RELIANCE ELECTRIC

AutoMax™ Network Communication Option Board For Use With FlexPak™ 3000 DC Drives and WebPak™ 3000 DC Drives

M/N 915FK0101

Instruction Manual D2-3318-5

Rockwell Automation

The information in this manual is subject to change without notice.

Throughout this manual, the following notes are used to alert you to safety considerations:

ATTENTION: Identifies information about practices or circumstances that can 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.

The thick black bar shown in the outside margin of this page will be used throughout this instruction manual to identify new or revised text or figures.

ATTENTION: Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this manual and other applicable manuals in their entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.

ATTENTION: Do not install modification kits with power applied to the drive. Disconnect and lock out incoming power before attempting such installation or removal. Failure to observe this precaution could result in severe bodily injury or loss of life.

ATTENTION: The user must provide an external, hardwired emergency stop circuit outside of the drive circuitry. This circuit must disable the system in case of improper operation. Uncontrolled machine operation may result if this procedure is not followed. Failure to observe this precaution could result in bodily injury.

ATTENTION: The drive contains ESD- (Electrostatic Discharge) sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing, or repairing the drive. Erratic machine operation and damage to, or destruction of, equipment can result if this procedure is not followed. Failure to observe this precaution can result in bodily injury.

ATTENTION: The user is responsible for conforming with all applicable local, national, and international codes. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

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CHAPTER 1

Introduction

This manual describes the AutoMax™ Network Communication Option Board (M/N 915FK0101). This board enables a FlexPak™ 3000 or a WebPak™ 3000 DC drive to be operated and monitored over the AutoMax network.

For normal operation, the drive can be completely controlled using the AutoMax Network Option board. This allows use of only a network interface connection, hardwired emergency stop, and three-phase input and output power wiring. Drive control (such as start, stop, and reset), reference changes, parameter modification, and drive monitoring can all be performed over the AutoMax network.

1.1 Before You Start

In this manual, parameters are shown by the parameter name used on the OIM, followed by the parameter number in parentheses. For example, the parameter to set acceleration time, parameter P.001, is shown as ACCELERATION TIME (P.001).

1.2 Where to Find Additional Information

You must be familiar with the instruction manuals that describe your system. This can include, but is not limited to:

- FlexPak 3000 DC Drive Hardware Reference manual, D2-3404.
- FlexPak 3000 DC Drive Software Reference manual, D2-3405.
- WebPak 3000 DC Drive Hardware Reference manual, D2-3443.
- WebPak 3000 DC Drive Software Reference manual, D2-3444.
- AutoMax Network Communications Module manual, D2-3001.
- ReSource AutoMax Programming Executive Instruction manual (various part numbers).
- Control and Configuration Software manual, D2-3348.
- WebPakCS Software manual, D2-3447.

1.3 Getting Assistance from Reliance Electric

If you have any questions or problems with the products described in this instruction manual, contact your local Reliance Electric sales office. For technical assistance, call 1-800-726-8112.

1.4 Related Hardware and Software

When the Network Option board is installed in a FlexPak 3000 or WebPak 3000 drive, the drive can be used with the hardware and software listed in table 1.1.

Table 1.1 – Hardware and Software Options Available for the Network Option Board (Purchased Separately)

Option Name	Model #	Description
75 Ohm Terminating Load	45C71	A terminating load is required at both ends of an AutoMax network coaxial cable system.
AutoMax Processor	57C430A 55C431 57C435	
AutoMax Programming Executive	Various	Includes the tools required for programming in Enhanced BASIC, Control Block, and Ladder Logic/PC languages.
Communications Passive Tap	57C380	Required at each network drop for connection to coaxial cabling.
Control and Configuration Software (FlexPak Drives Only)	2CS3000	Windows-based software that enables you to connect any personal computer running Microsoft Windows version 3.1 or later to a FlexPak 3000 drive. Enables you to create, store, upload, and download drive configurations.
WebPakCS Software (WebPak 3000 Drives Only)	?	Windows-based software that enables you to connect any personal computer running Microsoft Windows version 9x or later (including NT) and Internet Explorer vers or 5.0 or later to a WebPak 3000 drive. Enables you to create, store, upload, and download drive configurations.
AutoMax Network Communications Module	57C404 57C404A 57C404B	The master drop (and all AutoMax rack slave drops) on the AutoMax network must contain a Network Communications module.
Network Drop Cable	57C381	Cable that connects all network drops and the passive taps.
ReSource™ Interface Cable	61C127	Cable that connects a personal computer to the AutoMax Processor module

1.5 AutoMax Network Option Board Description

The AutoMax Network Option board makes the FlexPak 3000 or WebPak 3000 drive a slave drop on the AutoMax network. It is a printed circuit board assembly that mounts inside the drive and connects to the drive's Regulator board through a ribbon cable. The Network Option board is powered from the standard drive power supply.

The Network Option board has a 9-pin D-shell connector that connects to a network drop cable (M/N 57C381). The network drop cable is then connected to a passive tap on the AutoMax network.

The board contains its own microprocessor. The microprocessor connects to one port of the board's dual-port memory. The other port interfaces with the drive's Regulator board.

The AutoMax Network Communication Option board is shown in figure 1.1.

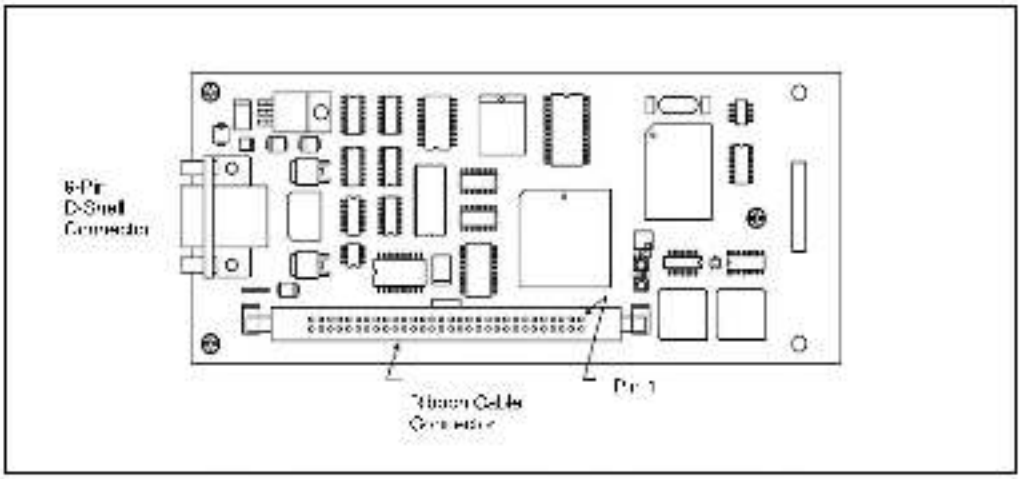

Figure 1.1 – AutoMax Network Communication Option Board

CHAPTER 2

Installation

This section describes how to install the Network Option board in the FlexPak 3000 or WebPak 3000 drive and connect the drive to an AutoMax network.

2.1 Installing the Network Option Board

ATTENTION: Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this manual and other applicable manuals in their entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.

ATTENTION: The user is responsible for conforming with all applicable local, national, and international codes. Wiring practices, grounding, disconnects, and overcurrent protection are particularly important. Failure to observe this precaution could result in severe bodily injury or loss of life.

ATTENTION: Do not install modification boards with power applied to the drive. Disconnect and lock out incoming power before attempting such installation. Failure to observe this precaution could result in severe bodily injury or loss of life.

To install the Network Option board:

Step 1. Turn off, lock out, and tag all incoming power to the drive.

Step 2. Loosen the two (2) captive screws on the drive cover. Remove the cover.

Step 3. Loosen the captive screw on the carrier. Swing open the carrier. See figure 2.1.

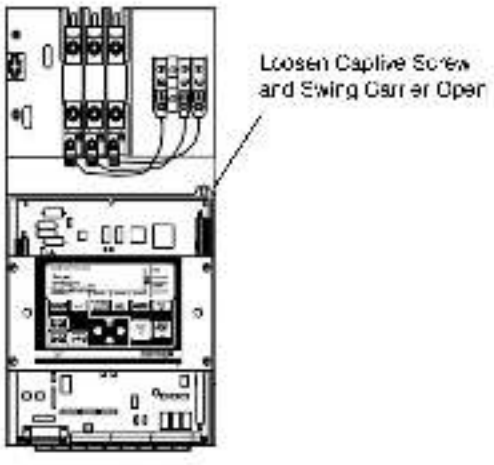

Figure 2.1 – Removing Drive Cover

Step 4. Remove the screws that attach the carrier shield to the carrier. See figure 2.2.

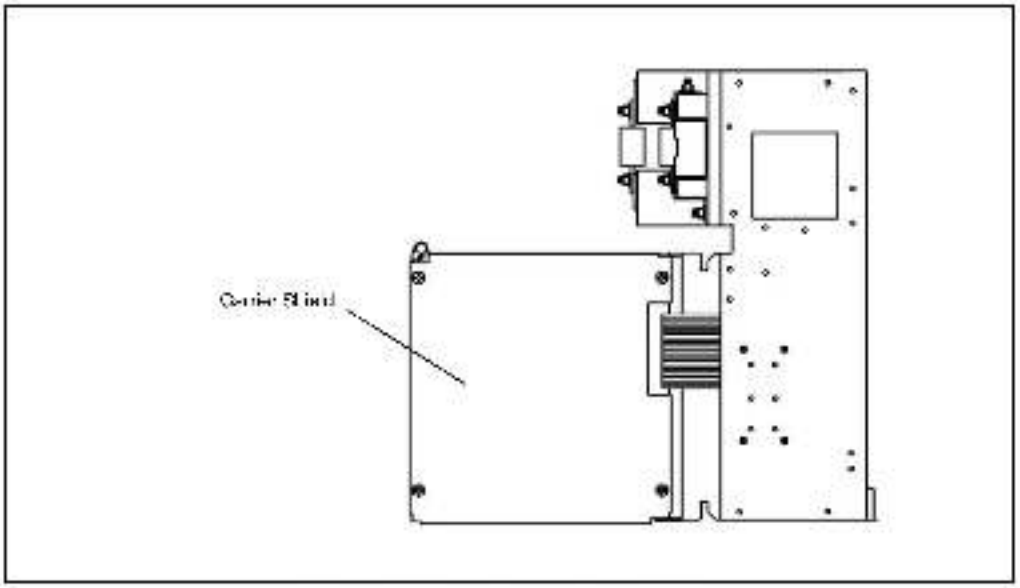

Figure 2.2 – Removing the Carrier Shield

Step 5. Remove the connector that attaches the shield ground wire to the drive power supply. Set the shield aside. See figure 2.3.

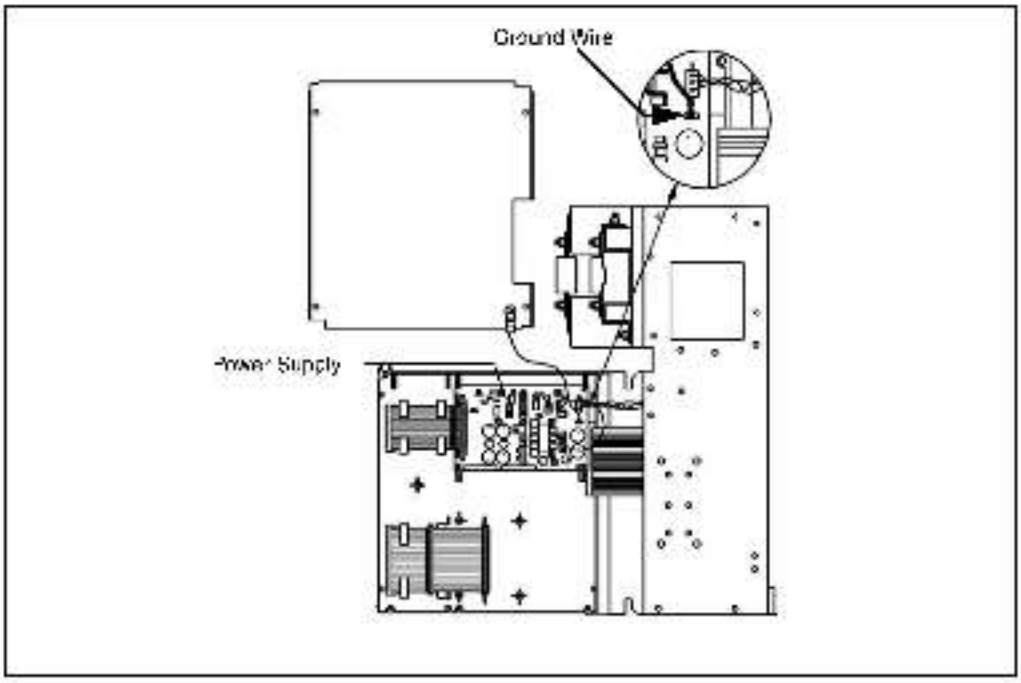

Figure 2.3 – Removing Shield Ground Wire

Step 6. Position the Network Option board over the standoffs. Refer to figure 2.4.

Step 7. Secure the Network Option board using three captive screws on the board.

Step 8. Plug the option board ribbon cable into the Network Option board.

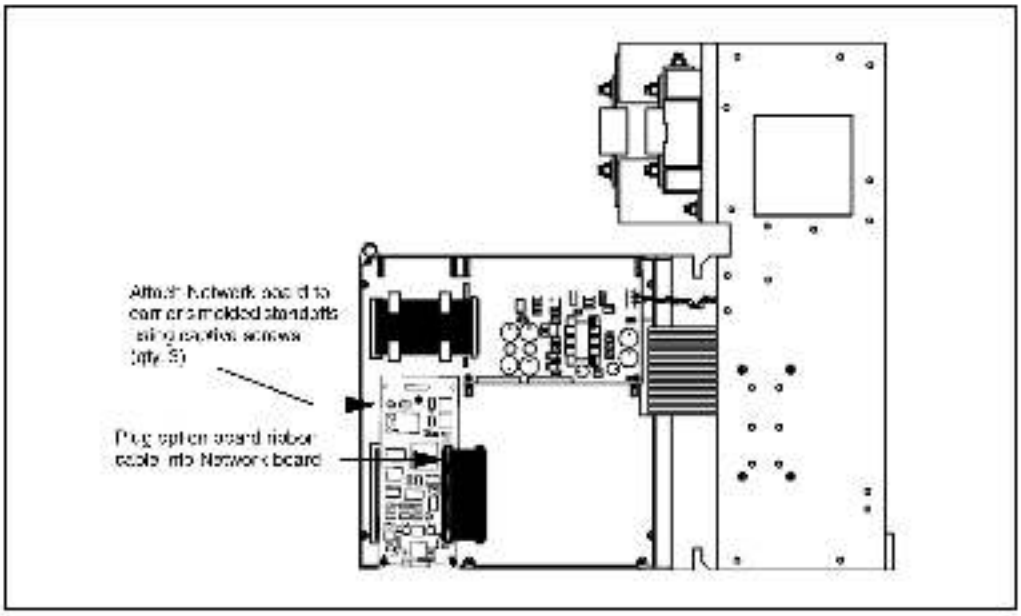

Figure 2.1 – Installing the Network Communication Option Board

Step 9. Re-attach the carrier shield ground wire to the drive power supply.

Step 10. Re-attach the carrier shield to the carrier.

Step 11. Close the carrier and fasten it with the captive screw.

Step 12. Re-install the drive cover.

2.2 Connecting the Drive to an AutoMax Network

ATTENTION: AutoMax networks with more than 5 drops might produce communication errors if 10-foot drop cables are used. Wherever possible, 3-foot drop cables or, if necessary, 5-foot drop cables should be used. Failure to observe this precaution could result in damage to, or destruction of, equipment.

See figure 2.5 for cabling and termination connections.

Refer to the Network Communications Module instruction manual (I2-3001) for a detailed description of how to add a drop to the network.

Step 1. Stop any application tasks that are running.

Step 2. Use the Network Drop Cable (M/N 57C381) to connect to the Communications Passive Tap (M/N57C380).

Step 3. If the drop is at the end of the coaxial cable system, it must be terminated. Terminate by connecting a 75 Ohm Terminating Load (M/N 45C71) to the remaining BNC connector on the passive tap.

Step 4. Remove the lockout and tag. Apply power to the drive. If a problem is detected during diagnostics, a fault or alarm will occur. See your drive software manual for information on faults and alarms.

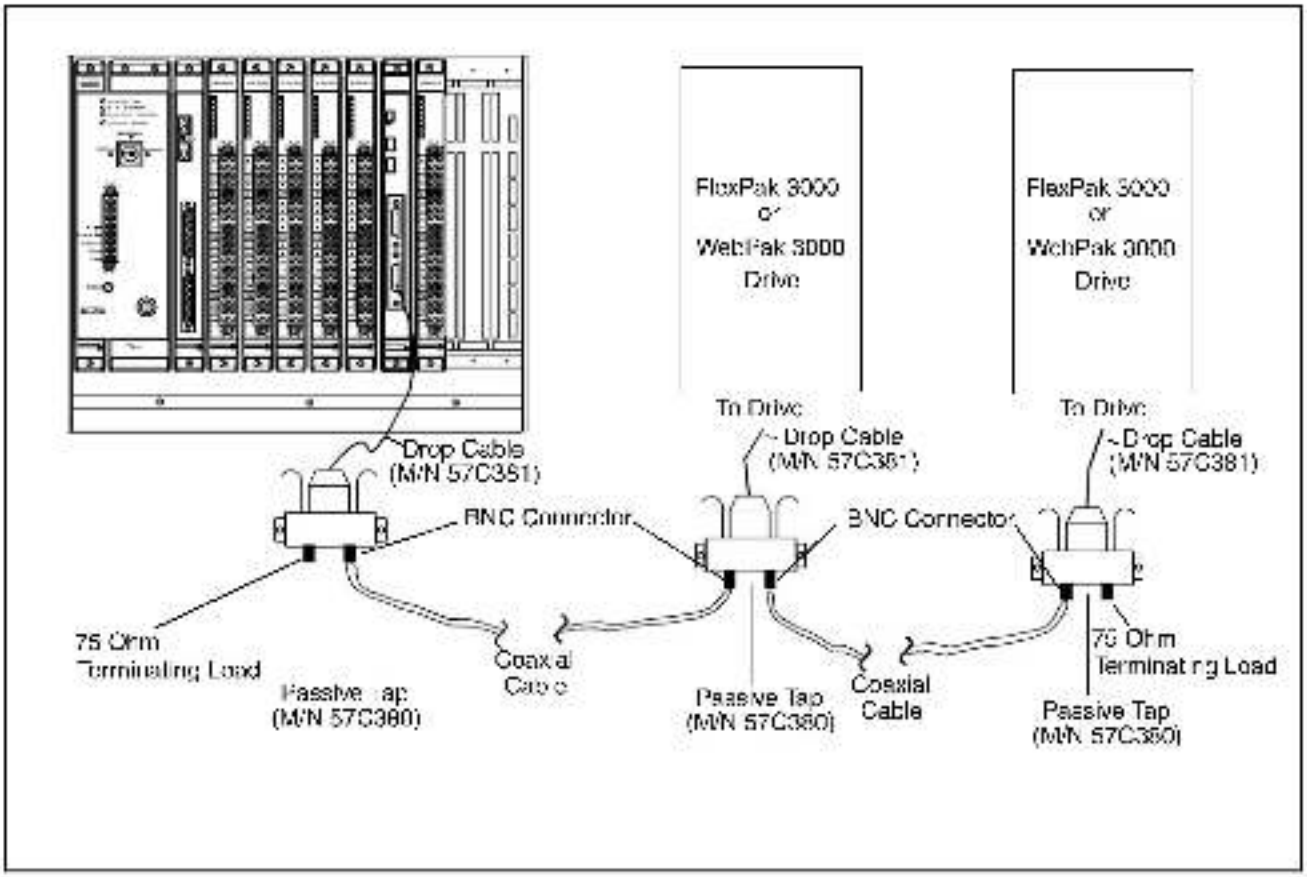

Figure 2-1 Connecting a Drive to the AutoMax Network

CHAPTER 3

Drive Configuration

This section describes how to configure a FlexPak 3000 or WebPak 3000 drive for use with an AutoMax network.

3.1 Setting Up the Drive for Network Communication

The drive becomes active on the AutoMax network after you complete the following steps:

Step 1. Connect the Network Option board to the network using a passive tap. See section 2.2.

Step 2. Apply power to the drive.

Step 3. Assign a valid AutoMax network drop number to the drive using parameter NETW DROP NUMBER (P.900). You must set this parameter through the drive keypad (OIM or DCM) or using drive configuration software (CS3000 or WebPakCS). This drop number is the base drop the drive will occupy. In this manual, the base drop number is called Drop 1.

When NETW DROP NUMBER (P.900) is set, you can set other parameters over the network.

FlexPak 3000 drives: For FULL connections, the drive occupies four sequential network drops, including Drop 1. Subsequent drops are called Drop 2, Drop 3, and Drop 4 in this manual. Your application might use different drop numbers.

WebPak 3000 drives: For FULL connections, the drive occupies three sequential network drops, including Drop 1. Subsequent drops are called Drop 2 and Drop 3 in this manual. Your application might use different drop numbers.

Step 4. Set the network connection type using NETW CONNECT TYPE (P.910). This defines the scope of data that will be communicated. It also determines the level of control that the master has with the connected drive. You can select one of two connection types:

- BASIC: Only essential drive data (reference, sequencing, basic tuning, and feedback data) are transferred over the network. This allows a higher density network with moderate functionality. Select this connection type if you do not need to completely configure the drive over the network. When BASIC is selected, the drive occupies a single network drop.
- FULL: The entire set of drive data that has been assigned network registers is transferred over the network. Select this connection type if your application must be able to configure the drive over the network and have access to most parameters, operating variables, and diagnostic information.

  The large amount of data transferred in the full connection type requires that the drive occupy multiple network drops, thus decreasing the potential number of devices on the network.

FlexPak 3000 drives: When FULL is selected, the drive will occupy four sequential network drops.

WebPak 3000 drives: When FULL is selected, the drive will occupy three sequential network drops using indirect registers in Drop 2 and Drop 3 (see section 7.1 for information about using indirect registers).

Step 5. Apply power to the AutoMax rack.

Serial communication is now established and information can be exchanged with the network master. The drive transfers output data whenever this connection is made. To transfer input data, you must complete the steps in the next section.

3.2 Selecting a Network Reference Source

AMX NETW REF SELECT (P.911) specifies the source of the speed/torque reference when CONTROL SOURCE SELECT (P.000) is set to NETWORK. You can select either:

- DIRECT: The reference is from register 33 in the drive's Drop_1 register map. See table 5.4 (FlexPak 3000 original map), table 6.4 (FlexPak 3000 alternate map), or table 7.5 (WebPak 3000 map).
- BROADCAST n: The reference is from one of the eight network broadcast data registers (network drop area 0, registers 32 to 39). The specific broadcast register (1 to 8) is assigned using a register in the drive's Drop_1 register map. See register 30 in table 5.3 (FlexPak 3000 original map), register 63 in table 6.6 (FlexPak 3000 alternate map), or register 30 in table 7.4 (WebPak 3000 map). See the Network Communications Module instruction manual (I2-3001) for information on broadcast data registers.

3.3 How the Drive Responds to a Loss of Network Communication

The Network Option board attempts to remain active on the network at all times, regardless of the control source setting.

At power up, the drive delays for approximately 10 seconds before indicating a loss of network communication.

If communication is interrupted:

- The Network Option board immediately notifies the drive Regulator.
- The Network Option board tries to re-establish communication with the network master.
- For FlexPak 3000 drives, if CONTROL SOURCE SELECT (P.000) is set to NETWORK, the drive reacts to a network communication loss as specified by NETW COMM LOSS SELECT (P.901).
- For WebPak 3000 drives, a fault is generated when network communication is lost if CONTROL SOURCE SELECT (P.000) is set to NETWORK.
- If the drive includes an OIM, the NETWORK indicator above the CONTROL SOURCE SELECT key blinks to indicate that network communication is inactive.

3.3.1 Setting NETW COMM LOSS SELECT (P.901) (FlexPak 3000 Drives Only)

ATTENTION: NETW COMM LOSS SELECT (P.901) allows you to configure the drive to continue to run if a loss of network communication occurs. You must provide some form of hardwired stop in case of communication loss, since stopping the drive over the network might not be possible. Failure to observe this precaution could result in bodily injury or damage to, or destruction of, equipment.

NETW COMM LOSS SELECT (P.901) is not used in WebPak 3000 drives. For WebPak 3000 drives, a fault is generated when network communication is lost, if CONTROL SOURCE SELECT (P.000) is set to NETWORK. This causes the drive to coast/DB stop. The drive cannot be restarted until the fault is cleared.

For FlexPak 3000 drives, NETW COMM LOSS SELECT (P.901) defines how the drive responds to network communication loss when CONTROL SOURCE SELECT (P.000) is set to network. Alarms do not cause the drive to stop. Therefore, some form of hardwired stop must be available in case of communication loss since stopping the drive over the network might not be possible.

You can set NETW COMM LOSS SELECT (P.901) to FAULT (0), USE LAST REF (1), USE TRMBLK REF (2), or USE TRMBLK CNTL (3).

P.901 = FAULT (0)

When NETW COMM LOSS SELECT (P.901) is set to FAULT and network communication is lost, the following occurs:

- The drive latches a fault condition and performs a coast/DB stop.
- A NETWORK COMMUNICATION LOSS fault is generated.

When network communication is re-established, you must reset the fault before the drive can be re-started. See the drive software manual for information on resetting faults.

ATTENTION: The drive is not equipped with a coast-stop pushbutton. You must install a hardwired operator-accesible pushbutton that provides a positive interrupt and shuts down the drive. Failure to observe this precaution could result in bodily injury.

ATTENTION: If you are using the alternate register map (NETW REGISTER MAP SEL (P.914) set to ALTERNATE) and you change the control source from NETWORK, the parameters SPD LOOP PI INT SEL, SPD LOOP PI INIT VAL, and SPD LOOP PI RESET are reset to their default values (0 for each). Ensure these values are appropriate for your application before changing the control source. Failure to observe this precaution could result in severe bodily injury or loss of life.

P.901 = USE LAST REF (1)

When NETW COMM LOSS SELECT (P.901) is set to USE LAST REF and network communication is lost, the following occurs:

- The drive continues to run, using the last reference received from the network master.
- A NETWORK COMMUNICATION TIMEOUT alarm (A00004) is generated.
- An entry is made into the drive's alarm log for each active-to-inactive transition of network communication status.
- If network communication is re-established and the drive is still running, the drive will again follow the reference and sequencing control inputs supplied by the network master.

You can stop the drive using the hardwired stop input or the CIM STOP/RESET key. However, you cannot restart the drive until network communication is re-established or CONTROL SOURCE SELECT (P.000) is changed.

P.901 = USE TRMBLK REF (2)

When NETW COMM LOSS SELECT (P.901) is set to USE TERMBLK REF (2) and network communication is lost, the following occurs:

- The drive continues to run, using the auto reference value selected by AUTO REFERENCE SELECT (P.103) ***(or Regulator board terminals 19 and 20?)***
- A NETWORK COMMUNICATION TIMEOUT alarm (A000014) is generated.
- If network communication is re-established and the drive is still running, the drive will again follow the reference and sequencing control inputs supplied by the network master.

You can stop the drive using the hardwired stop input, the CIM STOP/RESET key, or the hardwired stop input (coast/DB stop, Regulator board terminal 8). However, you cannot restart the drive until network communication is re-established or CONTROL SOURCE SELECT (P.000) is changed.

P.901 = USE TRMBLK CNTL (3)

When NETW COMM LOSS SELECT (P.901) is set to USE TRMBLK CNTL (3), and network communication is lost, the following occurs:

- The drive continues to run using the Regulator board terminal strip as the source for all control (run, jog, stop, fault reset, direction, and OCL enable) and speed (auto) reference signals.
- A NETWORK COMMUNICATION TIMEOUT alarm (A000014) is generated.
- The Speed Loop PI Reset and Underwind/Overwind bits cannot be changed while operating in this mode. They will remain at the last values received from the network.

If network communication is re-established and the drive is still running, the drive will again follow the reference and sequencing control inputs supplied by the network master.

CHAPTER 4

Programming

This section describes the organization of data in the AutoMax Network Communication Option board and how the network accesses the data.

4.1 Selecting a Register Map (FlexPak 3000 Drives Only)

There are two register maps available for the FlexPak 3000 drive: original and alternate.

The original register map allows you to use programs developed for versions earlier than 4.0 of the FlexPak 3000 drive. Register assignments for the original register map are listed in chapter 5.

The alternate register map is similar to the original register map, except that the most commonly accessed data is in the base drop area (Drop_1). The alternate register map also includes functions that were added in regulator software version ***4.2***. See the *FlexPak 3000 DC Drive Software Reference Manual*, manual number D2-3405, for details on the new version ***4.2*** features. Register assignments for the alternate register map are listed in chapter 6.

Important: When a version ***4.2*** Regulator board is used as a replacement in an existing AutoMax network that uses the ALTERNATE register map, you may need to reprogram the master task so that it writes valid data in the registers that are now being used (where previously they were marked as reserved).

The register map is selected using the NETW REGISTER MAP SEL (P.914) parameter.

4.2 How the Control Source Selection Affects Data Transfers

You can use the keypad to change parameter values when CONTROL SOURCE SELECT (P.000) is set to NETWORK. However, changes made through the keypad might be overwritten when the next network update occurs.

You cannot transfer data using the CS3000 or WebPak/CS software while CONTROL SOURCE SELECT (P.000) is set to NETWORK.

4.3 About Network Transfer Rates

To transfer data, the Network Option board must be communicating with the master. To transfer input data, the Network Option board must be communicating with the master and CONTROL SOURCE SELECT (P.000) must be set to NETWORK.

Data transfer rates between the Network Option board and Regulator board depend on the type of data being transferred.

Data can be input or output data.

Input data is one of three types:

- **Control/Reference:** Data that require the fastest update rates, including data such as the sequencing inputs (Stop, Run, Jog, Fwd/Rev) and speed/torque reference. These inputs are transferred every speed loop scan period. An exception to this occurs if the drive is configured to get its torque reference from the network. If the torque reference is from the network, the drive reads the CMD reference from the Network Option board every current minor loop scan.
- **Tunable:** Data that can be changed while the drive is running, such as ACCELERATION TIME (P.001). Tunable inputs are transferred approximately every 600 msec while the drive is running or stopped.
- **Configurable:** Data that cannot be changed while the drive is running, such as CONTROL SOURCE SELECT (P.000). Configurable inputs are transferred from the Network Option board to the Regulator board approximately every 600 msec when the drive is stopped. Values sent from the network master while the drive is running are stored in Network Option board memory but are not scanned into Regulator board memory until the drive is stopped.

Output data is one of two types:

- **Runtime Signal:** Data such as the selected speed reference value, drive status (such as ready or running), drive fault flags, the state of terminal strip digital inputs, and motor status values (RPM, VOLTS, AMPS). This information is transferred every speed loop scan period.
- **Tunable, Configurable, and Status:** All other information provided by the drive. This typically includes all stored drive parameter values. Tunable, configurable, and status data are transferred approximately every 600 msec.

Output data is transferred from the Regulator board to the Network Option board regardless of the status of AutoMax network communication (active or inactive) or the selected drive control source (KEYPAD, TERMBLK, or NETWORK).

For FlexPak 3000 drives, the speed loop scan period is 10 msec when FEEDBACK SELECT (P.200) is set to ARMATURE VOLT. It is 5 msec when FEEDBACK SELECT (P.200) is set to any other value.

For WebPak 3000 drives, the speed loop scan period is 10 msec.

4.3.1 I/O Update Enable Logic Summary

The logic strings shown in Figure 4.1 summarize the output and input enable logic described in this chapter.

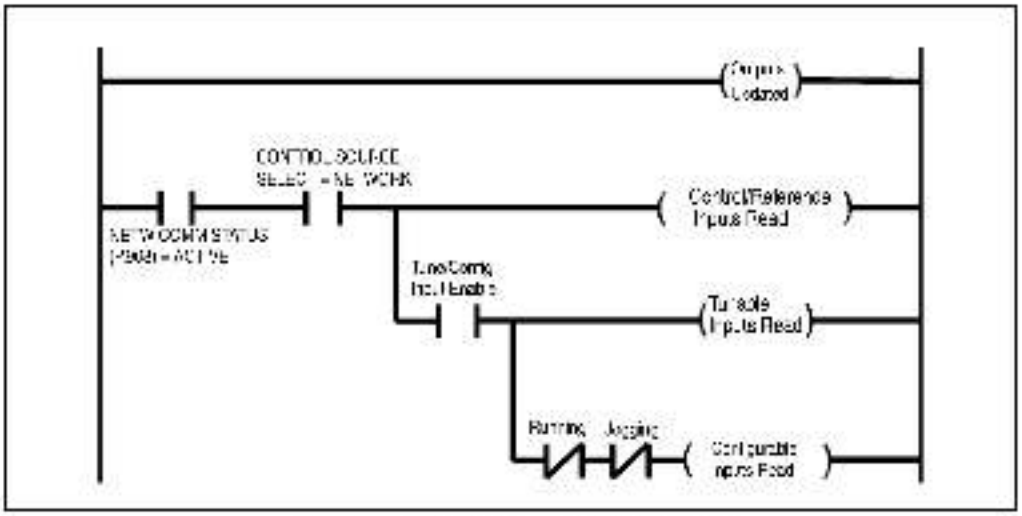

Figure 4.1 – I/O Update Enable Logic Strings

4.4 Setting Up Data Types That Can Be Transferred

You must enable the transfer of tunable and configurable inputs from the Network Option board to the Regulator board. Until you enable transfer, only control/reference data are read by the Regulator board.

To enable transfer of tunable and configurable data, set the network-master-controlled Tune/Config Input Enable bit (Drop 1, register 32, bit 14) to 1.

For example, the master application program would typically:

1. Initialize the tunable and configurable input data in the dual-port memory of the master's Network module
2. Delay for an appropriate amount of time to ensure data have been transferred to the drive
3. Set the Tune/Config Input Enable bit to 1.

If you only want to transfer control/reference data, leave the Tune/Config Input Enable bit at 0 (off). This forces you to configure the drive through another source, such as the DIM, CS3000 software, or WebPakCS software, but allows you to control the drive (including RUN, JOG, STOP, RESET, and the reference) from the network master.

4.5 Tune/Config Update Synchronization Flag

This flag allows the network master application program to track when the drive has updated tunable and configurable inputs. By toggling the tune/config update synchronization flag in the master and monitoring the copied value from the drive, the master's program can determine when the drive has read in that data. This feature has no affect on drive operation.

The drive regulator copies the tune/config update synchronization flag bit to its corresponding loopback bit after it has read in and processed all tunable input registers. Configurable inputs are only read in by the drive while it is not running. This will not affect copying the synchronization flag to the loopback bit, since tunable inputs will still be transferred.

When using WebPak 3000 indirect parameters, use the tune/config update synchronization flag with the network synchronization flag as described in section 7.1.

To use the synchronization flag, the tune/config input enable bit must be set to 1.

To determine when changes to tunable and configurable data in the drive have been completed, the master:

1. Modifies the tunable and configurable register data in the appropriate network registers.
2. Sets the tune/config input enable flag.
3. Toggles the tune/config update synchronization flag.
4. Monitors the tune/config update synchronization flag loopback bit until it equals the value written in item 3. above.

The tune/config update synchronization flag is defined in the first drop of the drive network drop connection. Therefore, it can only be used to indicate when data for the first drop has been read in and processed by the drive.

Table 4.1 Synchronization Flag Register Locations (Alternate and Original Register Maps)

Flag	Drop	Register	Bit
Tune/Config Update Synchronization Flag Loopback (Master Read) Bit	Drop_1	0	7
Tune/Config Update Synchronization Flag (Master Write)	Drop_1	32	15
Tune/Config Input Enable Bit	Drop_1	32	14

Alternative Synchronization Methods

The tune/config update synchronization flag applies only to Drop_1. To determine if the drive received data written to other drops, you must use other methods.

One method is to program a delay after writing to the network master's memory. Calculate the delay as needed for the number of drops on the network, adding 600 msec for processing time. See your AutoMax documentation for information on calculating the delay.

Note that this method assumes that all requirements have been met for the drive to obtain its inputs from the network (see figure 4.1).

4.6 Monitoring Unacceptable Parameter Values

The parameter processing error status flag (FlexPak drives: Drop_1, register 0, bit 12; WebPak drives: Drop_1, register 0, bit 13) allows the network master to monitor parameter values that are unacceptable to the drive.

When this flag is set to 1, one or more parameters sent to the drive were rejected.

When this flag is set to 0, all parameters sent to the drive were accepted.

Note that the Tune/Config Inputs Enable bit (Drop_1, register 32, bit 14) must be set to 1 before the drive will read or process any tune/config parameters. The parameter processing error flag is updated approximately every 600 msec.

More information on parameter processing errors is available when using the FlexPak 3000 alternate register map (see section 6.2) or the WebPak 3000 register map (see section 7.1).

4.7 Timing Requirements

The amount of time required by the network master to transmit data to the drive depends on the number of active drops on the network. This time is referred to as the "data update time." Refer to I/M J2-3001 for details on calculating this time.

Tunable and configurable drive input register values must be maintained by the network master's application program for the data update time plus at least 600 msec to assure that they are read by the drive.

Most of the control/reference data types do not have this 600 msec requirement because they are read by the drive every 5 or 10 msec.

To start the drive, the Run and Jog inputs must be set to 0 for at least 20 msec, then set to 1 for at least 20 msec (a 0-to-1 transition). The drive might delay the start for up to 100 msec after receiving the 0-to-1 transition because of variable processing delays.

For the following actions, the inputs must be set to 0 for at least 600 msec, then set to 1 for at least 600 msec (a 0-to-1 transition):

- Fault log clear
- Alarm log clear
- Alarm reset
- Memory save

To reset faults, the inputs must be set to 0 for at least 10 msec, then set to 1 for at least 10 msec (a 0-to-1 transition).

4.8 Drive Ready Status Bit

The Drive Ready status bit (Drop_1, register 0, bit 0) indicates that a 0-to-1 transition on the Run or Jog input will start the drive.

FlexPak 3000 drives: The Drive Ready bit is ON (1) when all of the following conditions are met, and OFF (0) if any one of these conditions is not met:

- No drive faults are active (Drop_1, register 0, bit 2 = 0)
- Network stop input is de-asserted (Drop_1, register 32, bit 1 = 1)
- Front-panel STOP/RESET button is not pressed
- Coast/DB Stop terminal strip input is closed (Drop_1, register 0, bit 10 = 1)
- Customer Interlock terminal strip input is closed (Drop_1, register 0, bit 11 = 1)
- A download from the serial port (using the CS3000 software) is not in progress

WebPak 3000 drives: The Drive Ready bit is on (1) when all of the following conditions are met, and off (0) if any one of these conditions is not met:

-
-

4.9 Display of Parameter Values Over the AutoMax Network

The display of parameter values on the network will be different than the display when on the OIM, DCM, or when using CS3000 or WebPakCS software.

Examples of these differences are shown in table 4.2. Refer to the register maps in chapters 5 and 6 for detail on the scaling parameter for transfer over the AutoMax network. ***(Does this table need to be revised for WebPak?)***

Table 4.2 – Front Panel Display Compared to Network Displays

Front Panel Display (OIM or DCM)		Network Value	Register Map Table Listing Example
Description	Example		
Values with a decimal point	Set MOTOR RATED ARM AMPS (P.008) to 27.3 amps.	273	amps * 10
Parameters with text choices	TRIM MODE SELECT (P.110) choices are NO TRIM, INCREMENTAL, or PROPORTIONAL.	0, 1, 2	0 = NO TRIM 1 = INCREMENTAL 2 = PROPORTIONAL
Speed/voltage loop and current minor loop parameters	TOP SPEED (P.011) = 1750 RPM. On the front panel, you read SPD LOOP FEEDBACK (P.296) = 1000 RPM.	3840 = (4095 / 1000 / 1750)	4095 at TOP SPEED (P.011)*

* For speed parameters, a value of 4095 corresponds to TOP SPEED (P.011). For load parameters, 4095 corresponds to MAXIMUM CURRENT (P.007).

4.10 Parameters That Are Not Accessible Over the AutoMax Network

These FlexPak 3000 parameters are not accessible over the AutoMax network at any time.

ANALOG MAN REFERENCE (P.192)
ANLG OUT 1 SIG TYPE (P.419)
^ARMATURE DELTA (P.399)
^CML ERROR (P.398)
^CML FEEDBACK (P.397)
^CT TURNS RATIO (P.810)
^CURRENT COMPOUND TP (P.293)
DEVNET POLL MSG TYPE (P.913)
DIG IN 8 (P.490)
^DRAW PERCENTAGE OUT (P.196)
^FIELD DELTA (P.588)
^FIELD DELTA HIGH LIM (P.587)
^FLD CURRENT REGULATOR (P.586)
^I/O EXPANSION KIT (P.797)
^INV FAULT AVOID SEL (P.312)
^IR COMPENSATION TP (P.290)
^J11 ANLG TACH VLT SCL (P.792)
^J14 ANLG TACH VLT RNG (P.793)
^J15 REGULATOR TYPE (P.799)
^J18 ARM FLD RESISTOR (P.395)
J20 FIELD LOSS DETECT (P.597)
J21 FLD SUPPLY JUMPER (P.598)
^JOG OFF DELAY TIME (P.121)
^JOG RAMP OUTPUT (P.294)
JOG SPEED 2 (P.017)
^LEVEL DETECT 1 OUTPUT (P.618)
^LEVEL DETECT 2 OUTPUT (P.619)
MANUAL REF SELECT (P.106)
METER OUT 1 GAIN ADJ (P.100)
METER OUT 1 SELECT (P.104)
METER OUT 1 ZERO ADJ (P.102)
METER OUT 2 GAIN ADJ (P.101)
METER OUT 2 SELECT (P.105)
METER OUT 2 ZERO ADJ (P.103)
MOP ACCEL TIME (P.115)
MOP DECEL TIME (P.120)
MOP OUTPUT (P.191)
MOP RESET ENABLE (P.116)
^NETW COMM STATUS (P.908)
^NETW DROP NUMBER (P.900)
^NETW IN REG 1 (P.905)
^NETW IN REG 2 (P.906)
^NETW IN REG 3 (P.907)
^NETW TYPE & VERSION (P.909)
NETWORK BAUD RATE (P.912)
^NETWORK KIT (P.796)
OCL ENABLE (P.849)
OCL FEEDBACK (P.847)
OCL REFERENCE (P.845)
^PHASE LOSS TEST DELTA (P.309)
^PHASE LOSS TST BRIDGE (P.310)
^POWER UNIT TYPE (P.795)
PRESET SPEED 1 (P.117)
PRESET SPEED 2 (P.118)
PRESET SPEED 3 (P.119)
PULSE TACHOMETER KIT (P.798)
^SELF TUNE BRIDGE (P.220)
SELF TUNE FIELD RANGE (P.218)
^SELF TUNE STABILITY (P.219)
^SPD LOOP LAG OUTPUT (P.298)
^SPEED RAMP INPUT TP (P.198)
^SPEED RAMP OUTPUT (P.199)
^TACH LEAD FLT DELAY (P.228)
^TACH LEAD FLT THRESH (P.227)
^TORQUE REFERENCE (P.189)
^CNF PROG/RUN MODE (P.915)

**** Indicates WebPak parameters. Are there other WebPak parameters? Should we make separate sections for WebPak and FlexPak?***

4.11 Parameters That Are Only Available in the FlexPak Alternate Register Map

RAMP STOP DECEL TIME (P.018)
STOP DECEL SELECT (P.122)
NEG CLR LIM INV EN (P.226)
CML REF LIMIT SELECT (P.311)
INV FAULT AVOID SEL (P.312)
DIG IN 8 SELECT (P.428)
TACH LOSS SCR ANGLE (P.608)
PHASE LOSS DETECT (P.609)
OCL PROP TRIM SELECT (P.813)
OCL TYPE3 POSN REG EN (P.814)
NETW REGISTER MAP SEL (P.914)
SPD LOOP P_INT SEL
SPD LOOP P_INT VAL
SPD LOOP P_RESET
UNDERWIND ENABLE
Process Error Parameter Number

4.12 Settings for Analog and Frequency Outputs

These are the options you can set for the I/O Expansion Kit analog and frequency output parameters.

0=CML FEEDBACK (P.397)
1=CML REFERENCE (P.396)
2=CML ERROR (P.398)
3=SPD LOOP FEEDBACK (P.296)
4=SPD LOOP REFERENCE (P.295)
5=SPD LOOP ERROR (P.297)
6=SPD LOOP OUTPUT (P.299)
7=SPEED RAMP OUTPUT (P.199)
8=SPEED RAMP INPUT TP (P.198)
9=SPD SOURCE SELECT OUT (P.193)
10=TRIM OUTPUT (P.197)
11=ARMATURE VOLTAGE (P.289)
12=ANALOG TACH FEEDBACK (P.291)
13=PULSE TACH FEEDBACK (P.292)
14=ZERO
15=FULL SCALE
16=POWER OUTPUT
17=OCL REFERENCE (P.845)
18=OCL RAMP OUTPUT (P.846)
19=OCL FEEDBACK (P.847)
20=OCL OUTPUT (P.848)
21=FIELD REFERENCE (P.590)
22=FIELD FEEDBACK (P.589)
23=NETW IN REG 1 (P.905)
24=NETW IN REG 2 (P.906)
25=NETW IN REG 3 (P.907)

Same for WebPak?

CHAPTER 5

FlexPak 3000 Drives: Original Register Map

This section lists the original register map, which allows you to use programs developed for versions earlier than 4.0 of the FlexPak 3000 drive. It also offers a different set of options in Drop 1 than the alternate register map.

Brief descriptions of parameters are in the register map tables. For detailed parameter descriptions, refer to the *FlexPak 3000 DC Drive Software Reference Manual*.

5.1 Accessing the Original Register Map

To access the original register map, set NETW REGISTER MAP SEL (P.914) to ORIGINAL.

Some parameters are not available and others are mapped differently when NETW REGISTER MAP SEL (P.914) is set to ALTERNATE. Make sure your application uses the correct mappings if you switch from the alternate register map to the original register map.

5.2 Finding Data in the Original Register Map Tables

The original register map shown in tables 5.2 through 5.18 describes the registers and bits used by the FlexPak 3000 drive on the AutoMax network when NETW REGISTER MAP SEL (P.914) is set to ORIGINAL.

There are no write registers for control/reference data for Drop 2, Drop 3, and Drop 4.

Table 5.1 – Location of Information in the Original Register Map Tables

Drop #	Master...	Data Type	Table	Page
1	Read	Runtime Signal	5.2	5-2
		Tunable, Configurable, and Status	5.3	5-4
	Write	Control/Reference	5.4	5-6
		Tunable	5.5	5-7
		Configurable	5.6	5-8
2	Read	Runtime Signal	5.7	5-9
		Tunable, Configurable, and Status	5.8	5-8
	Write	Tunable	5.9	5-9
		Configurable	5.10	5-10
3	Read	Runtime Signal	5.11	5-11
		Tunable, Configurable, and Status	5.12	5-12
	Write	Tunable	5.13	5-12
		Configurable	5.14	5-13
4	Read	Runtime Signal	5.15	5-14
		Tunable, Configurable, and Status	5.16	5-15
	Write	Tunable	5.17	5-16
		Configurable	5.18	5-17

Table 5.2 – FlexPak 3000 Original Register Map: Drive_1: Master Read Registers, BASIC and FULL Connections, Runtime Signal Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
0		Drive status word 1	Bit-packed word containing information on the present status of the drive:	
	0		Drive ready	
	1		Drive running	
	2		Fault active	
	3		Drive jogging	
	4		Forward/reverse command	0=forward; 1=reverse
	5		Drive shooting	
	6		Tune/config input enable loopback	0=disabled; 1=enabled
	7		Tune/config update synch. flag loopback (master read)	
	8		Alarm active	
	9		In current limit	
	10		Coast/DB interlock	0=open; 1=closed
	11		Customer interlock	0=open; 1=closed
	12		Parameter processing error	0=no errors; 1=one or more errors
	13		Terminal strip forward/reverse input state (terminal 5)	
	14		Terminal strip auto/manual input state (terminal 6)	
	15		Terminal strip fault/alarm reset input state (terminal 10)	
1		SPD SOURCE SELECT OUT (P.193)	Selected speed/voltage loop reference value	4095 at TOP SPEED (P.011)
2		SPD LOOP REFERENCE (P.295)	Final speed/voltage loop reference value	4095 at TOP SPEED (P.011)
3		SPD LOOP FEEDBACK (P.296)	Final speed/voltage loop feedback value after all scaling	4095 at TOP SPEED (P.011)
4		SPD LOOP OUTPUT (P.299)	Speed loop PI block output value	4095 at MAXIMUM CURRENT (P.007
5		ARMATURE VOLTAGE (P.269)	Armature voltage feedback value	4095 at MOTOR RATED ARM VOLTS (P.009)
6		Average CMI feedback	CMI feedback average over eight CMI scans	4095 at MAXIMUM CURRENT (P.007)
7		Network Output Register 1	Value of the parameter selected by NETW OUT REG 1 SELECT (P.902)	If no valid parameter value selected, 0=motor speed in RPM
8		Network Output Register 2	Value of the parameter selected by NETW OUT REG 2 SELECT (P.903)	If no valid parameter value selected, 0=armature voltage in volts
9		Network Output Register 3	Value of the parameter selected by NETW OUT REG 3 SELECT (P.904)	If no valid parameter value selected, 0=armature current in amps*10 or amps
10 to 15		Tunable, Configurable and Status Data	See table 5.3 on page 5-4.	
Runtime signal data are updated by the regulator every 5 msec, unless FEEDBACK SELECT (P.200) is set to ARMATURE VOLT, in which case the update time is 10 msec.				

Table 5.2 – FlexPak 3000 Original Register Map: Drop_1, Master Read Registers, BASIC and FULL Connections Runtime Signal Data (Drive Output Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
16		ANALOG AUTO REFERENCE (P.166)	The analog reference value in auto mode after all scaling	4095 at TOP SPEED (P.011)
17		ANALOG MAN TRIM REF (P.194)	Analog manual trim reference input value	4095 at TOP SPEED (P.011)
18		ANLG IN 1 (P.492)	I/O Exp. kit analog input 1 after gain and zero applied	4095 at full scale
19		ANLG IN 2 (P.493)	I/O Exp. kit analog input 2 after gain and zero applied	4095 at full scale
20		FREQ IN (P.491)	I/O Expansion kit frequency input value after all scaling	4095 at full scale
21		OCL OUTPUT (P.548)	Outer control loop output value	RPM
22		FIELD FEEDBACK (P.569)	Motor field current feedback value after scaling and gain	4095 at MOTOR HOT FLD AMPS (P.510)
23		AC LINE VOLTAGE (P.392)	Measured AC line RMS voltage	volts RMS
Runtime signal data are updated by the regulator every 5 msec, unless FEEDBACK SELECT (P.200) is set to ARMATURE VOLT, in which case the update time is 10 msec.				

Table 5.3 – FlexPak 3000 Original Register Map, Drop_1 Master Read Registers: BASIC and FULL Connections, Tunable, Configurable, and Status Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
10		Fault latch bits word 1	Bit-packed word indicating latched faults	
	0		AC LINE SYNCHRONIZATION FAULT (F00010)	
	1		FIELD CURRENT LOSS (F00004)	
	2		SUSTAINED OVERLOAD (F00005)	
	3		SELF TUNING FAULT (F00080 to F00099)	
	4		MOTOR THERMOSTAT TRIP (F00006)	
	5		CONTROLLER THERMOSTAT TRIP (F00009)	
	6		BLOWER MOTOR STARTER OPEN (F00008)	
	7		Reserved	
	8		IPT (OVERCURRENT) (F00001)	
	9		OVERSPEED (F00003) / ARMATURE OVERVOLTAGE (F00012)	
	10		SCR N or MULTIPLE SCRS NOT OPERATING (F00030–F00042)	
	11		OPEN ARMATURE (F00007)	
	12		TACHOMETER LOSS (F00002)	
	13		CIM COMMUNICATIONS TIMEOUT (F00011)	
	14		NETWORK COMMUNICATION TIMEOUT (F00013)	
	15		REVERSED TACH LEADS (F00014)	
11		Reserved		
12		First fault	Fault code of the first fault since the last fault reset	
13		Alarm latch bits word	Bit-packed word containing latched alarm bits	
	0		MOTOR BRUSH WEAR LOW (A00001)	
	1		AC LINE VOLTAGE LOW (A00002)	
	2		AC LINE VOLTAGE HIGH (A00003)	
	3 to 15		Reserved	
14		Last alarm	Alarm code of the most recent alarm	
15		CONTROL SOURCE SELECT (P.000)	Selected source for drive control signals	0=TERMINAL; 1=KEYPAD; 2=SERIAL; 3=NETWORK
16		ACCELERATION TIME (P.001)	Min. time to accelerate from zero to TOP SPEED (P.010)	seconds *10
17		DECELERATION TIME (P.002)	Min. time to decelerate from TOP SPEED (P.011) to zero	seconds *10
Tunable, configurable, and status data are updated by the regulator approximately every 600 msec.				

Table 5.3 – FlexPak 3000 Original Register Map, Drop_1 Master Read Registers: BASIC and FULL Connections, Tunable, Configurable and Status Data (Drive Output Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
18		MINIMUM SPEED (P.003)	Lowest operating speed	RPM
19		MAXIMUM SPEED (P.004)	Highest operating speed	RPM
20		POSITIVE CURRENT LIM (P.005)	Highest amount of current for the forward bridge	% of MOTOR RATED ARM AMPS (P.008)
21		NEGATIVE CURRENT LIM (P.006)	Highest amount of current for reverse bridge	% of MOTOR RATED ARM AMPS (P.008)
22		TRIM RANGE (P.109)	Amount the trim reference will affect the drive reference	%
23		SPD LOOP PI PROP GAIN (P.211)	Speed loop PI proportional gain	gain * 100
24		SPD LOOP PI LEAD FREQ (P.212)	Speed loop PI block lead break frequency	radians/second * 100
25		CML PI PROP GAIN (P.301)	CML PI proportional gain	gain * 1000
26		CML PI LEAD FREQUENCY (P.302)	CML PI lead break frequency	radians/second
27		CML REF RATE LIMIT (P.303)	Min. time for CML ref. to go from zero to MAXIMUM CURRENT	milliseconds
28	0	NETW CONNECT TYPE (P.910)	AutoMax network connection type	0 – BASIC; 1 – FULL
	8	NETW REGISTER MAP SEL (P.914)	Network register map selected	0=ORIGINAL; 1=ALTERNATE
29		NETW COMM LOSS SELECT (P.901)	How the drive responds to network communication loss	0 – FAULT; 1 – USE LAST REF; 2 – USE TRIM R EF; 3 – USE TRIM R CNTL
30		AMX NETW REF SELECT (P.911)	AutoMax network reference selection	0 – DIRECT; 1 to 8 – BROADCAST 1 to 8
31		REGULATOR SW VERSION (P.794)	Regulator board software version	
Tunable, configurable, and status data are updated by the regulator approximately every 600 msec.				

Table 5.1 – FlexPak 5000 Original Register Map: Prod_1: Master Write Registers, BASIC and FULL Connections: Control/Reference Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
32		Sequencing control word	Word containing drive sequencing and control bits	
	0		Run	0 to 1 transition to run
	1		Stop	0=stop; 1=not stop
	2		Fault reset	0 to 1 transition to reset
	3		Jog	0 to 1 transition to jog; 0=stop; jogging
	4		Forward/reverse select	0=forward; 1=reverse
	5 to 6		Reserved	
	7		Outer control loop enable	0=hold OCL in reset; 1=OCL enabled
	8		Fault log clear and reset	0 to 1 transition to clear
	9		Alarm log clear and reset	0 to 1 transition to clear
	10		Alarm reset	0 to 1 transition to reset
	11		Memory save	0 to 1 transition to save
	12 – 13		Reserved	
	14		Tune/config input enable: Determines what is read from network. "Read all" includes control/reference, tunable, and configurable inputs	0 = read only control/reference inputs 1 = read all
	15		Tune/config update synchronization flag (master write)	
33		Network Reference	Speed/voltage loop or CML reference value when CONTROL SOURCE SELECT (P.000) is set to NETWORK and AUX NETW REF SELECT (P.911)=0	4095 at TOP SPEED (P.011)/MOTOR RATED ARM VOLTS (P.009) or MAXIMUM CURRENT (P.007)
34		Network Input Register 1	Written by network master. Read this value through the DIN or DOV using NETW IN REG 1 (P.905)	
35		Network Input Register 2	Written by network master. Read this value through the DIN or DOV using NETW IN REG 2 (P.906)	
36		Network Input Register 3	Written by network master. Read this value through the DIN or DOV using NETW IN REG 3 (P.907)	
37		FIELD REF REGISTER (P.513)	Reference for the field current loop	4095 at MOTOR FIELD AMPS (P.510)
38 to 39		Reserved		
Control/reference data are read by the regulator every 5 msec, unless FEEDBACK SELECT (P.200) is set to ARMATURE VOLT, in which case the update time is 10 msec.				

Table 5.5 – FlexPak 3000 Original Register Map, Drop_1: Master Write Registers, BASIC and FULL Connections, Tunable Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
40		ACCELERATION TIME (P.001)	Min. time to accelerate from zero to TOP SPEED (P.011)	seconds * 10
41		DECELERATION TIME (P.002)	Min. time to decelerate from TOP SPEED (P.011) to zero	seconds * 10
42		MINIMUM SPEED (P.003)	Lowest operating speed	RPM
43		MAXIMUM SPEED (P.004)	Highest operating speed	RPM
44		POSITIVE CURRENT LIM (P.005)	Highest amount of current for the forward bridge	% of MOTOR RATED ARM AMPS (P.006)
45		NEGATIVE CURRENT LIM (P.006)	Highest amount of current for reverse bridge	% of MOTOR RATED ARM AMPS (P.006)
46		SHOWAVE ROUNDING (P.014)	Amount of smoothing of speed/voltage loop reference	%
47		TRIM RANGE (P.109)	Amount the trim reference will affect the drive reference	%
48		SPD LOOP PI PROP GAIN (P.211)	Speed loop PI proportional gain	gain * 100
49		SPD LOOP PI LEAD FREQ (P.212)	Speed loop PI block lead break frequency	radians/second * 100
50		CML PI PROP GAIN (P.301)	CML PI proportional gain	gain * 1000
51		CML PI LEAD FREQUENCY (P.302)	CML PI lead break frequency	radians/second
52		CML REF RATE LIMIT (P.303)	Min. time for CML ref. to go from zero to MAXIMUM CURRENT	milliseconds
53		JOG SPEED 1 (P.012)	Operating speed while jogging	RPM
54		STOP MODE SELECT (P.114)	Selects how drive responds to a normal stop command	0=RAMP; 1=COAST/DB; 2=CURRENT LIMIT
55		IR COMPENSATION (P.206)	Armature voltage loss compensation	%
56		CURRENT COMPOUNDING (P.209)	Sets the level of current compounding	%
57		NETW COMM LOSS SELECT (P.901)	How the drive responds to network communication loss	0=FAULT; 1=USE LAST REF; 2=USE TRMBLK REF; 3=USE TRMBLK CNTL
58		NETW OUT REG 1 SELECT (P.902)	Number of the parameter readable in Drop_1, register 7	If no valid parameter value selected, this is set to 0=motor speed in RPM
59		NETW OUT REG 2 SELECT (P.903)	Number of the parameter readable in Drop_1, register 8	If no valid parameter value selected, this is set to 0=armature voltage in volts
60		NETW OUT REG 3 SELECT (P.904)	Number of the parameter readable in Drop_1, register 9	If no valid parameter value selected, this is set to 0=armature current in amps*10 or amps
Tunable data are read by the regulator approximately every 600 msec while Tune/Config Input Enable bit=1				

Table 5.5 – FlexPak 3000 Original Register Map, Drop_1: Master Write Registers, BASIC and FULL Connections, Configurable Data (Drive Input Data)

Register	Parameter Name (Number)	Description	Settings
81	FEEDBACK SELECT (P.200)	Type of feedback for speed/voltage loop feedback	0 = ARMATURE VOLT; 1 = DC TACH; 2 = PULSE TACH; 3 = AC TACH
82	NETW CONNECT TYPE (P.910)	AutoMax network connection type	0 = BASIC; 1 = FULL
83	AMX NETW REF SELECT (P.911)	AutoMax network reference selection	0 = DIRECT; n = BROADCAST n (n=1 to 8)
Configurable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1 and the drive is not running or jogging			

Table 5.7 – FlexPak 3000 Original Register Map, Drop_2: Master Read Registers, FULL Connection, Runtime Signal Data (Drive Output Data)

Register	Parameter Name (Number)	Description	Settings
0	ANALOG AUTO REFERENCE (P.188)	The analog reference value in auto mode after all scaling	4095 at 10 V (P.011)
1	Reserved		
2	ANALOG MAN TRIM REF (P.194)	Analog manual trim reference in out value	4095 at 10 V (P.011)
3 to 10	Reserved		
Runtime signal data are updated by the regulator every 5 msec, unless FEEDBACK SELECT (P.200) is set to ARMATURE VOLT, in which case the update time is 10 msec.			

Table 5.8 – FlexPak 3000 Original Register Map, Drop_2: Master Read Registers, FULL Connection, Tunable, Configurable, and Status Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
11		SCL RAMP OUTPUT (P.848)	SCL reference S-curve block output	4095
12		SCL OUTPUT (P.848)	Outer control loop output value	RPM
13		TOP SPEED (P.011)	Highest running speed of motor	RPM
14		JOG SPEED 1 (P.012)	Operating speed while jogging	RPM
15		JOG ACCEL/DECEL TIME (P.013)	Minimum time in which jog reference can change from zero to TOP SPEED (P.011) and from TOP SPEED to zero	seconds * 10
16		S-CURVE ROUNDING (P.014)	Amount of smoothing of speed/voltage loop reference	%
17		REVERSE DISABLE (P.015)	Prevents speed/voltage loop ref. from going negative	0 = OFF (bipolar ref); 1 = ON (positive ref)
18		ANLG AUTO SIGNAL TYPE (P.100)	Type of signal applied to analog auto reference input	0 = 0-10V; 1 = ±10V; 2 = 4-20mA; 3 = 10-50mA
19		ANLG AUTO GAIN ADJ (P.101)	Scales analog auto reference signal	gain * 1000
20		ANLG AUTO ZERO ADJ (P.102)	Offset removed from analog auto reference signal	
21		AUTO REFERENCE SELECT (P.103)	Selects the type of auto reference	0 = ANALOG; 1 = FREQUENCY IN
22		ANLG MAN REF GAIN ADJ (P.104)	Scales the analog manual reference gain	gain * 1000
Tunable, configurable, and status data are updated by the regulator approximately every 600 msec.				

Table 5.8 – FlexPak 3000 Original Register Map, Drop_2, Master Read Registers, FULL Connection, Tunable, Configurable and Status Data (Drive Output Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
23		ANLG MAN REF ZERO ADJ (P.105)	Offset removed from the analog manual reference signal	
24		TRIM REF REGISTER (P.107)	Trim reference value	% TOP SPEED (P.011) * 10
25		TRIM REFERENCE SELECT (P.108)	Trim reference selection	0 = REG STPT; 1 = ANALOG MANUAL; 2 = ANALOG IN 1; 3 = NETW IN REG 1; 4 = NETW IN REG 2; 5 = NETW IN REG 3; 6 = ANALOG IN 2
26		TRIM MODE SELECT (P.110)	Type of trim mode selected	0 = NO TRIM; 1 = INCREMENTAL; 2 = PROPORTIONAL
27		AUTO MODE MIN BYPASS (P.111)	Disables minimum speed limit while in auto mode	0 = OFF; 1 = ON (min speed bypassed)
28		AUTO MODE RAMP BYPASS (P.112)	Bypasses speed loop S-curve block while drive is in auto	0 = OFF; 1 = ON (rate limit bypassed)
29		STOP SPEED THRESHOLD (P.113)	Speed threshold at which the main contactor will open during a controlled stop	RPM
30		STOP MODE SELECT (P.114)	Selects how drive responds to a normal stop command	0 = RAMP; 1 = COAST/DB; 2 = CURRENT LIMIT
31		TRIM OUTPUT (P.197)	Signal that trims the selected speed/voltage loop reference	4095 at TOP SPEED (P.011)
Tunable, configurable, and status data are updated by the regulator approximately every 600 msec.				

Table 5.9 – FlexPak 3000 Original Register Map, Drop_2, Master Write Registers, FULL Connection, Tunable Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
32		Reserved		
33		NORMALIZED INERTIA (P.222)	Combined inertia of motor and load	seconds * 100
34		OCL REF REGISTER (P.601)	Outer control loop reference	4095
35		OCL REF RAMP TIME (P.602)	Ramp time for OCL reference	seconds * 10
36		OCL REF ROUNDING (P.603)	Amount of smoothing of the outer control loop reference	%
37		OCL LEADLAG SELECT (P.605)	Outer control loop lead/lag block select	0 = LEAD/LAG; 1 = BYPASS; 2 = LAG/LEAD
38		OCL LEAD/LAG LOW FREQ (P.606)	OCL lead/lag block low break frequency	radians/second * 100
39		OCL LEADLAG RATIO (P.607)	Ratio between low and high frequencies of OCL	
40		JOG ACCEL/DECEL TIME (P.013)	Minimum time in which jog reference can change from zero to TOP SPEED (P.011) and from TOP SPEED to zero	seconds * 10
41		ANLG AUTO GAIN ADJ (P.101)	Scales analog auto reference signal	gain * 1000
42		ANLG AUTO ZERO ADJ (P.102)	Offset removed from analog auto reference signal	
Tunable data are updated by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1.				

Table 5-9 – FlexPak 3000 Original Register Map, Drop_2: Master Write Registers, FULL Connection, Tunable Data (Drive Input Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
43		Reserved		
44		ANLG MAN REF GAIN ADJ (P.104)	Scales the analog manual reference gain	gain * 1000
45		ANLG MAN REF ZERO ADJ (P.105)	Offset removed from the analog manual reference signal	
46		TRIM REFERENCE SELECT (P.108)	Trim reference selection	0=REG STPR; 1=ANALOG MANUAL; 2=ANALOG IN 1; 3=NETW IN REG 1; 4=NETW IN REG 2; 5=NETW IN REG 3; 6=ANALOG IN 2
47		TRIM MODE SELECT (P.110)	Type of trim mode selected	0=NO TRIM; 1=INCREMENTAL; 2=PROPORTIONAL
48		AUTO MODE MIN BYPASS (P.111)	Disables minimum speed limit while in auto mode	0=OFF; 1=ON (min speed bypassed)
49		AUTO MODE RAMP BYPASS (P.112)	Bypasses speed loop S-curve block while drive is in auto	0=OFF; 1=ON (rate limit bypassed)
50		STOP SPEED THRESHOLD (P.113)	Speed threshold at which the main contactor will open during a controlled stop	RPM
51		OCL PI PROP GAIN (P.808)	OCL PI block proportional gain	gain * 100
52		OCL PI LEAD FREQ (P.809)	Outer control loop PI block lead break frequency	radians/second * 100
53		OCL PI POSITIVE LIMIT (P.810)	OCL PI block positive limit	%
54		OCL PI NEGATIVE LIMIT (P.811)	Outer control loop PI block negative limit	%
55		OCL TRIM RANGE (P.812)	Trim range for the OCL	% * 10
Tunable data are updated by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1.				

Table 5-10 – FlexPak 3000 Original Register Map, Drop_2: Master Write Registers, FULL Connection, Configurable Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
56		INERTIA COMP SELECT (P.221)	Source of inertia compensation	0=NONE; 1=INTERNAL; 2=ANALOG IN 1; 3=ANALOG IN 2; 4=NETW IN REG 1 (P.905); 5=NETW IN REG 2 (P.906); 6=NETW IN REG 3 (P.907)
57		POS CURRENT LIM SEL (P.223)	Selects positive current limit source	0=REG STPR; 1=ANALOG IN 1; 2=ANALOG IN 2; 3=NETW IN REG; 4=NETW IN REG 2; 5=NETW IN REG 3
58		NEG CURRENT LIM SEL (P.224)	Selects negative current limit source	
59		OCL REFERENCE SELECT (P.800)	Selects OCL reference source	0=REG STPR; 1=ANALOG IN 1; 2=ANALOG IN; 3=FREQUENCY IN; 4=NETW IN REG 1; 5=NETW IN REG 2; 6=NETW IN REG 3
Configurable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit=1 and the drive is not running or jogging.				

Table 5.10 – FlexPak 3000 Original Register Map: Drop_2: Master Write Registers, FULL Connection: Configurable Data (Drive Input Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
80		CKT FEEDBACK SELECT (P.604)	Source of ckt feedback	0=NONE; 1=CMD FEEDBACK; 2=ANALOG IN 1; 3=ANALOG IN 2; 4=SPEED LOOP OUTPUT; 5=ANALOG AUTO REFERENCE; 6=NETW IN REG 1; 7=NETW IN REG 2; 8=NETW IN REG 3
81		TOP SPEED (P.011)	Highest running speed of motor	RPM
82		REVERSE DISABLE (P.015)	Prevents speed/voltage loop ref. from going negative	0=OFF (bipolar ref); 1=ON (positive ref)
83		ANLG AUTO SIGNAL TYPE (P.100)	Type of signal applied to analog auto reference input	0=0-10V; 1=±10V; 2=4-20mA; 3=10-50mA
Configurable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit=1 and the drive is not running or jogging.				

Table 5.11 – FlexPak 3000 Original Register Map: Drop_3: Master Read Registers, FULL Connection: Runtime Signal Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
0		ANALOG TACH FEEDBACK (P.291)	Analog tachometer feedback signal after all scaling	4095 at TOP SPEED (P.011)
1		PULSE TACH FEEDBACK (P.292)	Pulse encoder feedback signal after all scaling	4095 at TOP SPEED (P.011)
2		SPD LOOP ERROR (P.297)	Speed loop error	
3		CMD REFERENCE (P.396)	Amplitude and rate limited value of selected cmd ref.	4095 at MAXIMUM CURRENT (P.007)
4		FIELD REFERENCE (P.590)	Field current reference	4095 at MOTOR HOT FLD AMPS (P.510)
5		FIELD FEEDBACK (P.589)	Motor field current feedback value after scaling and gain	4095 at MOTOR HOT FLD AMPS (P.510)
6 to 11		Reserved		
Runtime signal data are updated by the regulator every 5 msec, unless FEEDBACK SELECT (P.200) is set to ARMATURE VOLT, in which case the update time is 10 msec.				

Table 5.12 – FlexPak 3000 Original Register Map: Drop_3: Master Read Registers, FULL Connection: Tunable, Configurable, and Status Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
12		MAXIMUM CURRENT (P.007)	Highest amount of current, either positive or negative	% of MOTOR RATED ARM AMPS (P.008)
13		MOTOR RATED ARM AMPS (P.008)	Rated armature current from motor nameplate	amps * 10
14		MOTOR RATED ARM VOLTS (P.009)	Rated armature voltage from motor nameplate	volts DC
15		FEEDBACK SELECT (P.200)	Type of feedback for speed/voltage loop: feedback	0=ARMATURE VOLT; 1=DC TACH; 2=PULSE TACH; 3=AC TACH
16		ANALOG TACH GAIN ADJ (P.201)	Scales analog tachometer feedback signal	gain * 1000
Tunable, configurable, and status data are updated by the regulator approximately every 600 msec.				

Table 5.12 – FlexPak 3000 Original Register Map, Drop_3: Master Read Registers, FULL Connection, Tunable, Configurable, and Status Data (Drive Output Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
17		ANALOG TACH ZERO ADJ (P.202)	Removes offset from analog tachometer feedback signa	
18		ANLG TACH VOLTS/1000 (P.203)	Analog tach scaling from tach nameplate in V/1000 RPM	volts * 10
19		ARM VOLTAGE GAIN ADJ (P.204)	Scales the armature voltage signal	gain * 1000
20		ARM VOLTAGE ZERO ADJ (P.205)	Offset removed from armature voltage feedback	
21		IR COMPENSATION (P.206)	Armature voltage loss compensation	%
22		PULSE TACH PPR (P.207)	Pulses per revolution from the pulse encoder nameplate	
23		PULSE TACH QUADRATURE (P.208)	Enables or disables pulse encoder quadrature	0 = OFF; 1 = ON (quad decode)
24		CURRENT COMPOUNDING (P.209)	Sets the level of current compounding	%
25		SPD LEAD/LAG RATIO (P.213)	Low & high break frequency ratio of feedback lead/lag	
26		SPD LEAD/LAG LOW FREQ (P.214)	Low break frequency of speed feedback lead/lag block	radians/second * 100
27		SPD LOOP LAG FREQ (P.215)	Lag break frequency of speed loop forward path lag	radians/second * 100
28		SPD LEAD/LAG SELECT (P.216)	Speed/voltage loop lead/lag block select	0=LEAD/LAG; 1=BYPASS; 2=LAG/LEAD
29		SPD LOOP LAG BYPASS (P.217)	Speed/voltage loop lag block bypass	0 = OFF (not bypassed); 1 = ON (bypassed)
30		CML FEEDBACK GAIN ADJ (P.300)	Current mirror loop feedback gain adjust	gain * 1000
31		ARMATURE BRIDGE POL (P.394)	Active armature bridge	0 = OFF (forward); 1 = ON (reverse)
Tunable, configurable, and status data are updated by the regulator approximately every 600 msec.				

Table 5.12 – FlexPak 3000 Original Register Map, Drop_3: Master Write Registers, FULL Connection, Tunable Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
32		Reserved		
33		FIELD ECONOMY REF (P.511)	Reference for field economy mode	% of MOTOR HOT FLD AMPS (P.510)
34		FIELD PI PROP GAIN (P.514)	Proportional gain setting for the field current loop PI block	gain * 100
35		FIELD PI LEAD FREQ (P.515)	Lead frequency for the field current loop PI block	radians/second * 100
36		FLD FEEDBACK GAIN ADJ (P.516)	Field current feedback gain adjust	gain * 1000
37		FLD WEAKEN THRESHOLD (P.518)	Point where the field control loop begins regulating armature voltage and the field begins to weaken	4095 at MOTOR RATED ARM VOLTS (P.009)
38		FLD WEAKEN PROP GAIN (P.519)	Proportional gain of field control loop armature voltage regulator	gain * 100
Tunable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable = 1.				

Table 5.10 – FlexPak 3000 Original Register Map, Drop_3: Master Write Registers, FULL Connection, Tunable Data (Drive Input Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
39		FLD WEAKEN LEAD FREQ (P.520)	= block lead break frequency of the field control loop's armature voltage regulator	radians/second * 100
40		ANALOG TACH GAIN ADJ (P.201)	Scales analog tachometer feedback signal	gain * 1000
41		ANALOG TACH ZERO ADJ (P.202)	Offset from analog tachometer feedback signal	
42		ARM VOLTAGE GAIN ADJ (P.204)	Scales the armature voltage signal	gain * 1000
43		ARM VOLTAGE ZERO ADJ (P.205)	Offset removed from armature voltage feedback	
44		SPD LEADLAG RATIO (P.213)	Specifies the ratio between low and high break frequencies of speed feedback lead/lag block	
45		SPD LEAD/LAG LOW FREQ (P.214)	Low break freq. of the speed feedback lead/lag block	radians/second * 100
46		SPD LOOP LAG FREQ (P.215)	Lag break freq. for the speed loop forward path lag block	radians/second * 100
47		SPD LEAD/LAG SELECT (P.216)	Speed/voltage loop lead/lag block select	0=LEAD/LAG; 1=BYPASS; 2 = LAG/LEAD
48		SPD LOOP LAG BYPASS (P.217)	Speed/voltage loop lag block bypass	0=OFF (not bypassed); 1=ON (bypassed)
49		CM FEEDBACK GAIN ADJ (P.300)	Current minor loop feedback gain adjust	gain * 1000
50 to 53		Reserved		
Tunable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1.				

Table 5.11 – FlexPak 3000 Original Register Map, Drop_3: Master Write Registers, FULL Connection, Configurable Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
54		AUTO REFERENCE SELECT (P.100)	Selects the type of auto reference	0=ANALOG; 1=FREQUENCY IN
55		MOTOR HOT FLD AMPS (P.510)	Rated hot field amps from motor nameplate	amps * 100
56		FIELD LOSS THRESHOLD (P.512)	Field current level at which a field loss fault is generated	% of MOTOR HOT FLD AMPS (P.510)
57		FIELD AUTO WEAKEN (P.517)	Enables or disables automatic field weakening	0=DISABLED; 1=ENABLED
58		MAXIMUM CURRENT (P.007)	Highest amount of current, either positive or negative	% of MOTOR RATED ARM AMPS (P.008)
59		MOTOR RATED ARM AMPS (P.008)	Rated armature current from motor nameplate	amps * 10
60		MOTOR RATED ARM VOLTS (P.009)	Rated armature voltage from motor nameplate	volts DC
61		ANLG TACH VOLTS/1000 (P.203)	Analog tachometer scaling from tachometer nameplate in volts per 1000 RPM	volts * 10
62		PULSE TACH PPR (P.207)	Pulses per revolution from pulse encoder nameplate	
63		PULSE TACH QUADRATURE (P.208)	Enables or disables pulse encoder quadrature	0=OFF; 1=ON (quad decode)
Configurable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit=1 and the drive is not running or jogging.				

Table 5.15 – FlexPak 3000 Original Register Map, Drop 1: Master Read Registers, FULL Connection, Runtime Signal Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
0		I/O Expansion Kit digital inputs	Bit-packed word that indicates the state of these inputs*	
	0		I/O Expansion Kit digital input 1 (Preset speed select 1)*	
	1		I/O Expansion Kit digital input 2 (Preset speed select 2)*	
	2		I/O Expansion Kit digital input 3 (mop decrement)*	
	3		I/O Expansion Kit digital input 4 (mop increment)*	
	4		I/O Expansion Kit digital input 5 (ccl enable)*	
1		ANLG IN 1 (P.192)	I/O Exp. Kit analog input 1 after gain and zero applied	4095 at full scale
2		ANLG IN 2 (P.493)	I/O Exp. Kit analog input 2 after gain and zero applied	4095=full scale
3		HLQ IN (P.491)	I/O Expansion Kit frequency input value after all scaling	4095=full scale
4 to 20		Reserved		
Runtime signal data are updated by the regulator every 5 msec, unless FEEDBACK SELECT (P.200) is set to ARMATURE VOLT, in which case the update time is 10 msec.				

* The I/O Expansion Kit digital inputs do not have fixed functions when CONTROL SOURCE SELECT (P.600) is set to NETWORK. Therefore, they do not select preset speeds, change the MOP setpoint, or enable or disable the CCL.

Table 5.16 – FlexPak 3000 Original Register Map, Drop 1: Master Read Registers, FULL Connection, Tunable, Configurable, and Status Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
21		Level Detector Outputs	Bit-packed word indicating state of level detector outputs	
	0		Level detector 1 output	
	1		Level detector 2 output	
Tunable, configurable and status data are updated by the regulator approximately every 600 msec.				

Table 5-16 – FlexPak 3000 Original Register Map, Drop_1: Master Read Registers: FULL Connection, Tunable, Configurable, and Status Data (Drive Output Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
22		Stop cause word	Bit-packed word indicating why the drive stopped	
	0		Stop asserted or Run de-asserted (regular)	
	1		Jog de-asserted for less than 1 second	
	2		Internal stop request	
	3		Current limit stop	
	4		Ramp stop	
	5		Coast/DB stop	
	6		Fault stop or self-tuning complete	
	7		Customer interlock opened	
	8		Coast/DB interlock opened	
	9		Main contactor opened	
	10 – 15		Reserved	
23		NOMINAL AC LINE FREQ (P.306)	Nominal AC line frequency	Hz
24		NOMINAL AC LINE VOLTS (P.307)	Nominal AC line RMS voltage	volts RMS
25		PLL MAXIMUM ERROR (P.308)	Max. allowed change in line period per AC line cycle	µsec
26		AC LINE VOLTAGE (P.392)	Measured AC line RMS voltage	volts RMS
27		ENHANCED FLD VOLT ADJ (P.500)	Adjusts the field output voltage	
28		FIELD ECONOMY DELAY (P.501)	Time between stopping and entering field economy	minutes
29		FIELD ECONOMY ACTIVE (P.599)	Indicates the present state of field economy	0 = OFF; 1 = ON (field economy active)
30		OPEN SCR SENSITIVITY (P.600)	Open SCR detection sensitivity adjustment	
31		OPEN SCR TRIP THRESH (P.601)	Open SCR detection trip threshold	
Tunable, configurable and status data are updated by the regulator approximately every 600 msec.				

Table 5.17 – FlexPak 3000 Drop_1, Master Write Registers: FULL Connection, Tunable Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
32		ANLG IN 1 ZERO ADJ (P.414)	I/O Expansion +lt analog input 1 zero adjust	
33		ANLG IN 1 GAIN ADJ (P.415)	I/O Expansion +lt analog input 1 gain adjust	gain * 1000
34		ANLG IN 2 ZERO ADJ (P.416)	I/O Expansion +lt analog input 2 zero adjust	
35		ANLG IN 2 GAIN ADJ (P.417)	I/O Expansion +lt ANALOG INPUT 2 GAIN ADJUST	gain * 1000
36		LEVEL DETECT 1 THRESH (P.603)	Level detector 1 threshold	% * 10
37		LEVEL DETECT 1 DELAY (P.604)	Level detector 1 delay time	seconds * 10
38		LEVEL DETECT 2 THRESH (P.606)	Level detector 2 threshold	% * 10
39		LEVEL DETECT 2 DELAY (P.607)	Level detector 2 delay time	seconds * 10
40		PLL MAXIMUM ERROR (P.308)	Max. allowed change in line period per AC line cycle	µsec
41		ENHANCED FLD VOLT ADJ (P.500)	Adjusts the field output voltage	
42		FIELD ECONOMY DELAY (P.501)	Time between stopping and entering field economy	minutes
43		OPEN SCR SENSITIVITY (P.600)	Open SCR detection sensitivity adjustment	
44		OPEN SCR TRIP THRESH (P.601)	Open SCR detection trip threshold	
45		ANLG OUT 1 GAIN ADJ (P.420)	I/O Expansion +lt analog output 1 gain adjust	gain * 1000
46		ANLG OUT 2 GAIN ADJ (P.422)	I/O Expansion +lt analog output 2 gain adjust	gain * 1000
47		Reserved		
Tunable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable = 1.				

Table 5-18 – FlexPak 3000 Original Register Map, Drop_/I: Master Write Registers, FULL Connection: Configurable Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
48		DIG OUT 1 SELECT (P409)	I/O Expansion kit digital output 1 source	0=LEVEL DETECT 1 OUTPUT (P.640); 1=LEVEL DETECT 2 OUTPUT (P.649); 2=In current limit; 3=drive ready; 4=NETW COMM STATUS (P.906); 5=bit 0 of Network Input Register 1; 6=bit 0 of Network Input Register 2; 7=bit 0 of Network Input Register 3
49		DIG OUT 2 SELECT (P.411)	I/O Expansion kit digital output 2 source)	0=LEVEL DETECT 1 OUTPUT (P.640) 1=LEVEL DETECT 2 OUTPUT (P.649) 2=in current limit; 3=drive ready 4=NETW COMM STATUS (P.906) 5=bit 1 of Network Input Register 1 6=bit 1 of Network Input Register 2 7=bit 1 of Network Input Register 3
50	0	DIG OUT 1 CONTACT TYP (P.410)	I/O Expansion kit digital output 1 contact type	0=NORMALLY OPEN 1=NORMALLY CLOSED
	1	DIG OUT 2 CONTACT TYP (P.412)	I/O Expansion kit digital output 2 contact type	
51		ANLG IN 1 SIG TYPE (P.413)	I/O Expansion kit analog input 1 signal type	0=0-10 V; 1=–/+10 V; 2=4-20 mA; 3=10-50 mA
52		ANLG OUT 1 SELECT (P.418)	I/O Expansion kit analog output 1 source select	See "Settings for Analog and Frequency Outputs" on page 4-8
53		ANLG OUT 1 SIG TYPE (P.419)	I/O Expansion kit analog output 1 signal type	0=0-10 V; 1=–/+10 V; 2=4-20 mA
54		ANLG OUT 2 SELECT (P.421)	I/O Expansion kit analog output 2 source select	See "Settings for Analog and Frequency Outputs" on page 4-8
55		FREQ IN ZERO (P.423)	I/O Expansion kit minimum input frequency	kHz * 10
56		FREQ IN FULL SCALE (P.424)	I/O Expansion kit maximum input frequency	kHz * 10
57		FREQ OUT SELECT (P.425)	I/O Expansion kit frequency output source select	See "Settings for Analog and Frequency Outputs" on page 4-8
58		FREQ OUT ZERO (P.426)	I/O Exp. kit frequency when freq. output signal is zero	kHz * 10
59		FREQ OUT FULL SCALE (P.427)	I/O Expansion kit frequency output at full scale	kHz * 10
60		LEVEL DETECT 1 SELECT (P.602)	Level detector 1 signal	0=OML FEEDBACK; 1=SPD LOOP FEEDBACK 2=SPEED RAMP OUTPUT; 3=SPD RAMP INPUT TP; 4=SPD SOURCE SELECT OUT
61		LEVEL DETECT 2 SELECT (P.605)	Level detector 2 signal	
62		NOMINAL AC LINE FREQ (P.306)	Nominal AC line frequency	Hz
63		NOMINAL AC LINE VOLTS (P.307)	Nominal AC line RMS voltage	volts RMS
Configurable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable is 1=1 and the drive is not running or jogging.				

CHAPTER 6

FlexPak 3000 Drives: Alternate Register Map

This section lists the alternate register map, which enables you to access most of the FlexPak 3000 original register map functions plus some additional functions. The alternate register map is organized so that commonly used functions are available in Drop 1. It also offers a different set of options in Drop 1 than the original register map.

The additional functions that are available through the alternate register map are:

- Winding functions: SPEED FEEDBACK GAIN (Drop 1, register 38) and UNDERWIND ENABLE (Drop 1, register 32, bit 5) enable you to set up under- or overwinding and set the gain of the speed loop feedback path for winding applications.
- Access to the speed loop PI reset and initial value. These parameters are SPD LOOP PI INIT SEL (Drop 2, register 32), SPD LOOP PI INIT VAL (Drop 1, register 39), and SPD LOOP PI RESET (Drop 1, register 32, bit 6).

> **ATTENTION:** If you are using the alternate register map (NETW REGISTER MAP SEL (P:914) set to ALTERNATE) and you change the control source from NETWORK, the parameters SPD LOOP PI INIT SEL, SPD LOOP PI INIT VAL, and SPD LOOP PI RESET are reset to their default values (0 for each). Make sure these values are appropriate for your application before changing the control source. Failure to observe this precaution could result in severe bodily injury or loss of life.

- Process Error Parameter Number (Drop_1, register 27)
- NETW REGISTER MAP SEL (P:914) (Drop_1, register 29)
- RAMP STOP DECEL TIME (P:018) (Drop_2, register 39)
- INV FLT AVOID SEL (P:312) (Drop_2, register 43)
- TACH LOSS SCR ANGLE (P:606), (Drop_3, register 50)
- NEG CUR LIM INV EN (P:226) (Drop_3, register 53, bit 0)
- CCL PROP TRIM SELECT (P:813) (Drop_3, register 53, bit 1)
- CCL TYPE3 POSN REG EN (P:814) (Drop_3, register 53, bit 2)
- PHASE LOSS DETECT EN (P:609) (Drop_3, register 53, bit 3)
- STOP RECT SELECT (P:122) (Drop_3, register 53, bit 4)
- CMD REF LIMIT SELECT (P:311) (Drop_3, register 53, bit 6
- DIG IN 0 SELECT (P:426) (Drop_4, register 47)

Brief descriptions of parameters are in the register map tables. For detailed parameter descriptions, refer to the *FlexPak 3000 DC Drive Software Reference Manual*.

6.1 Accessing the Alternate Register Map

To access the alternate register map, set NETW REGISTER MAP SEL (P.914) to ALTERNATE.

Some parameters are not available and others are mapped differently when NETW REGISTER MAP SEL (P.914) is set to ALTERNATE. Make sure your application uses the correct mappings if you switch from the original register map to the alternate register map.

Important: When a version **4.2** Regulator board is used as a replacement in an existing AutoMax network that uses the ALTERNATE register map, you may need to reprogram the master task so that it writes valid data in the registers that are now being used (where previously they were marked as reserved).

6.2 Diagnosing Processing Errors

In the alternate map, Drop 1, register 27, the number of the parameter that caused a processing error (indicated by alternate map, register 0, bit 10) is now recorded. If there are no processing errors, the value will be set to -1.

Because some parameters are processed in groups, it is not possible to always report the specific parameter that is out of range. Instead, the first parameter number of the group that contains the error is reported (see table 6.1). For example, if MOP ACCEL TIME (P.115) was set out of range by the Network Option board, Drop 1, register 27 would contain the value 14 (S-CURVE ROUNDING). Parameters not listed in table 6.1 are handled on an individual basis by the parameter processing routines so the parameter causing the processing error is reported by number directly. This feature is available only with the alternate register map. Also listed in the table are possible non-user paramter numbers (> 25000) that can cause parameter processing errors.

Be aware that certain parameters are used as limits for other parameters (for example, TOP SPEED (P.011) determines the maximum limit for MAXIMUM SPEED (P.004). The *FlexPak 3000 Software Reference* (D2-3405) describes the relationships between all user parameters. It is also possible (but very unlikely) to get a processing error reported for a non-user parameter number not listed below. If this occurs, the Regulator board is suspect. Cycle power, and if another non-user parameter number processing error occurs, replace the Regulator board.

Table 6.1 – Error Processing Parameters Reported by Group

Number Reported	Parameter Number	Parameter Name	Number Reported	Parameter Number	Parameter Name
004	004	MAXIMUM SPEED	014	014	S-CURVE ROUNDING
	003	MINIMUM SPEED		001	ACCELERATION TIME
	012	JOG SPEED 1		018	DECELERATION TIME
	017	JOG SPEED 2		013	RAMP STOP DECEL TIME
	117	PRESET SPEED 1		115	JOG ACCEL/DECEL TIME
	118	PRESET SPEED 2		120	MOP ACCEL TIME
	119	PRESET SPEED 3			MOP DECEL TIME
	113	STOP SPEED THRESHOLD			
005	005	POSITIVE CURRENT LIMIT	803	803	OCL REF ROUNDING
	006	NEGATIVE CURRENT LIMIT		802	OCL REF RAMP TIME
211	211	SPD LOOP PI PROP GAIN	807	807	OCL LEADLAG RATIO
	212	SPD LOOP PI LEAD FREQ		806	OCL LEADLAG LOW FREQ
213	213	SPD LEADLAG RATIO	808	808	OCL PI PROP GAIN
	214	SPD LEADLAG LOW FREQ		809	OCL PI LEAD FREQ
424	424	FREQ IN FULL SCALE	900	900	NETW DROP NUMBER
	423	FREQ IN ZERO		910	NETW CONNECT TYPE
427	427	FREQ OUT FULL SCALE	902	902	NETW OUT REG 1 SELECT
	426	FREQ OUT ZERO		903	NETW OUT REG 2 SELECT
				904	NETW OUT REG 3 SELECT
510	510	MOTOR RCT FLD AMPS	25200	25200	Trending Aquisition Rate (set by CS3000)
	516	FLD FEEDBACK GAIN ADJ			
514	514	FIELD PI PROP GAIN	26016		SPD LOOP PI INIT SEL (alternate, Drop 2, reg 32)
	515	FIELD PI LEAD FREQ			
519	519	FLD WEAKEN PROP GAIN			
	520	FLD WEAKEN LEAD GAIN			

6.3 Finding Data in the Alternate Register Map Tables

The alternate register maps in table 6.3 through table 6.18 describe the registers and bits used by the FlexPak 3000 drive on the AutoMax network when NETW REGISTER MAP SEL (P.914) is set to ALTERNATE.

Drop 2, Drop 3, and Drop 4 do not have master write registers for control/reference data. Drop 4 does not have a master read register for runtime signal data.

Table 6.2 – Location of Information in the FlexPak 3000 Alternate Register Map Tables

Drop #	Master...	Data Type	Table	Page
1	Read	Runtime Signal	6.3	6-5
		Tunable, Configurable, and Status	6.4	6-7
	Write	Control/Reference	6.5	6-9
		Tunable	6.6	6-10
		Configurable	6.7	6-10
2	Read	Runtime Signal	6.8	6-11
		Tunable, Configurable, and Status	6.9	6-11
	Write	Tunable	6.10	6-12
		Configurable	6.11	6-13
3	Read	Runtime Signal	6.12	6-14
		Tunable, Configurable, and Status	6.13	6-14
	Write	Tunable	6.14	6-15
		Configurable	6.15	6-16
4	Read	Tunable, Configurable, and Status	6.16	6-17
	Write	Tunable	6.17	6-18
		Configurable	6.18	6-18

Table 6.3 – FlexPak 3000 Alternate Register Map, Drop_1: Master Read Registers, BASIC and FULL Connections, Runtime Signal Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
0		Drive status word 1	Bit-packed word containing information on the present status of the drive	
	0		Drive ready	
	1		Drive running	
	2		Fault active	
	3		Drive jogging	
	4		Forward/Reverse command	0=forward; 1=reverse
	5		Drive stopping	
	6		Tune/config input enable loopback	0=disabled; 1=enabled
	7		Tune/config update synch flag loopback (master read)	
	8		Alarm active	
	9		In current limit	
	10		Parameter processing error	
	11		Level detector 1 output	
	12		Level detector 2 output	
	13–15		Reserved	
1		Drive status word 2	Bit-packed word containing information on the present status of the drive	
	0		ENABLE status	
	1		Customer interlock	0=open; 1=closed
	2		Terminal strip run	
	3		Terminal strip forward/reverse	
	4		Terminal strip jog	
	5		Terminal strip stop	
	6		Coast/DB interlock	0=open; 1=closed
	7		Terminal strip fault reset	
	8		I/O Expansion card digital input 1 (Preset speed select 1)*	
	9		I/O Expansion card digital input 2 (Preset speed select 2)*	
	10		I/O Expansion card digital input 3 (MOP decrement)*	
	11		I/O Expansion card digital input 4 (MOP increment)*	
	12		I/O Expansion card digital input 5 (COAST enable)*	
Runtime signal data are updated by the regulator every 5 msec, unless FEEDBACK SELECT (P200) is set to ARMATURE VOLT, in which case the update time is 10 msec.				

Table 8.3 – FlexPak 3000 Allenside Register Map, Drop_1 Master Read Registers, BASIC and FULL Connections, Runtime Signal Data (Drive Output Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
1 (cont'd.)	13		Terminal strip auto/manual	
	14		Digital input 8	
	15		Motor thermostat	
2		SPD LOOP REFERENCE (P.295)	Final speed/voltage loop reference value	4095 at TOP SPEED (P.011)
3		SPD LOOP FEEDBACK (P.296)	Final speed/voltage loop feedback value after all scaling	4095 at TOP SPEED (P.011)
4		SPD LOOP OUTPUT (P.299)	Speed loop PI block output value	4095 at MAXIMUM CURRENT (P.007)
5		ARMATURE VOLTAGE (P.269)	Armature voltage feedback value	4095 at MOTOR RATED ARM VOLTS (P.009)
6		Average CML feedback	Current minor loop feedback average over 8 CML scans	4095 at MAXIMUM CURRENT (P.007)
7		Network Output Register 1	Value of the parameter selected by NETW OUT REG 1 SELECT (P.902)	If no valid parameter value selected, 0=motor speed in RPM
8		Network Output Register 2	Value of the parameter selected by NETW OUT REG 2 SELECT (P.903)	If no valid parameter value selected, 0=armature voltage in volts
9		Network Output Register 3	Value of the parameter selected by NETW OUT REG 3 SELECT (P.904)	If no valid parameter value selected, 0=armature current in amps*10 or amps
10 to 15		Tunable, Configurable and Status Data	See table 8.4 on page 8-7.	
16		ANALOG AUTO REFERENCE (P.166)	Analog reference value in auto mode after all scaling	4095 at TOP SPEED (P.011)
17		ANALOG MAN TRIM REF (P.194)	Analog manual trim reference input value	4095 at TOP SPEED (P.011)
18		ANLG IN 1 (P.492)	I/O Exp. kit analog input 1 after gain and zero applied	4095 at full scale
19		ANLG IN 2 (P.493)	I/O Exp. kit analog input 2 after gain and zero applied	4095 at full scale
20		FREQ IN (P.491)	I/O Expansion kit frequency input value after all scaling	4095 at full scale
21		OCL OUTPUT (P.648)	Outer control loop output value	RPM
22		FIELD FEEDBACK (P.580)	Motor field current feedback value after scaling and gain	4095 at MOTOR HOT FLD AMPS (P.610)
23		AC LINE VOLTAGE (P.392)	Measured AC line RMS voltage	volts RMS
Runtime signal data are updated by the regulator every 5 msec, unless FEEDBACK SELECT (P.200) is set to ARMATURE VOLT, in which case the update time is 10 msec.				

* The I/O Expansion kit digital inputs do not have fixed functions when CONTROL SOURCE SELECT (P.500) is set to NETWORK. Therefore they do not select preset speeds, change the MOP setpoint, or enable or disable the OCL.

Table 6.1 – FlexPak 3000 Alternate Register Map, Drop_1: Master Read Registers, BASIC and FULL Connections, Tunable, Configurable and Status Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
10		Fault latch bits word 1	Bit-packed word indicating latched faults	
	0		AC LINE SYNCHRONIZATION FAULT (F00010)	
	1		FIELD CURRENT LOSS (F00004)	
	2		SUSTAINED OVERLOAD (F00005)	
	3		SELF TUNING FAULT (F00060 to F00069)	
	4		MOTOR THERMOSTAT TRIP (F00006)	
	5		CONTROL ER THERMOSTAT TRIP (F00009)	
	6		BLOWER MOTOR STARTER OPEN (F00008)	
	7		Reserved	
	8		IET (OVERCURRENT) (FCCCC1)	
	9		OVERSPEED (F00003)/ARMATURE OVERVOLTAGE (F00012)	
	10		SCR # OF MULTIPLE SCRS NOT OPERATING (F00030–F00042)	
	11		OPEN ARMATURE (F00007)	
	12		TACHOMETER LOSS (F00002)	
	13		CIM COMMUNICATIONS TIMEOUT (F00011)	
	14		NETWORK COMMUNICATION TIMEOUT (F00013)	
	15		REVERSED TACH LEADS (F00014)	
11		Reserved		
12		First fault	Fault code of the first fault since the last fault read	
13		Alarm latch bits word	Bit-packed word containing latched alarm bits	
	0		MOTOR BRUSH WEAR LOW (A00001)	
	1		AC LINE VOLTAGE LOW (A00002)	
	2		AC LINE VOLTAGE HIGH (A00003)	
	3 to 15		Reserved	
14		Last alarm	Alarm code of the most recent alarm	
15		CONTROL SOURCE SELECT (P.000)	Selected source for drive control signals	0 - TERMBLK; 1 - KEYPAD; 2 - SERIAL; 3 - NETWORK
16 to 23		See table 6.3 on page 6-5.		
24 to 25		Reserved		
Tunable, configurable, and status data are updated by the regulator approximately every 600 msec.				

Table 6.1 – FlexPak 3000 Alternate Register Map, Drop_1: Master Read Registers, BASIC and FULL Connections, Tunable, Configurable, and Status Data (Drive Output Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
26		Stop cause word	Bit-packed word indicating why the drive stopped*	
	0		Stop asserted or Run de-asserted (negated)	
	1		Jog de-asserted for more than 1 second	
	2		Internal stop request	
	3		Current limit stop	
	4		Ramp stop	
	5		Coast/DB stop	
	6		Fault stop or self-tuning completed	
	7		Customer interlock opened	
	8		Coast/DB interlock opened	
	9		Main contactor opened	
	10 – 15		Reserved	
27		Process Error Parameter Number	Indicates the parameter number that caused a processing error.	-1 = No parameter processing error.
28	0	NETW CONNECT TYPE (P910)	AutoMax network connection type	0=BASIC; 1=FULL
	8	NETW REGISTER MAP SEL (P914)	Network register map selected	0=ORIGINAL; 1=ALTERNATE
29 to 30		Reserved		
31		REGULATOR SW VERSION (P794)	Regulator board software version	
Tunable, configurable, and status data are updated by the regulator approximately every 600 msec.				

* Before examining this register, check the drive status word (Drop_1, register 0) to determine if the drive is presently running or jogging. If neither of these bits is set to ON (1), then the stop cause word can be examined to determine why the drive last stopped. If all the defined bits in the stop cause word are false, the drive is either running, jogging, or has not been started since the last power up.

Table 6-5 – FlexPak 3000 Alternate Register Map: Drop_1: Master Write Registers BASIC and FULL Connections. Control/Reference Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
32		Sequencing control word	Word containing drive sequencing and control bits	
	0		Run	0 to 1 transition to run
	1		Stop	0=stop; 1=not stop
	2		Fault reset	0 to 1 transition to reset
	3		Jog	0 to 1 transition to jog; 0=stop
	4		Fwd/Rev select	0 = forward; 1 = reverse
	5		UNDERWIND ENABLE	0=DISABLED (overwind); 1=ENABLED (underwind); (Default=0)*
	6		SPD LOOP PI RESET	0=OFF (enable) (default); 1=ON (reset)*
	7		Outer control loop enable	0=hold OCL in reset; 1=OCL enabled
	8		Fault log clear and reset	0 to 1 transition to clear
	9		Alarm log clear and reset	0 to 1 transition to clear
	10		Alarm reset	0 to 1 transition to reset
	11		Memory save	0 to 1 transition to save
	12&13		Reserved	
	14		Tune/config input enable. What to read from the network. "Read all" includes control/reference, tunable, and configurable inputs	0=read only control/reference inputs; 1=read all
	15		Tune/config update synchronization flag (master write)	
33		Network Reference	Speed/voltage loop or OCL reference value when CONTROL SOURCE SELECT (P200)=NETWORK and AUX NETW REF SELECT (P311)=0	4095 at TOP SPEED (P101)/MOTOR RATED ARM VOLTS (P109) or MAX CURRENT (P107)
34		Network Input Register 1	Written by network master	Read at DPM or DDM (NETW IN REG 1, P905)
35		Network Input Register 2	Written by network master	Read at DPM or DDM (NETW IN REG 2, P906)
36		Network Input Register 3	Written by network master	Read at DPM or DDM (NETW IN REG 3, P907)
37		FIELD REF REGISTER (P513)	Reference for the field current loop	4095 at MOTOR HOT FLD AMPS (P510)
38		SPEED FEEDBACK GAIN	Controls gain of the speed loop feedback path	Gain * 1000 (1000 to 32000) (Default=1000 (1.000))*
39		SPD LOOP PI INIT VAL	Initial value of speed loop PI block. This value is at the PI block output when block is in reset. Block is in reset when drive is stopped or bit 6 of sequencing control word (Drop_1, register 32) is set to 1.	4095 at MAXIMUM CURRENT (P107) (default=0)*
Control/reference data are read by the regulator every 5 msec, unless FEEDBACK SELECT (P200) is set to ARMATURE VOLT, in which case the update time is 10 msec.				

* This parameter is network-only. If the control source is changed from NETWORK to something else this parameter is automatically reset to its default value.

Table 6-6 – FlexPak 3000 Alternate Register Map: Drop_1: Master Write Registers, BASIC and FULL Connections. Tunable Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
40		ACCELERATION TIME (P.001)	Min. time to accelerate from zero to TOP SPEED (P.011)	seconds * 10
41		DECELERATION TIME (P.002)	Min. time to decelerate from TOP SPEED (P.011) to zero	seconds * 10
42		MINIMUM SPEED (P.003)	Lowest operating speed	RPM
43		MAXIMUM SPEED (P.004)	Highest operating speed	RPM
44		POSITIVE CURRENT LIM (P.005)	Highest amount of current for the forward bridge	% of MOTOR RATED ARM AMPS (P.008)
45		NEGATIVE CURRENT LIM (P.006)	Highest amount of current for reverse bridge	% of MOTOR RATED ARM AMPS (P.008)
46		S-CURVE ROUNDING (P.014)	Smoothing of the speed/voltage loop reference	%
47		TRIM RANGE (P.109)	Amount the trim reference will affect the drive reference	%
48		SPD LOOP PI PROP GAIN (P.211)	Speed loop PI proportional gain	gain * 100
49		SPD LOOP PI LEAD FREQ (P.212)	Speed loop PI block lead break frequency	radians/second * 100
50		CML PI PROP GAIN (P.301)	CML PI proportional gain	gain * 1000
51		CML PI LEAD FREQUENCY (P.302)	CML PI lead break frequency	radians/second
52		CCL PI PROP GAIN (P.808)	CCL PI block proportional gain	gain * 100
53		CCL PI LEAD FREQ (P.809)	Outer control loop PI block lead break frequency	radians/second * 100
54		CCL PI POSITIVE LIMIT (P.810)	CCL PI block positive limit	%
55		CCL PI NEGATIVE LIMIT (P.811)	Outer control loop PI block negative limit	%
56		CURRENT COMPOUNDING (P.209)	Sets the level of current compounding	%
57		NORMALIZED INERTIA (P.222)	Combined inertia of motor and load	seconds * 100
58		NETW OUT REG 1 SELECT (P.902)	Number of the parameter readable in Drop_1, register 7	If no valid parameter selected, set to 0—motor speed in RPM
59		NETW OUT REG 2 SELECT (P.903)	Number of the parameter readable in Drop_1, register 8	If no valid parameter selected, set to 0—armature voltage (volts)
60		NETW OUT REG 3 SELECT (P.904)	Number of the parameter readable in Drop_1, register 9	If no valid parameter selected, set to 0—armature current in amps * 10 or amps
Tunable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1.				

Table 6-7 – FlexPak 3000 Alternate Register Map: Drop_1: Master Write Registers, BASIC and FULL Connections. Configurable Data (Drive Input Data)

Register	Parameter Name (Number)	Description	Settings
61	FEEDBACK SELECT (P.200)	Type of speed/voltage loop feedback	0 = ARMATURE VOLT; 1 = 90 TACH; 2 = PULSE TACH; 3 = AC TACH
62	NETW CONNECT TYPE (P.910)	AutoMax network connection type	0 = BASIC; 1 = FULL
63	AMX NETW REF SELECT (P.911)	AutoMax network reference selection	0 = D REQT; n = BROADCAST n (n = 1 to 8)
Configurable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1 and the drive is not running or jogging.			

Table 6.8 – FlexPak 3000 Alternate Register Map, Drop_2: Master Read Registers, FULL Connection: Runtime Signal Data (Drive Output Data)

Register	Parameter Name (Number)	Description	Settings
0	SPD SOURCE SELECT OUT (P.193)	Selected speed/voltage loop reference value	4095 at TOP SPEED (P.011)
Runtime signal data are updated by the regulator every 5 msec, unless FEEDBACK SELECT (P.200) is set to ARMATURE VOLT, in which case the update time is 10 msec.			

Table 6.9 – FlexPak 3000 Alternate Register Map, Drop_2: Master Read Registers, FULL Connection: Tunable, Configurable, and Status Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
1		ACCELERATION TIME (P.001)	Min. time to accelerate from zero to TOP SPEED (P.011)	seconds * 10
2		DECELERATION TIME (P.002)	Min. time to decelerate from TOP SPEED (P.011) to zero	seconds * 10
3		MINIMUM SPEED (P.003)	Lowest operating speed	RPM
4		MAXIMUM SPEED (P.004)	Highest operating speed	RPM
5		POSITIVE CURRENT LIM (P.005)	Highest amount of current for the forward bridge	% of MOTOR RATED ARM AMPS (P.006)
6		NEGATIVE CURRENT LIM (P.006)	Highest amount of current for reverse bridge	% of MOTOR RATED ARM AMPS (P.006)
7		TRIM RANGE (P.109)	Amount the trim reference will affect the drive reference	%
8		SPD LOOP PI PROP GAIN (P.211)	Speed loop PI proportional gain	gain * 100
9		SPD LOOP PI LEAD FREQ (P.212)	Speed loop PI block lead break frequency	radians/second * 100
10		Reserved		
11		CCL RAMP OUTPUT (P.846)	CCL reference S curve block output	4095
12		Reserved		
13		TOP SPEED (P.011)	Highest running speed of motor	RPM
14		JOG SPEED 1 (P.012)	Operating speed while jogging	RPM
15		JOG ACCEL/DECEL TIME (P.013)	Minimum time in which jog reference can go from zero to TOP SPEED (P.011) and from TOP SPEED to zero	seconds * 10
16		S-CURVE ROUNDING (P.014)	Smoothing of the speed/voltage loop reference	%
17		REVERSE DISABLE (P.015)	Prevents speed/voltage loop ref. from going negative	0 = OFF (bipolar ref); 1 = ON (positive ref)
18		ANLG AUTO SIGNAL TYPE (P.100)	Type of signal applied to analog auto reference input	0=0–10V; 1=±10V; 2=4–20mA; 3=10–50mA
19		ANLG AUTO GAIN ADJ (P.101)	Scales analog auto reference signal	gain * 1000
20		ANLG AUTO ZERO ADJ (P.102)	Offset removed from analog auto reference zero	
21		AUTO REFERENCE SELECT (P.103)	Selects the type of auto reference	0 = ANALOG; 1 = FREQUENCY IN
22		ANLG MAN REF GAIN ADJ (P.104)	Scales the analog manual reference gain	gain * 1000
Tunable, configurable, and status data are updated by the regulator approximately every 500 msec.				

Table 6.9 – FlexPak 3000 Alternate Register Map, Drop_2: Master Read Registers, FULL Connection, Tunable, Configurable, and Status Data (Drive Output Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
23		ANLG MAN REF ZERO ADJ (P.105)	Offset removed from the analog manual reference signal	
24		TRIM REF REGISTER (P.107)	Trim reference value	% TOP SPEED (P.011) * 10
25		TRIM REFERENCE SELECT (P.108)	Trim reference selection	0 = REG STPT; 1 = ANALOG MANUAL; 2 = ANALOG IN 1; 3 = NETW IN REG 1; 4 = NETW IN REG 2; 5 = NETW IN REG 3; 6 = ANALOG IN 2
26		TRIM MODE SELECT (P.110)	Type of trim mode selected	0 = ADDITIVE 1 = INCREMENTAL; 2 = PROPORTIONAL
27		AUTO MODE MIN BYPASS (P.111)	Disables minimum speed limit while in auto mode	0 = OFF; 1 = ON (min speed bypassed)
28		AUTO MODE RAMP BYPASS (P.112)	Bypasses speed loop S-curve block when drive in auto	0 = OFF; 1 = ON (rate limit bypassed)
29		STOP SPEED THRESHOLD (P.113)	Where the main contactor opens during a controlled stop	RPM
30		Reserved		
31		TRIM OUTPUT (P.197)	Signal that trims selected speed/voltage loop reference	4095 at TOP SPEED (P.011)
Tunable, configurable, and status data are updated by the regulator approximately every 600 msec.				

Table 6.10 – FlexPak 3000 Alternate Register Map, Drop_2: Master Write Registers, FULL Connection, Tunable Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
33		RAMP STOP DECEL TIME (P.016)	Ramp stop deceleration time when STOP DECEL SELECT set to RAMP STOP DECEL TIME	seconds * 10
34		OCL REF REGISTER (P.801)	Outer control loop reference	4095
35		OCL REF RAMP TIME (P.802)	Ramp time for OCL reference	seconds * 10
36		OCL REF ROUNDING (P.803)	Amount of smoothing of the outer control loop reference	%
37		OCL LEADLAG SELECT (P.805)	Outer control loop lead/lag block select	0 = LEADLAG; 1 = BYPASS; 2 = LAG/LEAD
38		OCL LEADLAG LOW FREQ (P.806)	OCL lead/lag block low break frequency	radians/second * 100
39		OCL LEADLAG RATIO (P.807)	Ratio between low and high frequencies of OCL	
40		JOG ACCEL/DECEL TIME (P.013)	Minimum time in which the jog ref. can change from zero to TOP SPEED (P.011) and from TOP SPEED to zero	seconds * 10
41		ANLG ALTO GAIN ADJ (P.101)	Scales analog auto reference signal	gain * 1000
42		ANLG ALTO ZERO ADJ (P.102)	Offset removed from analog auto reference zero	
43		INV FAULT AVOID SEL (P.312)	Inverting fault avoidance select	0 = DISABLED; 1 = FAULT IMMEDIATELY; 2 = DELAY BEFORE FAULT
44		ANLG MAN REF GAIN ADJ (P.104)	Scales the analog manual reference gain	gain * 1000
Tunable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1.				

Table 6.10 – FlexPak 3000 Alternate Register Map, Drop_2: Master Write Registers, FULL Connection, Tunable Data (Drive Input Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
45		ANLG MAN REF ZERO ADJ (P.105)	Offset removed from the analog manual reference signal	
46		TRIM REFERENCE SELECT (P.108)	Trim reference selection	0=REGISTER; 1=ANALOG MANUAL; 2=ANALOG IN 1; 3=NETW IN REG1; 4=NETW IN REG2; 5=NETW IN REG3; 6=ANALOG IN 2
47		TRIM MODE SELECT (P.110)	Type of trim mode selected	0=NOTRIV; 1=INCREMENTAL; 2=PROPORTIONAL
48		AUTO MODE MIN BYPASS (P.111)	Disables minimum speed limit while in auto mode	0=OFF; 1=ON (min speed bypassed)
49		AUTO MODE RAMP BYPASS (P.112)	Bypasses speed loop S-curve block when drive in auto	0=OFF; 1=ON (rate limit bypassed)
50		STOP SPEED THRESHOLD (P.113)	Speed threshold at which the main contactor will open during a controlled stop	
51		CML REF RATE LIMIT (P.303)	Min time for CML ref to go from zero to MAXIMUM CURRENT	in 0.1 seconds
52		JOG SPEED 1 (P.012)	Operating speed while jogging	RPM
53		STOP MODE SELECT (P.114)	Selects how drive responds to a normal stop command	0=RAMP; 1=COAST/DB; 2=CURRENT LIMIT
54		IR COMPENSATION (P.206)	Armature voltage loss compensation	%
55		CCL TRIM RANGE (P.612)	Trim range for the ccl	% * 10
Tunable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1.				

Table 6.11 – FlexPak 3000 Alternate Register Map, Drop_2: Master Write Registers, FULL Connection, Configurable Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
32		SPD LOOP FLNT SEL	Source for the initial value of the speed loop FI block	0=ZERO (default); 1=SPD LOOP FLINT VAL (Drop_1, register 39); 2=ANALOG MAN TRIM REF (P.104)*
56		INERTIA COMP SELECT (P.221)	Source of inertia compensation	0=NONE; 1=INTERNAL; 2=ANALOG IN 1; 3=ANALOG IN 2; 4=NETW IN REG1 (P.905); 5=NETW IN REG 2 (P.906); 6=NETW IN REG 3 (P.907)
57		POS CURRENT LIM SEL (P.223)	Selects positive current limit source	0=REGISTER; 1=ANALOG IN 1; 2=ANALOG IN 2; 3=NETW IN REG; 4=NETW IN REG 2; 5=NETW IN REG 3
58		NEG CURRENT LIM SEL (P.224)	Selects negative current limit source	
59		CCL REFERENCE SELECT (P.600)	Selects ccl reference source	0=REGISTER; 1=ANALOG IN 1; 2=ANALOG IN 2; 3=FREQUENCY IN; 4=NETW IN REG 1; 5=NETW IN REG 2; 6=NETW IN REG 3
60		CCL FEEDBACK SELECT (P.604)	Source of CCL feedback	0=NONE; 1=CML FEEDBACK; 2=ANALOG IN 1; 3=ANALOG IN 2; 4=SPEED LOOP OUTPUT; 5=ANALOG AUTO REFERENCE; 6=NETW IN REG 1; 7=NETW IN REG 2; 8=NETW IN REG 3
61		TOP SPEED (P.011)	Highest running speed of motor	RPM
62		REVERSE DISABLE (P.015)	Prevents speed/voltage loop ref. from going negative	0=OFF (bipolar ref); 1=ON (positive ref)
Configurable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit=1 and the drive is not running or jogging.				

Table 6.11 – FlexPak 3000 Alternate Register Map, Drop_2 Master Write Registers, FULL Connection, Configurable Data (Drive Input Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
63		ANLG AUTO SIGNAL TYPE (P.100)	Type of signal applied to analog auto reference input	0 = 0–10V; 1 = +/–10V; 2 = 4-20mA; 3 = 0-50mA
Configurable data are read by the regulator approximately every 600 msec when TuneConfig Input Enable bit = 1 and the drive is not running or jogging.				

* This parameter is network-only. If the control source is changed from NETWORK to something else, this parameter is automatically reset to its default value.

Table 6.12 – FlexPak 3000 Alternate Register Map, Drop_3 Master Read Registers, FULL Connection, Runtime Signal Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
0		ANALOG TACH FEEDBACK (P.291)	Analog tachometer feedback signal after all scaling	4095 at TOP SPEED (P.011)
1		PULSE TACH FEEDBACK (P.292)	Pulse encoder feedback signal after all scaling	4095 at TOP SPEED (P.011)
2		SPD LOOP ERROR (P.297)	Speed loop error	
3		CML REFERENCE (P.396)	Amplitude and rate limited value of selected CML ref	4095 at MAXIMUM CURRENT (P.007)
4		FIELD REFERENCE (P.590)	Field current reference	4095 at MOTOR HOT FLD AMPS (P.510)
5		Reserved		
Runtime signal data are updated by the regulator every 5 msec, unless FEEDBACK SELECT (P.200) is set to ARMATURE VOLT, in which case the update time is 10 msec.				

Table 6.13 – FlexPak 3000 Alternate Register Map, Drop_3, Master Read Registers, FULL Connection, Tunable, Configurable, and Status Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
6		CML PI PROP GAIN (P.301)	CML PI proportional gain	gain * 1000
7		CML PI LEAD FREQUENCY (P.302)	CML PI lead break frequency	radians/second
8		CML REF RATE LIMIT (P.303)	Min time for CML ref to go from zero to MAXIMUM CURRENT	milliseconds
9 to 11		Reserved		
12		MAXIMUM CURRENT (P.007)	Highest amount of current, either positive or negative	% of MOTOR RATED ARM AMPS (P.008)
13		MOTOR RATED ARM AMPS (P.008)	Rated armature current from motor nameplate	amps * 10
14		MOTOR RATED ARM VOLTS (P.009)	Rated armature voltage from motor nameplate	volts DC
15		FEEDBACK SELECT (P.200)	Type of feedback for speed/voltage loop feedback	0=ARMATURE VOLT; 1=DC TACH; 2=PULSE TACH; 3=AC TACH
16		ANALOG TACH GAIN ADJ (P.201)	Scales analog tachometer feedback signal	gain * 1000
17		ANALOG TACH ZERO ADJ (P.202)	Offset removed from analog tachometer feedback signal	
Tunable, configurable, and status data are updated by the regulator approximately every 600 msec.				

Table 6.13 – FlexPak 3000 Alternate Register Map, Drop_3, Master Read Registers, FULL Connection: Tunable, Configurable, and Status Data (Drive Output Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
18		ANLG TACH VOLTS/1000 (P.203)	Analog tach scaling from tach nameplate (V/1000 RPM)	volts * 10
19		ARM VOLTAGE GAIN ADJ (P.204)	Scales the armature voltage signal	gain * 1000
20		ARM VOLTAGE ZERO ADJ (P.205)	Offset removed from armature voltage feedback	
21		Reserved		
22		PULSE TACH PPR (P.207)	Pulses per revolution from the pulse encoder nameplate	
23		PULSE TACH QUADRATURE (P.208)	Enables or disables pulse encoder quadrature	0=OFF; 1=ON (quad decode)
24		CURRENT COMPOUNDING (P.209)	Sets the level of current compounding	%
25		SPD LEAD/LAG RATIO (P.213)	Ratio between low and high break frequencies of speed feedback lead/lag block	
26		SPD LEAD/LAG LOW FREQ (P.214)	Low break frequency of speed feedback lead/lag block	radians/second * 100
27		SPD LOOP LAG FREQ (P.215)	Lag break frequency for speed loop forward path lag	radians/second * 100
28		SPD LEAD/LAG SELECT (P.216)	Speed/voltage loop lead/lag block select	0=LEAD/LAG; 1=BYPASS; 2=LAG/LAG
29		SPD LOOP LAG BYPASS (P.217)	Speed/voltage loop lag block bypass	0=OFF (not bypassed); 1=ON (bypassed)
30		CM FEEDBACK GAIN ADJ (P.300)	Current minor loop feedback gain adjust	gain * 1000
31		ARMATURE BRIDGE POL (P.394)	Active armature bridge	0=OFF (forward); 1=ON (reverse)
Tunable, configurable, and status data are updated by the regulator approximately every 600 msec.				

Table 6.14 – FlexPak 3000 Alternate Register Map, Drop_3, Master Write Registers, FULL Connection: Tunable Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
33		FIELD ECONOMY REF (P.511)	Reference for field economy mode	% of MOTOR RATED FLD AMPS (P.510)
34		FIELD PI PROP GAIN (P.514)	Proportional gain setting for the field current loop PI block	gain * 100
35		FIELD PI LEAD FREQ (P.515)	Lead frequency for the field current loop PI block	radians/second * 100
36		FLD FEEDBACK GAIN ADJ (P.516)	Field current feedback gain adjust	gain * 1000
37		FLD WEAKEN THRESHOLD (P.518)	Where field control loop begins regulating armature voltage and the field begins to weaken	4095 at MOTOR RATED ARM VOLTS (P.009)
38		FLD WEAKEN PROP GAIN (P.519)	Proportional gain of the field control loop's armature voltage regulator	gain * 100
39		FLD WEAKEN LEAD FREQ (P.520)	PI block lead break frequency of the field control loop's armature voltage regulator	radians/second * 100
Tunable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1.				

Table 8.14 – FlexPak 3000 Alternate Register Map, Drop_3: Master Write Registers, FULL Connection: Tunable Data (Drive Input Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
40		ANALOG TACH GAIN ADJ (P.201)	Scales analog tachometer feedback signal	gain * 1000
41		ANALOG TACH ZERO ADJ (P.202)	Offset removed from analog tachometer feedback signal	
42		ARM VOLTAGE GAIN ADJ (P.204)	Scales the armature voltage signal	gain * 1000
43		ARM VOLTAGE ZERO ADJ (P.205)	Offset removed from armature voltage feedback	
44		SPD LEADLAG RATIO (P.213)	Ratio between low and high break frequencies of speed feedback lead/lag block	
45		SPD LEADLAG LOW FREQ (P.214)	Low break frequency of speed feedback lead/lag block	radians/second * 100
46		SPD LOOP LAG FREQ (P.215)	Lag break frequency for the speed loop forward path lag block	radians/second * 100
47		SPD LEADLAG SELECT (P.216)	Speed/voltage loop lead/lag block select	0 = LEAD/LAG; 1 = BYPASS; 2 = LAG/LEAD
48		SPD LOOP LAG BYPASS (P.217)	Speed/voltage loop lag block bypass	0 = OFF (not bypassed); 1 = ON (bypassed)
49		CML FEEDBACK GAIN ADJ (P.300)	Current minor loop feedback gain adjust	gain * 1000
50		NETW COMM LOSS SELECT (P.501)	Selects how the drive responds to network communication loss	0 = FAULT; 1 = USE LAST REF; 2 = USE TRIM REF
Tunable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1.				

Table 8.15 – FlexPak 3000 Alternate Register Map, Drop_3: Master Write Registers, FULL Connection: Configurable Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
50		TACH LOSS SCR ANGLE (P.606)	SCR firing angle used in tach loss detection logic	degrees
51		FIELD REF SELECT (P.521)	Selects reference source for the field current regulator	0 = REGISTER; 1 = ANALOG MAN TRIM REF; 2 = ANALOG IN 1; 3 = ANALOG IN 2
53	0	NEG CURR LIM INV EN (P.226)	Enables negative current limit inverter	0 = DISABLED; 1 = ENABLED
	1	CCL PROP TRIM SELECT (P.813)	Sets CCL output proportional to absolute value of speed reference at the output of the speed loop S curve block	0 = DISABLED; 1 = ENABLED
	2	CCL TYPE3 POSN REG EN (P.814)	Implements type 3 position regulator	
	3	STOP DECEL SELECT (P.122)	Selects the deceleration time for ramp stop sequences	1 = DECELERATION TIME; 2 = RAMP STOP DECEL TIME
	4	Reserved		
	5	CML REF LIMIT SELECT (P.311)	Source for CML positive and negative current limits	1 = SPD LOOP PI LIMITS; 2 = REGISTER
	6 to 15	Reserved		
Configurable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1 and the drive is not running or jogging.				

Table 6.15 – FlexPak 3000 Alternate Register Map, Drop_3: Master Write Registers, FULL Connection, Configurable Data (Drive Input Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
54		AUTO REFERENCE SELECT (P.100)	Selects the type of auto reference	0 = ANALOG; 1 = FREQUENCY IN
55		MOTOR HOT FLD AMPS (P.510)	Rated hot field amps from motor nameplate	amps * 100
56		FIELD LOSS THRESHOLD (P.512)	Field current level at which a field loss fault is generated	% of MOTOR HOT FLD AMPS (P.510)
57		FIELD AUTO WEAKEN (P.517)	Enables or disables automatic field weakening	0=DISABLED; 1=ENABLED
58		MAXIMUM CURRENT (P.007)	Highest amount of current, either positive or negative	% of MOTOR RATED ARM AMPS (P.008)
59		MOTOR RATED ARM AMPS (P.008)	Rated armature current from motor nameplate	amps * 10
60		MOTOR RATED ARM VOLTS (P.009)	Rated armature voltage from motor nameplate	volts DC
61		ANLG TACH VOLTS/1000 (P.203)	Analog tach scaling from tach nameplate in V/1000 RPM	volts * 10
62		PULSE TACH PPR (P.207)	Pulses per revolution from pulse encoder nameplate	
63		PULSE TACH QUADRATURE (P.208)	Enables or disables pulse encoder quadrature	0=OFF; 1=ON (quad decode)
Configurable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1 and the drive is not running or jogging.				

Table 6.16 – FlexPak 3000 Alternate Register Map, Drop_1: Master Read Registers, FULL Connection, Tunable, Configurable, and Status Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
23		NOMINAL AC LINE FREQ (P.006)	Nominal AC line frequency	Hz
24		Reserved		
25		PLL MAXIMUM ERROR (P.308)	Max. allowed change in line period per AC line cycle	µsec
26		Reserved		
27		ENHANCED FLD VOLT ADJ (P.500)	Adjusts the field output voltage	
28		FIELD ECONOMY DELAY (P.501)	Time between stopping and entering field economy	minutes
29		FIELD ECONOMY ACTIVE (P.599)	Indicates the present state of field economy	0=OFF; 1=ON (field economy active)
30		OPEN SCR SENSITIVITY (P.600)	Open SCR detection sensitivity adjustment	
31		OPEN SCR TRIP THRESH (P.601)	Open SCR detection trip threshold	
Tunable, configurable, and status data are updated by the regulator approximately every 600 msec.				

Table 6.17 – FlexPak 3000 Alternate Register Map, Drop 7: Master Write Registers FULL Connection, Tunable Data (Drive Input Data).

Register	Bit	Parameter Name (Number)	Description	Settings
32		ANLG IN 1 ZERO ADJ (P.414)	I/O Expansion card analog input 1 zero adjust	
33		ANLG IN 1 GAIN ADJ (P.415)	I/O Expansion card analog input 1 gain adjust	gain * 1000
34		ANLG IN 2 ZERO ADJ (P.416)	I/O Expansion card analog input 2 zero adjust	
35		ANLG IN 2 GAIN ADJ (P.417)	I/O Expansion card analog input 2 gain adjust	gain * 1000
36		LEVEL DETECT 1 THRESH (P.603)	Level detector 1 threshold	% * 10
37		LEVEL DETECT 1 DELAY (P.604)	Level detector 1 delay time	seconds * 10
38		LEVEL DETECT 2 THRESH (P.605)	Level detector 2 threshold	% * 10
39		LEVEL DETECT 2 DELAY (P.607)	Level detector 2 delay time	seconds * 10
40		PLL MAXIMUM ERROR (P.308)	Max. allowed change in line period per AC line cycle	µsec
41		ENHANCED FLD VOLT ADJ (P.500)	Adjusts the field output voltage	
42		FIELD ECONOMY DELAY (P.501)	Time between stopping and entering field economy	minutes
43		OPEN SCR SENSITIVITY (P.600)	Open SCR detection sensitivity adjustment	
44		OPEN SCR TRIP THRESH (P.601)	Open SCR detection trip threshold	
45		ANLG OUT 1 GAIN ADJ (P.420)	I/O Expansion card analog output 1 gain adjust	gain * 1000
46		ANLG OUT 2 GAIN ADJ (P.422)	I/O Expansion card analog output 2 gain adjust	gain * 1000
Tunable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1				

Table 6.18 – FlexPak 3000 Alternate Register Map, Drop 7: Master Write Registers, FULL Connection, Configurable Data (Drive Input Data).

Register	Bit	Parameter Name (Number)	Description	Settings
47		DIG IN 0 SELECT (P.428)	Determines the function controlled by digital input 0	0=BRUSH WEAR INPUT;1=LOCK SPEED SELECT; 2=OCL ENABLE
48		DIG OUT 1 SELECT (P.409)	I/O Expansion card digital output 1 source	0=LEVEL DETECT 1 OUTPUT (P.648) 1=LEVEL DETECT 2 OUTPUT (P.649) 2=in current limit; 3=drive ready 4=NETW COMM STATUS (P.906) 5=bit 0 of Network Input Register 1 6=bit 0 of Network Input Register 2 7=bit 0 of Network Input Register 3
Configurable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1 and the drive is not running or jogging.				

Table 6-18 – FlexPak 3000 Alternate Register Map, Drive_1, Master Write Registers, FULL Connection: Configurable Data (Drive Input Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
49		DIG OUT 2 SELECT (P.411)	I/O Expansion kit digital output #2 source	0=LEVEL DETECT 1 OUTPUT (P.648); 1=LEVEL DETECT 2 OUTPUT (P.649); 2=in current limit; 3=drive ready; 4=NETW COMM STATUS (P.908); 5=bit 1 of Network Input Register 1; 6=bit 1 of Network Input Register 2; 7=bit 1 of Network Input Register 3
50	0	DIG OUT 1 CONTACT TYP (P.410)	I/O Expansion kit digital output 1 contact type	0=NORMALLY OPEN 1=NORMALLY CLOSED
	1	DIG OUT 2 CONTACT TYP (P.412)	I/O Expansion kit digital output 2 contact type	
51		ANLG IN 1 SIG TYPE (P.413)	I/O Expansion kit analog input 1 signal type	0=0-10 V; 1=+/-10 V; 2=4-20mA; 3=10-50mA
52		ANLG OUT 1 SELECT (P.418)	I/O Expansion kit analog output 1 source select	See "Settings for Analog and Frequency Outputs" on page 4-8
53		ANLG OUT 1 SIG TYPE (P.419)	I/O Expansion kit analog output 1 signal type	0=0-10 V; 1=+/-10 V; 2=4-20 mA
54		ANLG OUT 2 SELECT (P.421)	I/O Expansion kit analog output source select	See "Settings for Analog and Frequency Outputs" on page 4-8
55		FREQ IN ZERO (P.423)	I/O Expansion kit minimum input frequency	kHz * 10
56		FREQ IN FULL SCALE (P.424)	I/O Expansion kit maximum input frequency	kHz * 10
57		FREQ OUT SELECT (P.425)	I/O Expansion kit frequency output source select	See "Settings for Analog and Frequency Outputs" on page 4-8.
58		FREQ OUT ZERO (P.426)	I/O Exp. kit frequency generated when frequency output signal is zero	kHz * 10
59		FREQ OUT FULL SCALE (P.427)	I/O Expansion kit frequency output at full scale	kHz * 10
60		LEVEL DETECT 1 SELECT (P.602)	Level detector 1 signal	0=OML FEEDBACK; 1=SPD LOOP FEEDBACK; 2=SPEED RAMP OUTPUT; 3=SPD RAMP INPUT TP; 4=SPD SOURCE SELECT OUT
61		LEVEL DETECT 2 SELECT (P.605)	Level detector 2 signal	
62		NOMINAL AC LINE FREQ (P.306)	Nominal AC line frequency	Hz
63		NOMINAL AC LINE VOLTS (P.307)	Nominal AC line RMS voltage	volts RMS
Configurable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit=1 and the drive is not running or jogging.				

CHAPTER 7

WebPak 3000 Drives: Register Map

This section lists the WebPak 3000 register map and describes how to use indirect parameters.

Brief descriptions of parameters are in the register map tables. For detailed parameter descriptions, refer to the *WebPak 3000 DC Drive Software Reference Manual*.

7.1 Using Indirect Parameters

In a full connection, the WebPak 3000 drive occupies three sequential network drops. Drop 2 and Drop 3 contain indirect registers. The indirect registers enable you to customize the list of input parameters you want the master to write to.

The Drop 2 master write registers (registers 32 to 63) determine the parameters to which the values in the Drop 3 master write registers are written. Up to 33 user-specified input registers can be accessed at any one time. A value of 0 in any of the Drop 2 write registers disables the corresponding indirect register in drop 3.

Drop 3, register 31 contains an Indirect Register Status (ISR) word. This output register indicates the current status of the parameters written to the master write registers in Drop 2 along with the tune/config update synchronization flag loopback bit (Drop 3, register 32, bit 15). This network synchronization bit functions the same as the network synchronization bit in Drop 1 (register 0, bit 15) (described in section 4.5 of this manual).

The ISR word also contains status information about the parameters input to Drop 2. When all of the parameter numbers have been accepted by the drive, the two status bits (Drop 3, register 31, bits 13 to14) and the lower six bits are all 0. If the value entered in Drop 2 is not a valid parameter number, then bit 13 is set. If the value entered in Drop 2 corresponds to an output parameter, then bit 14 is set. In either case, the offending register number is placed in the lower six bits (1 to 32). If multiple errors are present, then the highest numbered register is reported.

Example Using the ISR Word

Assume the master program writes the value 820 (the parameter number for DANCER LOADING) to AutoMax indirect parameter 17 (Drop 2, register 18).

After the drive completes processing, the drive updates the ISR (bits 0 to 14) with the value 16401 (4011 hexadecimal). Bit 15 equals the value written to the network synchronization flag (Drop 1, register 0, bit 15).

Since parameter P.820 is an output parameter, bit 14 in the ISR is set. Bits 0 to 6 identify the offending AutoMax indirect register as number 17.

When updating the Drop 2 master read registers in the WebPak 3000 drive, the network synchronization flag must be used with the tune/config input enable flag. If the updating of the indirect parameter numbers in Drop 2 is not properly synchronized to the values written in Drop 3, improper values written to parameters may result in unintended drive operation. The following sections describe the proper sequences for modifying the Drop 2 and Drop 3 master read values.

7.1.1 Enabling the AutoMax Indirect Parameter Numbers

Step 1. The tune/config input enable flag must have been cleared for a minimum of 600 msec (Drop 1, register 32, bit 14).

Step 2. Modify AutoMax Indirect Register numbers (Drop 2, registers 32 to 63) with the parameter numbers that you wish to write to in the corresponding Drop 3 register. Parameter number 0 deactivates that particular indirect register.

Step 3. Modify the corresponding register values (Drop 3, registers 32 to 63) for the parameters selected in step 2.

Step 4. Set the tune/config input enable flag (Drop 1, register 32, bit 14).

Step 5. Toggle the tune/config update synchronization flag (Drop 1, register 32, bit 15).

Step 6. Monitor the tune/config update synchronization flag loopback bit in the Indirect Register Status word (Drop 3, register 32, bit 15) until it equals the value written in step 4.

7.1.2 Changing the AutoMax Indirect Register Values

Step 1. Modify the desired register values (Drop 3, registers 32 to63).

Step 2. Toggle the tune/config update synchronization flag (Drop 1, register 32, bit 15).

Step 3. Monitor the tune/config update synchronization flag loopback bit in the Indirect Register Status word (Drop 3, register 32, bit 15) until it equals the value written in step 4.

7.1.3 Disabling the AutoMax Indirect Registers

Step 1. Clear the tune/config input enable flag (Drop 1, register 32, bit 14).

Step 2. Toggle the tune/config update synchronization flag (Drop 1, register 32, bit 15).

Step 3. Monitor the tune/config update synchronization flag loopback bit in the Indirect Register Status word (Drop 3, register 32, bit 15) until it equals the value written in step 4.

7.2 Diagnosing Processing Errors

In the alternate map, Drop 1, register 27, the number of the parameter that caused a processing error (indicated by alternate map, register 0, bit 10) is now recorded. If there are no processing errors, the value will be set to -1.

Because some parameters are processed in groups, it is not possible to always report the specific parameter that is out of range. Instead, the first parameter number of the group that contains the error is reported (see table 7.1). ***For example, if MOP ACCEL TIME (P.115) was set out of range by the Network Option board, Drop 1, register 27 would contain the value 14 (S-CURVE ROUNDING).*** Parameters not listed in table 7.1 are handled on an individual basis by the parameter processing routines so the parameter causing the processing error is reported by number directly. Also listed in the table are possible non-user parameter numbers (> 25000) that can cause parameter processing errors.

Be aware that certain parameters are used as limits for other parameters (for example, ***TOP SPEED (P.011) determines the maximum limit for MAXIMUM SPEED (P.004).*** The WebPak 3000 Software Reference (D2-3444) describes the relationships between all user parameters. It is also possible (but very unlikely) to get a processing error reported for a non-user parameter number not listed below. If this occurs, the Regulator board is suspect. Cycle power, and if another non-user parameter number processing error occurs, replace the Regulator board.

Table 7.1 – Error Processing Parameters Reported by Group

Number Reported	Parameter Number	Parameter Name	Number Reported	Parameter Number	Parameter Name
004	004	MAXIMUM SPEED	519	519	FLD WEAKEN PROP GAIN
	003	MINIMUM SPEED		520	FLD WEAKEN LEAD FREQ
	012	JOG SPEED 1			
	113	STOP SPEED THRESHOLD			
005	005	POSITIVE CURRENT LIM	803	803	OCL REF ROUNDING
	006	NEGATIVE CURRENT LIM		802	OCL REF RAMP TIME
213	213	SPD LEADLAG RATIO	807	807	OCL LEADLAG RATIO
	214	SPD LEADLAG LOW FREQ		806	OCL LEADLAG LOW REQ
014	014	S-CURVE ROUNDING	900	900	NETW DROP NUMBER
	001	ACCELERATION TIME		910	NETW CONNECT TYPE
	002	DECELERATION TIME			
	018	RAMP STOP DECEL TIME			
	013	JOG ACCEL/DECEL TIME			
424	424	FREQ IN FULL SCALE	902	902	NETW OUT REG 1 SELECT
	423	FREQ IN ZERO		903	NETW OUT REG 2 SELECT
				904	NETW OUT REG 3 SELECT
427	427	FREQ OUT FULL SCALE	25200	25200	Trending Aquisition Rate (set by WebPakCS)
	426	FREQ OUT ZERO			
510	510	MOTOR FLCT FLD AMPS	26015		SPD LOOP PI INIT SEL (alternate, Drop 2, reg 32)
	516	FLD FEEDBACK GAIN ADJ			
514	514	FIELD PI PROP GAIN			
	515	FIELD PI LEAD FREQ			

7.3 Finding Data in the Register Map Tables

There are no write registers for control/reference data for Drop 2 and Drop 3.

Table 7.2 – Location of Information in the WebPak Register Map Tables

Drop_#	Master...	Data Type	Table	Page
1	Read	Runtime Signal	7.3	7-5
		Tunable, Configurable, and Status	7.4	7-7
	Write	Control/Reference	7.5	7-8
		Tunable	7.6	7-9
		Configurable	7.7	7-11
2	Read	Runtime Signal	7.8	7-11
		Tunable, Configurable, and Status	7.9	7-12
	Write	Tunable - Indirect Parameters	7.10	7-13
3	Read	Runtime Signal	7.11	7-15
	Write	Tunable/Configurable - Indirect Parameters	7.11	7-16

Table 7.3 – WebPak 3000 Register Map, Drop_1, Master Read Registers, BASIC and FULL Connections, Runtime Signal Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
0		Drive status word 1	31-packed word containing information on the present status of the drive	
	0		Drive ready	
	1		Drive running	
	2		Fault active	
	3		Jogging forward	
	4		Jogging reverse	
	5		Underwind active	
	6		Stopping	
	7		Tension On active	
	8		Stall tension active	
	9		Current main active	
	10		Current limit	
	11		Alarm active	
	12		Current/speed active	
	13		Processing error	
	14		Tune/cnfg enable	
	15		Network sync	
1		Drive status word 2	31-packed word containing information on the present status of the drive	
	0		EN/DS status	
	1		Customer interlock	
	2		TB Section Run	
	3		TB Jog Reverse	
	4		TB Jog Forward	
	5		TB Section Off	
	6		Coast/DB interlock	
	7		TB Fault Reset	
	8		TB Diameter Sel A	
	9		TB Diameter Sel B	
	10		TB Diameter Reset	
Runtime signal data are updated by the regulator every 10 msec.				

Table 7.3 – WebPak 3000 Register Map, Drop_1, Master Read Registers, BAS C and FULL Connections: Runtime Signal Data (Drive Output Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
	11		TB Tension On	
	12		TB Current Memory	
	13		TB Underwind	
	14		TB Stick Take Up	
	15		Level Dc11 Output	
2		SPD LOOP REFERENCE (P.295)	Final speed/voltage loop reference value	
3		SPD LOOP FEEDBACK (P.296)	Final speed/voltage loop feedback value after all scaling	
4		SPD LOOP OUTPUT (P.299)	Speed loop PI block output value	4095 at MAXIMUM CURRENT (P.007)
5		ARMATURE VOLTAGE (P.269)	Armature voltage feedback value	4095 at MOTOR RATED ARM VOLTS (P.009)
6		CML REFERENCE (P.196)	Amplitude and rate-limited value of the selected CML reference	
7		Average CML feedback	CML feedback average over eight CML scans	4095 at MAXIMUM CURRENT (P.007)
8		Network Output Register 1	Value of the parameter selected by NETW OUT REG 1 SELECT (P.902)	If no valid parameter value selected, 0 = MOTOR SPEED IN RPM
9		Network Output Register 2	Value of the parameter selected by NETW OUT REG 2 SELECT (P.903)	If no valid parameter value selected, 0=armature voltage in volts
10		Network Output Register 3	Value of the parameter selected by NETW OUT REG 3 SELECT (P.904)	If no valid parameter value selected, 0=armature current in amps*10 or amps
11 to 16		Tunable, Configurable and Status Data	See table 7.4 on page 7-7.	
17		INF SPEED (P.166)	Analog reference value output by the drive	
18		DIAMETER/TAPER INPUT (P.192)	Diameter/taper range input (TB 16, 17, 18) in counts after gain and zero applied	DIAMETER, TAPER RANGE
19		TENSION SETPOINT IN (P.492)	Digital value of the tension setpoint input (TB 50, 51) after gain and zero applied	
20		TENSION/DANCER FDBK (P.493)	Digital value of the tension/dancer feedback input (TB 52, 53) after gain and zero applied	
21		FREQ IN (P.491)	Frequency input value (terminals 39, 40, 41 on I/O Expansion board) after all scaling	4095 at full scale
22		OCL OUTPUT (P.848)	Outer control loop output value	RPM
23		OCL PARALLEL OUT (P.816)	Output of the selected outer control loop for parallel mode	
Runtime signal data are updated by the regulator every 10 msec.				

Table 7-3 – WebPak 3000 Register Map, Drop_1, Master Read Registers, BASIC and FULL Connections: Runtime Signal Data (Drive Output Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
24		FIELD FEEDBACK (P.569)	Motor field current feedback value after scaling and gain	4095 at MOTOR FIELD AMPS (P.510)
25		AC LINE VOLTAGE (P.392)	Measured AC line RMS voltage	Volts RMS
Runtime signal data are updated by the regulator every 10 msec.				

Table 7-4 – WebPak 3000 Register Map, Drop_1, Master Read Registers, BASIC and FULL Connections: Tunable, Configurable, and Status Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
11		Fault latch bits word 1	Bit-packed word indicating latched faults	
	0		AC LINE SYNCHRONIZATION FAULT (F00010)	
	1		FIELD CURRENT LOSS (F00004)	
	2		SUSTAINED OVERLOAD (F00005)	
	3		SELF TUNING FAULT (F00060 to F00069)	
	4		MOTOR THERMOSTAT TRIP (F00006)	
	5		CONTROLLER THERMOSTAT TRIP (F00009)	
	6		BLOWER MOTOR STARTER OPEN (F00008)	
	7		Reserved	
	8		ICT (OVERCURRENT) (F00001)	
	9		OVERSPEED (F00003) / ARMATURE OVERVOLTAGE (F00012)	
	10		SCR OR MULTIPLE SCRS NOT OPERATING (F00030 to F00042)	
	11		OPEN ARMATURE (F00007)	
	12		TACHOMETER LOSS (F00002)	
	13		CIM COMMUNICATIONS TIMEOUT (F00011)	
	14		NETWORK COMMUNICATION TIMEOUT (F00013)	
	15		REVERSED TACH LEADS (F00014)	
12		Reserved		
13		First fault	Fault code of the first fault since the last fault read	
Tunable, configurable, and status data are updated by the regulator approximately every 600 msec.				

Table 7.4 – WebPak 3000 Register Map, Drop_1: Master Read Registers, BASIC and FULL Connections. Tunable, Configurable, and Status Data (Drive Output Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
14		Alarm latch bits word	Bit-packed word containing latched alarm bits	
	0		MOTOR BRUSH WEAR LOW (A00001)	
	1		AC LINE VOLTAGE LOW (A00002)	
	2		AC LINE VOLTAGE HIGH (A00003)	
	3 to 15		Reserved	
15		Last alarm	Alarm code of the most recent alarm	
16		CONTROL SOURCE SELECT (P.000)	Selected source for drive control signals	0 = TERMINAL; 1 = KEYPAD; 2 = SERIAL; 3 = NETWORK
17 to 25		Runtime parameters see table 7.2		
26		Reserved		
27		Stop cause		
28		Param Proc Error Number		
29		NETW CONNECT TYPE (P.910)	AutoMax network connection type	BASIC; FULL
30		AMX NETW REF SELECT (P.911)	AutoMax network reference selection	DIRECT; BROADCAST N (N = 1 TO 8)
31		REGULATOR SW VERSION (P.794)	Regulator board software version	
Tunable, configurable, and status data are updated by the regulator approximately every 600 msec.				

Table 7.5 – WebPak 3000 Register Map, Drop_1: Master Write Registers. BASIC and FULL Connections. Control/Reference Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
32		Sequencing control word	Word containing drive sequencing and control bits	
	0		Section run	
	1		Section off	
	2		Fault/alarm reset	
	3		Jog forward	
	4		Jog reverse	
	5		Unwind	
	6		Slack take up	
	7		Tension on	
	8		Diameter reset	
Control/reference data are read by the regulator every 10 msec.				

Table 7.5 – WebPak 3000 Register Map, Drop_1: Master Write Registers, BASIC and FULL Connections, Control/Reference Data (Drive Input Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
	9		Current memory	
	10		Memory save	
	11		Current/speed	
	12		Diameter set A	
	13		Diameter set B	
	14		Tune/config input enable: Determines what is read from network. "Read all" includes control/reference, tunable, and configurable inputs	0 = READ ONLY CONTROL/REFERENCE INPUTS 1 = READ ALL
	15		Network sync	
33		Network Reference	Speed/voltage loop or CML reference value when CONTROL SOURCE SELECT (P.000) is set to NETWORK and ANX NETW REF SELECT (P.911) = 0	
34		NETW IN REG 1	Written by network master. Read this value through the CIN using NETW IN REG 1 (P.905)	
35		NETW IN REG 2	Written by network master. Read this value through the CIN using NETW IN REG 2 (P.906)	
36		NETW IN REG 3	Written by network master. Read this value through the CIN using NETW IN REG 3 (P.907)	
37		TAPER REGISTER (P.860)	Determines amount of taper to apply to the line or reference when TAPER TYPE (P.863) = REGISTER	0.000 to 1.000
38		FIELD REF REGISTER (P.513)	Reference for the field current loop	4095 at MOTOR HOT FLD AMPS (P.510)
39		POSITION REFERENCE (P.240)	Dancer position reference.	-4095 to 4095 COUNTS
Control/reference data are read by the regulator every 10 msec.				

Table 7.8 – WebPak 3000 Register Map, Drop_1: Master Write Registers, BASIC and FULL Connections, Tunable Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
40		DIAMETER REGISTER (P.074)	Value assigned to NORM ROLL DIAMETER (P.131) when DIAMETER CALC ENABLE (P.826) = DISABLE.	1.000 to 9.000
41		ACCELERATION TIME (P.001)	Min. time to accelerate from zero to GEAR IN SPEED (P.011)	seconds * 10
42		DECELERATION TIME (P.002)	Min. time to decelerate from GEAR IN SPEED (P.011) to zero	seconds * 10
43		MINIMUM SPEED (P.003)	Lowest operating speed	RPM
44		MAXIMUM SPEED (P.004)	Highest operating speed	RPM
45		POSITIVE CURRENT LIM (P.005)	Highest amount of current for the forward bridge	
46		NEGATIVE CURRENT LIM (P.006)	Highest amount of current for reverse bridge	
47		S-CURVE ROUNDING (P.014)	Amount of smoothing of speed/voltage loop reference	0 to 50%
48		TRIM RANGE (P.109)	Amount the trim reference will affect the drive reference	0.0 to 100.0%
49		SPD LOOP PI PROP GAIN (P.211)	Speed loop PI proportional gain	0.10 to 128.00
50		SPD LOOP PI LEAD FREQ (P.212)	Speed loop PI block lead break frequency	
51		CML PI PROP GAIN (P.301)	CML PI proportional gain	
52		CML PI LEAD FREQUENCY (P.302)	CML PI lead break frequency	0.000 to 4.000
53		TEN PI PROP GAIN (P.841)	Tension loop PI block proportional gain	0.001 to 32.767
54		TEN PI LEAD FREQ (P.840)	Tension loop PI block lead frequency	0.00 to 141.37 radians/second
55		TENSION PI LIMIT (P.853)	Tension loop pi block high and low limits	0 to 4095 COUNTS
56		JOG SPEED (P.012)	Operating speed while jogging	0 to BASE SPEED (P.017) in RPM
57		STOP MODE SELECT (P.114)	Selects how drive responds to a normal stop command	RAMP; COAST/DB; CURRENT LIMIT
58		NETW O.IT REG 1 SELECT (P.902)	Number of the parameter readable in Drop_1, register 7	If no valid parameter value selected, this is set to 0=motor speed in RPM
59		NETW O.IT REG 2 SELECT (P.903)	Number of the parameter readable in Drop_1, register 8	If no valid parameter value selected, this is set to 0=armature voltage in volts
60		NETW O.IT REG 3 SELECT (P.904)	Number of the parameter readable in Drop_1, register 9	If no valid parameter value selected, this is set to 0 = armature current in amps * 10 or amps
Tunable data are read by the regulator approximately every 600 msec while Tune/Config Input Enable bit = 1.				

Table 7.7 – WebPak 3000 Register Map, Drop_1: Master Write Registers, BASIC and FULL Connections: Configurable Data (Drive Input Data)

Register	Parameter Name (Number)	Description	Settings
81	FEEDBACK SELECT (P.200)	Type of feedback for speed/voltage loop feedback	ARMATURE VOLT; DC TACH ; ENCODER
82	NETW CONNECT TYPE (P.910)	AutoMax network connection type	BASIC, FULL
83	AMX NETW REF SELECT (P.911)	AutoMax network reference selection	DIRECT; BROADCAST N (N=1 to 8)
Configurable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit 1 and the drive is not running or jogging.			

Table 7.8 – WebPak 3000 Register Map, Drop_2: Master Read Registers, FULL Connection: Runtime Signal Data (Drive Output Data)

Register	Parameter Name (Number)	Description	Settings
0	ANALOG TACH FEEDBACK (P.291)	Analog tachometer feedback input after scaling	
1	ANALOG TRIM REF (P.195)	Trim reference value when TRIM REFERENCE SELECT (P.108) = ANALOG	
2	CML ERROR (P.396)	CML error signal	
3	DANGER LOADING (P.820)	Rate limited and scaled value of TENSION DEMAND (P.844)	
4	ENCODER FEEDBACK (P.292)	Digital value from pulse encoder after scaling	
5	FIELD REFERENCE (P.590)	Reference to the field regulator PI block as a percentage of MOTOR HOT FLD AMPS (P.510)	
6	INSTANTANEOUS INERTIA (P.230)	Dynamic load inertia as provided by the inertial compensation task	
7	NORM FLD REF (P.130)	Normalized reference to the field shaping table	
8	NORM ROLL DIAMETER (P.131)	Roll diameter normalized at 1.000 at EMPTY CORE DIAMETER (P.830)	
9	POSITION VERNIER (P.241)	Output of the position major loop	
10	REFERENCE RATE (P.566)	Rate of change in the speed loop reference.	
11	SPD LOOP ERROR (P.297)	Speed loop error signal	
12	SPD LOOP LAG OUTPUT (P.298)	Output of the lag block following the speed loop PI block	
13	TENSION DEMAND (P.844)	Output of the tension setpoint generator in counts	
14	TENSION VERNIER (P.836)	Output of the tension major loop in counts	
Runtime signal data are updated by the regulator every 10 msec.			

Table 7.3 – WebPak 2000 Register Map, Drop_2: Master Read Registers, FULL Connection, Tunable, Configurable, and Status Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
15		AC LINE PERIOD (P.393)	AC line period as measured by the drive in microseconds	
16		ARMATURE BRIDGE POI (P.394)	Indicates which bridge is currently active.	OFF (forward bridge active); ON (reverse bridge active)
17		ARMATURE DELTA (P.399)	Armature firing angle in microseconds	
18		CML FEEDBACK (P.397)	CML feedback signal after scaling	
19		CML RAMP INPUT TP (P.390)	Current reference value to the CML ramp block	
20		CML SPEED REFERENCE (P.391)	Speed reference value to the current minor loop	
21		CURRENT COMPOUND TP (P.293)	Trim value that is subtracted from the speed reference based on motor load	
22		DIAMETER ANALOG (P.821)	Output of the diameter calculator scaled from zero at empty core to 4095 at full roll diameter	
23		DIAMETER RESET TP (P.829)	State of the diameter reset signal	
24		DRAW PERCENTAGE OUT (P.196)	Product of the selected trim reference value and trim range value	
25		ENCODER KIT (P.795)	Indicates if Pulse Encoder kit is installed and passed diagnostics	INSTALLED; NOT INSTALLED; FAILED DIAGS
26		FIELD DELTA (P.588)	Field firing angle in degrees	0 to 180 degree
27		FIELD ECONOMY ACTIVE (P.599)	State of the field economy function	ON; OFF
28		FLD CURRENT REGULATOR (P.586)	Indicates if the Field Current Regulator kit is installed and its rating	NOT INSTALLED; 4 AMP, 10 AMP, 20 AMP
29		INERTIA COMPENSATION (P.244)	Output of the inertia compensation calculator	
30		IR COMPENSATION TP (P.290)	Level of IR compensation being subtracted from the measured armature voltage	
31		DIAMETER CALC OUTPUT (P.132)	Value of the calculated roll diameter normalized at 1.000 at EMPTY CORE DIAMETER (P.830)	
Tunable, configurable, and status data are updated by the regulator approximately every 600 msec.				

Table 7-10 – WebPak 3000 Register Map: Drop_2: Master Write Registers, FULL Connection: Tunable Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
32		AutoMax Indirect Parameter 1	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 32 in Drop 3
33		AutoMax Indirect Parameter 2	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 33 in Drop 3
34		AutoMax Indirect Parameter 3	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 34 in Drop 3
35		AutoMax Indirect Parameter 4	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 35 in Drop 3
36		AutoMax Indirect Parameter 5	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 36 in Drop 3
37		AutoMax Indirect Parameter 6	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 37 in Drop 3
38		AutoMax Indirect Parameter 7	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 38 in Drop 3
39		AutoMax Indirect Parameter 8	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 39 in Drop 3
40		AutoMax Indirect Parameter 9	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 40 in Drop 3
41		AutoMax Indirect Parameter 10	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 41 in Drop 3
42		AutoMax Indirect Parameter 11	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 42 in Drop 3
43		AutoMax Indirect Parameter 12	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 43 in Drop 3
44		AutoMax Indirect Parameter 13	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 44 in Drop 3
45		AutoMax Indirect Parameter 14	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 45 in Drop 3
46		AutoMax Indirect Parameter 15	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 46 in Drop 3
47		AutoMax Indirect Parameter 16	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 47 in Drop 3
Tunable data are updated by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1.				

Table 7.10 – WebPak 3000 Register Map, Drop_2, Master Write Registers, FULL Connection Tunable Data (Drive Input Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
48		AutoMax Indirect Parameter 17	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 48 in Drop 3
49		AutoMax Indirect Parameter 18	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 49 in Drop 3
50		AutoMax Indirect Parameter 19	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 50 in Drop 3
51		AutoMax Indirect Parameter 20	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 51 in Drop 3
52		AutoMax Indirect Parameter 21	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 52 in Drop 3
53		AutoMax Indirect Parameter 22	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 53 in Drop 3
54		AutoMax Indirect Parameter 23	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 54 in Drop 3
55		AutoMax Indirect Parameter 24	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 55 in Drop 3
56		AutoMax Indirect Parameter 25	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 56 in Drop 3
57		AutoMax Indirect Parameter 26	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 57 in Drop 3
58		AutoMax Indirect Parameter 27	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 58 in Drop 3
59		AutoMax Indirect Parameter 28	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 59 in Drop 3
60		AutoMax Indirect Parameter 29	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 60 in Drop 3
61		AutoMax Indirect Parameter 30	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 61 in Drop 3
62		AutoMax Indirect Parameter 31	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 62 in Drop 3
63		AutoMax Indirect Parameter 32	Selects parameter to which the value in the corresponding Drop 3 register is written	Value of 0 disables register 63 in Drop 3
Tunable data are updated by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1.				

Table 7-11 – WebPak 3000 Register Map, Drop_3. Master Read Registers, FULL Connection. Runtime Signal Data (Drive Output Data)

Register	Bit	Parameter Name (Number)	Description	Settings
0		J11 ANLG TACH VLT SCL (P.792)	Position to set J11 jumper	16; 31; 62; 125; 250
1		J14 ANLG TACH VLT RNG (P.793)	Position to set J14 jumper	LOW; HIGH
2		J15 REGULATOR TYPE (P.799)	Indicates position of jumper J15	SPEED/VOLTAGE; CURRENT/TORQUE
3		J16 ARM FB RESISTOR (P.395)	Indicates the burden resistor position	1 (15 ohm); 2 (20 ohm) 3 (30 ohm); 4 (39 ohm)
4		JOG RAMP OUTPUT (P.294)	Jog ramp reference value immediately after the jog ramp function	
5		LEVEL DETECT 1 OUTPUT (P.648)	Output of level detector 1	ON, OFF
6		LEVEL DETECT 2 OUTPUT (P.649)	Output of level detector 2	ON OFF
7		LOSSES COMPENSATION (P.316)	Output of the losses compensation calculator	
8		NETW COMM STATUS (P.908)	Status of network communication	NOT ACTIVE; ACTIVE
9		NETW TYPE & VERSION (P.909)	Type of network board installed and its software version	
10		POS LL RATIO OUT (P.247)	Value of the position loop lead/lag ratio	
11		POS LL WLD OUT (P.246)	Value of the position loop lead/lag low frequency	
12		POS LOOP ERROR (P.254)	Position loop error signal (difference between POSITION REFERENCE (P.240) and position feedback)	
13		POS PI KP OUT (P.248)	Value of the position loop PI proportional gain	
14		POS PI WLD OUT (P.249)	Value of the position loop PI load frequency	
15		POS RAMP OUTPUT (P.237)	Output of the position major loop ramp block	
16		ROLL DIAMETER (P.865)	Value of the calculated roll diameter in same units used for EMPTY CORE DIAMETER (P.830) and FULL ROLL DIAMETER (P.125)	
17		SPD SOURCE REFLCT OUT (P.193)	Selected speed reference source used as input to the speed reference ramp section (rpm or user-defined units)	
18		SPEED CROSS OVER (P.730)	Speed loop cross over frequency	
19		SPEED LAG FREQ OUT (P.252)	Value of the speed loop lag frequency	
20		SPEED PI KP OUT (P.251)	Value of the speed loop PI proportional gain	
21		SPEED PI WLD OUT (P.250)	Value of the speed loop PI low frequency	
22		SPEED RAMP INPUT TP (P.198)	Value of the speed reference signal immediately before the speed loop S-CURVE block	
Runtime signal data are updated by the regulator every 10 msec.				

Table 7.11 – WebPak 3000 Register Map, Drop_3. Master Read Registers, FULL Connection Runtime Signal Data (Drive Output Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
23		SPEED RAMP OUTPUT (P.199)	Value of the speed reference signal immediately after the speed loop S-CURVE block	
24		TAPER PERCENT (P.659)	Percent reduction to be applied to the tension reference from the taper function	
25		TEN LOOP ERROR (P.834)	Tension/current loop error signal after scaling	
26		TEN PI KP OUT (P.879)	Value of the tens on loop pi proportional gain	
27		TEN RAMP OUTPUT (P.842)	Output of the tension major loop ramp block after tens on-to-current conversion	
28		TEN TO CURRENT OUT (P.876)	Output of the tension loop's tension-to-current scaling block	
29		TRIM OUTPUT (P.197)	Actual signal used to trim the selected speed loop reference signal	
30		UNWIND DIAMETER IN (P.826)	Analog input signal (TB 16, 17) when DIAMTER/TAPER SELECT (P.870) = DIAMETER	
31		Indirect Register Status	Bit-packed word containing information on	
	0 to 6		Offending register number.	0 = No error
	7 to 12		Reserved	
	13		Error - Not found	
	14		Error - Output parameter	
	15		Network sync	
Runtime signal data are updated by the regulator every 10 msec.				

Table 7.12 – WebPak 3000 Register Map, Drop_3. Master Write Registers. FULL Connection Tunable/Configurable Data (Drive Input Data)

Register	Bit	Parameter Name (Number)	Description	Settings
32		AutoMax Indirect Register 1	Value to be written to the parameter selected in the corresponding Drop 2 register	
33		AutoMax Indirect Register 2	Value to be written to the parameter selected in the corresponding Drop 2 register	
34		AutoMax Indirect Register 3	Value to be written to the parameter selected in the corresponding Drop 2 register	
Configuration data are read by the regulator approximately every 600 msec when Tune/Config Input Enable is 1 and the drive is not running or jogging.				

Table 7.12 – WebPak 3000 Register Map, Drop_3, Master Write Registers, FULL Connection, Tunable/Configurable Data (Drive Input Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
35		AutoMax Indirect Register 4	Value to be written to the parameter selected in the corresponding Drop 2 register	
36		AutoMax Indirect Register 5	Value to be written to the parameter selected in the corresponding Drop 2 register	
37		AutoMax Indirect Register 6	Value to be written to the parameter selected in the corresponding Drop 2 register	
38		AutoMax Indirect Register 7	Value to be written to the parameter selected in the corresponding Drop 2 register	
39		AutoMax Indirect Register 8	Value to be written to the parameter selected in the corresponding Drop 2 register	
40		AutoMax Indirect Register 9	Value to be written to the parameter selected in the corresponding Drop 2 register	
41		AutoMax Indirect Register 10	Value to be written to the parameter selected in the corresponding Drop 2 register	
42		AutoMax Indirect Register 11	Value to be written to the parameter selected in the corresponding Drop 2 register	
43		AutoMax Indirect Register 12	Value to be written to the parameter selected in the corresponding Drop 2 register	
44		AutoMax Indirect Register 13	Value to be written to the parameter selected in the corresponding Drop 2 register	
45		AutoMax Indirect Register 14	Value to be written to the parameter selected in the corresponding Drop 2 register	
46		AutoMax Indirect Register 15	Value to be written to the parameter selected in the corresponding Drop 2 register	
47		AutoMax Indirect Register 16	Value to be written to the parameter selected in the corresponding Drop 2 register	
48		AutoMax Indirect Register 17	Value to be written to the parameter selected in the corresponding Drop 2 register	
49		AutoMax Indirect Register 18	Value to be written to the parameter selected in the corresponding Drop 2 register	
50		AutoMax Indirect Register 19	Value to be written to the parameter selected in the corresponding Drop 2 register	
Configurable data are read by the regulator approximately every 600 msec when Tune/Config Input Enable is 1=1 and the drive is not running or jogging.				

Table 7.12 – WebPax 3000 Register Map, Drop_3, Master Write Registers, FULL Connection, Tunable/Configurable Data (Drive Input Data) (Continued)

Register	Bit	Parameter Name (Number)	Description	Settings
51		AutoMax Indirect Register 20	Value to be written to the parameter selected in the corresponding Drop 2 register	
52		AutoMax Indirect Register 21	Value to be written to the parameter selected in the corresponding Drop 2 register	
53		AutoMax Indirect Register 22	Value to be written to the parameter selected in the corresponding Drop 2 register	
54		AutoMax Indirect Register 23	Value to be written to the parameter selected in the corresponding Drop 2 register	
55		AutoMax Indirect Register 24	Value to be written to the parameter selected in the corresponding Drop 2 register	
56		AutoMax Indirect Register 26	Value to be written to the parameter selected in the corresponding Drop 2 register	
57		AutoMax Indirect Register 27	Value to be written to the parameter selected in the corresponding Drop 2 register	
58		AutoMax Indirect Register 28	Value to be written to the parameter selected in the corresponding Drop 2 register	
59		AutoMax Indirect Register 29	Value to be written to the parameter selected in the corresponding Drop 2 register	
60		AutoMax Indirect Register 30	Value to be written to the parameter selected in the corresponding Drop 2 register	
61		AutoMax Indirect Register 31	Value to be written to the parameter selected in the corresponding Drop 2 register	
62		AutoMax Indirect Register 21	Value to be written to the parameter selected in the corresponding Drop 2 register	
Configuration data are read by the regulator approximately every 600 msec when Tune/Config Input Enable bit = 1 and the drive is not running or jogging.				

APPENDIX A

Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Original Map)

Table A.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Original Map)

Parameter Name (No.)	Drop	Register	Bit
AC LINE SYNCHRONIZATION FAULT (F00010)	1	10	0
AC LINE VOLTAGE (P.392)	1	23	
	4	26	
AC LINE VOLTAGE HIGH (A00003)	1	13	2
AC LINE VOLTAGE LOW (A00002)	1	13	1
ACCELERATION TIME (P.001)	1	16	
	1	40	
Alarm active	1	0	8
Alarm latch bits word	1	13	
Alarm log clear and reset	1	32	9
Alarm reset	1	32	10
AMX NETW REF SELECT (P.911)	1	30	
	1	63	
ANALOG AUTO REFERENCE (P.158)	1	16	
	2	0	
ANALOG MAN TRIM REF (P.194)	1	17	
	2	2	
ANALOG TACH FEEDBACK (P.291)	3	0	
ANALOG TACH GAIN ADJ (P.201)	3	16	
	3	40	
ANALOG TACH ZERO ADJ (P.202)	3	17	
	3	41	
ANLG AUTO GAIN ADJ (P.101)	2	19	
	2	41	
ANLG AUTO SIGNAL TYPE (P.100)	2	18	
	2	63	
ANLG AUTO ZERO ADJ (P.102)	2	20	
	2	42	

Table A.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Original Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
ANLG IN 1 (P.402)	1	18	
	4	1	
ANLG IN 1 GAIN ADJ (P.415)	4	33	
ANLG IN 1 SIG TYPE (P.413)	4	51	
ANLG IN 1 ZERO ADJ (P.414)	4	32	
ANLG IN 2 (P.493)	1	19	
	4	2	
ANLG IN 2 GAIN ADJ (P.417)	4	35	
ANLG IN 2 ZERO ADJ (P.416)	4	34	
ANLG MAN REF GAIN ADJ (P.104)	2	22	
	2	44	
ANLG MAN REF ZERO ADJ (P.105)	2	23	
	2	45	
ANLG OUT 1 GAIN ADJ (P.420)	4	45	
ANLG OUT 1 SELECT (P.418)	4	52	
ANLG OUT 1 SIG TYPE (P.419)	4	53	
ANLG OUT 2 GAIN ADJ (P.422)	4	46	
ANLG OUT 2 SELECT (P.421)	4	54	
ANLG TACH VOLTS/1000 (P.203)	3	18	
	3	61	
ARM VOLTAGE GAIN ADJ (P.204)	3	19	
	3	42	
ARM VOLTAGE ZERO ADJ (P.205)	3	20	
	3	43	
ARMATURE BRIDGE TOL (P.304)	3	31	
ARMATURE OVERVOLTAGE (F00012)	1	10	9
ARMATURE VOLTAGE (P.280)	1	5	

Table A.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Original Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
AUTO MODE MIN BYPASS (P.111)	2	27	
	2	45	
AUTO MODE RMP BYPASS (P.112)	2	28	
	2	46	
AUTO REFERENCE SELECT (P.103)	2	21	
	3	54	
Average CMD feedback	1	6	
BLOWER MOTOR STARTER OPEN (F00006)	1	10	6
CNI REFERENCE GAIN ADJ (P.305)	3	30	
	3	48	
CNI PI LEAD FREQUENCY (P.302)	1	26	
	1	51	
CNI PI PROP GAIN (P.301)	1	25	
	1	50	
CNI REF RATE LIMIT (P.303)	1	27	
	1	52	
CNI REFERENCE (P.396)	3	3	
Coast/DB interlock	1	0	10
Coast/DB interlock opened	4	22	8
Coast/DB stop	4	22	5
CONTROL SOURCE SELECT (P.000)	1	15	
CONTROLLER THERMOSTAT TRIP (F00009)	1	10	5
CURRENT COMPOUNDING (P.209)	1	56	
	3	24	
Current limit stop	4	22	3
Customer interlock	1	0	11
Customer interlock opened	4	22	7
DECELERATION TIME (P.002)	1	17	
	1	41	
DIG OUT 1 CONTACT TYP (P.410)	4	50	0
DIG OUT 1 SELECT (P.409)	4	45	
DIG OUT 2 CONTACT TYP (P.412)	4	50	1
DIG OUT 2 SELECT (P.411)	4	49	
Drive jogging	1	0	3
Drive ready	1	0	0
Drive running	1	0	1
Drive status word 1	1	0	

Table A.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Original Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
Drive stopping	1	0	5
ENHANCED FLD VOLT ADJ (P.500)	4	27	
	4	41	
Fault active	1	0	2
Fault latch bits word 1	1	10	
Fault log clear and reset	1	32	8
Fault reset	1	32	2
Fault stop or self-tune complete	4	22	6
FEEDBACK SELECT (P.200)	1	61	
	3	15	
FIELD AUTO WEAKEN (P.517)	3	57	
FIELD CURRENT LOSS (F00004)	1	10	1
FIELD ECONOMY ACTIVE (P.599)	4	20	
FIELD ECONOMY DELAY (P.501)	4	28	
	4	42	
FIELD ECONOMY REF (P.511)	3	33	
FIELD FEEDBACK (P.589)	1	22	
	3	5	
FIELD LOSS THRESHOLD (P.512)	3	58	
FIELD PI LEAD FREQ (P.515)	3	35	
FIELD PI PROP GAIN (P.514)	3	34	
FIELD REF REGISTER (P.513)	1	37	
FIELD REFERENCE (P.590)	3	4	
First fault	1	12	
FLD FEEDBACK GAIN ADJ (P.516)	3	36	
FLD WEAKEN LEAD FREQ (P.520)	3	39	
FLD WEAKEN PROP GAIN (P.519)	3	38	
FLD WEAKEN THRESHOLD (P.518)	3	37	
Forward/reverse command	1	0	4
Forward/reverse select	1	32	4
FREQ IN (P.491)	1	20	
	4	3	
FREQ IN FULL SCALE (P.424)	4	56	
FREQ IN ZERO (P.423)	4	55	
FREQ OUT FULL SCALE (P.427)	4	59	
FREQ OUT SELECT (P.425)	4	57	
FREQ OUT ZERO (P.426)	4	58	
I/O Expansion kit digital inputs	4	0	0 4

Table A.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Original Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
IET (OVERCURRENT) (F00001)	1	10	8
In current limit	1	0	9
INERTIA COMP SELECT (P.221)	2	56	
Internal stop request	4	22	2
IR COMPENSATION (P.206)	1	55	
	3	21	
Jog	1	32	3
JOG ACCEL/DECEL TIME (P.013)	2	15	
	2	40	
Jog de-asserted < 1 second	4	22	-
JOG SPEED 1 (P.012)	1	53	
	2	14	
Last alarm	1	14	
Level Detector Outputs	4	21	0&1
LEVEL DETECT 1 DELAY (P.604)	4	37	
LEVEL DETECT 1 SELECT (P.602)	4	60	
LEVEL DETECT 1 THRESH (P.603)	4	36	
LEVEL DETECT 2 DELAY (P.607)	4	39	
LEVEL DETECT 2 SELECT (P.605)	4	61	
LEVEL DETECT 2 THRESH (P.606)	4	38	
Main contactor opened	4	22	9
MAXIMUM CURRENT (P.007)	3	12	
	3	58	
MAXIMUM SPEED (P.004)	1	19	
	1	43	
Memory save	1	32	11
MINIMUM SPEED (P.003)	1	18	
	1	42	
MOTOR BRUSH WEAR LOW (A00001)	1	13	0
MOTOR FOT FLD AMPS (P.510)	3	55	
MOTOR RATED ARM AMPS (P.008)	3	13	
	3	59	
MOTOR RATED ARM VOLTS (P.009)	3	14	
	3	60	
MOTOR THERMOSTAT TRIP (F00008)	1	10	4
NEG CURRENT LIM SEL (P.224)	2	58	
NEGATIVE CURRENT LIM (P.006)	1	21	
	1	45	

Table A.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Original Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
NETW COMM LOSS SELECT (P.901)	1	29	
	1	57	
NETW CONNECT TYPE (P.910)	1	28	
	1	62	
NETW IN REG 1 (P.905)	1	34	
NETW IN REG 2 (P.906)	1	35	
NETW IN REG 3 (P.907)	1	36	
NETW OUT REG 1 SELECT (P.902)	1	58	
NETW OUT REG 2 SELECT (P.903)	1	59	
NETW OUT REG 3 SELECT (P.904)	1	60	
NETWORK COMMUNICATION TIMEOUT (F00013)	1	10	14
Network Output Register 1	1	7	
Network Output Register 2	1	8	
Network Output Register 3	1	9	
Network Reference	1	33	
NOMINAL AC LINE FREQ (P.306)	4	23	
	4	62	
NOMINAL AC LINE VOLTS (P.307)	4	24	
	4	63	
NORMALIZED INERTIA (P.222)	2	33	
OCL FEEDBACK SELECT (P.804)	2	60	
OCL LEAD/LAG LOW FREQ (P.808)	2	38	
OCL LEAD/LAG RATIO (P.807)	2	39	
OCL LEAD/LAG SELECT (P.805)	2	37	
OCL OUTPUT (P.845)	1	21	
	2	12	
OCL P LEAD FREQ (P.809)	2	52	
OCL P NEGATIVE LIMIT (P.811)	2	54	
OCL P POSITIVE LIMIT (P.810)	2	53	
OCL P PROP GAIN (P.806)	2	51	
OCL RAMP OUTPUT (P.846)	2	11	
OCL REF RAMP TIME (P.802)	2	35	
OCL REF REGISTER (P.801)	2	34	
OCL REF ROUNDING (P.803)	2	36	
OCL REFERENCE SELECT (P.800)	2	59	
OCL TRIM RANGE (P.812)	2	55	

Table A.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Original Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
DM COMMUNICATIONS TIMEOUT (F00011)	1	10	13
OPEN ARMATURE (F00007)	1	10	7
OPEN SCR SENSITIVITY (P.500)	4	30	
	4	43	
OPEN SCR TRIP THRESH (P.501)	4	31	
	4	44	
Outer control loop enable	1	32	7
OVERSPEED (F00003)	1	10	9
Parameter processing error	1	0	12
PL MAXIMUM ERROR (P.305)	4	25	
	4	40	
POS CURRENT LIM SEL (P.223)	2	57	
POSITIVE CURRENT LIM (P.005)	1	20	
	1	44	
PULSE TACH FEEDBACK (P.292)	3	1	
PULSE TACH PPR (P.207)	3	22	
	3	62	
PULSE TACH QUADRATURE (P.208)	3	23	
	3	63	
Ramp stop	4	22	4
REGULATOR SW VERSION (P.794)	1	31	
REVERSE DISABLE (P.015)	2	17	
	2	62	
Run	1	32	0
S-CURVE ROUNDING (P.014)	1	46	
	2	16	
SCR # or MULTIPLE SCRS NOT OPERATING (F00030–F00042)	1	10	10
SELF TUNING FAULT (F00060 to F00069)	1	10	3
Sequencing control word	1	32	
SPD LEADLAG LOW FREQ (P.214)	3	26	
	3	45	
SPD LEADLAG RATIO (P.213)	3	25	
	3	44	
SPD LEADLAG SELECT (P.216)	3	28	
	3	47	
SPD LOOP ERROR (P.297)	3	2	
SPD LOOP FEEDBACK (P.296)	1	3	

Table A.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Original Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
SPD LOOP LAG BYPASS (P.217)	3	29	
	3	48	
SPD LOOP LAG FREQ (P.215)	3	27	
	3	46	
SPD LOOP OUTPUT (P.299)	1	4	
SPD LOOP PI LEAD FREQ (P.212)	1	24	
	1	40	
SPD LOOP PI PROP GAIN (P.211)	1	23	
	1	48	
SPD LOOP REFERENCE (P.295)	1	2	
SPD SOURCE SEL OUT (P.193)	1	1	
Stop	1	32	1
Stop asserted or Run de-asserted (negated)		22	0
Stop cause word	4	22	
STOP MODE SELECT (P.114)	1	54	
	2	30	
STOP SPEED THRESHOLD (P.113)	2	29	
	2	50	
SUSTAINED OVERLOAD (F00005)	1	10	2
TACHOMETER LOSS (F00002)	1	10	12
Terminal strip auto/manual input state (terminal 6)	1	0	14
Terminal strip fault/alarm reset input state (terminal 10)	1	0	15
Terminal strip forward/reverse input state (terminal 5)	1	0	13
TOP SPEED (P.011)	2	13	
	2	61	
TRIM MODE SELECT (P.110)	2	26	
	2	47	
TRIM OUTPUT (P.197)	2	31	
TRIM RANGE (P.109)	1	22	
	1	47	
TRIM SET REGISTER (P.107)	2	24	
TRIM REFERENCE SELECT (P.108)	2	25	
	2	46	
Turn/config input enable	1	32	14
Turn/config input enable copyback	1	0	6

Table A.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Original Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
Tune/config update synchronization flag (master write)	1	32	15
Tune/config update synchronization flag loopback (master read)	1	0	7

APPENDIX B

Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Alternate Map)

Table B.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Alternate Map)

Parameter Name (No.)	Drop	Register	Bit
AC LINE VOLTAGE (P.392)	1	23	
ACCELERATION TIME (P.001)	1	40	
	2	1	
Alarm active	1	0	8
Alarm latch bits word	1	3	
Alarm log clear and reset	1	32	9
Alarm reset	1	32	10
AC LINE SYNCH FAULT (F00010)	1	0	0
AC LINE VOLTAGE LOW (A00002)	1	3	1
AC LINE VOLTAGE HIGH (A00003)	1	3	2
AMX NETW RET SELECT (P.911)	1	63	
ANALOG AUTO REF (P.155)	1	6	
ANALOG MAN TRIM REF (P.194)	1	7	
ANALOG TACH FDBACK (P.291)	3	0	
ANALOG TACH GAIN ADJ (P.201)	3	6	
	3	40	
ANALOG TACH ZERO ADJ (P.202)	3	7	
	3	41	
ANLG AUTO GAIN ADJ (P.101)	2	9	
	2	41	
ANLG AUTO SIGNAL TYPE (P.100)	2	8	
	2	63	
ANLG AUTO ZERO ADJ (P.102)	2	20	
	2	42	
ANLG IN 1 (P.402)	1	8	
ANLG IN 1 GAIN ADJ (P.416)	4	33	
ANLG IN 1 SIG TYPE (P.413)	4	51	
ANLG IN 1 ZERO ADJ (P.414)	4	32	
ANLG IN 2 (P.493)	1	9	
ANLG IN 2 GAIN ADJ (P.417)	4	35	

Table B.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Alternate Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
ANLG IN 2 ZERO ADJ (P.418)	4	34	
ANLG MAN REF GAIN ADJ (P.104)	2	22	
	2	44	
ANLG MAN REF ZERO ADJ (P.105)	2	23	
	2	45	
ANLG OUT 1 GAIN ADJ (P.420)	4	45	
ANLG OUT 1 SELECT (P.415)	4	52	
	4	52	
ANLG OUT 1 SIG TYPE (P.419)	4	53	
ANLG OUT 2 GAIN ADJ (P.422)	4	46	
ANLG OUT 2 SELECT (P.421)	4	54	
ANLG TACH VOLTS/1000 (P.203)	3	18	
	3	61	
ARM VOLTAGE GAIN ADJ (P.204)	3	19	
	3	42	
ARM VOLTAGE ZERO ADJ (P.205)	3	20	
	3	43	
ARMATURE BRIDGE POL (P.394)	3	31	
ARMATURE OVERVOLTAGE (F00012)	1	10	9
ARMATURE VOLTAGE (P.289)	1	5	
AUTO MODE MIN BYPASS (P.111)	2	27	
	2	48	
AUTO MODE RAMP BYPASS (P.112)	2	28	
	2	49	
AUTO REFERENCE SELECT (P.103)	2	21	
	3	54	
Average CMI feedback	1	6	
BLOWER MOTOR STARTER OPEN (F00006)	1	10	6

Table B.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Alternate Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
CML FEEDBACK GAIN ADJ (P.300)	3	30	
	3	49	
CML FILTER FREQUENCY (P.302)	1	51	
	3	7	
CML PI PROP GAIN (P.301)	1	50	
	3	6	
CML REF LIMIT SELECT (P.311)	3	59	5
CML REF RATE LIMIT (P.303)	2	51	
	3	8	
CML REFERENCE (P.396)	3	3	
Coast/DB interlock	1	1	6
Coast/DB interlock opened	1	26	8
Coast/DB stop	1	26	5
CONTROL SOURCE SEL (P.000)	1	15	
CONTROLLER THERMOSTAT TRIP (F00009)	1	10	5
CURRENT COMPOUNDING (P.209)	1	56	
	3	24	
Current limit stop	1	26	3
Customer interlock	1	1	1
Customer interlock opened	1	26	7
DECELERATION TIME (P.002)	2	2	
	1	41	
DIG IN 3 SELECT (P.428)	4	47	
DIG OUT 1 CONTACT TYP (P.410)	4	50	C
DIG OUT 1 SELECT (P.409)	4	48	
DIG OUT 2 CONTACT TYP (P.412)	4	50	1
DIG OUT 2 SELECT (P.411)	4	49	
Digital input 6	1	1	14
Drive jogging	1	0	3
Drive ready	1	0	C
Drive running	1	0	1
Drive status word 1	1	0	
Drive status word 2	1	1	
Drive stopping	1	0	5
ENHANCED FLD VOLT ADJ (P.500)	4	27	
	4	41	
Fault active	1	0	2
Fault latch bits word 1	1	10	
Fault log clear and reset	1	32	8

Table B.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Alternate Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
Fault reset	1	32	2
Fault stop or self-tune complete	1	26	6
FEEDBACK SELECT (P.200)	1	61	
	3	15	
FIELD AUTO WEAKEN (P.517)	3	57	
FIELD CURRENT LOSS (F00001)	1	10	1
FIELD ECONOMY ACTIVE (P.599)	4	29	
FIELD ECONOMY DELAY (P.501)	1	28	
	4	42	
FIELD ECONOMY REF (P.511)	3	33	
FIELD FEEDBACK (P.589)	1	22	
FIELD LOSS THRESHOLD (P.512)	3	56	
FIELD PI LEAD FREQ (P.515)	3	35	
FIELD PI PROP GAIN (P.514)	3	34	
FIELD REF REGISTER (P.513)	1	37	
FIELD REF SELECT (P.521)	3	51	
FIELD REFERENCE (P.590)	3	4	
First fault	1	12	
FLD FEEDBACK GAIN ADJ (P.516)	3	36	
FLD WEAKEN LEAD FREQ (P.520)	3	39	
FLD WEAKEN PROP GAIN (P.519)	3	38	
FLD WEAKEN THRESHOLD (P.518)	3	37	
FN/DB status	1	1	0
Forward/Reverse command	1	0	4
FREQ IN (P.491)	1	20	
FREQ IN FULL SCALE (P.424)	4	56	
FREQ IN ZERO (P.423)	4	55	
FREQ OUT FULL SCALE (P.427)	4	59	
FREQ OUT SELECT (P.425)	4	57	
FREQ OUT ZERO (P.426)	4	58	
Fwd/Rev select	1	32	4
I/O Expansion kit digital in out 1 (Preset speed select 1)	1	1	5
I/O Expansion kit digital in out 2 (Preset speed select 2)	1	1	9
I/O Expansion kit digital in out 3 (MOP decrement)	1	1	10
I/O Expansion kit digital in out 4 (MOP increment)	1	1	11
I/O Expansion kit digital in out 5 (DCL enable)	1	1	12

Table B.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Alternate Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
IFT (OVERCURRENT) (F00001)	1	10	8
In current limit	1	0	9
INERTIA COMP SELECT (P.221)	2	56	
Internal stop request	1	26	2
IR COMPENSATION (P.206)	2	54	
Jog	1	32	2
JOG ACCEL/DECEL TIME (P.013)	2	15	
	2	40	
Jog de-asserted > 1 second	1	26	1
JOG SPEED 1 (P.012)	2	14	
	2	52	
Last alarm	1	14	
LEVEL DETECT 1 DELAY (P.604)	4	37	
LEVEL DETECT 1 SELECT (P.602)	4	60	
LEVEL DETECT 1 THRESH (P.603)	4	36	
LEVEL DETECT 2 DELAY (P.607)	4	39	
LEVEL DETECT 2 SELECT (P.605)	4	61	
LEVEL DETECT 2 THRESH (P.606)	4	38	
Level detector 1 output	1	0	11
Level detector 2 output	1	0	12
Main contactor opened	1	26	9
MAXIMUM CURRENT (P.007)	3	12	
	3	58	
MAXIMUM SPEED (P.004)	1	43	
	2	4	
Memory save	1	32	11
MINIMUM SPEED (P.003)	1	42	
	2	3	
MOTOR BRUSH WEAR LOW (A00001)	1	13	0
MOTOR FIELD AMPS (P.510)	3	55	
MOTOR RATED ARM AMPS (P.008)	3	13	
	3	59	
MOTOR RATED ARM VOLTS (P.009)	3	14	
	3	60	
Motor thermostat	1	1	15
MOTOR THERMOSTAT TRIP (F00008)	1	10	4
NEG CUR LIM INV EN (P.226)	3	53	0
NEG CURRENT LIM SEL (P.224)	2	58	

Table B.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Alternate Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
NEGATIVE CURRENT LIM (P.006)	1	45	
	2	6	
NETW COMM LOSS SEL (P.901)	3	52	
NETW CONNECT TYPE (P.910)	1	28	
	1	62	
NETW IN REG 1 (P.905)	1	34	
NETW IN REG 2 (P.906)	1	35	
NETW IN REG 3 (P.907)	1	36	
NETW OUT REG 1 SELECT (P.902)	1	58	
NETW OUT REG 2 SELECT (P.903)	1	59	
NETW OUT REG 3 SELECT (P.904)	1	60	
NETW REGISTER MAP SEL (P.914)	1	29	
NETW COMM TIMEOUT (F00013)	1	10	14
Network Output Register 1	1	7	
Network Output Register 2	1	8	
Network Output Register 3	1	9	
Network Reference	1	33	
NOMINAL AC LINE FREQ (P.306)	4	23	
	4	62	
NOMINAL AC LINE VOLTS (P.307)	4	63	
	4	63	
NORMALIZED INERTIA (P.222)	1	57	
OCL FEEDBACK SELECT (P.804)	2	60	
OCL LEADLAG LOW FREQ (P.806)	2	38	
OCL LEADLAG RATIO (P.807)	2	30	
OCL LEADLAG SELECT (P.805)	2	37	
OCL OUTPUT (P.848)	1	21	
OCL PI LEAD FREQ (P.809)	1	53	
OCL PI NEGATIVE LIMIT (P.811)	1	55	
OCL PI POSITIVE LIMIT (P.810)	1	54	
OCL PI PROP GAIN (P.808)	1	52	
OCL PROP TRIM SELECT (P.813)	3	53	1
OCL RAMP OUTPUT (P.846)	2	11	
OCL REF RAMP TIME (P.802)	2	35	
OCL REF REGISTER (P.801)	2	34	
OCL REF ROUNDING (P.803)	2	36	
OCL REFERENCE SELECT (P.800)	2	30	
OCL TRIM RANGE (P.812)	2	55	

Table B.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Alternate Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
OCI TYPE3 POSN REG FN (P.814)	3	53	2
OIM COMM TIMEOUT (F00011)	1	10	13
OPEN ARMATURE (F00007)	1	10	7
OPEN SCR SENSITIVITY (P.600)	4	30	
	4	43	
OPEN SCR TRIP THRESH (P.601)	4	31	
	4	44	
Outer control loop enable	1	32	7
OVERSPEED (F00003)	1	10	9
Parameter processing error(s)	1	0	10
PI MAXIMUM ERROR (P.305)	4	25	
	4	40	
POS CURRENT LIM SEL (P.223)	2	57	
POSITIVE CURRENT LIM (P.005)	1	44	
	2	5	
PULSE TACH FEEDBACK (P.202)	3	1	
PULSE TACH PPR (P.207)	3	22	
	3	62	
PULSE TACH QUADRATURE (P.208)	3	23	
	3	63	
Ramp stop	1	26	4
RAMP STOP DECEL TIME (P.018)	2	33	
REGULATOR SW VERSION(P.794)	1	31	
REVERSE DISABLE (P.015)	2	17	
	2	62	
Run	1	32	0
S-CURVE ROUNDING (P.014)	1	46	
	2	16	
SCR # or MULTIPLE SCRS NOT OPERATING (F00030 - F00042)	1	10	10
SELF TUNE FAULT (F00080 to F00092)	1	10	3
Sequencing control word	1	32	
SPD LEADLAG LOW FREQ (P.214)	3	26	
	3	45	
SPD LEADLAG RATIO (P.213)	3	25	
	3	44	
SPD LEADLAG SELECT (P.216)	3	26	
	3	47	
SPD LOOP ERROR (P.297)	3	2	
SPD LOOP FEEDBACK (P.296)	1	3	

Table B.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Alternate Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
SPD LOOP FLAG BYPASS (P.217)	3	29	
	3	48	
SPD LOOP FLAG FREQ (P.215)	3	27	
	3	46	
SPD LOOP OUTPUT (P.299)	1	4	
SPD LOOP PI LIMIT SEL	2	32	
SPD LOOP PI LIMIT VAL	1	39	
SPD LOOP PI LEAD FREQ (P.212)	1	49	
	2	9	
SPD LOOP PI PROP GAIN (P.211)	1	48	
	2	8	
SPD LOOP PI Reset	1	32	5
SPD LOOP REFERENCE (P.295)	1	2	
SPD SOURCE SEL OUT (P.193)	2	0	
SPEED FEEDBACK GAIN	1	38	
Stop	1	32	1
Stop asserted/Run command	1	26	0
Stop cause word	1	26	
STOP DECEL SELECT (P.122)	3	33	3
STOP MODE SELECT (P.111)	2	33	
STOP SPEED THRESHOLD (P.113)	2	20	
	2	50	
SUSTAINED OVERLOAD (F00005)	1	10	2
TACH LOSS SCR ANGLE (P.608)	2	43	
TACHOMETER LOSS (F00002)	1	10	12
Terminal strip auto/manual	1	1	13
Terminal strip fault reset	1	1	7
Terminal strip forward/reverse	1	1	3
Terminal strip jog	1	1	4
Terminal strip run	1	1	2
Terminal strip stop	1	1	5
TOP SPEED (P.011)	2	13	
	2	61	
TRIM MODE SELECT (P.110)	2	26	
	2	47	
TRIM OUTPUT (P.197)	2	31	
TRIM RANGE (P.109)	1	47	
	2	7	
TRIM REF REGISTER (P.107)	2	24	
TRIM REFERENCE SELECT (P.108)	2	25	
	2	46	

Table B.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Alternate Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
Tune/config input enable	1	32	14
Tune/config input enable loopback	1	0	6
Tune/config update synch flag loopback (master read)	1	0	7
Tune/config update synchronization flag (master write)	1	32	15

Table B.1 – Cross Reference of Parameter Name to Drop and Register (FlexPak 3000 Alternate Map) (Continued)

Parameter Name (No.)	Drop	Register	Bit
UNDERWIND ENABLE	1	32	5

APPENDIX C

Cross Reference of Parameter Name to Drop and Register (WebPak 3000 Drives)

Table C.1 – Cross Reference of Parameter Name to Drop and Register (WebPak 3000 Map)

Parameter Name (No.)	Drop	Register	Bit
AMX Indirect Parameter 1	2	32	
AMX Indirect Parameter 2	2	33	
AMX Indirect Parameter 3	2	34	
AMX Indirect Parameter 4	2	35	
AMX Indirect Parameter 5	2	36	
AMX Indirect Parameter 6	2	37	
AMX Indirect Parameter 7	2	38	
AMX Indirect Parameter 8	2	39	
AMX Indirect Parameter 9	2	40	
AMX Indirect Parameter 10	2	41	
AMX Indirect Parameter 11	2	42	
AMX Indirect Parameter 12	2	43	
AMX Indirect Parameter 13	2	44	
AMX Indirect Parameter 14	2	45	
AMX Indirect Parameter 15	2	46	
AMX Indirect Parameter 16	2	47	
AMX Indirect Parameter 17	2	48	
AMX Indirect Parameter 18	2	49	
AMX Indirect Parameter 19	2	50	
AMX Indirect Parameter 20	2	51	
AMX Indirect Parameter 21	2	52	
AMX Indirect Parameter 22	2	53	
AMX Indirect Parameter 23	2	54	
AMX Indirect Parameter 24	2	55	
AMX Indirect Parameter 25	2	56	
AMX Indirect Parameter 26	2	57	
AMX Indirect Parameter 27	2	58	
AMX Indirect Parameter 28	2	59	
AMX Indirect Parameter 29	2	60	

Table C.1 – Cross Reference of Parameter Name to Drop and Register (WebPak 3000 Map)

Parameter Name (No.)	Drop	Register	Bit
AMX Indirect Parameter 30	2	61	
AMX Indirect Parameter 31	2	62	
AMX Indirect Parameter 32	2	63	
AMX Indirect Parameter 1	3	32	
AMX Indirect Parameter 2	3	33	
AMX Indirect Parameter 3	3	34	
AMX Indirect Parameter 4	3	35	
AMX Indirect Parameter 5	3	36	
AMX Indirect Parameter 6	3	37	
AMX Indirect Parameter 7	3	38	
AMX Indirect Parameter 8	3	39	
AMX Indirect Parameter 9	3	40	
AMX Indirect Parameter 10	3	41	
AMX Indirect Parameter 11	3	42	
AMX Indirect Parameter 12	3	43	
AMX Indirect Parameter 13	3	44	
AMX Indirect Parameter 14	3	45	
AMX Indirect Parameter 15	3	46	
AMX Indirect Parameter 16	3	47	
AMX Indirect Parameter 17	3	48	
AMX Indirect Parameter 18	3	49	
AMX Indirect Parameter 19	3	50	
AMX Indirect Parameter 20	3	51	
AMX Indirect Parameter 21	3	52	
AMX Indirect Parameter 22	3	53	
AMX Indirect Parameter 23	3	54	
AMX Indirect Parameter 24	3	55	
AMX Indirect Parameter 25	3	56	
AMX Indirect Parameter 26	3	57	

Table C.1 – Cross Reference of Parameter Name to Drop and Register (WebPak 3000 Map)

Parameter Name (No.)	Drop	Register	Bit
AMX Indirect Parameter 27	3	58	
AMX Indirect Parameter 28	3	59	
AMX Indirect Parameter 29	3	60	
AMX Indirect Parameter 30	3	61	
AMX Indirect Parameter 31	3	62	
AMX Indirect Parameter 32	3	63	
AC LINE PERIOD (P.393)	2	15	
AC LINE VOLTAGE (P.392)	1	25	
ACCELERATION TIME (P.001)	1	41	
Alarm latch bits	1	14	
AMX NETW REF SELECT (P.911)	1	30	
	1	63	
ANALOG TACH FEEDBACK (P.291)	2	0	
ANALOG TRIM REF (P.195)	2	1	
ARMATURE BRIDGE POL (P.394)	2	16	
ARMATURE DELTA (P.399)	2	17	
ARMATURE VOLTAGE (P.289)	1	5	
Average CML feedback	1	7	
CML ERROR (P.398)	2	2	
CML FEEDBACK (P.397)	2	18	
CML PI LEAD FREQUENCY (P.302)	1	52	
CML PI PROP GAIN (P.301)	1	51	
CML RAMP INPUT TP (P.390)	2	19	
CML REFERENCE (P.396)	1	6	
CML SPEED REFERENCE (P.391)	2	20	
CONTROL SOURCE SELECT (P.000)	1	16	
CURRENT COMPOUNDING (P.209)	1	56	
	3	24	
DANCER LOADING (P.820)	2	3	
DECELERATION TIME (P.002)	1	42	
DIAMETER ANALOG (P.821)	2	22	
DIAMETER CALC OUTPUT (P.132)	2	31	
DIAMETER REGISTER (P.874)	1	40	
DIAMETER RESET TP	2	23	
DIAMETER/TAPER IN TP (P.192)	1	15	
DRAW PERCENTAGE OUT (P.198)	2	24	
ENCODER FEEDBACK (P.292)	2	4	

Table C.1 – Cross Reference of Parameter Name to Drop and Register (WebPak 3000 Map)

Parameter Name (No.)	Drop	Register	Bit
ENCODER KIT (P.798)	2	25	
Fault latch bits word	1	11	
FEEDBACK SELECT (P.200)	1	61	
FIELD DELTA (P.588)	2	26	
FIELD ECONOMY ACTIVE (P.599)	2	28	
FIELD FEEDBACK (P.589)	1	24	
FIELD REF REGISTER (P.513)	1	38	
FIELD REFERENCE (P.590)	2	5	
First fault code	1	13	
FLD CURRENT REGULATOR (P.586)	2	28	
FREQ IN (P.491)	1	21	
Indirect Register Status	2	31	
INERTIA COMPENSATION (P.244)	2	29	
INSTANTANEOUS INERTIA (P.230)	2	6	
I/P COMPENSATION TP (P.290)	2	30	
J17 ANLG TACH VLT SCL (P.792)	3	0	
J14 ANLG TACH VLT RNG (P.793)	3	1	
J15 REGULATOR TYPE (P.799)	3	2	
J18 ARM FB RESISTOR (P.395)	3	3	
JOG RAMP OUTPUT (P.294)	3	4	
JOG SPEED (P.012)	1	56	
Last alarm code	1	15	
LEVEL DETECT 1 OUTPUT (P.648)	3	5	
LEVEL DETECT 2 OUTPUT (P.649)	3	6	
LINE SPEED (P.158)	1	17	
LOSSES COMPENSATION (P.316)	3	7	
MAXIMUM SPEED (P.004)	1	44	
MINIMUM SPEED (P.003)	1	43	
NEGATIVE CURRENT LIM (P.006)	1	46	
NETW COMM STATUS (P.908)	3	8	
NETW CONNECT TYPE (P.910)	1	20	
	1	62	
NETW IN REG 1 (P.905)	1	34	
NETW IN REG 2 (P.906)	1	35	
NETW IN REG 3 (P.907)	1	36	

Table C.1 – Cross Reference of Parameter Name to Drop and Register (WebPak 3000 Map)

Parameter Name (No.)	Drop	Register	Bit
NETW OUT REG 1 SELECT (P.902)	1	58	
NETW OUT REG 2 SELECT (P.903)	1	59	
NETW OUT REG 3 SELECT (P.904)	1	60	
NETW TYPE & VERSION (P.909)	3	0	
Network Output Register 1	1	8	
Network Output Register 2	1	9	
Network Output Register 3	1	10	
Network Reference	1	33	
NORM FIELD REF (P.130)	3	7	
NORM ROLL DIAMETER (P.131)	3	8	
OCL OUTPUT (P.848)	1	22	
OCL PARALLEL OUT (P.816)	1	23	
Parameter processing error	1	26	
POS CL RATIO OUT (P.247)	3	10	
POS CL WLD OUT (P.246)	3	11	
POS LOOP ERROR (P.254)	3	12	
POS PI KP OUT (P.245)	3	13	
POS PI WLD OUT (P.249)	3	14	
POS RAMP OUTPUT (P.237)	3	15	
POSITION REFERENCE (P.240)	1	39	
POSITION VERNIER (P.241)	3	9	
POSITIVE CURRENT LIM (P.003)	1	45	
REFERENCE RATE (P.866)	3	10	
REGULATOR SW VERSION (P.794)	1	31	
ROLL DIAMETER (P.865)	3	16	
S CURVE ROUNDING (P.014)	1	47	
Sequencing control word	1	32	
SPD LOOP ERROR (P.207)	3	11	
SPD LOOP FEEDBACK (P.296)	1	3	
SPD LOOP LAG OUTPUT (P.298)	3	12	
SPD LOOP OUTPUT (P.299)	1	4	
SPD LOOP PI LEAD FREQ (P.212)	1	50	
SPD LOOP PI PROP GAIN (P.211)	1	49	
SPD LOOP REFERENCE (P.295)	1	2	
SPD SOURCE SEL OUT (P.193)	3	17	
SPEED CROSS OVER (P.133)	3	18	
SPEED LAG FREQ OUT (P.252)	3	19	

Table C.1 – Cross Reference of Parameter Name to Drop and Register (WebPak 3000 Map)

Parameter Name (No.)	Drop	Register	Bit
SPEED PI KP OUT (P.251)	3	20	
SPEED PI WLD OUT (P.250)	3	21	
SPEED RAMP INPUT TP (P.198)	3	22	
SPEED RAMP OUTPUT (P.199)	3	23	
Status 1	1	0	
Status 2	1	1	
Stop cause word	1	27	
STOP MODE SELECT (P.114)	1	57	
TAPER PERCENT (P.839)	2	24	
TAPER REG STEP (P.860)	1	37	
TEN LOOP ERROR (P.834)	2	25	
TEN PI KP OUT (P.879)	2	26	
TEN PI LEAD FREQ (P.840)	1	54	
TEN PI PROP GAIN (P.841)	1	53	
TEN RAMP OUTPUT (P.842)	2	27	
TEN TO CURRENT OUT (P.876)	2	28	
TENS ON DEMAND (P.844)	3	13	
TENS ON PI LIMIT	1	55	
TENS ON SETPOINT IN	1	19	
TENS ON VERNIER (P.856)	3	14	
TENS ON/DANCER TRIM	1	20	
TRIM OUTPUT (P.197)	2	29	
TRIM RANGE (P.109)	1	48	
UNWIND DIAMETER IN (P.526)	2	30	

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