz Min/Max: Set by the power structure Units: 1 kHz
		131	**[AC Low Freq Lmt]** Sets the low frequency limit used by parameter 132 - [AC Low Freq Time].	Default: 29.0 Hz Min/Max: 27.0/93.0 Hz Units: 0.1 Hz
		132	**[AC Low Freq Time]** Sets how long the line frequency must be less than the limit set by parameter 131 - [AC Low Freq Lmt] before a fault is generated.	Default: 5.0 Sec Min/Max: 0.1/10.0 Sec Units: 0.1 Sec
		133	**[AC High Freq Lmt]** Sets the high frequency limit used by parameter 134 - [AC High Freq Time].	Default: 91.0 Hz Min/Max: 27.0/93.0 Hz Units: 0.1 Hz
		134	**[AC High Freq Time]** Sets how long the line frequency must be greater than the limit set by parameter 133 - [AC High Freq Lmt] before a fault is generated.	Default: 5.0 Sec Min/Max: 0.1/10.0 Sec Units: 0.1 Sec
		135	**[AC Maximum dF/dt]** Sets the maximum dF/dt that the AC converter will allow. A change in frequency greater than this may generate a fault.	Default: 10.0 Hz/sec Min/Max: 0.1/30.0 Hz/sec Units: 0.1 Hz/sec

Dynamic Control File

File	Group	No.	Parameter Name & Description	Values
DYNAMIC CONTROL	Current Loop	150	**[Reduce IImt Sel]** Enables the use of a reduced current limit when in overload. "Disabled" = The Converter current limit is always the value in parameter 100 - [Active I Lmt]. "Enabled" = The Converter current limit will switch to the value set by parameter 101 - [Active OL I Lmt] when in overload.	Default: 1 "Disabled" Options: 0 "Disabled" 1 "Enabled"
		151	**[Active I Cmd]** Displays the commanded active current.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1 Amps
		152	**[Inductance]** Sets the input filter inductance. When set to non-zero, this value is used to calculate the tuning coefficients for the current loop CML Ki and Kp.	Default: Rated µH Min/Max: 0/32767 µH Units: 1 µH
		153	**[CML Bandwidth]** Sets the Current Minor Loop bandwidth. When set to non-zero, this value is used to calculate the tuning coefficients for the current loop CML Ki and Kp.	Default: 1500 Rad/sec Min/Max: 0/4000 Rad/sec Units: 1 Rad/sec
		154	**[CML Damping]** Sets the Current Minor Loop damping. When set to non-zero, this value is used to calculate the tuning coefficients for the current loop CML Ki and Kp.	Default: 1.6 Min/Max: 0.5/5.0 Units: None
		155	**[CML Ki]** Tunes the integral gain of the current loop.	Default: Drive Size Dependent Min/Max: 0/32767 Units: None
		156	**[CML Kp]** Tunes the proportional gain of the current loop.	Default: Drive Size Dependent Min/Max: 0/32767 Units: None
		157	**[PF Bandwidth]** Sets the bandwidth of the current regulator maintaining the desired power factor. This is used only when parameter 051 - [Option Select] Bit 1 (Unbal V Comp) is set to "1" to enable unbalanced voltage compensation.	Default: Drive Size Dependent Min/Max: 0/4000 Units: None
		158	**[Reactive I Lmt]** Displays the calculated reactive current limit.	Default: Read Only Min/Max: 0.0/3000.0 Units: 0.1 Amps
		159	**[Reactive I Cmd]** Displays the commanded reactive current.	Default: Read Only Min/Max: -3000.0/+3000.0 Units: 0.1 Amps
	Voltage Loop	160	**[Voltage Loop Sel]** Selects the operation of the voltage loop. "Optimize Ref" = Vdc reference is calculated to minimize switching losses, based on the measured AC Line voltage and the minimum voltage required by the Inverter. "Manual Ref" = The value set by parameter 060 - [DcLink Reference] is used for Vdc reference. "Regen Only" = Reserved for future. "Open Loop" = The Converter outputs a sinusoidal voltage synchronized to the AC line with an amplitude set by parameter 063 - [Modulation Index]. This feature requires a password to operate.	Default: 0 "Optimize Ref" Options: 0 "Optimize Ref" 1 "Manual Ref" 2 "Regen Only" 3 "Open Loop"
		161	**[DcLink Command]** Displays the commanded DC Link voltage.	Default: Read Only Min/Max: 0.0/1225.0 Units: 0.1 Vdc

File	Group	No.	Parameter Name & Description	Values
DYNAMIC CONTROL	Voltage Loop	162	**[Capacitance]** Sets the DC Link capacitance. When set to non-zero, this value is used to calculate the tuning coefficients for the voltage loop VML Ki and Kp. In the case of a Frame 2 or Frame 3A drive, this is the capacitance inside the drive. In the case of a Frame 3B drive, it is the capacitance in the Converter and one Inverter. The capacitance of any additional Inverters connected to a common bus must be entered in parameter 170 - [Bus Capacitance].	Default: Rated µF Min/Max: 0/65535 µF Units: 1 µF
		163	**[VML Bandwidth]** Sets the Voltage Major Loop bandwidth. When set to non-zero, this value is used to calculate the tuning coefficients for the voltage loop VML Ki and Kp.	Default: 400 Rad/sec Min/Max: 0/800 Rad/sec Units: 1 Rad/sec
		164	**[VML Damping]** Sets the Voltage Major Loop damping. When set to non-zero, this value is used to calculate the tuning coefficients for the voltage loop VML Ki and Kp.	Default: 1.6 Min/Max: 0.5/5.0 Units: None
		165	**[VML Ki]** Tunes the integral gain of the voltage loop.	Default: Drive Size Dependent Min/Max: 0/32767 Units: None
		166	**[VML Kp]** Tunes the proportional gain of the voltage loop.	Default: Drive Size Dependent Min/Max: 0/32767 Units: None
		167	**[VML Kf]** Tunes the feed forward gain of the voltage loop.	Default: 0 Min/Max: 0/32767 Units: None
		168	**[VML Reset Level]** Sets the voltage error when to reset the integrator.	Default: 60.0 Vdc Min/Max: 10.0/300.0 Vdc Units: 0.1 Vdc
		169	**[Parallel Config]** Reserved for future.	Default: 0 "Stand Alone" Options: 0 "Stand Alone" 1 "Master of 1" 2 "Master of 2" 3 "Master of 3" 4 "Follower"
		170	**[Bus Capacitance]** Sets the additional capacitance connected to the DC link in a common bus application. This value, in addition to the value of parameter 162 - [Capacitance], sets the tuning coefficient for the voltage loop VML Ki and Kp.	Default: 0 µF Min/Max: 0/2000000000 µF Units: 1 µF

Utility File

File	Group	No.	Parameter Name & Description	Values
UTILITY	Drive Memory	196	**[Param Access Lvl]** Selects which parameters are accessible by the HIM. "Basic" = A minimal subset of parameters are accessible on the HIM. "Advanced" = All parameters are accessible on the HIM.	Default: 0 "Basic" Options: 0 "Basic" 1 "Advanced"
		197	**[Reset to Defaults]** Resets all values in the Converter to the factory defaults. "Ready" = A new value may be entered. "Factory" = Parameters are reset.	Default: 0 "Ready" Options: 0 "Ready" 1 "Factory"
		200	**[Reset Meters]** Resets the elapsed kWh and run time parameters to zero. "Ready" = A new value may be entered. "kWh" = The kWh accumulators are reset to zero. "Elapsed Time" = The Time accumulators are reset to zero.	Default: 0 "Ready" Options: 0 "Ready" 1 "kWh" 2 "Elapsed Time"
		201	**[Language]** Selects the language in which all text is displayed.	Default: 0 "Not Selected" Options: 0 "Not Selected" 1 "English" 2 "French" 3 "Spanish" 4 "Italian" 5 "German" 7 "Portuguese" 10 "Dutch"
		203	**[Drive Checksum]** Displays the checksum of all the parameters in the Converter. This provides a quick way to know if any parameter has been changed.	Default: Read Only Min/Max: 0/65535 Units: None
		204	**[Control SW Ver]** Displays the software version of the Converter.	Default: Read Only Min/Max: 0/65.535 Units: None
		205	**[Password]** Value entered here to enable protected feature.	Default: 0 Min/Max: 0/65535 Units: None
	Diagnostic	211	**[Alarm Status]** A set of bits displaying the alarms active in the Converter.	Read Only

Bit Definition	Start Inhibit			PWM SyncLoss	Coldplate Temp	Junction Temp	Base Temp	Ambient Temp	IT Overload	V Imbalance	I Imbalance	Ac High dFdt	Ac High Freq	Ac Low Freq	Ac High Volt	Ac Low Volt
Default	0	x	x	0	0	0	0	0	0	0	0	0	0	0	0	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

0 = Disabled
1 = Enabled
x = Reserved

- Bit 0 (Ac Low Volt) is set when the average AC line voltage is less than the limit in parameter 112 - [Low Vac Lmt].
- Bit 1 (Ac High Volt) is set when the average AC line voltage exceeds the limit in parameter 114 - [High Vac Lmt].
- Bit 2 (Ac Low Freq) is set when the AC line frequency is less than the limit in parameter 131 - [AC Low Freq Lmt].
- Bit 3 (Ac High Freq) is set when the AC line frequency exceeds the limit in parameter 133 - [AC High Freq Lmt].
- Bit 4 (Ac High dFdt) is set when the AC line frequency is changing faster than the limit in parameter 135 - [AC Maximum dF/dt].
- Bit 5 (I Imbalance) is set when the phase current imbalance exceeds the limit in parameter 103 - [I Imbalance Lmt].
- Bit 6 (V Imbalance) is set when the phase voltage imbalance is greater than the limit in parameter 116 - [V Imbalance Lmt].
- Bit 7 (IT Overload) is set when the overload counter is greater than 90%.
- Bit 8 (Ambient Temp) is set when the ambient temperature exceeds the limit in parameter 120 - [Ambnt Temp Alrm].
- Bit 9 (Base Temp) is set when the IGBT base temperature exceeds the limit in parameter 122 - [Base Temp Alrm].
- Bit 10 (Junction Temp) is set when the IGBT junction temperature exceeds the limit in parameter 124 - [Junct Temp Alrm].
- Bit 11 (Coldplate Temp) is set when the coldplate temperature is less than the limit in parameter 126 - [CldPlt Temp Alrm].
- Bit 12 (PWM SyncLoss) is set when PWM carrier synchronization is lost.
- Bit 15 (Start Inhibit) is set when one or more start inhibits are present.

File	Group	No.	Parameter Name & Description	Values
UTILITY	Diagnostic	214	**[Start Inhibit]** A set of bits displaying the interlocks that inhibit the Converter from starting.	Read Only

Bit Definition	Faulted				High DC Link	Reqst Maintd	PWM Not Sync	Pchg Open	High dv/dt	DC Link Low	Phased ACB	Single Phase	Ac High Freq	Ac Low Freq	Ac High Volt	Ac Low Volt
Default	0	x	x	x	0	0	0	0	0	0	0	0	0	0	0	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

0 = Disabled
1 = Enabled
x = Reserved

- Bit 0 (Ac Low Volt) is set when the average AC line voltage is less than the limit in parameter 112 - [Low Vac Lmt].
- Bit 1 (Ac High Volt) is set when the average AC line voltage exceeds the limit in parameter 114 - [High Vac Lmt].
- Bit 2 (Ac Low Freq) is set when the AC line frequency is less than the limit in parameter 131 - [AC Low Freq Lmt].
- Bit 3 (Ac High Freq) is set when the AC line frequency exceeds the limit in parameter 133 - [AC High Freq Lmt].
- Bit 4 (Single Phase) is set when an input phase is missing.
- Bit 5 (Phased ACB) is set when an input phase voltage is phased ACB and parameter 051 - [Option Select] Bit 0 (AutoPhaseRot) is not enabled.
- Bit 6 (DC Link Low) is set when DC Link voltage is too low to close the precharge bypass contactor.
- Bit 7 (High dv/dt) is set when DC Link dv/dt is too high to close the precharge bypass contactor.
- Bit 8 (Pchg Open) is set when the precharge bypass contactor is open and manual sequencing is selected.
- Bit 9 (PWM Not Sync) is set when Par 051 - [Option Select] Bit 3 (PWM SyncRecv) is turned on and synchronization is not completed.
- Bit 10 (Reqst Maintd) is set after a fault if the enable is not turned off. Restart requires a rising edge.
- Bit 11 (High DC Link) is set when Run On PwrUp is selected in parameter 50 - [Start Config] and the DC Link is greater than 1.44 times the value in parameter 114 - [High Vac Lmt]. On a 480 volt unit, parameter 114 - [High Vac Lmt] defaults to “528” so inhibit Bit 11 (High DC Link) defaults to 760 volts.
- Bit 15 (Faulted) is set when the Converter is faulted.

File	Group	No.	Parameter Name & Description	Values
UTILITY	Diagnostic	220	**[Fault Frequency]** Displays the AC line frequency at the time of the fault.	Default: Read Only Min/Max: 0.0/100.0 Units: 0.1 Hz
		221	**[Fault Amps R]** Displays phase R peak current at the time of the fault.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1 Amps
		222	**[Fault Amps S]** Displays phase S peak current at the time of the fault.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1 Amps
		223	**[Fault Amps T]** Displays phase T peak current at the time of the fault.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1 Amps
		224	**[Fault Amps Q]** Displays the real current at the time of the fault.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1 Amps
		225	**[Fault Amps D]** Displays the reactive current at the time of the fault.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1 Amps
		226	**[Fault Volts RS]** Displays the RMS line-to-line voltage between phase R and S at the time of the fault.	Default: Read Only Min/Max: 0.0/3276.7 Units: 0.1 Vac
		227	**[Fault Volts ST]** Displays the RMS line-to-line voltage between phase S and T at the time of the fault.	Default: Read Only Min/Max: 0.0/3276.7 Units: 0.1 Vac
		228	**[Fault Volts TR]** Displays the RMS line-to-line voltage between phase T and R at the time of the fault.	Default: Read Only Min/Max: 0.0/3276.7 Units: 0.1 Vac
		229	**[Fault Volts Vdc]** Displays the DC Link voltage at the time of the fault.	Default: Read Only Min/Max: 0.0/3276.7 Units: 0.1 Vdc

File	Group	No.	Parameter Name & Description	Values
UTILITY	Diagnostic	230	**[Fault Base Temp]** Displays the IGBT base temperature at the time of the fault.	Default: Read Only Min/Max: -40.0/+150.0 Units: 0.1°C
		234	**[Testpoint 1 Sel]** Allows for access to other test points in the system.	Default: 499 Min/Max: 0/65535 Units: 1
		235	**[Testpoint 1 Data]** Displays the data selected in parameter 234 - [Testpoint 1 Sel].	Default: Read Only Min/Max: -2147483647/+2147483647 Units: 1
		236	**[Testpoint 2 Sel]** Allows for access to other test points in the system.	Default: 499 Min/Max: 0/65535 Units: 1
		237	**[Testpoint 2 Data]** Displays the data selected in parameter 236 - [Testpoint 2 Sel].	Default: Read Only Min/Max: -2147483647/+2147483647 Units: 1
	Fault Queue	238	**[Fault Config]** A set of bits that select which conditions may generate faults. Bit Definition: Inverter Flt, PWM SyncLost, V Imbalance, I Imbalance, High dFdt, Ac High Freq, Ac Low Freq, Ac High Volt, Ac Low Volt Default: x x x x x x x 1 0 1 1 0 1 1 0 0 Bit: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 0 = Disabled 1 = Enabled x = Reserved • Bit 0 (Ac Low Volt) – When this bit is set, low AC line voltage will generate a fault. • Bit 1 (Ac High Volt) – When this bit is set, high AC line voltage will generate a fault. • Bit 2 (Ac Low Freq) – When this bit is set, low AC line frequency will generate a fault. • Bit 3 (Ac High Freq) – When this bit is set, high AC line frequency will generate a fault. • Bit 4 (High dFdt) – When this bit is set, high dF/dt will generate a fault. • Bit 5 (I Imbalance) – When this bit is set, high current imbalance will generate a fault. • Bit 6 (V Imbalance) – When this bit is set, high voltage imbalance will generate a fault. • Bit 7 (PWM SyncLost) – When this bit is set, loss of PWM synchronization will generate a fault. • Bit 8 (Inverter Flt) – When this bit is set, a fault in the Inverter will fault the Converter.	
		239	**[Fault Clear]** Resets faults and clears the fault queue. "Ready" = A new value may be entered. "Clear Faults" = A fault is reset. "Clr Fault Que" = The fault queue is cleared.	Default: 0 "Ready" Options: 0 "Ready" 1 "Clear Faults" 2 "Clr Fault Que"
		242	**[Power Up Marker]** Displays the elapsed time at power up. This is used to know if a fault occurred since the last time power was applied.	Default: Read Only Min/Max: 0.0000/429496.7295 Units: 0.0001 Hrs
		243	**[Fault 1 Code]** Displays the most recent fault code detected.	Default: Read Only Min/Max: 0/65535 Units: 0
		244	**[Fault 1 Time]** Displays the time stamp for the most recent fault detected.	Default: Read Only Min/Max: 0.0000/429496.7295 Units: 0.0001 Hrs
		245	**[Fault 2 Code]** Displays the most second recent fault code detected.	Default: Read Only Min/Max: 0/65535 Units: 0
		246	**[Fault 2 Time]** Displays the time stamp for the most second recent fault detected.	Default: Read Only Min/Max: 0.0000/429496.7295 Units: 0.0001 Hrs

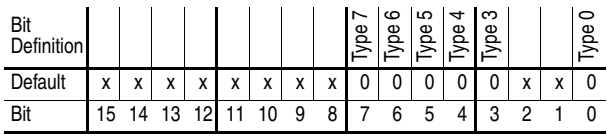
File	Group	No.	Parameter Name & Description	Values
UTILITY	Fault Queue	247	**[Fault 3 Code]** Displays the most third recent fault code detected.	Default: Read Only Min/Max: 0/65535 Units: 0
		248	**[Fault 3 Time]** Displays the time stamp for the most third recent fault detected.	Default: Read Only Min/Max: 0.0000/429496.7295 Units: 0.0001 Hrs
		249	**[Fault 4 Code]** Displays the most fourth recent fault code detected.	Default: Read Only Min/Max: 0/65535 Units: 0
		250	**[Fault 4 Time]** Displays the time stamp for the most fourth recent fault detected.	Default: Read Only Min/Max: 0.0000/429496.7295 Units: 0.0001 Hrs
		260	**[Alarm Config]** A set of bits to enable/disable alarm conditions that will initiate a Converter alarm.	

Bit Definition	Start Inhibit			PWM SyncLoss	Coldplate Temp	Junction Temp	Base Temp	Ambient Temp	IT Overload	V Imbalance	I Imbalance	Ac High dFdt	Ac High Freq	Ac Low Freq	Ac High Volt	Ac Low Volt
Default	1	x	x	1	0	1	1	1	1	1	1	1	1	1	1	1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

0 = Disabled
1 = Enabled
x = Reserved

- Bit 0 (Ac Low Volt) sets an alarm when the average AC line voltage is less than the limit in parameter 112 - [Low Vac Lmt].
- Bit 1 (Ac High Volt) sets an alarm when the average AC line voltage exceeds the limit in parameter 114 - [High Vac Lmt].
- Bit 2 (Ac Low Freq) sets an alarm when the AC line frequency is less than the limit in parameter 131 - [AC Low Freq Lmt].
- Bit 3 (Ac High Freq) sets an alarm when the AC line frequency exceeds the limit in parameter 133 - [AC High Freq Lmt].
- Bit 4 (Ac High dFdt) sets an alarm when the AC line frequency is changing faster than the limit in parameter 135 - [AC Maximum dF/dt].
- Bit 5 (I Imbalance) sets an alarm when the phase current imbalance exceeds the limit in parameter 103 - [I Imbalance Lmt].
- Bit 6 (V Imbalance) sets an alarm when the phase voltage imbalance is greater than the limit in parameter 116 - [V Imbalance Lmt].
- Bit 7 (IT Overload) sets an alarm when the Overload counter is greater than 90%.
- Bit 8 (Ambient Temp) sets an alarm when the ambient temperature exceeds the limit in parameter 120 - [Ambnt Temp Alrm].
- Bit 9 (Base Temp) sets an alarm when the IGBT base temperature exceeds the limit in parameter 122 - [Base Temp Alrm].
- Bit 10 (Junction Temp) sets an alarm when the IGBT junction temperature exceeds the limit in parameter 124 - [Junct Temp Alrm].
- Bit 11 (Coldplate Temp) sets an alarm when the coldplate temperature is less than the limit in parameter 126 - [CldPlt Temp Alrm].
- Bit 12 (PWM SyncLoss) sets an alarm when PWM carrier synchronization is lost.
- Bit 15 (Start Inhibit) sets an alarm when one or more start inhibits are present.

Communication File

File	Group	No.	Parameter Name & Description	Values
COMMUNICATION	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.	Default: 0 (0 = "Disabled") Min/Max: 0/399 Units: 1
		302 303	**[Data In B1] - Link B Word 1** **[Data In B2] - Link B Word 2** Parameter number whose value will be written from a communications device data table.	Default: 0 (0 = "Disabled") Min/Max: 0/399 Units: 1
		304 305	**[Data In C1] - Link C Word 1** **[Data In C2] - Link C Word 2** Parameter number whose value will be written from a communications device data table.	Default: 0 (0 = "Disabled") Min/Max: 0/399 Units: 1
		306 307	**[Data In D1] - Link D Word 1** **[Data In D2] - Link D Word 2** Parameter number whose value will be written from a communications device data table.	Default: 0 (0 = "Disabled") Min/Max: 0/399 Units: 1
		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: 0/399 Units: 1
		312 313	**[Data Out B1] - Link B Word 1** **[Data Out B2] - Link B Word 2** Parameter number whose value will be written to a communications device data table.	Default: 0 (0 = "Disabled") Min/Max: 0/399 Units: 1
		314 315	**[Data Out C1] - Link C Word 1** **[Data Out C2] - Link C Word 2** Parameter number whose value will be written to a communications device data table.	Default: 0 (0 = "Disabled") Min/Max: 0/399 Units: 1
		316 317	**[Data Out D1] - Link D Word 1** **[Data Out D2] - Link D Word 2** Parameter number whose value will be written to a communications device data table.	Default: 0 (0 = "Disabled") Min/Max: 0/399 Units: 1
	DPI Status	320	**[Connect Status]** A set of bits displaying which DPI communication types are in use by the Converter.  0 = Disabled 1 = Enabled x = Reserved • Bit 0 (Type 0) is set when Type 0 PC is connected. • Bit 3 (Type 3) is set when Type 3 PC is connected. • Bit 4 (Type 4) is set when Type 4 PC is connected. • Bit 5 (Type 5) is set when Type 5 PC is connected. • Bit 6 (Type 6) is set when Type 6 PC is connected. • Bit 7 (Type 7) is set when Type 7 PC is connected.	Read Only
		321	**[DPI Error Out]** Displays a counter that increments on a DPI error.	Default: Read Only Min/Max: 0/255 Units: None
		322	**[CS Msg Rx Cnt]** Displays a counter that increments on a Client Server message received.	Default: Read Only Min/Max: 0/65535 Units: None
		323	**[CS Msg Tx Cnt]** Displays a counter that increments on a Client Server message transmitted.	Default: Read Only Min/Max: 0/65535 Units: None
		324	**[CS Timeout Cnt]** Displays a counter that increments on a Client Server message time out.	Default: Read Only Min/Max: 0/255 Units: None

Bit Definition									Type 7	Type 6	Type 5	Type 4	Type 3			Type 0
Default	x	x	x	x	x	x	x	x	0	0	0	0	0	x	x	0
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

File	Group	No.	Parameter Name & Description	Values
COMMUNICATION	DPI Status	325	**[CS Msg Bad Cnt]** Displays a counter that increments on a bad Client Server message.	Default: Read Only Min/Max: 0/255 Units: None
		326	**[PC Msg Rx Cnt]** Displays a counter that increments on a Producer Consumer message received.	Default: Read Only Min/Max: 0/65535 Units: None
		327	**[PC Msg Tx Cnt]** Displays a counter that increments on a Producer Consumer message transmitted.	Default: Read Only Min/Max: 0/65535 Units: None
		328	**[PC Timeout Cnt]** Displays a counter that increments on a Producer Consumer message time out.	Default: Read Only Min/Max: 0/255 Units: None
		329	**[CAN Bus Off Cnt]** Displays a counter that increments on when the CAN Bus is turned off.	Default: Read Only Min/Max: 0/65535 Units: None
	Masks & Owners (1)	340	**[Logic Mask]** Determines which ports can control the drive when parameter 348 - [Write Mask Act] Bit 15 is set to "1." If the bit for a port is set to "0," the port will have no control functions except for stop. The drive must be stopped to change this parameter.	
		341	**[Start Mask]** Controls which adapters can issue start commands.	See [Logic Mask].
		342	**[Fault Clr Mask]** Controls which adapters can clear a fault.	See [Logic Mask].
		343	**[Stop Owner]** Displays adapters that are presently issuing a valid stop command.	Read Only
		344	**[Start Owner]** Displays adapters that are presently issuing a valid start command.	See [Stop Owner].
		345	**[Fault Clr Owner]** Displays adapters that are presently clearing a fault.	See [Stop Owner].
	Security (1)	346	**[Port Mask Act]** Bits 0-6 indicate status for DPI port communication. Bit 15 indicates when security software is controlling the parameter.	Read Only

[Logic Mask]

Bit Definition										DPI Port 6	DPI Port 5	DPI Port 4	DPI Port 3	DPI Port 2	DPI Port 1	
Default	x	x	x	x	x	x	x	x	x	1	1	1	1	1	1	x
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

0 = Control Masked
1 = Control Permitted
x = Reserved

[Stop Owner]

Bit Definition										DPI Port 6	DPI Port 5	DPI Port 4	DPI Port 3	DPI Port 2	DPI Port 1	
Default	x	x	x	x	x	x	x	x	x	0	0	0	0	0	0	x
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

0 = No Command
1 = Issuing Command
x = Reserved

[Port Mask Act]

Bit Definition	Security									DPI Port 6	DPI Port 5	DPI Port 4	DPI Port 3	DPI Port 2	DPI Port 1	Host
Default	0	x	x	x	x	x	x	x	x	1	1	1	1	1	1	1
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

0 = Not Active
1 = Active
x = Reserved

File	Group	No.	Parameter Name & Description	Values
COMMUNICATION	Security (1)	347	**[Write Mask Cfg]** Enables/disables write access of parameters for DPI ports. Changes to this parameter only become effective when power is cycled, the drive is reset, or Bit 15 of parameter 348 - [Write Mask Act] transitions from "1" to "0." The drive must be stopped to change this parameter.	
		348	**[Write Mask Act]** Indicates status of write access for DPI ports. When Bit 15 is set, network security is controlling the write mask instead of parameter 347 - [Write Mask Cfg].	Read Only
		349	**[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 340 - [Logic Mask].	Read Only

Bit Definition for 347:

										DPI Port 6	DPI Port 5	DPI Port 4	DPI Port 3	DPI Port 2	DPI Port 1	
Default	x	x	x	x	x	x	x	x	x	1	1	1	1	1	1	x
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

0 = Read Only
1 = Write Permitted
x = Reserved

Bit Definition for 348:

	Security									DPI Port 6	DPI Port 5	DPI Port 4	DPI Port 3	DPI Port 2	DPI Port 1	
Default	0	x	x	x	x	x	x	x	x	1	1	1	1	1	1	x
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

0 = Read Only
1 = Write Permitted
x = Reserved

Bit Definition for 349:

	Security									DPI Port 6	DPI Port 5	DPI Port 4	DPI Port 3	DPI Port 2	DPI Port 1	
Default	0	x	x	x	x	x	x	x	x	1	1	1	1	1	1	x
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

0 = Control Masked
1 = Control Permitted
x = Reserved

(1) The parameters in the Masks & Owners group and the Security group are displayed only when the Active Converter is operating as a Stand Alone unit. When the Active Converter is operating as a Coupled unit, these parameters are reserved.

Inputs & Outputs File

File	Group	No.	Parameter Name & Description	Values
INPUTS & OUTPUTS	Mux'ed Temps	330	**[IGBT NTC Temp1]** Displays the temperature measured in IGBT module 1.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1°C
		331	**[IGBT NTC Temp2]** Displays the temperature measured in IGBT module 2.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1°C
		332	**[IGBT NTC Temp3]** Displays the temperature measured in IGBT module 3.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1°C
		333	**[IGBT NTC Temp4]** Displays the temperature measured in IGBT module 4.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1°C
		334	**[Coldplate Temp1]** Displays the temperature measured on the first coldplate.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1°C
		335	**[IGBT NTC Temp5]** Displays the temperature measured in IGBT module 5.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1°C
		336	**[IGBT NTC Temp6]** Displays the temperature measured in IGBT module 6.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1°C
		337	**[IGBT NTC Temp7]** Displays the temperature measured in IGBT module 7.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1°C
		338	**[IGBT NTC Temp8]** Displays the temperature measured in IGBT module 8.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1°C
		339	**[Coldplate Temp2]** Displays the temperature measured on the second coldplate.	Default: Read Only Min/Max: -3276.7/+3276.7 Units: 0.1°C
	Digital Inputs	350	**[Dig In Status]** A set of bits displaying the status of the digital input. Bit Definition: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 Sel Switch Aux Input Default: x x x x x x x x x x x x x x 0 0 Bit: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 0 = Disabled 1 = Enabled x = Reserved • Bit 0 (Aux Input) is set when Aux Input is on. • Bit 1 (Sel Switch) is set when the DPI SLAVE/MASTER switch on the Active Converter control PCB assembly (Figure 1.3 on page 1-5) is in the DPI MASTER position (Stand Alone operation).	Read Only
		351	**[Dig In Frc Mask]** A set of bits to select which input bits are forced. Bit Definition: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 Sel Switch Aux Input Default: x x x x x x x x x x x x x x 0 0 Bit: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 0 = Disabled 1 = Enabled x = Reserved • Bit 0 (Aux Input) – Enables forcing of the Aux Input signal. This feature requires a password to operate. • Bit 1 (Sel Switch) – Enables forcing of the DPI SLAVE/MASTER switch signal on the Active Converter control PCB assembly (Figure 1.3 on page 1-5). This feature requires a password to operate.	

File	Group	No.	Parameter Name & Description	Values
INPUTS & OUTPUTS	Digital Inputs	352	**[Dig In Frc Data]** A set of bits to select the state of the input bits that are forced. Bit Definition: Sel Switch, Aux Input Default: x x x x x x x x x x x x x x 0 0 Bit: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 0 = Disabled 1 = Enabled x = Reserved • Bit 0 (Aux Input) sets the state of the Aux Input signal when forcing is enabled. This feature requires a password to operate. • Bit 1 (Sel Switch) sets the state of the DPI SLAVE/MASTER switch signal on the Active Converter control PCB assembly (Figure 1.3 on page 1-5) when forcing is enabled. This feature requires a password to operate.	
	Digital Outputs	360	**[Dig Out Status]** A set of bits displaying the status of the digital output. Bit Definition: Cls Bypass, Aux Output Default: x x x x x x x x x x x x x x 0 0 Bit: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 0 = Disabled 1 = Enabled x = Reserved • Bit 0 (Aux Output) is set when Aux Output is on. • Bit 1 (Cls Bypass) is set when the precharge bypass contactor is closed.	Read Only
		361	**[Dig Out Frc Mask]** A set of bits to select which output bits are forced. Bit Definition: Cls Bypass, Aux Output Default: x x x x x x x x x x x x x x 0 0 Bit: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 0 = Disabled 1 = Enabled x = Reserved • Bit 0 (Aux Output) – Enables forcing of the Aux Output signal. This feature requires a password to operate. • Bit 1 (Cls Bypass) – Enables forcing of the Cls Bypass signal. This feature requires a password to operate.	
		362	**[Dig Out Frc Data]** A set of bits to select the state of the output bits that are forced. Bit Definition: Cls Bypass, Aux Output Default: x x x x x x x x x x x x x x 0 0 Bit: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 0 = Disabled 1 = Enabled x = Reserved • Bit 0 (Aux Output) sets the state of the Aux Output signal when forcing is enabled. This feature requires a password to operate. • Bit 1 (Cls Bypass) sets the state of the Cls Bypass signal when forcing is enabled. This feature requires a password to operate.	

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Notes:

Troubleshooting

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

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Faults and Alarms

A fault is a condition that stops the Converter. There are two fault types.

Type	Fault Description	
①	Reserved for future.	
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 Converter. All alarms are configurable using parameter 260 - [Alarm Config].

Manually Clearing Faults

Step	Key(s)
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 239 - [Fault Clear] to “1 = Clear Faults.” • “Clear Faults” on the HIM Diagnostic menu.	

Fault Descriptions

The PowerFlex 700L Active Converter Power Module tests for many different conditions to detect abnormal operation. The following Active Converter faults are listed by name, fault code number, type, description of the condition, and corrective action required by the user where applicable.

With the ability to connect larger frame size power structures in parallel, each structure has independent fault detection to indicate the source of the problem (for example, PS1 for Primary Converter and PS2 for Secondary Converter).

Table 4.A Fault Types, Descriptions, and Actions

Fault	No.	Type [1]	Description	Action
Converter Control Board Hardware Faults				
HW Over Current	1		Control board detected excessive phase current.	Verify AC line power quality.
HW Over Voltage	2		Control board detected excessive phase DC Link voltage.	Verify regenerating current limit is not being exceeded.
HW Ground Fault	3		Control board detected a ground fault.	Verify motor insulation.
HW Disabled	4		Control board detected phase current that did not sum to 0.	Verify control board enable is present.
HW Latch Error	5		Control board detected excessive an unidentified fault.	Contact Technical Support.
Sequencing Faults				
Precharge Open	6		The precharge contactor opened when it was commanded closed.	Verify operation of the precharge contactor.
Precharge Closed	7		The precharge contactor closed when it was commanded open.	Verify operation of the precharge contactor.
Communication Faults				
DPI Mstr ComLoss	8		DPI communication with the Inverter was lost.	Verify DPI cable installation.
Inverter Flt	9		Inverter detected a fault.	
Power Structure Faults				
PS1 DSAT Phase R	10		Power Structure 1 detected a Dsat fault on phase R. [2]	Contact Technical Support.
PS1 DSAT Phase S	11		Power Structure 1 detected a Dsat fault on phase S. [2]	Contact Technical Support.
PS1 DSAT Phase T	12		Power Structure 1 detected a Dsat fault on phase T. [2]	Contact Technical Support.
PS1 Over Current	13		Power Structure 1 detected excessive phase current. [2]	Verify AC line power quality.
PS1 Over Voltage	14		Power Structure 1 detected excessive DC Link voltage. [2]	Verify regenerating current limit is not being exceeded.
PS1 Asym DC Link	15		Power Structure 1 detected an asymmetrical DC Link voltage. [2]	Verify load balance resistors.
PS1 Power Supply	16		Power Structure 1 detected power supply out of tolerance. [2]	Replace power supply if problem persists.
PS1 HW Disable	17		Power Structure 1 detected excessive phase current. [2]	Verify drive enable is present.
PS1 Latch Error	18		Power Structure 1 detected an unidentified fault. [2]	Contact Technical Support.
PS2 DSAT Phase R	20		Power Structure 2 detected a Dsat fault on phase R. [3]	Contact Technical Support.
PS2 DSAT Phase S	21		Power Structure 2 detected a Dsat fault on phase S. [3]	Contact Technical Support.
PS2 DSAT Phase T	22		Power Structure 2 detected a Dsat fault on phase T. [3]	Contact Technical Support.
PS2 Over Current	23		Power Structure 2 detected excessive phase current. [3]	Verify AC line power quality.
PS2 Over Voltage	24		Power Structure 2 detected excessive DC Link voltage. [3]	Verify regenerating current limit is not being exceeded.
PS2 Asym DC Link	25		Power Structure 2 detected an asymmetrical DC Link voltage. [3]	Verify load balance resistors.
PS2 Power Supply	26		Power Structure 2 detected power supply out of tolerance. [3]	Replace power supply if problem persists.
PS2 HW Disable	27		Power Structure 1 detected excessive phase current. [3]	Verify drive enable is present.
PS2 Latch Error	28		Power Structure 1 detected an unidentified fault. [3]	Contact Technical Support.
Non-Volatile Storage Faults				
PwrBd Incompat	30	②	Power board incompatible with control board.	Load new file into power board.
PB Ver Corrupted	31	②	Power board version number is corrupted.	Load new file into power board.
Default Corruptd	32	②	Power board parameter default data file is corrupted.	Load new file into power board.
Rating Corrupted	33	②	Power board rating data file is corrupted.	Load new file into power board.
New ControlBoard	34		New Converter control board was detected.	Reset to defaults is required.
Elapsed CheckSum	35		Elapsed operation data checksum is invalid at power up.	Reset to defaults is required.
Param CheckSum	36		Parameter data checksum is invalid at power up.	Reset to defaults is required.
Param CheckSum B	37		Parameter data checksum error when writing a BYTE value.	Reset to defaults is required.
Param CheckSum W	38		Parameter data checksum error when writing a WORD value.	Reset to defaults is required.
Param CheckSum L	39		Parameter data checksum error when writing a LONG value.	Reset to defaults is required.
AC Line Synchronization Faults				
Ac Line Lost	40		AC line synchronization was lost when power turned off.	Verify proper input line voltage is present.
Ac Phase Lost	41		AC line synchronization was lost when phase was lost.	Verify proper input line voltage is present.
Ac Sync Low Vac	42		AC line synchronization was lost because voltage was low.	Verify proper input line voltage is present.
Ac Sync Low Freq	43		AC line synchronization was lost because frequency was low.	Verify proper input line voltage is present.
Ac Sync High Freq	44		AC line synchronization was lost because frequency was high.	Verify proper input line voltage is present.
Ac Sync Conflict	45		Conflict in AC line synchronization state machine.	Contact Technical Support.

Fault	No.	Type [1]	Description	Action
PWM Sync Lost	46	③	PWM Carrier synchronization was lost.	Verify wiring of carrier synchronization cable.
Variations in the AC Line Faults				
Ac Low Voltage	50	③	AC line voltage was below the configured limit for the configured time.	Verify proper input line voltage is present.
Ac High Voltage	51	③	AC line voltage exceeded the configured limit for the configured time.	Verify proper input line voltage is present.
Ac Low Frequency	52	③	AC line frequency was below the configured limit for the configured time.	Verify proper input line voltage is present.
Ac HighFrequency	53	③	AC line frequency exceeded the configured limit for the configured time.	Verify proper input line voltage is present.
Ac High dFdt	54	③	Change in line frequency exceeded the configured limit.	Verify proper input line voltage is present.
Ac I Imbalance	55	③	AC current balance exceeded the configured limit for the configured time.	Verify proper input line voltage is present.
Ac V Imbalance	56	③	AC voltage balance exceeded the configured limit for the configured time.	Verify proper input line voltage is present.
DcLink Low Volt	57		DC link voltage was below the precharge open level.	Verify proper input line voltage is present.
Ride Thru Expire	58		Power dip ride through expired with precharge open.	Verify proper input line voltage is present.
Ride Thru Expire	59		Power dip ride through expired with precharge closed.	Verify proper input line voltage is present.
Overload Faults				
IT Over Load	60		Operating current levels exceeded the rated overload.	Verify proper input line voltage is present.
Ambnt Over Temp	61		Measured ambient temperature exceeded the maximum limit.	
Base Over Temp	62		IGBT base temperature exceeded the maximum limit.	Verify required drive cooling is present.
Junct Over Temp	63		IGBT junction temperature exceeded the maximum limit.	Verify required drive cooling is present.
Ntc Range Low	64		NTC temperature outside below rated temperature range.	Check for open or shorted NTC device.
Ntc Range High	65		NTC temperature outside above rated temperature range.	Check for open or shorted NTC device.
PS1 Fan Loss	66		Power Structure 1 detected a circulating fan was lost. [2]	Verify internal circulating fans are turning.
PS1 Reactor Temp	67		Power Structure 1 detected the reactor thermal switch opened. [2]	Verify reactor cooling fans are turning.
PS2 Fan Loss	68		Power Structure 2 detected a circulating fan was lost. [3]	Verify internal circulating fans are turning.
PS2 Reactor Temp	69		Power Structure 2 detected the reactor thermal switch opened. [3]	Verify reactor cooling fans are turning.
Input Filter Fault				
FiltCap Contactr	70		The detected state (open/closed) of the input filter capacitor bank contactor does not match the commanded state.	Verify wiring of filter capacitor contactor.
Stand Alone Unit (DPI MASTER) Faults				
Port 1 Adapter	71		The communication card has detected a fault on the network. [4]	Check DPI device event queue and corresponding fault information for the device.
Port 2 Adapter	72		The communication card has detected a fault on the network. [4]	
Port 3 Adapter	73		The communication card has detected a fault on the network. [4]	
Port 4 Adapter	74		The communication card has detected a fault on the network. [4]	
Port 5 Adapter	75		The communication card has detected a fault on the network. [4]	
Port 6 Adapter	76		The communication card has detected a fault on the network. [4]	
Port 1 DPI Loss	81		The DPI communication to a peripheral was lost. [4]	1. If adapter was not intentionally disconnected, check wiring to the port. Replace wiring, port expander, adapters, Main Control Board, or complete Converter as required. 2. Check 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 [Logic Mask] bit for the adapter to "0."
Port 2 DPI Loss	82		The DPI communication to a peripheral was lost. [4]	
Port 3 DPI Loss	83		The DPI communication to a peripheral was lost. [4]	
Port 4 DPI Loss	84		The DPI communication to a peripheral was lost. [4]	
Port 5 DPI Loss	85		The DPI communication to a peripheral was lost. [4]	
Port 6 DPI Loss	86		The DPI communication to a peripheral was lost. [4]	

[1] See page 4-1 for a description of fault types.

[2] These faults only apply to Frame 3 power structures.

[3] These faults are reserved for future use.

[4] These faults only apply when operating the Active Converter as a Stand Alone unit (DPI Master).

Table 4.B Fault Cross Reference – By Number

No. (1)	Fault
1	HW Over Current
2	HW Over Voltage
3	HW Ground Fault
4	HW Disabled
5	HW Latch Error
6	Precharge Open
7	Precharge Closed
8	DPI Mstr ComLoss
9	Inverter Flt
10	PS1 DSAT Phase R
11	PS1 DSAT Phase S
12	PS1 DSAT Phase T
13	PS1 Over Current
14	PS1 Over Voltage
15	PS1 Asym DC Link
16	PS1 Power Supply
17	PS1 HW Disable
18	PS1 Latch Error
20	PS2 DSAT Phase R
21	PS2 DSAT Phase S

No.(1)	Fault
22	PS2 DSAT Phase T
23	PS2 Over Current
24	PS2 Over Voltage
25	PS2 Asym DC Link
26	PS2 Power Supply
27	PS2 HW Disable
28	PS2 Latch Error
30	PwrBd Incompat
31	PB Ver Corrupted
32	Default Corruptd
33	Rating Corrupted
34	New ControlBoard
35	Elapsed CheckSum
36	Param CheckSum
37	Param CheckSum B
38	Param CheckSum W
39	Param CheckSum L
40	Ac Line Lost
41	Ac Phase Lost
42	Ac Sync Low Vac

No.(1)	Fault
43	Ac Sync Low Freq
44	Ac Sync High Freq
45	Ac Sync Conflict
46	PWM Sync Lost
50	Ac Low Voltage
51	Ac High Voltage
52	Ac Low Frequency
53	Ac HighFrequency
54	Ac High dFdt
55	Ac I Imbalance
56	Ac V Imbalance
57	DcLink Low Volt
58	Ride Thru Expire
59	Ride Thru Expire
60	IT Over Load
61	Ambnt Over Temp
62	Base Over Temp
63	Junct Over Temp
64	Ntc Range Low
65	Ntc Range High

No.(1)	Fault
66	PS1 Fan Loss
67	PS1 Reactor Temp
68	PS2 Fan Loss
69	PS2 Reactor Temp
70	FiltCap Contactr
71	Port 1 Adapter
72	Port 2 Adapter
73	Port 3 Adapter
74	Port 4 Adapter
75	Port 5 Adapter
76	Port 6 Adapter
81	Port 1 DPI Loss
82	Port 2 DPI Loss
83	Port 3 DPI Loss
84	Port 4 DPI Loss
85	Port 5 DPI Loss
86	Port 6 DPI Loss

(1) Fault numbers not listed are reserved for future use.

Clearing Alarms

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

Alarm Descriptions

All Active Converter alarms are configurable using parameter 260 - [Alarm Config]. The status of the alarms can be viewed using parameter 211 - [Alarm Status].

Table 4.C Alarm Descriptions for Parameter 211 - [Alarm Status] Bits

Bit	Bit Definition	Description
0	Ac Low Volt	Bit 0 is set when the average AC Line Voltage is less than the limit in parameter 112 - [Low Vac Lmt].
1	Ac High Volt	Bit 1 is set when the average AC Line Voltage exceeds the limit in parameter 114 - [High Vac Lmt].
2	Ac Low Freq	Bit 2 is set when the AC Line Frequency is less than the limit in parameter 131 - [AC Low Freq Lmt].
3	Ac High Freq	Bit 3 is set when the AC Line Frequency exceeds the limit in parameter 133 - [AC High Freq Lmt].
4	Ac High dFdt	Bit 4 is set when the AC Line Frequency is changing faster than the limit in parameter 135 - [AC Maximum dF/dt].
5	I Imbalance	Bit 5 is set when the phase current imbalance exceeds the limit in parameter 103 - [I Imbalance Lmt].
6	V Imbalance	Bit 6 is set when the phase voltage imbalance is greater than the limit in parameter 116 - [V Imbalance Lmt].
7	IT Overload	Bit 7 is set when the Overload counter is greater than 90%.
8	Ambient Temp	Bit 8 is set when the ambient temperature exceeds the limit in parameter 120 - [Ambnt Temp Alrm].
9	Base Temp	Bit 9 is set when the IGBT base temperature exceeds the limit in parameter 122 - [Base Temp Alrm].
10	Junction Temp	Bit 10 is set when the IGBT junction temperature exceeds the limit in parameter 124 - [Junct Temp Alrm].
11	Coldplate Temp	Bit 11 is set when the coldplate temperature is less than the limit in parameter 126 - [CldPlt Temp Alrm].
12	PWM SyncLoss	Bit 12 is set when PWM carrier synchronization is lost.
13	Reserved	
14	Reserved	
15	Start Inhibit	Bit 15 is set when one or more start inhibits are present.

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