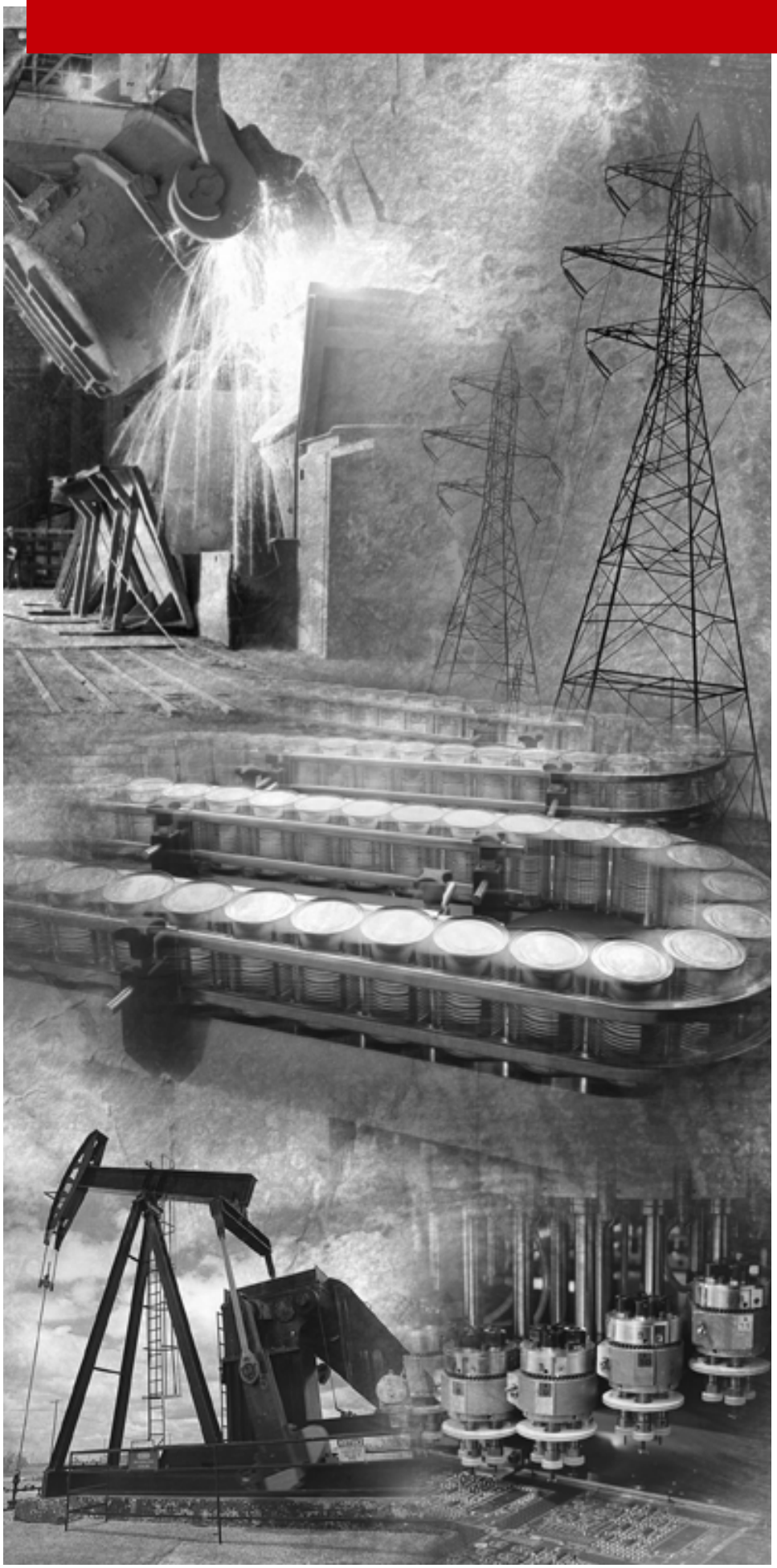


Allen-Bradley

8720MC High Performance Drives

(Catalog Numbers 8720MC-B014, -B021, -B027, -B034, -B042, and -B048

8720MC-D065, -D078, -D097, -D120, -D149, and -D180

8720MC-RPS027, -RPS065, and -RPS190

8720MC-LR03, -LR05, -LR10, and -LR14)

Integration Manual

Rockwell Automation

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley® does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Allen-Bradley office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

Throughout this manual we use notes to make you aware of safety considerations:

ATTENTION

Identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss.

Attention statements help you to:

- identify a hazard
- avoid a hazard
- recognize the consequences

IMPORTANT

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

Appendix B

Using the Human Interface Module (HIM)

Appendix C

Programming Parameters

Appendix D

8720SM Motor Specifications and Performance Curves

Preface

Introduction

Read this preface to familiarize yourself with the rest of the manual. This preface contains the following topics:

- Who Should Use this Manual
- Purpose of this Manual
- Contents of this Manual
- Related Documentation
- Conventions Used in this Manual
- Product Receiving and Storage Responsibility
- Allen-Bradley Support

Who Should Use this Manual

This manual is intended for engineers or programmers directly involved in the operation, field maintenance, and integration of the 8720MC High Performance analog drive and the 8720MC SERCOS drive with the 1756-M*xx*SE SERCOS interface™ module.

If you do not have a basic understanding of the 8720MC, contact your local Allen-Bradley representative for information on available training courses before using this product.

Purpose of this Manual

This manual provides the startup, configuration, and troubleshooting procedures for the 8720MC. The purpose of this manual is to assist you in the commissioning of your 8720MC analog drive and the commissioning and integration of the 8720MC SERCOS drive with the 1756-M*xx*SE SERCOS interface module.

Contents of this Manual

Refer to the following listing for the descriptive contents of this installation manual.

Chapter	Title	Contents
	Preface	Describes the purpose, background, and scope of this manual. Also specifies the audience for whom this manual is intended.
1	*Commissioning Your 8720MC SERCOS Interface Drive*	Provides steps to follow when configuring your 8720MC SERCOS interface drive, the 1756-M*xx*SE SERCOS interface module, and when applying power to the 8720MC for the first time.
2	*Commissioning Your 8720MC Analog Drive*	Provides information on how to apply power and configure your 8720MC analog drive.
3	*Troubleshooting Your 8720MC Servo Drive*	Provides diagnostic aids that help isolate problems with your 8720MC drive.
4	*SCANport Command Interface*	Provides information on the SCANport interface.
Appendix A	*Interconnect Diagrams*	Provides power, drive/motor, and active shunt interconnect diagrams for the 8720MC.
Appendix B	*Using the Human Interface Module (HIM)*	Provides operator instructions when using the HIM.
Appendix C	*Programming Parameters*	Provides programming information used with the 8720MC analog drive.
Appendix D	*8720SM Motor Specifications and Performance Curves*	Provides 8720SM motor, 8720MC drive, 8720MC-RPS, and 8720MC line reactor specification tables and motor/drive torque/speed curves.

Related Documentation

The following documents contain additional information concerning related Allen-Bradley products. To obtain a copy, contact your local Allen-Bradley office, distributor, or download them from TheAutomationBookstore.com.

For:	Read This Document:	Publication Number:
Information on installation and wiring of your 8720MC drive	*8720MC High Performance Drive Installation Manual*	8720MC-IN001*x*-EN-P
The instructions needed for the installation and wiring of the 8720MC-RPS	*8720MC Regenerative Power Supply User Manual*	8720MC-RM001*x*-US-P
The instructions needed for the installation of the 8720SM motors	*8720SM High Performance AC Induction Motors Installation Instructions*	8720SM-IN001*x*-EN-P
The information necessary to select, configure, and install the Bulletin 1336 Heavy Duty Dynamic Brake	*Heavy Duty Dynamic Braking Installation Instructions*	1336-5.64
Specifications and descriptions of the Industrial Motion Control drive products and accessories	*Motion Control Selection Guide*	GMC-SG001*x*-EN-P
Application sizing and configuration information	*Motion Book Servo Sizing CD* (v4.0 or above)	Motion Book-*mmmyy*
More detailed information on the use of ControlLogix™ motion features and application examples	*ControlLogix Motion Module Programming Manual*	1756-RM086*x*-EN-P
8 or 16 Axis SERCOS interface module installation instructions	*8 or 16 Axis SERCOS interface Module Installation Instructions*	1756-IN572*x*-EN-P
The instructions needed to program a motion application	*Logix™ Controller Motion Instruction Set Reference Manual*	1756-RM007*x*-EN-P
Information on configuring and troubleshooting your ControlLogix motion module	*ControlLogix Motion Module Setup and Configuration Manual*	1756-UM006*x*-EN-P
The instructions needed to monitor and edit parameters using DriveExplorer™ software	*DriveExplorer Getting Results Manual*	9306-GR001x-EN-E
Information, examples, and techniques designed to minimize system failures caused by electrical noise	*System Design for Control of Electrical Noise Reference Manual*	GMC-RM001*x*-EN-P
For declarations of conformity (DoC) currently available from Rockwell Automation	Rockwell Automation Product Certification website	www.ab.com/certification/ce/docs
An article on wire sizes and types for grounding electrical equipment	*National Electrical Code*	Published by the National Fire Protection Association of Boston, MA.
A glossary of industrial automation terms and abbreviations	*Allen-Bradley Industrial Automation Glossary*	AG-7.1

Conventions Used in this Manual

The following conventions are used throughout this manual.

- Bulleted lists such as this one provide information, not procedural steps
- Numbered lists provide sequential steps or hierarchical information
- Words that you type or select appear in bold
- When we refer you to another location, the section or chapter name appears in italics

Product Receiving and Storage Responsibility

You, the customer, are responsible for thoroughly inspecting the equipment before accepting the shipment from the freight company. Check the item(s) you receive against your purchase order. If any items are obviously damaged, it is your responsibility to refuse delivery until the freight agent has noted the damage on the freight bill. Should you discover any concealed damage during unpacking, you are responsible for notifying the freight agent. Leave the shipping container intact and request that the freight agent make a visual inspection of the equipment.

Store the product in its shipping container prior to installation. If you are not going to use the equipment for a period of time, store using the following guidelines.

- Use a clean, dry location
- Maintain an ambient temperature range of -40 to 70° C (-40 to 158° F)
- Maintain a relative humidity range of 5% to 95%, non-condensing
- Store it where it cannot be exposed to a corrosive atmosphere
- Store it in a non-construction area

Allen-Bradley Support

Allen-Bradley offers support services worldwide, with over 75 Sales/ Support Offices, 512 authorized Distributors and 260 authorized Systems Integrators located throughout the United States alone, plus Allen-Bradley representatives in every major country in the world.

Local Product Support

Contact your local Allen-Bradley representative for:

- Sales and order support
- Product technical training
- Warranty support
- Support service agreements

Technical Product Assistance

If you need technical assistance, please review the *Troubleshooting Your 8720MC Servo Drive* chapter first. If the problem persists, contact your local Allen-Bradley representative or Rockwell Automation Technical Support at (440) 646-5800 / www.ab.com/support. Please have the catalog numbers of your products available when you call.

For 8720MC replacement part numbers refer to the *8720MC High Performance Drives Installation Manual* (publication 8720MC-IN001*x*-EN-P).

Comments Regarding this Manual

To offer comments regarding the contents of this manual, go to www.ab.com/manuals/gmc and download the Motion Control Problem Report form. Mail or fax your comments to the address/fax number given on the form.

Commissioning Your 8720MC SERCOS Interface Drive

Chapter Objectives

This chapter provides you with information to configure and apply power to your 8720MC SERCOS interface drive. This chapter includes:

- General Startup Precautions
- Locating 8720MC Connectors and Indicators
- Locating SERCOS Interface Module Connectors
- Configuring Your 8720MC
- Configuring Your 1756-M*xx*SE SERCOS interface Module
- Applying Power to Your 8720MC
- Testing and Tuning Your Axes

Note: Some of the procedures in this chapter include information regarding integration with other products.

IMPORTANT When used in SERCOS mode, the 8720MC drive requires MPL-B8*xxx*, -B9*xxx*, or 8720SM-*xxxxxxxx*S1, -*xxxxxxxx*S2 motors.

General Startup Precautions

The following precautions pertain to all of the procedures in this chapter. Be sure to read and thoroughly understand them before proceeding.

ATTENTION

This product contains stored energy devices. To avoid hazard of electrical shock, verify that all voltages on the system bus network have been discharged before attempting to service, repair or remove this unit. Only qualified personnel familiar with solid state control equipment and safety procedures in publication NFPA 70E or applicable local codes should attempt this procedure.

ATTENTION

This drive contains ESD (Electrostatic Discharge) sensitive parts and assemblies. You are required to follow static control precautions when you install, test, service, or repair this assembly. If you do not follow ESD control procedures, components can be damaged. If you are not familiar with static control procedures, refer to Allen-Bradley publication 8000-4.5.2, *Guarding Against Electrostatic Damage* or any other applicable ESD Protection Handbook.

Locating 8720MC Connectors and Indicators

8720MC connectors and indicators are located as shown in figures 1.1 and 1.2 below. You must remove the front cover to gain access to the control board.

Note: Only drives with the enclosure option (-AA) have a front cover.

Figure 1.1
8720MC-*xxxx* Control Board Switches and Connectors

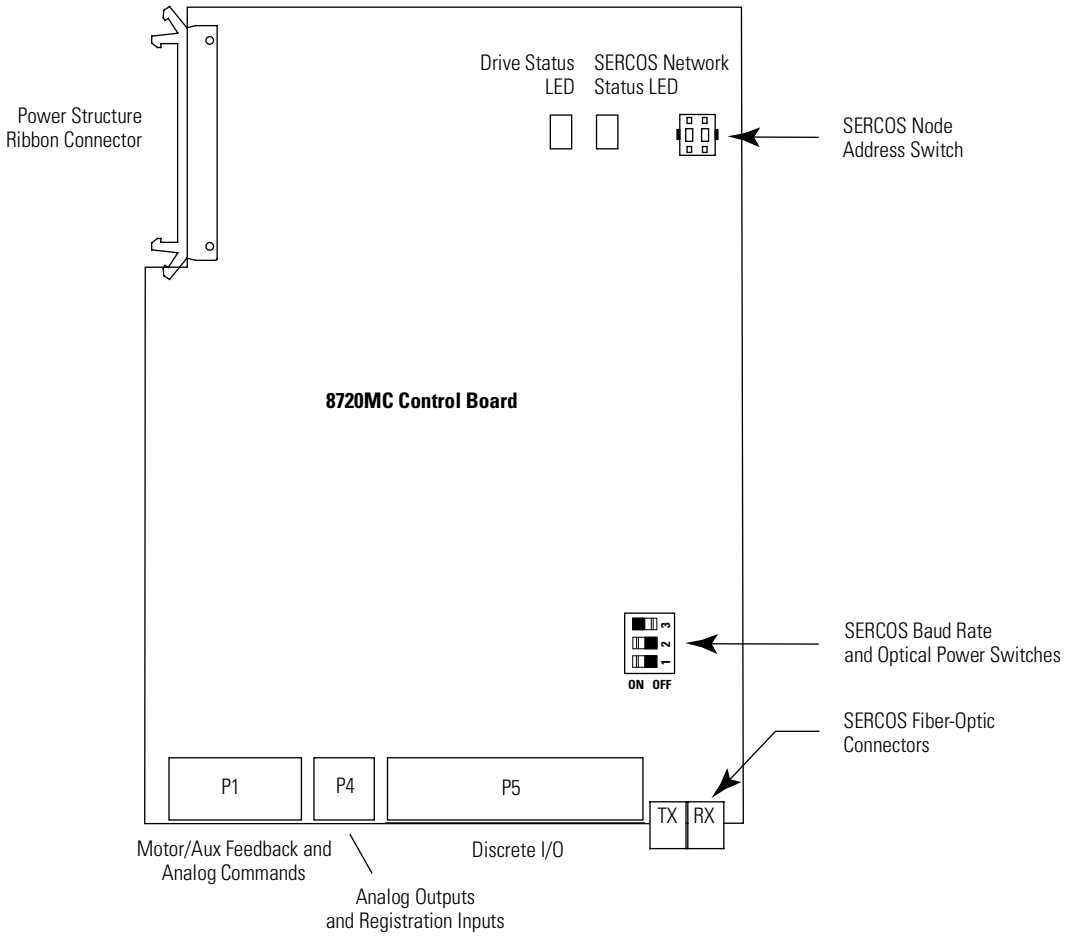
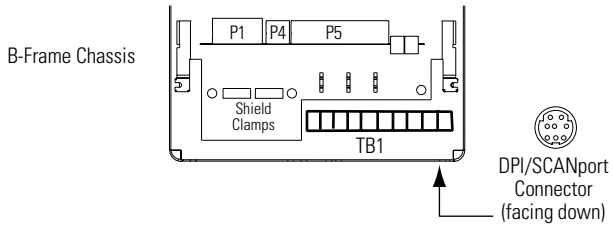


Figure 1.2
8720MC-*xxxx* DPI/SCANport™ Connector

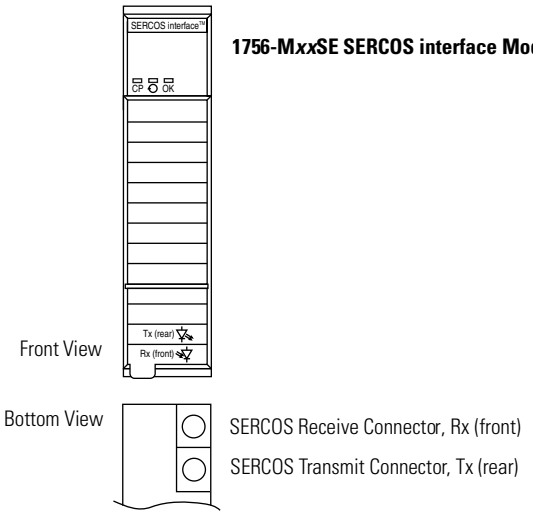


Note: Refer to the *8720MC Regenerative Power Supply User Manual* (publication 8720MC-RM001*x*-US-P) for 8720MC-RPS connector and indicator locations.

Locating SERCOS Interface Module Connectors

Use the figure below to locate the 1756-M*xx*SE SERCOS fiber-optic connectors. The fiber-optic ring is connected using the SERCOS Receive and Transmit connectors.

Figure 1.3
SERCOS Fiber-Optic Connections



Note: Fiber optic cable lengths of 0.3 m (4.0 in.) to 32 m (105.0 ft) are available in plastic or glass. Lengths of 50 m (164.2 ft) to 200 m (656.7 ft) are available in glass only.

Configuring Your 8720MC

These procedures assume you have completed mounting, wiring, and connecting your 1756-M*xx*SE SERCOS interface module and 8720MC drive.

The procedures in this section apply to 8720MC drive components and describe how to:

- Configure your 8720MC drive(s)
- Configure your 1756-M*xx*SE SERCOS interface module using RSLogix 5000 software
- Download your program to your ControlLogix controller
- Apply power to your 8720MC drive components
- Test and tune your motor using RSLogix 5000™ software

These procedures assume you have connected the fiber optic cables between your 8720MC drive and the 1756-M*xx*SE SERCOS interface module.

Configuring Your 8720MC Drive

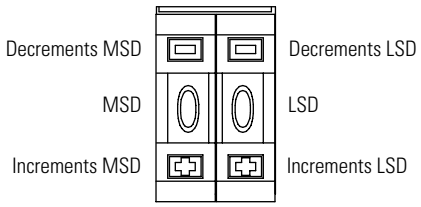
To configure your 8720MC drive:

1. Verify that there is no power applied to the 8720MC and that the SERCOS fiber-optic cables are plugged into the Tx and Rx connectors. To verify your fiber-optic cable connections, refer to the *8720MC High Performance Drive Installation Manual* (publication 8720MC-IN001*x*-EN-P).

2. Set the base node address for the 8720MC by setting the SERCOS Node Address switch. Valid node addresses are 01-99. The left hand switch sets the most significant digit (MSD) and the right hand switch sets the least significant digit (LSD). Refer to the table below for switch operation. Refer to Figure 1.1 for switch location.

To:	Press:
Increment the (MSD/LSD) node address	The plus (+) switch.
Decrement the (MSD/LSD) node address	The minus (-) switch.

Figure 1.4
Setting the Base Address Switches



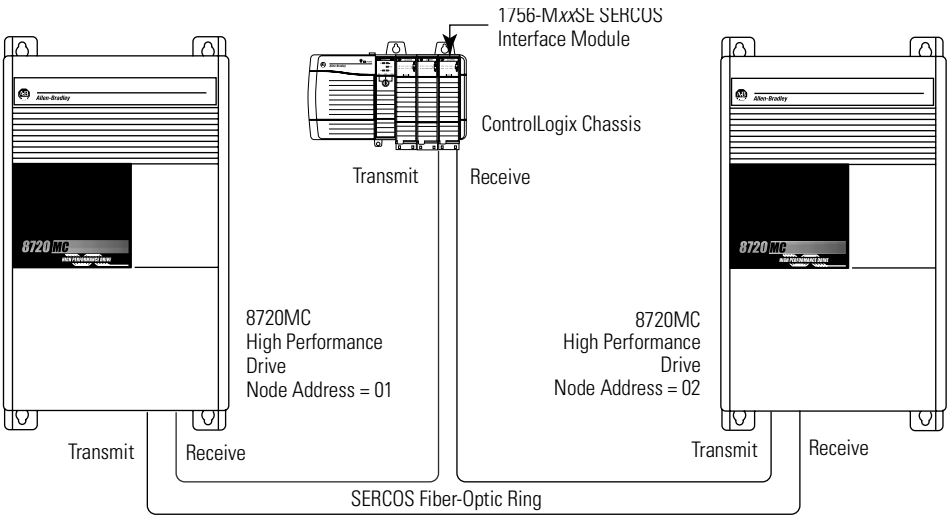
IMPORTANT When two or more 8720MC drives are connected to the same 1756-M*xx*SE module, each node address must be unique.

Refer to Figure 1.5 for an example of how node addresses are assigned.

3.

If you:	Then:
Have more 8720MC node addresses to set	Go to step 1.
Do not have more 8720MC node addresses to set	Go to step 4.

Figure 1.5
Fiber-Optic Ring Connection Example



Note: You can mount two 1756-M*xx*SE SERCOS interface modules in two separate ControlLogix chassis or you can mount them in the same chassis (as shown above).

Utilizing two 1756-M*xx*SE SERCOS interface modules allows you to reduce the SERCOS ring cycle times.

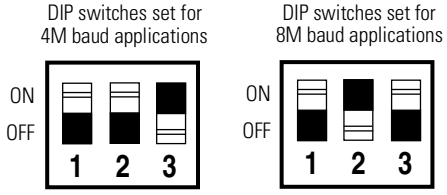
4. Set the SERCOS baud rate using DIP switches 2 and 3, as shown in Figure 1.6. Refer to the table below for baud rate switch settings. Refer to Figure 1.1 for the baud rate (DIP) switch location.

For this baud rate:	Set switch 2:	Set switch 3:
4M baud	OFF	ON
8M baud	ON	OFF

5. Set the SERCOS optical power level to **High** using DIP switch 1, as shown in Figure 1.6. Refer to the table below for optical power level switch settings. Refer to Figure 1.1 for the optical power switch location.

For this optical power level:	Set switch 1:
Low	OFF
High	ON

Figure 1.6
SERCOS Baud Rate and Optical Power DIP Switches



Configuring Your 1756-M*xx*SE SERCOS Interface Module

This procedure assumes that you have wired your 8720MC system and have configured the 8720MC baud rate and optical power switches.

Note: For detailed configuration information, refer to the *ControlLogix Motion Module Setup and Configuration Manual* (publication 1756-UM006*x*-EN-P).

IMPORTANT In order for the 8720MC to communicate with the 1756-M*xx*SE SERCOS interface module, (indicated by the three LEDs on the 1756-M*xx*SE going solid green) your RSLogix 5000 software must be version 11.0 or above.

To configure your 1756-M*xx*SE SERCOS interface module and create a program including your 8720MC drive:

1.

If you have:	Then:
Already configured your 1756-M*xx*SE SERCOS interface module using the *ControlLogix Motion Module Setup and Configuration Manual* (publication 1756-UM006*x*-EN-P)	Go to section Applying Power to Your 8720MC.
Not configured your 1756-M*xx*SE SERCOS interface module	Go to step 2.

2. Apply power to your ControlLogix chassis containing the 1756-M*xx*SE SERCOS interface module and open your RSLogix 5000 software.

IMPORTANT Refer to the *ControlLogix Motion Module Setup and Configuration Manual* (publication 1756-UM006*x*-EN-P) for specific instructions and troubleshooting.

3. Select **New** in the File menu. The New Controller window opens.

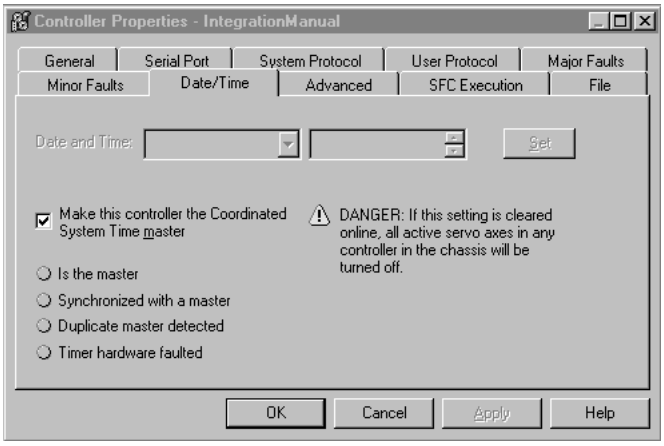
4. Provide/select the following New Controller attributes:

- Controller type
- File name
- ControlLogix chassis size
- ControlLogix processor slot

5. Select **OK**.

6. Select **Controller Properties** in the edit menu. The Controller Properties window opens.

7. Select the **Date and Time** tab.



8. Check the box **Make this controller the Coordinated System Time master**.

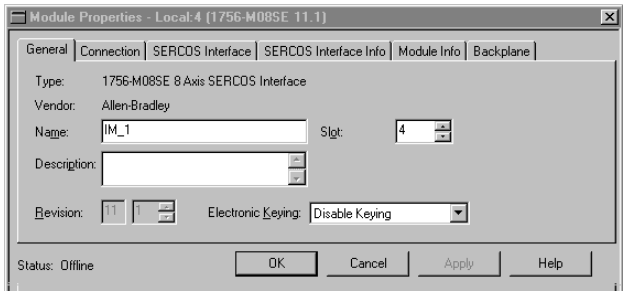
IMPORTANT Only one ControlLogix processor can be assigned as the Coordinated System Time master.

9. Select **OK**.

10. Right-click on I/O Configuration in the explorer window and select **New Module**. The Select Module Type window opens.

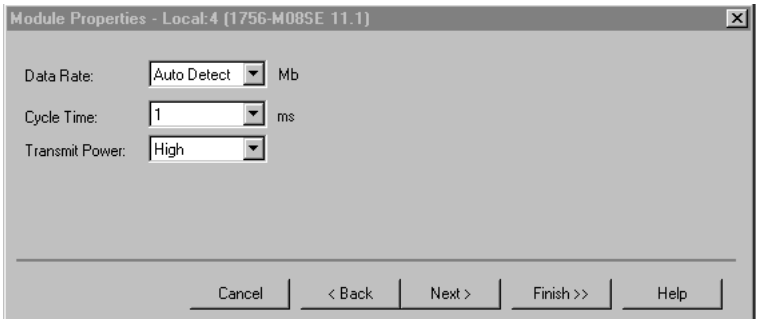
11. Select **1756-M*xx*SE** as appropriate for your actual hardware configuration.

12. Select **OK**. The Module Properties wizard opens.



- Name the module
- Select the slot where your module resides (left most slot = 0)
- Select an Electronic Keying option (select Disable Keying if unsure)

13. Select **Next** until the following screen opens.



14. Select **Data Rate, Cycle Time,** and **optical power Power** settings.

- Ensure the Data Rate setting matches DIP switches 2 and 3 (baud rate) as set on the 8720MC control board, or use the Auto Detect setting.
- Set the Cycle Time according to the table below.

ControlLogix SERCOS Module	**Data Rate** Mbit/s	**SERCOS Ring Cycle Time** ms	**Number of Axes**
1756-M08SE	4	0.5	2
		1.0	4
		2.0	8
	8	0.5	4
		1.0	8
		2.0	
1756-M16SE	4	0.5	2
		1.0	4
		2.0	8
	8	0.5	4
		1.0	8
		2.0	16

- Ensure the Optical Power setting (high or low) matches DIP switch 1 as set on the 8720MC control board.

15. Select **Finish**. Your new 1756-M*xx*SE servo module appears under the I/O Configuration folder in the explorer window.

16. Right-click on the new 1756-M*xx*SE module you just created and select **New Module**. The Select Module Type window opens.

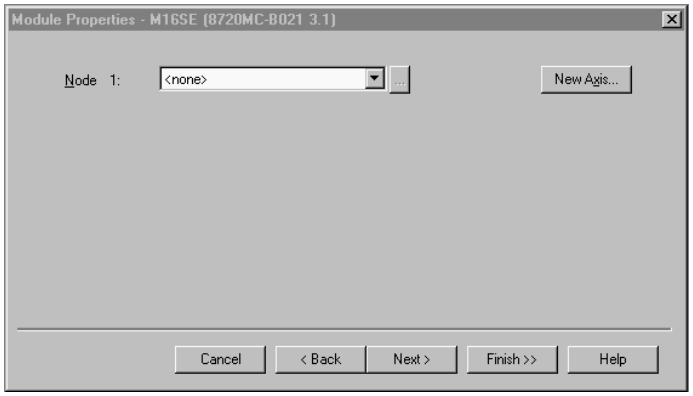
17. Select your 8720MC-*xxxx* drive.

18. Select **OK**. The Module Properties window opens.

19. Provide/select the following Module Properties attributes:

- Module name
- Base Node address
- Electronic Keying option

20. Select **Next** until the following window opens.

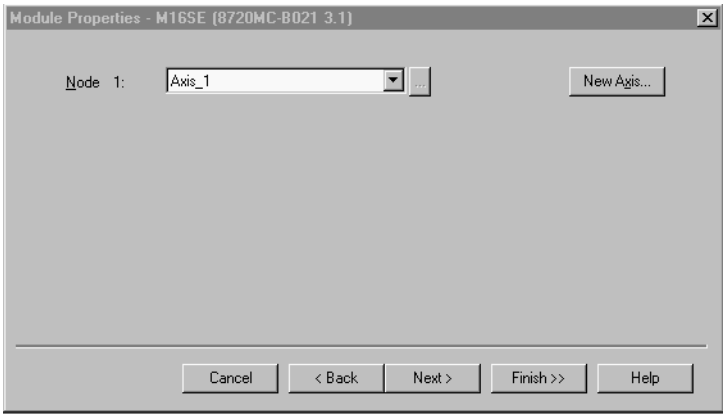


21. Select the **New Axis** button. The New Tag window opens.

22. Provide/select the following New Tag attributes:

- Axis name
- **AXIS_SERVO_DRIVE** as the Data Type

23. Assign your axis to the node address (as shown in the window below).



24. Select **Next**.

25. Select **None** as the Bus Regulator Catalog Number (shunt option).

26. Select **Finish**.

27. Repeat steps 16-26 for each 8720MC-*xxxx* drive. The axes appear under the Ungrouped Axes folder in the explorer window.

28. Right-click Motion Groups in the explorer window and select **New Motion Group**. The New Tag window opens.

29. Name the new motion group.

30. Select **OK**. New group appears under the Motion Groups folder.

31. Right-click on the new motion group and select **Motion Group Properties**. The Motion Group Properties window opens.

32. Select the **Axis Assignment** tab and move your axes (created in Step 21) from *Unassigned* to *Assigned*.

33. Select the **Attribute** tab and edit the default values as appropriate for your application.

34. Select **OK**.

35. Right-click on an axis in the explorer window and select **Axis Properties**. The Axis Properties window opens.

36. Select the **Units** tab and edit default values as appropriate for your application.

37. Select the **Conversion** tab and edit default values as appropriate for your application.

38. Select the **Drive** tab and set the 8720MC-*xxxx* Amplifier Catalog Number.

39. Set **Loop Configuration** to Position Servo.

40. Select the **Motor/Feedback** tab and set the Motor Catalog Number and Feedback Type as appropriate for you actual hardware configuration.

41. Select **OK**.

42. Repeat steps 35-41 for each axis.

43. Verify your ControlLogix program and save the file.

44. Download your program to the ControlLogix processor.

Applying Power to Your 8720MC

This procedure assumes you have finished configuring your 8720MC drive and 1756-M*xx*SE SERCOS interface module.

ATTENTION

To avoid damage to your 8720SM motor, apply power to the 8720SM blower motor and verify the direction of air flow before applying power to your 8720MC drive. Refer to the *8720SM High Performance AC Induction Motors Installation Instruction*s (publication 8720SM-IN001*x*-EN-P) for blower motor wiring instructions. Refer to *Appendix A* for *Power Interconnect Diagrams*.

Use the table below to determine where to begin applying power to your 8720MC.

If your 8720MC system:	Then:
Includes a (8720MC-RPS) Regenerative Power Supply	Go to *Applying Power to Your 8720MC (with 8720MC-RPS)*
Does not include a (8720MC-RPS) Regenerative Power Supply	Go to *Applying Power to Your 8720MC (without 8720MC-RPS)*

Applying Power to Your 8720MC (with 8720MC-RPS)

This procedure assumes that you have finished configuring your 8720MC drive (including the 8720MC-RPS) and your 1756-M*xx*SE SERCOS interface module.

IMPORTANT Follow this procedure if your 8720MC system includes a Regenerative Power Supply (8720MC-RPS).

To apply power to your 8720MC system:

1. Ensure cabinet disconnect switch is in the OFF position.
2. Disconnect the load to the motor(s).

ATTENTION

To avoid personal injury or damage to equipment, disconnect the load to the motor(s). Ensure each motor is free of all linkages when initially applying power to the system.

3. Apply three-phase input power to the 8720MC-RPS. Refer to the *8720MC Regenerative Power Supply User Manual* (publication 8720MC-RM001*x*-US-P) for power up procedure and troubleshooting.

4. Wait for 8720MC-RPS to finish initialization and close the (MC) contactor. Bus voltage is now supplied to 8720MC drive.

5. Observe the Drive Status LED.

If the Drive Status LED is:	Status:	Do This:
Flashing green	Normal condition	Go to step 6.
Flashing red	Drive is faulted	Go to the chapter *Troubleshooting Your 8720MC Servo Drive*.

6. Observe the SERCOS Network Status LED.

If the Network Status LED is:	Status:	Do This:
Flashing green	Establishing communication with network	Wait for steady green.
Steady green	Communication is ready	Go to step 7.
Flashing red	No communication	Go to the chapter *Troubleshooting Your 8720MC Servo Drive*.

7. Observe the three SERCOS LEDs on the 1756-M*xx*SE module.

If the three SERCOS LEDs are:	Status:	Do This:
Flashing green and red	Establishing communication	Wait for steady green on all three LEDs.
Steady green	Communication ready	Go to *Testing and Tuning Your Axes*.
Not flashing or steady green	1756-M*xx*SE module is faulted	Go to the *ControlLogix Motion Module Setup and Configuration Manual* (publication 1756-UM006*x*-EN-P) for specific instructions and troubleshooting.

Applying Power to Your 8720MC (without 8720MC-RPS)

This procedure assumes that you have finished configuring your 8720MC drive and 1756-M*xx*SE SERCOS interface module.

IMPORTANT Follow this procedure if your 8720MC system does not include a Regenerative Power Supply (8720MC-RPS).

To apply power to your 8720MC system:

1. Ensure cabinet disconnect switch is in the OFF position.
2. Disconnect the load to the motor(s).

ATTENTION To avoid personal injury or damage to equipment, disconnect the load to the motor(s). Ensure each motor is free of all linkages when initially applying power to the system.

3. Apply three-phase input power to the 8720MC drive.
4. Observe the Drive Status LED.

If the Drive Status LED is:	Status:	Do This:
Flashing green	Normal condition	Go to step 6.
Flashing red	Drive is faulted	Go to the chapter *Troubleshooting Your 8720MC Servo Drive*.

5. Observe the SERCOS Network Status LED.

If the Network Status LED is:	Status:	Do This:
Flashing green	Establishing communication with network	Wait for steady green.
Steady green	Communication is ready	Go to step 6.
Flashing red	No communication	Go to the chapter *Troubleshooting Your 8720MC Servo Drive*.

6. Observe the three SERCOS LEDs on the 1756-M*xx*SE module.

If the three SERCOS LEDs are:	Status:	Do This:
Flashing green and red	Establishing communication	Wait for steady green on all three LEDs.
Steady green	Communication ready	Go to *Testing and Tuning Your Axes*.
Not flashing or steady green	1756-M*xx*SE module is faulted	Go to the *ControlLogix Motion Module Setup and Configuration Manual* (publication 1756-UM006*x*-EN-P) for specific instructions and troubleshooting.

Testing and Tuning Your Axes

This procedure assumes that you have configured your 8720MC drive, your 1756-M*xx*SE SERCOS interface module, and applied power to the system.

IMPORTANT Before proceeding with testing and tuning your axes, verify that the 8720MC status LEDs are as described in the table below.

Status LED:	Must be:	Status:
Drive	Flashing green	Normal condition
Network	Steady green	Communication is ready

Note: For detailed testing and tuning information, refer to the *ControlLogix Motion Module Setup and Configuration Manual* (publication 1756-UM006*x*-EN-P).

To test and tune each axis:

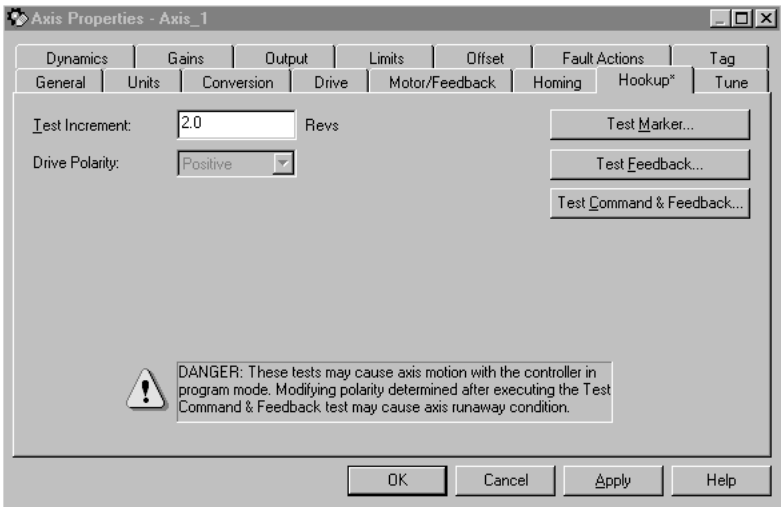
1.

If you have:	Then:
Already tested and tuned your 1756-M*xx*SE SERCOS interface module axes using the *ControlLogix Motion Module Setup and Configuration Manual* (publication 1756-UM006*x*-EN-P)	You are finished commissioning your 8720MC.
Not tested and tuned your 1756-M*xx*SE SERCOS interface module	Go to step 2.

2. Verify the load was removed from the motor(s).

3. Right-click on an axis in your Motion Group folder in the explorer window and select **Axis Properties**. The Axis Properties window appears.

4. Select the **Hookup** tab.



5. Select **2.0** as the number of revolutions for the test (or another number more appropriate for your application).

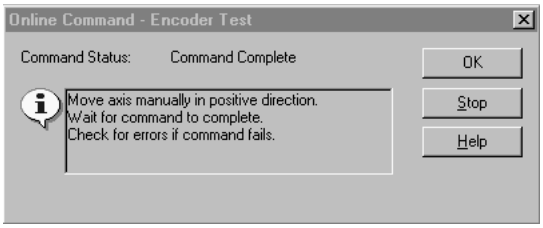
This Test:	Performs this Test:
Test Marker	Verifies marker detection capability as you rotate the motor shaft.
Test Feedback	Verifies feedback connections are wired correctly as you rotate the motor shaft.
Test Command & Feedback	Verifies motor power and feedback connections are wired correctly as you command the motor to rotate. Also, allows you to define polarity.

6. Apply Drive Enable Input signal (P5-14) for the axis you are testing.

ATTENTION

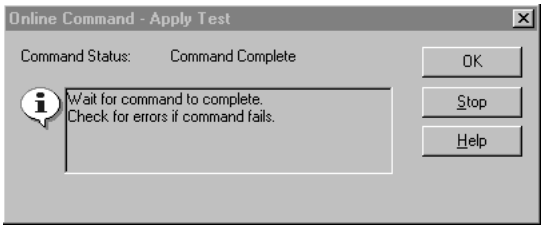
To avoid personal injury or damage to equipment, apply 24V Drive Enable Input signal (P5-14) only to the axis you are testing.

7. Select the **Test** (Marker/Feedback/Command & Feedback) button to verify connections. The Online Command window opens. Follow the on-screen test instructions. When the test completes, the Command Status changes from *Executing* to *Command Complete*.

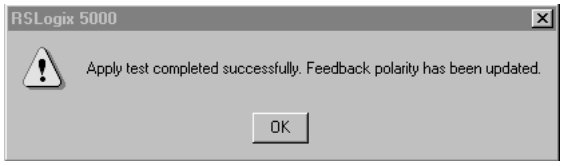
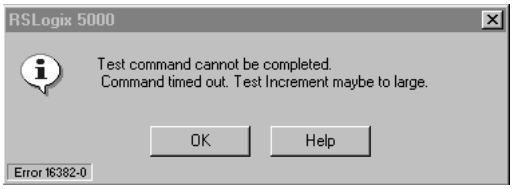


8. Select **OK**.

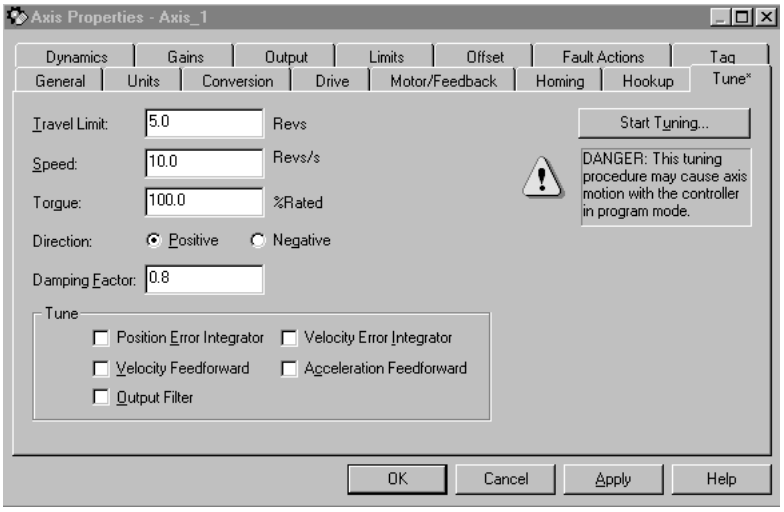
9. The Online Command - Apply Test window opens (Feedback and Command & Feedback tests only). When the test completes, the Command Status changes from *Executing* to *Command Complete*.



10. Select **OK**.

If:	Then:
Your test completes successfully, this window appears: 	1. Select **OK**. 2. Go to step 11.
Your test failed, this widow appears: 	1. Select **OK**. 2. Verify that the Drive Enable Input signal (P5-14) is applied to the axis you are testing. 3. Verify the Drive Status LED turned solid green during the test. 4. Return to step 7 and run the test again.

11. Select the **Tune** tab.



12. Enter values for Travel Limit and Speed. In this example, Travel Limit = 5 and Speed = 10.

Note: Actual value of programmed units depend on your application.

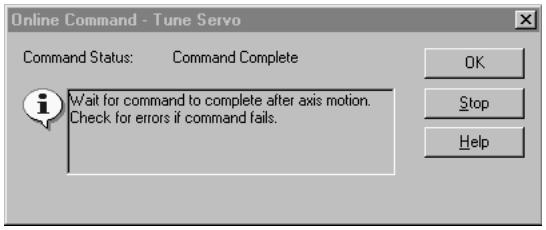
13. Check **Tune** boxes as appropriate for your application.

14. Apply Drive Enable Input signal (P5-14) for the axis you are tuning.

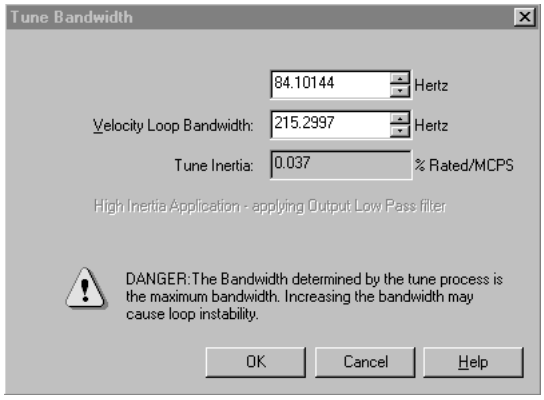
ATTENTION

To avoid personal injury or damage to equipment, apply 24V Drive Enable Input signal (P5-14) only to the axis you are tuning.

15. Select the **Start Tuning** button to auto-tune your axis. The Online Command - Tune Servo window opens. When the test completes, the Command Status changes from *Executing* to *Command Complete*.



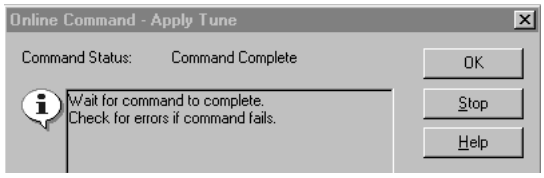
16. Select **OK**. The Tune Bandwidth window opens.



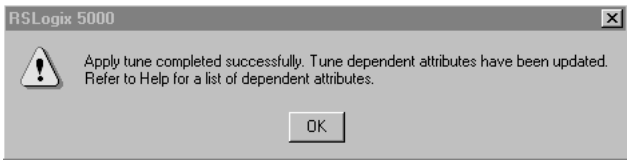
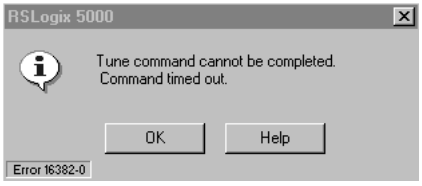
Note: Actual bandwidth values (Hz) depend on your application and may require adjustment once motor and load are connected.

17. Select **OK**.

18. The Online Command - Apply Tune window opens. When the test completes, the Command Status changes from *Executing* to *Command Complete*.



19. Select **OK**.

If:	Then:
Your test completes successfully, this window appears: 	1. Select **OK**. 2. Go to step 20.
Your test failed, this widow appears: 	1. Select **OK**. 2. Make an adjustment to motor velocity 3. Refer to 1756-UM006*x*-EN-P for more information, if necessary. 4. Return to step 15 and run the test again.

20. Remove Drive Enable Input signal (P5-14) signal (applied in step 6 above) to disable the axis.

Commissioning Your 8720MC Analog Drive

Chapter Objectives

This chapter provides you with the information to start up and tune your 8720MC analog system. This chapter includes:

- General Start-up Precautions
- Setting Up Your 8720MC Drive
- Understanding Servo Loop Parameters
- Auto Tuning Your 8720MC Drive
- Scaling of Auto Velocity Analog Reference
- Scaling of Manual Velocity Analog Reference
- Operating in Manual Mode Using Digital I/O Interface
- Operating in Manual Mode with an Internal or External HIM
- Start-up of Motor Orient

The procedures in this chapter do not include information regarding integration with other products.

IMPORTANT When used in analog mode, the 8720MC drive requires 8720SM-*xxxxxxxx*S3 or 8720SM-*xxxxxxxx*S4 motors.

General Start-up Precautions

The following precautions pertain to all of the procedures in this chapter. Be sure to read and thoroughly understand them before proceeding.

ATTENTION

This product contains stored energy devices. To avoid hazard of electrical shock, verify that all voltages on the system bus network have been discharged before attempting to service, repair or remove this unit. Only qualified personnel familiar with solid state control equipment and safety procedures in publication NFPA 70E or applicable local codes should attempt this procedure.

This drive contains ESD (Electrostatic Discharge) sensitive parts and assemblies. You are required to follow static control precautions when you install, test, service, or repair this assembly. If you do not follow ESD control procedures, components can be damaged. If you are not familiar with static control procedures, refer to Allen-Bradley publication 8000-4.5.2, *Guarding Against Electrostatic Damage* or any other applicable ESD Protection Handbook.

Setting Up Your 8720MC Drive

The following procedures only apply to the drive component of the 8720MC product line. For details on starting up the 8720MC-RPS Regenerative Power Supply, refer to the *8720MC Regenerative Power Supply User Manual* (publication 8720-RM001*x*-US-P). This section provides the following to help you set up and tune the 8720MC drive:

- Information you need before you begin
- Setup procedures

The instructions in this chapter assume that you are using a SCANport HIM (1201-HA*x*) or DPI/SCANport HIM (20-HIM-A*x*). Refer to *Appendix B* for general HIM programming information.

The start-up procedure can also be performed on a desktop, lap top or hand-held personal computer using Allen-Bradley's Drive Explorer (v3.02 or above) software. This method greatly enhances the ability to navigate through and display or modify parameters. For more information on DriveExplorer, refer to the *DriveExplorer Getting Results Manual* (publication 9306-GR001*x*-EN-E). When using DriveExplorer with the 8720MC you must use the (catalog number 1203-SSS) series B or later SCANport to RS-232 serial port adaptor to interface your PC to the SCANport connector on the drive.

In most cases the default values in the startup procedure are adequate, however, you can modify the values, as needed, for your application.

Before You Begin

In an initial start-up it is always good practice to check the motor windings before you apply power to the drive. This is done by first disconnecting the motor leads from the drive, terminals T1, T2 and T3. Use a multi-meter to check continuity between the motor leads. There should be very low resistance between T1 and T2, T2 and T3 and T3 and T1. Make sure there is no continuity between any of the motor leads and the motor case ground.

Before reconnecting the motor leads make sure there is no continuity between the motor leads and the temperature switch leads. Connect a multi-meter between terminal P1-12 and each of the motor leads. There should be almost infinite resistance. Also make sure there is no continuity between terminal P1-13 and each of the motor leads. Examine the drive input wiring carefully and make sure that there are no shorts to ground on the incoming leads. Before you begin the startup procedure, verify that the system has been wired correctly per the drawings in *Appendix A* and that you have a good quality digital multi-meter available for troubleshooting. In complicated systems it may be best to remove all fuses and bring up the system gradually by installing the device fuses as needed to bring on line additional equipment.

IMPORTANT If you need to exit the start-up procedures before you are finished, you should always save your parameters to EEprom memory. If you fail to do this before removing power any changes made after the last save to EEprom will be lost. The procedure for saving parameters to EEprom is discussed in *Appendix B*.

Applying Power

This procedure assumes that you have wired your 8720MC system and verified the wiring.

1. Apply 380/460V ac input power to the 8720MC-RPS or drive. The Drive Status LED on the Control PCB flashes green. In addition, the HIM becomes active and a message similar to the following appears:

   ```
   System Ready
   ```

   When you apply power to the HIM, a series of messages appears before the final *System Ready* message appears.

2.

If the Drive Status LED:	Then:
Flashes green	The control and bus power is active, but the drive is not enabled.
Flashes red	You may have a wiring or power problem. Refer to *Chapter 3*.
Remains solid red	
Does not illuminate	

Key Set-up Parameters

The 8720MC analog drive is controlled from analog inputs, SCANport/DPI device. It also can be used as a spindle or a power servo. Parameter 501, "A-B® Application", is used to identify the specific application use of the 8720MC Drive. You must select one of the 4 valid application choices provided in parameter 501:

- Analog spindle
- Analog power servo
- SCANport, Digital Peripheral Interface, spindle
- SCANport, Digital Peripheral Interface, power servo

Note: Although spindle and power servo are choices for both Analog and SCANport/DPI modes, there is no difference between them.

Refer to *Appendix C* for more information on programming parameters.

When you choose “Ana Spindle” or “Ana Servo” parameter 503, “AuxFdbk Type must be set to “analog ref”. For analog input applications make sure parameter 503 is set to “Analog Ref”.

For analog spindle applications make sure that “Position Scaling”, parameter 76, bit 7 is set to “modulo”. When modulo is selected the “Motor Posn Fdbk”, parameter 51 will display actual motor position to whatever resolution is selected in “Rot Posn Resolut”, parameter 79. For example if Parameter 79 and parameter 103 are set for 30,000 resolution counts/rev, the motor position, parameter 51, will count from 0 to 29,999 and back to 0 as it is rotated clockwise when viewed from the drive end.

Also for analog spindle or power servo applications where the A quad B simulated digital encoder output is used, parameter 582 must be set to “Index” to assure that the encoder marker is available at the motion controller interface on terminals P5-3 and P5-21.

Initial Checks

With power on the drive, motor selected (refer to parameter 777), the drive disabled (P5-14) and the load disconnected, display parameter 51 “Motor_Pos_Fdbk”, found in file: Control, group: Position. Rotate the motor shaft cw and the display should increase as the shaft rotates. Turning the shaft ccw should decrease the position display. This confirms that the feedback device and wiring are performing properly.

After enabling the drive by applying +24V dc to input 1 “Drive Enable” (P5-14) on the digital I/O interface, the module status LED should illuminate steady green and the motor drive shaft should be very stiff. Usually the motor will slowly rotate since it is in velocity mode with the position loop open.

If the motor is erratic and uncontrollable it is probably improperly phased. Refer to the *8720MC High Performance Drive Installation Manual* (publication 8720MC-IN001*x*-EN-P) to correct the phasing. With the load unconnected press the stop button on the HIM module. This will tell the drive that the HIM module is the controlling input. Press the green start button on the HIM and increase the speed command with the speed pot (HAS1 option) or up/down arrows (HAS2 option).The motor should rotate faster or slower based on the HIM speed selected. The direction key should reverse the motor direction. Depress the stop button to stop the motor and remove the +24V dc from the drive enable (P5-14). The drive should be disabled with the drive status LED flashing green and the motor shaft will freely rotate by hand. If these initial checks are successful and there are no error messages on the HIM you are ready to connect the load and tune the drive.

Understanding Servo Loop Parameters

This section provides the information you will need to select and adjust servo loop parameters.

One of the most important tasks to be performed during startup is the adjustment of the servo loop parameters. Adjustment of these parameters is essential to get the maximum performance from a drive application. The 8720MC is supplied with a set of default parameters which are intended to provide a good starting point. In addition all the motor-specific parameters are stored in the motor encoder.

As a consequence, only a few key servo loop parameters require tuning to the specific load and application.

The traditional method of tuning the servo loop parameters is performed by a process of trial and error adjustment. The 8720MC drive provides an auto tuning procedure which greatly simplifies this task. Eight sets of servo loop parameters (selectable via digital inputs on P5-16 through P5-18) are shown in *Parameter Files, Groups, and Elements (Group Listing)* in *Appendix C*. Each group has 16 servo loop parameters or "elements" of which 4 are set by the auto tuning procedure. The 8 groups of servo loop parameters are provided to support multiple gear ranges, high /low winding motors and multiple operating modes. Each unique gear range, winding or operating mode requires a separates set of servo loop parameters and each should be separately auto tuned. Auto tuning compensates for the changes in the reflected inertia and changes in the motor operating characteristics caused by gear changes or switching the high/low winding.

Selecting a Servo Loop Parameter Group

Before you begin auto tuning it is necessary to select the servo loop parameter group that you wish to auto tune. This may be done from the HIM, DriveExplorer or the digital I/O. Assuming you wish to select parameter group 4, the HIM procedure for changing the active parameter group is explained below:

1. At the HIM, press **ENTER**. A message similar to the following appears:

```
Choose Mode
Display
```

2. Press either the up or down arrow key until the following appears:

```
Choose Mode
Program
```

3. Press **ENTER**. Press either the up or down arrow key until the following appears:

```
Choose File
Procedure
```

4. Press **ENTER**. Press either the up or down arrow key until the following appears:

```
Choose Group
Parameter Switch
```

5. Press **ENTER**. Press either the up or down arrow key until you have located "*Select Param Set*", parameter 217.

6. Press **SEL** and the number on the bottom line will flash. Use the up or down arrow key to change the number to 4 and press **ENTER**.

7. To activate parameter group 4, press the up or down arrow key until you find "*Switch Param Set*", parameter 216.

8. Press the **SEL** and the number on the bottom line will flash. Use the up or down arrow key to change the number to 1, and then press **ENTER**.

   Parameter group 4 is now the active parameter group.

9. To confirm that parameter group 4 is the active parameter group, view parameter 254, "*Actual Param Set*", by pressing the up or down arrow key until the top line displays "*Actual Param Set*". The bottom line should display a value of 4, confirming that parameter group 4 is active.

The procedure for changing parameter groups described above can also be performed with DriveExplorer in much the same way. In addition the parameter groups may be changed via the digital I/O by selecting the proper binary bit pattern at the interface. Each servo loop parameter group which your application requires will require setting and tuning of the servo parameters.

Setting the Servo Loop Parameters

Each group of servo loop parameters can have its own set of values for mode of operation, velocity limits and torque limits. In the analog version of the 8720MC drive, the mode of operation can be set for either velocity or torque modes. The parameter for making this selection for group 0 is parameter 32, "*Primary Op Mode0*". The parameter numbers are different for each of the 8 servo loop parameter groups as (refer to *Appendix C*). The default mode for parameter 32 and all 7 of the other primary operation mode parameters is "*Velocity"*. If torque mode is required, use the techniques described in *Appendix B* to modify this parameter. The velocity limits should be modified to suit the application. Parameters 38 and 39, "+*Velocity Limit 0*" and "-*Velocity Limit 0*" are the velocity limit parameters for servo loop parameter group 0.

The parameter numbers are different for each of the 8 servo loop parameter groups as described in *Appendix C*. Locate these parameters and change their values to the maximum motor speed in rpm, as desired for the application.

The torque limits should also be modified to suit the application. Parameters 82 and 83, "+*Torque Limit 0*" and "-*Torque Limit 0*" are the torque limit parameters for servo loop parameter group 0. The parameter numbers are different for each of the 8 servo loop parameter groups as described in *Appendix C*. Locate these parameters and change their values to the maximum allowable motor torque for the application as a percentage of full-rated continuous motor torque, as desired for the application. The drive is now ready to auto tune the remaining servo loop parameters.

Understanding Acceleration/Deceleration Parameters

Each parameter set has an acceleration parameter and a deceleration parameter. For parameter group 0 the acceleration parameter number is 136 and the deceleration parameter is 137. These parameters are used to select the maximum acceleration and deceleration rates in radians per second squared for a given parameter set. The acceleration and deceleration parameters are used to limit the rate of change of velocity of the motor to a level that can be supported with load connected. With high inertia loads it is often necessary to limit the deceleration to prevent bus over voltage or over current trips caused by over running loads. The values for acceleration and deceleration are adjusted by trial and error to suit the application.

Auto Tuning Your 8720MC Drive

This section provides the information you need to auto tune your 8720MC drive. This procedure assumes that you have wired your 8720MC drive and have completed the procedures already covered in this chapter.

Before You Perform an Auto Tune

Observe the following guidelines before auto tuning your drive.

- The Drive Status LED must be flashing green to indicate the bus voltage is up. Refer to *Start-up Troubleshooting Procedures* in *Chapter 3* for the status LED troubleshooting table.
- Make sure the desired application load for this group of servo loop parameters is connected to the motor.
- Auto tune default parameter values are normally adequate. To change them, refer to *Appendix C*.

Performing the Auto Tune

To auto tune your drive:

1. Before initiating the auto tuning of the motor make sure the desired application load for this group of servo loop parameters is connected to the motor.

2. For the analog input command configuration, set Parameter 501, the application parameter, to either "*Ana Spindle*" or "*Ana Servo*" as required by the application.

3. Set Parameter 503, "*Aux Fdbk Type*", to "*Analog Ref*" to ensure the drive is prepared to accept an analog command reference via the auxiliary feedback port. This is a general requirement for any analog input application and not specifically for auto tuning.

ATTENTION

Auto tuning will initiate a fast rotation in one direction of the motor shaft followed by a fast rotation in the opposite direction; resulting in rapid motion of the connected load. Make sure all mechanical connections are securely fastened and that nothing is in the path of the load. Failure to observe this precaution could result in bodily injury.

For the analog configuration, auto tuning will automatically calculate the following Group 0 Servo Loop parameters: Parameter 100, "*Vel Prop Gain 0*"; Parameter 101, "*Vel Integ Time 0*"; Parameter 523, "*System Accel 0*"; Parameter 562, "*Torq Lowpas Frq0*" and "*Pos Loop Gain 0*".

Before initiating the auto tune procedure, ensure that the Parameter 546, "*Atune Config*", has the four lowest significant bits set to one. This means that:

- bit 0 - "*Auto Save*" is on and the calculated parameters will be automatically saved
- bit 1 - "*Calc Gains*" is on and the proportional and integral gains for the selected servo loop parameter group will be calculated
- bit 2 - "*Inertia*" is on and the system acceleration for the selected servo loop parameter group will be calculated
- bit 3 - "*Auto Offset*" is on and the system calculates the analog auto reference offset, parameter 693.

The speed for the auto tune procedure as well as the torque and the maximum distance for the auto tune moves can be modified. Parameter 543, "*ATune Vel Limit*"; Parameter 542, "*ATune Torq Limit*" and Parameter 544, "*ATune Posn Limit*" serve this purpose. The default values are 1000 RPM, 100% rated continuous torque and 65,535 counts, respectively. Changing these values will change the calculated values of the servo loop parameters. The default values represent a good compromise and should be used unless the application does not support the default values. For example, if you know the torque will be limited to 75% of rated motor torque, Parameter 542 should be set to 75%.

To Auto tune the drive:

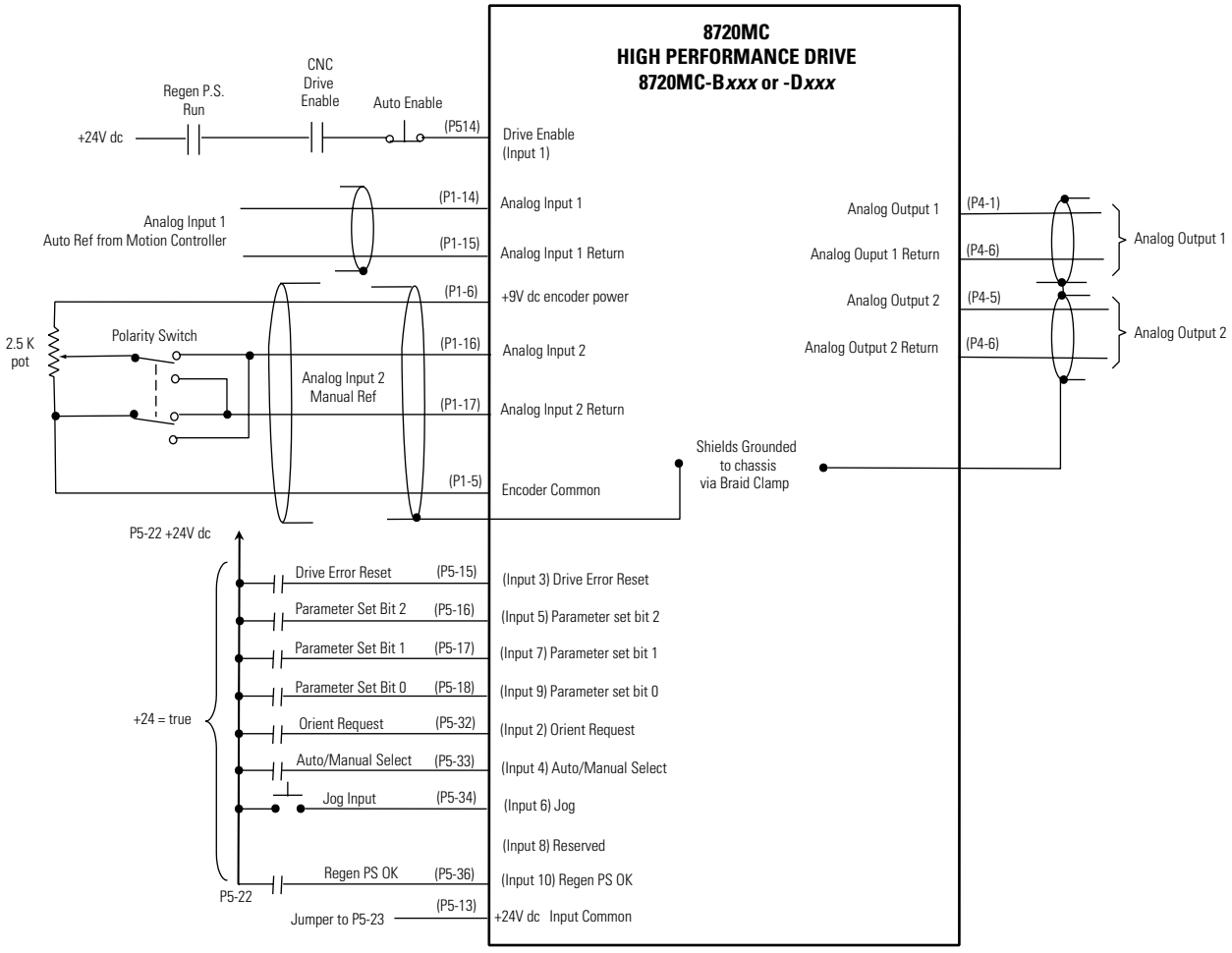
1. With the drive disabled set parameter 541 to "Execute".
2. Making sure the motor and load are safe to operate, enable the drive. The motor will quickly rotate clockwise and counter-clockwise indicating that the auto tune procedure has executed. Parameter 547 will indicate "successful" if the auto tune procedure executed properly.
3. Disable the drive and set parameter 541 to "Idle".

Analog Inputs and Outputs

The 8720MC has two ±10V dc analog outputs and two ±10V dc analog inputs. The analog inputs are only available in the analog input spindle or power servo software configurations (parameter 501). In the SERCOS configuration the analog inputs are used to interface to the auxiliary, spindle, or axis mounted feedback device that is connected to the auxiliary feedback connector. In the analog input spindle or power servo software configurations (as determined by parameter 501) analog input 1 provides the torque or velocity command reference to the drive. Analog input 2 provides a manual velocity reference for manual operator stations. Figure 2.1 illustrates the recommended connections for the analog inputs and outputs.

Refer to *Appendix C* for a description of the analog input parameters (analog inputs 1 and 2) under parameters 691 to 692. Each analog input has a scaling factor associated with it, parameters 695 and 696. Refer to *Appendix C* for details on how to use the scaling parameters with the analog inputs. The default velocity scaling is 100 rpm/volt for both analog input 1 and 2. As an example, assume the motion controller is scaled such that 8 volts produces a maximum speed of 6,000 rpm. The drive should also be scaled such that 8 volts equals 6,000 rpm. This is accomplished by using a scaling factor value of 750 rpm/volt or a value of 7500 in parameter 695. The A/D resolution is ±8192 bits or 1.2 mv/bit, based on a ±10 volt input command. It is always best to use the full ±10 Volt range so that maximum velocity resolution is achieved. When in torque mode the scaling factor for analog input 1 is fixed at 2.5 volts = 100% continuous rated torque.

Figure 2.1
Analog Input and Output Connection Diagram



Analog default links to the 8720MC software are shown in the table below.

Connection	Parameter Number	Analog Spindle	Analog Power Servo	SERCOS - Spindle / Power Servo	SCANport - Spindle/ Power Servo
P5-14 & 15 / Analog Input 1	661	Auto Velocity Reference	Auto Velocity Reference	Not Available	Reserved
P5-16 & 17 / Analog Input 2	664	Manual Velocity Reference	Manual Velocity Reference	Not Available	Manual Velocity Reference.
P4-1 & 6 / Analog Output 1	681	Velocity Feedback	Velocity Feedback	Velocity Feedback	Velocity Feedback
P4-5 & 6 / Analog Output 2	386	Motor Shaft Power	% Rated Torque Parameter 84	Motor Shaft Power	Motor Shaft Power

The analog input assignments are fixed. In the SERCOS configuration, the analog inputs are not available since the velocity or position command is provided by the SERCOS fiber-optic ring. In their place a second feedback channel is provided for spindle or axis mounted feedback devices. In the SCANport configuration, the velocity or torque reference is provided by a PLC® via a DeviceNet, Remote I/O, or ControlNet connection to a SCANport communication bridge module. Any of the analog output default links can be changed by entering a new linkable parameter number into the analog output 1 or 2 (parameters 681 or 683).

Changing the Default Digital Output Links

If necessary, changing one or several default output assignments can be accomplished by modifying the pointer or "link" values in the digital output parameters (662 through 671). This may be accomplished with DriveExplorer or the HIM module in "Program" mode. In the tables below, entering the parameter number of the "source" 8720MC I/O event into the "sink" 8720MC digital output parameter will create a link between the 8720MC I/O event variable and the digital output.

For example, assigning Digital Output 5 to the motor at "Zero_Speed" variable can be accomplished by entering the value 331 into parameter 666 using either DriveExplorer or the HIM in program mode. The state of Digital Output 5 or any other digital output can be observed using either DriveExplorer or the HIM in program mode by selecting parameter 661, "Digital Output Status". The status of all 10 digital outputs will be displayed as a bit array. A display of 1 is true and 0 is false for each output. An x indicates an unused bit. Bit 5 will be "1" whenever the motor falls within the zero speed window.

The state of the Zero_Speed variable can also be observed by selecting parameter 331 using either DriveExplorer or the HIM in program mode. It will indicate 1 for true and 0 for false.

If you change the digital output default assignments the 8720MC will change parameter 501 to "Custom Configuration" so that it is clear that this configuration has modified values which are different from the default values.

If you use DriveExplorer to restore the defaults by selecting and storing one of the application types in parameter 501, the modified parameters will be changed back to the default values associated with that application type. If you have a custom configuration, DriveExplorer or the HIM can be used to identify parameters which do not conform to the application defaults.

Refer to the tables below for the linking relationship between the 8720MC I/O event variables and the digital output parameters.

Sinks			Typical Sources	
Parameter Number	**Parameter**		**Parameter Number**	**Parameter**
663	Digital_Output_2	Link ←	330	At Programmed Speed
664	Digital_Output_3		331	Zero Speed
665	Digital_Output_4		332	Motor Speed Below Threshold
666	Digital_Output_5		334	Torque Above Limit
667	Digital_Output_6		335	Velocity Above Limit
668	Digital_Output_7		336	In Position
669	Digital_Output_8		339	Speed Below Minimum
670	Digital_Output_9		340	Speed Above Maximum
671	Digital_Output_10		526	High Winding Enable
			527	Low Winding Enable
			528	Enable Brake Solenoid
			529	Auto Reference Enabled
			530	Manual Mode Selected
			583	Orient Complete
			615	Shut Down Error

Scaling of Auto Velocity Analog Reference

This section provides the information you need to scale an auto velocity analog reference. The default setting is 1000 rpm/10V.

To change the scale factor for the auto velocity analog reference, perform the following procedure:

1. At the HIM, press the escape key get to the top level display then depress **ENTER**. A message similar to the following appears:

```
Choose Mode
Display
```

2. Press either the up or down arrow key until the following appears:

```
Choose Mode
Program
```

3. Press **ENTER**. Press either the up or down arrow key until the following appears:

```
Choose File
I/O Interface
```

4. Press **ENTER**. Press either the up or down arrow key until the following appears

```
Choose Group
Analog Inputs
```

5. Press **ENTER**. Use the up and down arrow keys to find Parameter 695, "*Analog Vel Scale*".

6. Press **SEL** to select the numerical value.

7. Use the up and down arrow keys to change the numerical value.

8. To change the motor direction for a given analog voltage input, press **SEL** to highlight the sign character.

9. Use the up and down arrow keys to change the sign. Press **ENTER**.

IMPORTANT Remember to save any changed values to nonvolatile EEPROM memory. Refer to *Appendix B*.

In velocity mode with 0 volts at the auto analog reference input the drive may still slowly rotate cw or ccw. To minimize this parameter 693, "Auto_Ref_Offset", is provided. Values ranging from ±0.01% to ±100% can be entered. A plus value is used to offset in the cw direction and a minus value is used to offset in the ccw direction.

Scaling of Manual Velocity Analog Reference

This section provides the information you need to scale a manual velocity analog reference. Default scaling is 1000 rpm/10 volts.

To scale motor jog speed:

1. At the HIM, press **ENTER**. A message similar to the following appears:

```
Choose Mode
Display
```

2. Press either the up or down arrow key until the following appears:

```
Choose Mode
Program
```

3. Press **ENTER**. Press either the up or down arrow key until the following appears:

```
Choose File
I/O Interface
```

4. Press **ENTER**. Press either the up or down arrow key until the following appears:

```
Choose Group
Analog Inputs
```

5. Press **ENTER**. Use the up and down arrow keys to find Parameter 696, "*Manual Vel Scale*".

6. Press **ENTER**. The following message appears:

```
Manual Vel Scale
+ 1000 RPM
```

7. Press **SEL**. The cursor moves to the bottom line. Continue pressing **SEL** until the cursor moves to the digits that you need to change.

8. Press the up and down arrows to change the scale value.

9. To change the shaft direction from positive to negative, press **SEL** until the cursor is on the plus sign and press the up or down arrow key.

IMPORTANT Default shaft direction is positive (clockwise while looking at the shaft).

10. Press **ENTER**.

In velocity mode with 0 volts at the manual analog reference input the drive may still slowly rotate cw or ccw. To minimize this parameter 694 "Man_Ref_Offset" is provided. Values ranging from ±0.01% to ±100% can be entered. A plus value is used to offset in the cw direction and a minus value is used to offset in the ccw direction.

Operating in Manual Mode Using Digital I/O Interface

This section provides the information you need to operate your 8720MC drive in manual mode using a digital I/O interface. Before beginning this procedure, scale the manual velocity analog reference for the desire speed range and shaft direction.

To operate the 8720MC drive in manual mode using digital I/O interface:

1. Using your voltmeter, verify that all analog reference signals connected to analog inputs are set to zero.
2. Set the Auto/Manual Select digital input 4 high.
3. Enable the drive by setting the Drive Enable, digital input 1, high.
4. Set the digital input 6 to high in order to jog the motor.

Your drive is now ready to jog in the manual mode. The drive will follow the reference signal voltage and polarity provided to analog input 2. Refer to *Appendix C.*

Disabling the drive will stop the motor.

Operating in Manual Mode with an Internal or External HIM

This section provides the information you need to operate your 8720MC drive with an internal or external HIM. Before beginning this procedure, scale the manual velocity analog reference for the desired motor speed range and shaft direction. Refer to *Scaling of Manual Velocity Analog Reference.*

To operate the 8720MC drive in manual mode using an internal or external HIM:

1. Enable the drive by setting the Drive Enable digital input 1 high.
2. Depress the red stop button on the HIM module. Use the speed potentiometer or speed arrows on the HIM to set the speed reference to zero.
3. Push the start or green HIM button to run the motor, or the jog button to jog the motor.
4. Use the speed potentiometer or speed arrows to increase your speed reference to a desired level.

Disabling the drive, pressing the HIM red stop button, or releasing the jog button will stop the motor.

Start-up of Motor Orient

This section provides the information you will need to orient your motor. The motor orient procedure provides a means of positioning the motor to a precise location regardless of whether the motor is starting from standstill or rotating at high speed. The procedure that follows assumes that the motor feedback device is an SNS-60 Sincoder (8720SM-*xxxxxxxx*S3, 8720SM-*xxxxxxxx*S4 motors).

To understand the drive controlled motor orient feature refer to *Appendix C* for the following:

Parameter 152, "*Spin Orient Req*"; Parameter 150, "*Mtr Marker Ofset*"; Parameter 153, "*Orient Angle*"; Parameter154 "*Orient Options"*; Parameter 157, *"At Spd Window"*; Parameter 222, "*Spin Orient Spd"*; Parameter 260, "*Pos Accel Rate*"; Parameter 582, "*Auto Home*", Parameter 76, *"Position Scaling"* Parameter 79, *"Rot Posn Resolut"* Parameter 103*, "Modulo Value"*

ATTENTION

Use caution to avoid personal injury or damage to equipment caused by unanticipated motor rotation while changing motor parameters.

To orient your motor:

1. As an initial check, make sure that Parameter 582 *"Auto Home"* is set for "*Index*" and Parameter 76, *"Position Scaling",* has *modulo* checked.

2. Verify that Parameter 79, *"Rot Posn Resolut"* = 3600 counts/ revolution. Increase the resolution if higher resolution than 3600 counts per revolution is desired. This can be increased to 32,767 counts.

3. Verify that the following parameters are set to the described values:

   - Parameter 150, "*Mtr Marker Ofset*" = 0 counts
   - Parameter 153, "*Orient Angle*" = 0 counts
   - Parameter 222, "*Spin Orient Spd"* = 100 rpm.
   - Reduce the speed if it is too high for the application.
   - Parameter 260, "*Pos Accel Rate*" = 100 rad/sec.
   - Reduce the acceleration if it is too high for the application.
   - Parameter 103, "*Modulo Value"* = the value in parameter 79.

4. Navigate to Parameter 154, "*Orient Options*" and select an orient direction. The application will dictate this choice. The available options are *"CW"*, *"CCW"* or "*Shortest Pth"*.

5. Enable the drive.

6. Toggle the orient request input, P5-32, to a true state or navigate to Parameter 152, "*Spin Orient Req*" and select a state of "1" and press **ENTER**.

   The motor will rotate in velocity mode in the selected direction at the selected orient speed until the encoder marker is detected. The drive will then transfer to positioning mode and calculate the desired end point of zero motor offset angle and zero programmed angle. Regardless of the orient direction chosen, with the end location at zero counts the motor will stop and return via shortest path to the marker and stop.

IMPORTANT Because the motor is randomly assembled to the mechanical system this is probably not the actual orient position required for the application.

To change the motor position to the desired zero angle, Parameter 150 "*Mtr Marker Ofset*" must be modified to reflect the difference between the actual zero angle and the desired zero angle.

1. To determine the motor marker offset first orient the spindle with zero in Parameter 150. Navigate to Parameter 51, "Mtr Posn Fdbk", and the position value displayed will be zero in counts.

2. With the drive disabled, rotate the motor to the desired motor angle and record that position.

The required correction angle is the difference between the marker 0 angle reading and the desired angle 0 reading for the application.

Signs are very important in determining offsets. Make sure to record if the position value increased or decreased. Viewing from the drive end of the motor, for standard configurations, CCW (or -) rotation decreases parameter 51. CW (or positive) rotation increases parameter 51. Parameter 150 has the opposite sense since it is subtracted from the position. Therefore if the desired offset direction is CW it should have a minus value. Conversely ccw offset should have a positive value.

To prevent reversals in direction during orient it is good practice to make the direction of the offset the same as the direction of the selected orient rotation. That is if the orient direction is CW the offset angle should be CW. If the orient direction is CCW the offset angle should be CCW. Accordingly it may be necessary to calculate the

complimentary offset value to assure there are no direction reversals during the orient.

Assuming modulo scaling is selected the complimentary offset value is defined as the number of resolution units set in Parameter 79, minus the modulo position value in parameter 51, "*Motor Posn Fback*". A simple rule of thumb is to use the complimentary offset value if the orient direction is CCW.

Multiple revolution orients can be obtained by having the "*Modulo Value"* (parameter 103) a value greater than the "*Rot Posn Resolut"* (parameter 79). For example, "*Rot Posn Resolut"* = 3600, "*Modulo Value"* = 7200.

For Example: Assume Parameter 79, *"Rot Posn Resolut"* = 10,000 counts/revolution; Parameter 103, *"Modulo Value"* = 10,000 counts/revolution; Parameter 154, "*Orient Options*" = CW and Servo Loop Parameter Group 0 is selected as determined by Parameter 254, "*Actual Param Set*". Initiate an orient by setting parameter 152, "Orient Request", to a value of 1. Note that after an orient with zero in Parameter 150, "*Mtr Marker Ofset*" and zero also in Parameter 153, "*Orient Angle*" the position display, Parameter 51, "*Mtr Posn Fdbk*" = 0 or 10,000 counts. To determine the required offset correction manually rotate the motor to the desired angle with the drive disabled. Assume after doing this Parameter 51 reads 2,500 counts meaning we rotated cw 2500 counts. For parameter 150 CW offsets have a minus value. We record the difference as -2500 counts CW by setting Parameter 150 to -2500. To prevent orient direction reversals it is always good practice to record the marker offset direction the same as the desired orient direction. In this example since the selected orient direction is CW and we do not desire direction reversal during orient and the orient direction is also clockwise. To achieve the same target orient position with a CCW orient direction we would set Parameter 150, "*Mtr Marker Ofset*" to a complimentary CCW offset. This is done by subtracting the measured offset counts from the number of counts per revolution, Parameter 79. In this case we subtract 2500 from 10,000 and get 7,500 counts, CCW. For parameter 150 CCW offsets have a plus value. We now then enter 7500 in Parameter 150, "*Mtr Marker Ofset*". Assuming a CCW orient direction and the motor standing still, if we request an orient via the digital I/O or Parameter 152, "*Spin Orient Req*", the motor will behave as follows:

- Accelerate to "*Spin Orient Spd"*, Parameter 222, in the CCW direction using the "*Posn Accel Rate"*, Parameter 260, until it is within the velocity speed window, Parameter 157, "*At Spd Window*" or Parameter 272, "*Speed Window %*". The drive will not look for the encoder marker until it determines the motor speed is within the selected velocity window.

- Once achieving the "*At Program Speed*" state, Parameter 330, the drive will find the marker. After detecting the marker it will change to positioning mode and determine the desired end point. In this case it determines it must continue rotating in CCW direction for another 7500 counts.
- At this time the drive will issue the "*Orient Complete*" event, Parameter 583. The motor will be locked in the orient position until the orient request is removed. As long as the orient request is maintained the drive will ignore the analog references. As soon as the orient request is released the drive will follow the analog references based on the current active mode of operation.

It is possible to orient to a specific angle other than zero as well as perform multi-revolution orients (refer to parameter 153 "*Orient Angle*" in *Appendix C*).

With the SNS-60 encoder marker orient (8720SM-*xxxxxxx*S3 and -*xxxxxxx*S4 motors), the drive does not know where the marker is when motor orient is initiated. If the motor is at standstill when the orient request is received and "Shortest Pth" is selected in Parameter 154 "*Orient Options"* the drive will assume a clockwise orient direction. If it is rotating at speed and "Shortest Pth" is selected in Parameter 154 "*Orient Options"* it will assume the orient direction is the same as the direction it is rotating in. If it is rotating at speed and "CW or CCW" is selected in Parameter 154 "*Orient Options"* it will assume the orient direction is as programmed in 154, regardless of the direction that it is currently rotating in. If the orient direction is different from the current motor speed direction it will stop and reverse direction for the orient.

As a final note to the operation of motor orient, the drive will hold the motor locked in the orient position until the orient request from either the digital I/O or SCANport is released. If the drive is enabled and there is a non zero analog reference command on Analog Input 1 in Auto Mode or Analog Input 2 in Manual Mode the drive will immediately respond to the input reference and motor will accelerate to the commanded speed. If this is undesirable make sure the analog references are zero after an orient is complete.

ATTENTION

Unexpected motor rotation may occur after a spindle orient request is released from the digital input. If motion is not desired after an orient request is removed from the drive digital input make sure your logic assures that zero speed is commanded or that the drive is disabled.

Optimizing the Motor Orient Procedure

This section provides the information you need to optimize your motor's orientation: Usually motor orient cycle time is a critical issue. It is therefore important to adjust the parameters to get the most out of the drive and motor. The 8720MC is capable of high accelerations, speeds and torques therefore the mechanical systems usually become the limit. To achieve maximum performance it is desirable to get the maximum orient speed and acceleration the mechanical system can support.

The key parameters in achieving this are Parameter 222, "*Spin Orient Spd*"; Parameter 260, *"Posn Accel Rate";* Parameter 157*, "At Spd Window"* or Parameter 272*, "Speed Window%"* and Parameter 100, "*Vel Prop Gain*" assuming Servo Loop Parameter Group 0.

In general the optimizing procedure is to:

1. First auto tune the motor with the orient load, such as a spindle or indexing mechanism, connected. Refer to *Performing the Auto Tune*.

2. Next gradually increase the orient speed and orient acceleration in unison.

3. After each change in Parameters 222 and 260 execute an orient.

Continue to do this until the desired cycle time is achieved or the maximum capability of the mechanical system is realized.

It may be necessary to increase the *"At Spd Window"* via Parameter 157 or 272 to avoid missing a marker and taking an extra revolution to achieve the orient position. Also, if the motor and load mechanism are overshooting the orient angle, it may help to increase the velocity proportional gain, Parameter 100, "*Vel Prop Gain 0*" assuming Servo Loop Parameter Group 0. It may also be necessary to increase the plus and minus torque limits via Parameters 82 and 83 assuming Servo Loop Parameter Group 0.

Troubleshooting Your 8720MC Servo Drive

Chapter Objectives

This chapter provides information to help you determine the cause of a drive fault or improper 8720MC Drive operation and define possible corrective actions. This chapter includes:

- Required Equipment
- Start-up Troubleshooting Procedures
- Viewing the Fault Queue
- Fault Descriptions
- Understanding the Fault Parameters
- Troubleshooting the Digital I/O
- Troubleshooting SCANport I/O
- Troubleshooting the 8720MC-RPS Regenerative Power Supply
- Supplemental Troubleshooting Information

Required Equipment

The 8720MC can be equipped with a resident HIM display module. If not, it will be necessary to use a remote HIM module or DriveExplorer to troubleshoot the drive. The A-B remote HIM (catalog number 1203-HA2, Series B or later) or (20-HIM-A*x*) can be connected to the external SCANport connector. As an alternative to the HIM, a computer running Windows® or a handheld running Windows CE® can be used as a diagnostic tool. The available computer should be equipped with the A-B DriveExplorer software. Use of DriveExplorer also requires the 1203-SSS Serial to SCANport adapter. For operating instructions refer to the *DriveExplorer Getting Results Manual* (publication 9306-GR001*x*-EN-E). In addition to these diagnostic tools a volt meter, a battery box, and some small hand tools may be necessary. In rare instances an oscilloscope may be necessary to analyze feedback signals.

Start-up Troubleshooting Procedures

Before installing fuses into the AC input lines of the drive or regenerative power supply, if supplied, first check that the incoming AC voltage falls within the range of 324 to 505 Vrms across each of the three phases. Make sure the AC or DC power inputs are properly wired per the *8720MC High Performance Drive Installation Manual* (publication 8720MC-IN001*x*-EN-P). Also make sure the motor and feedback devices are wired using the recommended shielded cables. For the feedback cables make sure there is continuity between the motor and drive connectors. Make sure the Weidmueller connector spring clamps are clamped to the wire and not the insulation.

If you are using an 8720MC Regenerative Power Supply, refer to the *8720MC Regenerative Power Supply User Manual* (publication 8720MC-RM001*x*-US-P) for configuration and startup information.

After power is applied to the drive the first thing to observe is the status of the control board LEDs and the HIM display on the drive. There are two LEDs on the control board. If you have an enclosed 8720MC Drive you must first remove the cover to observe the LEDs. The left LED is used to indicate the status of the drive control board. The right LED indicates the status of the SERCOS ring. The table below indicates how these LED's should be interpreted.

LED Name	LED Status	Potential Cause	Possible corrective action
Drive Status	Not Illuminated	There is no power to the Control Board	Check the incoming AC power for AC input drives or the incoming DC power DC for common bus drives
Drive Status	Steady Red	Malfunctioning Control Board	Software or hardware failure. Replace the Control Board
Drive Status	Flashing Red	A fault has occurred in the system	Verify wiring. Use the HIM fault log or DriveExplorer to investigate the fault
Drive Status	Alternating red and greens	DC bus is not up	Check 3 phase AC incoming or DC incoming power
Drive Status	Flashing Green	There are no faults and the DC bus is up but the enable input is not being detected. As a consequence no torque is being applied to the motor. The drive may be in manual mode and the jog button has not been depressed.	• Check if +24V dc is on the enable input • Check the run output from the RPS • Check the enable output from the Motion Controller • Check the enable input wiring. • Recycle the enable • If in manual mode depress jog button.
Drive Status	Steady Green	Drive is enabled.	No corrective action
SERCOS Network Status	Flashing Red	There is a SERCOS ring communication error.	Make sure the fibre optic ring is connected at all nodes on the ring and that power is on all the nodes. Make sure power is on the master.
SERCOS Network Status	Steady Green	Normal operation	No corrective action
SERCOS Network Status	Green Flashing	Establishing communications	No corrective action

Fault messages can be displayed on the HIM, or on a PC running DriveExplorer or RSLogix 5000 if used with SERCOS.

Viewing the Fault Queue

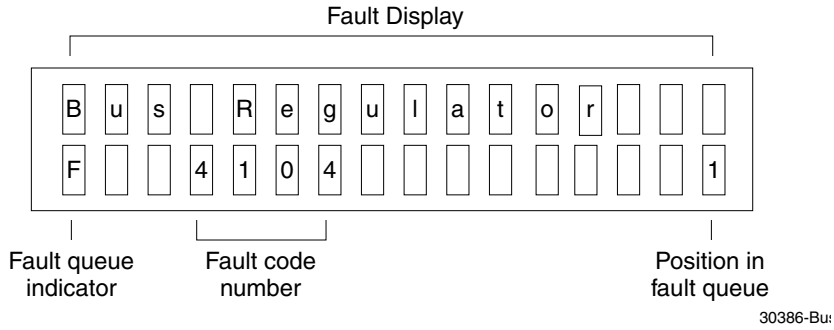
Control Status mode on the HIM or Explore/Device Properties/Faults tab in DriveExplorer let you view the fault queue.

To view the fault queue on the HIM:

1. Press any key from the status display. "*Choose Mode"* is shown.
2. Press the increment up key or the decrement down key to show "*Control Status"*.
3. Press enter to select Control Status
4. Press the increment up key or the decrement down key until "*Fault Queue*" is displayed.
5. Press enter to select "Fault Queue"
6. Press the increment up key or the decrement down key until "*View Queue*" is displayed.
7. Press enter to select "View Queue"

The fault queue can contain up to 8 faults. The 8720MC Drive reports the faults using the following format.

Figure 3.1
Fault Queue Format



The number (1) on the display in the figure above indicates this faults position within the fault queue.

The 8720MC fault queue can also be monitored with DriveExplorer. The fault queue can be accessed through the *Explore* pull down menu, the *Device Properties* command and the *Faults* tab.

Fault Descriptions

When a fault occurs, the fault is displayed until you initiate a *Drive Error Reset* from the digital I/O or depress the stop button from the HIM module or by executing MSFR from RSLogix 5000 if used with SERCOS.

The following table provides a list of the faults, their probable causes and the drives response to the faults.

Fault Message RSLogix (HIM)	**Probable Cause/Drive Response**	**Corrective Actions**
No Fault Message (condition indicated by on-screen message) (Axis 1 ATune Flt)	Auto Tuning procedure failed to complete successfully	Assure that the drive and motor are functional and repeat the auto tune procedure.
DriveOvervoltageFault (Bus Overvoltage)	Bus voltage exceeded 810V dc. This is usually caused by a high inertia motor load being decelerated very fast. / Disable stop: the drive will disable and the motor will coast to a stop with an error message on the HIM. The control board status LED will be flashing and the drive OK output will be open.	• Monitor the AC line for high voltage or transient conditions. • Decrease the deceleration parameter for the active parameter set, param. 137 for set zero • Decrease the stopping torque, parameter 571. • Increase the dynamic braking capacity by increasing the brake chopper capacity. • Adjust parameter 563 to a lower value. This will limit the motor deceleration rate. • Check for 8720MC-RPS faults. • Reduce the 8720MC-RPS bus voltage
BusUndervoltageFault (Bus Loss)	The DC bus voltaged has dropped below the minimum acceptable level. / Disable stop	• Monitor the AC line for low voltage or power interruption. • Check for 8720MC-RPS faults.
GroundShortFault (Ground Short)	A current path to earth ground in excess of drive rated current has been detected at one of the output terminals. / Disable stop	• Check the motor wiring to the drive output terminals for a grounded condition. • Replace the drive
BusUndervoltageFault (Bus Regulator)	The regenerative power supply has faulted. / Disable stop	Investigate the 8720MC-RPS message display on the unit. Refer to publication 8720MC-RM001 for diagnostic trouble shooting procedures. Check input 10, Regen PS-OK.
BusUndervoltageFault (Bus Precharge)	The precharge time could not complete within 30 seconds.	
DriveOvercurrentFault (A1: Desat)	There was to much current in the system. / Disable stop	Check for shorted motor or motor wiring
PositionErrorFault (A1: Follow Error)	Excessive following error has been detected. This means that the motor cannot keep up with the position command. / Regen stop	• Investigate motor load for any possible binding. • Increase position loop proportional gain • Increase the allowable following error, parameter 159
DriveOvercurrentFault (A1: Overcurrent)	A drive overcurrent has occurred. The current has exceeded 150% of the inverter rated continuous current. / Disable stop.	• Decrease the deceleration parameter for the active parameter set, param. 137 for set zero. The drive is particularly sensitive to this fault at high speeds. • Adjust parameter 563 to a lower value. • Check for a shorted motor or shorted motor wiring. • Replace the drive

Fault Message RSLogix (HIM)	**Probable Cause/Drive Response**	**Corrective Actions**
DriveOvertempFault (A1: Overtemp)	A drive heat sink temperature has exceeded the specified limit. / Regen stop	• Check the cabinet filters, drive fans and heat sinks. • Check the thermal sensor and sensor wiring. • Reduce the load or duty cycle.
MotFeedbackFault (A1: Fdbk 1 Loss)	The motor encoder feedback signal has been lost. / Disable stop: the drive will disable and the motor will coast to a stop with an error message on the HIM. The control board status LED will be flashing and the drive OK output will be open.	• Make sure the feedback wires are firmly crimped on the 8720MC mating feedback connector. • Check the MS motor feedback connector. • Check the encoder connector inside the motor. • Check for wire breaks in the feedback cable. • Make sure encoder power is available on P1-6. • If all connections are verified and encoder power is available and encoder output is still not present - replace motor.
AuxFeedbackFault (A1: Fdbk 2 Loss)	The auxiliary encoder feedback signal has been lost. SERCOS configuration only. / Disable stop	• Make sure the feedback wires are firmly crimped on the 8720MC mating feedback connector. • Check the MS motor feedback connector. • Check the encoder connector inside the motor. • Check for wire breaks in the feedback cable. • Make sure encoder power is available on P1-19 or P1-20. • If all connections are verified and encoder power is available and encoder output is still not present - replace motor.
MotFeedbackFault (A1: Fdbk 1 AQB)	A feedback counting error has occurred on the motor feedback interface. Electromagnetic interference is the probable cause. / Disable stop	• Check that the feedback cable braided shield is firmly bonded to the drive chassis via the shield clamps. • Make sure the feedback and motor cables recommended in the *8720MC High Performance Drives Installation Manual* (publication 8720MC-IN001*x*-EN-P) are being used. • Make sure the shield and drain wire for the motor cable is securely bonded to the drive chassis. Make sure 4 wire shielded motor cable is being used and that the ground wire is connected to drive PE ground. • If the recommended cable is being used and all shields are tied to earth ground replace the motor.
AuxFeedbackFault (A1: Fdbk 2 AQB)	A feedback counting error has occurred on the motor feedback interface. SERCOS configuration only / Disable stop	• Check that the feedback cable braided shield is firmly bonded to the drive chassis via the shield clamps. • Make sure the feedback and motor cables recommended in the *8720MC High Performance Drive Installation Manual* (publication 8720MC-IN001*x*-EN-P) are being used. • Make sure the shield and drain wire for the motor cable is securely bonded to the drive chassis. Make sure 4 wire shielded motor cable is being used and that the ground wire is connected to drive PE ground. • If the recommended cable is being used and all shields are tied to earth ground replace the motor.
OverSpeedFault (A1: Overspeed)	The maximum commanded motor speed has exceeded the maximum allowable motor speed. / Disable stop	• Check the velocity limit parameters for the active parameter set against parameter 113, max motor speed. • Check parameter 695, the analog scale factor
DriveHardFault (Memory Init)	Control board hardware Failure	Fatal error - replace control board

Fault Message RSLogix (HIM)	**Probable Cause/Drive Response**	**Corrective Actions**
DriveHardFault (EEprom Init)	Base driver board hardware Failure	Fatal error - replace base driver board
DriveHardFault (CPLD Load)	Control board hardware Failure	Fatal error - replace control board
DriveHardFault (IDMA Load)	Control board hardware Failure	Fatal error - replace control board
DriveHardFault (CAN Init)	Control board hardware Failure	Fatal error - replace control board
DriveHardFault (SERCOS Init)	Control board hardware Failure	Fatal error - replace control board
DriveHardFault (Task Init)	Control board software error	Fatal error - replace control board
DriveHardFault (Objects Init)	Control board software error	Recall parameters, save to non volatile memory, recycle power or reset the drive. If this fails to produce positive results replace the control board.
DriveHardFault (NV Mem Init)	Control board software error	Recall parameters, save to non volatile memory, recycle power or reset the drive. If this fails to produce positive results replace the control board.
MotFeedbackFault (Fdbk Watch dog)	The feedback processor has faulted	Fatal error - replace control board
MotorOvertempFault (Motor 1 Overtemp)	The motor over temperature switch has tripped	Allow motor to cool down and investigate the cause of the motor overload.
DriveHardFault (SCANport Comm)	The controlling HIM has lost communication with the drive.	Investigate the SCANport cable and make sure it is properly connected
SERCOSFault (SERCOS Ring Flt))	The SERCOS ring is not active after being active and operational.	Check that the fiber-optic cable is present and connected properly.
(No Fault)	No fault message appears in the fault que when there are no faults	No action is needed

Understanding the Fault Parameters

Using the HIM module or DriveExplorer is an effective way of finding the source of a drive fault. Several of the parameters are specifically designed to annunciate drive status and faults. The following is a description of the fault parameters. The 12 character fault messages are shown in italics.

Parameter 11 - Shutdown Errors

This parameter is a bit pattern that identifies any active major fault within the drive. IDN 00011, parameter 11 is a SERCOS standard variable conforming to IEC Standard 61491. The structure of parameter 11 is:

If any bit is true (1) an error is indicated.

Bit 0 = Overload shut down - *"Drive Ovrld"*

Bit 1 = Amplifier over temperature shut-down - "*Drive Ovrtmp*"

Bit 2 = Motor over temperature shut down - "*Motor Ovrtmp*"

Bit 3 = Reserved

Bit 4 = Reserved

Bit 5 = Feedback error - "*Feedback*"

Bit 6 = Commutation error - "*Commutation"*

Bit 7 = Overcurrent error - "*Overcurrent*"

Bit 8 = Overvoltage error - "*Bus Overvolt*"

Bit 9 = Undervoltage error - "*Bus Undervlt"*

Bit 10 = "*Phase Loss*"

Bit 11 = Excess position error - "*Follow Error*"

Bit 12 = "*Communicate*"

Bit 13 = "*Overtravel*"

Bit 14 = Reserved

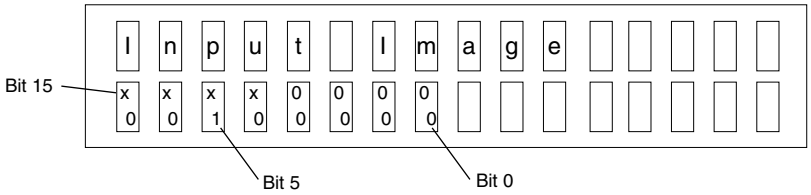
Bit 15 = 8720MC Drive Specific error - "*AB Specific*"

To view the fault parameters in Display mode on the HIM:

1. Press any key from the status display. "*Choose Mode"* is shown.
2. Press the increment up key or the decrement down key to show "*Display"*. Press the enter key to select it.
3. Press the increment or decrement key to find *"Status/Faults"*. Press the enter key to select the file
4. Press the increment up key or the decrement down key until "*Errors"* is displayed.
5. For this example press enter to select the "*Errors*" group
6. Press the increment up key or the decrement down key until "*Shut Down Errors*" is displayed.
7. Press enter to select "*Shut Down Errors*"

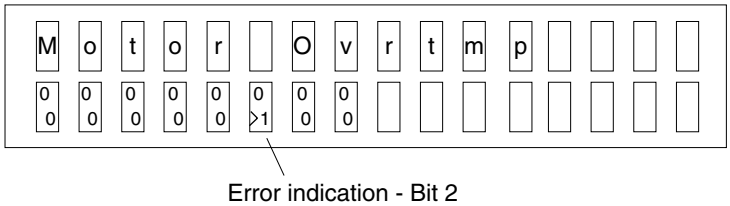
The 8720MC Drive fault parameters are reported using the format shown in the figure below. In this example a "1" in bit 2 indicates a motor over temperature fault.

Figure 3.2
Fault Parameter Format



Depressing the select key allows the user to determine the nature of the fault. Each time the select key is depressed the arrow symbol moves to the next higher bit. The top line provides the message text associated with that fault.

Figure 3.3
Fault Display



Parameters 13 and 129 are additional parameters that have the same fault display format.

Parameter 13 - Drive Status

This parameter is a bit pattern that identifies the status of the drive the drive. The structure of parameter 13 is:

Bit 0: true = Command speed = motor speed - "*At Speed*"

Event parameter 330, Setup parameter 157 or 272

Bit 1: true = Motor speed = 0 - "*Zero Speed*"

Event parameter 331, Setup parameter 124

Bit 2: true = Motor is below threshold speed - "*Vel Below Th*"

Event parameter 332, Setup parameter 125

Bit 3: true = Torque greater than threshold torque -

"Trq above Th"

Event parameter 333, Setup parameter 126

Bit 4: true = Torque greater than torque limit -

"Trq Above Lt",

Event parameter 334, Setup parameter 82 or 83

Bit 5: true = Commanded motor velocity is greater

than the velocity limit - *"Vel above Lt"*,

Event parameter 335, Setup parameter 38 or 39

Bit 6: true = Motor is in Position - *"In Position"*

Event parameter 336, Setup parameter 57

Bit 7 = Reserved

Bit 8 = Reserved

Bit 9: true = Spindle feedback is less than the minimum spindle

speed - "*Spd Below Mn*",

Event parameter 339, Setup parameter 220

Bit 10: true = Spindle feedback is greater than the maximum

spindle speed - "*Spd Above Mx*",

Event parameter 340, Setup parameter 221

Bit 11 = Reserved

Bit 12 = Reserved

Bit 13 = Reserved

Bit 14 = Reserved

Bit 15 = AB Specific

Parameter 129 - 8720MC Drive Errors

This parameter is a bit pattern that identifies drive error conditions that are in addition to the shutdown faults in parameter 11. The structure of parameter 129 is:

If any bit is true an error is indicated.

Bit 0 = + Software Overtravel - "*+Sft ovrtrvl"*

Bit 1 = - Software Overtravel - "*-Sft ovrtrvl"*

Bit 2 = + Hardware Overtravel *"+Hrd ovrtrvl"*

Bit 3 = - Hardware Overtravel *"-Hrd ovrtrvl"*

Bit 4 = Motor feedback loss - "*Mtr fdbk los*"

Bit 5 = Motor feedback noise - *"Mtr fdbk nse"*

Bit 6 = Aux feedback loss - "*Aux fdbk los*"

Bit 7 = Aux feedback noise - "*Aux fdbk nse*"

Bit 8 = Reserved

Bit 9 = Reserved

Bit 10 = Reserved

Bit 11 = Reserved

Bit 12 = Reserved

Bit 13 = Power structure ground short - "*Ground Short*"

Bit 14 = Drive hardware - "*Drv hardware*"

Bit 15 = Motor overspeed - "*Overspeed*"

Troubleshooting the Digital I/O

In troubleshooting the digital I/O interface it is often necessary to monitor the status of the digital and analog inputs and outputs to determine the source of the problem. The following parameters can be used for this purpose.

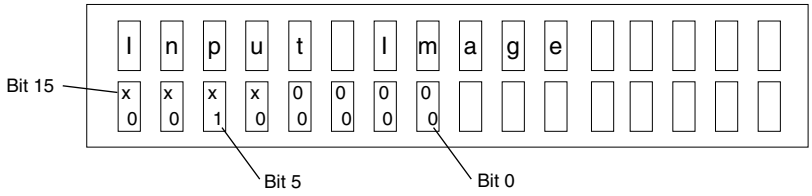
Parameter 666 - Digital Output Status

Bit 0 corresponds to Output 1 and bit 9 corresponds to Output 10. All other bits are not used. Bits 0 to 9 will change from 0 to 1 when the linked event variable comes true. Parameters 662 to 671 are used to link the output to an internal event variable. Refer to the *8720MC High Performance Drives Installation Manual* (publication 8720MC-IN001*x*-EN-P) for the default links and the assignable event links.

Parameter 690 - Digital Input Status

Figure 3.4 illustrates the digital input image display. Bit 0 corresponds to Input 1 and bit 9 corresponds to Input 10. Bits 10 and 11 are the registration inputs. All other bits are not used. Bits 0 to 11 will change from 0 to 1 when the input comes true. The input variable assignments are discussed in the *8720MC High Performance Drives Installation Manual* (publication 8720MC-IN001*x*-EN-P).

Figure 3.4
Input Image Display



Parameters 691 and 692 - Analog Input 1 Value and Analog Input 2 Value

These parameters may be used to display the analog inputs as the 8720MC sees them. The scaling is.00% to 100.00% where 100% = 10 volts. The displayed values include the associated analog offsets, Parameters 693 and 694.

Troubleshooting SCANport I/O

Two parameters are available to monitor the SCANport command and status information exchange, parameters 717 and 718.

Parameter 717 - SCANport Logic Command

A SCANport peripheral gateway device such as an A-B PLC can initiate drive activity via the SCANport Logic Command word. The structure of parameter 717 is as follows. The 12 character command messages are shown in italics.

If any bit is true the function is selected.

Bit 0: Regenerative stop request - "*Regen Stop*"

Bit 1: Start request - "*Start*"

Bit 2: Jog request - "*Jog*"

Bit 3: Clear fault request - "*Fault Clea*r"

Bit 4: Coast stop request - "*Coast Stop*"

Bit 5: Parameter Set Select bit 0 - "*Parmset Bit0*"

Bit 6: Parameter Set Select bit 1 - "*Parmset Bit1"*

Bit 7: Parameter Set Select bit 2 - "*Parmset Bit2"*

Bit 8: Parameter Set Strobe - "*Parmset Chg*"

Bit 9: Orient Request - "*Orient Req*"

Bit 10: Home request - "*Home Req*"

Bit 11: Manual/Auto request - "*Man Mode Req*"

Bits 12 to 15 are reserved:

Display mode on the HIM or DriveExplorer allows the user to view the command bits.

Parameter 718 - SCANport Logic Status

The 8720MC drive sends a status word to any SCANport connected device via a SCANport communications adapter. This may used by an A-B PLC to monitor the status of the drive. This may also be used for diagnostic purposes. The structure of parameter 718 is as follows. The 12 character status messages are shown in italics.

If a bit is set true (1) the function is enabled.

Bit 0: Drive enabled - "*Enabled*"

Bit 1: Drive auto enabled - "*Auto Ref Ena*"

Bit 2: Rotation direction - "*Rotate Dir*"

Bit 3: Drive O.k. - "*Drive OK*"

Bit 4: Zero speed - "*Zero Speed*"

Bit 5: At reference speed - "*At Ref Speed*"

Bit 6: Orient complete - "*Orient Done*"

Bit 7 Reserved

Bit 8 Brake solenoid enabled - "*Brake Enable*"

Bit 9: Torque >/= Torque limit - "*Torque Limit*"

Bit 10: High Winding Selected - "*Hi Wind Sel*"

Bit 11: Low winding Selected - "*Lo Wind Sel*"

Bit 12: Shut down fault - "*Shutdn Fault"*

Bit 13: Reserved

Bit 14: Reserved

Bit 15: Manual mode selected - "*Manual Mode*"

Parameter 716 - SCANport Logic Mask

This parameter may be used to prevent any SCANport device from controlling the drive. The structure of parameter 716 is as follows:

If a bit is set true (1) the device interface is enabled.

Bit 0: Digital I/O - “I/O”

Bit 1: Port control 1 - “Port Cntrl 1”

Bit 2: Port control 2 - “Port Cntrl 2”

Bit 3: Port control 3 - “Port Cntrl 3”

Bit 4: Port control 4 - “Port Cntrl 4”

Bit 5: Port control 5 - “Port Cntrl 5”

Bit 6: Port control 6 - “Port Cntrl 6”

For the location of the DPI/SCANport connector, refer to Figure 1.2 in *Chapter 1*.

Troubleshooting the 8720MC-RPS Regenerative Power Supply

The 8720MC-RPS regenerative power supply is equipped with a 4 character display, 6 LEDs and 5 function keys. The display can be used to monitor incoming AC voltage, outgoing DC bus voltage, input current to the RPS, output power in kW and % RPS load. In addition the display can be used to view the RPS error log which can contain up to 10 error messages in the form of fault codes. The error messages are displayed as a 2 or 3 character flashing display. The last error that occurred is the first one to appear on the screen when accessing the error log. If multiple errors occur at the same time the corresponding error codes are scrolled, flashing one by one. To reset an error code, press the reset, "RST", key or recycle power after removing the cause of the error.

The *8720MC Regenerative Power Supply User Manual* (publication 8720MC-RM001*x*-US-P) contains a complete listing of all the fault codes along with appropriate corrective measures. It also provides troubleshooting procedures as well as a troubleshooting flowchart.

The *8720MC High Performance Drives Installation Manual* (publication 8720MC-IN001*x*-EN-P) shows how to wire the various configurations between the drive and RPS. In general, it is recommended that the run output is connected in series with Input 1, "Drive Enable", on P5-14. It is required to tie the RPS fault output to input 10 on the drive, P5-36, "Regen PS OK". Parameter 617 "Regen PS Fault" can be monitored on the HIM or DriveExplorer to determine the state of the RPS. This parameter can also be linked to a digital output if the application requires it.

Supplemental Troubleshooting Information

This section provides information for accessing and changing parameters not accessible through RSLogix 5000 software.

Tools for Changing Parameters

Most parameters are accessible through RSLogix 5000 software. Alternatives to RSLogix 5000 software for changing parameters include the DPI compatible Human Interface Module (HIM), the SCANport HIM, and DriveExplorer software. Refer to the table below for catalog numbers.

Method	Description	Catalog Number	Firmware Revision
DriveExplorer	DriveExplorer Software[1]	9306-4KSOEFF	2.01 or later
	Serial to SCANport Adapter	1203-SSS (Series B)	3.005 or later
DPI HIM	Full Numeric LCD HIM (32 bit)	20-HIM-A3[2]	N/A
SCANport HIM	Numeric LCD HIM (16 bit)	1201-HA*x*[3]	N/A

[1] Refer to *DriveExplorer Getting Results Manual* (publication 9306-GR001*x*-EN-E) for instructions.

[2] Compatible catalog numbers include all 20-HIM-A*x*.

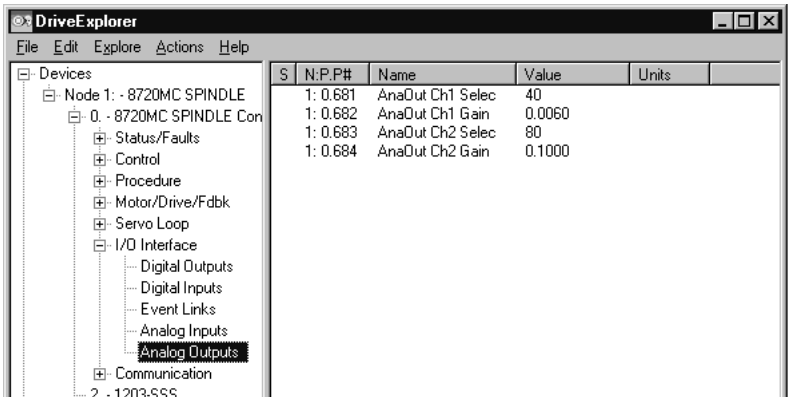
[3] Compatible catalog numbers include all 1201-HA*x*.

Changing Parameters Using DriveExplorer

To navigate using DriveExplorer, refer to the figure below. In this example, the I/O Interface group folder is open, the Analog Outputs parameter is selected, and the parameter elements are displayed in the box to the right.

IMPORTANT Parameters are read-only when SERCOS ring is active. You must break SERCOS ring to change parameters. To save changes, perform a non-volatile save (NVS) prior to cycling power.

Figure 3.5
DriveExplorer Example



Changing Parameters Using the DPI HIM

When using the HIM to monitor or change parameters, use the up and down arrows (∧ and ∨) to arrive at selections. Refer to the instructions that came with your HIM for more information.

To monitor or change parameters using the DPI HIM:

1. Select **Parameter** from main menu. Press ↵.
2. Select parameter number. Press ↵.
3. Enter new value. Press ↵.

Changing Parameters Using the SCANport HIM

When using the HIM to monitor or change parameters, use the up and down arrows (∧ and ∨) to arrive at selections. Refer to the instructions that came with your HIM for more information.

To monitor or change parameters using the SCANport HIM:

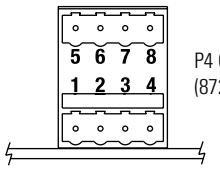
1. Press **ESC**.
2. Select **Program**. Press ↵.
3. Select **Servo Loop**. Press ↵.
4. Select **Linear List.** Press ↵.
5. Select parameter number. Press ↵.
6. Press **Sel**.
7. Enter new value. Press ↵.

Using Analog Test Points to Monitor System Variables

There are two analog output test points accessible from the P4 connector (refer to Figure 1.1 for connector location).

P4 Pin	Description	Signal
P4-1	Analog Output 1	ANAOUT_CH1
P4-6	Analog Output Common	ANA_COM
P4-5	Analog Output 2	ANAOUT_CH2
P4-6	Analog Output Common	ANA_COM

Figure 3.6
Pin Orientation for P4 Connector



P4 Connector
(8720MC Control Board)

Refer to the *8720MC High Performance Drives Installation Manual* (publication 8720MC-IN001*x*-EN-P) for analog output specifications.

Refer to *Appendix C* for a description of the analog output parameters (Analog Outputs 1 and 2) under parameters 681 and 683. Each analog output has an scaling parameter associated with it (parameters 682 and 684). The analog outputs can be changed from there default linkages in the same way as the digital outputs.

Use the two analog output test points to monitor system variables, as shown in the table below.

Analog Output	Controlling Parameter		Scale Parameter	
	Parameter Number	Default Value	Parameter Number	Default Value
1	0681	0040	0682	0.0060
2	0683	0084	0684	0.1000

The value entered in Scale Parameter will scale the analog output so that you can get a full scale reading of the specific parameter for the dynamic range or values you are testing.

To monitor dynamic system variables on analog outputs, use the values shown in the table below.

Attribute	Parameter Number
Velocity Feedback[1]	0040
Velocity Commanded[1]	0036
Torque Feedback[2]	0084
Torque Commanded[2]	0080
Following Error[3]	0189

[1] Velocity Command and Feedback scaling value is 0.25V = 1000 rpm (using default scaling).

[2] Torque Command and Feedback scaling value is 0.25V = 100% rated motor current or amplifier rating (whichever is less) using default scaling.

[3] Output scaling is dependant on feedback device and drive resolution.

SCANport Command Interface

Chapter Objectives

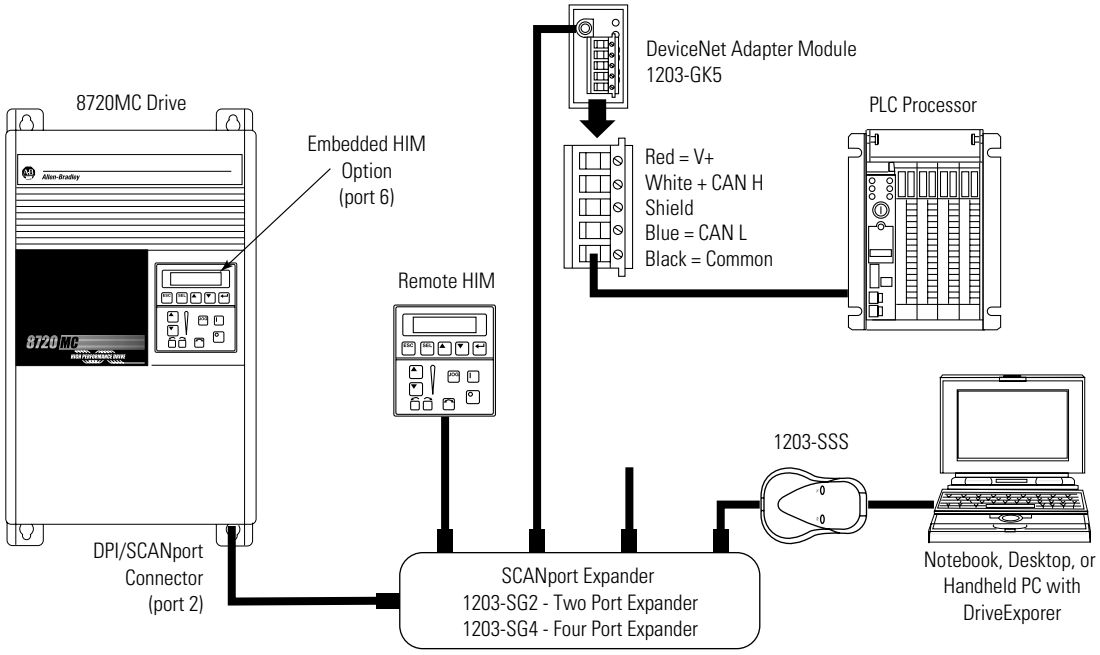
This chapter includes a description of the SCANport command interface. The following topics are covered:

- SCANport Overview
- SCANport Command Reference

SCANport Overview

SCANport is a Rockwell Automation peripheral communication network which is used by the 8720MC to communicate with the integral HIM, a remote HIM, a PC running DriveExplorer in a Windows environment or an Allen-Bradley PLC. SCANport is a multi-channel communication network which supports multiple nodes or “ports”. The 8720MC has an internal SCANport connection point and an external SCANport connection point. The integrated HIM option is connected to the internal Port 6 connector as shown in Figure 4.1.

Figure 4.1
SCANport Peripheral Interface

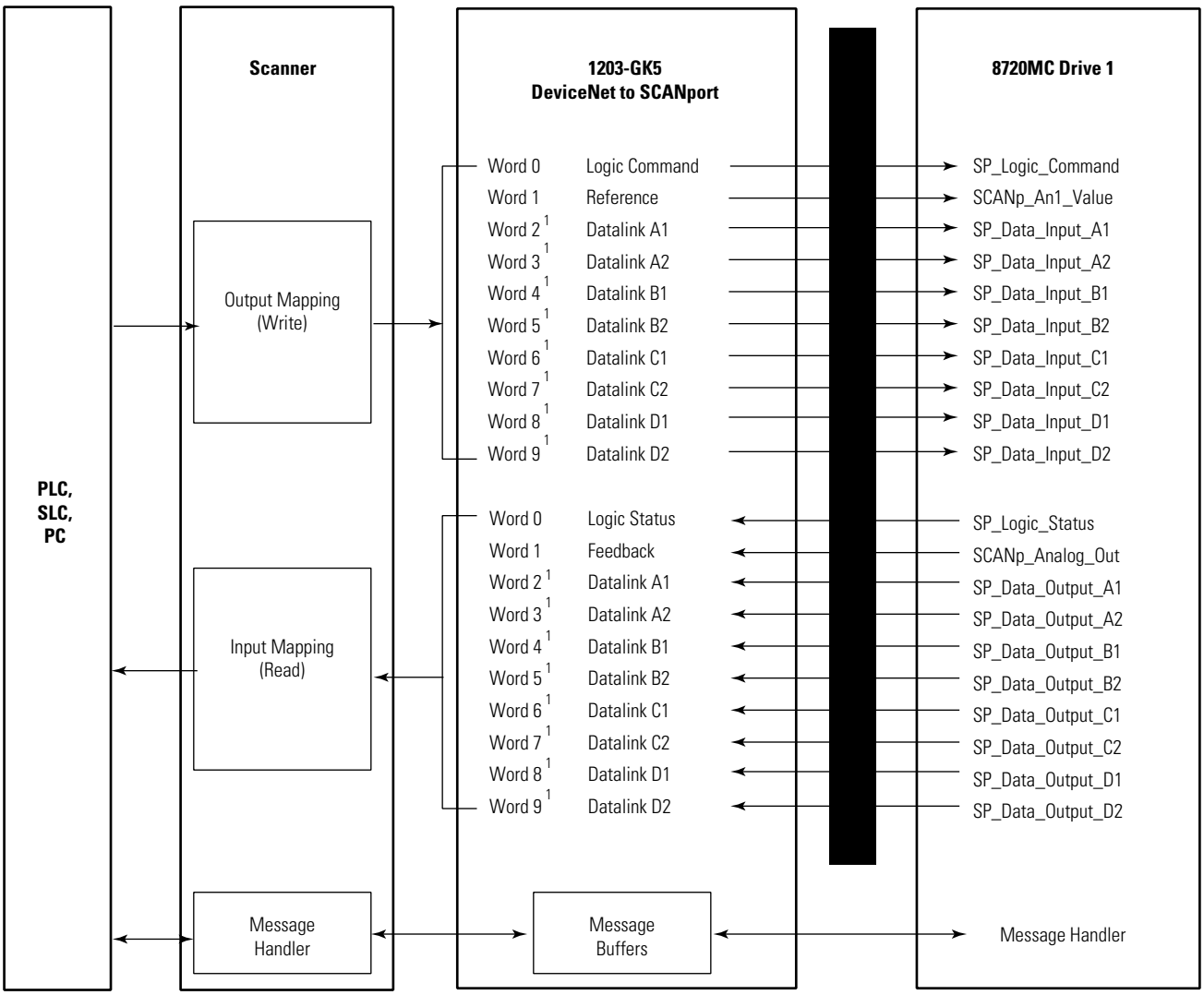


The 8720MC external SCANport connection uses the Port 2 address. It can be used as a single connection to a remote HIM, a PC, or PLC. It can also be connected to a 2 or 4 port expander as shown in Figure 4.1. The SCANport expander is very useful in situations where a PLC is used as the source of the command reference and the logic interface. The expander allows easy plug in of a personal computer running DriveExplorer for the purpose of displaying and/or modifying parameters as well as monitoring process parameters while the process is executing. The PLC interface is accomplished via a SCANport adapter module connected to one of Rockwell's communication networks such as remote I/O, DeviceNet or ControlNet. The 1203-GK5 module shown in Figure 4.1 is a stand alone DeviceNet adapter. Use of a SCANport adapter module with a PLC allows the control of position as well as velocity or torque. See parameters 258, *Target_Position*, 259, *Posn-Velocity* and 260, *Posn_Accel _Rate* in *Appendix C* for details.

SCANport Command Reference

For applications where a digital communications network interface is the preferred interface, one of the Allen-Bradley 1200 series SCANport adapter modules must be used. Regardless of the control network the method of passing data to and from the drive is the same. Figure 4.2 illustrates the nature of the data exchanged. The illustration uses DeviceNet as an example of a open communication network.

Figure 4.2
SCANport Adapter Communication Interface



The communication adapter allows the exchange of ten 16 bit command input words to the drive from the PLC and ten - 16 bit status output words from the drive to the PLC. *SCANp_AN1_Value* is the parameter location (parameter 713) where the incoming velocity or torque command value, as received from the adapter, is stored. When either SCANport/DPI Spindle or SCANport/DPI Power Servo applications are selected in parameter 501, all velocity, torque, and logic commands are delivered to the 8720MC from the PLC via the communication adapter on SCANport. *SCANp_Analog_Out* is the parameter location (parameter 715) where the out going actual velocity or torque value is stored.

SCANport_AN1_Value has a scaling factor associated with it as defined in *Appendix C*. The default velocity scaling ±1 LSB = ±1 rpm. The torque scaling is fixed at ±1000 = ±100% rated torque.

All velocity feedback or torque feedback and logic status information is returned to the PLC from the 8720MC via the communication adapter on SCANport. The drive can operate in position, velocity or torque modes. The mode is determined by the primary operating mode parameter for the active parameter set. There are 8 servo parameter sets available to accommodate gear range switching, high / low windings and mode switching. The active parameter set is stored in parameter 254. Each parameter set has a primary operating mode parameter. Refer to parameter 32 in *Appendix C* for a description of the Primary Operating Mode Parameter. The SCANport adapter reference command must be scaled by the PLC if something other than the default scaling is required. The default velocity scaling ±1 LSB = ±1 rpm. The torque scaling is fixed at ±1000 = ±100% rated torque

SCANport Command Logic Inputs

When SCANport is the primary command interface the velocity or the torque command is provided from an Allen-Bradley PLC via a SCANport adapter. The key logic commands are passed through the Logic Input Command Word and the Logic Output Status Word. The following descriptions apply:

Regenerative Stop Request - When this bit is set true by the PLC the drive will come to a regenerative stop regardless of the auto or jog reference command.

Start Request - When the start command bit is set true and there are no faults the drive will respond to the auto reference in auto mode and the jog reference in manual mode. It will continue to follow the reference until there is a regenerative stop or a coast stop request or the active reference is set to zero.

Jog Request - If the drive is stopped (disabled via bit 00 of the command word) and the jog command bit is set true (rising edge) and there are no faults, the drive will assert the jog reference enabled state and follow SCANport jog reference command on SCANport adapter Input Word 2.

The drive will continue to follow the jog reference until the jog is released. It will then regenerate to a stop.

The manual reference request, bit 11 of the SCANport Logic Command Word, does not need to be asserted. This will automatically occur when the jog bit 02 is set.

Fault Clear - If a drive shut down fault has occurred setting the Drive_Err_Reset bit is required in order to reset the drive shut down error. The fault cannot be reset unless the fault condition is removed.

Coast Stop Request - If the drive is running and the Coast Stop Request bit is set the drive power will be removed from the motor and it will not regenerate. Under this condition the motor will coast until the friction of the motor and load bring it to a stop.

Refer to the tables below for SCANport I/O key logic commands.

SCANport Input Command Word	
Bit	**Description**
00	Regenerative Stop Request
01	Start Request
02	Jog Request
03	Fault Clear
04	Coast Stop Request
05	Parameter Set Select bit 0
06	Parameter Set Select bit 1
07	Parameter Set Select bit 2
08	Parameter Strobe
09	Orient Request
10	Home Request
11	Manual Reference Select
12	Reserved
13	Reserved
14	Reserved
15	Reserved

SCANport Output Status Word	
Bit	**Description**
00	Drive Enabled
01	Auto Reference Enabled
02	Rotation Direction
03	Drive OK
04	At Zero Speed
05	At Reference Speed
06	Orient complete
07	Reserved
08	Brake Solenoid enabled
09	Torque greater than Torque Limit
10	High Winding Selected
11	Low Winding Selected
12	Shut Down Fault
13	Reserved
14	Reserved
15	Manual Reference Selected

Parameter Set Select bit 0, 1 and 2 - Setting these 3 binary bits determines which parameter set is in use and /or which motor winding is selected. The choices are:

000 = low 0, 001 = low1, 010 = low 2, 011 = low 3

100 = high 0, 101 = high1, 110 = high 2. 111 = high 3

Parameter Strobe - When the parameter strobe bit is set momentarily the preselected parameter set number (bits 5, 6 and 7) will be selected and the associated parameters will be enabled.

Orient Request - The SCANport orient request is identical to the digital I/O orient request. When the Orient Request bit is set an orient will be initiated as determined by the Auto Home Parameter, parameter 582, and the orient parameters 150 motor marker offset, 153 orient angle, 154 orient options, 222 orient speed and 260 positioning acc/dec rate. The orient will terminate when the orient complete status bit is set and the orient request is removed.

Manual Reference Select - When the manual reference select bit is set true in the SCANport command word the manual (jog) reference is enabled. In this state the drive will follow the manual jog reference provided on SCANport adapter input word 2. When initiating a jog the manual reference request, bit 11 of the SCANport Logic Command Word, does not need to be asserted. This will automatically occur when the jog bit 02 of the Input Command Word is set. To terminate a manual start or disable the jog reference state, with Manual Reference Select not asserted, bit 00 of the Input Command Word “Stop Request” must be set true. The auto command reference is then followed by the drive.

SCANport Logic Status Outputs

Several of the logic output signals have already been defined in the section, Default Digital I/O Descriptions. The following is an explanation of those that have not already been described.

Drive Enabled - The drive is in the enabled state when the drive enable digital input is true and there are no shut down faults. Drive enabled means the power IGBT’s are switching and the drive is capable supplying motor torque.

Auto Reference Enabled - Parameter 529 is an event link which indicates that there are no drive faults, the drive is enabled and it is in auto mode and it is capable of following the auto reference. This event has a default link to both the digital interface and the SCANport Logic Status Word.

Rotation Direction - The rotation direction bit is used to identify the direction of motor rotation.

Manual Reference Selected - Whenever the digital or SCANport interfaces select the manual reference the drive acknowledges this state by setting the manual reference selected bit 15, SCANport Output Status Word.

The table below describes the fixed assignments for the eight 16 bit input data words and the eight 16 bit output data words.

Data Word	Data Link Identifier	8720MC Parameter Assignment	Default Link	8720MC Data Description	Data Type (16 bit word)
Input Word 0	Logic Command	717	717	SCANport Logic Command Word	Bit Pattern
Input Word 1	Command Reference	713	713	SCANport velocity/torque Input Reference Value	Signed Integer
Input Word 2	Data In A1	725	36	SCANport Velocity Reference Value	Signed Integer
Input Word 3	Data In A2	726	258	Target Position ±32,768 resolution units	Signed Integer
Input Word 4	Data In B1	727	153	Orient Angle	Signed Integer
Input Word 5	Data In B2	728	259	Positioning Velocity	Signed Integer
Input Word 6	Data In C1	729	260	Positioning Acceleration	Signed Integer
Input Word 7	Data IN C2	730	222	Orient Speed	Signed Integer
Input Word 8	Data IN D1	731	154	Orient Options	Signed Integer
Input Word 9	Data In D2	732		Reserved	Signed Integer
Output Word 0	Logic Status	718	718	SCANport Logic Status Word	Bit Pattern
Output Word 1	Velocity Feedback	715	40	SCANport Velocity Feedback	Signed Integer
Output Word 2	Data Out A1	733	11	Shut Down Errors	Bit Pattern
Output Word 3	Data Out A2	734	129	8720MC Drive Errors	Bit Pattern
Output Word 4	Data Out B1	735	13	Drive Status	Bit Pattern
Output Word 5	Data Out B2	736	386	Motor Shaft power	Integer
Output Word 6	Data Out C1	737	254	Actual parameter set	Binary 0 -7
Output Word 7	Data Out C2	738		Reserved	Signed Integer
Output Word 8	Data Out D1	739	347	Velocity Error	Signed Integer
Output Word 9	Data Out D2	740	84	Torque Feedback	Signed Integer

SCANport Data Interface

In addition to the SCANport Logic Command word, the SCANport Logic Status word, the SCANport Command Reference and the SCANport Feedback Output there are 16 additional 16 bit words which can be exchanged between an Allen-Bradley PLC and the drive.

Interconnect Diagrams

Chapter Objectives

This appendix contains the 8720MC interconnect diagrams. The following diagrams are included:

- Power Interconnect Diagrams
- External Active Shunt Module Interconnect Diagrams
- Drive/Motor Interconnect Diagrams
- 8720MC Drive and 1756-M02AE Interconnect Diagram

8720MC Interconnect Diagrams

This section provides interconnect diagrams to assist you in wiring the 8720MC system. The notes in the table below apply to the interconnect diagrams on the pages that follow.

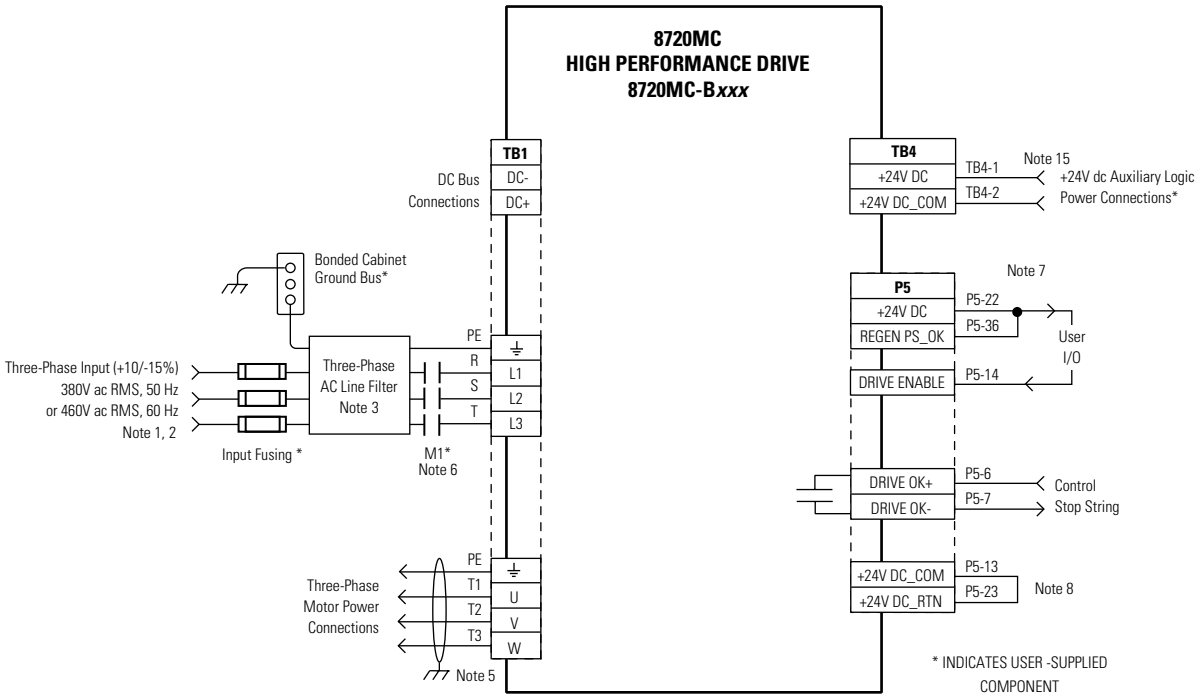
Note:	Information:
1	Refer to the *8720MC High Performance Drives Installation Manual* (publication 8720MC-IN001*x*-EN-P) for power wiring specifications.
2	Refer to the *8720MC High Performance Drives Installation Manual* (publication 8720MC-IN001*x*-EN-P) for input fuse sizes.
3	Refer to the *8720MC High Performance Drives Installation Manual* (publication 8720MC-IN001*x*-EN-P) for AC line filter specifications.
4	Refer to *Motion Control Selection Guide* (publication GMC-SG002*x*-EN-P) for motor cable specifications.
5	Use cable shield clamp where provided or tie shield to ground (TB1) in order to meet CE requirements. Refer to the *8720MC High Performance Drives Installation Manual* (publication 8720MC-IN001*x*-EN-P) for additional information.
6	Contactor coil (M1) needs integrated surge suppressors for AC coil operation.
7	Jumper P5-22 (+24V dc) to P5-36 when the 8720MC-RPS or the external active shunt is not used.
8	Jumper P5-13 to P5-23 when the 8720MC internal +24V dc power is used (recommended). When external +24V dc power is used connect the +24V dc return to P5-13 and remove the jumper.
9	The TE terminal and 120V ac drive fan input (rated 0.8A, 5A inrush) on TB1 is present on 8720MC D Frame drives only.
10	**ATTENTION**  Implementation of safety circuits and risk assessment is the responsibility of the machine builder. Please reference international standards EN1050 and EN954 estimation and safety performance categories. For more information refer to *Understanding the Machinery Directive* (publication SHB-900).
11	Connection at E includes 0.47 µF capacitor. Connection at N does not.
12	Drive Error Reset connections as shown apply to analog configurations. This is a function of the RSLogix 5000 software in SERCOS configurations.
13	Drive Enable connections as shown apply to analog configurations. Drive Enable must be wired to P5-22 (+24V dc) for SERCOS configurations.
14	Pre-Charge board as shown in Figure A.2 applies, but to 8720MC (C and D frame) drives only.
15	This user-supplied +24V dc is required to maintain SERCOS ring communications and encoder power in the event DC Bus voltage is t emporarily removed.

Power Interconnect Diagrams

The interconnect power wiring for the 8720MC drive is shown in figures A.1, A.2, and A.3.

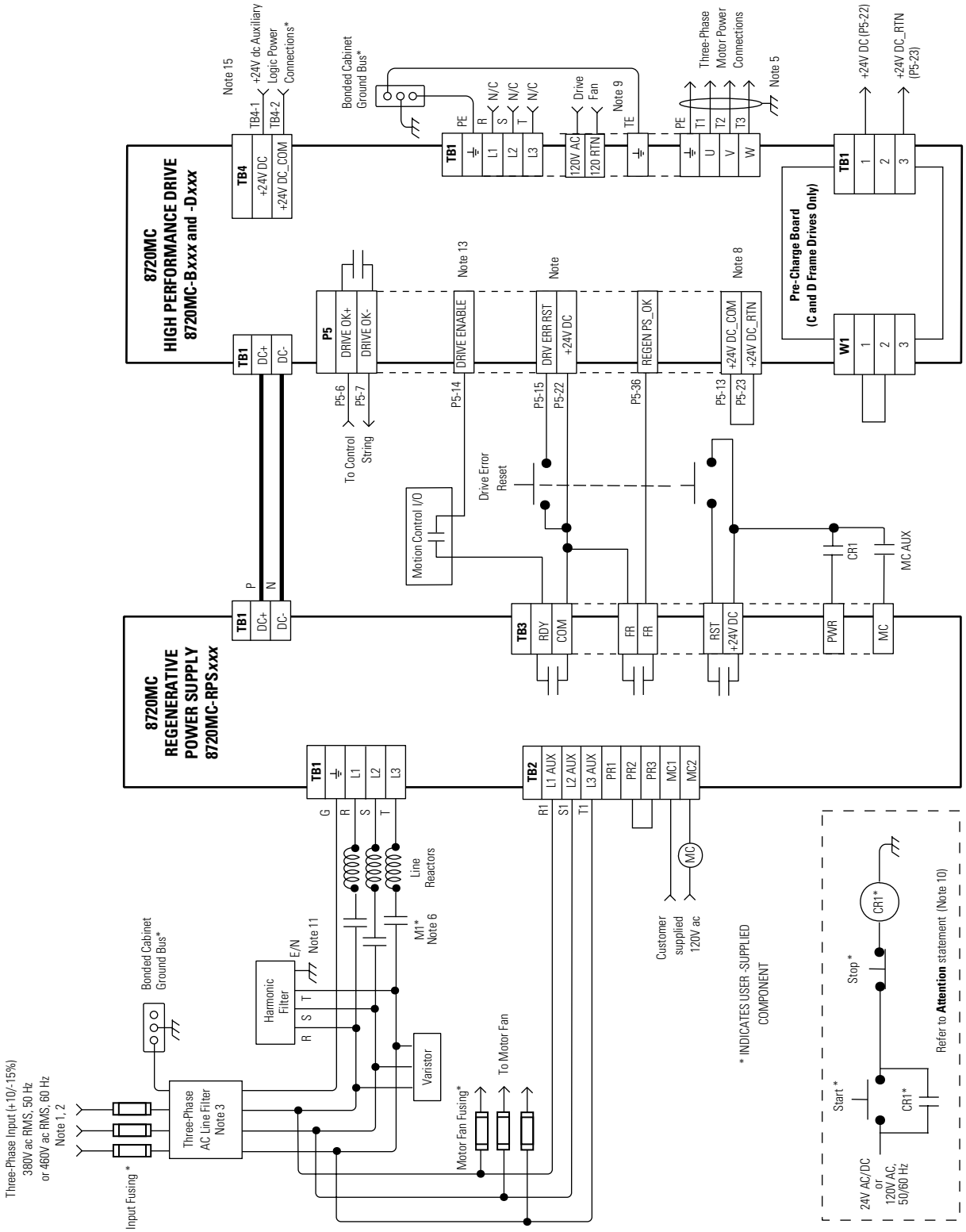
In the configuration below, the 8720MC drive is shown with 380/460V ac (three-phase) input. This configuration applies only to the 8720MC-B021, -B027, -B034, -B042, and -B048 drives.

Figure A.1
8720MC Power Interconnect (8720MC with 380/460V ac Input)



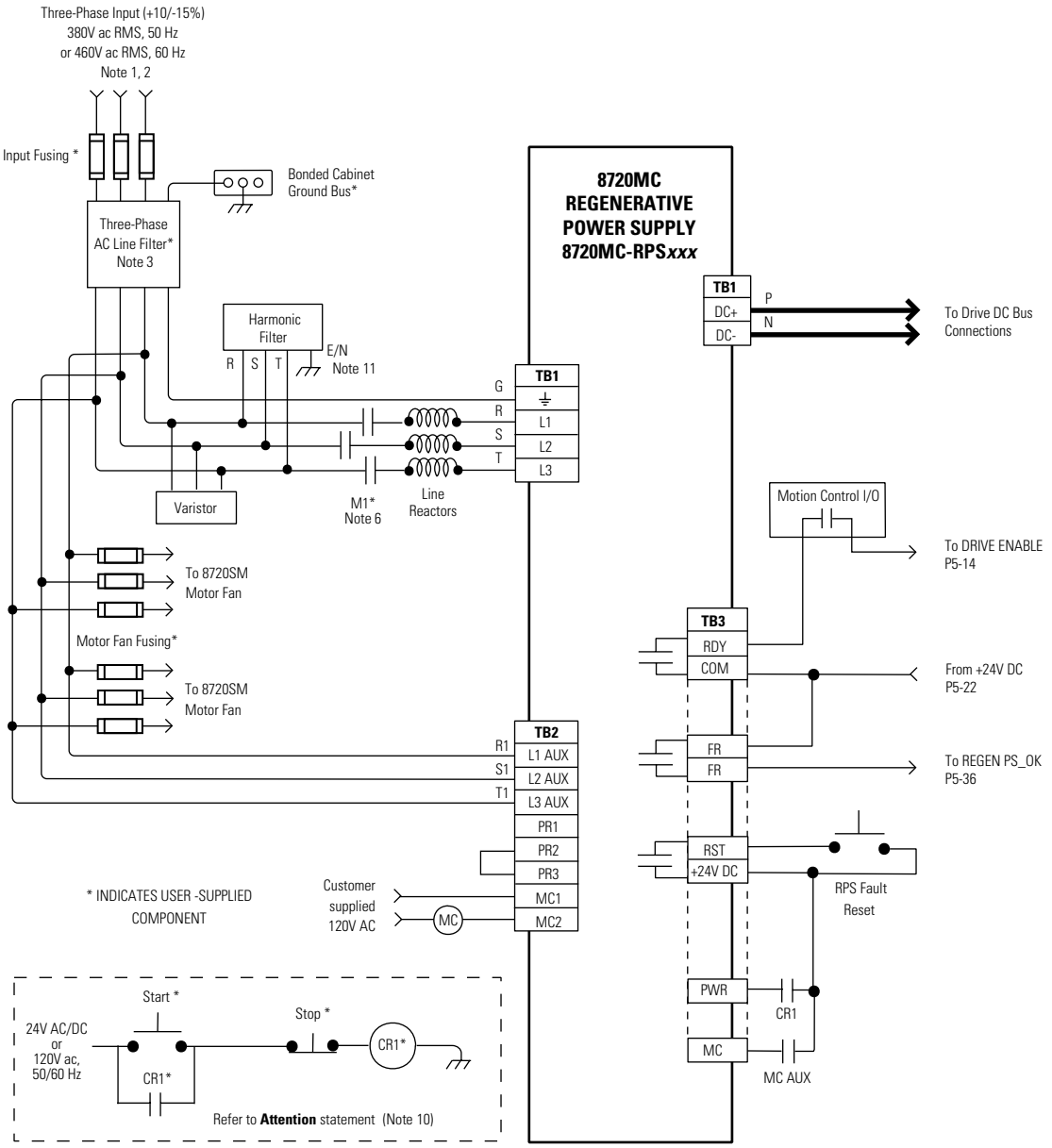
In the configuration below, the 8720MC drive is shown with the 8720MC-RPS and 750V dc (common bus) input. This configuration applies to all 8720MC drives.

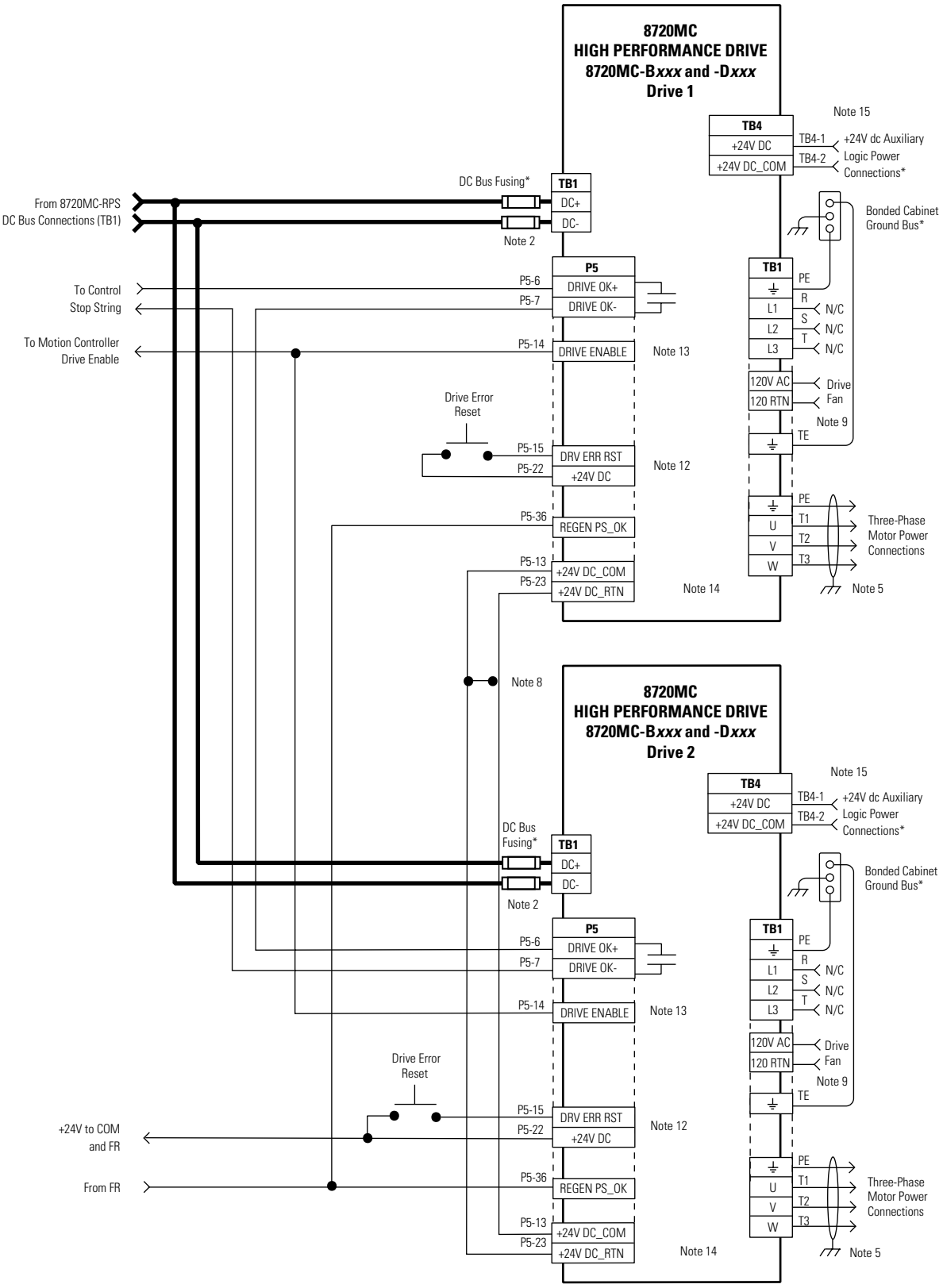
Figure A.2
8720MC Power Interconnect (8720MC with 750V dc Input)



In the configuration below, two 8720MC drives are shown with the 8720MC-RPS and 750V dc (common bus) input. This configuration applies to all 8720MC drives.

Figure A.3
8720MC Power Interconnect (Multiple 8720MC Drives with 8720MC-RPS)

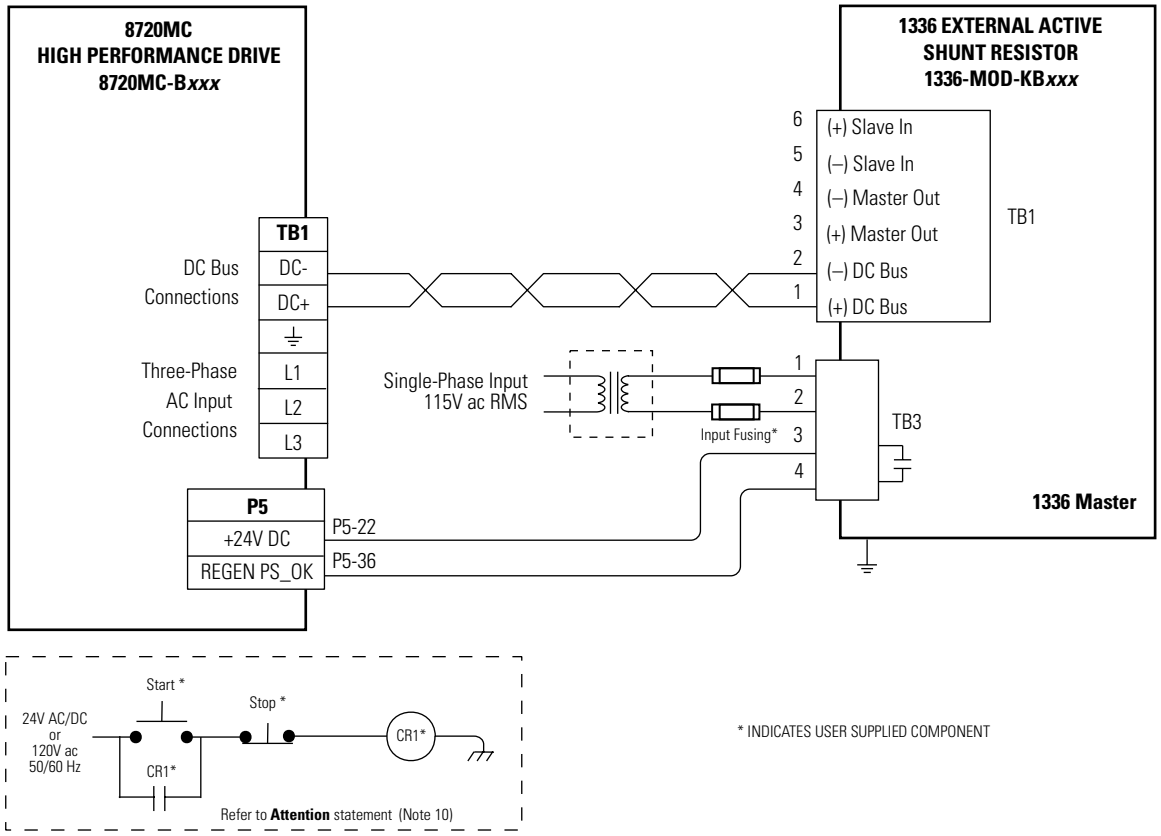



8720MC
HIGH PERFORMANCE DRIVE
8720MC-Bxxx and -Dxxx
Drive 1
Note 15
TB4
+24V DC
+24V DC_COM
TB4-1
TB4-2
+24V dc Auxiliary
Logic Power
Connections*
DC Bus Fusing*
TB1
DC+
DC-
From 8720MC-RPS
DC Bus Connections (TB1)
Note 2
Bonded Cabinet
Ground Bus*
P5
P5-6
DRIVE OK+
P5-7
DRIVE OK-
To Control
Stop String
To Motion Controller
Drive Enable
P5-14
DRIVE ENABLE
Note 13
PE
R
L1
S
L2
T
L3
N/C
120V AC
120 RTN
Drive
Fan
Note 9
TE
Drive Error
Reset
P5-15
DRV ERR RST
P5-22
+24V DC
Note 12
P5-36
REGEN PS_OK
P5-13
+24V DC_COM
P5-23
+24V DC_RTN
Note 14
U
V
W
T1
T2
T3
Three-Phase
Motor Power
Connections
Note 5
Note 8
8720MC
HIGH PERFORMANCE DRIVE
8720MC-Bxxx and -Dxxx
Drive 2
Note 15
TB4
+24V DC
+24V DC_COM
TB4-1
TB4-2
+24V dc Auxiliary
Logic Power
Connections*
DC Bus
Fusing*
TB1
DC+
DC-
Note 2
Bonded Cabinet
Ground Bus*
P5
P5-6
DRIVE OK+
P5-7
DRIVE OK-
P5-14
DRIVE ENABLE
Note 13
PE
R
L1
S
L2
T
L3
N/C
120V AC
120 RTN
Drive
Fan
Note 9
TE
Drive Error
Reset
P5-15
DRV ERR RST
P5-22
+24V DC
Note 12
+24V to COM
and FR
From FR
P5-36
REGEN PS_OK
P5-13
+24V DC_COM
P5-23
+24V DC_RTN
Note 14
U
V
W
T1
T2
T3
Three-Phase
Motor Power
Connections
Note 5

External Active Shunt Module Interconnect Diagrams

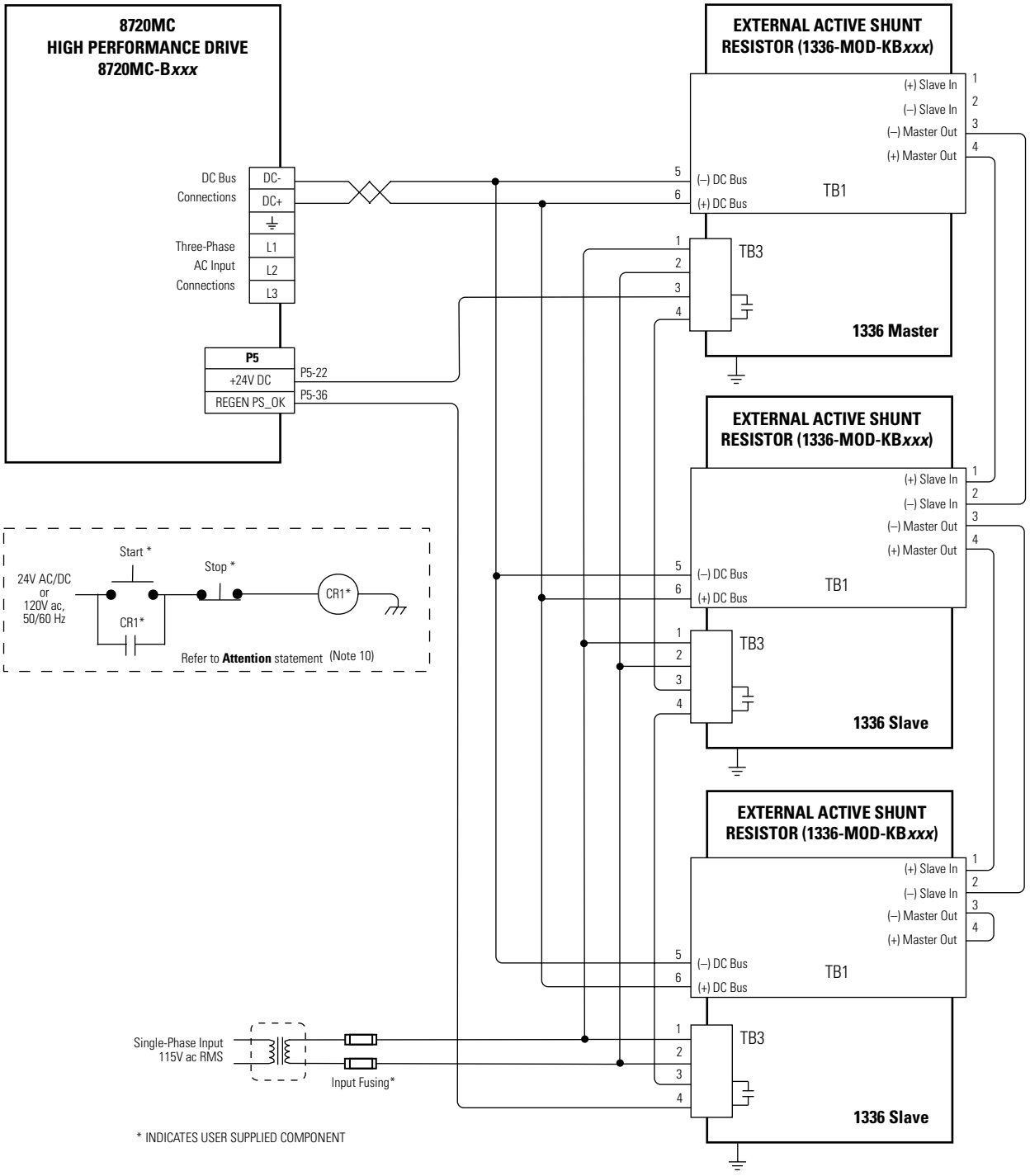
In the figure below, the 8720MC is shown wired with a Bulletin 1336 external active shunt. Refer to the *8720MC High Performance Drives Installation Manual* (publication 8720MC-IN001*x*-EN-P) for a list of external active shunt module catalog numbers available for the 8720MC.

Figure A.4
External Active Shunt Module Interconnect Diagram



In the figure below, the 8720MC (with three-phase AC input) is shown wired with a Bulletin 1336 external active shunt (master) and two slave units. Refer to the *8720MC High Performance Drives Installation Manual* (publication 8720MC-IN001*x*-EN-P) for a list of external active shunt module catalog numbers available for the 8720MC.

Figure A.5
External Active Shunt Module Interconnect Diagram

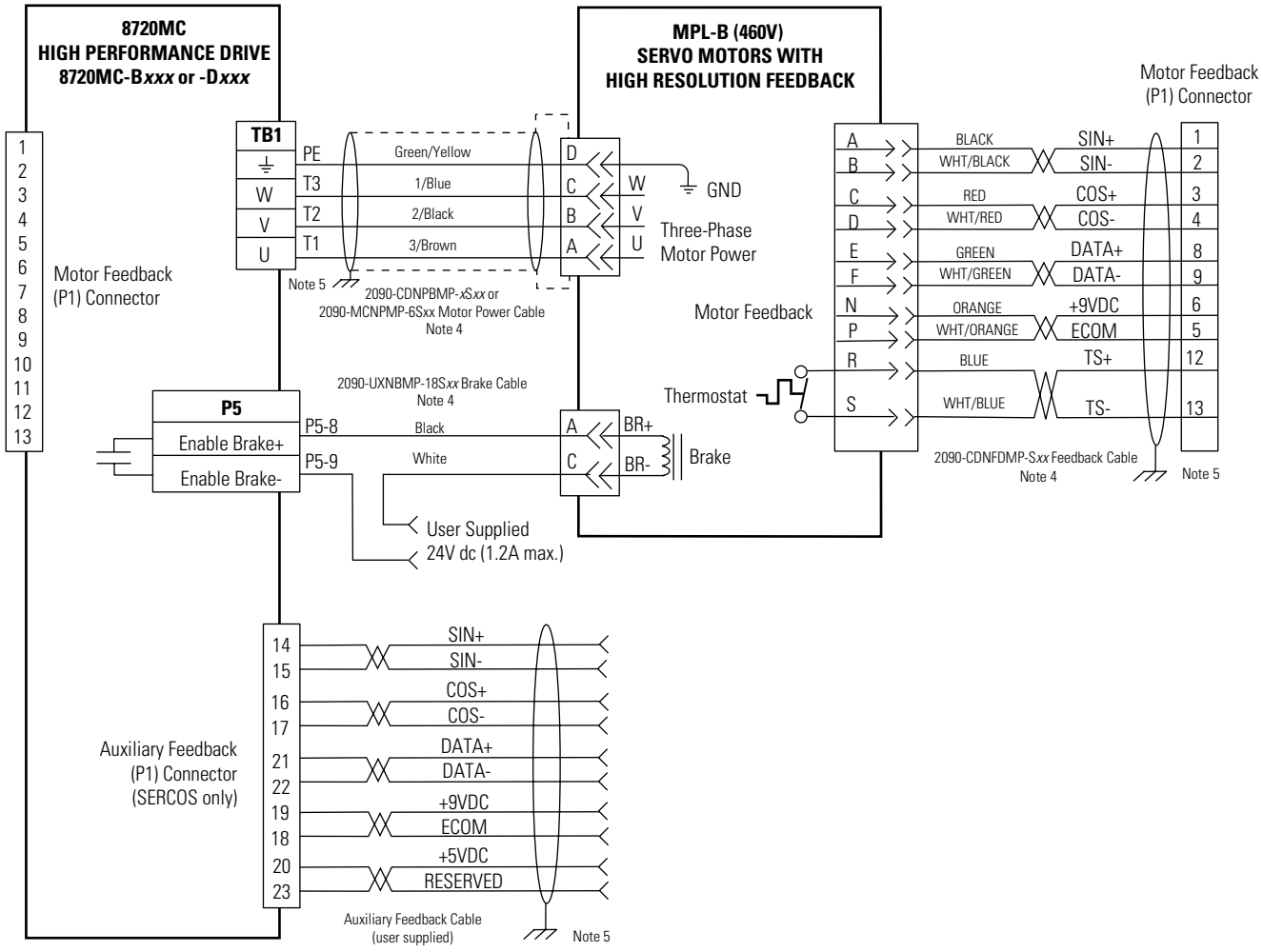


Drive/Motor Interconnect Diagrams (SERCOS)

This section contains the motor power, brake, and feedback signal interconnect diagrams between the 8720MC drive and the MPL-B8*xxx*, MPL-B9*xxx*, and 8720SM motors used in SERCOS interface mode.

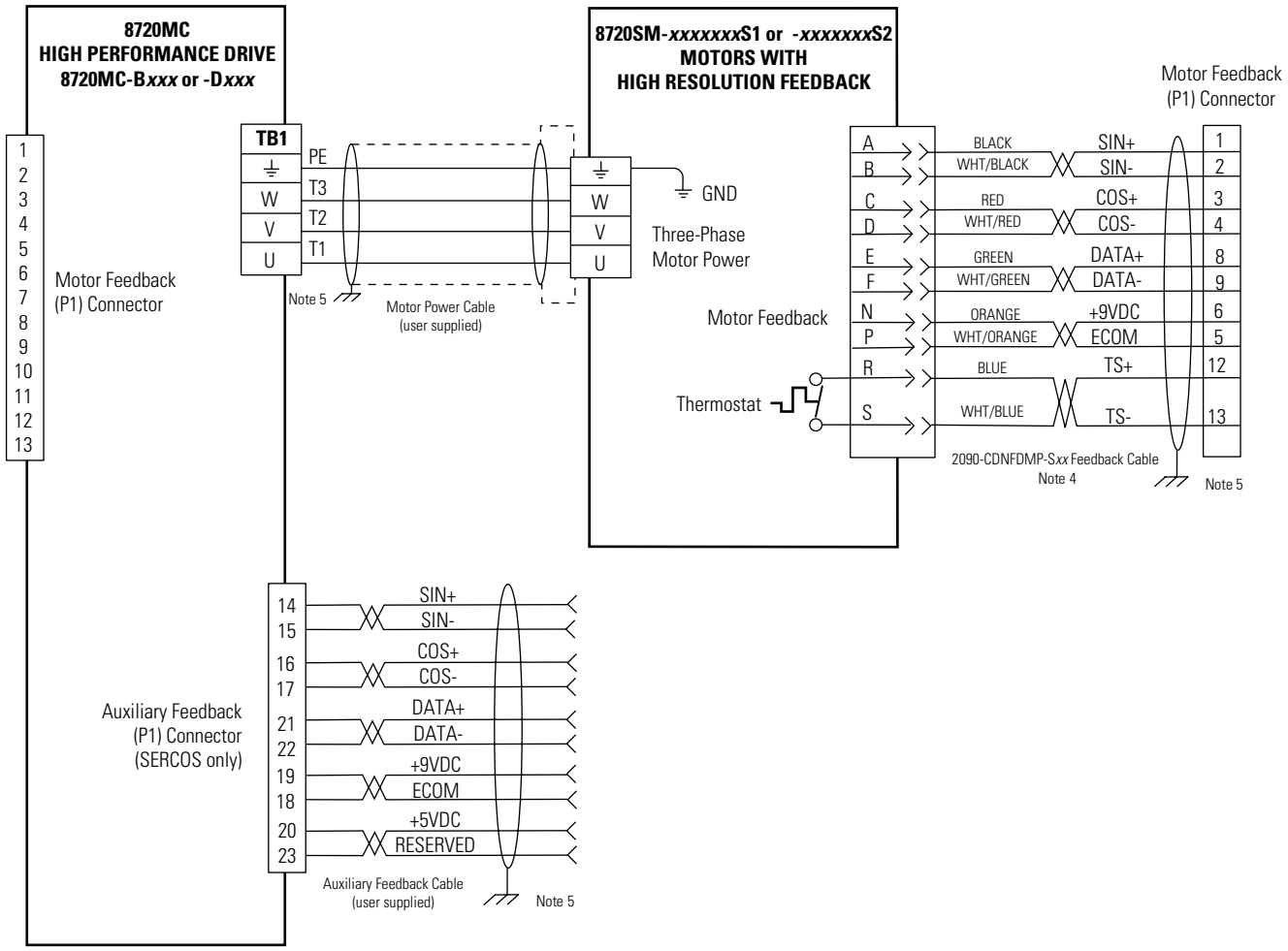
In the configuration below, the 8720MC drive is shown connected to the MPL-B8*xxx* or MPL-B9*xxx* (SERCOS mode) motors.

Figure A.6
8720MC Drive/Motor Interconnect (SERCOS Mode)



In the configuration below, the 8720MC drive is shown connected to the 8720SM-*xxxxxxxx*S1 or -*xxxxxxxx*S2, (SERCOS mode) motors.

Figure A.7
8720MC Drive/Motor Interconnect (SERCOS Mode)

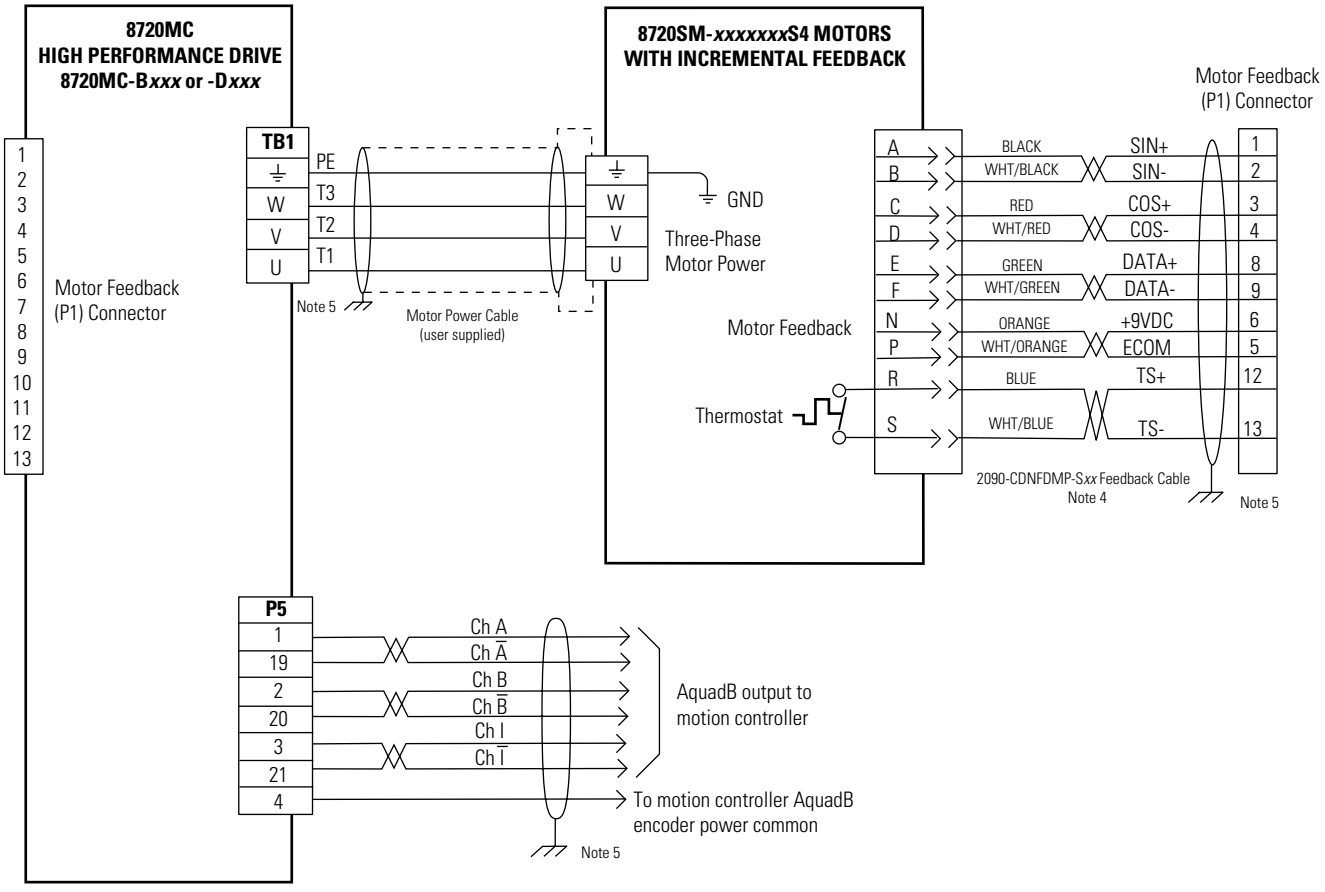


Drive/Motor Interconnect Diagrams (Analog)

This section contains the motor power and feedback signal interconnect diagrams between the 8720MC drive and the 8720SM motors used in analog mode.

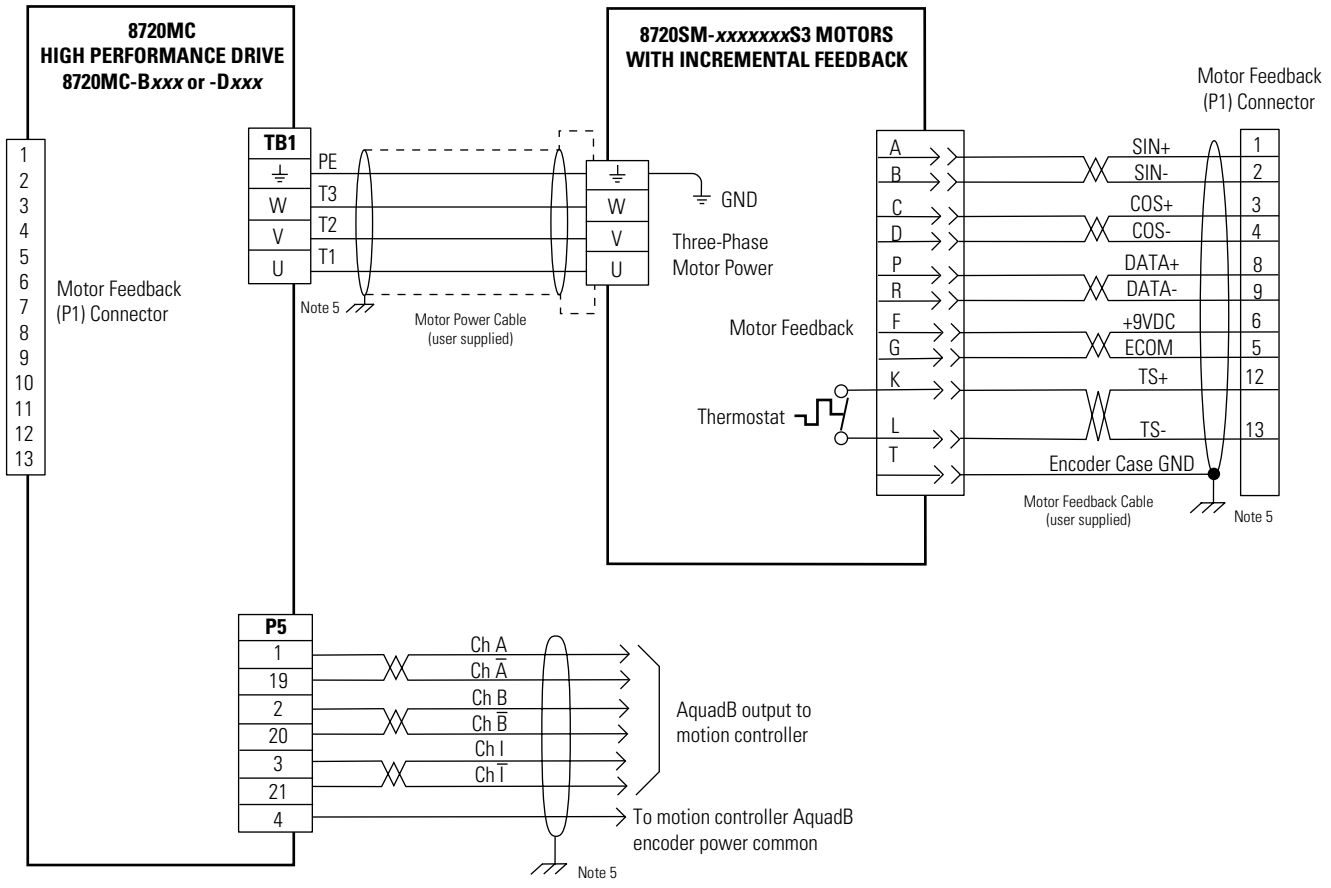
In the configuration below, the 8720MC drive is shown connected to the 8720SM-*xxxxxxx*S4 (analog mode) motors.

Figure A.8
8720MC Drive/8720SM-*xxxxxxx*S4 Motor Interconnect (Analog Mode)



In the configuration below, the 8720MC drive is shown connected to the 8720SM-*xxxxxxxx*S3, (analog mode) motor.

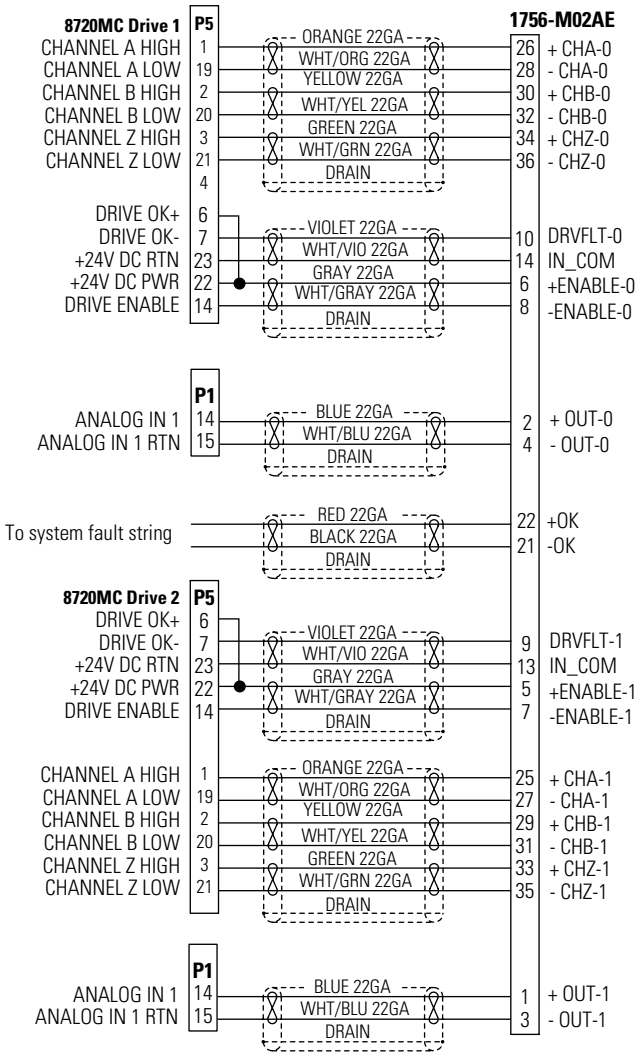
Figure A.9
8720MC Drive/8720SM-*xxxxxxx*S3 Motor Interconnect (Analog Mode)



8720MC Drive and 1756-M02AE Interconnect Diagram

Figure A.10 provides information to assist you in wiring the 1756-M02AE servo module to your 8720MC drive.

Figure A.10
8720MC Drive to 1756-M02AE Servo Module



Note: Connect DRAIN to convenient chassis ground terminals on either 8720MC drive or 1756-M02AE chassis terminal.

Using the Human Interface Module (HIM)

Chapter Objectives

Refer to this chapter when using the Human Interface Module (HIM) to configure your 8720MC analog drive.

- HIM Operation
- HIM Menu Tree
- Using the Program and Display Modes
- Modifying Parameters
- Viewing Bit Pattern
- Changing a Bit in a Bit Pattern
- Using the EEProm Mode
- Using the Search Mode
- Viewing the Fault Queue/Warning Queue
- Using the Password Mode
- Creating or Changing a Link
- Removing a Link

The Human Interface Module (HIM) is the standard user interface for the 8720MC Drive. When a drive mounted HIM is supplied, it can be accessed from the front of the drive. A remote HIM is also available for connection via a SCANport interface cable. For the location of the DPI/SCANport connector, refer to Figure 1.2 in *Chapter 1*.

The HIM provides a way to display and modify drive parameters and to view the operating parameters. The HIM also provides a means of starting, stopping, jogging, switching directions and adjusting manual speeds.

ATTENTION

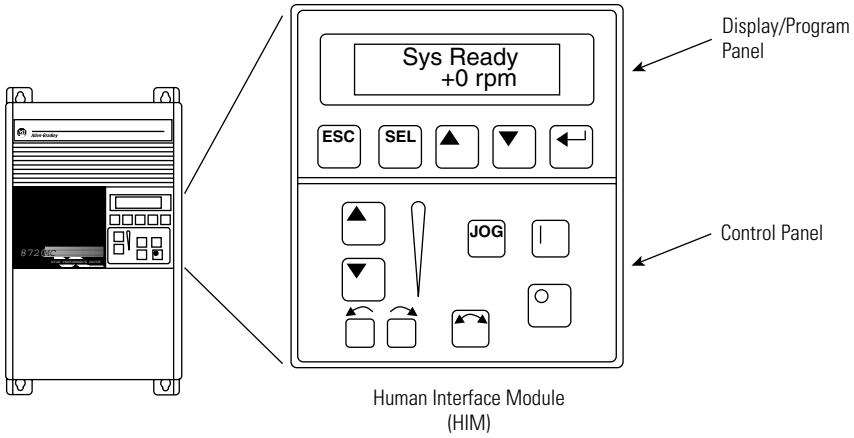
When a drive mounted HIM is not supplied on enclosed drives, you must install the blank cover plate (option HAB) to close the opening in the front cover of the enclosure. Failure to install the blank cover plate allows access to electrically live parts that may result in personal injury and/or equipment damage.

HIM Display Panel and Control Panel

The HIM contains a display panel and a control panel:

- The display panel lets you program the drive, view the various operating parameters and monitor the drive status.
- The control panel lets you perform manual control functions such as start, stop, jog and setting the manual velocity.

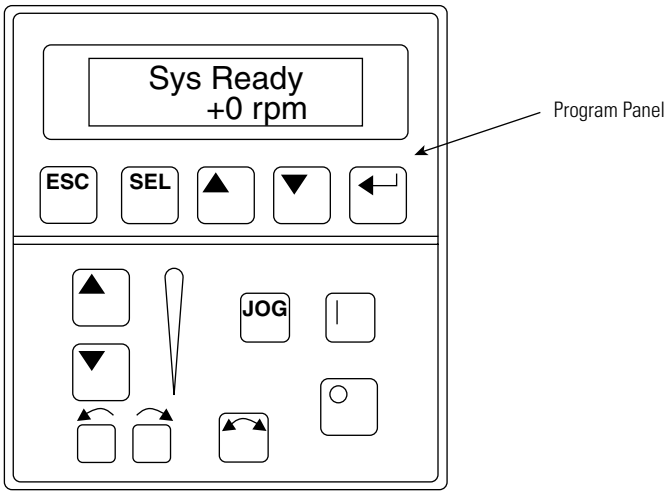
Figure B.1
Example of a HIM



HIM Display Panel Keys

The HIM programming panel provides the 5 keys and a 2 line by 16 character LCD display as shown in Figure B.2.

Figure B.2
HIM Display/Program Keys

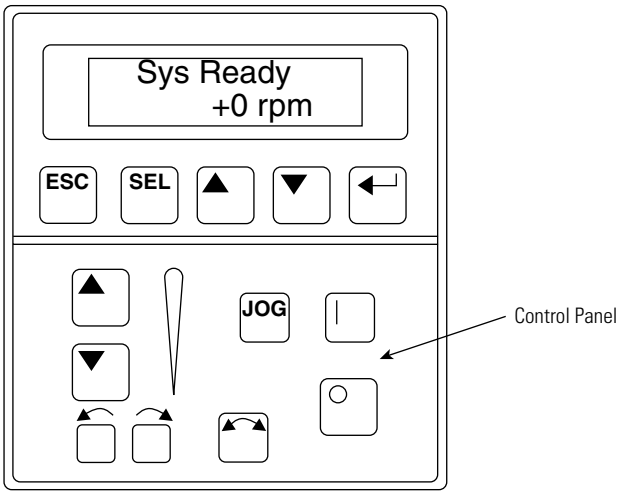


Press this key:	To:	It is called:
ESC	Go back one level in the menu tree that the HIM uses to organize information	Escape key
SEL	Alternates which display line (top or bottom) is currently active. Also allows navigation in numerical fields or bit patterns	Select key
▲	Increment (increase) the selected value. If no value is selected, use this key to scroll through the groups or parameters that are currently selected.	Increment key
▼	Decrement (decrease) the selected value. If no value is selected, use this key to scroll through the groups or parameters that are currently selected.	Decrement key
↵	Select the group or parameter that is currently active or enter the selected parameter value into memory. The top line of the display automatically becomes active to let you choose another parameter or group.	Enter key

HIM Control Panel Keys

The HIM provides the eight keys for motor control in the control panel section as shown in Figure B.3.

Figure B.3
HIM Control Panel Keys



Press this key:	To:	It is called:
I	If the drive is in manual mode and no other control devices are sending a Stop command, the start key will cause the motor to rotate in the HIM selected direction and velocity. Speed will be based on the HIM reference command.	Start key
O	Pressing the stop key will initiate a stop sequence if the drive is running. The drive stops according to the stopping torque specified in parameter 571. The stop key also issues a clear fault command if the drive is currently faulted.	Stop key
JOG	In manual mode depressing the jog key will Jog the motor at the HIM selected jog reference speed and direction. Releasing the key will initiate a decelerated stop. The drive stops according to the stopping torque specified in parameter 571.	Jog key
	Pressing the direction key will change the motor direction if it is being controlled from this HIM. The appropriate direction indicator light will light to indicate direction.	Change Direction key
▲ ▼	Increase or decrease the HIM speed command. An indication of this command is shown on the visual Speed Indicator. Parameter 696 determines the maximum manual speed. Press both keys simultaneously to store the current HIM speed command in HIM memory. Cycling power or removing the HIM from the drive sets the speed command to the value stored in HIM memory. These arrows are only available with digital speed control.	Up Arrow and Down Arrow keys

HIM Control Panel Indicators

The HIM control panel has the following indicators.

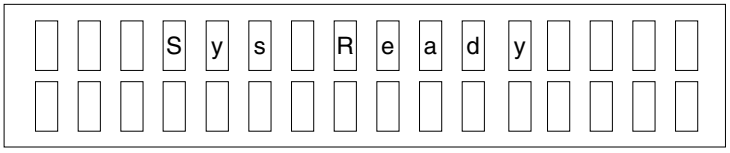
This indicator:	Provides information about:	It is called:
	The direction of motor rotation	Direction LED
	An approximate visual indication of the command manual jog speed. This indicator is only available with digital speed control.	Speed Indicator

HIM Operation

Initial Status Display

When you first apply power to the 8720MC Drive, the HIM cycles through a series of displays. These displays show the initialization and communication status. When complete, the following type of status display is shown. The display indicates the current status of the drive (such as Sys Bus Chrg or Enabled) or any faults that may be present. The display hardware is a two line, 16 characters per line, LCD display panel. Selecting one of the 2 display lines is accomplished with the "Sel" select button.

Figure B.4
Initial Status Display



30387-M

Choosing a HIM Mode

From the Initial Status Display, press any one of the five display panel keys. "*Choose Mode"* is displayed. Press the Increment or Decrement key to scroll through the modes. The navigation diagram for the available modes in shown Figure B.5 "HIM Menu Tree". The HIM modes are displayed in a circular register. Depressing the increment up key selects the next mode while depressing the decrement down key selects the previous mode. Once the desired mode is displayed it is necessary to depress the enter key to select the mode. File, group and parameter names are limited to 16 characters, one line of the HIM display. Selections within a parameter are limited to 12 characters. Because of these limitations the names may be abbreviated.

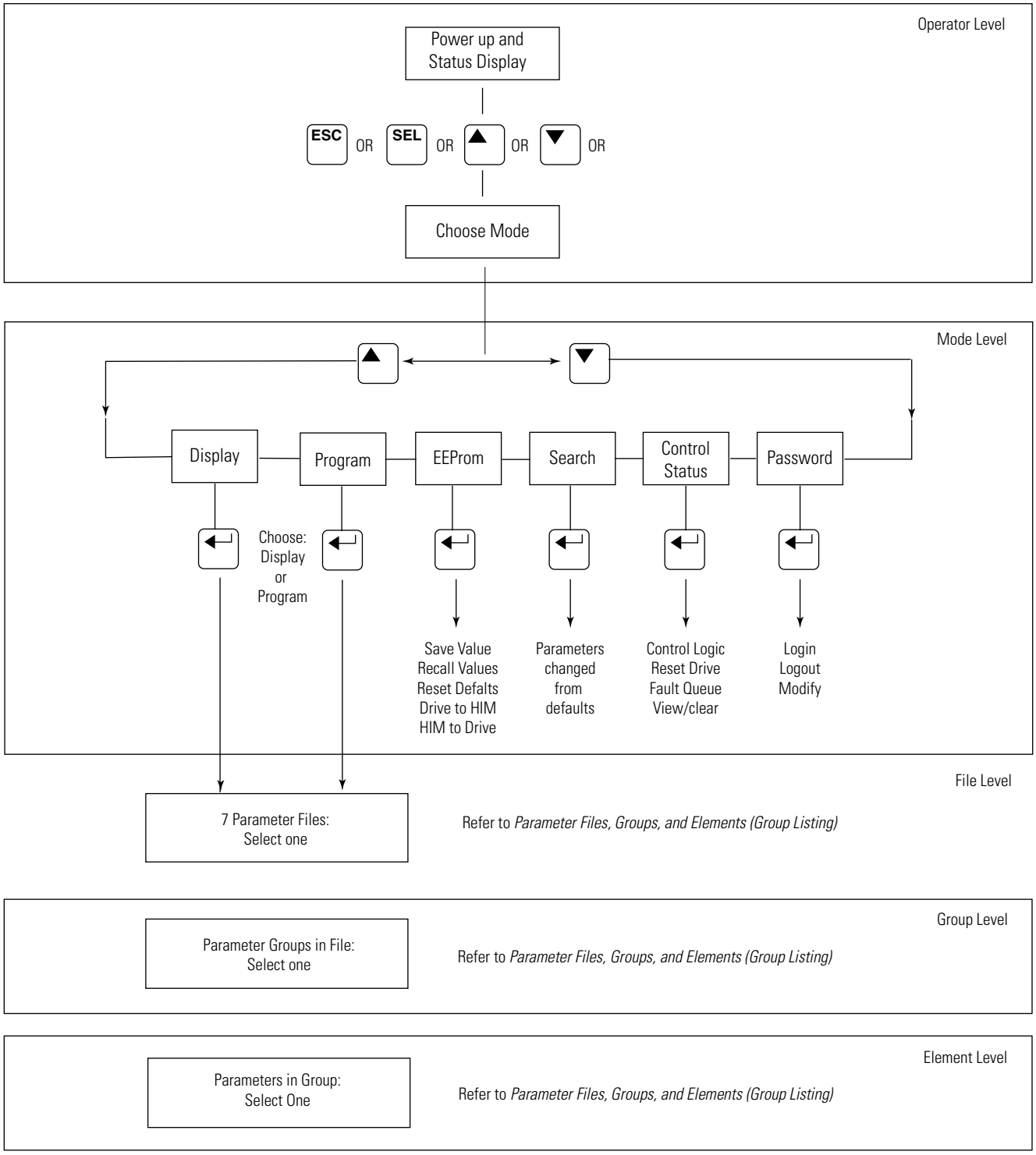
The following modes are available:

This mode:	Lets you:
Display	View the value of any parameter. You cannot modify parameters in this mode.
Program	Access the complete listing of parameters available for programming.
EEProm	Reset all parameters to the factory default settings or save modified parameters. In addition, you can upload/download parameters between the HIM and the drive.(remote HIM only)
Search	Search for parameters that are not at their default values.
Control Status	You can access the fault and warning queues from Control Status. A clear function clears the queue. It will not clear an active fault. Refer to *Chapter 3*, for more information about the fault and warning queues.
Password	Protect the drive parameters against programming changes by unauthorized personnel. When a password has been assigned, you must have the correct password to access the Program/EEProm modes and the Control Logic/Clear Fault Queue menus. You can choose any five digit number between 00000 and 65535 for the password.

HIM Menu Tree

Figure B.5 provides a graphical representation of the method of navigating through the modes of operation of the HIM Module. "Parameter Files, Groups and Elements", in *Appendix C*, provides an overall view of the 7 major files and their associated groups and elements. Display or modification of any parameter (element) is accomplished by selecting the display or program mode, selecting a file, selecting a group within the file and selecting the desired (element) or parameter. All parameters may be read. If the parameter is a read/ write parameter it may be modified from its default value. See "Using Display and Programming modes" in this chapter. The parameters or elements may be replicated in different groups and files to simplify the navigation process and enhance functional organization. The HIM increment, decrement, select and enter keys are used to navigate through the files, groups and elements.

Figure B.5
HIM MenuTree



Using the Program and Display Modes

The Display and Program modes let you view and modify parameters. To use these modes, follow these steps:

1. Press any key from the status display. *Choose Mode* is shown.
2. Press the increment up key or the decrement down key to display "Program" if you want to change the value of a parameter or "Display" if you only want to view the value of a parameter.
3. Press the enter key
4. Press the increment up key or the decrement down key to scroll through the available files. You may choose among the following files: Status/Faults, Control, Procedure, Motor/Drive/Fdbk, Servo Loop, I/O Interface, or Communications.
5. After displaying the desired file press the enter key to display the groups within the file.
6. Press the increment up key or the decrement down key to scroll through the available groups. See *Appendix C* for the groups that are available for each file.
7. After displaying the desired group press the enter key to display the parameters (elements) within the group.
8. Press the increment up key or the decrement down key to scroll through the parameters (elements) for the group you chose.
9. After displaying the desired parameter name press the enter key to select the parameter.

Modifying Parameters

Once you have selected a read/write parameter in "Program" mode you can modify it by making the parameter's value active. This is done be depressing the "Select" key. If the parameter is a value like: "+_ Velocity_Limit_0" the least significant character will blink on the bottom data line. The value can be increased or decreased with the increment and decrement buttons. The select key can be used to move from character to character. After all the characters have been changed to the desired value depressing the enter key will store the new value.

If the value is an enumerated selection the currently active selection will be displayed on the bottom line. The selection may be changed by using the increment and decrement keys to scroll through the available choices. Once finding the desired new selection depressing the enter key will store the change.

Viewing Bit Pattern

Some parameters, such as “Dig_Output_Status” (parameter 661), have a bit pattern that you can view, and in some cases, change. You can use your HIM to see what each bit means.

For example, if you want to check if the orient complete bit is being set for your analog spindle application perform the following: Navigate through the HIM menu tree structure to parameter 667, “Digital_Output_6”, which is located in the file: “I/O Interface” and the group: “Digital Outputs”.

1. Make sure the output link for Digital Output 6 is parameter 583 “Orient Complete”. This is the default link for the analog spindle configuration as determined by parameter 501.

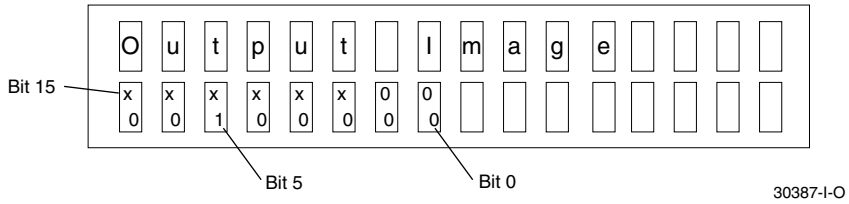
2. Navigate through the HIM menu tree structure to parameter 661 “Dig_Output_Status”, which is located in the file: “I/O Interface” and the group: “Digital Outputs”.

3. Press the enter key to view the bit pattern definition. Bit 0 is located in the lower right. The bits are numbered from 15 to 8 on the top row and 7 to 0 are on the bottom row. An “x” in any bit position indicates that bit is not defined. A “1” indicates the output is on. A “0” indicates the output is off.

4. In this example, if we were to execute a spindle orient, output 6 would transition from 0 to 1 after the orient was complete. This means that bit 5 of the Dig_Output_Status would transition from 0 to 1 as shown in Figure B.6.

5. For the 8720MC there are 10 digital outputs in the file: “I/O Interface” and the group: “Digital Outputs”. Depressing the increment up key will progressively steps your through the output assignments for digital outputs 1 thru 10. If you wish to change an output assignment, first locate the output you wish to change and then press enter. Press select to locate the curser in the parameter field. Use the increment up and increment down keys to change the output parameter assignment. Press enter to save your changes and press exit to step up one level in the parameter tree.

Figure B.6
Bit Pattern Display



Changing a Bit in a Bit Pattern

Some of the bit pattern parameters can be changed. For example, if you wish to change the configuration selections for the auto tune procedure. First, using the increment, decrement and enter keys navigate to parameter 546 in the file "Procedure" and the group "Auto Tune". This is a bit pattern used to select the auto tune options. Using the select key you can highlight the bit you wish to change. Depressing the enter key changes the bit from 1 to 0. Depressing the enter key again changes the bit back to 1. When the bit is highlighted the top line contains the description of the bit. For example bit 0 = "*Auto Save*".

Using the EEProm Mode

You can use EEProm mode to save values, recall values, reset values to the factory defaults, upload a parameter profile from the drive to the HIM, or download a parameter profile. To perform any of these functions, you need to first enter EEProm mode by selecting it from the *Choose Mode* prompt.

Saving Values/Recalling Values

The 8720MC Drive stores parameters in flash memory. When the drive is shipped from the factory a set of default values for all the parameters is provided. Most of these default parameters are suitable for a wide variety of applications and therefore will not need to be changed. The motor and amplifier specific parameters in the file "Motor/Drive/Fdbk" are directly read from the motor feedback device and the power structure of the 8720MC therefore these parameters should not be changed. Several of the Servo Loop parameters can be auto tuned by the drive and therefore these parameters should not require manual entry by the user. Under the EEProm mode you can:

1. Select *Restore Defaults*
2. Select *Save Values*
3. Select *Recall Values*
4. Upload or download parameters from the HIM or DriveExplorer

Restoring the Factory Default Values

To reset the values of all parameters to the factory default values, first disable the drive if it is enabled, then:

1. From the EEProm mode prompt, press the increment up key or the decrement down key until “Reset Defaults” is displayed.
2. Press the enter key to restore all parameters to their original factory setting.
3. Press Escape. Reprogram Fault is displayed.
4. Press the Stop key to reset the fault. If A-B Application, parameter 501 was previously set to a value other than analog spindle, cycle drive power to reset.

Saving Values to Flash Memory

When parameter changes are made their new values are stored in volatile memory. This means if power is removed any parameters which were changed and were not saved will be lost. For this reason it is always good practice to save modified parameters to flash memory after making changes. This can be done from the HIM or DriveExplorer. With the HIM, from the EEProm mode prompt press the increment up key or the decrement down key until “Save” is displayed. Depressing the enter key will execute the save.

Recalling Values from Flash Memory

It is possible to make changes to parameters on an experimental basis which do not produce the desired benefit. In this situation it is possible to recall the flash stored values without cycling power by disabling the drive, choosing the “Recall” selection under the EEProm mode and depressing the enter key.

Uploading a Parameter Profile

You can transfer a parameter profile from the 8720MC Drive to a remote HIM, Cat. No. 1201-HAx, as a means of transferring a parameter set from one 8720MC to another. This functionality is not available with the 8720MC built in HIM. To upload a parameter profile from the drive to the HIM:

1. From the EEProm mode prompt, press the increment up key or the decrement down key until "*Drive -> HIM"* is displayed.

2. Press a - A profile name (up to 14 characters) is displayed on line 2 of the HIM.

3. Change this name or enter a new name. Use the increment up key to move the cursor to the left. Use the increment up key or the decrement down key to change the characters.

4. Press enter. An informational display is shown. This display indicates the drive type and firmware version.

5. Press enter to start the upload. The parameter number currently being uploaded is displayed on line I of the HIM. Line 2 indicates the total progress. Press ESC to stop the upload.

6. Press enter when "*COMPLETE"* is displayed on line 2. If line 2 reports "*ERROR"*, refer to *Chapter 3*.

Downloading a Parameter Profile

To download a parameter profile from the remote HIM to a drive:

The download function is only available when a valid profile is stored in the HIM.

1. From the EEProm mode prompt, press the increment up key or the decrement down key until "*HIM →Drive"* is displayed.

2. Press enter. A profile name (up to 14 characters) is displayed on line 2 of the HIM.

3. Press the increment up key or the decrement down key to scroll to a second profile (if available).

4. Press enter when the desired profile name is displayed. An information display is shown that indicates the version numbers of the profile and the drive.

5. Press enter to start the download. The parameter number currently being downloaded is displayed on line I of the HIM. Line 2 indicates the total progress. Press ESC to stop the download.

6. Press enter when "*COMPLETE"* is displayed on line 2. If line 2 reports '*ERROR"*, refer to the following table.

If you receive this error:	Then:
Error 1	An EEPROM CRC error occurred.
Error 2	The profile is a different length than the master.
Error 3	You are downloading between different types of masters.
Error 4	The data is out or range or illegal
Error 5	You attempted the download while the drive was running.
Error 6	You are downloading between different types of masters.

Using the Search Mode

Search mode lets you search through the parameter list and display all parameters that are not at the factory default values. You can also search for links that are not the factory defaults.

To use Search mode:

1. From the status display, press any key. "*Choose Mode"* is shown.
2. Press the increment up key or the decrement down key to display "*Search"* mode.
3. Press enter.
4. To search through the parameter list, press the increment up key or the decrement down key. The HIM will search in ascending or descending order depending on which key was depressed. The display will scroll and stop at the next parameter or link which is not at it's default value.
5. Press the increment up key or the decrement down key again. The HIM searches for the next parameter which is not at it's default value. In this way all parameters/links that are not at their factory defaults can be displayed on the HIM.
6. Press the escape key to leave search mode and return to the next higher level in the HIM logic tree.

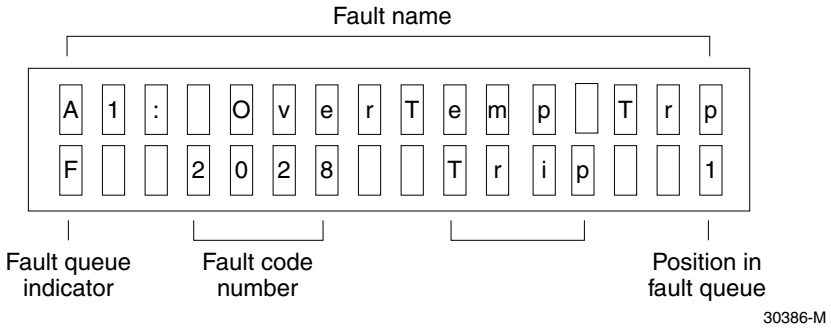
Viewing the Fault Queue/ Warning Queue

Control Status mode lets you view the fault queue. To view the fault queue:

1. Press any key from the status display. "*Choose Mode"* is shown.
2. Press the increment up key or the decrement down key to show "*Control Status"*.
3. Press enter to select Control Status
4. Press the increment up key or the decrement down key until "*Fault Queue*" is displayed.
5. Press enter to select "Fault Queue"
6. Press the increment up key or the decrement down key until "*View Queue*" is displayed.
7. Press enter to select "View Queue"

The fault queue can contain up to 32 faults. The 8720MC Drive reports the faults using the following format.

Figure B.7
Fault Format



- The trip indicator is only present if this fault caused the drive to trip.
- The last number (1) indicates this faults position within the fault queue.

Using the Password Mode

Password mode lets you enable password protection and change the password. By default, the password is 0, which disables password protection. To use Password mode:

1. Press any key from the status display. “Choose Mode” is shown.
2. Press the increment up key or the decrement down key to show “*Password*”.
3. Press the enter key
4. Press the increment up key or the decrement down key until “*Modify*” is displayed.
5. Press the enter key
6. “Enter Password” is displayed on the top line and a blinking 0 appears on the bottom line.
7. Press the increment up key or the decrement down key to increase or decrease the least significant digit. Press the select key to go to the next most significant digit and repeat until the desired password number is displayed. The number can range from 0 to 65535. 0 is the default value meaning there is no password.
8. Press enter to save your new password.

Programming a Password When Drive Power is Applied

With a Series B remote HIM, you can program Password mode to be displayed when drive power is applied. To do this, you need to press the Increment and Decrement keys simultaneously while the Password display is shown.

Once you set the password, the Program/EEProm modes and the Control Logic/Clear Queue menus are password protected and are not displayed in the menu. To access these modes, you need to:

1. Press any key from the status display. Choose Mode is shown.
2. Press the increment up or decrement down keys to show "*Password*."
3. Press the enter key. "*Enter Password"* is displayed.
4. Press the increment up or the decrement down key until the correct password digit is displayed. The select key can be used to move the cursor from digit to digit.
5. When the correct password number is displayed press enter

You can now access the Program and EEProm modes.

Logging Out

To prevent future access to program changes, you need to logout:

1. Press any key from the status display. "*Choose Mode"* is shown.
2. Press the increment up or the decrement down key to show "*Password"*.
3. Press enter
4. Press the increment up or the decrement down key until "*Logout"* is displayed.
5. Press enter to log out of Password mode.

Creating or Changing a Link

The 8720MC analog, digital and SCANport outputs can be linked to different variables within the 8720 system. The analog, digital and SCANport inputs have fixed links and cannot be modified. The outputs have default links as discussed in the *8720MC High Performance Drives Installation Manual* (publication 8720MC-IN001*x*-EN-P). These default links were chosen to suit most spindle or power servo applications. If the 8720MC application needs a different set of outputs the output links my be changed. To change an output parameter link you simply select the output parameter and change its address value so that it points to the parameter that you wish to link to that output. For example, if you wish to link parameter 380, "Bus_Voltage" to "Analog_Output_2", the following procedure should be followed:

1. From the "*Choose Mode"* prompt, use the increment up key or the decrement down key to display "*Program*" and press the enter key.

2. Press the increment up key or the decrement down key to display the "*I/O Interface*" file. Pressing the enter key will select this file.

3. Press the increment up key or the decrement down key to display the "*Analog_Output*" group. Pressing the enter key will display this group parameters.

4. Use the increment up key or the decrement down key to scroll through the parameter list until you come to "*Anaout_Ch2_Selec"*, parameter 683. Pressing the enter key will select this parameter. For a spindle application the value displayed will be the factory default setting of "386", the parameter number for *Mtr_Shaft_Power*.

5. Press the select key and the character 6 will blink indicating that the parameter number may be changed.

6. Press the decrement down key to decrease the parameter number to 380 which is the parameter number for DC_Bus_Voltage.

7. Press the enter key to store the value.

8. Press escape when you have finished to exit the Set Links mode.

9. If you wish to retain the new output link after power is recycled you must store it to non volatile flash memory. See "Storing Values to Flash Memory" in this chapter.

10. The available output links are discussed in the *8720MC High Performance Drives Installation Manual* (publication 8720MC-IN001*x*-EN-P). If you attempt to link to a reserved parameter the drive will display a numerical value of 12. The output will be disabled.

Removing a Link

You may remove an output link by setting it's parameter address value to zero. The procedure for changing a parameter link discussed above may be used for this purpose if the parameter address value is changed to zero. Note that the displayed value will be 12 since 0 is a reserved parameter.

ATTENTION

Be careful when removing links. If the source parameter has already written a value to the destination parameter, the destination parameter retains the value until you explicitly remove it. For some parameters, this may produce undesirable results.

Using DriveExplorer

The functionality available on the HIM module is also available on the Windows compatible Allen-Bradley software program called DriveExplorer. A desktop, laptop or handheld PC can be connected to the SCANport connector via the Serial to SCANport adapter (catalog number 1203-SSS). The additional power of a Windows PC significantly simplifies the 8720MC configuration task. For details refer to the *DriveExplorer Getting Results Manual* (publication 9306-GR001*x*-EN-E).

Programming Parameters

Chapter Objectives

This chapter provides the following information so that you can program your 8720MC drive operating in analog mode:

- Understanding the Parameter Files, Groups and Elements
- Parameter Files, Groups, and Elements (Group Listing)
- 8720MC Parameters (Alphabetical Listing)
- Parameter Descriptions (Numerical Listing)

Understanding the Parameter Files, Groups and Elements

The 8720MC Parameters are divided into 7 files to help organize the parameters into logical groupings that simplify programming and operator access. Each of the 7 files are divided into groups, and each parameter is an element in a specific group. Parameters may be used as elements in more than one group. When using the file/group/element navigation method, searching is accomplished by first finding a file, then a group within the file, and then a specific element within the group. Once finding the element or "parameter" it may be read, modified or linked depending on the type of parameter. The tables in this chapter provide a cross reference between the 8720MC parameter name/description and parameter numbers.

You can also view the parameters in a linear mode. This lets you view the entire parameter table in numerical order. You can access the linear mode from the bottom of any group. The parameter numbers range from 0 to 999. The list of parameters used is far less than 1,000 since there are reserved spaces provided for future product growth.

The current tools available to read, modify, or link the 8720MC parameters are:

- (1) an integral HIM module - SCANport interface
- (2) a remote HIM module - DPI or SCANport
- (3) DriveExplorer - DPI interface (and 1203 SSS adapter)

Parameter Files, Groups, and Elements (Group Listing)

This section provides parameters supported by the 8720MC drive listed by group, file, and element.

Parameter Number	Element Name
File: Group	
Status Faults: Drive Status	
13	Drive Status
182	A-B Drive Status
95	Diagnostic Msg
380	DC Bus Voltage
386	Mtr Shaft Power
520	Cur Limit Source
532	Pwr Sup Utilized
533	Bus Reg Utilized
563	Regen Energy Val
14	Commun Errors
661	Output Image
690	Input Image
717	Logic Command
718	SP Logic Status
Status/Faults: Errors	
11	Shut Down Errors
129	A-B Fault
14	Commun Errors
95	Diagnostic Msg
99	Drive Err Reset
Status/Faults: Setup	
504*	Config Options
601*	Soft Ovrtrvl Act
602*	Pos Err Flt Act
604*	Fdbk Nse Flt Act
606*	Mt Therm Flt Act
605*	Dr Therm Flt Act
607*	Enable Swtch Act
384	HeatSink Temp
528	Enable Brake Sol
207	Drive Off Delay
206	Drive On Delay
57	In Posn Value
124	Zero Spd Window
125	Speed Threshold
126	Torque Threshold
157	At Spd Window
159	Max Foll Error
220	Min Spindle Spd
221	Max Spindle Spd
272	Speed Window %

Parameter Number	Element Name
File: Group	
Control: Velocity	
36	Vel Command
40	Velocity Fback
37	Velocity Offset
43	Vel Polarity
44	Vel Scale Type
45	Vel Scaling
46	Vel Exponent
91	+/- Vel Limit
695	Analog Vel Scale
696	Manual Vel Scale
347	Velocity Error
516	Vel Integ Err
551*	Velocity Droop
155*	Friction Comp
988	Vel Bandwidth
989	Vel Damping
534*	Integ Hold En
Control: Position	
47	Position Command
51	Motor Posn Fback
53	Aux Posn Fback
55	Posn Polarity
76	Pos Scaling Type
77	Lin Posn Scaling
78	Lin Posn Expon
79	Rot Posn Resolut
103	Modulo Value
189	Posn Foll Error
986	Pos Bandwidth
987	Pos Damping
515	Posn Integ Err
258	Target Position
177	Abs Distance 1
178*	Abs Distance 2

Parameter Number	Element Name
File: Group	
Control: Torque	
80	Torque Command
84	Torque Fback
81	Torque Offset
85	Torque Polarity
86	Torq Scale Type
93	Torque Scaling
94	Torque Exponent
573	Torq Scale Gain
517	Id Reference
992	Id Feedback
520	Cur Limit Source
92	+/- Torque Limit
519	+Dyn Iq Limit
536	-Dyn Iq Limit
155*	Friction Comp
997*	Iq Knff
998*	Id Knff
106	Cur Bandwidth
571	Stopping Torque
572	Stop Time Limit
Control: Acceleration	
194*	Accel Command
564*	Accel Feedback
138	+/- Accel Limit
160	Acc Scale Type
161	Accel Scaling
162	Accel Exponent
260	Posn Acc Rate
516	Vel Integ Err
Control: Registration*	
130*	Reg 1 Rising
131*	Reg 1 Falling
132*	Reg 2 Rising
133*	Reg 2 Falling
171*	Calc Displacemnt
52*	Ref Distance 1
54*	Ref Distance 2
410*	-Reg 1 Latch
409*	+Reg 1 Latch
412*	-Reg 2 Latch
411*	+Reg 2 Latch
173*	Marker Posn A
174*	Marker Posn B

Parameter Number	Element Name
File: Group	
Procedure: Homing*	
147*	Homing Parameter
400*	Homing Switch
298*	Home Sw Distance
52*	Ref Distance 1
54*	Ref Distance 2
407*	Homing Enable
529*	Auto Ref Enabled
150*	Mtr Marker Ofset
151*	Aux Marker Ofset
403*	Posn Fdbk Status
Procedure: Orient	
154	Orient Options
582	Auto Home
103	Modulo Value
150	Mtr Marker Ofset
151	Aux Marker Ofset
152	Spin Orient Req
153	Orient Angle
222	Spin Orient Spd
260	Posn Acc Rate
Procedure: Registration*	
169*	Reg Edge Config
170*	Reg Procedure
405*	Reg 1 Enable
401*	Reg 1 State
406*	Reg 2 Enable
402*	Reg 2 State
584*	Reg 1 Window Min
585*	Reg 1 Window Max
586*	Reg 2 Window Min
587*	Reg 2 Window Max
Procedure: Parameter Switch	
216	Switch Param Set
217	Select Param Set
254	Actual Param Set

* Used only with SERCOS interface

Parameter Number	Element Name
File: Group	
Procedure: Auto Tune	
541	ATune Select
542	ATune Torq Limit
543	ATune Vel Limit
544	ATune Posn Limit
546	ATune Config
547	ATune Status
548	ATune Direction
549	ATune Accel Time
550	ATune Decel Time
523	System Accel 0
780	Mtr Acceleration
561	Torq Notch Freq0
562	Torq Lowpass Frq0
Procedure: Hookup*	
621*	Hookup Test Sel
622*	Hookup Test ID
623*	Hookup Test Incr
624*	Hookup Direction
625*	Hookup Status
626*	Hookup Results
Motor/Drive/Fdbk: Drive Data	
140*	Drive Catalog
110	Drive Peak Amps
112	Drive Cont Amps
30	Version Data
501	A-B Application
141	Motor Data
143*	System I/F Vers
522	PWM Frequency
563	Regen Energy Val
518	Drive Utilized
531	Motor Utilized
535*	Drive ID
519	+Dyn Iq Limit
536	-Dyn Iq Limit
690	Input Image

Parameter Number	Element Name
File: Group	
Motor/Drive/Fdbk: Motor Data	
777	Motor Select
141	Motor Data
778	Motor Type
502	MtrFdbk Type
779	Motor Pole Count
780	Mtr Acceleration
781	Base Speed
113	Max Mtr Speed
782	Mtr Rated Power
783	Mtr Max Volts
784	Mtr Rated Volts
785	Rated Torque
196	Mtr Cont Current
111	Mtr Cont Current
109	Mtr Peak Current
786	Motor Back EMF
787	R1-Motor Stator
788	R2-Motor Rotor
789	X1-Stat Self/Lk
790	XM-Stator Mutual
791	X2-Rotor Leakage
792	Mtr Mag Current
793	Mtr Slip Freq
794*	Mtr Damping Coef
795*	Mtr Mag Tmp Coef
796*	Mtr Thrmal Res
797*	Mtr Thrmal Cap
798*	Integ Gear Ratio
776*	Mtr Commu Offset
773*	Mtr Mfg Month
774*	Mtr Mfg Day
775*	Mtr Mfg Year
386	Mtr Shaft Power
531	Motor Utilized
525	Mtr Elec Angle
802*	Mtr Encoder Temp
Motor/Drive/Fdbk: Motor Feedback	
116	Motor Fdbk Resol
177	Abs Distance 1
175*	Displacement 1
277	Mtr Fdbk Config
502	Mtr Fdbk Type
800*	Mtr MT Fdbk Res
802*	Mtr Encoder Temp

Parameter Number	Element Name
File: Group	
Motor/Drive/Fdbk: Aux Feedback	
115	Aux Fdbk Config
117	Aux Fdbk Resol
173	Marker Posn A
174	Marker Posn B
178	Abs Distance 2
503	AuxFdbk Type
176*	Displacement 2
539*	Aux Fdbk LP Freq
801*	Aux MT Fdbk Res
Motor/Drive/Fdbk: Brake	
206	Drive On Delay
207	Drive Off Delay
I/O Interface: Digital Outputs	
661	Output Image
662	Output 01 Source
663	Output 02 Source
664	Output 03 Source
665	Output 04 Source
666	Output 05 Source
667	Output 06 Source
668	Output 07 Source
669	Output 08 Source
670	Output 09 Source
671	Output 10 Source
I/O Interface: Digital Inputs	
690	Input Image
504*	Config Options
I/O Interface: Event Links	
330	Reserved
331	Reserved
332	Reserved
334	Reserved
335	Reserved
336	Reserved
339	Reserved
340	Reserved
526	Hi Wind Enable
527	Lo Wind Enable
528	Enable Brake Sol
529	Auto Ref Enabled
530	Local Ref Enable
583	Orient Complete
610	Drive OK
615	Shut Down Error
617	Power Supply OK

Parameter Number	Element Name
File: Group	
I/O Interface: Analog Inputs	
691	AnaInput 1 Value
692	AnaInput 2 Value
693	AnaInput 1 Ofset
694	AnaInput 2 Ofset
695	Analog Vel Scale
696	Manual Vel Scale
698	Analog Trq Scale
I/O Interface: Analog Outputs	
681	AnaOut Ch1 Selec
682	AnaOut Ch1 Gain
982*	AnaOut Ch1 Value
683	AnaOut Ch2 Selec
684	AnaOut Ch2 Gain
983*	AnaOut Ch2 Value
Communication: SCANp Ref/Fdback	
713	SCANp An1 Value
715	Analog Out Parm
Communication: SCANp Data In	
717	Logic Command
725	SP Data Input A1
726	SP Data Input A2
727	SP Data Input B1
728	SP Data Input B2
729	SP Data Input C1
730	SP Data Input C2
731	SP Data Input D1
732	SP Data Input D2
Communication: SCANp Data Out	
718	Logic Status
733	SP Data Out A1
734	SP Data Out A2
735	SP Data Out B1
736	SP Data Out B2
737	SP Data Out C1
738	SP Data Out C2
739	SP Data Out D1
740	SP Data Out D2

* Used only with SERCOS interface

Parameter Number	Element Name
File: Group	
Servo Loop: Group 0	
505*	OP Mode 0
38	+Vel Limit 0
39	-Vel Limit 0
136	+Accel Limit 0
137	-Accel Limit 0
82	+Torque Limit 0
83	-Torque Limit 0
100	Vel Prop Gain 0
101	Vel Integ Time 0
104	Pos Loop Gain 0
105	Pos Int Time 0
296	Vel Fdfwd Gain 0
348	Acc Fdfwd Gain 0
523	System Accel 0
561	Torq Notch Freq0
562	Torq Lowpas Frq0
121	Gear In Revs 0
122	Gear Out Revs 0

Parameter Number	Element Name
Servo Loop: Group 1	
811*	OP Mode 1
812	+Vel Limit 1
813	-Vel Limit 1
825	+Accel Limit 1
826	-Accel Limit 1
814	+Torque Limit 1
815	-Torque Limit 1
816	Vel Prop Gain 1
817	Vel Integ Time 1
818	Pos Loop Gain 1
819	Pos Int Time 1
820	Vel Fdfwd Gain 1
821	Acc Fdfwd Gain 1
822	System Accel 1
823	Torq Notch Freq1
824	Torq Lowpas Frq1
827	Gear In Revs 1
828	Gear Out Revs 1

Parameter Number	Element Name
File: Group	
Servo Loop: Group 2	
831*	OP Mode 2
832	+Vel Limit 2
833	-Vel Limit 2
845	+Accel Limit 2
846	-Accel Limit 2
834	+Torque Limit 2
835	-Torque Limit 2
836	Vel Prop Gain 2
837	Vel Integ Time 2
838	Pos Loop Gain 2
839	Pos Int Time 2
840	Vel Fdfwd Gain 2
841	Acc Fdfwd Gain 2
842	System Accel 2
843	Torq Notch Freq2
844	Torq Lowpas Frq2
847	Gear In Revs 2
848	Gear Out Revs 2

Parameter Number	Element Name
Servo Loop: Group 3	
851*	OP Mode 3
852	+Vel Limit 3
853	-Vel Limit 3
865	+Accel Limit 3
866	-Accel Limit 3
854	+Torque Limit 3
855	-Torque Limit 3
856	Vel Prop Gain 3
857	Vel Integ Time 3
858	Pos Loop Gain 3
859	Pos Int Time 3
860	Vel Fdfwd Gain 3
861	Acc Fdfwd Gain 3
862	System Accel 3
863	Torq Notch Freq3
864	Torq Lowpas Frq3
867	Gear In Revs 3
868	Gear Out Revs 3

Parameter Number	Element Name
File: Group	
Servo Loop: Group 4	
871*	OP Mode 4
872	+Vel Limit 4
873	-Vel Limit 4
885	+Accel Limit 4
886	-Accel Limit 4
874	+Torque Limit 4
875	-Torque Limit 4
876	Vel Prop Gain 4
877	Vel Integ Time 4
878	Pos Loop Gain 4
879	Pos Int Time 4
880	Vel Fdfwd Gain 4
881	Acc Fdfwd Gain 4
882	System Accel 4
883	Torq Notch Freq4
884	Torq Lowpas Frq4
887	Gear In Revs 4
888	Gear Out Revs 4

Parameter Number	Element Name
Servo Loop: Group 5	
891*	OP Mode 5
892	+Vel Limit 5
893	-Vel Limit 5
905	+Accel Limit 5
906	-Accel Limit 5
894	+Torque Limit 5
895	-Torque Limit 5
896	Vel Prop Gain 5
897	Vel Integ Time 5
898	Pos Loop Gain 5
899	Pos Int Time 5
900	Vel Fdfwd Gain 5
901	Acc Fdfwd Gain 5
902	System Accel 5
903	Torq Notch Freq5
904	Torq Lowpas Frq5
907	Gear In Revs 5
908	Gear Out Revs 5

Parameter Number	Element Name
File: Group	
Servo Loop: Group 6	
911*	OP Mode 6
912	+Vel Limit 6
913	-Vel Limit 6
925	+Accel Limit 6
926	-Accel Limit 6
914	+Torque Limit 6
915	-Torque Limit 6
916	Vel Prop Gain 6
917	Vel Integ Time 6
918	Pos Loop Gain 6
919	Pos Int Time 6
920	Vel Fdfwd Gain 6
921	Acc Fdfwd Gain 6
922	System Accel 6
923	Torq Notch Freq6
924	Torq Lowpas Frq6
927	Gear In Revs 6
928	Gear Out Revs 6

Parameter Number	Element Name
Servo Loop: Group 7	
931*	OP Mode 7
932	+Vel Limit 7
933	-Vel Limit 7
945	+Accel Limit 7
946	-Accel Limit 7
934	+Torque Limit 7
935	-Torque Limit 7
936	Vel Prop Gain 7
937	Vel Integ Time 7
938	Pos Loop Gain 7
939	Pos Int Time 7
940	Vel Fdfwd Gain 7
941	Acc Fdfwd Gain 7
942	System Accel 7
943	Torq Notch Freq7
944	Torq Lowpas Frq7
947	Gear In Revs 7
948	Gear Out Revs 7

* Used only with SERCOS interface.

8720MC Parameters (Alphabetical Listing)

This section provides parameters supported by the 8720MC drive (in alphabetical order by parameter description). Each parameter is cross-referenced to the associated file and group.

Parameter Number	Description	16 Character Name	File	Group
503	A-B Auxiliary Feedback Type	AuxFdbk Type	Motor/Drive/Fdbk	Aux Feedback
501	A-B Drive Type/Application	A-B Application	Motor/Drive/Fdbk	Drive Data
502	A-B Motor Feedback Type	MtrFdbk Type	Motor/Drive/Fdbk	Motor Data
778	A-B Motor Type	Motor Type	Motor/Drive/Fdbk	Motor Data
177	Absolute Distance 1	Abs Distance 1	Control	Position
162	Acceleration Data Scaling Exponent	Accel Exponent	Control	Acceleration
161	Acceleration Data Scaling Factor	Accel Scaling	Control	Acceleration
160	Acceleration Data Scaling Type	Acc Scale Type	Control	Acceleration
348	Acceleration Feedforward Gain	Acc Fdfwd Gain 0	Servo Loop	Group 0
821	Acceleration Feedforward Gain 1	Acc Fdfwd Gain 1	Servo Loop	Group 1
841	Acceleration Feedforward Gain 2	Acc Fdfwd Gain 2	Servo Loop	Group 2
861	Acceleration Feedforward Gain 3	Acc Fdfwd Gain 3	Servo Loop	Group 3
881	Acceleration Feedforward Gain 4	Acc Fdfwd Gain 4	Servo Loop	Group 4
901	Acceleration Feedforward Gain 5	Acc Fdfwd Gain 5	Servo Loop	Group 5
921	Acceleration Feedforward Gain 6	Acc Fdfwd Gain 6	Servo Loop	Group 6
941	Acceleration Feedforward Gain 7	Acc Fdfwd Gain 7	Servo Loop	Group 7
254	Actual Parameter Set	Actual Param Set	Procedure	Parameter Switch
81	Additive Torque Command Value	Torque Offset	Control	Torque
37	Additive Velocity Command Value	Velocity Offset	Control	Velocity
110	Amplifier Peak Current	Drive Peak Amps	Motor/Drive/Fdbk	Drive Data
112	Amplifier Rated Current	Drive Cont Amps	Motor/Drive/Fdbk	Drive Data
384	Amplifier Temperature	HeatSink Temp	Status/Faults	Setup
691	Analog Input 1	AnaInput 1 Value	I/O Interface	Analog Inputs
692	Analog Input 2	AnaInput 2 Value	I/O Interface	Analog Inputs
693	Analog Input Offset 1	AnaInput 1 Offse	I/O Interface	Analog Inputs
694	Analog Input Offset 2	AnaInput 2 Offse	I/O Interface	Analog Inputs
681	Analog Output 1	AnaOut Ch1 Selec	I/O Interface	Analog Outputs
682	Analog Output 1 Scale Factor	AnaOut Ch1 Gain	I/O Interface	Analog Outputs
683	Analog Output 2	AnaOut Ch2 Selec	I/O Interface	Analog Outputs
684	Analog Output 2 Scale Factor	AnaOut Ch2 Gain	I/O Interface	Analog Outputs
698	Analog Torque Scale Factor	Analog Trq Scale	I/O Interface	Analog Inputs
529	Auto Reference Enabled	Auto Ref Enabled	I/O Interface	Event Links
549	Auto Tune Acceleration Time	ATune Accel Time	Procedure	Auto Tune
546	Auto Tune Configuration	ATune Config	Procedure	Auto Tune
550	Auto Tune Deceleration Time	ATune Decel Time	Procedure	Auto Tune
548	Auto Tune Direction	ATune Direction	Procedure	Auto Tune
544	Auto Tune Position Limit	ATune Posn Limit	Procedure	Auto Tune
541	Auto Tune Procedure Command	ATune Select	Procedure	Auto Tune
547	Auto Tune Status	ATune Status	Procedure	Auto Tune
542	Auto Tune Torque Limit	ATune Torq Limit	Procedure	Auto Tune
543	Auto Tune Velocity Limit	ATune Vel Limit	Procedure	Auto Tune
539	Auxiliary Feedback LP Filter Frequency	Aux Fdbk LP Freq	Motor/Drive/Fdbk	Aux Feedback
138	Bipolar Acceleration Limit Value	+/-Accel Limit	Control	Acceleration
92	Bipolar Torque Limit Value	+/- Torque Limit	Control	Torque
91	Bipolar Velocity Limit Value	+/- Vel Limit	Control	Velocity
528	Brake Enable/Disable	Enable Brake Sol	Status/Faults	Setup
533	Bus Regulator Utilization	Bus Reg Utilized	Status/Faults	Drive Status
11	Class 1 Diagnostic (C1D)	Shut Down Errors	Status/Faults	Errors
13	Class 3 Diagnostic (C3D)	Drive Status	Status/Faults	Drive Status
520	Current Limit Source	Cur Limit Source	Status/Faults	Drive Status

Parameter Number	Description	16 Character Name	File	Group
106	Current Loop Proportional Gain 1	Cur Bandwidth	Control	Torque
380	DC Bus Voltage	DC Bus Voltage	Status/Faults	Drive Status
95	Diagnostic Message	Diagnostic Msg	Status/Faults	Errors
690	Digital Input Status Bytes	Input Image	I/O Interface	Digital Inputs
662	Digital Output 1	Output 01 Source	I/O Interface	Digital Outputs
671	Digital Output 10	Output 10 Source	I/O Interface	Digital Outputs
663	Digital Output 2	Output 02 Source	I/O Interface	Digital Outputs
664	Digital Output 3	Output 03 Source	I/O Interface	Digital Outputs
665	Digital Output 4	Output 04 Source	I/O Interface	Digital Outputs
666	Digital Output 5	Output 05 Source	I/O Interface	Digital Outputs
667	Digital Output 6	Output 06 Source	I/O Interface	Digital Outputs
668	Digital Output 7	Output 07 Source	I/O Interface	Digital Outputs
669	Digital Output 8	Output 08 Source	I/O Interface	Digital Outputs
670	Digital Output 9	Output 09 Source	I/O Interface	Digital Outputs
661	Digital Output Status Bytes	Output Image	I/O Interface	Digital Outputs
207	Drive Off Delay Time	Drive Off Delay	Status/Faults	Setup
610	Drive OK	Drive OK	I/O Interface	Event Links
206	Drive On Delay Time	Drive On Delay	Status/Faults	Setup
518	Drive Utilization	Drive Utilized	Motor/Drive/Fdbk	Drive Data
741	Encoder Memory Map Revision	Enc Mem Map Rev	Motor/Drive/Fdbk	Motor Data
189	Following Distance	Posn Foll Error	Control	Position
526	High Winding Enable	Hi Wind Enable	I/O Interface	Event Links
517	Id Current Command	Id Reference	Control	Torque
992	Id Feedback	Id Feedback	Control	Torque
121	Input Revolutions of Load Gear	Gear In Revs 0	Servo Loop	Group 0
827	Input Revolutions of Load Gear 1	Gear In Revs 1	Servo Loop	Group 1
847	Input Revolutions of Load Gear 2	Gear In Revs 2	Servo Loop	Group 2
867	Input Revolutions of Load Gear 3	Gear In Revs 3	Servo Loop	Group 3
887	Input Revolutions of Load Gear 4	Gear In Revs 4	Servo Loop	Group 4
907	Input Revolutions of Load Gear 5	Gear In Revs 5	Servo Loop	Group 5
927	Input Revolutions of Load Gear 6	Gear In Revs 6	Servo Loop	Group 6
947	Input Revolutions of Load Gear 7	Gear In Revs 7	Servo Loop	Group 7
14	Interface Status	Commun Errors	Status/Faults	Drive Status
78	Linear Position Data Scaling Exponent	Lin Posn Expon	Control	Position
77	Linear Position Data Scaling Factor	Lin Posn Scaling	Control	Position
114	Load Limit of the Motor	Mtr Torq Overld	Linear List	Linear List
527	Low Winding Enable	Lo Wind Enable	I/O Interface	Event Links
530	Manual Mode Status	Local Ref Enable	I/O Interface	Event Links
696	Manual Velocity Scale Factor	Manual Vel Scale	Control	Velocity
129	Manufacturer Class 1 Diagnostic	A-B Fault	Status/Faults	Errors
30	Manufacturer Version	Version Data	Motor/Drive/Fdbk	Drive Data
113	Maximum Motor Speed	Max Mtr Speed	Motor/Drive/Fdbk	Motor Data
221	Maximum Spindle Speed	Max Spindle Spd	Status/Faults	Setup
386	Mechanical Power	Mtr Shaft Power	Motor/Drive/Fdbk	Motor Data
220	Minimum Spindle Speed	Min Spindle Spd	Status/Faults	Setup
103	Modulo Value	Modulo Value	Procedure	Orient
159	Monitoring Window	Max Foll Error	Status/Faults	Setup
786	Motor Back EMF Constant (KE)	Motor Back EMF	Motor/Drive/Fdbk	Motor Data
781	Motor Base Speed	Base Speed	Motor/Drive/Fdbk	Motor Data
111	Motor Continuous Stall Current	Mtr Cont Current	Motor/Drive/Fdbk	Motor Data
525	Motor Electrical Angle	Mtr Elec Angle	Motor/Drive/Fdbk	Motor Data
792	Motor Magnetizing Current (IM)	Mtr Mag Current	Motor/Drive/Fdbk	Motor Data
783	Motor Maximum Voltage (VM)	Mtr Max Volts	Motor/Drive/Fdbk	Motor Data
742	Motor Parameter Revision	Motor Parm Rev	Motor/Drive/Fdbk	Motor Data

Parameter Number	Description	16 Character Name	File	Group
109	Motor Peak Current	Mtr Peak Current	Motor/Drive/Fdbk	Motor Data
779	Motor Pole Count/Linear Motor Pole Pitch	Motor Pole Count	Motor/Drive/Fdbk	Motor Data
780	Motor Rated Acceleration	Mtr Acceleration	Motor/Drive/Fdbk	Motor Data
782	Motor Rated Continuous Power	Mtr Rated Power	Motor/Drive/Fdbk	Motor Data
785	Motor Rated Continuous Torque/Force (TC or FC)	Rated Torque	Motor/Drive/Fdbk	Motor Data
196	Motor Rated Current	Mtr Cont Current	Motor/Drive/Fdbk	Motor Data
784	Motor Rated Voltage (VR)	Mtr Rated Volts	Motor/Drive/Fdbk	Motor Data
791	Motor Rotor Leakage Inductance (L2)	X2-Rotor Leakage	Motor/Drive/Fdbk	Motor Data
788	Motor Rotor Resistance (R2)	R2-Motor Rotor	Motor/Drive/Fdbk	Motor Data
777	Motor Select	Motor Select	Motor/Drive/Fdbk	Motor Data
793	Motor Slip Frequency	Mtr Slip Freq	Motor/Drive/Fdbk	Motor Data
789	Motor Stator Leakage/Self Inductance (L1/LS)	X1-Stat Self/Lk	Motor/Drive/Fdbk	Motor Data
790	Motor Stator Magnetizing Inductance (LM)	XM-Stator Mutual	Motor/Drive/Fdbk	Motor Data
787	Motor Stator Resistance (R1/RS)	R1-Motor Stator	Motor/Drive/Fdbk	Motor Data
141	Motor Type	Motor Data	Motor/Drive/Fdbk	Motor Data
531	Motor Utilization	Motor Utilized	Motor/Drive/Fdbk	Motor Data
137	Negative Acceleration Limit Value	-Accel Limit 0	Servo Loop	Group 0
826	Negative Acceleration Limit Value 1	-Accel Limit 1	Servo Loop	Group 1
846	Negative Acceleration Limit Value 2	-Accel Limit 2	Servo Loop	Group 2
866	Negative Acceleration Limit Value 3	-Accel Limit 3	Servo Loop	Group 3
886	Negative Acceleration Limit Value 4	-Accel Limit 4	Servo Loop	Group 4
906	Negative Acceleration Limit Value 5	-Accel Limit 5	Servo Loop	Group 5
926	Negative Acceleration Limit Value 6	-Accel Limit 6	Servo Loop	Group 6
946	Negative Acceleration Limit Value 7	-Accel Limit 7	Servo Loop	Group 7
536	Negative Dynamic Torque Limit	-Dyn Iq Limit	Control	Torque
50	Negative Position Limit Value	-Position Limit	Linear List	Linear List
815	Negative Torque Limit 1	-Torque Limit 1	Servo Loop	Group 1
835	Negative Torque Limit 2	-Torque Limit 2	Servo Loop	Group 2
855	Negative Torque Limit 3	-Torque Limit 3	Servo Loop	Group 3
875	Negative Torque Limit 4	-Torque Limit 4	Servo Loop	Group 4
895	Negative Torque Limit 5	-Torque Limit 5	Servo Loop	Group 5
915	Negative Torque Limit 6	-Torque Limit 6	Servo Loop	Group 6
935	Negative Torque Limit 7	-Torque Limit 7	Servo Loop	Group 7
83	Negative Torque Limit Value	-Torque Limit 0	Servo Loop	Group 0
813	Negative Velocity Limit 1	-Vel Limit 1	Servo Loop	Group 1
833	Negative Velocity Limit 2	-Vel Limit 2	Servo Loop	Group 2
853	Negative Velocity Limit 3	-Vel Limit 3	Servo Loop	Group 3
873	Negative Velocity Limit 4	-Vel Limit 4	Servo Loop	Group 4
893	Negative Velocity Limit 5	-Vel Limit 5	Servo Loop	Group 5
913	Negative Velocity Limit 6	-Vel Limit 6	Servo Loop	Group 6
933	Negative Velocity Limit 7	-Vel Limit 7	Servo Loop	Group 7
39	Negative Velocity Limit Value	-Vel Limit 0	Servo Loop	Group 0
583	Orient Complete	Orient Complete	I/O Interface	Event Links
582	Orient Strategy	Auto Home	Procedure	Orient
122	Output Revolutions of Load Gear	Gear Out Revs 0	Servo Loop	Group 0
828	Output Revolutions of Load Gear 1	Gear Out Revs 1	Servo Loop	Group 1
848	Output Revolutions of Load Gear 2	Gear Out Revs 2	Servo Loop	Group 2
868	Output Revolutions of Load Gear 3	Gear Out Revs 3	Servo Loop	Group 3
888	Output Revolutions of Load Gear 4	Gear Out Revs 4	Servo Loop	Group 4
908	Output Revolutions of Load Gear 5	Gear Out Revs 5	Servo Loop	Group 5
928	Output Revolutions of Load Gear 6	Gear Out Revs 6	Servo Loop	Group 6
948	Output Revolutions of Load Gear 7	Gear Out Revs 7	Servo Loop	Group 7
217	Parameter Set Preselection	Select Param Set	Procedure	Parameter Switch
47	Position Command Value	Position Command	Control	Position

Parameter Number	Description	16 Character Name	File	Group
76	Position Data Scaling Type	Pos Scaling Type	Control	Position
277	Position Feedback 1 Type (Motor)	Mtr Fdbk Config	Motor/Drive/Fdbk	Motor Feedback
115	Position Feedback 2 Type (Auxiliary)	Aux Fdbk Config	Motor/Drive/Fdbk	Aux Feedback
51	Position Feedback Value 1 (Motor Feedback)	Motor Posn Fback	Control	Position
53	Position Feedback Value 2 (Auxiliary Feedback)	Aux Posn Fback	Control	Position
515	Position Integrator Error	Posn Integ Err	Control	Position
986	Position Loop Bandwidth	Pos Bandwidth	Control	Position
987	Position Loop Damping	Pos Damping	Control	Position
105	Position Loop Integral Action Time	Pos Int Time 0	Servo Loop	Group 0
819	Position Loop Integral Action Time 1	Pos Int Time 1	Servo Loop	Group 1
839	Position Loop Integral Action Time 2	Pos Int Time 2	Servo Loop	Group 2
859	Position Loop Integral Action Time 3	Pos Int Time 3	Servo Loop	Group 3
879	Position Loop Integral Action Time 4	Pos Int Time 4	Servo Loop	Group 4
899	Position Loop Integral Action Time 5	Pos Int Time 5	Servo Loop	Group 5
919	Position Loop Integral Action Time 6	Pos Int Time 6	Servo Loop	Group 6
939	Position Loop Integral Action Time 7	Pos Int Time 7	Servo Loop	Group 7
104	Position Loop KV Factor	Pos Loop Gain 0	Servo Loop	Group 0
818	Position Loop KV Factor 1	Pos Loop Gain 1	Servo Loop	Group 1
838	Position Loop KV Factor 2	Pos Loop Gain 2	Servo Loop	Group 2
858	Position Loop KV Factor 3	Pos Loop Gain 3	Servo Loop	Group 3
878	Position Loop KV Factor 4	Pos Loop Gain 4	Servo Loop	Group 4
898	Position Loop KV Factor 5	Pos Loop Gain 5	Servo Loop	Group 5
918	Position Loop KV Factor 6	Pos Loop Gain 6	Servo Loop	Group 6
938	Position Loop KV Factor 7	Pos Loop Gain 7	Servo Loop	Group 7
55	Position Polarity Parameter	Posn Polarity	Control	Position
152	Position Spindle Procedure Command	Spin Orient Req	Procedure	Orient
57	Position Window	In Posn Value	Status/Faults	Setup
260	Positioning Acceleration	Posn Acc Rate	Procedure	Orient
259	Positioning Velocity	Posn Velocity	Linear List	Linear List
136	Positive Acceleration Limit Value	+Accel Limit 0	Servo Loop	Group 0
825	Positive Acceleration Limit Value 1	+Accel Limit 1	Servo Loop	Group 1
845	Positive Acceleration Limit Value 2	+Accel Limit 2	Servo Loop	Group 2
865	Positive Acceleration Limit Value 3	+Accel Limit 3	Servo Loop	Group 3
885	Positive Acceleration Limit Value 4	+Accel Limit 4	Servo Loop	Group 4
905	Positive Acceleration Limit Value 5	+Accel Limit 5	Servo Loop	Group 5
925	Positive Acceleration Limit Value 6	+Accel Limit 6	Servo Loop	Group 6
945	Positive Acceleration Limit Value 7	+Accel Limit 7	Servo Loop	Group 7
519	Positive Dynamic Torque Limit	+Dyn Iq Limit	Control	Torque
49	Positive Position Limit Value	+Position Limit	Linear List	Linear List
814	Positive Torque Limit 1	+Torque Limit 1	Servo Loop	Group 1
834	Positive Torque Limit 2	+Torque Limit 2	Servo Loop	Group 2
854	Positive Torque Limit 3	+Torque Limit 3	Servo Loop	Group 3
874	Positive Torque Limit 4	+Torque Limit 4	Servo Loop	Group 4
894	Positive Torque Limit 5	+Torque Limit 5	Servo Loop	Group 5
914	Positive Torque Limit 6	+Torque Limit 6	Servo Loop	Group 6
934	Positive Torque Limit 7	+Torque Limit 7	Servo Loop	Group 7
82	Positive Torque Limit Value	+Torque Limit 0	Servo Loop	Group 0
812	Positive Velocity Limit 1	+Vel Limit 1	Servo Loop	Group 1
832	Positive Velocity Limit 2	+Vel Limit 2	Servo Loop	Group 2
852	Positive Velocity Limit 3	+Vel Limit 3	Servo Loop	Group 3
872	Positive Velocity Limit 4	+Vel Limit 4	Servo Loop	Group 4
892	Positive Velocity Limit 5	+Vel Limit 5	Servo Loop	Group 5
912	Positive Velocity Limit 6	+Vel Limit 6	Servo Loop	Group 6
932	Positive Velocity Limit 7	+Vel Limit 7	Servo Loop	Group 7

Parameter Number	Description	16 Character Name	File	Group
38	Positive Velocity Limit Value	+Vel Limit 0	Servo Loop	Group 0
532	Power Supply Utilization	Pwr Sup Utilized	Status/Faults	Drive Status
811	Primary Operating Mode 1	OP Mode 1	Servo Loop	Group 1
831	Primary Operating Mode 2	OP Mode 2	Servo Loop	Group 2
851	Primary Operating Mode 3	OP Mode 3	Servo Loop	Group 3
871	Primary Operating Mode 4	OP Mode 4	Servo Loop	Group 4
891	Primary Operating Mode 5	OP Mode 5	Servo Loop	Group 5
911	Primary Operating Mode 6	OP Mode 6	Servo Loop	Group 6
931	Primary Operating Mode 7	OP Mode 7	Servo Loop	Group 7
32	Primary Operation Mode	Prime OP Mode 0	Servo Loop	Group 0
522	PWM Frequency	PWM Frequency	Motor/Drive/Fdbk	Drive Data
150	Reference Offset 1	Mtr Marker Ofset	Procedure	Homing
151	Reference Offset 2	Aux Marker Ofset	Procedure	Homing
563	Regenerative Energy Capacity	Regen Energy Val	Status/Faults	Drive Status
617	Regenerative Power Supply Fault	Power Supply OK	I/O Interface	Event Links
585	Registration 1 Window Maximum Value	Reg 1 Window Max	Procedure	Registration
584	Registration 1 Window Minimum Value	Reg 1 Window Min	Procedure	Registration
587	Registration 2 Window Maximum Value	Reg 2 Window Max	Procedure	Registration
586	Registration 2 Window Minimum Value	Reg 2 Window Min	Procedure	Registration
99	Reset Class 1 Diagnostic	Drive Err Reset	Status/Faults	Errors
116	Resolution of Feedback 1	Motor Fdbk Resol	Motor/Drive/Fdbk	Motor Feedback
117	Resolution of Feedback 2	Aux Fdbk Resol	Motor/Drive/Fdbk	Aux Feedback
79	Rotational Position Resolution	Rot Posn Resolut	Control	Position
713	SCANport Analog Input 1 Value	SCANp An1 Value	Communication	SCANp Ref/Fdback
715	SCANport Analog Output	Analog Out Parm	Communication	SCANp Ref/Fdback
725	SCANport Data In Channel A1	SP Data In A1	Communication	SCANp Data In
726	SCANport Data In Channel A2	SP Data In A2	Communication	SCANp Data In
727	SCANport Data In Channel B1	SP Data In B1	Communication	SCANp Data In
728	SCANport Data In Channel B2	SP Data In B2	Communication	SCANp Data In
729	SCANport Data In Channel C1	SP Data In C1	Communication	SCANp Data In
730	SCANport Data In Channel C2	SP Data In C2	Communication	SCANp Data In
731	SCANport Data In Channel D1	SP Data In D1	Communication	SCANp Data In
732	SCANport Data In Channel D2	SP Data In D2	Communication	SCANp Data In
733	SCANport Data Out Channel A1	SP Data Out A1	Communication	SCANp Data Out
734	SCANport Data Out Channel A2	SP Data Out A2	Communication	SCANp Data Out
735	SCANport Data Out Channel B1	SP Data Out B1	Communication	SCANp Data Out
736	SCANport Data Out Channel B2	SP Data Out B2	Communication	SCANp Data Out
737	SCANport Data Out Channel C1	SP Data Out C1	Communication	SCANp Data Out
738	SCANport Data Out Channel C2	SP Data Out C2	Communication	SCANp Data Out
739	SCANport Data Out Channel D1	SP Data Out D1	Communication	SCANp Data Out
740	SCANport Data Out Channel D2	SP Data Out D2	Communication	SCANp Data Out
717	SCANport Logic Command	Logic Command	Status/Faults	Drive Status
716	SCANport Logic Mask	SP Logic Mask	Communication	SCANp Data In
718	SCANport Type 2 Logic Status	SP Logic Status	Status/Faults	Drive Status
615	Shut Down Error Status	Shut Down Error	I/O Interface	Event Links
153	Spindle Angle Position	Orient Angle	Procedure	Orient
154	Spindle Positioning Parameter	Orient Options	Procedure	Orient
222	Spindle Positioning Speed	Spin Orient Spd	Procedure	Orient
124	Standstill Window	Zero Spd Window	Status/Faults	Setup
572	Stopping Time Limit	Stop Time Limit	Control	Torque
571	Stopping Torque	Stopping Torque	Control	Torque
216	Switch Parameter Set Procedure Command	Switch Param Set	Procedure	Parameter Switch
523	System Acceleration	System Accel 0	Procedure	Auto Tune
822	System Acceleration 1	System Accel 1	Servo Loop	Group 1

Parameter Number	Description	16 Character Name	File	Group
842	System Acceleration 2	System Accel 2	Servo Loop	Group 2
862	System Acceleration 3	System Accel 3	Servo Loop	Group 3
882	System Acceleration 4	System Accel 4	Servo Loop	Group 4
902	System Acceleration 5	System Accel 5	Servo Loop	Group 5
922	System Acceleration 6	System Accel 6	Servo Loop	Group 6
942	System Acceleration 7	System Accel 7	Servo Loop	Group 7
258	Target Position	Target Position	Control	Position
80	Torque Command Value	Torque Command	Control	Torque
94	Torque Data Scaling Exponent	Torque Exponent	Control	Torque
93	Torque Data Scaling Factor	Torque Scaling	Control	Torque
84	Torque Feedback Value	Torque Fback	Control	Torque
85	Torque Polarity Parameter	Torque Polarity	Control	Torque
562	Torque Reference Low Pass Filter Bandwidth	Torq Lowpas Frq0	Procedure	Auto Tune
824	Torque Reference Lowpass Filter Frequency 1	Torq Lowpas Frq1	Servo Loop	Group 1
844	Torque Reference Lowpass Filter Frequency 2	Torq Lowpas Frq2	Servo Loop	Group 2
864	Torque Reference Lowpass Filter Frequency 3	Torq Lowpas Frq3	Servo Loop	Group 3
884	Torque Reference Lowpass Filter Frequency 4	Torq Lowpas Frq4	Servo Loop	Group 4
904	Torque Reference Lowpass Filter Frequency 5	Torq Lowpas Frq5	Servo Loop	Group 5
924	Torque Reference Lowpass Filter Frequency 6	Torq Lowpas Frq6	Servo Loop	Group 6
944	Torque Reference Lowpass Filter Frequency 7	Torq Lowpas Frq7	Servo Loop	Group 7
561	Torque Reference Notch Filter Frequency	Torq Notch Freq0	Servo Loop	Group 0
823	Torque Reference Notch Filter Frequency 1	Torq Notch Freq1	Servo Loop	Group 1
843	Torque Reference Notch Filter Frequency 2	Torq Notch Freq2	Servo Loop	Group 2
863	Torque Reference Notch Filter Frequency 3	Torq Notch Freq3	Servo Loop	Group 3
883	Torque Reference Notch Filter Frequency 4	Torq Notch Freq4	Servo Loop	Group 4
903	Torque Reference Notch Filter Frequency 5	Torq Notch Freq5	Servo Loop	Group 5
923	Torque Reference Notch Filter Frequency 6	Torq Notch Freq6	Servo Loop	Group 6
943	Torque Reference Notch Filter Frequency 7	Torq Notch Freq7	Servo Loop	Group 7
573	Torque Scaling Gain	Torq Scale Gain	Control	Torque
126	Torque Threshold	Torque Threshold	Status/Faults	Setup
86	Torque/Force Data Scaling Type	Torq Scale Type	Control	Torque
36	Velocity Command Value	Velocity Command	Control	Velocity
46	Velocity Data Scaling Exponent	Vel Exponent	Control	Velocity
45	Velocity Data Scaling Factor	Vel Scaling	Control	Velocity
44	Velocity Data Scaling Type	Vel Scale Type	Control	Velocity
347	Velocity Error	Velocity Error	Control	Velocity
40	Velocity Feedback Value	Velocity Fback	Control	Velocity
296	Velocity Feedforward Gain	Vel Fdfwd Gain 0	Servo Loop	Group 0
820	Velocity Feedforward Gain 1	Vel Fdfwd Gain 1	Servo Loop	Group 1
840	Velocity Feedforward Gain 2	Vel Fdfwd Gain 2	Servo Loop	Group 2
860	Velocity Feedforward Gain 3	Vel Fdfwd Gain 3	Servo Loop	Group 3
880	Velocity Feedforward Gain 4	Vel Fdfwd Gain 4	Servo Loop	Group 4
900	Velocity Feedforward Gain 5	Vel Fdfwd Gain 5	Servo Loop	Group 5
920	Velocity Feedforward Gain 6	Vel Fdfwd Gain 6	Servo Loop	Group 6
940	Velocity Feedforward Gain 7	Vel Fdfwd Gain 7	Servo Loop	Group 7
516	Velocity Integrator Error	Vel Integ Err	Control	Velocity
988	Velocity Loop Bandwidth	Vel Bandwidth	Control	Velocity
989	Velocity Loop Damping	Vel Damping	Control	Velocity
101	Velocity Loop Integral Action Time	Vel Integ Time 0	Servo Loop	Group 0
817	Velocity Loop Integral Action Time 1	Vel Integ Time 1	Servo Loop	Group 1
837	Velocity Loop Integral Action Time 2	Vel Integ Time 2	Servo Loop	Group 2
857	Velocity Loop Integral Action Time 3	Vel Integ Time 3	Servo Loop	Group 3
877	Velocity Loop Integral Action Time 4	Vel Integ Time 4	Servo Loop	Group 4
897	Velocity Loop Integral Action Time 5	Vel Integ Time 5	Servo Loop	Group 5

Parameter Number	Description	16 Character Name	File	Group
917	Velocity Loop Integral Action Time 6	Vel Integ Time 6	Servo Loop	Group 6
937	Velocity Loop Integral Action Time 7	Vel Integ Time 7	Servo Loop	Group 7
100	Velocity Loop Proportional Gain	Vel Prop Gain 0	Servo Loop	Group 0
816	Velocity Loop Proportional Gain 1	Vel Prop Gain 1	Servo Loop	Group 1
836	Velocity Loop Proportional Gain 2	Vel Prop Gain 2	Servo Loop	Group 2
856	Velocity Loop Proportional Gain 3	Vel Prop Gain 3	Servo Loop	Group 3
876	Velocity Loop Proportional Gain 4	Vel Prop Gain 4	Servo Loop	Group 4
896	Velocity Loop Proportional Gain 5	Vel Prop Gain 5	Servo Loop	Group 5
916	Velocity Loop Proportional Gain 6	Vel Prop Gain 6	Servo Loop	Group 6
936	Velocity Loop Proportional Gain 7	Vel Prop Gain 7	Servo Loop	Group 7
43	Velocity Polarity Parameter	Vel Polarity	Control	Velocity
695	Velocity Scale Factor	Analog Vel Scale	Control	Velocity
125	Velocity Threshold	Speed Threshold	Status/Faults	Setup
157	Velocity Window	At Spd Window	Status/Faults	Setup
272	Velocity Window Percentage	Speed Window %	Status/Faults	Setup

Parameter Descriptions (Numerical Listing)

This section provides detailed definition of the parameters supported by the 8720MC drive (in numerical order by parameter number). These parameters are required to provide the basic drive functionality. Some of the parameters are read only (as indicated by the letter R in the top right corner of each parameter) and are available for display only. Some are user read/write variables (as indicated by the R/W) which can be modified via the HIM module or other SCANport device such as DriveExplorer operating on a Windows platform.

IMPORTANT If you are using a SCANport HIM (1201-HA*x*), limits for display/settings are 2 byte (16 bit).

If you are using a DPI HIM (20-HIM-A*x*) or DriveExplorer software, limits for display/settings are 4 byte (32 bit).

<table>
<tr><td></td><td colspan="2">Name: Shut_Down_Errors</td><td colspan="2">Data Display: Bit Pattern</td><td>R</td></tr>
<tr><td>Parameter No.
11
File:
Status/Faults
Group:
Errors</td><td colspan="5">Description: Class 1 diagnostic (C1D). Drive shut-down error.
A drive error status of C1D leads to the following:
a) A best case deceleration followed by torque release at nfeedback = 0 (Parameter 331)
b) The drive shut-down error bit for C1D is set to '1' in the SERCOS drive status (bit 13). The error bit is reset to '0' by the drive only when no errors of C1D exists and after the command 'reset class 1 diagnostic' (parameter 99) has been received by the drive via the SERCOS service channel.
In the analog configuration, parameter 615 is set true indicating there is a shut down failure.
Enumerated Bit Pattern:
Structure of C1D:
Bit 0: Drive overload shut-down
Bit 1: Drive over temperature shut-down
Bit 2: motor over temperature shut-down
Bit 3: cooling error shut-down (not supported in 8720MC)
Bit 4: control voltage error (not supported in 8720MC)
Bit 5: feedback error
Bit 6: error in the "commutation" system (not supported in 8720MC)
Bit 7: overcurrent error
Bit 8: overvoltage error
Bit 9: undervoltage error
Bit 10: power supply phase error (not supported in 8720MC)
Bit 11: excessive following error (see parameter 159)
Bit 12: communication error
Bit 13: overtravel limit is exceeded (not supported in drive)
Bit 14: reserved
Bit 15: A-B drive fault (see parameter 129)

0 = no error
1 = error</td></tr>
<tr><td>Default
N/A</td><td>Length
2 bytes</td><td>Minimum/Maximum
N/A</td><td>Scaling Resolution
N/A</td><td colspan="2">Units
N/A</td></tr>
</table>

	Name: Drive_Status		**Data Display:** Bit Pattern	R
Parameter No. 13 **File:** Status/Faults **Group:** Drive Status	**Description:** Class 3 diagnostic (C3D). Drive operation status flags. When a condition changes in the drive, the corresponding bit changes in the C3D, this sets the change bit for C3D in the SERCOS drive status (bit 11) to a binary '1'. When the C3D is read via the service channel, the C3D change bit is reset to '0'. **Enumerated Bit Pattern:** Structure of C3D: Bit 0: *n*feedback = *n*command (see parameter 330) "At_Prog_Speed" Bit 1: *n*feedback = 0 (see parameter 331) "Zero Speed" Bit 2: $n_{feedback} < n_x$ (see parameter 332) "Velocity Below Threshold" Bit 3: $T \geq T_x$ (see parameter 333) "Torque Above Threshold" Bit 4: $T \geq T_{limit}$ (see parameter 334) "Torque Above Limit" Bit 5: $n_{command} >$ |*n* limit (see parameter 335) "Velocity Above Limit" Bit 6: In Position (see parameter 336) Bit 7: $P \geq P_x$ (see parameter 337) not supported in the 8720MC Bit 8: reserved Bit 9: $n_{feedback} \leq$ minimum spindle speed (see parameter 339) "Speed Below Minimum" Bit 10: $n_{feedback} \geq$ maximum spindle speed (see parameter 340) "Speed Above Maximum" Bit 11: Reserved Bit 12: Reserved Bit 13: Reserved Bit 14: reserved Bit 15: A-B Drive Status (see parameter 182) Bit = 0, condition does not exist Bit = 1, condition exists			
Default: N/A	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Version_Data		**Data Display:** ASCII Characters	R
Parameter No. 30 **File:** Motor/Drive/ Fdbk **Group:** Drive Data	**Description:** Manufacturer version. The operation data of the manufacturer version contains the actual version and additional information of the manufacturer. The structure of the manufacturer version appears as: Vers: 01.001, where the first 2 numbers are the major revision and the second 3 numbers are the minor revision.			
Default: N/A	**Length** Variable Characters	Minimum/Maximum N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Prime_OP_Mode_n		**Data Display:** Enumerated Selection	R/W
Parameter No. 32 **File:** Servo Loop **Group:** Group 0	**Description:** Primary operation mode - There are 8 groups of servo parameters (n = 0 - 7) and "Primary Operating Mode" is one of them. The choices available for primary operating mode are: **Enumerated Bit Pattern:** bits 0-2 001 - Torque Mode 010 - Velocity Mode 011 - Position with feedback 1, motor feedback (SERCOS only) 100 - Position with feedback 2, auxiliary feedback (SERCOS only) 101 - Position Control using both motor and auxiliary feedback (SERCOS only) bit 3 - 15 reserved In the analog version each of the 8 parameter sets has a "Prime_Op_Mode_n" parameter. Group zero is parameter 32. In the SERCOS version the drive modes of operation defined by this parameter becomes active when the operation mode is selected via bits 9 and 8 in the SERCOS control word of the MDT. The activated operation mode is indicated by bits 9 and 8 of the SERCOS drive status in the AT telegram from the drive to the master. In the analog configuration only position with motor feedback (feedback 1), velocity and torque modes are available. The operating mode can be changed on line in the analog version by switching parameter sets.			
Default: 010, velocity	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Velocity_Command		**Data Display:** Decimal	R, Link
Parameter No. 36 **File:** Control **Group:** Velocity	**Description:** Velocity command value.This parameter contains the value of the reference velocity command. Possible sources are Analog Input 1 (parameter 691), SCANp An1 Value (parameter 713), and the SERCOS cyclic telegram. The source of the velocity reference command is determined by parameter 501, "A-B Application". With the suggested feedback and motor wiring a positive velocity reference produces clockwise rotation when viewed from the shaft end of the motor.			
Default: 0	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ -30,000 Max. ≤ +30,000	**SCANport Scaling Resolution** 1 = 1RPM	**Units** RPM
Default: 0 - preferred scaling	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min.≥ -2^{31} Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 44 Scaling factor: parameter 45 Scaling exponent: parameter 46	**Units** parameter 44

	Name: +Vel_Limit_0		**Data Display:** Signed Decimal	R/W
Parameter No. 38 **File:** Servo Loop **Group:** Group 0	**Description:** Positive velocity limit value. This parameter describes the maximum allowable velocity in the positive direction. If the velocity limit value is exceeded, the drive responds by setting the status '*n*command > *n*limit' in C3D (see parameter 13) as well as parameter 335 "Vel_Above_Limit". This parameter appears in 8 sets of servo loop parameters. Parameter 38 appears in Group 0. See *Parameter Files, Groups, and Elements (Group Listing)* in this chapter. The commanded positive RPM will be limited to this value. If for any reason the actual motor velocity exceeds + Vel_Limit_0 by 50% an overspeed fault will disable the drive.			
Default: 6000	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ +30,000	**SCANport Scaling Resolution** 1 = 1RPM	**Units** RPM
Default: 6000	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 44 Scaling factor: parameter 45 Scaling exponent: parameter 46	**Units** parameter 44

	Name: -Vel_Limit_0		**Data Display:** Signed Decimal	R/W
Parameter No. 39 **File:** Servo Loop **Group:** Group 0	**Description:** Negative velocity limit value. This parameter describes the maximum allowable velocity in the negative direction. If the velocity limit value is exceeded, the drive responds by setting the status '*n*command > *n*limit' in C3D (see parameter 13) as well as parameter 335 "Vel_Above_Limit". This parameter appears in 8 sets of servo loop parameters. Parameter 39 appears in Group 0. See *Parameter Files, Groups, and Elements (Group Listing)* in this chapter. The commanded negative RPM will be limited to this value. If for any reason the actual motor velocity exceeds - Vel_Limit_0 by 50% an overspeed fault will disable the drive.			
Default: -6000	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ -30,000 Max. ≤ 0	**SCANport Scaling Resolution** 1 = 1RPM	**Units** RPM
Default: -6000	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{31} Max. ≤ 0	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 44 Scaling factor: parameter 45 Scaling exponent: parameter 46	**Units** parameter 44

	Name: Velocity_Fback		**Data Display:** Decimal	R, Link
Parameter No. 40 **File:** Control **Group:** Velocity	**Description:** The velocity feedback value. In the SERCOS configuration the velocity feedback value is transferred from the drive to the control unit in each AT cyclic telegram in order to allow the control unit to have access to the actual velocity. In both the analog and SERCOS configurations the motor encoder supplied velocity feedback is used to close the velocity loop. With the suggested feedback and motor wiring a positive velocity reference produces clockwise rotation when viewed from the shaft end of the motor.			
Default: 0	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ -30,000 Max. ≤ 30,000	**SCANport Scaling Resolution** 1 = 1RPM	**Units** RPM
Default: 0	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{31} Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 44 Scaling factor: parameter 45 Scaling exponent: parameter 46	**Units** parameter 44

	Name: Velocity_Polarity		**Data Display: E**numeration of Choices	R/W
Parameter No. 43 **File:** Control **Group:** Velocity	**Description:** Velocity polarity parameter. This parameter is used to switch polarities of velocity data for specific applications. Polarities are not switched internally but externally (on the input and output) of a closed loop system. The motor shaft turns clockwise when there is a positive velocity command difference and no inversion is programmed. SERCOS interface only. **Enumeration:** Structure of velocity polarity parameter: Bit 0 – Velocity command value 0 = non-inverted 1 = inverted Bit 1 – Additive velocity command value (SERCOS interface only) 0 = non-inverted 1 = inverted Bit 2 – Velocity feedback value 0 = non-inverted 1 = inverted Bits 15-3 (reserved) This parameter is available with the 8720MC SERCOS interface.			
Default: x000	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Vel_Scale_Type		**Data Display:** Bit Pattern	R/W
Parameter No. 44 **File:** Control **Group:** Velocity	**Description:** SERCOS Velocity Data Scaling Type. A variety of scaling methods can be selected by means of the scaling type parameter. Bit 5 is set to “minutes” for preferred data. **Enumeration:** Structure of velocity data scaling type: Bits 2–0: Scaling method 000 = no scaling 001 = linear scaling 010 = rotational scaling Bit 3: 0 = preferred scaling 1 = parameter scaling Bit 4: Units for linear scaling 0 = meters (m) **1 = inches (in)** Bit 4: Units for rotational scaling 0 = revolutions (R) 1 = (reserved) Bit 5: Time units 0 – minutes (min) 1 – seconds (s) Bit 6: Data reference 0 – at the motor shaft 1– at the load (all other bits are reserved) This parameter is available with the 8720MC SERCOS interface.			
Default x000x010**:**	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Vel_Scale_Factor		**Data Display:** Integer	R/W
Parameter No. 45 **File:** Control **Group:** Velocity	**Description:** Velocity data scaling factor. This parameter defines the scaling factor for all velocity data in a SERCOS configured drive. This parameter is available with the 8720MC SERCOS interface.			
Default: preferred	**Length** 2 bytes	**SERCOS/DPI Min/Max** Min. ≥ 1 Max. ≤ $+2^{15}$ - 1	**SERCOS/DPI Scaling Resolution** Structure of the scaling factor: Bits 15-0: factor	**Units** scaler

	Name: Vel_Scale_Expon		**Data Display:** Signed Integer	R/W
Parameter No. 46 **File:** Control **Group:** Velocity	**Description:** Velocity data scaling exponent. This parameter defines the scaling exponent for all velocity data in a SERCOS configured drive.			
Default: preferred	**Length** 2 bytes	**SERCOS Min/Max** Min. ≥ -2^{15} Max. ≤ $+2^{15}$- 1	**SERCOS Scaling Resolution** Structure of the scaling exponent: Bit 15: Sign of the exponent 0 – positive 1 – negative Bits 14-0: Exponent	**Units** scaler

	Name: Position_Command		**Data Display:** Decimal	R/W
Parameter No. 47 **File:** Control **Group:** Position	**Description:** Position command value. In the SERCOS configurations, during the positioning mode of operation, the position command values are transferred from the motion control unit to the drive. In the analog versions the only commanded position is the orient position. See parameter 153,"Orient angle". In the SCANport configurations the position is available from 1203 Gateway Communication Modules via parameter 258 "Target Position"			
Default: N/A	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ -32768 Max. ≤ +32767	**SCANport Scaling Resolution** 360/parameter 79 = rotary position increment in deg. parameter 79 = rotary position increment in counts/ rev.	**Units** parameter 79
Default: N/A	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{31} Max. ≤ $+2^{31}$ - 1	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 76 Scaling factor: parameter 77 Scaling exponent: parameter 78 Rotational position resolution: parameter 79	**Units** parameter 76

	Name: +Position_Limit		**Data Display:** Signed Integer	R/W
Parameter No. 49 **File:** Linear List **Group:** Linear List	**Description:** This is the maximum allowable distance in the positive direction. When the positive position limit is exceeded, the drive sets error bit 13 of the C1D (parameter 11).			
Default: +32767	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ -32768 Max. ≤ +32767	**SCANport Scaling Resolution** 360/parameter 79 = rotary position increment in deg. parameter 79 = rotary position increment in counts/ rev.	**Units** parameter 79
Default: $+2^{31} - 1$	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{31} Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 76 Scaling factor: parameter 77 Scaling exponent: parameter 78 Rotational position resolution: parameter 79	**Units** parameter 76

	Name: -Position_Limit		**Data Display:** Signed Integer	R/W
Parameter No. 50 **File:** Linear List **Group:** Linear List	**Description:** This is the maximum allowable distance in the negative direction. When the negative position limit value is exceeded, the drive sets error bit 13 of the C1D (parameter 11).			
Default: +32767	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ -32768 Max. ≤ +32767	**SCANport Scaling Resolution** 360/parameter 79 = rotary position increment in deg. parameter 79 = rotary position increment in counts/ rev.	**Units** parameter 79
Default: $+2^{31} - 1$	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{31} Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 76 Scaling factor: parameter 77 Scaling exponent: parameter 78 Rotational position resolution: parameter 79	**Units** parameter 76

	Name: Motor_Posn_Fback		**Data Display:** Resolution Units	R
Parameter No. 51 **File:** Control **Group:** Position	**Description:** Position feedback value 1 (motor feedback). In the analog spindle and power servo configurations the feedback is always scaled for rotary feedback with modulo format using parameter scaling. This means that the resolution of the feedback as displayed in parameter 51 is defined by parameter 79 and the feedback is modulo in that it ranges from 0 to parameter 103 counts absolute and rolls over to zero. In the analog spindle and power servo configurations the absolute zero of the rotary axis feedback can be shifted clockwise or counter-clockwise via parameter 150, "Motor Marker Offset". The HIM display of parameter 51 in the analog configurations will be the absolute accumulation of the modulo axis feedback after it is modified by parameter 150. This is true after the first orient regardless of whether the feedback type is incremental or single turn absolute. In the analog version the display is in rotary resolution units as defined in parameter 79. It's range will be 0 to parameter 103, the modulo rotary axis value.			
Default: N/A	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ -32768 Max. ≤ +32767	**SCANport Scaling Resolution** 360/parameter 79 = rotary position increment in deg.	**Units** parameter 79
Default: N/A	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{31} Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 76 Scaling factor: parameter 77 Scaling exponent: parameter 78 Rotational position resolution: parameter 79	**Units** parameter 76

	Name: Aux_Posn_Fback		**Data Display:** Decimal	R
Parameter No. 53 **File:** Control **Group:** Position	**Description:** Position feedback value 2 (auxiliary feedback). It is used for slide or spindle mounted feedback devices such as linear scales or toothed wheel spindle encoders. This parameter is not available for analog configurations.			
Default: N/A	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{31} Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 76 Scaling factor: parameter 77 Scaling exponent: parameter 78 Rotational position resolution: parameter 79	**Units** parameter 76

	Name: Posn_Polarity		**Data Display:** Bit Pattern	R/W
Parameter No. 55 **File:** Control **Group:** Position	**Description:** Position polarity parameters. This parameter is used to switch polarities of reported position data for specific applications. Polarities are switched outside (i.e. on the input and output) of a closed loop system. The motor shaft turns clockwise (when viewed from the output shaft) when there is a positive position command difference and no inversion is programmed. **Enumerations:** Structure of the Position polarity parameter: Bit 0 Position command value 0 = Non-inverted 1 = Inverted Bit 1 Additive position command value 0 = Non-inverted 1 = Inverted Bit 2 Position feedback value 1 0 = Non-inverted 1 = Inverted Bit 3 Position feedback value 2 0 = Non-inverted 1 = Inverted Bit 4 Position limit values 0 – disabled 1 – enabled Bit 5: Underflow / Overflow threshold (parameter 280, 281) 0 – disabled 1 – enabled Bits 15-6 (reserved) This parameter is available with the 8720MC SERCOS interface.			
Default: 0	**Length** 2 bytes	**SERCOS/DPI Min/Max** N/A	**SERCOS/DPI Scaling Resolution** N/A	**Units** N/A

	Name: IN_Posn_Value		**Data Display:** Decimal, nnn.nn	R/W
Parameter No. 57 **File:** Status/Fault **Group:** Setup	**Description:** Position window. When the difference between the accumulated position command value and the position feedback value is within the range of the position window, then the drive sets the status “in position” (parameter 336). When needed, the status 'in position' is assigned to a real-time status bit within the drive status and then transferred to the control unit (see parameter 305).			
Default: 10 counts	**Length** 2 bytes	**SCANport Minimum/ Maximum** Min. ≥ 0 Max. ≤ +30,000	**SCANport Scaling Resolution** 1 = 1 count/rev as determined by parameter 79, with parameter 79 set at 3,600 then each count will equal. 1 degree e.g. with parameter 79 set for 3600, 2 = .2 degree	**Units** parameter 79 counts/rev
Default:	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 76 Scaling factor: parameter 77 Scaling exponent: parameter 78 Rotational position resolution: parameter 79	**Units** parameter 76

	Name: Position Scaling		**Data Display:** Bit Pattern	R/W
Parameter No. 76 **File:** Control **Group:** Position	**Description:** Position data scaling type. A variety of scaling methods can be selected by means of the scaling type parameter. This parameter applies to the SERCOS and 32 bit SCANport (DPI) configurations. By default the analog version uses rotational and parameter scaling. For any analog application using positioning, as with spindle orient, bit 7, Processing format, should be set to "modulo". Resolution is determined by parameter 79. **Enumerated Bit Pattern:** Structure of position data scaling type: Bits 2–0: Scaling method 000 – no scaling 001 – linear scaling 010 – rotational scaling Bit 3: 0 – preferred scaling 1 – parameter scaling Bit 4: Units for linear scaling or Bit 4: Units for rotational scaling 0 – meters (m) 0 – degrees **1 – inches (in)** 1 – (reserved) Bit 5: (reserved) Bit 6: Data reference 0 – at the motor shaft 1 – at the load Bit 7: Processing format 0 – absolute format 1 – modulo format (see parameter 103) (all other bits are reserved) This parameter is available with the 8720MC SERCOS interface.			
Default: x00x01010	**Length** 2 bytes	**SERCOS/DPI Min/Max** N/A	**SERCOS/DPI Scaling Resolution** N/A	**Units** N/A

	Name: Posn_Scal_Factor		**Data Display:** Integer	R/W
Parameter No. 77 **File:** Control **Group:** Position	**Description:** Linear position data scaling factor. This parameter defines the scaling factor for all linear position data in a drive. Parameter 77 applies to the SERCOS and 32 bit SCANport (DPI) configurations when preferred scaling is not used. Parameter 79, not 77, is used for analog configurations. This parameter is available with the 8720MC SERCOS interface.			
Default: 1	**Length** 2 bytes	**SERCOS/DPI Min/Max** Min.≥1 Max. ≤ $+2^{16} - 1$	**SERCOS/DPI Scaling Resolution** Structure of the scaling factor: Bits 15-0: factor	**Units** N/A

	Name: Posn_Scale_Expon		**Data Display**: Signed Integer	R/W
Parameter No. 78 **File:** Control **Group:** Position	**Description:** Linear position data scaling exponent. This parameter defines the scaling exponent for all linear position data in a SERCOS configured drive. Parameter 78 applies to the SERCOS and 32 bit SCANport (DPI) configurations when preferred scaling is not used. Parameter 79, not 78, is used for analog configurations. This parameter is available with the 8720MC SERCOS interface.			
Default: Preferred 10^{-4} degree 10^{-6} inch	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ -2^{15} Max. $+2^{15}- 1$	**Scaling Resolution** Structure of the scaling exponent: Bit 15: Sign of the exponent 0 – positive 1 – negative Bits 14–0: Exponent	**Units** N/A

	Name: Rot_Posn_Resolut		**Data Display:** Integer	R/W
Parameter No. 79 **File:** Control **Group:** Position	**Description:** Rotational position resolution. This parameter defines the rotational position resolution for all position data in a drive when rotational scaling and parameter scaling are selected in parameter 76. With the analog configuration the default scaling is rotational and parameter scaling therefore parameter 79 is required to determine the position resolution for orient. Parameter 79 is entered as an integer value representing the number of position counts per revolution of the motor.			
Default: 3600 counts or .1 deg	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 1 Max. ≤ +65535	**Scaling Resolution** 1 = 1 drive feedback count 360/parameter 79 = rotary position increment in deg.	**Units** counts/rev.

	Name: Torque_Command		**Data Display:** Decimal	R/W
Parameter No. 80 **File:** Control **Group:** Torque	**Description:** Torque command value. In the SERCOS configuration, during the torque control operation mode of the drive, torque command values are transferred from the control unit to the drive via parameter 80.			
Default: 0.0	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ -1000.0 Max. ≤ +1000.0	**SCANport Scaling Resolution** 1=.1%	**Units** %
Default: 0	**Length** 2 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{15} Max. ≤ $+2^{15} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 86 Scaling factor: parameter 93 Scaling exponent: parameter 94	**Units** parameter 86

	Name: Torque_Offset		**Data Display:** Signed Decimal	R/W
Parameter No. 81 **File:** Control **Group:** Torque	**Description:** This is an additional function for torque control in the drive. The additive torque command value is added to the torque command value (parameter 80) in the drive.			
Default: 0.0	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ -1000.0 Max. ≤ +1000.0	**SCANport Scaling Resolution** 1=.1%	**Units** %
Default: 0.0	**Length** 2 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{15} Max. ≤ $+2^{15} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 86 Scaling factor: parameter 93 Scaling exponent: parameter 94	**Units** parameter 86

	Name: +Torque_Limit_0		**Data Display:** Decimal	R/W
Parameter No. 82 **File:** Servo Loop **Group:** 0	**Description:** The positive torque limit value limits the maximum torque in the positive direction. If the torque limit value is exceeded, the drive sets the status '$T \geq T_{limit}$' in C3D (parameter 13). There are 8 sets of +Torque Limit and - Torque limit parameters. +Torque_Limit_0 applies to group zero.			
Default: 400.0	**Length** 2 bytes	**SCANport Minimum/ Maximum** Min. ≥ 0 Max. ≤ +1000.0	**SCANport Scaling Resolution** 1=.1%	**Units** %
Default: 400.0	**Length** 2 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ $+2^{15} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 86 Scaling factor: parameter 93 Scaling exponent: parameter 94	**Units** parameter 86

	Name: -Torque_Limit_0		**Data Display:** Decimal	R/W
Parameter No. 83 **File:** Servo Loop **Group:** 0	**Description:** The negative torque limit value limits the maximum torque in the negative direction. If the torque limit value is exceeded, the drive sets the status '$T \geq T_{limit}$' in C3D (parameter 13). There are 8 sets of +Torque Limit and - Torque limit parameters			
Default: -400.0	**Length** 2 bytes	**SCANport Minimum/ Maximum** Min. ≥ -1000.0 Max. ≤ 0	**SCANport Scaling Resolution** 1=.1%	**Units** %
Default: -400.0	**Length** 2 bytes	**SERCOS/DPI Minimum/Maximum** Min. ≥ -2^{15} Max. ≤ 0	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 86 Scaling factor: parameter 93 Scaling exponent: parameter 94	**Units**

	Name: Torque_Fback		**Data Display:** Decimal	R, Link
Parameter No. 84 **File:** Control **Group:** Torque	**Description:** The torque feedback value can be is transferred from the drive to the control unit via SERCOS.			
Default: 0.0	**Length** 2 bytes	**SCANport Minimum/ Maximum** Min. ≥ -1000.0 Max. ≤ +1000.0	**SCANport Scaling Resolution** 1=.1%	**Units** %
Default: 0	**Length** 2 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{15} Max. ≤ $+2^{15} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 86 Scaling factor: parameter 93 Scaling exponent: parameter 94	**Units** parameter 86

	Name: Torque_Polarity		**Data Display:** Bit Pattern	R/W
Parameter No. 85 **File:** Control **Group:** Torque	**Description:** Torque polarity parameter. This parameter is used to switch polarities of reported torque data for specific applications. Polarities are not switched internally but externally (on the input and output) of a closed loop system. The motor shaft turns clockwise when there is a positive torque command difference and no inversion. **Enumerated Bit Pattern:** Structure of torque polarity parameter: Bit 0 – Torque command value 0 = non-inverted 1 = inverted Bit 1 – Additive torque command value 0 = non-inverted 1 = inverted Bit 2 – Torque feedback value 0 = non-inverted 1 = inverted Bits 15-3 (reserved) This parameter is available with the 8720MC SERCOS interface.			
Default: x000	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Torq_Scale_Type		**Data Display:** Bit Pattern	R/W
Parameter No. 86 **File:** Control **Group:** Torque	**Description:** Torque/force data scaling type. In the SERCOS configuration a variety of scaling methods can be selected by means of this scaling type parameter. In the analog configuration percent scaling of motor torque is the only available choice. **Enumerated Bit Pattern:** Structure of torque/force data scaling type: Bits 2–0: Scaling method 000 – percentage scaling 001 – linear scaling (force) 010 – rotational scaling (torque) Bit 3: 0 – preferred scaling 1 – parameter scaling Bit 4: Units for force or Bit 4: Units for torque 0 – newton (N) 0 – newton metre (Nm) **1 – pound force (lbf**) **1 – inch pound force (in lbf)** Bit 5: (reserved) Bit 6: Data reference 0 – at the motor shaft 1 – at the load (all other bits are reserved) This parameter is available with the 8720MC SERCOS interface.			
Default: x000	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: ±Vel_Limit		**Data Display:** Signed Decimal	R/W
Parameter No. 91 **File:** Control **Group:** Velocity	**Description:** Sets the velocity limit symmetrically in both directions. When in velocity mode, if the command velocity exceeds this value, bit 5 in C3D (parameter 13) is set.			
Default: +32,767	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ +32,767	**SCANport Scaling Resolution** 1 = 1RPM	**Units** RPM
Default: $+2^{31} - 1$	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 44 Scaling factor: parameter 45 Scaling exponent: parameter 46	**Units** parameter 44

	Name: ±Torque_Limit		**Data Display:** Signed Decimal	R/W
Parameter No. 92 **File:** Control **Group:** Torque	**Description:** Sets the torque limit symmetrically in both directions. When the actual torque exceeds this value, bit 4 in C3D (parameter 13) is set.			
Default: 0.0	**Length** 2 bytes	**SCANport Min/Max** Min. 0.0 Max. ≤ +1000.0	**SCANport Scaling Resolution** 1=.1%	**Units** %
Default: 0	**Length** 2 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{15} Max. ≤ $+2^{15} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 86 Scaling factor: parameter 93 Scaling exponent: parameter 94	**Units** parameter 86

	Name: Torq_Scal_Factor		**Data Display:** Integer	R/W
Parameter No. 93 **File:** Control **Group:** Torque	**Description:** Torque/force data scaling factor. In the SERCOS configuration this parameter defines the scaling factor for all torque/force data in a drive. This parameter is only used when the preferred scaling is not selected in parameter 86. In the analog configuration the scale factor is always 1. This parameter is available with the 8720MC SERCOS interface.			
Default: 1	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 1 Max. ≤ $+2^{16} - 1$	**Scaling Resolution** Structure of the torque/force data scaling factor: Bits 15-0: factor	**Units** scaler

	Name: Torq_Scale_Expon		**Data Display:** Integer	R/W
Parameter No. 94 **File:** Control **Group:** Torque	**Description:** Torque/force data scaling exponent. In the SERCOS configuration his parameter defines the scaling exponent for all torque/force data in a drive. This parameter is only used when the preferred scaling is not selected in parameter 86. In the analog configuration the scale exponent is always 10-1. This parameter is available with the 8720MC SERCOS interface.			
Default: 10-1	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ -2^{15} Max. ≤ $+2^{15} - 1$	**Scaling Resolution** Structure of the torque/force data scaling exponent: Bit 15: Sign of the exponent 0 – positive 1 – negative Bits 14-0: Exponent	**Units** scaler

	Name: Diagnostic_Msg		**Data Display:** ASCII Characters	R
Parameter No. 95 **File:** Status/Faults **Group:** Errors	**Description:** Any drive-specific message concerning the operation of the drive can be stored here, and the master can read it at any time.			
Default: N/A	**Length** Variable Characters	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Drive_Err_Reset		**Data Display:** Bit Pattern	R
Parameter No. 99 **File:** Status/Faults **Group:** Errors	**Description:** Reset class 1 diagnostic. In the SERCOS configuration when this procedure command is received by the drive via the service channel and no error exists in parameter 11, "Class 1 Diagnostics" (C1D) or parameter 129, "A-B Fault", the manufacturer's C1D, the drive shut-down error bit in the SERCOS drive status word (bit 13), will be reset by the drive. This essentially means that any shut-down errors detected by the drive and subsequently removed will be reset by the drive. (see parameter 11, and parameter 129). In the analog configuration this function is provided by the Drive Error Reset reset input. **Enumerated Bit Pattern:** Structure of reset class 1 diagnostic Structure of procedure command acknowledgment			
Default: N/A	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Vel_Prop_Gain_0		**Data Display:** Integer	R/W
Parameter No. 100 **File:** Servo Loop **Group:** group 0	**Description:** Velocity loop proportional gain. This is one of the parameters included in the 8 sets of servo loop parameters. Increasing this parameter produces faster velocity loop dynamic response with higher risk of instability. It will also reduce the dynamic velocity error. Decreasing this parameter will soften the dynamic response, increase the dynamic velocity error and reduce the velocity loop instability. This parameter may be auto tuned. See parameter 541			
Default: 600	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +30000	**Scaling Resolution** 1 = 1/sec	**Units** 1/sec

	Name: Vel_Integ_Time_0		**Data Display:** Decimal	R/W
Parameter No. 101 **File:** Servo Loop **Group:** group 0	**Description:** Velocity loop integral action time. This is one of the parameters included in the 8 sets of servo loop parameters. Decreasing this value will increase the dynamic response in the velocity loop and reduce the steady state velocity error. This value will be modified as a result of auto tuning.			
Default: 240	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +6553.5	**Scaling Resolution** 1 = .1 msec	**Units** msec

	Name: Modulo_Value		**Data Display:** Integer	R/W
Parameter No. 103 **File:** Control **Group:** Position	**Description:** Modulo value. In the SERCOS configuration if the modulo format is selected in the position scaling parameter (parameter 76), the modulo value defines the range that the drive & control must implement. This value determines the roll over point of a modulo axis. In the analog configuration the position data scaling type is always rotary axis. For example, if a 360 degree roll over point is desired, 3600 must be entered into parameter 103, assuming parameter 79 is set up for a resolution of 3600 counts per revolution. In this configuration the motor will move from o to 359.9 and roll over to zero in one motor revolution when rotating in the positive clockwise direction and viewing from the shaft end of the motor. As another example a 7200 count modulo rotary axis can be set up by entering 7200 in parameter 103 and 7200 in parameter 79. In this case the position feedback display will rollover after 7200 feedback counts of the motor. As yet another example, a 30,000 count modulo rotary axis can be set up by entering 30,000 in parameter 103 and 30,000 in parameter 79. In this case the position feedback will accumulate from 0 to 29999 and rollover back to 0 after 1 revolution of the motor and the resolution will be one in 30,000. It is always a good practice for applications using orient to set the value of parameter 103 to the same value as parameter 79, "Rotary Position Resolution". This assures that an orient from stand still will take one revolution.			
Default: 3600 counts	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ +1 Max. ≤ +65535	**Scaling Resolution** 1 = 1 count as determined by parameter 79	**Units** param 79 in counts
Default:	**Length** 4 bytes	**SERCOS/DPI Min/Max** Minimum Input: ≥ 1 Maximum Input: ≤ 2^{31}-1	**SERCOS/DPI Scaling Resolution** Scaling type parameter 76 Scaling factor parameter 77 Scaling exponent parameter 78 Rotational position resolution parameter 79 Preferred scaling: –rotational = 1x10-4 degrees –linear = 1x10-7 m or 1x10-6 in	**Units** parameter 76

	Name: Pos_Loop_Gain_0		**Data Display:** Decimal	R/W
Parameter No. 104 **File:** Servo Loop **Group:** group 0	**Description:** Position loop *KV* -factor. The *KV*-factor determines the gain of the position loop regulator throughout the entire velocity range. Increasing this parameter produces faster position loop dynamic response with higher risk of instability. It will also reduce the dynamic position error. Decreasing this parameter will soften the dynamic response, increase the dynamic position error and reduce the position loop instability.			
Default: 60	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ 30,000	**Scaling Resolution** 1 = .01 m/min/mm or .01 in/min/.001 in	**Units** (m/min)/ mm

	Name: Pos_Int_Time_0		**Data Display:** Decimal	R/W
Parameter No. 105 **File:** Servo Loop: **Group:** group 0	**Description:** Position loop integral action time. Increasing this parameter will increase the integration time and thus reduce the dynamic response. Decreasing this parameter will decrease the integration time and thus increase the dynamic response.			
Default: 6553.5	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ .1 Max. ≤ 6553.5	**Scaling Resolution** 1 = .1 msec	**Units** msec

	Name: Cur_Bandwidth		**Data Display:** unsigned Integer	R
Parameter No. 106 **File:** Control: **Group:** Torque	**Description:** This attribute defines the tuned bandwidth setting so that the current regulator's K_P and K_I can be derived.			
Default: 2000	**Length** 2 bytes	**Minimum/Maximum** Min. $\geq .1$ Max. ≤ 6553.5	**Scaling Resolution** 1 = 1 rad/s	**Units** rad/s

	Name: Mtr_Peak_Current		**Data Display:** Decimal	R/W
Parameter No. 109 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** If the motor peak current is less than the capacity of the drive amplifier, the amplifier is automatically limited to the level of the motor peak current. Parameter 109 motor peak RMS current at rated (base) speed. For a standard 8720SM motor with Stegmann feedback this value is read from the motor encoder memory.			
Default: From motor encoder	**Length** 2 bytes	**Analog Minimum/Maximum** Min. ≥ 0 Max. ≤ 1000.0	**Analog Scaling Resolution** 1 = .1 amps	**Units** amps
Default: From motor encoder	**Length** 4 bytes	**SERCOS Min/Max** Min. ≥ 0 Max. $\leq 2^{32} - 1$	**SERCOS Scaling Resolution** 1 = .001 amps	Units amps

	Name: Drive_Peak_Amps		**Data Display:** Decimal	R
Parameter No. 110 **File:** Motor/Drive/ Fdbk **Group:** Drive Data	**Description:** The amplifier peak current is limited by the drive hardware, which means that the current for the maximum attainable torque limit value is fixed as well. This parameter is determined by the drive and can't be changed.			
Default: From drive amplifier	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ 3000.0	**SCANport Scaling Resolution** 1 = .1 amps	**Units** amps
Default: From drive amplifier	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. $\leq 2^{32} - 1$	**SERCOS/DPI Scaling Resolution** 1 = .001 amps	**Units** amps

	Name: Mtr_Cont_Current		**Data Display:** Decimal	R/W
Parameter No. 111 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** The motor continuous stall current is the current at which the motor produces the continuous standstill torque according to the motor spec sheet. For all motors except for asynchronous motors, this parameter is used as a reference for all torque data and for determining motor-related current values. This parameter is ignored for induction motors therefore it does not apply to 8720SM motors.			
Default: null	**Length** 4 bytes	**Minimum/Maximum** Min. ≥ 0 Max.≤ 1000.0	**SERCOS Scaling Resolution** 1 = .1 amps	**Units** amps

	Name: Drive_Cont_Amps		**Data Display:** Decimal	R/W
Parameter No. 112 **File:** Motor/Drive/ Fdbk **Group:** Drive Data	**Description:** The amplifier rated current is equal to the allowable continuous current of the drive unit. This parameter is determined by the drive and can't be changed.			
Default: From drive amplifier	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ 1000.0	**SCANport Scaling Resolution** 1 = .1 amps	**Units** amps
Default: From drive amplifier	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max.$\leq 2^{32} - 1$	**SERCOS/DPI Scaling Resolution** 1 = .001 amps	**Units** amps

	Name: Max_Mtr_Speed		**Data Display:** Integer	R/W
Parameter No. 113 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** The maximum motor speed is the maximum rated operating speed of the motor. With the standard 8720SM motors this value is stored in the motor encoder. If this value is exceeded by 20% an overspeed fault will disable the drive. Parameter 129, "A-B Faults", bit 15 will be set true.			
Default: From motor encoder	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. $\leq 30,000$	**SCANport Scaling Resolution** 1 = 1 rpm	**Units** rpm
Default: From motor encoder	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max.$\leq 2^{32} - 1$	**SERCOS/DPI Scaling Resolution** 10^{-4}	**Units** min^{-1}

	Name: Mtr_Torq_OverId		**Data Display:** Signed Decimal	R/W
Parameter No. 114 **File:** Linear List **Group:** Linear List	**Description:** When the load limit is exceeded for a period of time, the overload shut-down bit 0 of C1D (parameter 11) is set.			
Default: 100.0	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ 1,000	**SCANport Scaling Resolution** 1 = 0.1%	**Units** %
Default: 100.0	**Length** 2 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{15} Max. ≤ $+2^{15} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 86 Scaling factor: parameter 93 Scaling exponent: parameter 94	**Units** Parameter 86

	Name: Motor_Fdbk_Resol		**Data Type:** Integer	R/W
Parameter No. 116 **File:** Motor/Drive/ Fdbk **Group:** Motor Feedback	**Description:** For rotary feedback the resolution parameter of feedback 1 (motor feedback) defines the number of cycles per revolution of the motor. For a sinusoidal device this represents the number of periods per revolution. For a TTL devices this represents the number of lines per motor revolution. For a linear feedback the grid constant is entered. For the standard Stegmann motor feedback devices this will be self identified at 1024 counts.			
Default: From motor encoder	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ 32,000	**SCANport Scaling Resolution** 1 = 1 cycle/motor revolution	**Units** fdbk cycles
Default: From motor encoder	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max.≤ $2^{32} - 1$	**SERCOS/DPI Scaling Resolution** 1 [cycles/motor revolution]	**Units** fdbk cycles

	Name: Gear_In_Revs_0		**Data Display:** Integer	R/W
Parameter No. 121 **File:** Servo Loop **Group:** Group 0	**Description:** Input revolutions of load gear set as viewed from the motor. Input revolutions must be entered as an integer value. This parameter applies to the SERCOS interface only.			
Analog Default: 1	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ +65535	**SCANport Scaling Resolution** 1 revolution of the input shaft	**Units** revs
Default: 1	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ $+2^{32} - 1$	**SERCOS/DPI Scaling Resolution** 1 [input revolution]	**Units** revs

	Name: Gear_Out_Revs_0		**Data Display:** Integer	R/W
Parameter No. 122 **File:** Servo Loop **Group:** Group 0	**Description:** Output revolutions of load gear set. Output revolutions must be entered as an integer value. For example: If the input makes 4 turns for each output revolution, a value of 4 is entered into parameter 121 and a value of 1 is entered into parameter 122. This parameter applies to the SERCOS interface only.			
Analog Default: 1	**Length** 2 bytes	**Analog Minimum/Maximum** Min. ≥ 0 Max. ≤ +65535	**Analog Scaling Resolution** 1 revolution of the output shaft	**Units** revs
Default: 1	**Length** 4 bytes	**SERCOS Min/Max** Min. ≥ 0 Max.≤ 2^{32} - 1	**SERCOS Scaling Resolution** 1 [output revolution]	**Units** revs

	Name: Zero_Spd_Window		**Data Display:** Integer	R/W
Parameter No. 124 **File:** Status/Faults **Group:** Setup	**Description:** The standstill window describes the amount of the deviation of the velocity from 0. If the velocity feedback value is within the standstill window the drive sets the status *n* feedback = 0 (parameter 331).			
Analog Default: 10	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ +30,000	**SCANport Scaling Resolution** 1 = 1 rpm	**Units** rpm
Default:	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max.≤ 2^{32} - 1	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 44 Scaling factor: parameter 45 Scaling exponent: parameter 46	**Units** parameter 44

	Name: Speed_Threshold		**Data Display:** Integer	R/W
Parameter No. 125 **File:** Status/Faults **Group:** Setup	**Description:** Velocity threshold (n_x). If the velocity feedback value falls below the velocity threshold *n*x, the drive sets the status '*n*feedback < *n*x ' (parameter 332) in C3D.			
Analog Default: 1000	**Length** 2 bytes	**Analog Minimum/Maximum** Min. ≥ 0 Max. ≤ +30,000	**Analog Scaling Resolution** 1 = 1 rpm	**Units** rpm
Default: 1	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max.≤ 2^{32} - 1	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 44 Scaling factor: parameter 45 Scaling exponent: parameter 46	**Units** parameter 44

	Name: Torque_Threshold		**Data Display:** Decimal	R/W
Parameter No. 126 **File:** Status/Faults **Group:** Setup	**Description:** Torque threshold (*T*x). If the torque feedback value exceeds the torque threshold *T* x, the drive sets the status '*T* ≥ *T*x' in C3D (parameter 333).			
Analog Default: 100.0	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ +1000.0	**SCANport Scaling Resolution** 1 = .1 %	**Units** % Rated motor torq
Default: 100.0	**Length** 2 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max.≤ 2^{15}- 1	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 86 Scaling factor: parameter 93 Scaling exponent: parameter 94	**Units** parameter 86

	Name: A-B Fault		**Data Display:** Bit Pattern	R
Parameter No. 129 **File:** Status/Faults **Group:** Errors	**Description:** Manufacturer class 1 diagnostic. The 8720MC defines additional shut-down errors in manufacturer class 1 diagnostic (C1D). If an error is set in the manufacturer class 1 diagnostic, the manufacturer-specific error bit in class 1 diagnostic (see parameter 11) is set as well. The drive cancels the manufacturer-specific error and resets to '0' only if the error in manufacturer class 1 diagnostic has been eliminated and on receiving the command 'reset class 1 diagnostic' (see parameter 99) via SERCOS or the drive error reset input. **Enumerated faults:** 0: positive software overtravel fault 1: negative software overtravel fault 2: + hardware overtravel 3: - hardware overtravel 4: motor feedback 1 lost signal 5: motor feedback 1 noise fault 6: aux feedback 2 lost signal 7: aux feedback 2 noise fault 8: reserved 9: reserved 10: reserved 11: reserved 12: reserved 13: Power structure ground short 14: Drive Hardware Fault 15: Overspeed = 120% of parameter 113, “Max Motor Speed”, or 150% of the velocity limits set for the active servo loop parameter set, parameters 38 and 39 for servo loop group 0, etc.			
Default: N/A	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: +Accel_Limit_0		**Data Display:** Integer	R/W
Parameter No. 136 **File:** Servo Loop **Group:** Group 0	**Description:** Acceleration Limit Parameter 136 contains the desired acceleration limit for parameter set zero in radians per sec^2. This parameter applies to the command reference regardless of it's source e. g. Analog input, SCANport or HIM. Reducing the acceleration rate will prevent shocking the mechanical system while increasing the speed.			
Default: 65535	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ 65535	**SCANport Scaling Resolution** 1 = 1rad/sec2	**Units** rad/sec^2
Default: 65535	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 160 Scaling factor: parameter 161 Scaling exponent: parameter 162	**Units** parameter 160

	Name: -Accel_Limit_0		**Data Display:** Signed Integer	R/W
Parameter No. 137 **File:** Servo Loop **Group:** Group 0	**Description:** Deceleration Limit Parameter 137 contains the desired deceleration limit for parameter set zero in radians per sec2. This parameter applies to the command reference regardless of it's source e. g. Analog Input, SCANport or HIM. Reducing the deceleration rate may be required to prevent bus over voltage when neither a regenerative converter or a brake chopper are required. Also reducing the deceleration rate may be required to prevent overcurrent faults caused by fast deceleration at high speeds.			
Default: -32768	**Length** 2 bytes	**SCANport Min/Max** Min. ≤ 0 Max. ≥ -32768	**SCANport Scaling Resolution** 1 = 1rad/sec2	**Units** rad/sec^2
Default: -32768	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≤ 0 Max. ≥ -2^{31}	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 160 Scaling factor: parameter 161 Scaling exponent: parameter 162	**Units** parameter 160

	Name: ±Accel_Limit		**Data Display:** unsigned Decimal	R/W
Parameter No. 138 **File:** Control **Group:** Acceleration	**Description:** This parameter sets the acceleration and deceleration limits for the drive. This is only in effect when operating in velocity mode.			
Default: 65535	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ 65535	**SCANport Scaling Resolution** 1 = 1rad/sec2	**Units** rad/sec^2
Default: 1,000,000	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 160 Scaling factor: parameter 161 Scaling exponent: parameter 162	**Units** parameter 160

	Name: Motor_Data		**Data Display:** ASCII Representation of Enumeration	R
Parameter No. 141 **File:** Motor/Drive/ Fdbk **Group:** Drive Data, Motor Data	**Description:** Motor Catalog Number Parameter 141 contains the Allen-Bradley catalog number of the motor. This is a 64 character string which contains multiple display elements. The data which can be displayed is as follows: * Motor catalog number * Motor serial number * Date motor manufactured * Manufacturing lot * Motor ID Number			
Default: From motor encoder mem.	**Length** 64 character string	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Mtr_Marker_Ofset		**Display format:** Signed Integer	R/W
Parameter No. 150 **File:** Procedure **Group:** Orient, Homing	**Description:** Reference offset 1 is used to offset the motor encoder zero point. This parameter describes the distance between the incremental encoder zero reference marker pulse or the single turn absolute encoder zero reference point and the desired mechanical zero reference of the axis motor or spindle motor. "Position feedback 1", parameter 51 - the motor mounted feedback rotary position feedback value, can be modified with this offset. Parameter 150 provides an offset that compensates for rotary mis-alignment between the encoder zero point and the desired mechanical zero of the spindle or axis. This parameter is used to configure the axis or spindle motor zero during startup. A - value produces a clockwise offset angle when facing the shaft end of the motor and a + value produces a counter-clockwise offset. It should be noted that this is the opposite sense to the position and orient angle signs. To prevent reversals during orient use a - signed offset for cw orient and a + signed offset for ccw orient.			
Analog Default: 0.00	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ -32768, Max. ≤ +32767	**SCANport Scaling Resolution** 1 = 1 count as determined by parameter 79 e.g.: with parameter 79 at 3600 cnts/rev, 1 count = .1 degree, Practical Range = -360.0 to + 360.0 degrees	**Units** parameter 79 Counts/rev
Default: 0.0	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{31} Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 76 Scaling factor: parameter 77 Scaling exponent: parameter 78 Rotational position resolution: parameter 79	**Units** parameter 76

	Name: Aux_Marker_Ofset		**Display format:** Signed Integer	R/W
Parameter No. 151 **File:** Procedure **Group:** orient, homing	**Description:** Reference offset 2 is used to offset the axis or spindle mounted encoder zero point. This parameter describes the distance between the incremental encoder zero reference marker pulse or the single turn absolute encoder zero reference point and the desired mechanical zero reference of the axis or spindle. "Position feedback 2", parameter 53 - the axis or spindle mounted feedback device position feedback value can be modified with this offset. Parameter 151 provides an offset that compensates for mis-alignment between the spindle or axis mounted encoder zero point and the desired mechanical zero of the spindle or axis. This parameter is used to configure the axis or spindle zero during startup. Parameter 151 is used in the SERCOS interface only. The secondary auxiliary feedback port is not available in the analog configuration. A + value produces a clockwise offset angle when facing the shaft end of the motor and a - value produces a counter-clockwise offset.			
Default: 0.0	**Length** 4 bytes	**SERCOS Min/Max** Min. ≥ -2^{31} Max. ≤ $+2^{31} - 1$	**SERCOS Scaling Resolution** Scaling type: parameter 76 Scaling factor: parameter 77 Scaling exponent: parameter 78 Rotational position resolution: parameter 79	**Units** parameter 76

<table>
<tr><td></td><td colspan="2">Name: Spin_Orient_Req</td><td>Data Display: Bit Pattern</td><td>R/W</td></tr>
<tr><td>Parameter No.
152
File:
Procedure
Group:
Orient</td><td colspan="4">Description: Spindle Orient Procedure Command. This procedure command automatically switches the drive to internal position loop control, below the spindle orient speed (parameter 222), and initiates an orient to the defined orient position. In a SERCOS drive when bits 0 and 1 of parameter 152 are set true an orient is requested. Orient is also requested when input 2 is set true at the digital interface. While the orient procedure is active, all changes to external velocity, position or torque command values are ignored.
If the drive is stopped an orient procedure command initiates a clockwise, counter-clockwise or shortest path orient depending on the spindle Orient Options, Parameter 154 (parameter 154). The drive positions the spindle to the programmed orient angle, parameter 153 (parameter 153), using the spindle orient speed specified in parameter 222 and the position acceleration rate defined in parameter 260. The actual target position is derived from the motor or spindle mounted encoder as determined by it's zero reference marker in the case of an incremental encoder or it's absolute zero position in the case of a single turn absolute encoder. For motor mounted feedback the target position is calculated by the 8720MC as encoder zero - parameter 150 + parameter 153. For spindle mounted feedback in the SERCOS configuration the final position is calculated by the 8720MC as encoder zero ± parameter 151 ± parameter 153. When the drive interpolator reaches the selected orient position, the drive sets the status "Orient Complete", parameter 583. The status "In Position" (parameter 336) is true as long as the drive is in the orient position and the spindle position is within the in- position band established by parameter 57, "IN_Pos_Value".
If the drive is rotating at a speed higher than the orient speed when the orient request is received the drive will decelerate at the acceleration rate defined in parameter 260 to the orient speed defined in parameter 222. If parameter 154 calls for clockwise orient and the drive is already rotating clockwise and the drive has decelerated to orient speed, the drive will place itself in positioning mode and decelerate to the calculated target orient angle moving in the clockwise direction. If parameter 154 calls for counter-clockwise orient and the drive is already rotating clockwise and the drive has decelerated to orient speed the drive will place itself in positioning mode and decelerate to a stop. It will then move to the calculated target orient angle moving in the counter-clockwise direction. If parameter 154 calls for shortest path orient and the drive is already rotating clockwise or counter-clockwise once the drive decelerates to orient speed the drive will place itself in positioning mode and decelerate to the calculated target orient angle moving in the same direction as the spindle was rotating when the orient request occurred. For motor mounted feedback the target position is calculated by the 8720MC as encoder zero - parameter 150 + parameter 153. For spindle mounted feedback in the SERCOS configuration the final position is calculated by the 8720MC as encoder zero ± parameter 151 ± parameter 153. Since it is being subtracted a - value in parameter 151 produces a clockwise offset angle when facing the shaft end of the motor or the drive end of the spindle and a + value in parameter 151 produces a counter-clockwise offset.
The drive will remain oriented in servo position lock as long as the spindle orient request input is enabled. When the orient request is removed the drive switches over to the mode of operation called for in the mode parameter of the active parameter set. The drive will immediately follow the auto reference if auto mode is active.</td></tr>
<tr><td>Default:
null</td><td>Length
2 bytes</td><td>Minimum/Maximum
N/A</td><td>Scaling Resolution
N/A</td><td>Units
N/A</td></tr>
</table>

	Name: Orient_Angle		**Data Display:** Integer	R/W
Parameter No. 153 **File:** Procedure **Group:** Orient	**Description:** Spindle angle position. This parameter is the absolute spindle position angle relative to the zero position reference point as modified by the motor marker offset (parameter 150) or the spindle mounted encoder marker offset (parameter 151, SERCOS and SCANport configurations only). Parameter 153 can be provided by a SCANport peripheral port terminal or a SCANport gateway communication module via explicit message or the SERCOS link. It is enabled only in connection with the spindle orient request command (see parameter 152). For a motor mounted feedback source a + sign produces a clockwise orient angle when facing the shaft end of the motor. For a spindle mounted feedback source a + sign produces a clockwise orient angle when viewed from the face of the spindle. A value greater than 1 revolution in resolution counts produces a multiple turn orient from a stand still position. Also for orients the sign of "orient_angle" should agree with the orient direction established by parameter 154, if clockwise or counter- clockwise is selected. For example: with parameter 79 and parameter 103 both set at 3600 counts and parameter 153 "orient angle" set to 0 counts, a stand still cw orient will take 1 revolution. If parameter 153 is changed to 3600 counts a stand still cw orient will take 2 revolutions. If parameter 153 is changed to 7200 counts a stand still cw orient will take 3 revolutions, etc. If ccw orient is desired parameter 153 should have a negative value.,			
Default: 0.00	**Length** 2 bytes	**SCANport Minimum/ Maximum** Min. ≥ -32768 Max. ≤ +32767	**SCANport Scaling Resolution** 1 = 1 count as determined by parameter 79, with paramter 79 set at 3600 cnts/rev, 1 increment = .1 degree, Range = -3276.8 to +3276.7 degrees	**Units** param 79 counts
Default: 0.0	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{31} Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 76 Scaling factor: parameter 77 Scaling exponent: parameter 78 Rotational position resolution: parameter 79)	**Units** parameter 76

	Name: Orient_Options		**Data Display:** Bit Pattern	R/W
Parameter No. 154 **File:** Procedure **Group:** Orient	**Description:** Spindle Orient Configuration Parameter. When the velocity feedback value is equal to zero, as defined by the zero speed window (parameter 124) and the spindle orient request is active, the direction and source of feedback device for spindle orient is defined by this parameter. If the spindle velocity value is not equal to zero and the current turning direction does not match the configured orient direction (ccw or cw) the spindle will stop and return to target orient position in the selected orient direction. If shortest path is selected and the spindle is rotating when the orient request is received the spindle will orient in the direction of rotation. **Enumerated Bit Pattern:** Structure of spindle position parameter: Bit 0-1: 00 – rotate clockwise 01 – rotate counter-clockwise 10 – take shortest path Bit 2: 0 - spindle angle position (parameter 153) - SERCOS interface Bit 3: 0 – motor feedback - SERCOS interface 1 – spindle feedback For orients greater than 360 degrees the clockwise or counter-clockwise orient direction must be selected. Also the sign of the orient angle should agree with the orient direction. That is if a clockwise orient greater than 360 degrees is required the orient angle, parameter 153, should be expressed as a positive angle. If a counter-clockwise orient greater than 360 degrees is required the orient angle should be expressed as a negative angle.			
Default: 0000	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: At_Spd_Window		**Data Display:** Integer	R/W
Parameter No. 157 **File:** Status/Faults **Group:** Setup	**Description:** The velocity window relates the current velocity to the velocity command value (parameter 36). If the current velocity feedback value falls within the calculated velocity window, the drive sets the status "*n* feedback = *n* command" (parameter 330). A value of zero disables the occurrence of the At_Prog_Speed event, parameter 330			
Default: 10	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ +30,000	**SCANport Scaling Resolution** 1 RPM, range - 0 to +30,000 RPM	**Units** RPM
Default: 5	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 44 Scaling factor: parameter 45 Scaling exponent: parameter 46	**Units** parameter 44

	Name: Max_Foll_Error		**Data Display:** Integer	R/W
Parameter No. 159 **File:** Status/Faults **Group:** Setup	**Description:** Monitoring window. By means of the monitoring window, the maximum position deviation, as referenced to the active actual position value, can be defined for the position feedback value. When the position error value exceeds the maximum position window value, the drive sets an error for excessive position deviation in C1D (parameter 11).			
Default: 30,000	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ +65535	**SCANport Scaling Resolution** 360/parameter 79, default: with parameter 79 at 3600 cnts/rev, increment = .1 degree, Range = 0 to +3276.7 degrees	**Units** Param 79 counts/rev
Default: $+2^{31} - 1$	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥0 Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type parameter 76 Scaling factor parameter 77 Scaling exponent parameter 78 Rotational position resolution parameter 79	**Units** parameter 76

	Name: Acc_Scale_Type		**Data Display:** Bit Pattern	R/W
Parameter No. 160 **File:** Control **Group:** Acceleration	**Description:** Acceleration data scaling type. A variety of scaling methods can be selected by means of the acceleration data scaling type parameter. This parameter is used with SERCOS interface. For the analog configuration see parameter 260. **Enumerated Bit Pattern:** Structure of the acceleration data scaling type: Bits 2–0: Scaling method 000 – no scaling 001 – linear scaling 010 – rotational scaling Bit 3: 0 – preferred scaling 1 – parameter scaling Bit 4: Units for linear scaling 0 – meters (m) **1 – inches (in)** Bit 4: Units for rotational scaling 0 – radian (rad) 1 – (reserved) Bit 5: Time units 0 – seconds (s) 1 – (reserved) Bit 6: Data reference 0 – at the motor shaft 1 – at the load (all other bits are reserved)			
Default: Preferred	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Accel_Scaling		**Data Display:** Integer	R/W
Parameter No. 161 **File:** Control **Group:** Acceleration	**Description:** Acceleration data scaling factor. In the SERCOS configuration this parameter defines the scaling factor for all acceleration data in a drive.			
Default: preferred	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 1 Max. $\leq +2^{31} - 1$	**Scaling Resolution** Structure of the scaling factor: Bits 15-0: factor	**Units** scaler

	Name: Accel_Exponent		**Data Display:** Integer	R/W
Parameter No. 162 **File:** Control **Group:** Acceleration	**Description:** Acceleration data scaling exponent. This parameter defines the scaling exponent for all acceleration data in a drive.			
Default: preferred	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ -2^{15} Max. ≤ $+2^{15}-1$	**Scaling Resolution** Structure of the scaling exponent: Bit 15: Sign of the exponent 0 – positive 1 – negative Bits 14-0: Exponent	**Units** scaler

	Name: Abs_Distance_1		**Data Display:** Decimal	R/W
Parameter No. 177 **File:** Motor/Drive/ Fdbk **Group:** Motor Feedback	**Description:** Absolute distance 1. This parameter describes the distance between the machine zero point and the zero point of an absolute feedback system on the motor. This parameter is used with the SERCOS interface.			
Default: 0	**Length** 4 bytes	**SERCOS Min/Max** Min. ≥ -2^{31} Max. ≤ $+2^{31} - 1$	**SERCOS Scaling Resolution** Scaling type: parameter 76 Scaling factor: parameter 77 Scaling exponent: parameter 78 Rotational position resolution: parameter 79	**Units** parameter 76

	Name: Posn_Foll_Error		**Data Display: Integer**	R,Link
Parameter No. 189 **File:** Control **Group:** Position	**Description:** Following distance. The drive uses the operation data of this parameter to store the distance between position command value and the appropriate position feedback value 1/2. Calculation of the following distance: following distance = position command value – position feedback value 1/2			
Default: 0.00	**Length** 2 bytes	**SCANport Minimum/ Maximum** Min. ≥ -32768 Max. ≤ +32767	**SCANport Scaling Resolution** 1 = 1 count as determined by parameter 79, with paramter 79 set at 3600 cnts/rev, 1 increment = .1 degree, Range = -3276.8 to +3276.7 degrees	**Units** param 79 counts
Default: 0	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{31} Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 76 Scaling factor: parameter 77 Scaling exponent: parameter 78 Rotational position resolution: parameter 79	**Units** parameter 76

	Name: Mtr_Cont_Current		**Data Display:** Decimal	R/W
Parameter No. 196 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** Motor rated current. The motor rated current is the current at which the motor produces the rated torque according to the motor spec sheet. For all asynchronous motors, this parameter is used as a reference for all torque data and for determining motor related current values.			
Analog Default: Motor encoder	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ +1000.0	**SCANport Scaling Resolution** 1 = .1 amp	**Units** amp
Default: Motor encoder	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** 1 = .001 amp	**Units** amp

	Name: Drive_On _Delay		**Data Display:** Decimal	R/W
Parameter No. 206 **File:** Motor/Drive/ Fdbk **Group:** Brake	**Description:** Drive on delay time. When "drive on" and "drive enable" are set (bits 14 and 15 of the SERCOS master control word) torque is activated at once, but the drive follows the command values after this waiting time has elapsed. In the analog configuration this delay occurs after the drive enable input is energized. This allows the drive time to develop holding torque before energizing the release brake solenoid.			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +6,553.5	**Scaling Resolution** 1 = .1 msec	**Units** msec

	Name: Drive_Off _Delay		**Data Display:** Decimal	R/W
Parameter No. 207 **File:** Motor/Drive/ Fdbk **Group:** Brake	**Description:** Drive off delay time. After "drive off" (bit 15 of the SERCOS master control word) is reset and *n*feedback = 0 (parameter 124) is reached, the torque remains activated in the drive until this waiting time is elapsed. In the analog configuration this delay occurs after the zero speed output is energized. This allows the drive time to develop holding torque before de energizing the release brake solenoid.			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +6,553.5	**Scaling Resolution** 1 = .1 msec	**Units** msec

	Name: Switch_Param_Set		**Data Display:** Bit Pattern	R/W
Parameter No. 216 **File:** Procedure **Group:** Parameter Switch	**Description:** Switch parameter set procedure command. This procedure command allows the system to switch parameter sets. The drive switches to the parameter set which is programmed in the parameter set preselection (parameter 217). This parameter is used with the SERCOS interface. If this parameter is set true, "1", the active parameter set will be changed to the selected value in paramter 217.			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Select_Param_Set		**Data Display:** Binary	R/W
Parameter No. 217 **File:** Procedure **Group:** Parameter Switch	**Description:** Parameter set preselection. In the SERCOS configuration the desired parameter set of the drive is selected by means of the parameter set preselection. The switch parameter set procedure command (see parameter 216) is used to switch parameter sets. If the drive has no switchable parameter sets, it will only accept parameter set 0. Therefore, parameter set 0 must be available in every drive and will be activated during initialization. In the analog configuration the binary set code is provided to the drive via the digital input. Changing the digital input binary value will initiate switching of the parameter set. **Enumerated Bit Pattern:** Structure of parameter set preselection: Bit 2 – 0: 0 0 0 – parameter set 0 0 0 1 – parameter set 1 0 1 0 – parameter set 2 0 1 1 – parameter set 3 1 0 0 – parameter set 4 1 0 1 – parameter set 5 1 1 0 – parameter set 6 1 1 1 – parameter set 7 (all other bits are reserved) Bit 2 of parameter 217 is linked to Digital Input 5. In addition to being used to select the parameter set, if Digital Input 5 is true, +24V dc, the high winding will be selected for a dual wound motor and the "High Winding Enable" linkable variable (parameter 526) will be true. In the Spindle configuration this is linked to Relay Output 3 and this relay contact output can be used to close a the high winding motor contactor and open the low winding contactor. If Digital Input 5 is false, 0V dc, the Low winding will be selected for a dual wound motor and the "Low Winding Enable" linkable variable (parameter 527) will be true. In the Spindle configuration this is linked to Relay Output 4 and this relay contact output can be used to close a the low winding motor contactor and open the high winding contactor. Bits 1 and 0 of parameter 217 are also linked to Digital Inputs 7 and 9. In dual winding applications this interface allows for 4 sets of high winding servo parameters and 4 sets of low winding parameters. In single winding configurations all 8 sets of parameters are available and the high and low winding relay outputs can be linked to other 8720MC event links. This value can be set via DriveExplorer or the HIM as well.			
Default: 000	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ 7 binary	**Scaling Resolution** N/A	**Units** N/A

	Name: Min_Spindle_Spd		**Data Display:** Integer	R/W
Parameter No. 220 **File:** Status/Faults **Group:** Setup	**Description:** Minimum spindle speed. When the speed falls below minimum spindle speed, the state "Speed Below Minimum" (parameter 339) is created. This event can be linked to a digital output or SCANport status bit. It can also be assigned to a real time SERCOS status bit.			
Analog Default: 10,000	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ +30,000	**SCANport Scaling Resolution** 1 = 1 rpm	**Units** rpm
Default: 0	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min.≥ 0 Max.≤ 2^{31} - 1	**SERCOS/DPI Scaling Resolution** 10^{-4}	**Units** min^{-1}

	Name: Max_Spindle_Spd		**Data Display:** Integer	R/W
Parameter No. 221 **File:** Status/Faults **Group:** Setup	**Description:** Maximum spindle speed. When the speed moves above the maximum spindle speed, the state "Speed Above Maximum" (parameter 340) is created. This event can be linked to a digital output or SCANport status bit. It can also be assigned to a real time SERCOS status bit.			
Analog Default: 10,000	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ +30,000	**SCANport Scaling Resolution** 1 = 1 rpm	**Units** rpm
Default: 2^{31} - 1	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min.≥ 0 Max.≤ 2^{31} - 1	**SERCOS/DPI Scaling Resolution** 10^{-4}	**Units** min^{-1}

	Name: Spin_Orient_Spd		**Data Display:** Decimal	R/W
Parameter No. 222 **File:** Procedure **Group:** Orient	**Description:** Spindle positioning speed. When the orient spindle procedure command (see parameter 152) is received, the drive accelerates or decelerates to the spindle orient speed, depending upon the current speed. The spindle orient speed is the velocity at which the orient is executed.			
Default: 100	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ +30,000	**SCANport Scaling Resolution** 1 = 1 RPM	**Units** RPM
Default: 50.0	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min.≥ 0 Max.≤ 2^{31} - 1	**SERCOS/DPI Scaling Resolution** 10^{-4}	**Units** RPM

	Name: Actual_Param_Set		**Data Display:** Bit Pattern	R
Parameter No. 254 **File:** Procedure **Group:** Parameter Switch	**Description:** Actual parameter set. This parameter stores the current active parameter set in the drive. In the SERCOS configuration if a new parameter set is to be activated, it must first be preselected using parameter set preselection (parameter 217). Parameter set 0 must be active in every drive before and during initialization. In the analog version the actual parameter set can be linked to the SCANport output word. Structure of the actual parameter set: Bit 2 – 0: 0 0 0 – parameter set 0 active 0 0 1 – parameter set 1 active 0 1 0 – parameter set 2 active 0 1 1 – parameter set 3 active 1 0 0 – parameter set 4 active 1 0 1 – parameter set 5 active 1 1 0 – parameter set 6 active 1 1 1 – parameter set 7 active (all other bits are reserved)			
Default: 000	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ 7 binary	**Scaling Resolution** N/A	**Units** N/A

	Name: Target_Position		**Data Display:** Decimal	R/W
Parameter No. 258 **File:** Control **Group:** Position	**Description:** Target Position - The target position may be provided by the DPI master via SCANport "Data IN A2" or SERCOS. For example with the DPI configuration selected in parameter 501 and the resolution set to 3000 units in Parameter 79 and a modulo axis of 30,000 units as set by parameter 103 a target move of 15,000 units would take 5 motor revolutions CW at a speed determined by parameter 259 velocity and an acceleration and deceleration determined by parameter 260, assuming the position move started from 0. The primary operating mode, parameter 32, must be set to position control using motor feedback.			
Default: 0	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ -32768 Max. ≤ +32767	**SCANport Scaling Resolution** Resolution units as determined by parameter 79	**Units** parameter 79 counts/rev
SERCOS Default: 0	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{31} Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type parameter 76 Scaling factor parameter 77 Scaling exponent parameter 78 Rotational Position Resolution parameter 79	**Units** parameters 76, 77, 78

	Name: Posn_Velocity		**Data Display:** Decimal	R/W
Parameter No. 259 **File:** LInear list **Group:** LInear list	**Description:** Positioning Velocity. The "positioning velocity" is used in the "drive resident position interpolation" operation mode as the positioning velocity during a DPI or SERCOS commanded change in target position, Parameter 258			
Default: 1000	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ +30,000	**SCANport Scaling Resolution** 1 rev/min, 0 to +30,000	**Units** RPM
SERCOS Default: 1000	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type parameter 160 Scaling factor parameter 161 Scaling exponent parameter 162	**Units** parameter 160

	Name: Posn_Acc_Rate		**Data Display:** Decimal	R/W
Parameter No. 260 **File:** Control, Procedure **Group:** Acceleration, Orient	**Description:** Positioning acceleration. The "positioning acceleration" is used in the "drive resident interpolation" operation mode as the rate to accelerate to and decelerate from the positioning velocity (parameter 222) during an orient procedure request (parameter 152). This acceleration rate is also used with SERCOS or DPI initiated positioning moves to "Target Position", parameter 258.			
Default: 100	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ +65535	**SCANport Scaling Resolution** 1 rad/sec^2	**Units** Rad/Sec^2
SERCOS Default:	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type parameter 160 Scaling factor parameter 161 Scaling exponent parameter 162	**Units** parameter 160

	Name: Speed_Window_%		**Data Display:** Decimal	R/W
Parameter No. 272 **File:** Status/Faults **Group:** Setup	**Description:** Velocity window percentage. The velocity window percentage refers to a percentage of the "Velocity command value" (parameter 36). See parameter 330 for additional information. If the velocity feedback value (parameter 40) is found to be within a window of the velocity command defined by this percentage, the drive will set the status ""*n* feedback = *n* command" (parameter 330). This parameter serves the same function as parameter 157 but is expressed as a % rather than RPM			
Default: 1.00	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ Max. ≤ 655.35	**Scaling Resolution** 0.01	**Units** %

	Name: Mtr_Fdbk_Config		**Data Display:** Bit Pattern	R/W
Parameter No. 277 **File:** Motor/Drive/ Fdbk **Group:** Motor Feedback	**Description:** Position feedback 1 type. The position feedback 1 type parameter refers only to a motor feedback device. This parameter is programmed to define the corresponding conditions which apply to reading the motor feedback device. **Enumerated Bit Pattern:** Structure of Position Feedback 1 Type: Bit 0: Feedback type 0 – rotational feedback (parameter 116) 1 – linear feedback (not defined) Bit 1: Distance coded feedback 0 – no distance coded reference marks 1 – distance coded reference marks (parameters 165, 166) Bit 2: Feedback resolution (parameter 118 - linear) or (parameter 116 - rotary) 0 – resolution = metric or 0 - resolution = degree 1 – resolution = inches or 1 - resolution = (reserved) Bit 3: Direction polarity 0 – not inverted 1 – inverted Bit 4: marker pulse quantity 0 – only one reference marker pulse 1 – multiple cyclic reference marker pulses Bit 5: Structure of distance coded feedback 0 – counting positive with positive direction 1 – counting negative with positive direction Bit 6: Type of measuring system 0 - relative (incremental) measuring system 1 - absolute measuring system Bit 7: Usage 0 - absolute measurements with an absolute measuring system 1 - relative (incremental) measurements with an absolute measuring system Bits 15-8 (reserved)			
Default: xxxx0000	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Vel_Fdfwd_Gain_0		**Data Display:** Decimal	R/W
Parameter No. 296 **File:** Servo Loop **Group:** Group 0	**Description:** Velocity feed forward gain. This parameter is one of the 8 sets of servo parameters. The velocity feed forward parameter is effective in the operation mode “Position control without following error (lag-less)”, and serves to reduce the velocity-dependent following error.			
Default: 0.00	**Length** 2 bytes	**Minimum/Maximum** Minimum Input: ≥ 0 Maximum Input: ≤100.00	**Scaling Resolution** 1 = .01%	**Units** **%**

	Name: Velocity_Error		**Data Display:** Decimal	R, Link
Parameter No. 347 **File:** Control **Group:** Velocity	**Description:** Velocity error. The current difference between the commanded velocity and actual velocity is placed in this parameter			
Default: 0	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ -30,000 Max. ≤ +30,000	**SCANport Scaling Resolution** 1 = 1 RPM	**Units** RPM
Default:	**Length** 4 bytes	**SERCOS/DPI Min/Max** Minimum Input: ≥ -2^{31} Maximum Input: ≤ $+2^{31}-1$	**SERCOS/DPI Scaling Resolution** Scaling type parameter 44 Scaling factor parameter 45 Scaling exponent parameter 46	**Units** parameter 44

	Name: Acc_Fdfwd_Gain_0		**Data Display:** Decimal	R/W
Parameter No. 348 **File:** Servo Loop **Group:** Group 0	**Description:** Acceleration feed forward gain. This parameter is one of the 8 sets of servo loop parameters. Acceleration feed forward is when minimum following error is desired and serves to reduce acceleration / deceleration-dependent following error.			
Default: 0.00	**Length** 2 bytes	**Minimum/Maximum** Minimum Input: ≥ 0 Maximum Input: ≤ +100.00	**Scaling Resolution** 1 = .01%	**Units** **%**

	Name: DC_Bus_Voltage		**Data Display:** Decimal	R, Link
Parameter No. 380 **File:** Status/Faults **Group:** Drive Status	**Description:** DC bus voltage. The drive's DC (intermediate) bus voltage value is placed in this parameter.			
Default: From RPS	**Length** 2 bytes	**Minimum/Maximum** Minimum Input: ≥ 0 Maximum Input: ≤ +1000	**Scaling Resolution** 1 = 1 volt	**Units** Volt

	Name: Mtr_Shaft_Power		**Data Display:** Decimal	R, Link
Parameter No. 386 **File:** Status/Faults **Group:** Drive Status	**Description:** Motor shaft power. The drive places the estimated motor shaft power in this parameter.			
Default:	**Length** 2 bytes	**Minimum/Maximum** Minimum Input: ≥ 0 Maximum Input: ≤ +655.35	**Scaling Resolution** 1 = .01 kW	**Units** kW

	Name: A-B_Application		**Data Type:** Enumeration	R/W
Parameter No. 501 **File:** Motor/Drive/ Fdbk **Group:** Drive Data	**Description:** These choices are used to identify the I/O faults, the data scaling and the reference source for automatic operation. The choices available are: * 000 - Analog Spindle - "Ana Spindle" * 001 - Analog power servo - "Ana Servo" * 010 - SERCOS spindle - "SERCOS Spindle" * 011 - SERCOS power servo - "SERCOS Servo" * 100 - SCANport Digital Peripheral Interface spindle - "DPI Spindle" * 101- SCANport Digital Peripheral Interface power servo - "DPI Servo" When choosing Analog Spindle or Analog Servo make sure parameter 503 is set to "Analog_Ref"			
Default: Analog Spindle	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Mtr_Fdbk_Type		**Data Type:** Enumeration	R/W
Parameter No. 502 **File:** Motor/Drive/ Fdbk **Group:** Motor Feedback	**Description:** The feedback type of the motor mounted feedback device is found in parameter 277. The resolution for rotary devices is found in parameter 116 and 118 for linear devices. Parameter 502 is used to provide additional motor feedback information. Structure of motor feedback type: Bits: 3-0: 0000 = No Feedback 0001 = SRS_60 Single turn absolute 1024 S/C per rev 0010 = SRM_60 Multi-turn absolute 1024 S/C per rev 0011 = SCS_60 Single turn absolute 512 S/C per rev 0100 = SCM_60 Multi-turn absolute 512 S/C per rev 0101 = SNS_60 High resolution incremental 1024 S/C per rev 1001 = Sin/Cos Generic linear or rotary S/C device w/index 1010 = TTL Generic linear or rotary TTL A quad B device w/index			
Default: SRS_60	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: AuxFdbk_Type		**Data Type:** ASCII Characters	R/W
Parameter No. 503 **File:** Motor/Drive/ Fdbk **Group:** Aux Feedback	**Description:** The feedback type for a machine mounted feedback device is found in parameter 115. The resolution of the machine mounted feedback device is found in parameter 117 for both rotary and linear devices. Parameter 503 is used to provide additional auxiliary feedback information. Structure of motor feedback type: Bits: 3-0: 0000 = No Feedback 0001 = SRS_60 Single turn absolute 1024 S/C per rev 0010 = SRM_60 Multi-turn absolute 1024 S/C per rev 0011 = SCS_60 Single turn absolute 512 S/C per rev 0100 = SCM_60 Multi-turn absolute 512 S/C per rev 0101 = SNS_60 High resolution incremental 1024 S/C per rev 1000 = Analog Reference +/- 10V dc differential 1001 = Sin/Cos Generic linear or rotary S/C device w/index 1010 = TTL Generic linear or rotary TTL A quad B device w/index Analog reference must be chosen whenever the drive is configured for an analog command reference. See parameter 500			
Default: Analog Ref	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Posn_Integ_Err		**Data Display:** Signed Decimal	R
Parameter No. 515 **File:** Control **Group:** Position	**Description:** This parameter contains the position loop integral gain multiplied by the integrator. This is the integrator's contribution to the velocity command.			
Default: 6000	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ +30,000	**SCANport Scaling Resolution** 1 = 1RPM	**Units** RPM
Default: 0.0	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{31} Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 44 Scaling factor: parameter 45 Scaling exponent: parameter 46	**Units** parameter 44

	Name: Vel_Integ_Err		**Data Display:** Signed Decimal	R
Parameter No. 516 **File:** Control **Group:** Velocity	**Description:** This parameter contains the velocity loop integral gain multiplied by the integrator. This is the integrator's contribution to the acceleration command.			
Default: 65535	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ 65535	**SCANport Scaling Resolution** 1 = 1rad/sec2	**Units** rad/sec^2
Default: 0.0	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{31} Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 160 Scaling factor: parameter 161 Scaling exponent: parameter 162	**Units** parameter 160

	Name: Id_Reference		**Data Display:** Signed Decimal	R
Parameter No. 517 **File:** Control **Group:** Torque	**Description:** This parameter displays the present level of the Id current reference for the axis.			
Default: 65535	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ 65535	**SCANport Scaling Resolution** 1 = 1rad/sec2	**Units** rad/sec^2
Default: 0.0	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ 10,000	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 160 Scaling factor: parameter 161 Scaling exponent: parameter 162	**Units** parameter 160

	Name: Drive Utilized		**Data Display:** Signed Decimal	R
Parameter No. 518 **File:** Mtr/Drive/Fdbk **Group:** Drive Data	**Description:** This parameter displays the present level of the current output to the motor as a percent of drive rated.			
Default: 65535	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ 65535	**SCANport Scaling Resolution** 1 = 1rad/sec2	**Units** rad/sec^2
Default: 0.0	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ 1000	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 160 Scaling factor: parameter 161 Scaling exponent: parameter 162	**Units** parameter 160

	Name: +Dyn_Iq_Limit		**Data Display:** Signed Decimal	R/W
Parameter No. 519 **File:** Control **Group:** Torque	**Description:** The positive dynamic Iq limit defines the maximum positive torque producing current available in the motor/inverter system. A value of +100% is defined as the motor or drive rated current, whichever is less. This value can change dynamically based on peak capability, motor 12T fold back protection, inverter I^2T fold back protection, user torque limits, or bus voltage headroom limits. Related to this, parameter 520 indicates the source of real time limits in the system described above.			
Default: 0.0	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ -1000.0 Max. ≤ +1000.0	**SCANport Scaling Resolution** 1=.1%	**Units** %
Default: 0	**Length** 2 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ $+2^{15}$ - 1	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 86 Scaling factor: parameter 93 Scaling exponent: parameter 94	**Units** parameter 86

	Name: Cur_Limit_Source		**Data Type:** ASCII Representation of Enumeration	R
Parameter No. 520 **File:** Status/Faults **Group:** Drive Status	**Description:** This parameter displays the present source, if any, of an 8720MC Drive.current limit request. Structure of the current limit source: Bits 3 - 0 0000 = Not limited 0001 = Negative user current limit 0010 = Positive user current limit 0011 = Amplifier peak limit 0100 = Amplifier I^2T foldback 0101 = Regenerative energy limit 0110 = ± User current limit 0111 = Motor peak limit 1000 = Motor I^2T foldback 1001 = Bus voltage headroom limit			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: PWM_Frequency		**Data Type:** Integer	R
Parameter No. 522 **File:** Motor/Drive/ Fdbk **Group:** Drive Data	**Description:** The PWM frequency is matched to the connected motor to minimize the audible noise without reducing the motor and amplifier thermal capacities. This parameter should not be changed for any standard MPL-B8*xxx*, -B9*xxx*, or 8720SM motor.			
Default: 4000 hz	**Length** 2 bytes	**Minimum/Maximum** 1000 to 30,000	**Scaling Resolution** 1 = 1hz	**Units** hz

	Name: System_Accel_0		**Data Type:** Integer	R/W
Parameter No. 523 **File:** Servo Loop **Group:** Group 0	**Description:** The 8720MC supports 8 sets of Servo Parameters (0-7). The SERCOS link, the I/O interface or SCANport can select which set of parameters is to be enabled. Group 0 is the default group. Parameter 523 is used to provide the drive with the required motor acceleration that will produce 100% torque for Servo group 0. This value should be derived by the drive via auto tuning with the desired load connected. It will effect the stability of the velocity loop. This parameter is used by the drive to translate acceleration commands (output of the velocity regulator) to torque commands. The data is represented by an unsigned integer.			
Default: 65535	**Length** 2 bytes	**Minimum/Maximum** Minimum Input: ≥ 0 Maximum Input: ≤ 65535	**Scaling Resolution** 1 = 1 rad/sec2	**Units** rad/sec2

	Name: Mtr_Elec_Angle		**Data Type:** Signed Decimal	R
Parameter No. 525 **File:** Mtr/Drive/Fdbk **Group:** Motor Data	**Description:** This parameter is the present electrical angle (theta) of the motor shaft.			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** Minimum Input: ≥ 0 Maximum Input: ≤ 65535	**Scaling Resolution** 1 = 0.001 rads	**Units** radians

	Name: Hi_Wind_Enable		**Data Display:** Bit Flag	R, Link
Parameter No. 526 **File:** I/O Interface **Group:** Event Links	**Description:** The 8720MC drive support dual (wye - Delta) wound motors. The motor is connected wye for low speed and delta for high speed. These motors require switching via external contactors. Parameter 526 can be linked to a digital output relay contact by writing it's parameter number into a digital relay output word. When this I/O link is created the relay output contact will close whenever the high winding is selected. Also the low winding output will be disabled since both cannot be on concurrently.			
Default: 0.0	**Length** 2 bytes	**Minimum/Maximum** Min. 0.0 Max. 1.0	**Scaling Resolution** N/A	**Units** N/A

	Name: Lo_Wind_Enable		**Data Display:** Bit Flag	R, Link
Parameter No. 527 **File:** I/O Interface **Group:** Event Links	**Description:** The 8720MC drive support dual (wye - Delta) wound motors. The motor is connected wye for low speed and delta for high speed. These motors require switching via external contactors. Parameter 527 can be linked to a digital output relay contact by writing it's parameter number into a digital relay output word. When this I/O link is created the relay output contact will close whenever the low winding is selected. Also the high winding output will be disabled since both cannot be on concurrently. .			
Default: 0.0	**Length** 2 bytes	**Minimum/Maximum** Min. 0.0 Max. 1.0	**Scaling Resolution** N/A	**Units** N/A

	Name: Enable_Brake_Sol		**Data Type:** Bit Flag	R, Link
Parameter No. 528 **File:** I/O Interface **Group:** Event Links	**Description:** The 8720MC digital I/O can be linked to events within the drive. One of the 8720MC relay contact outputs can be linked to parameter 528. Parameter 528 is true whenever the drive is enabled and the brake delay constants (parameters 206 and 207) are satisfied. Entering 528 into digital outputs 2, 3, or 4 will link the "Enable Brake Solenoid" event to one of the relay contact outputs.			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** Min. 0.0 Max. 1.0	**Scaling Resolution** N/A	**Units** N/A

	Name: Auto_Ref_Enabled		**Data Type:** Bit Flag	R, Link
Parameter No. 529 **File:** I/O Interface **Group:** Event Links	**Description:** Parameter 529 can be linked to a digital output and is provided in the SCANport logic status word. It is used to identify when the 8720MC is capable of following the auto reference from the primary source identified in parameter 501. If the drive enable input is true and the auto mode of operation is active and there are no drive faults, parameter 565 will be true.			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** Min. 0.0 Max. 1.0	**Scaling Resolution** N/A	**Units** N/A

	Name: Local_Ref_Enabled		**Data Type:** Bit Flag	R, Link
Parameter No. 530 **File:** I/O Interface **Group:** Event Links	**Description:** Parameter 530 can be linked to a digital output and is used by the system to indicate that the manual mode of operation is selected. The manual mode of operation can be established from the HIM by depressing the stop button. It can also be requested from the digital I/O and the SCANport command word. When parameter 530 is true manual mode is selected. In manual mode the drive can be jogged by the HIM, the digital I/O or SCANport at the jog reference speed established by the requesting device. When switching from manual mode back to auto it is necessary to auto enable the drive by dropping the drive enable input low and returning it back to the true (+24V dc) state. This prevents an auto ref start when selecting auto mode.			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** Min. 0.0 Max. 1.0	**Scaling Resolution** N/A	**Units** N/A

	Name: Motor_Utilized		**Data Type:** Signed Decimal	R
Parameter No. 531 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** This parameter displays the present level of the current output to the motor as a percent of motor rated.			
Default: 0.0	**Length** 2 bytes	**Minimum/Maximum** Minimum Input: ≥ 0 Maximum Input: ≤ 1000	**Scaling Resolution** 1 = 0.1%	**Units** N/A

	Name: -Dyn_Iq_Limit		**Data Display:** Signed Decimal	R/W
Parameter No. 536 **File:** Control **Group:** Torque	**Description:** The negative dynamic Iq limit defines the maximum negative torque producing current available in the motor/inverter system. A value of -100% is defined as the motor or drive rated current, whichever is less. This value can change dynamically based on peak capability, motor 12T fold back protection, inverter I^2T fold back protection, user torque limits, or bus voltage headroom limits. Related to this, parameter 520 indicates the source of real time limits in the system described above.			
Default: 0.0	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ -1000.0 Max. ≤ +1000.0	**SCANport Scaling Resolution** 1=.1%	**Units** %
Default: 0	**Length** 2 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{15} Max. ≤ 0	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 86 Scaling factor: parameter 93 Scaling exponent: parameter 94	**Units** parameter 86

	Name: ATune_Select		**Data Type:** Bit Pattern	R/W
Parameter No. 541 **File:** Procedure **Group:** Auto Tune	**Description:** The 8720MC supports auto tuning. Parameter 541 initiates the auto tune cycle procedure command. This cycle measures the auto tune inertia and auto tune friction by accelerating the motor up to the auto tune velocity at the auto tune current. The gains are also calculated based on the auto tune information. For the servo loop parameter set selected auto tuning will calculate: “Vel_Prop_Gain_n”, “Vel_Int_Time_n”, “System_Accel_n” and “Torq_Lowpas_Frqn”. It will also calculate parameter 693, “Auto_Ref_Offset” to zero the analog command reference. The structure of Auto tune Select is: Bits 3-0 0000 = Idle - The auto tune system can be used 0001 = Execute - Initiates the auto tune process 0010 = 0011 = Done -> Idle - Auto tune has completed, set to IDLE 01xx = Executing - Auto tuning in process 1xxx = Error - An error has occurred in the auto tune procedure			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: ATune_Torq_Limit		**Data Type:** Decimal	R/W
Parameter No. 542 **File:** Procedure **Group:** Auto Tune	**Description:** Parameter 542 specifies the motor torque used while an auto tuning cycle is executed			
Default: 100%	**Length** 2 bytes	**Minimum/Maximum** Minimum Input: ≥ 0 Maximum Input: ≤ +100.0	**Scaling Resolution** 1 = .1% motor current	**Units** **%**

	Name: ATune_Vel_Limit		**Data Type:** Decimal	R/W
Parameter No. 543 **File:** Procedure **Group:** Auto Tune	**Description:** Parameter 543, specifies the maximum motor velocity the motor may attain when an auto tuning cycle is executed.			
Default: 1000	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ -0 Max. ≤ 10,000	**SCANport Scaling Resolution** 1 = 1RPM	**Units** RPM
Default: 0	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{31} Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 44 Scaling factor: parameter 45 Scaling exponent: parameter 46	**Units** parameter 44

	Name: ATune_Posn_Limit		**Data Type:** Decimal	R/W
Parameter No. 544 **File:** Procedure **Group:** Auto Tune	**Description:** Parameter 544 specifies the maximum position the motor shaft may attain during execution of an auto tuning cycle.			
Default: 65535	**Length** 2 bytes	**Min/Max** Min. ≥ -0 Max. ≤ 65535	**Scaling Resolution** 1 = 1 resolution unit as defined by parameter 79.	**Units** parameter 79 counts/rev

	Name: ATune_Config		**Data Type:** Bit Pattern	R/W
Parameter No. 546 File: Procedure **Group:** Auto Tune	**Description:** Parameter 546 is used to allow the user a means of configuring the auto tune procedure execution. Structure of the auto tune selections: Bits 3-0: Bit 0 = Auto Save- If selected, the calculated auto tune parameters are saved after completion of the auto tune cycle Bit 1 = Calculate Gains - If selected, the loop gains will be calculated. Bit 2 = Inertia - If selected, the auto tune procedure performs an inertial tune. Bit 3 = Analog Offset - If selected, the auto tune procedure calculates the auto zero speed A/D offset, Parameter 693, “AnaInput 1 Offse”.			
Default: 1111	**Length** 2 bytes	**Min/Max** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: ATune_Status		**Data Type:** ASCII Representation of Enumeration	R
Parameter No. 547 File: Procedure **Group:** Auto Tune	**Description:** Parameter 547 indicates the status of the auto tune procedure. Structure of the auto tune status: Bits 2-0: 000 = Successful - The auto tune process was successful 001 = In process - Auto tuning is active. 010 = Tune aborted - Auto tuning was cancelled by user. 011 = Tune Timeout - Auto tuning timed out 100 = Drive Fault - Auto tuning did not complete due to drive fault. 101 = Travel limit - Travel Limit was exceeded during auto tune 111 = Polarity fault - The feedback polarity was incorrect.			
Default: 000	**Length** 2 bytes	**Min/Max** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: ATune_Accel_Time		**Data Display:** Unsigned Integer	R/W
Parameter No. 549 **File:** Procedure **Group:** Auto Tune	**Description:** This parameter is used for setting the acceleration time for the auto tune procedure.			
Default: 65535	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ 65535	**SCANport Scaling Resolution** 1 = 1rad/sec2	**Units** rad/sec^2
Default: 0.0	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 160 Scaling factor: parameter 161 Scaling exponent: parameter 162	**Units** parameter 160

	Name: ATune_Decel_Time		**Data Display:** Unsigned Integer	R/W
Parameter No. 550 **File:** Procedure **Group:** Auto Tune	**Description:** This parameter is used for setting the deceleration time for the auto tune procedure.			
Default: 65535	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ 65535	**SCANport Scaling Resolution** 1 = 1rad/sec2	**Units** rad/sec^2
Default: 0.0	**Length** 4 bytes	**SERCOS/DPI Min/Max** Min. ≥ 0 Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 160 Scaling factor: parameter 161 Scaling exponent: parameter 162	**Units** parameter 160

	Name: Torq_Notch_Freq0		**Data Type:** Integer	R/W
Parameter No. 561 **File:** Servo Loop **Group:** Group 0	**Description:** The 8720MC supports 8 sets of Servo Parameters (0-7). The SERCOS link, the I/O interface or SCANport can select which set of parameters is to be enabled. Group 0 is the default group. Parameter 561 is used to provide the drive with the Torque reference notch filter frequency for Servo group 0. This parameter is used to minimize resonances in the mechanical system. It's value defines a notch filter frequency at which the torque command is attenuated. This value should always be set to ≥ 2.5 times the velocity loop bandwidth (parameter 988). A value of 0.0 disables the filter.			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ 10,000	**Scaling Resolution** 1	**Units** rad/sec

	Name: Torq_Lowpas_Frq0		**Data Type:** Integer	R/W
Parameter No. 562 **File:** Servo Loop **Group:** Group 0	**Description:** The 8720MC supports 8 sets of Servo Parameters (0-7). The SERCOS link, the I/O interface or SCANport can select which set of parameters is to be enabled. Group 0 is the default group. Parameter 562 is used to provide the drive with the Torque reference low pass filter frequency for Servo group 0. This value should initially be derived by the drive via auto tuning with the load connected. The parameter establishes the 3db point of the low pass filter applied to the torque commands. This parameter (if used) should be set higher than the notch filter frequency.			
Default: 2000	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ 10000	**Scaling Resolution** 1	**Units** rad/sec

	Name: Regen_Energy_Val		**Data Type:** Decimal	R/W
Parameter No. 563 **File:** Motor/Drive/ Fdbk **Group:** Drive Data	**Description:** Parameter 563 specifies the amount regenerative energy capacity available to the 8720MC Drive. This parameter is useful in AC input applications where the supplied regenerative capacity is less than 100% of the motor current. Parameter 563, Regen_Energy_Val, is used to limit the regeneration current above base speed. It is expressed as a percentage of continuous current at base speed. Reducing this value will reduce the deceleration rate and therefore the regenerative current supplied by the motor to the brake chopper module or the regenerative converter. It can be used to eliminate over voltage trips during rapid motor deceleration.			
Default: 1000.0%	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ 1000.0	**Scaling Resolution** 10^{-1}	**Units** %

	Name: Stopping_Torque		**Data Type:** Decimal	R/W
Parameter No. 571 **File:** Control **Group:** Torque	**Description:** Parameter 571 specifies the maximum amount of torque available to stop the motor when the drive enable signal is removed from the drive interface. This parameter is expressed as a percentage of rated motor continuous torque. Reducing this value will reduce the amount of stopping torque and therefore limit the current produced by the motor when the drive is disabled while it is running.			
Default: 1000.0	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0.0 Max. ≤ +1000.0	**SCANport Scaling Resolution** 1=.1%	**Units** %
Default: 1000.0%	**Length** 2 bytes	**SERCOS/DPI Min/Max** Min. ≥ -2^{15} Max. ≤ $+2^{15} - 1$	**SERCOS/DPI Scaling Resolution** Scaling type: parameter 86 Scaling factor: parameter 93 Scaling exponent: parameter 94	**Units** parameter 86

	Name: Stop_Time_Limit		**Data Type:** Decimal	R/W
Parameter No. 572 **File:** Control **Group:** Torque	**Description:** Parameter 572 specifies the maximum amount of time that the module will remain enabled while stopping the motor. This is useful for applications where the deceleration rate is very slow.			
Default: 10	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +1000	**Scaling Resolution** 1	**Units** sec

	Name: Torq_Scale_Gain		**Data Type:** Unsigned Decimal	R/W
Parameter No. 573 **File:** Control **Group:** Torque	**Description:** This parameter is the value of the torque scaling gain. This gain compensates the servo loop for the system inertia.			
Default: 0.0	**Length** 2 bytes	**SCANport Min/Max** Min. ≥ 0 Max. ≤ +32767	**SCANport Scaling Resolution** 10^{-5}	**Units** %/rev(s)
Default: 0.0	**Length** 4 bytes	**SERCOS/DPI Minimum/Maximum** Min. ≥ 0 Max. ≤ $+2^{31} - 1$	**SERCOS/DPI Scaling Resolution** 10^{-5}	**Units** %/rev(s)

	Name: Homing_Strategy		**Data Type:** ASCII Representation of Enumeration	R/W
Parameter No. 581 **File:** Procedure **Group:** Homing	**Description:** When the 8720MC is configured for power servo and single-turn absolute or incremental feedback is selected homing is required. Parameter 582 determines what homing strategy will be used. The possible choices are: (00) next marker - Proceed to the next marker after the home limit switch is detected (01) previous marker - Stop and return to the last marker after the home limit switch is detected. This parameter is not available for the 8720MC analog version.			
Default: 00	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Auto_Home		**Data Display:** ASCII Representation of Enumeration	R/W
Parameter No. 582 **File:** Procedure **Group:** Orient	**Description:** When the 8720MC is configured for spindle operation, typically it is required to orient the spindle to a specific tool change location. Parameter 582 determines what orient strategy will be used. The possible choices are: 00 **=** Disabled 01 = "Index" - Orient to the motor encoder marker or absolute zero, if single turn absolute feedback is used. Parameter 154 is used to determine if the motor encoder or the spindle encoder is the assigned feedback orient device. 02 = "Reg 0 Rise" - Orient to a spindle mounted registration sensor using the rising edge of the +24V dc registration input. 03 = "Reg 0 Fall" - Orient to a spindle mounted registration sensor using the falling edge of the +24V dc registration input. 04 = "Reg 1 Rise" - Orient to a spindle mounted registration sensor using the rising edge of the +5V dc registration input. 05 = "Reg 1 Fall" - Orient to a spindle mounted registration sensor using the falling edge of the +5V dc registration input. In most applications it is required to orient to the 8720SM motor encoder marker. In this case "Index" must be selected.			
Default: 00	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Orient_Complete		**Data Type:** Bit Flag	R, Link
Parameter No. 583 **File:** I/O Interface **Group:** Event Links	**Description:** With the 8720MC drive analog configuration a drive orient can be initiated via Digital Input 2. +24vdc on Digital Input 2 causes parameter 152 "Spin_Orient_Req" to become true. Parameter 583 can be linked to a digital output by entering 583 into one of the digital output words. In so doing when the spindle orient procedure is complete the digital output will become true. Accordingly in the analog spindle configuration a spindle orient can be requested and acknowledged to be complete via the digital I/O. In the SERCOS spindle configuration the orient is handled as a drive orient procedure initiated by the master via the SERCOS link.			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** Min. = 0.0 Max. = 1.0	**Scaling Resolution** 1.0	**Units** N/A

	Name: Drive_Ok		**Data Type:** Bit Flag	R, Link
Parameter No. 610 **File:** I/O Interface **Group:** Event Links	**Description:** The 8720MC drive parameter 610 "Drive OK" is permanently linked to digital output 1, Parameter 661, the drive OK output relay contact. This is provided as a motion controller output to indicate that there are no major faults and that the drive can be enabled.			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** Min. = 0.0 Max. = 1.0	**Scaling Resolution** 1.0	**Units** N/A

	Name: Shut_Down_Error		**Data Display:** Bit Flag	R/Link
Parameter No. 615 **File:** I/O Interface **Group:** Event Links	**Description:** The 8720MC drive parameter 11 defines 14 different types of shut down errors which can occur. Parameter 615 becomes true if any of these shut down errors occur. Parameter 615 remains true until the fault is removed and its is cleared by the Drive Error Reset input or the SERCOS master. Parameter 615 can be linked to a digital output by writing its parameter number into an output source word. In so doing if a shut down error occurs the digital output will become true.			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** Min. = 0.0 Max. = 1.0	**Scaling Resolution** 1.0	**Units** N/A

	Name: Power_Supply_OK		**Data Type:** Bit Flag	R/link
Parameter No. 617 **File:** I/O Interface **Group:** Event Links	**Description:** The standard 8720MC-RPS has a regenerative power supply fault relay contact output. If this fault is connected to terminal P5-36, Digital Input 10, an interlock to "Power Supply OK" is created. When 8720MC-RPS Fault contact is closed an RPS fault condition does not exist. Therefore, a high input to the 8720MC digital I/O is interpreted as "Power Supply OK" when it is linked to parameter 617. If the 8720MC digital input goes low, "Power Supply OK" will become false and an 8720MC shut down error (parameter 11, bit 9) will occur. After the fault is removed a Drive Error Reset is necessary to clear this error. Parameter 617 can be linked to an digital output.			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** Min. = 0.0 Max. = 1.0	**Scaling Resolution** 1.0	**Units** N/A

	Name: Output_Image		**Data Type:** - Bit Pattern	R
Parameter No. 661 **File:** Status/Faults or I/O Interface **Group:** Drive Status or Digital Outputs	**Description:** The standard 8720MC has 10 digital inputs and 10 digital outputs. Parameter 661 provides a means of monitoring the status of the 10 digital outputs. The status of each of the 10 outputs appears in one of the bits (0 to 9) in the Output Image word. The output status can be displayed on the HIM or DriveExplorer via SCANport as a bit pattern. Structure of the digital output word: Bit 0 = Digital Output 1 Bit 1 = Digital Output 2 Bit 2 = Digital Output 3 Bit 3 = Digital Output 4 Bit 4 = Digital Output 5 Bit 5 = Digital Output 6 Bit 6 = Digital Output 7 Bit 7 = Digital Output 8 Bit 8 = Digital Output 9 Bit 9 = Digital Output 10			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Output n Source (n = 1 to 10)		**Data Type:** Unsigned Integer	R/W
Parameter No. 662 to 671 **File:** I/O Interface **Group:** Digital Outputs	**Description:** Parameters 662 to 671 contain the linkable parameter number for the 8720MC digital outputs. For example if it is desired to support an output that indicates that the 8720SM motor high winding output is enabled, via digital relay contact output 3, then this can be accomplished by entering parameter number 526, "Hi_Wind_Enable" into parameter 664. Entry can be made via the HIM or DriveExplorer. Parameter 610, "Drive_OK", is permanently assigned to parameter 662. All other outputs have default assignments based on the application as determined by parameter 501. Parameters 663 to 671 can be modified by the user if the default settings are not appropriate for the intended application. For the 8720MC outputs 1 to 4 are relay contacts while 5 to 10 are solid state 24vdc drivers.			
Default:	**Length** 2 bytes	**Minimum/Maximum** 0/10,000	**Scaling Resolution** 1	**Units** param no.

	Name: AnaOut_Ch1_Selec		**Data Type:** Integer	R/W
Parameter No. 681 **File:** I/O Interface **Group:** Analog Outputs	**Description:** The 8720MC Drive supports two +/-11 bit analog outputs. Parameter 681 provides a means of linking the 8720MC physical address of: connector P4, row 1, terminal 1 and row 2, terminal 6 (analog output 1) to a variable within the drive. This allows the user to link an external analog output to a linkable variable within the 8720MC Drive. A +/- 10V dc analog voltage can be provided at analog output 1 which represents the value of an 8720MC parameter such as % rated torque value or velocity feedback value or % power. Analog output 1, parameter 681 contains the parameter number of the linked variable. If a +/- 10V dc analog output representing actual velocity is desired at analog output 1 then parameter number 40, velocity feedback, must be entered into parameter 681. The analog output value can be modified by multiplying the source variable by the scaling factor stored in parameter 682. D/A output = (Variable * scaling factor), D/A range +/- 2048 = +/- 10V dc)			
Default: 40	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +65535	**Scaling Resolution** 1	**Units** param number

	Name: AnaOut_Ch1_Gain		**Data Type:** Integer	R/W
Parameter No. 682 **File:** I/O Interface **Group:** Analog Outputs	**Description:** Parameter 682 provides a means of scaling analog output 1. This parameter is used to assign a scale factor to Analog Output 1 which is the analog output tied to the 8720MC physical address of: connector P4, row 1, terminals 1 and row 2 terminal 6. This allows the user to apply a scale factor to an external analog output which is linked to a variable within the 8720MC Drive. The value of the source variable linked by parameter 681 is multiplied by the scale factor stored in parameter 682 in order to produce the value delivered to the digital to analog converter. For example, with a scale factor of 1, a variable with a value of 100% will produce a D/A output of 10V dc.			
Default: 1.0	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ -3.0000 Max. ≤ +3.0000	**Scaling Resolution** 10^{-4}	**Units**

	Name: AnaOut_Ch2_Selec		**Data Type:** Integer	R/W
Parameter No. 683 **File:** I/O Interface **Group:** Analog Outputs	**Description:** The 8720MC Drive supports two +/-11 bit analog outputs. Parameter 683 provides a means of linking the 8720MC physical address of: connector P4, row 2, terminal 5 and row 2, terminal 6 (analog output 2) to a variable within the drive. This allows the user to link an external analog output to a linkable variable within the 8720MC Drive. A +/- 10V dc analog voltage can be provided at analog output 2 which represents the value of an 8720MC parameter such as % rated torque value or velocity feedback value or % power. Analog output 2, parameter 683 contains the parameter number of the linked variable. If a +/- 10V dc analog output representing torque is desired at analog output 2 then parameter number 84, torque feedback, must be entered into parameter 683. The analog output value can be modified by multiplying the source variable by the scaling factor stored in parameter 684. D/A output = (Variable * scaling factor), D/A range +/- 2048 = +/- 10V dc)			
Default: 84 (parameter 84)	**Length** 2 byte	**Minimum/Maximum** 0/10,000	**Scaling Resolution** 1	**Units** param no.

	Name: AnaOut_Ch2_Gain		**Data Type:** Integer	R/W
Parameter No. 684 **File:** I/O Interface **Group:** Analog Outputs	**Description:** Parameter 684 provides a means of scaling analog output 2. This parameter is used to assign a scale factor to Analog Output 2 which is the analog output tied to the 8720MC physical address of: connector P4, row 2, terminal 5 and row 2, terminal 6. This allows the user to apply a scale factor to an external analog output which is linked to a variable within the 8720MC Drive. The value of the source variable linked by parameter 683 is multiplied by the scale factor stored in parameter 684 in order to produce the value delivered to the digital to analog converter. For example, with a scale factor of 1, a variable with a value of 100% will produce a D/A output of 10V dc.			
Default: 1.0	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ -3.000 Max. ≤ +3.000	**Scaling Resolution** 10^{-4}	**Units**

	Name: Input_Image		**Data Type:** - Bit Pattern	R
Parameter No. 690 **File:** Fault/Status or I/O Interface **Group:** Drive Status or Digital Inputs	**Description:** The standard 8720MC has 10 digital inputs and 10 digital outputs. Parameter 690 provides a means of monitoring the digital input status. The status of each of the 10 inputs plus the 2 registration inputs appears in one of the bits (0 to 11) in the Input Image status word. The input status can be displayed on the HIM or DriveExplorer via SCANport as a bit pattern. Structure of the digital output word: Bit 0 = Digital Input 1 Bit 1 = Digital Input 2 Bit 2 = Digital Input 3 Bit 3 = Digital Input 4 Bit 4 = Digital Input 5 Bit 5 = Digital Input 6 Bit 6 = Digital Input 7 Bit 7 = Digital Input 8 Bit 8 = Digital Input 9 Bit 9 = Digital Input 10 Bit 10 = +24v registration Bit 11 = +5 v registration			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: AnaInput_1_Value		**Data Type:** Decimal	R
Parameter No. 691 **File:** I/O Interface **Group:** Analog Inputs	**Description:** The 8720MC Drive analog configuration supports two +/-13 bit analog inputs. Analog input 1, the auto analog reference, is connected to the 8720MC physical address of: connector P1, row 2, terminals 14 and 15. Parameter 691 "AnaInput1_Value" the digital representation of +/- 10V dc analog voltage. Analog Input 1 is defined in the 8720MC as the analog auto reference command. After scaling, parameter 691 is permanently linked to parameter 36, the velocity command variable within the 8720MC Drive. This value may be modified by the scaling factor stored in parameter 695, the analog velocity scale factor. For auto mode, parameter 691 % * parameter 695 rpm/100% = parameter 36 analog auto velocity reference command in rpm. Parameter 691 is automatically offset to zero during auto tuning.			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ -100.00 Max. ≤ +100.00	**Scaling Resolution** $1 = 10^{-2}$	**Units** %

	Name: AnaInput_2_Value		**Data Type:** Integer	R/Link
Parameter No. 692 **File:** I/O Interface **Group:** Analog Inputs	**Description:** The 8720MC Drive analog configuration supports two +/-13 bit analog inputs. Analog input 2 the manual analog reference, is connected to the 8720MC physical address of: connector P1, row 2, terminals 16 and 17. Parameter 692 "AnaInput2_Value" stores the digital representation of +/- 10V dc analog voltage. Analog Input 2 is defined in the 8720MC as the analog manual reference command. Parameter 692 is permanently linked to parameter 36, the velocity command variable within the 8720MC Drive. This value may be modified by the scaling factor stored in parameter 696, the manual velocity reference scale factor. For manual mode, parameter 692 % * parameter 696 rpm/100% = parameter 36 analog velocity reference command in rpm.			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ -100.00 Max. ≤ +100.00	**Scaling Resolution** $1 = 10^{-2}$	**Units** %

	Name: AnaInput 1 Offse		**Data Type:** Signed Integer	R/W
Parameter No. 693 **File:** I/O Interface **Group:** Analog Inputs	**Description:** Parameter 693 provides a means of offsetting analog input 1. This parameter is used to assign an A/D offset to "AnaInput1_Value", parameter 691, which is the analog input tied to the 8720MC physical address of: connector P1, row 2, terminals 16 and 17. This allows the user to apply an offset to an external analog input which is linked to a variable within the 8720MC Drive. Analog Input 1 is used as the motion controller reference command. Parameter 693 contains an offset variable in % which may be used to adjust the drive for zero speed or zero torque when the motion controllers reference is 0 volts. This offset may be auto tuned if "auto Offset" is selected in parameter 546			
Default: 0.00	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ -100.00 Max. ≤ +100.00	**Scaling Resolution** 1=.01%	**Units** %

	Name: AnaInput 2 Offse		**Data Type:** Signed Integer	R/W
Parameter No. 694 **File:** I/O Interface **Group:** Analog Inputs	**Description:** Parameter 694 provides a means of offsetting analog input 2. This parameter is used to assign an A/D offset to "AnaInput1_Value", parameter 692, which is the analog input tied to the 8720MC physical address of: connector P1, row 2, terminals 16 and 17. This allows the user to apply an offset to an external analog input which is linked to a variable within the 8720MC Drive. Analog Input 2 is only used as the manual analog velocity reference. Parameter 694 contains offset factor in % which may be used to adjust the drive for zero speed when the manual analog reference is at 0 volts.			
Default: 0.00	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ -100.00 Max. ≤ +100.00	**Scaling Resolution** 1=.01%	**Units** %

	Name: Analog_Vel_Scale		**Data Type:** Signed Integer	R/W
Parameter No. 695 **File:** I/O Interface **Group:** Analog Inputs	**Description:** Parameter 695 provides a means of scaling analog input 1. This parameter is used to assign a scale factor to "AnaInput1_Value" which is the analog input tied to the 8720MC physical address of: connector P1, row 2, terminals 14 and 15. This allows the user to apply a scale factor to an external analog input which is linked to a variable within the 8720MC Drive. When the drive is configured for velocity mode, parameter 32 for parameter set 0, parameter 695 parameter contains the velocity scale factor in rpm/10 volt. For example, if the incoming analog voltage full scale range is +/- 8 volts and the desired max rpm range is +/- 6000 rpm, then the scale factor would be 6000 *10/8 or 7500 rpm/10 volts. This parameter should not generate a speed requirement greater than the maximum speed of the motor, parameter 113. For applications were torque mode is used, parameter 695, Analog Input 1 is always scaled to 25% (2.5 volts) = 100% rated torque. See parameter 32 for mode setting.			
Default: 1000	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ -30000 Max. ≤ +30000	**Scaling Resolution** 1	**Units** rpm/100%

	Name: Manual_Vel_Scale		**Data Type:** Signed Integer	R/W
Parameter No. 696 **File:** I/O Interface **Group:** Analog Inputs	**Description:** Parameter 696 provides a means of scaling analog input 2. This parameter is used to assign a scale factor to "AnaInput2_Value" which is the analog input tied to the 8720MC physical address of: connector P1, row 2, terminals 16 and 17. This allows the user to apply a scale factor to an external analog input which is linked to a variable within the 8720MC Drive. Analog Input 2 is only used in manual velocity mode. Parameter 696 contains the velocity scale factor in rpm/100%. For example, if the incoming analog voltage full scale range is +/- 9 volts and the desired max rpm range is +/- 3000 rpm, then the scale factor would be 3000 *10/9 or 3333 rpm/ 100%. This parameter should not generate a speed requirement greater than the maximum speed of the motor, parameter 113. Analog Input 2 supports only velocity scaling.			
Default: 1000	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ -30,000 Max. ≤ +30,000	**Scaling Resolution** 1	**Units** rpm/100%

	Name: Analog_Trq_Scale		**Data Type:** Signed Decimal	R/W
Parameter No. 698 **File:** I/O Interface **Group:** Analog Inputs	**Description:** This parameter is used to assign a scale factor for an external torque reference.			
Default: 0.0	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +10,000	**Scaling Resolution** 1 = 0.1% / 10V	**Units** %/ Volts

	Name: SCANp_AN1_Value		**Data Type:** Integer	R/W
Parameter No. 713 **File:** Communication **Group:** SCANp_Ref/ fdback	**Description:** Parameter 713 contains the value of the reference as provided by a SCANport connected PLC. Parameter 713 is linked to the velocity reference command 36 or the torque reference command, parameter 80, by the 8720MC drive software as determined by the velocity/torque mode parameter 32. The value of parameter 713, as provided by the PLC, should be scaled to motor rpm when in velocity mode and % rated torque when in torque mode. See parameter 32 "Primary Operating Mode" for an explanation of the 8720MC operating modes.			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ -32768 Max. ≤ +32767	**Scaling Resolution** 1 = 1 rpm or 1 = .1% rated torque	**Units** rpm or % rated torq

	Name: Analog_Out _Parm		**Data Type:** Integer	R/W
Parameter No. 715 **File:** Communication **Group:** SCANp_Ref/ fdback	**Description:** Parameter 715 contains the linkable parameter number for the SCANport analog output. The value transferred is a 16 bit integer variable within the 8720MC. Examples of common links are: parameter 40, velocity feedback, parameter 84, torque feedback, parameter 347, velocity error, parameter 386, motor shaft power etc. See *Supplemental Troubleshooting Information* in *Chapter 3* for a description of the potential links. Parameter 715 contains the parameter number of a linkable variable. This output is available to a SCANport connected communication gateway as the reference feedback.			
Default: 36	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +1000	**Scaling Resolution** see parameter definition for the linked variable. For velocity: 1 = 1 rpm, for torque 1 = .1 %	**Units** parameter address

	Name: SP_Logic_Mask		**Data Type:** 16 bit word, Bit Pattern	R/W
Parameter No. 716 **File:** Communication **Group:** SCANp Data In	**Description:** The 8720MC drive can be operated by an A-B PLC via a SCANport gateway. Parameter 716 is used to set the SCANport logic mask bits. This function may be used to enable or prevent some of the SCANport nodes from controlling the 8720MC. This is a 16 bit word with a bit pattern which the 8720MC defines as follows: If a bit is set true (1) the function is enabled. Bit 0: Digital I/O Tables 6.1 and 6.2 Bit 1: Port control 1 Bit 2: Port control 2 Bit 3: Port control 3 Bit 4: Port control 4 Bit 5: Port control 5 Bit 6: Port control 6 Embedded HIM Module			
Default: x1111111	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: Logic_Command		**Data Type:** 16 bit word, Bit Pattern	R
Parameter No. 717 **File:** Communication **Group:** SCANp Data In	**Description:** The 8720MC drive can be operated by an A-B PLC via a SCANport gateway. Parameter 717 contains the "Logic Command" word coming from the gateway product. This is a 16 bit word with a bit pattern which the 8720MC defines as follows: If a bit is set true (1) the function is enabled. Bit 0: Regenerative stop request Bit 1: Start request Bit 2: Jog request Bit 3: Drive Error Reset request Bit 4: Coast stop request Bit 5: Parameter Set Select bit 0 Bit 6: Parameter Set Select bit 1 Bit 7: Parameter Set Select bit 2 Bit 8: Parameter Set Change Bit 9: Orient Request, Bit 10: Reserved Bit 11: Manual/Auto request, 1 = manual Bits 12 to 15 are reserved: The Scanport Logic command word is used by the 8720MC when it is configured for SCANport PLC operation as determined by parameter 501			
Default: 00	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: SP_Logic_Status		**Data Type:** 16 bit word, Bit Pattern	R
Parameter No. 718 **File:** Communication **Group:** SCANp Data Out	**Description:** The 8720MC drive can be operated by an A-B PLC via a SCANport gateway. Parameter 718 contains the "Logic Status" word going to the gateway communication product. This is a 16 bit word which the 8720MC defines as follows: If a bit is set true (1) the function is enabled. Bit 0: Drive enabled Bit 1: Drive auto reference enabled Bit 2: Rotation direction Bit 3: Drive O.k. Bit 4: Zero Speed Bit 5: At reference speed Bit 6: Orient complete Bit 7 Reserved Bit 8 Brake solenoid enabled Bit 9: Torque >/= Torque limit Bit 10: High Winding Selected Bit 11: Low winding Selected Bit 12: Shut down fault Bit 13: Reserved Bit 14: Reserved Bit 15: Manual mode selected The SCANport Logic Status word is Provided by the 8720MC to a gateway communication module when it is configured for SCANport PLC operation as determined by parameter 501			
Default: 00	**Length** 2 bytes	**Minimum/Maximum** N/A	**Scaling Resolution** N/A	**Units** N/A

	Name: SP_Data_In_xx xx=A1, A2, B1, B2, C1, C2, D1 or D2		**Data Type:** Integer	R, Link
Parameter No. 725 to 732 **File:** SCANport **Group:** Gateway Data In	**Description:** The 8720MC drive can be operated by an A-B PLC via a SCANport DeviceNet, Remote I/O or ControlNet gateway communication adapter. It is possible to connect the PLC to port 2 or ports 2, 3, 4 or 5 using a SCANport expander. Parameters 725 to 732 are a group of eight 16 bit PLC words which have fixed input links to internal 8720 variables or flags. This provides a means of passing one to eight 16 bit PLC variables to the 8720MC Drive. See *Chapter 4* for the definition of the input links. These parameters can be used as bit flags as well as signed or unsigned 16 bit integers. The data type is determined by the PLC and the 8720 variables they are linked to. The relationship to the gateway variable descriptions are as follows: 725 = P00225 = SCANport Data Input A1 726 = P00226 = SCANport Data Input A2 727 = P00227 = SCANport Data Input B1 728 = P00228 = SCANport Data Input B2 729 = P00229 = SCANport Data Input C1 730 = P00230 = SCANport Data Input C2 731 = P00231 = SCANport Data Input D1 732 = P00232 = SCANport Data Input D2 See *Chapter 4* for the default assignments.			
Default: 00	**Length** 2 bytes	**Minimum/Maximum** +/- 32768 or 0 to 65535	**Scaling Resolution** N/A	**Units** N/A

	Name: SP_Data_Out_xx xx=A1, A2, B1, B2, C1, C2, D1 or D2		**Data Type:** Integer	R/W
Parameter No. 733 to 740 **File:** SCANport **Group:** Gateway Data Out	**Description:** The 8720MC drive can be operated by an A-B PLC via a SCANport, DeviceNet, Remote I/O or ControlNet gateway communication adapter. It is possible to connect the PLC to port 2 or ports 2, 3, 4 or 5 using a SCANport expander. Parameters 733 to 740 are a group of eight 16 bit words which can be linked to internal 8720 variables or flags. These variables are then made available via the SCANport gateway as output words to be used by an A-B PLC interfaced to the SCANport gateway product. These parameters can be used as bit flags as well as signed or unsigned 16 bit integers. The data type is determined by the PLC and the 8720 variables they are linked to. The relationship to the gateway variable descriptions are as follows: 733 = P00233 = SCANport Data Output A1 734 = P00234 = SCANport Data Output A2 735 = P00235 = SCANport Data Output B1 736 = P00236 = SCANport Data Output B2 737 = P00237 = SCANport Data Output C1 738 = P00238 = SCANport Data Output C2 739 = P00239 = SCANport Data Output D1 740 = P00240 = SCANport Data Output D2 See *Chapter 4* for the default assignments.			
Default: 00	**Length** 2 bytes	**Minimum/Maximum** +/- 32768 or 0 to 65535	**Scaling Resolution** N/A	**Units** N/A

Parameters 741 thru 793 represent the 8720MC image of the Allen-Bradley motor and encoder parameters stored in the motor encoder memory at manufacture. Any of the encoder stored parameters may be read from the 8720MC memory image via the HIM or DriveExplorer.

	Name: Enc_Mem_Map_Rev		**Data Type:** Integer	R
Parameter No. 741 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** The 8720MC Drive supports an intelligent feedback device which stores all motor and feedback specific parameters for standard A-B Motors. At power up these parameters are available to the drive to configure it's operation. Parameter 741 identifies the revision of the memory map to the drive.			
Default:	**Length** 1 byte	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +255	**Scaling Resolution** N/A.	**Units** N/A

	Name: Motor_Param_Rev		**Data Type:** Integer	R
Parameter No. 742 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** The 8720SM Motor parameters are subject to revision over time. Parameter 742 is used to identify the revision number of the motor parameters			
Default:	**Length** 1 byte	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +255	**Scaling Resolution** 1	**Units** N/A

	Name: Motor_Select		**Data Type:** Ascii enumeration of motor catalog numbers	R/W
Parameter No. 777 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** The standard 8720SM Motors have assigned 8720SM catalog numbers. Parameter 777 provides a list of the available standard 8720 motors. If the motor catalog number does not appear on the list “custom” must be entered and all motor specific parameters must be entered individually. For standard MPL-B8*xxx*, -B9*xxx*, and 8720SM motors this parameter is set by the data stored in the encoder and cannot be changed unless the feedback is disconnected and power recycled.			
Default: custom	**Length** 2 bytes	**Minimum/Maximum** 0 to 65535	**Scaling Resolution** N/A	**Units** N/A

	Name: Motor_Type		**Data Type:** binary	R/W
Parameter No. 778 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** The 8720MC can be used with several different types of motors. Parameter 778 identifies the type of motor the 8720MC is connected to. The possible enumerations are: * 000 - Rotary PM Brushless * 001 - Rotary Induction * 010 - Rotary Induction Dual Winding * 011 - Linear PM Brushless * 100 - Linear PM Brushless AC Ironless			
Default: 001	**Length** 1 byte	**Minimum/Maximum** 0 to 255	**Scaling Resolution** N/A	**Units** N/A

	Name: Motor_Pole_Count		**Data Type:** unsigned Integer	R/W
Parameter No. 779 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** Parameter 779 provides the drive with the number of motor poles. If the motor is a linear motor this parameter provides the linear motor pole pitch in millimeters			
Default: 4	**Length** 1 byte	**Minimum/Maximum** 2/255	**Scaling Resolution** N/A	**Units:** poles/rev poles/mm

	Name: Mtr_Acceleration		**Data Type:** Unsigned Integer	R/W
Parameter No. 780 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** Parameter 780 is defined as the continuous force/torque (in newtons /newton-meters) at rated base speed divided by the rotor mass/inertia in (Kg/ Kg-m^2)			
Default: N/A	**Length** 4 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +65535	**Scaling Resolution** 1	**Units:** Rad/sec^2 m/sec^2

	Name: Base_Speed		**Data Type:** Unsigned Integer	R/W
Parameter No. 781 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** Parameter 781 defines the base speed, the speed at which the motor continuous power and torque are rated.			
Default: 1500	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +30000	**Scaling Resolution** 1	**Units** rpm

	Name: Mtr_Rated_Power		**Data Type:** Unsigned Integer	R/W
Parameter No. 782 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** Parameter 533 identifies the motor power in kilowatts.			
Default: N/A	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +6553.5	**Scaling Resolution** 10^{-1}	**Units** kW

	Name: Motor_Max_Volts		**Data Type:** unsigned Integer	R/W
Parameter No. 783 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** This parameter defines the maximum DC bus voltage required in the constant power region.			
Default: Motor Specific	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +6553.5	**Scaling Resolution** .1	**Units** volts

	Name: Mtr_Rated_Volts		**Data Type:** Unsigned Integer	R/W
Parameter No. 784 **File:** Motor/Drive **Group:** Motor Data	**Description:** This parameter defines the nominal DC bus voltage required to achieve base speed and rated torque.			
Default: Motor Specific	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +6553.5	**Scaling Resolution** .1	**Units** volts

	Name: Rated_Torque		**Data Type:** Unsigned Integer	R/W
Parameter No. 785 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** This parameter defines the continuous torque rating of the motor at base speed (8720SM) and stall (MPL-B8*xxx*/-B9*xxx*) at 40° C			
Default:	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +6553.5	**Scaling Resolution** 10^{-1}	**Units** newton-meters or newtons

	Name: Motor_Back_EMF		**Data Type:** Unsigned Integer	R/W
Parameter No. 786 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** This parameter defines the synchronous motor (MPL-B8*xxx*/-B9*xxx*) back emf phase to phase constant at 25° C. This is set to zero for asynchronous motors (8720SM).			
Default: 0	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +655.35	**Scaling Resolution** 10^{-2}	**Units** volts rms

	Name: R1-Motor_Stator		**Data Type:** unsigned Integer	R/W
Parameter No. 787 **File:** Motor/Drive **Group:** Motor Data	**Description:** This parameter defines the per unit stator phase to neutral resistance R_1 @ 25° C in % (for asynchronous 8720SM motors). This parameter is set to zero for synchronous motors (MPL-B8*xxx*/-B9*xxx*).			
Default: per motor	**Length** 2 byte	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +30.000	**Scaling Resolution** 10^{-3}	**Units** %

	Name: R2-Motor_Rotor		**Data Type:** Unsigned Integer	R/W
Parameter No. 788 **File:** Motor/Drive **Group:** Motor Data	**Description:** This parameter defines the per unit rotor phase to neutral resistance as referred to the stator @ 25° C in % (for asynchronous 8720SM motors). This parameter is set to zero for synchronous motors (MPL-B8*xxx*/-B9*xxx*).			
Default: per motor	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +30.000	**Scaling Resolution** 10^{-3}	**Units** %

	Name: X1-Stat_Self/Lk		**Data Type:** Unsigned Integer	R/W
Parameter No. 789 **File:** Motor/Drive **Group:** Motor Data	**Description:** This parameter defines the per unit motor stator leakage reactance at base frequency.			
Default: per motor	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +30.000	**Scaling Resolution** 10^{-3}	**Units** %

	Name: XM-Stator Mutual		**Data Type:** unsigned Integer	R/W
Parameter No. 790 **File:** Motor/Drive/Fdbk **Group:** Motor Data	**Description:** This parameter defines the per unit asynchronous motor (8720SM) stator magnetizing reactance @ base frequency, phase to neutral. This is also the per unit synchronous motor (MPL-B8*xxx*/-B9*xxx*) stator magnetizing reactance at 1000 rpm (phase to neutral)			
Default: per motor	**Length** 2 byte	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +300.00	**Scaling Resolution** 10^{-2}	**Units** %

	Name: X2-Rotor_Leakage		**Data Type:** Unsigned Integer	R/W
Parameter No. 791 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** This parameter defines the per unit asynchronous motor (8720SM) rotor leakage reactance @ base frequency, phase to neutral. This is set to zero for synchronous (MPL-B8*xxx*/-B9*xxx*) motors.			
Default: per motor	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +30.000	**Scaling Resolution** 10^{-3}	**Units** %

	Name: Mtr_Mag_Current		**Data Type:** Unsigned Integer	R/W
Parameter No. 792 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** This parameter defines the per unit asynchronous (8720SM) motor magnetizing current as a ratio to the continuous current. This is set to zero for synchronous (MPL-B8*xxx*/-B9*xxx*) motors.			
Default: per motor	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +100.0	**Scaling Resolution** 10^{-1}	**Units** %

	Name: Mtr_Slip_Freq		**Data Type:** Unsigned Integer	R/W
Parameter No. 793 **File:** Motor/Drive/ Fdbk **Group:** Motor Data	**Description:** This parameter is the asynchronous (8720SM) motor slip frequency. This is set to zero for synchronous (MPL-B8*xxx*/-B9*xxx*) motors.			
Default:	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +100.00	**Scaling Resolution** 10^{-2}	**Units** rad/sec

	Name: Pos_Bandwidth		**Data Type:** Unsigned Integer	R/W
Parameter No. 986 **File:** Control **Group:** Position	**Description:** This parameter allows access to the position loop bandwidth.			
Default: 10	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +10,000	**Scaling Resolution** 1 = 1 rad/s	**Units** rad/s

	Name: Pos_Damping		**Data Type:** Unsigned Decimal	R/W
Parameter No. 987 **File:** Control **Group:** Position	**Description:** This parameter allows access to the position loop damping factor.			
Default: 1.0	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0.001 Max. ≤ 65.535	**Scaling Resolution** 10^{-3}	**Units** N/A

	Name: Vel_Bandwidth		**Data Type:** Unsigned Integer	R/W
Parameter No. 988 **File:** Control **Group:** Velocity	**Description:** This parameter allows access to the velocity loop bandwidth.			
Default: 100	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0 Max. ≤ +10,000	**Scaling Resolution** 1 = 1 rad/s	**Units** rad/s

	Name: Vel_Damping		**Data Type:** Unsigned Decimal	R/W
Parameter No. 989 **File:** Control **Group:** Velocity	**Description:** This parameter allows access to the velocity loop damping factor.			
Default: 1	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ 0.001 Max. ≤ 65.535	**Scaling Resolution** 10^{-3}	**Units** N/A

	Name: Id_Feedback		**Data Type:** Signed Decimal	R
Parameter No. 992 **File:** Control **Group:** Torque	**Description:** This parameter displays the Id current feedback value.			
Default: 0.0	**Length** 2 bytes	**Minimum/Maximum** Min. ≥ -1000 Max. ≤ +1000	**Scaling Resolution** 1 = 0.1%	**Units** %

The remaining parameters are 7 sets of servo loop parameters found in **File:** Servo Loop, **Groups:** 1 to 7. The 14 elements in groups 1 to 7 are the same as those found in parameter group 0. The element definitions for Servo Loop: Group 0 are found in the following parameter descriptions:

- Parameter 32 Primary_Op_Mode0
- Parameter 38 +Velocity_Limit_0
- Parameter 39 -Velocity_Limit_0
- Parameter 82 +Torque_Limit_0
- Parameter 83 -Torque_Limit_0
- Parameter 100 Vel_Prop_Gain_0
- Parameter 101 Vel_Integ_Time_0
- Parameter 104 Pos_Loop Gain_0
- Parameter 105 Pos_Integ_Time_0
- Parameter 136 Accel_Limit__0
- Parameter 137 Decel_Limit__0
- Parameter 296 Vel_Fdfwd_Gain_0
- Parameter 348 Acc_Fdfwd_Gain_0
- Parameter 523 System_Accel_0
- Parameter 561 Cur_Notch_Freq0
- Parameter 562 Cur_Lowpas_Frq0

The following table is presented to illustrate the relationship between the servo loop parameter groups:

Parameter Name	Param. No Group 0	Param. No Group 1	Param. No Group 2	Param. No Group 3	Param. No Group 4	Param. No Group 5	Param. No Group 6	Param. No Group 7
Primary_Op_Mode_n	32	811	831	851	871	891	911	931
+Velocity_Limit_n	38	812	832	852	872	892	912	932
-Velocity_Limit_n	39	813	833	853	873	893	913	933
+Torque_Limit_n	82	814	834	854	874	894	914	934
-Torque_Limit_n	83	815	835	855	875	895	915	935
Vel_Prop_Gain_n	100	816	836	856	876	896	916	936
Vel_Integ_Time_n	101	817	837	857	877	897	917	937
Pos_Loop_Gain_n	104	818	838	858	878	898	918	938
Pos_Integ_Time_n	105	819	839	859	879	899	919	939
Accel_Limit__0	136	825	845	865	885	905	925	945
Decel_Limit_0	137	826	846	866	886	906	926	946
Vel_Fdfwd_Gain_n	296	820	840	860	880	900	920	940
Acc_Fdfwd_Gain_n	348	821	841	861	881	901	921	941
System_Accel_n	523	822	842	862	882	902	922	942
Torq_Notch_Freq_n	561	823	843	863	883	903	923	943
Torq_Lowpas_Freq_n	562	824	844	864	884	904	924	944

8720SM Motor Specifications and Performance Curves

Chapter Objectives

This chapter contains:

- Specifications common to all 8720MC drive amplifiers and 8720SM motors
- Specifications for 5.5 to 37 kW motors with the 8720MC, 750V dc input, Drive Amplifier and 8720MC-RPS Regenerative Power Supply
- Power and torque curves for 5.5 to 37 kW motors with the 8720MC, 750V dc Input, Drive Amplifier and 8720MC-RPS Regenerative Power Supply
- Specifications for 45 to 93 kW motors with the 8720MC, 750V dc input, Drive Amplifier and the Master/Slave 8720MC-RPS Regenerative Power Supply
- Power and torque curves for 45 to 93 kW motors with the 8720MC, 750V dc input, Drive Amplifier and the Master/Slave 8720MC-RPS Regenerative Power Supply
- Specifications for 5.5 kW to 18.5 kW motors with the 8720MC, 460V ac input, Drive Amplifier
- Power and torque curves for 5.5 to 18.5 kW motors with the 8720MC, 460V ac input, Drive Amplifier

Common Specifications

The following specifications are common to all the drive amplifiers and motors. The following conversion factors apply to the tables:

- Torque: 1 newton meter = .7376 ft-lb = 8.85 in-lb
- Inertia: 1 kg-meter^2 = 23.7 lb-ft^2 = 8.85 in-lb sec^2
- Power: 1 horsepower = .746 kW
- Weight 1 kg = 2.205 lbs

8720MC 750V dc Input Drive Amplifier Specifications

Specification Type	Value
Frequency range	0 to ±500 Hz
2 pole AC motor speed range	0 to ±30,000 RPM
Voltage at maximum speed	505V RMS
Max Velocity loop bandwidth (-3db)	108 Hz (MPL-B8*xxx*/-B9*xxx* motors)
	215 Hz (8720SM motors)
Current Loop Bandwidth	1270 Hz (MPL-B8*xxx*/-B9*xxx* motors)
	1100 Hz (8720SM motors)
Peak Current (1 minute)	150% rated
Speed regulation (% max. speed)	0.01% with 100% disturbance
Rated operating temp (Open)	0 to 50° C
Rated operating temp (enclosed)	0 to 40° C
Storage temperature	-40 to 70° C
Ambient humidity	5 to 95%
Altitude	1000 m (3300 ft)
Vibration as displacement	.0006
Shock	15 in. @ 1G
Agency Certification	UL™ /CUL™/CE

8720MC I/O Specifications

Specification Type	Value
24V dc input current - sourcing	3.3 to 12 mA
24V dc output current sourcing capability	up to 75 mA
Dry contact current capacity	5A AC or DC
Dry contact voltage range	up to 30V dc (250V ac)
24V dc registration input current	5 to 15 mA
24V dc registration input voltage range	17.5 to 38V dc
5V dc registration input current	5 to 15 mA
5V dc registration input voltage	4 to 7.5V dc
±10V dc analog input resolution	1.25 mV/LSB (14 bits)
±10V dc analog output resolution	5 mV/LSB (12 bits)
Available 22V dc ±25% VDC output power	120 mA continuous
Available 5V dc ±10% VDC output power	250 mA continuous
SERCOS data rate	4 or 8 Mbits/sec
SCANport data rate	125 kbits/sec
DPI data rate	500 kbits/sec

Feedback Specifications

Feedback specifications for the 8720SM motors are given in the table below.

Specification Type	**SRM Value** 8720SM-*xxxxxxx*S1 Motors	**SRS Value** 8720SM-*xxxxxxx*S2 Motors	**SNS-60 Value** 8720SM-*xxxxxxx*S3 and -*xxxxxxx*S4 Motors
Absolute accuracy	±7 Arc seconds	±7 Arc seconds	±60 Arc seconds
Number of sinusoidal periods per revolution	1024	1024	1024
8720MC Drive position resolution	4 million counts/rev	4 million counts/rev	4 million counts/rev
Input voltage range	7 to 12V dc	7 to 12V dc	7 to 12V dc
Operating current without loads	130 mA	80 mA	100 mA
Available memory (bytes)	128	128	128
Max recommended cable length	90 m	90 m	90 m

8720SM Motor Specifications

Specification Type	Value
Rated ambient temperature	0 to 40° C (32 to 104° F)
Storage temperature	-20 to 80 (7.6 to 176° F)
Environmental protection	IP 55
Agency certification	UL/CSA/CE
Available mounting methods	flange/foot
Vibration	≤ 0.12 in./s

Specifications for 5.5 to 37 kW 8720SM Motors

The following specifications apply to 5.5 to 37 kW motors, 8720MC drive amplifier, and 8720MC -RPS with 750V dc input.

8720SM Motor Specifications

8720SM Motor Specifications when used with 750V dc Input Drives and 8720MC-RPS Regenerative Power Supply									
Motor Specifications	**Units**	**Motor Data for Each Power Rating**							
Motor catalog number	8720SM-	005S1BA	007S1CA	011S1DA	015S2EA	018S2FA	022S2GA	030S4JA	037S4KA
Motor frame number		DL1106	DL1108	DL1110	RDL1307	RDL1308	RDL1310	RDL1611	RDL1613
Continuous power	kW (hp)	5.5 (7.5)	7.5 (10)	11 (15)	15 (20)	18.5 (25)	22 (30)	30 (40)	37 (50)
S6 - 50% duty - power	kW (hp)	7.5 (10)	10 (13.4)	15 (20.1)	18 (24.1)	22 (29.5)	30 (40.2)	37 (49.6)	45 (60.3)
1 minute peak power	kW (hp)	8.3 (11.1)	11.5 (15.4)	16.5 (22.1)	23 (30.8)	28 (37.5)	33 (44.2)	45 (60.3)	55 (76.1)
Rated torque at base speed	N-M (lb-ft)	35 (25.8)	48 (35.4)	70 (51.6)	96 (70.8)	118 (90)	140 (103.2	192 (141.5)	238 (175.4)
Peak torque at base speed	N-M (lb-ft)	53 (39)	72 (53.1)	105 (77.4)	143 (105.5)	176 (129.8)	210 (154.9)	290 (213.4)	355 (261.8)
Base speed	rpm	1500	1500	1500	1500	1500	1500	1500	1500
Max speed - foot mount	rpm	9000	9000	9000	8000	8000	7400	6500	6500
Max speed - flange mount	rpm	9000	9000	9000	8000	8000	7400	6000	5800
Constant power speed range		4.1:1	5.5:1	4.4:1	4.1:1	4.3:1	4.2:1	4.0:1	3.9:1
Rotor inertia	kg-m^2 (lb-ft^2)	0.0165 (0.391)	0.0222 (0.527)	0.0272 (.645)	0.0809 (1.92)	0.0977 (2.32)	0.111 (2.63)	0.176 (4.2)	0.209 (4.9)
Rated continuous motor current at base speed	Amps (RMS cont.)	13.5	20.3	26.8	33.4	41.4	48	63.1	76.1
S6 current at base speed	Amps (RMS)	17.2	25.3	34.6	39.1	47.2	61.2	74.6	89.2
Peak current at base speed	Amps (RMS)	18.7	27.9	37.6	46	57	66.5	88.5	107
Voltage at Base Speed	Volts (RMS)	350	315	335	370	364	369	371	375
Voltage at max speed	Volts (RMS)	505	505	505	505	505	505	505	505
Motor weight	kg (lbs)	75 (165)	91 (201)	102 (225)	131 (289)	150 (331)	163 (359)	226 (497)	272 (598)
Max radial bearing load	kg (lbs)	206 (455)	206 (455)	206 (455)	243 (535)	243 (535)	243 (535)	350 (770)	350 (770)

8720MC Drive Amplifier Specifications

8720MC Drive Amplifier Specifications for 750V dc Input 8720MC-RPS Regenerative Power Supply and 8720SM AC Motor									
Drive Amp. Specifications	**Units**	**Drive Amplifier Data for Each Power Rating**							
Motor catalog number	8720SM-	005S1BA	007S1CA	011S1DA	015S2EA	018S2FA	022S2GA	030S4JA	037S4KA
Rated continuous motor current at base speed	Amps (RMS cont.)	13.5	20.3	26.8	33.4	41.4	48	63.1	76.1
Drive amplifier catalog no.	8720MC-	B014	B021	B027	B034	B042	B048	D065	D078
DC input current @750V dc	Amps	8.9	12.1	16.9	23.3	28.4	33.4	44.1	53.8
Max cont. output power	kW (hp)	5.5 (7.5)	7.5 (10)	11 (15)	15 (20)	18.5 (25)	22 (30)	30 (40)	37 (50)
Max cont. output current	Amps (RMS)	14	21	27	34	42	48	65	78
Drive amplifier frame		B	B	B	B	B	B	C	C
DC Bus Capacitance	µF	1350	1350	2150	2150	4300	4300	6450	6450
Rated operating temp. (open)	deg C	0 to 50	0 to 50	0 to 50	0 to 50	0 to 50	0 to 50	0 to 50	0 to 50
Weight	kg (lbs)	22.7 (50)	22.7 (50)	22.7 (50)	22.7 (50)	22.7 (50)	22.7 (50)	38.6 (85)	38.6 (85)

8720MC Line Reactor Specifications

8720MC Line Reactor Specifications for 750V dc Input Drives with 8720MC-RPS Regenerative Power Supply and 8720SM AC Motor									
Line Reactor Specifications	**Units**	**Line Reactor Data for Each Power Rating**							
Motor catalog number	8720SM-	005S1BA	007S1CA	011S1DA	015S2EA	018S2FA	022S2GA	030S4JA	037S4KA
Req. RPS continuous Input current	Amps (RMS)	9	12	18	25	31	36	50	61
Drive amplifier catalog no.	8720MC-	B014	B021	B027	B034	B042	B048	D065	D078
Line Reactor catalog no.	8720MC-	LR03-032B	LR03-032B	LR03-032B	LR03-032B	LR05-048B	LR05-048B	LR10-062B	LR10-062B
Max cont. current	Amps (RMS)	32	32	32	32	48	48	62	62
Inductance	uH	850	850	850	850	800	800	1100	1100
Weight	kg (lbs)	17 (37.4)	17 (37.4)	17 (37.4)	17 (37.4)	21 (46.2)	21 (46.2)	27 (59.4)	27 (59.4)

8720MC-RPS Regenerative Power Supply Specifications

8720MC-RPS Regenerative Power Supply Specifications when used with 750V dc Input Drives and 8720SM AC Motors									
8720MC-RPS Regen. P.S.	**Units**	**Power Supply Specifications**							
Motor catalog number	8720SM-	005S1BA	007S1CA	011S1DA	015-S2EA	018S2FA	022S2GA	030S4JA	037S4KA
Drive amplifier catalog number	8720MC-	B014	B021	B027	B034	B042	B048	D065	D078
Regen. P. S. catalog number	8720MC-	RPS027 BM	RPS027 BM	RPS027 BM	RPS027 BM	RPS065 BM	RPS065 BM	RPS065 BM	RPS065 BM
AC Input voltage +10/-15%	RMS Volts	380 to 460	380 to 460	380 to 460	380 to 460	380 to 460	380 to 460	380 to 460	380 to 460
Input frequency	Hz ±3%	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Input power factor		.98 or less	.98 or less	.98 or less	.98 or less	.98 or less	.98 or less	.98 or less	.98 or less
Required input kVA	kVA	7	10	14	20	24	29	39	49
Required input current	Amps RMS	9	12	18	25	31	36	50	61
Required input 1 min current	Amps RMS	14	19	27	37	46	55	74	92
Required output kVA	kVA	7	9	13	18	22	27	36	45
Required output current	Amps DC	8.9	12.1	16.9	23.3	28.4	33.4	44.1	53.8
Required max current(1 min)	Amps DC	13	18	27	36	45	53	73	90
Design Bus voltage	Volts DC	750	750	750	750	750	750	750	750
Rated input kVA	kVA	20	20	20	20	50	50	50	50
Rated input current	Amps RMS	28	28	28	28	65	65	65	65
Rated input 1 min current	Amps RMS	42	42	42	42	98	98	98	98
Rated output kVA	kVA	19	19	19	19	45	45	45	45
Rated output current	Amps DC	27	27	27	27	64	64	64	64
Rated max output current (1 min)	Amps DC	40.5	40.5	40.5	40.5	96	96	96	96
Operating Temperature	deg C	-10 to 55	-10 to 55	-10 to 55	-10 to 55	-10 to 55	-10 to 55	-10 to 55	-10 to 55
Storage temperature	deg C	-40 to 65	-40 to 65	-40 to 65	-40 to 65	-40 to 65	-40 to 65	-40 to 65	-40 to 65
Ambient humidity	%	5 to 95%	5 to 95%	5 to 95%	5 to 95%	5 to 95%	5 to 95%	5 to 95%	5 to 95%
Altitude	m (ft)	1000 (3300)	1000 (3300)	1000 (3300)	1000 (3300)	1000 (3300)	1000 (3300)	1000 (3300)	1000 (3300)
Vibration	G	<1G @ 25 Hz	<1G @ 25 Hz	<1G @ 25 Hz	<1G @ 25 Hz	<1G @ 25 Hz	<1G @ 25 Hz	<1G @ 25 Hz	<1G @ 25 Hz
Shock	G	<2G	<2G	<2G	<2G	<2G	<2G	<2G	<2G
Weight	kg (lbs)	11 (24.3)	11 (24.3)	11 (24.3)	11 (24.3)	13.5 (29.8)	13.5 (29.8)	13.5 (29.8)	13.5 (29.8)

Power and Torque Curves for 5.5 to 37 kW 8720SM Motors

The following power and torque curves contain data for 5.5 to 37 kW motors at 1500 RPM base speed with the 8720MC-RPS regenerative power supply providing 750V dc input voltage.

Figure D.1
8720SM-005S1BA Motor with 8720MC-B014 Drive

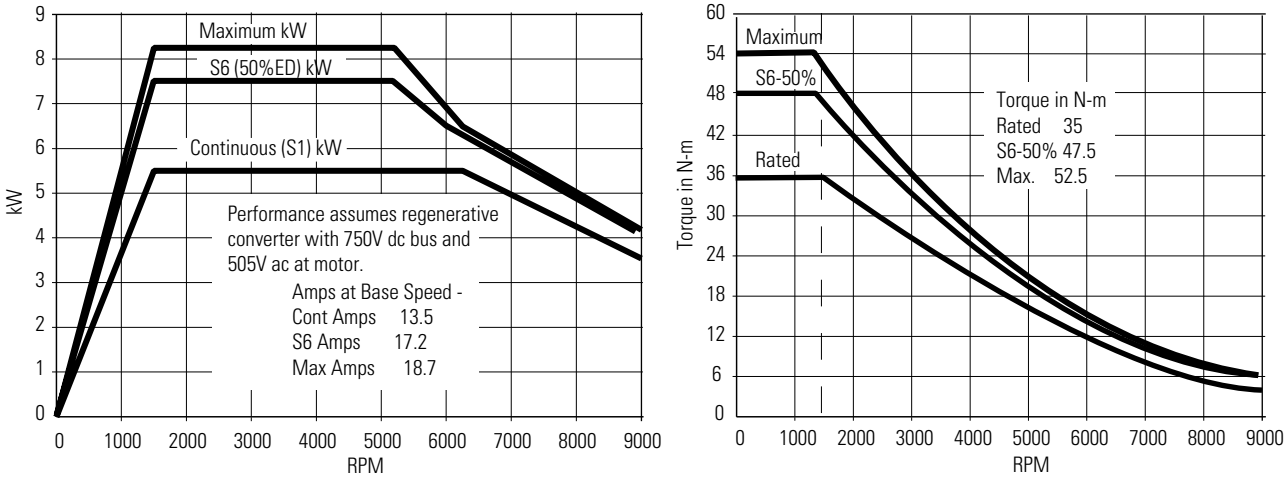


Figure D.2
8720SM-007S1CA Motor with 8720MC-B021 Drive

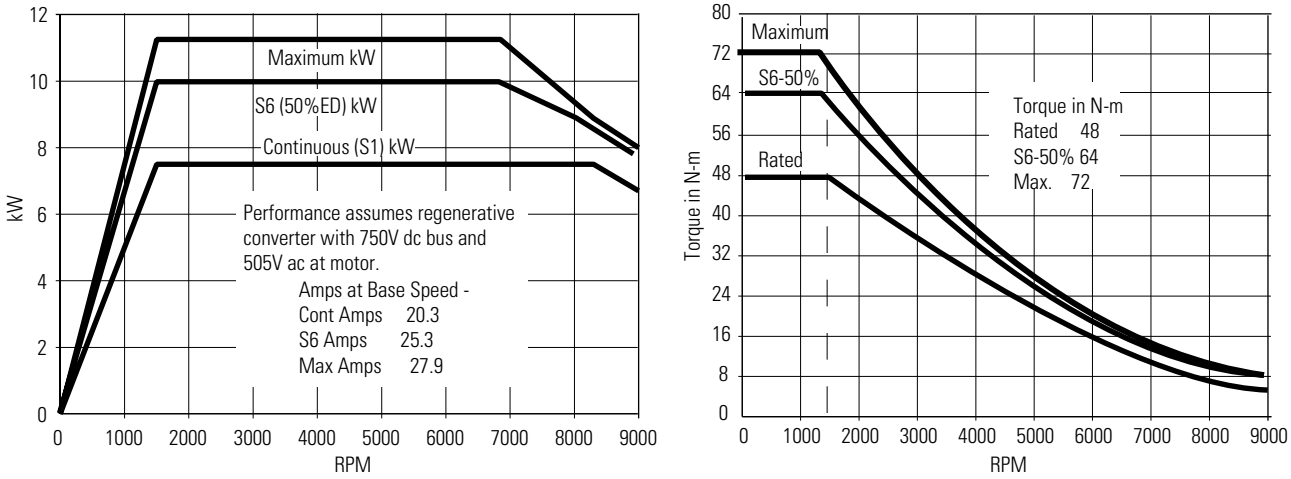


Figure D.3
8720SM-011S1DA Motor with 8720MC-B027 Drive

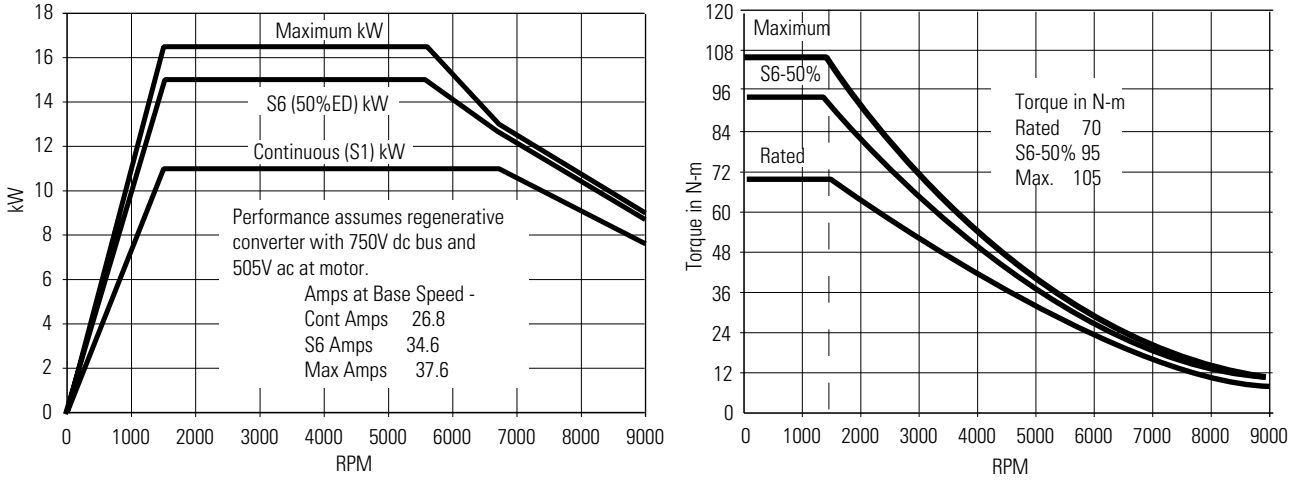


Figure D.4
8720SM-015S2EA Motor with 8720MC-B034 Drive

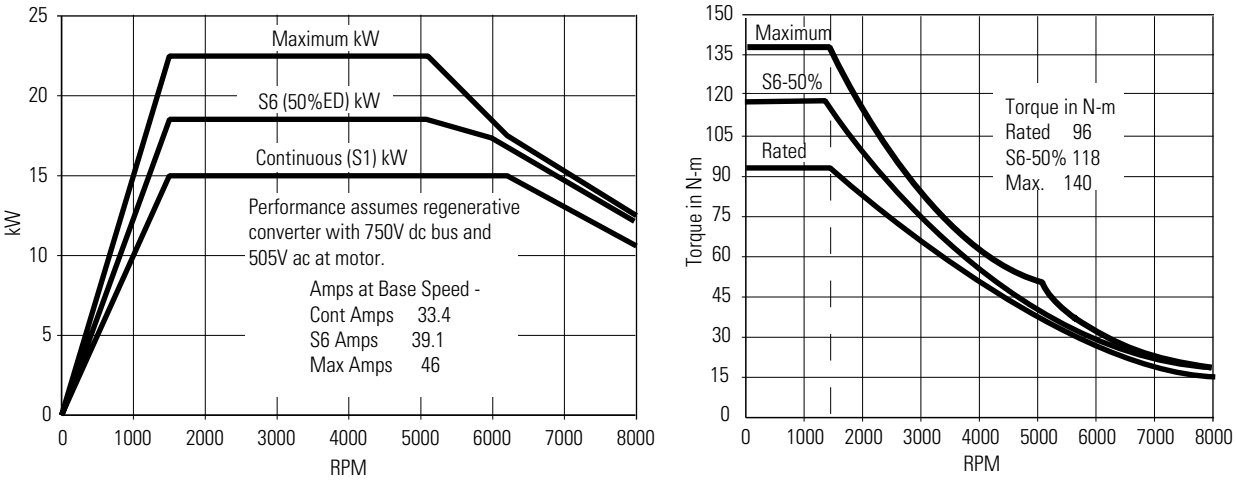


Figure D.5
8720SM-018S2FA Motor with 8720MC-B042 Drive

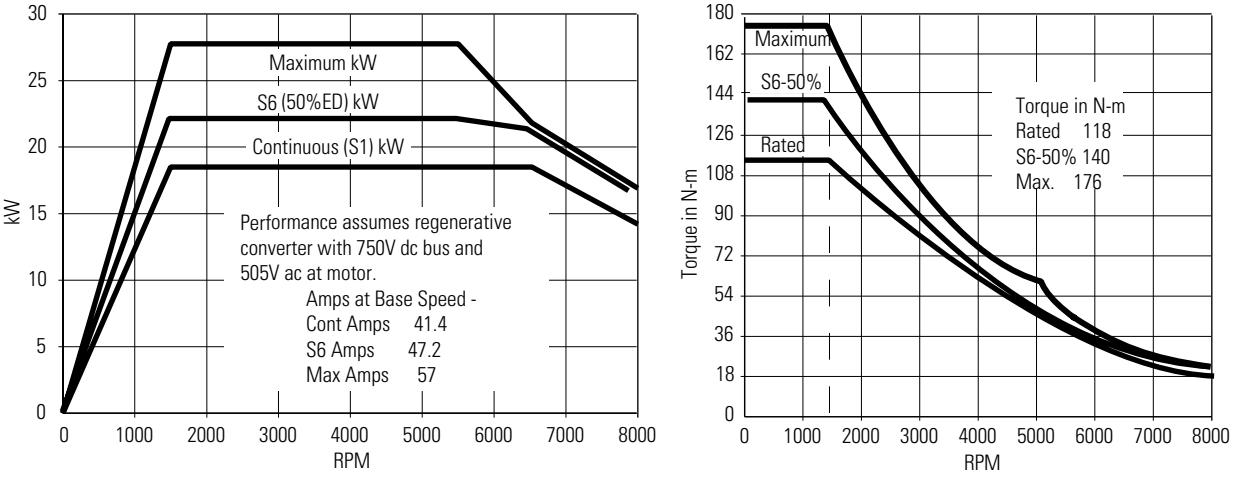


Figure D.6
8720SM-022S2GA Motor with 8720MC-B048 Drive

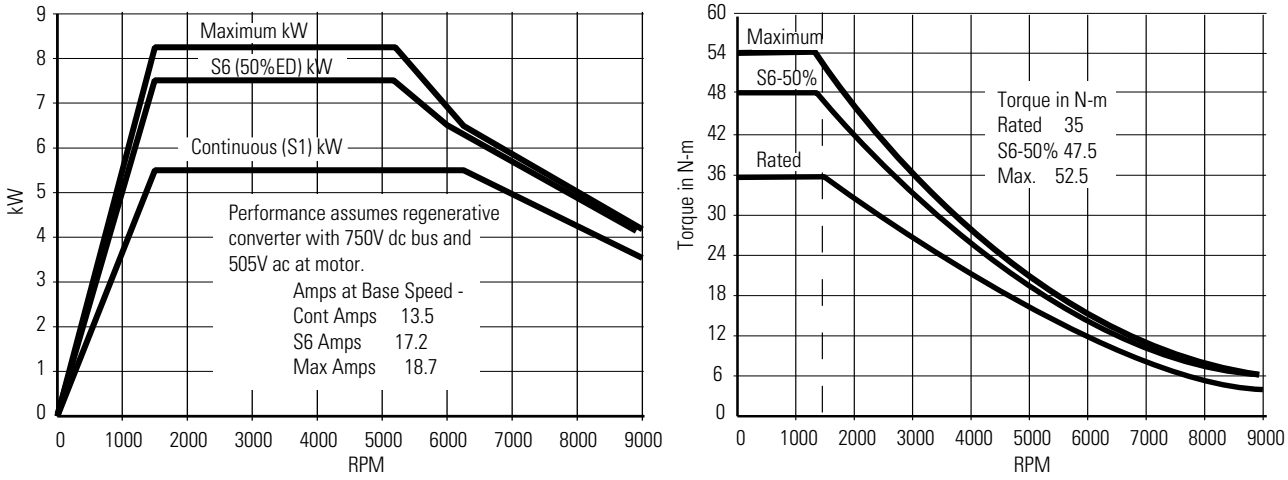


Figure D.7
8720SM-030S4JA Motor with 8720MC-B065 Drive

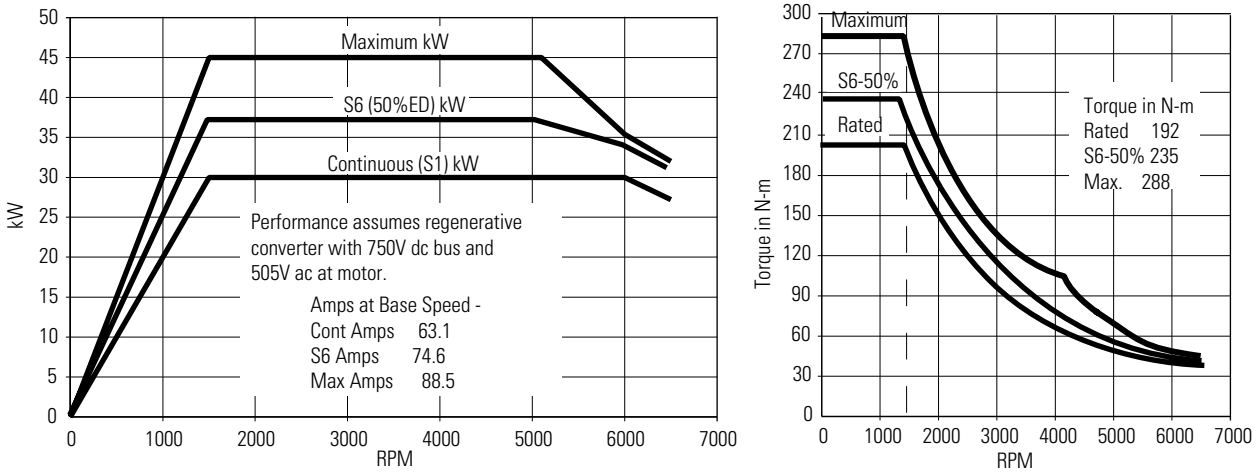
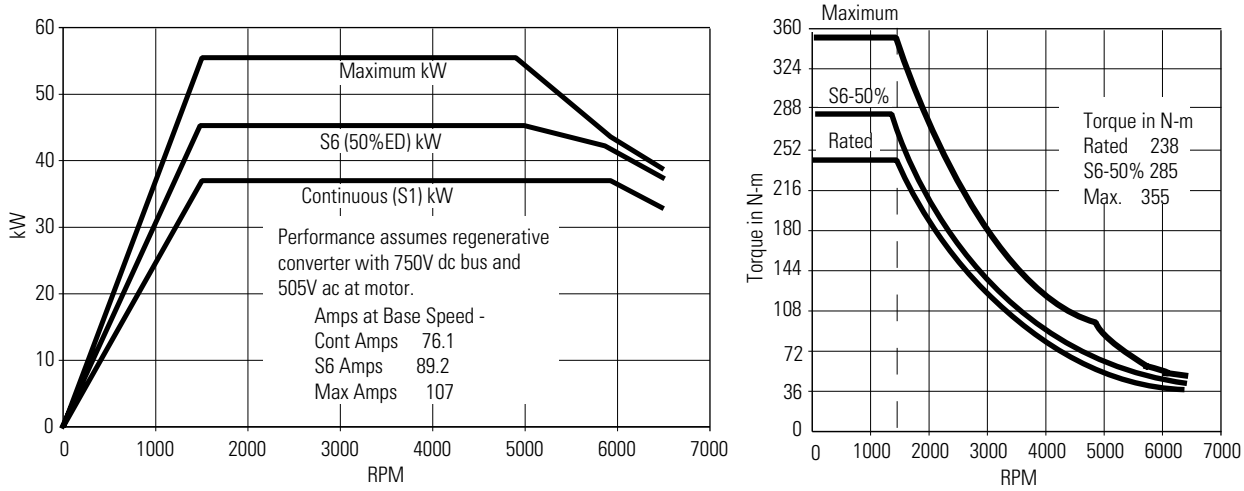


Figure D.8
8720SM-037S4KA Motor with 8720MC-B078 Drive



Specifications for 45 to 93 kW 8720SM Motors

The following specifications apply to 45 to 93 kW motors, 8720MC drive amplifier, and 8720MC -RPS (master and slave units) with 750V dc input.

8720SM Motor Specifications

8720SM Motor Specifications for 750V dc Input Drives with Master/Slave Regenerative Power Supplies

Motor Specifications	Units	Motor Data for Each Power Rating				
Motor catalog number	8720SM-	045S5NA	055S5PA	063S5QA	075S6SA	093S6TA
Motor frame number		DL1811	DL1813	DL1815	DL2010	DL2012
Continuous power	kW (hp)	45 (60)	55 (73.7)	63 (84.4)	75 (100.5)	93 (125)
S6 - 50% duty	kW (hp)	55 (73.7)	63 (84.4)	76 (101.8)	92 (123.3)	110(147.4)
1 minute peak power	kW (hp)	68 (91.1)	82 (110)	95 (127.3)	112 (150)	140 (187.7)
Rated torque at base speed	N-m (lb-ft)	287 (211.5)	350 (258)	400 (294.8)	480 (353.8)	590 (434.8)
peak torque at base speed	N-M (lb-ft)	430 (317.2)	525 (387.24)	600 (442)	720 (531.1)	890 (656.5)
Base speed - rpm	rpm	1500	1500	1500	1500	1500
Max speed - foot mount	rpm	6500	5000	5000	5000	4500
Max speed - flange mount	rpm	6000	5000	5000	4500	4000
Constant power speed range		3.7:1	3.3:1	3.3:1	3.3:1	3.0:1
Rotor inertia	$kg\text{-}m^2$ ($lb\text{-}ft^2$)	.35 (8.3)	.409 (9.7)	.468 (11.1)	.885 (21.0)	1.01 (24.0)
Rated continuous motor current at base speed	Amps (RMS cont.)	93	116	117.5	137	176
S6 current at base speed	Amps (RMS)	110	129	135	161	200
Peak current at base speed	Amps (RMS)	131	161	163	188	242
Voltage at Base Speed	Volts (RMS)	375	370	418	430	410
Voltage at max speed	Volts (RMS)	505	505	505	505	505
Motor weight	kg (lbs)	297 (655)	324 (714)	350 (772)	453 (999)	478 (1054)
Max radial bearing load	kg (lbs)	390 (860)	390 (860)	390 (860)	422 (930)	422 (930)

8720MC Drive Amplifier Specifications

8720MC Drive Amplifier Specifications for 750V dc Input 8720MC-RPS Regenerative Power Supplies and 8720SM AC Motor						
Drive Amplifier Specifications	**Units**	**Drive Amplifier Data for Each Power Rating**				
Motor catalog number	8720SM-	045S5NA	055S5PA	063S5QA	075S6SA	093S6TA
Rated Continuous motor current at base speed	Amps (RMS cont.)	93	116	117.5	137	176
Drive amplifier catalog number	8720MC-	D097	D120	D120	D149	D180
DC input current @ 750V dc	Amps	65.7	80.9	92.6	111.1	135.3
Max continuous output power	kW (hp)	45 (60.3)	63 (84.4)	63 (84.4)	75 (100.5)	93 (125)
Max continuous output current	Amps	97	120	120	149	180
DC Bus Capacitance	µF	9000	9000	9000	9000	12000
Drive amplifier frame		D	D	D	D	D
Weight	kg (lbs)	108.9 (240)	108.9 (240)	108.9 (240)	108.9 (240)	108.9 (240)

8720MC Line Reactor Specifications

8720MC Line Reactor Specifications for 750V dc Input Drives with Multiple 8720MC-RPS Regen Power Supplies and 8720SM AC Motor						
Line Reactor Specifications	**Units**	**Line Reactor Data for Each Power Rating**				
Motor catalog number	8720SM-	045S5NA	055S5PA	063S5QA	075S6SA	093S6TA
Req. RPS continuous Input current	Amps RMS	71	91	105	125	154
Drive amplifier catalog number	8720MC-	D097	D120	D120	D149	D180
Line Reactor catalog number	8720MC-	LR05-048B	LR05-048B	LR10-062B	LR14-070B	LR10-100B
Number of Reactor Assemblies Req	quantity	2	2	2	2	2
Max cont. current	Amps RMS	48	48	62	70	62
Inductance	uH	800	800	1100	1200	1100
Weight	kg (lbs)	21 (46.2) each	21 (46.2) each	27 (59.4) each	38 (83.8) each	27 (59.4) each

Regenerative Power Supply Specifications

Specifications for 8720MC-RPS Master and Slave(s) Regenerative Power Supplies with 750V dc Drives and 8720SM AC Motors						
8720MC-RPS065 Regen. P.S.	**Units**	**Power Supply Specifications**				
Motor catalog number	8720SM-	045S5NA	055S5PA	063S5QA	075S6SA	093S6TA
Drive amplifier catalog number	8720MC-	D097	D120	D120	D149	D180
Regenerative Power Supply catalog number	8720MC-	RPS065 BM and BS	RPS065 BM and BS	RPS065 BM and BS	RPS065 BM and BS	RPS190 BM
AC input voltage AC+10/-15%	RMS Volts	380 to 460	380 to 460	380 to 460	380 to 460	380 to 460
Input frequency	Hz ±3%	50/60	50/60	50/60	50/60	50/60
Input power factor		0.98	0.98	0.98	0.98	0.98
Required input kVA	kVA	56.5	72.4	83.6	99.5	122.5
Required input current	Amps RMS	71	91	105	125	154
Required input 1 min current	Amps RMS	106.5	136.5	157.5	187.5	231
Required output kVA	kVA	49.3	60.6	69.4	83.2	101.9
Required output current	Amps DC	65.7	80.8	92.5	110.9	135.9
Required max current (1 min)	Amps DC	98	121	139	166	204
Design Bus voltage	Volts DC	750	750	750	750	750
Rated input kVA	kVA	100	100	100	100	150
Rated input current	Amps RMS	130	130	130	130	195
Rated input 1 min current	Amps RMS	196	196	196	196	292
Rated output kVA	kVA	90	90	90	90	135
Rated output current	Amps DC	128	128	128	128	192
Rated max output current (1 min)	Amps DC	192	192	192	192	288
Operating Temperature (open)	deg C	0 to 50	0 to 50	0 to 50	0 to 50	0 to 50
Operating Temperature (Nema1)	deg C	0 to 40	0 to 40	0 to 40	0 to 40	0 to 40
Storage temperature	deg C	-40 to 85	-40 to 85	-40 to 85	-40 to 85	-40 to 85
Ambient humidity	%	5 to 95%	5 to 95%	5 to 95%	5 to 95%	5 to 95%
Altitude	m (ft)	1000 (3300)	1000 (3300)	1000 (3300)	1000 (3300)	1000 (3300)
Shock	G peak for 11 ms	15	15	15	15	15
Vibration	mm (in) Displacement at 1g	0.152 (.0006)	0.152 (.0006)	0.152 (.0006)	0.152 (.0006)	0.152 (.0006)
Weight	kg (lbs)	38.6 (85)	108.9 (240)	108.9 (240)	108.9 (240)	108.9 (240)

Because of the larger current requirements for motors from 45 to 75 kW a master 37 kW regenerative power supply (RPS) and a slave 37 kW RPS are required. Each master or slave RPS requires its own line reactor, harmonic filter and varister. The master and slave RPS units are designed to share the current loads equally so incoming AC fuses and wiring should be sized accordingly.

Power and Torque Curves for 45 to 93 kW 8720SM Motors

The following power and torque curves contain data for 45 to 93 kW motors at 1500 RPM base speed with the 8720MC-RPS regenerative power supply and 750V dc input voltage.

Figure D.9
8720SM-045S5NA Motor with 8720MC-D097 Drive

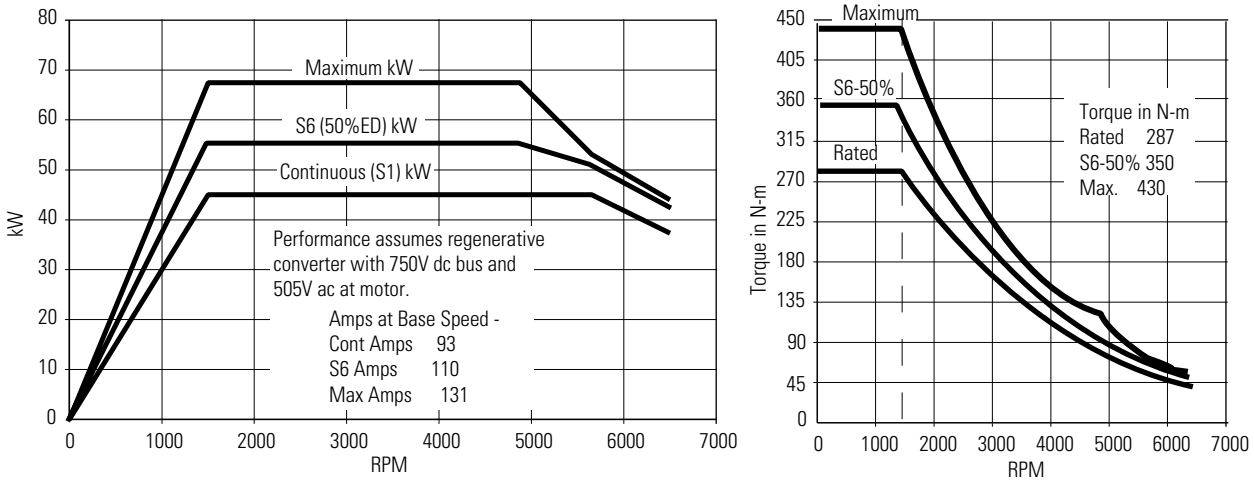


Figure D.10
8720SM-055S5PA Motor with 8720MC-D120 Drive

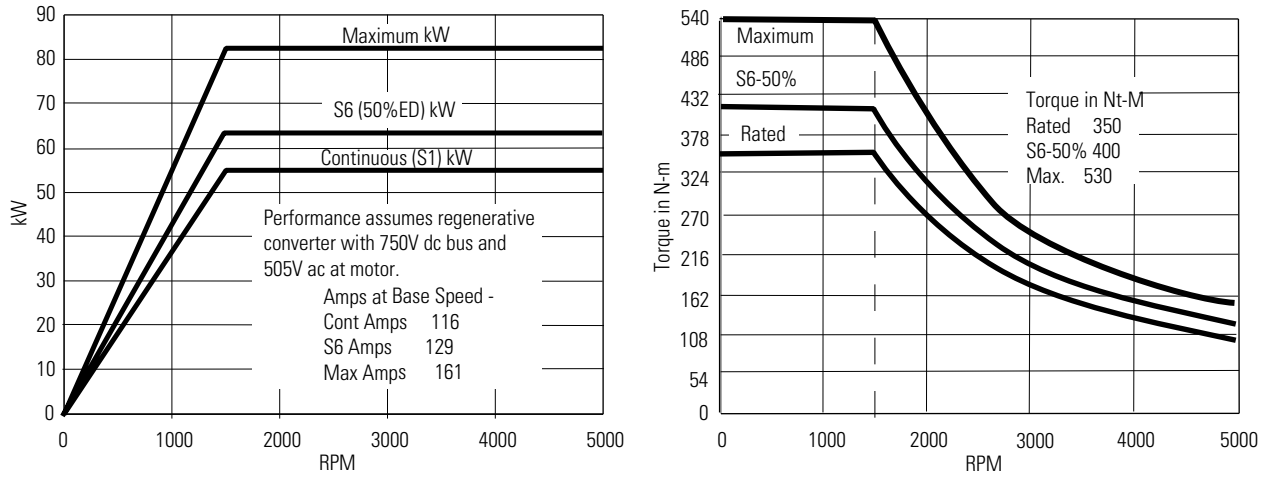


Figure D.11
8720SM-063S5QA Motor with 8720MC-D120 Drive

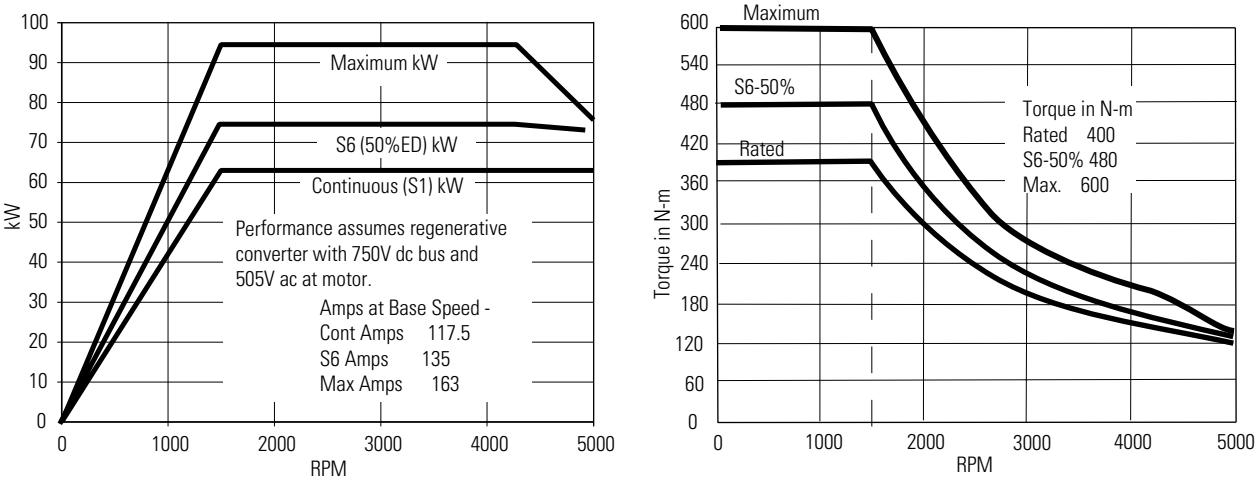


Figure D.12
8720SM-075S6SA Motor with 8720MC-D149 Drive

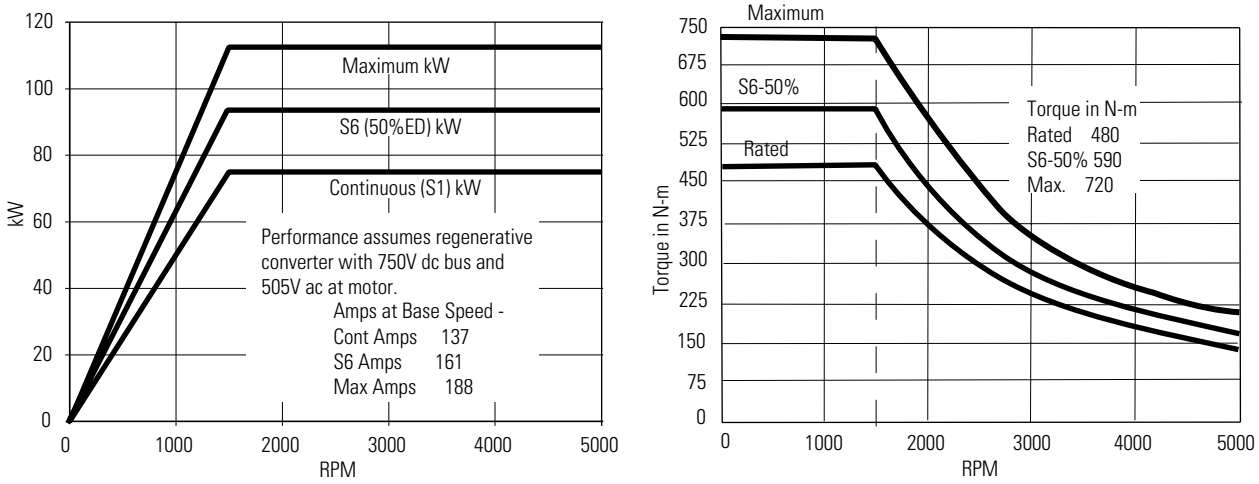
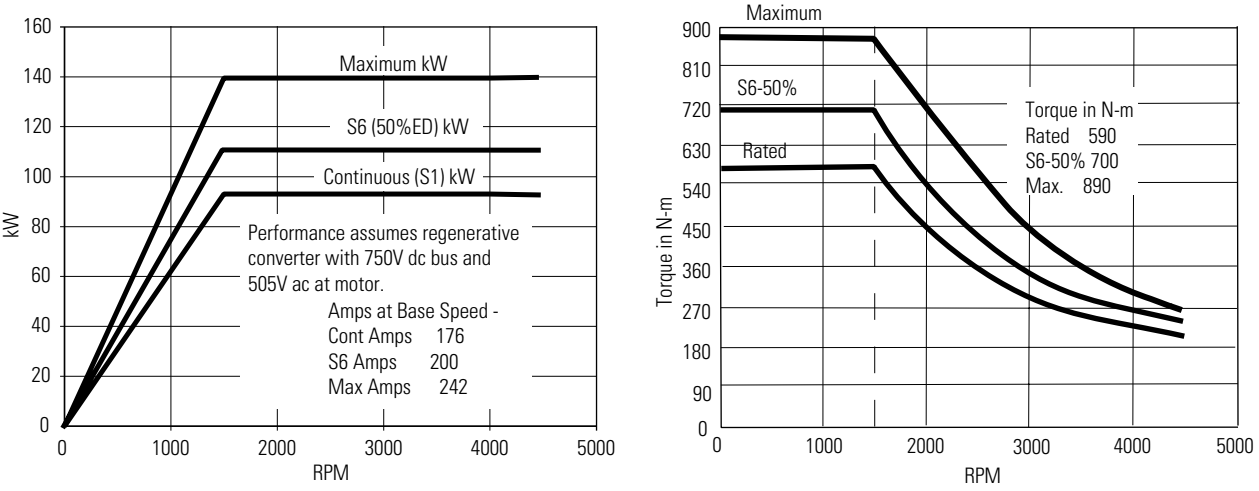


Figure D.13
8720SM-093S6TA Motor with 8720MC-D180 Drive



Specifications for 5.5 to 18.5 kW 8720SM Motors

The following specifications apply to 5.5 to 18.5 kW motors and the 8720MC drive amplifier operating with 460V ac input.

8720SM Motor Specifications for 460V ac Input Drives

8720SM Motor Specifications for 460V ac Input Drives						
Motor Specifications	**Units**	**Motor Data for Each Power Rating**				
Motor catalog number	8720SM-	005S1BB	007S1CB	011S1DB	015S2EB	018S2FB
Motor frame number		DL1106	DL1108	DL1110	DL1307	DL1308
Continuous power	kW (hp)	5.5 (7.5)	7.5 (10)	11 (15)	15 (20)	18.5 (25)
S6 - 50% duty	kW (hp)	7.5 (10)	10 (13.4)	15 (20.1)	18 (24.1)	22 (29.5)
1 minute peak	kW (hp)	8.3 (11.1)	11.5 (15.4)	16.5 (22.1)	23 (30.8)	28 (37.5)
Rated Torque at Base Speed	N-m (lb-ft)	35 (25.8)	48 (35.4)	70 (51.7)	96 (70.8)	118 (87)
Peak Torque at Base Speed	N-m (lb-ft)	53 (39.1)	72 (53.1)	105 (77.4)	143 (105.5)	177 (130.5)
Base speed	rpm	1500	1500	1500	1500	1500
Max speed S series	rpm	9000	9000	9000	8000	8000
Constant power speed range		5.8:1	6:1	4.5:1	4.3:1	3.9:1
Rotor inertia	$kg\text{-}m^2$ ($lb\text{-}ft^2$)	0.0165 (.392)	0.0222 (.528)	0.0272 (.645)	0.0809 (1.92)	0.0977 (2.32)
Rated continuous motor current at base speed	Amps (RMS cont.)	19.3	26.4	32.3	41.5	47.1
S6 current at base speed	Amps (RMS)	25	33	42	49	54
Peak current at base speed	Amps (RMS)	27.5	37	46	58	65
Voltage at Base Speed	Volts (RMS)	245	243	278	297	320
Voltage at max speed	Volts (RMS)	420	420	420	420	420
Motor weight	kg (lbs)	75 (165)	91 (201)	102 (225)	131 (289)	150 (331)
Max radial bearing load	kg (lbs)	206(455)	206(455)	206(455)	243 (535)	243 (535)

8720MC Drive Amplifier Specifications with 460V ac Input

8720MC Drive Amplifier Specifications for 460V ac Input Drives						
Drive Amplifier Specifications	**Units**	**Drive Amplifier Data for Each Power Rating**				
Motor catalog number	8720SM-	005S1BB	007S1CB	011S1DB	015S2EB	018S2FB
Rated motor current at base speed	Amps (RMS cont.)	19.3	26.4	32.3	41.5	47.1
Drive amplifier catalog number	8720MC-	B021	B027	B034	B042	B048
AC input voltage	Volts (RMS)	460	460	460	460	460
AC input current	Amps (RMS)	22	28	35	43	49
Rated Input kVA	kVA	18	23	29	35	40
Max continuous output power	kW (hp)	5.5 (7.5)	7.5 (10)	11 (15)	15 (20)	18.5 (25)
Max continuous output current	Amps	21	27	34	42	48
Rated output kVA	kVA	15	20	35	43	49
DC Bus Capacitance	µF					
Drive amplifier frame		B	B	B	B	B
Weight	kg(lbs)	22.7 (50)	22.7 (50)	22.7 (50)	22.7 (50)	22.7 (50)

Power and Torque Curves for 5.5 to 18.5 kW 8720SM Motors

The following power and torque curves contain data for 5.5 to 18.5 kW motors at 1500 RPM base speed and the 8720MC drive amplifier with 460V ac input voltage.

Figure D.14
8720SM-005S1BB Motor with 8720MC-B021 Drive

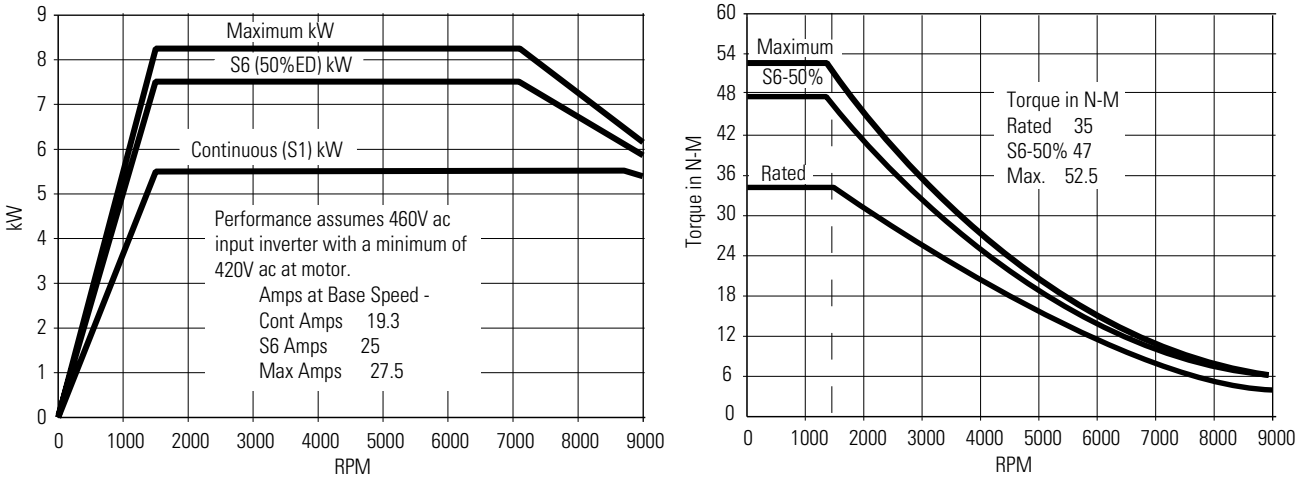
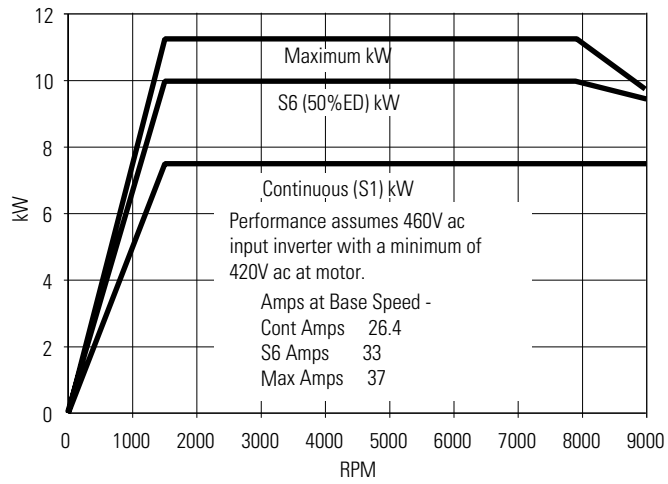


Figure D.15
8720SM-007S1CB Motor with 8720MC-B027 Drive



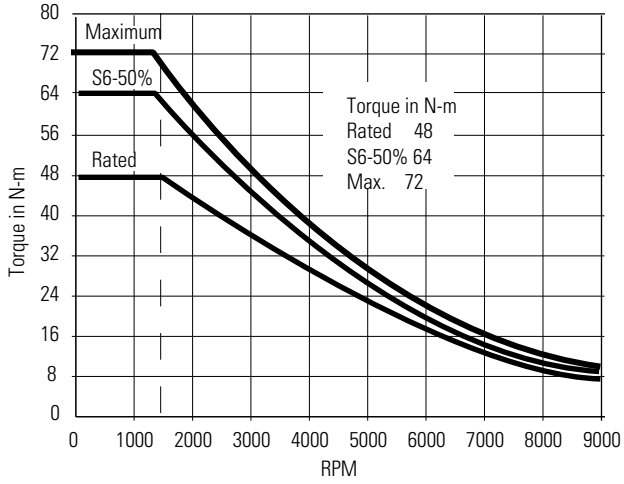
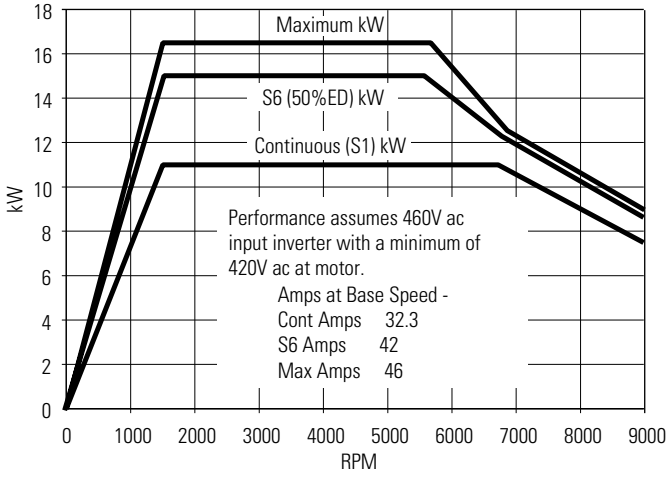


Figure D.16
8720SM-011S1DB Motor with 8720MC-B034 Drive



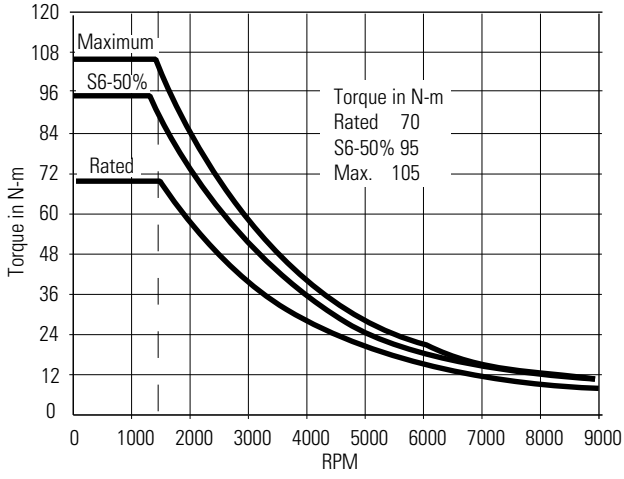
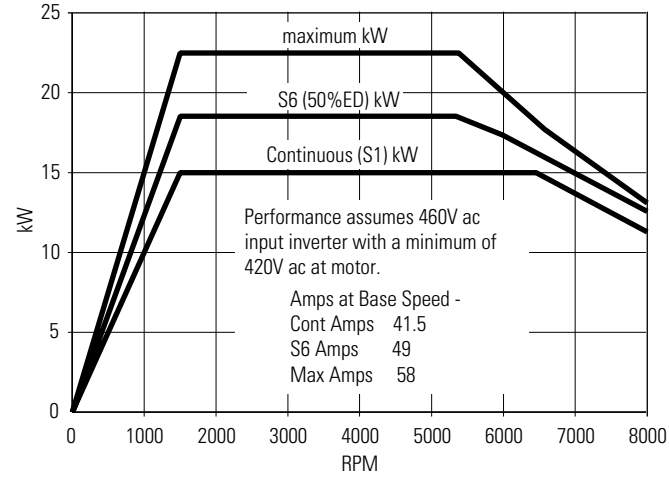


Figure D.17
8720SM-015S2EB Motor with 8720MC-B042 Drive



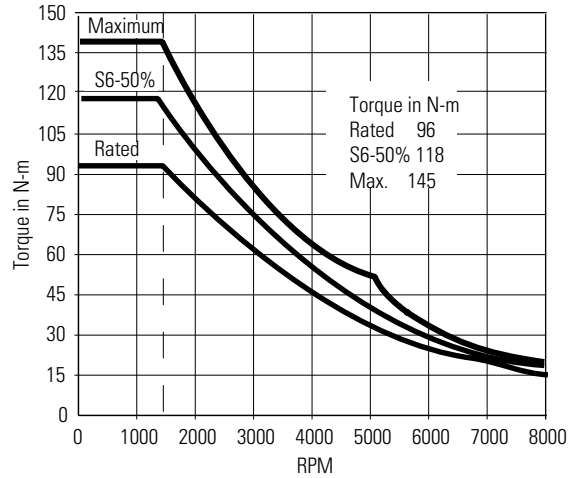
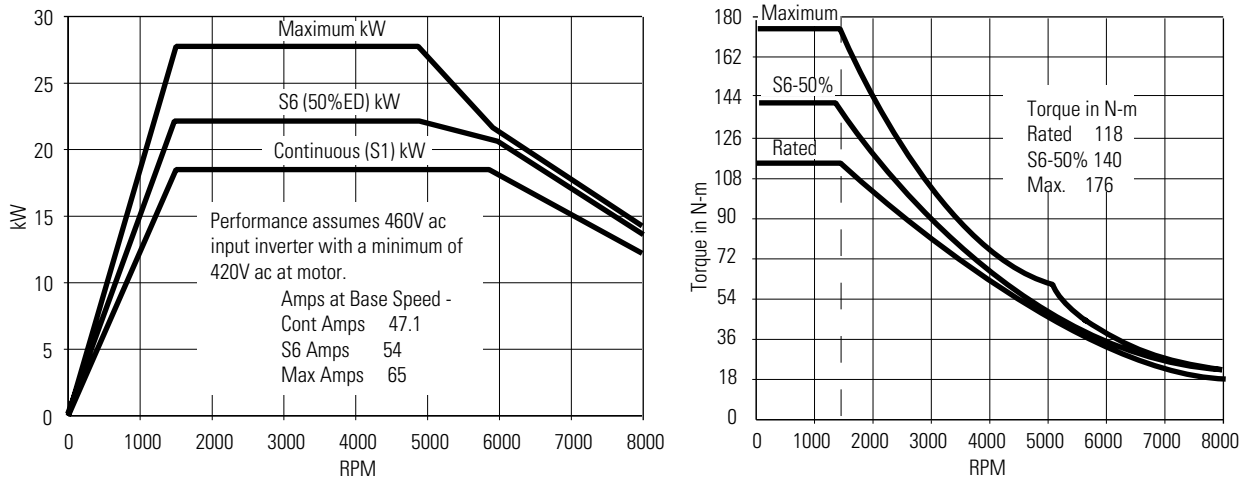


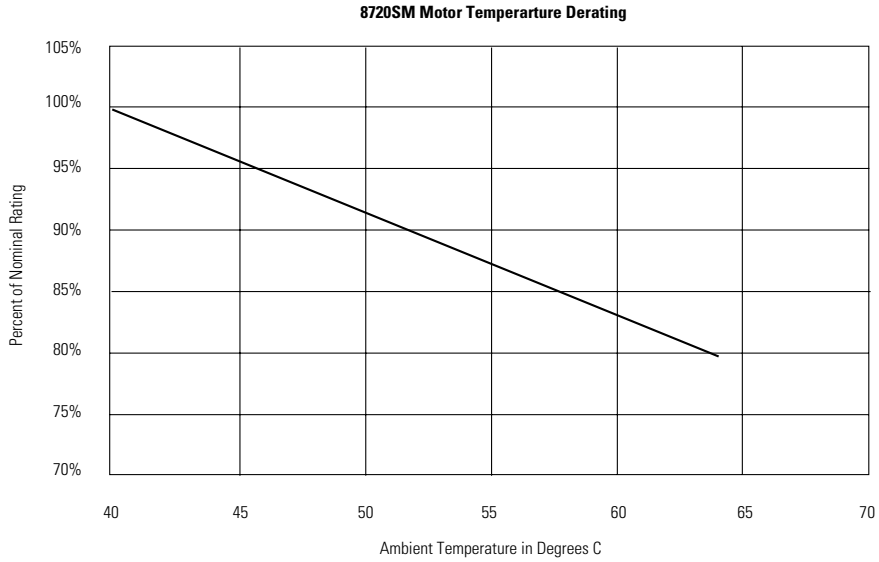
Figure D.18
8720SM-018S2FB Motor with 8720MC-B048 Drive



8720SM Motor Temperature Derating Curve

Figure D.19 shows the derating curve for all 8720SM Motors operating at temperatures above the 40° C (104° F) rated temperature.

Figure D.19
8720SM Motors



Numerics

A

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W

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