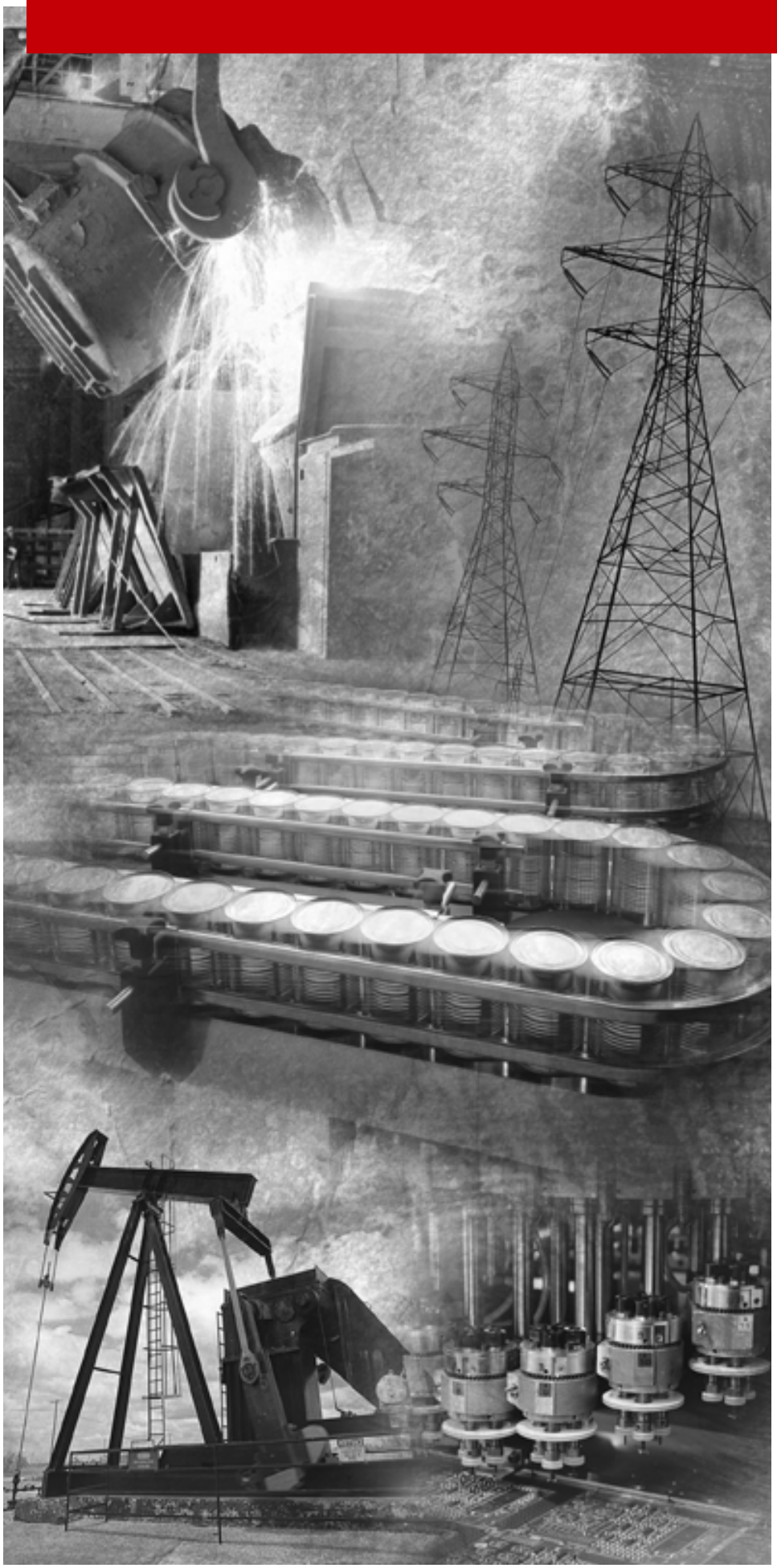


Allen-Bradley

8720MC High Performance Drives

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

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

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

Installation 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.

Chapter 3

Connecting Your 8720MC

Appendix A

Specifications and Dimensions

Appendix B

Interconnect Diagrams

Appendix C

Catalog Numbers and Accessories

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

Use this manual for designing, installing, and wiring your 8720MC drive. The manual is intended for engineers or technicians directly involved in the installation and wiring of the 8720MC.

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

Purpose of this Manual

This manual provides the mounting, wiring, and connecting procedures for the 8720MC and standard Rockwell Automation/ Allen-Bradley motors recommended for use with the 8720MC.

For troubleshooting and system integration with the ControlLogix™ SERCOS interface™ module (1756-M*xx*SE), refer to the *8720MC High Performance Drive Integration Manual* (publication 8720MC-IN002*x*-EN-P). This manual is available at TheAutomationBookstore.com electronically (as a .pdf) or in hardcopy.

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	*Installing Your 8720MC Drive*	Provides mounting information for the 8720MC drive components.
2	*8720MC Connector Data*	Provides 8720MC connector locations, signal descriptions, and specifications.
3	*Connecting Your 8720MC*	Provides connection and wiring information for the 8720MC drive components.
Appendix A	*Specifications and Dimensions*	Provides mounting dimensions, and power, weight, environmental, and functional specifications for the 8720MC drive.
Appendix B	*Interconnect Diagrams*	Provides power and drive/motor interconnect diagrams for the 8720MC.
Appendix C	*Catalog Numbers and Accessories*	Provides catalog numbers and descriptions of the 8720MC drives and related products.

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 configuring and troubleshooting your 8720MC	*8720MC High Performance Drive Integration Manual*	8720MC-IN002*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
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, 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.

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.

Installing Your 8720MC Drive

Chapter Objectives

This chapter provides system installation guidelines and procedures for mounting your 8720MC drive. This chapter covers the following topics:

- Complying with European Union Directives
- 8720MC Drive Component Overview
- Before Mounting Your System
- HF Bonding Your System
- Planning Your Panel Layout
- Mounting Your 8720MC Drive System

Note: Refer to the *8720MC Regenerative Power Supply User Manual* (publication 8720MC-UM001*x*-US-P) for 8720MC-RPS installation instructions.

ATTENTION

The following information is a guideline for proper installation. The National Electrical Code and any other governing regional or local codes overrule this information. The Allen-Bradley Company cannot assume responsibility for the compliance or the noncompliance with any code, national, local or otherwise, for the proper installation of this system or associated equipment. If you ignore codes during installation, hazard of personal injury and/or equipment damage exists.

Complying with European Union Directives

If this product is installed within the European Union or EEC regions and has the CE mark, the following regulations apply.

For more information on the concept of electrical noise reduction, refer to *System Design for Control of Electrical Noise* (publication GMC-RM001*x*-EN-P).

EMC Directive

This unit is tested to meet Council Directive 89/336/EEC Electromagnetic Compatibility (EMC) using the following standards, in whole or in part:

- EN 50081-2 EMC — Generic Emission Standard, Part 2 — Industrial Environment
- EN 50082-2 EMC — Generic Immunity Standard, Part 2 — Industrial Environment

The product described in this manual is intended for use in an industrial environment.

Meeting CE Requirements

To meet CE requirements the following components are required:

- Install an AC line filter as close as possible to the module (8720MC drive or 8720MC-RPS) where three-phase input power connects. Refer to *Appendix C* for available AC line filter catalog numbers.
- Use 2090 series motor power cables (MP-Series motors) or use connector kits. Clamp the cable shields at the drive and provide a ground path to the motor ground terminal on TB1. Refer to *Chapter 3* for wiring examples and guidelines when making your own 8720SM cables.
- Use 2090 series motor feedback cables (MP-Series and 8720SM S1, S2, and S4 motors) or use connector kits. Terminate the feedback shield to the chassis clamp provided. Refer to *Chapter 3* for wiring examples and guidelines when making your own 8720SM cables.
- Install the 8720MC system inside an enclosure. Run input power wiring (clamped to the enclosure) in conduit outside of the enclosure. Separate signal and power cables as shown in *Planning Your Panel Layout* beginning on page 1-14.
- Motor power/feedback cable length must not exceed 90 m (295.2 ft). Refer to *Appendix C* for motor connector kit catalog numbers.

Low Voltage Directive

These units are tested to meet Council Directive 73/23/EEC Low Voltage Directive. The EN 60204-1 Safety of Machinery-Electrical Equipment of Machines, *Part 1-Specification for General Requirements* standard applies in whole or in part. Additionally, the standard EN 50178 *Electronic Equipment for use in Power Installations* applies in whole or in part.

8720MC Drive Component Overview

This section provides an overview of the 8720MC drive components and a typical installation.

8720MC Component:	Catalog Numbers:	Description:
8720MC Drives	8720MC-B*xxx*-A*x*-HAS*x*	The 8720MC drives available with 14, 21, 27, 34, 42, and 48A (max.) continuous output current.
	8720MC-D*xxx*-A*x*-HAS*x*	The 8720MC drive available with 65, 78, 97, 120, 149, and 180A (max.) continuous output current.
8720MC Regenerative Power Supplies	8720MC-RPS-*xxx*B*x*-*xxx*	The 8720MC regenerative power supply available with 27, 64, and 190 (max.) motor amps. Included with regenerative power supply is the 8720MC-HF-B2 harmonic filter and 8720MC-VA-B varistor.
8720MC Line Reactors	8720MC-LR-*xxxxx*	The 8720MC line reactors with 32, 48, 62, and 70A current ratings.
ControlLogix Chassis with SERCOS interface module	1756-M*xx*SE	The 1756-M*xx*SE SERCOS interface module serves as a link between the ControlLogix platform and 8720MC system. The communication link uses the IEC 61491 SErial Real-time COmmunication System (SERCOS) protocol over a fiber-optic cable.
RSLogix 5000™ software	9324-RLD300ENE	RSLogix 5000 provides support for programming, commissioning, and maintaining the Logix family of controllers.
Motors	MPL-B8*xxx*, -B9*xxx* and 8720SM S1 and S2	These MP-Series (permanent magnet) and 8720SM (induction) motors are available for use with the 8720MC drives in SERCOS interface mode.
	8720SM S3 and S4	These 8720SM (induction) motors are available for use with the 8720MC drives in analog mode.
Motor Power Cables	2090-CDNPBMP-8S*xx*	Quick release, straight connectors at the motor and flying leads at the drive end. For use with MPL-B860*x*, -B880*x*, -B960*x*, -B980B*x*, and -B980C motors.
	2090-MCNPMP-6S*xx*	Quick release, straight connectors at the motor and flying leads at the drive end. For use with MPL-B980D motors.
	Motor power cables for all 8720SM motors are customer supplied.	
Feedback Cables	2090-CDNFDMP-S*xx*	Quick release, straight connectors at the motor and flying leads at the drive end. For use with all applicable MP-Series motors and 8720SM-*xxxxxxx*S1, -*xxxxxxx*S2, and -*xxxxxxx*S4.
	Motor feedback cables for all 8720SM-*xxxxxxx*S3 motors are customer supplied.	
SERCOS Fiber-Optic Cables	2090-SC*xxx-x*	SERCOS fiber-optic cables are available in four types (inside enclosure, outside enclosure, outside enclosure in harsh environments, and glass). All four types include connectors at both ends.
AC Line Filters	8720MC-RFI80	The 8720MC-RFI80 three-phase AC line filter is suitable for use with the 8720MC-RPS27 and -RPS65 regenerative power supply.
	8720MC-EF190-VB	The 8720MC-EF190-VB three-phase AC line filter is suitable for use with the 8720MC-RPS190 regenerative power supply.
External Active Shunt Module	1336-MOD-KB*xxx*	The Bulletin 1336 Heavy Duty Dynamic Brake is available when the 8720MC-RPS is not part of the configuration.

Note: Refer to *Appendix C* for a complete list of catalog numbers for the 8720MC components listed above.

You can configure the 8720MC drive with 380/460V ac input power or with 750V dc common bus power as described in the table below.

You can configure this Drive: 8720MC-	**With this input voltage:**
B021, B027, B034, B042, B048	380/460V three-phase ac or 750V dc common bus
B014, D065, D078, D097, D120, D149, D180	750V dc common bus

Refer to figures 1.1 and 1.2 for examples of three-phase and common bus configurations.

Figure 1.1
8720MC Drive System Overview (750V dc Common Bus Configuration)

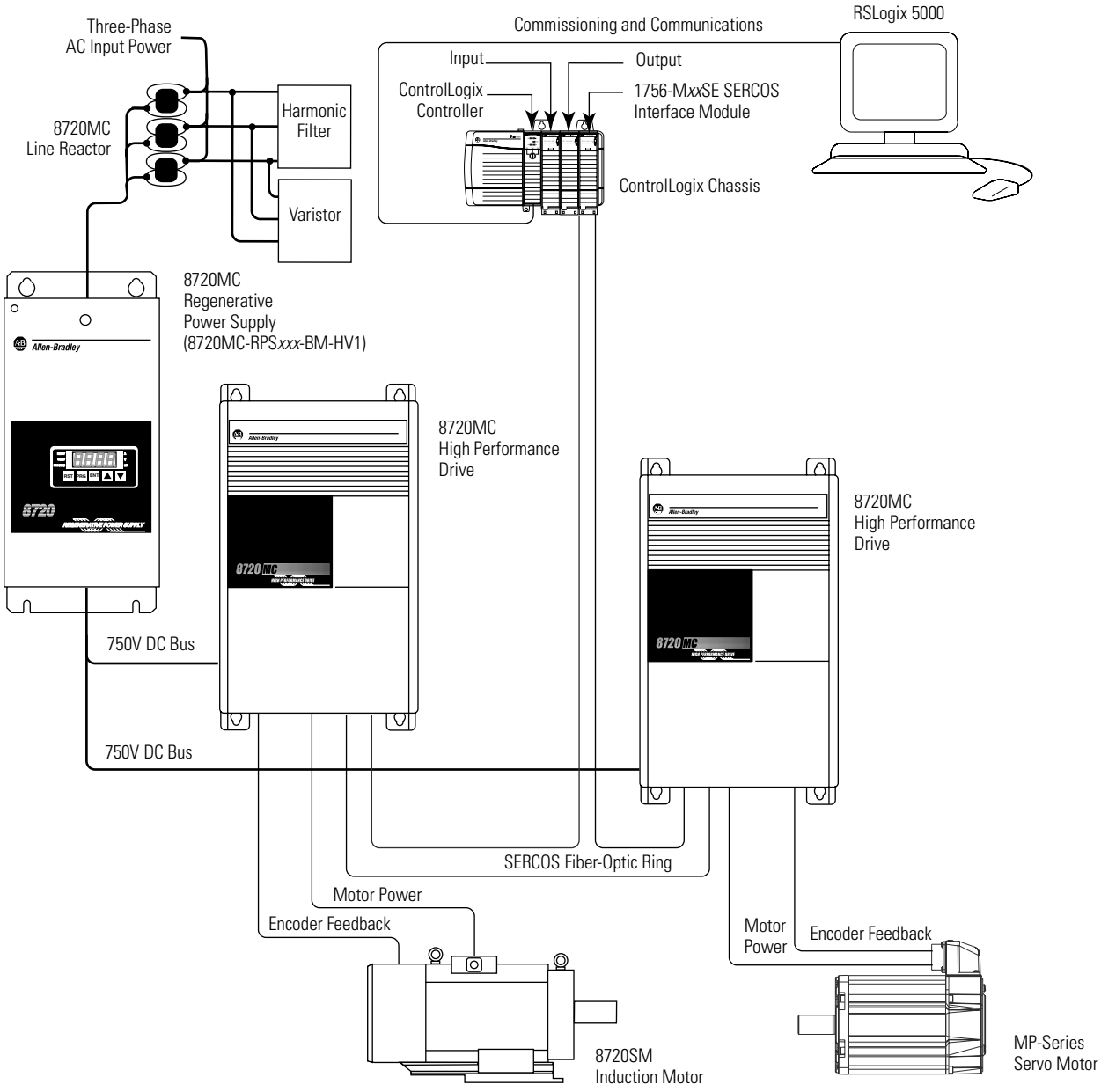
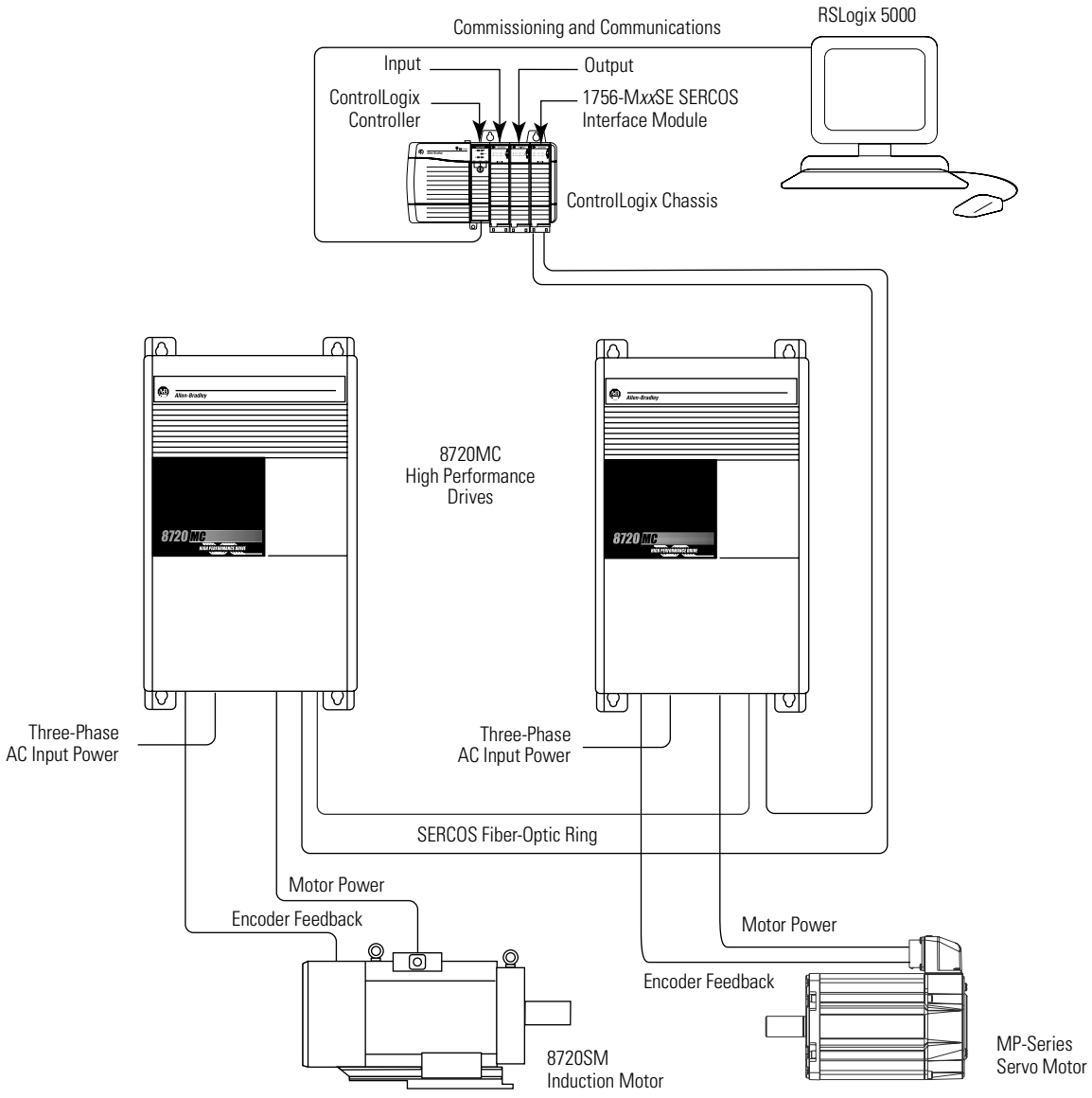


Figure 1.2
8720MC Drive System Overview (380/460V ac Three-Phase Configuration)



Before Mounting Your System

Before you mount your 8720MC system make sure you understand the following:

- How to unpack the system
- System mounting requirements
- Ventilation requirements
- How to size an enclosure
- How to select fuses

Unpacking Your 8720MC

Remove all packing material, wedges, and braces from within and around the components. After unpacking, check the item(s) name plate catalog number against the purchase order.

Each 8720MC drive ships with the following:

- One 8720MC drive
- One bag of connectors for feedback and I/O connections
- One installation manual (publication 8720MC-IN001*x*-EN-P)

IMPORTANT Some of the mounting and wiring information is specific to the individual frame sizes. If you do not know what your frame size is, refer to *Dimensions* in *Appendix A*.

System Mounting Requirements

There are several things that you need to take into account when preparing to mount the 8720MC:

- The 8720MC must be enclosed in a grounded conductive enclosure offering protection as defined in standard EN 60529 (IEC 529) to IP55 such that they are not accessible to an operator or unskilled person, in order to comply with UL® and CE requirements. A NEMA 4X enclosure exceeds these requirements providing protection to IP66.
- The ambient temperature of the enclosure in which you install the 8720MC must not exceed 50° C (122° F).
- The panel you install inside the enclosure for mounting your system components must be on a flat, rigid, vertical surface that won't be subjected to shock, vibration, moisture, oil mist, dust, or corrosive vapors.
- You need to maintain minimum clearances (refer to Figure 1.3) for proper airflow, easy module access, and proper cable bend radius.
- The 8720MC can operate at elevations to 1000 m (3280 ft) without derating, however, the continuous current rating must be de-rated by 3% for each additional 300 m (984 ft) up to 3000 m (9842 ft). Consult your local Allen-Bradley representative prior to operating above 3000 m (9842 ft).

ATTENTION

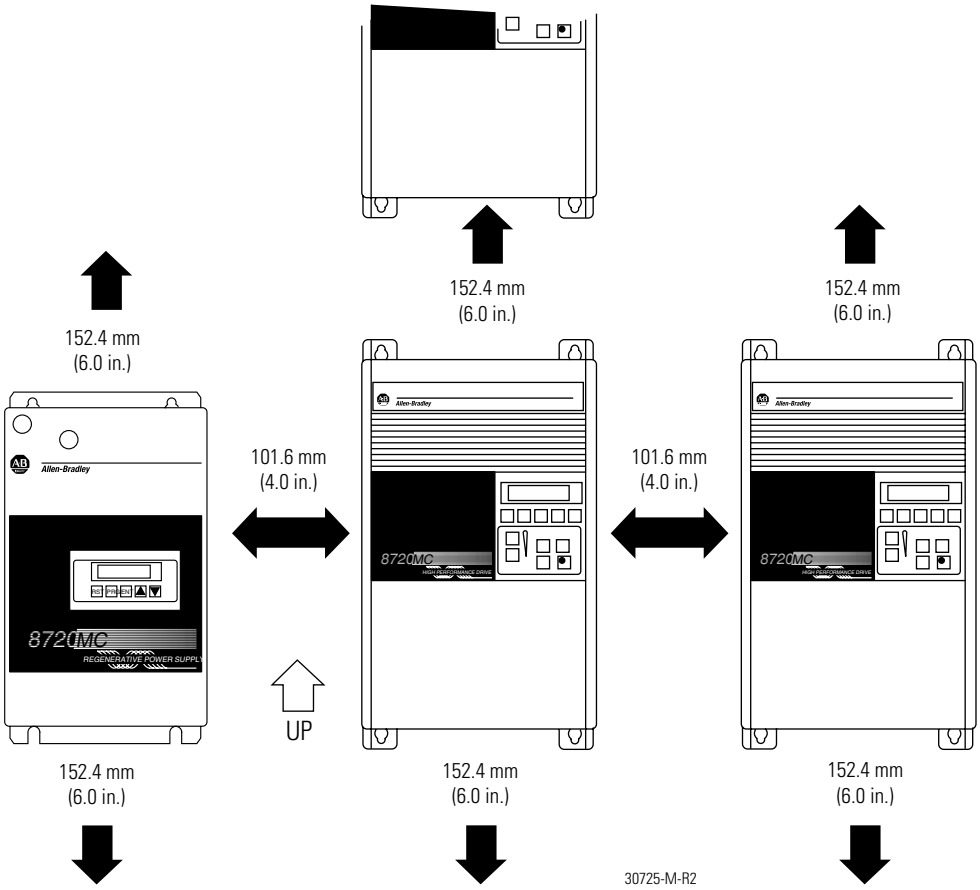
Plan the installation of your system so that you can perform all cutting, drilling, tapping, and welding with the system removed from the enclosure. Because the system is of the open type construction, be careful to keep any metal debris from falling into it. Metal debris or other foreign matter can become lodged in the circuitry, which can result in damage to components.

Refer to *Appendix A* for mounting dimensions, power dissipation, and environmental specifications for the 8720MC.

Ventilation Requirements

This section provides information to assist you in sizing your cabinet and locating your 8720MC system components. Refer to Figure 1.3 for minimum clearance requirements for 8720MC components mounted inside the cabinet.

Figure 1.3
Minimum 8720MC Clearance Requirements)



IMPORTANT If the cabinet is ventilated, use filtered or conditioned air to prevent the accumulation of dust and dirt on electronic components. The air should be free of oil, corrosives, or electrically conductive contaminates.

Refer to *Appendix A* for 8720MC power dissipation specifications.

Sizing an Enclosure

If you are supplying your own enclosure for the 8720MC drive, you can mount your drive within an enclosure or you can mount the drive and let the heat sink extend outside the enclosure.

With no active method of heat dissipation (such as fans or air conditioning) either of the following approximate equations can be used:

Metric	Standard English
$A = \frac{0.38Q}{1.8T - 1.1}$	$A = \frac{4.08Q}{T - 1.1}$
Where T is temperature difference between inside air and outside ambient (°C), Q is heat generated in enclosure (Watts), and A is enclosure surface area (m^2). The exterior surface of all six sides of an enclosure is calculated as	Where T is temperature difference between inside air and outside ambient (°F), Q is heat generated in enclosure (Watts), and A is enclosure surface area (ft^2). The exterior surface of all six sides of an enclosure is calculated as
A = 2dw + 2dh + 2wh	A = (2dw + 2dh + 2wh) / 144
Where d (depth), w (width), and h (height) are in meters.	Where d (depth), w (width), and h (height) are in inches.

Contact your cabinet manufacturer for options available to cool your cabinet. Refer to *Power Dissipation Specifications* in *Appendix A*.

Fuse Selection

This section describes the fuse requirements for your 8720MC system.

The 8720MC utilizes internal short circuit output protection and is suitable for use on a circuit capable of delivering up to 100,000 amperes, when protected by class CC, J, L, and R fuses. Circuit breakers with adequate widthstand and interrupt ratings, as defined in NEC 2002, article 110.9 and 110.10, are also allowed. Overcurrent protection must be adequately coordinated per NEC 2002, article 240.

The 8720MC is listed by Underwriters Laboratories, Inc. with fuses sized (FLA), according to UL 508C. Refer to *Fuse Specifications* in *Appendix A* for recommended fuses.

In most cases, fuses selected to match the drive input current rating will meet the NEC requirements and provide the full drive capabilities. Dual element, time delay (slow acting) fuses should be used to avoid nuisance trips during the inrush current of power initialization. Refer to *Power Specifications* in *Appendix A* for input current specifications for your 8720MC.

AC Input Fusing (380-460V ac)

The 8720MC AC input drives (8720MC-B021, -B027, -B034, -B042, and -B048) are suitable for use in circuits that can deliver up to a maximum of 70 rms amperes when used with the AC input line fuses specified in *Appendix A*.

The 8720MC AC input drives do not contain input power short circuit fusing. For the recommended size and type specifications for fuses necessary to protect against short circuits, refer to *AC Input Line Fuse Ratings (380 to 460V ac Input)* on page A-3.

Blower Motor Fusing

Protect all 8720SM motor fans with the use of 1A, time delayed, current limiting fuses. Bussmann™ fuse (LP-CC-1) is recommended.

Refer to *Appendix B* for the 8720MC drive interconnect diagrams.

8720MC-RPS Fusing

The 8720MC DC input drives (8720MC-B*xxx* and -D*xxx*) are suitable for use in circuits that can deliver up to a maximum of 250 rms symmetrical motor amperes when used with the 8720MC-RPS and the AC input line fuses specified in *600V ac Input Fuse Specifications* on page A-4.

When two or three 8720MC-RPS065 Regenerative Power Supplies are operating in a master/slave mode, the output load is shared equally between the power supplies. When a master and one slave is required input fuses and wire should be sized to 1/2 of the total required maximum continuous input current for the total required drive load, multiplied by 1.75. When a master and two slaves are required input fuses and wire should be sized to 1/3 of the total required maximum continuous input current for the total required drive load, multiplied by 1.75.

Refer to *Appendix B* for the 8720MC drive with 8720MC-RPS interconnect diagrams. For more information on the 8720MC-RPS Regenerative Power Supply, refer to the *8720MC Regenerative Power Supply User Manual (*publication 8720MC-RM001*x*-US-P).

DC Input Fusing (750V dc)

When multiple drives and/or master/slave RPS units are needed to meet the load requirements a common bus architecture is preferred. For common bus applications Allen-Bradley's Bulletin 140 bus bar and panel mounting components are recommended. Size the bus bar capacity to at least 175% of total RPS continuous output current. The DC input wire and fuses to each drive should be sized to 175% of each drives' maximum continuous input current requirements.

All fuses on the DC bus must be rated for 1,000V dc operation. For DC bus fuses use Gould A1-100P, Gould A100C (80 amps and higher) or equal. Refer to the *8720MC Regenerative Power Supply User Manual (*publication 8720MC-RM001*x*-US-P) for master/slave RPS configurations.

When a single RPS is matched to a single drive, DC drive input fuses are not required. The following table is used to select DC drive input fuses and assumes more than one drive is connected to the RPS common bus, otherwise DC drive input fuses are not required. Suggested wire sizes assume single conductor connections. It is perfectly acceptable to use 2 or 3 conductors in parallel as long as the total amperage requirements are met. For example 2 parallel #12 conductors could be used in place of a single # 10 conductor.

Refer to *1000V dc Input Fuse Specifications* on page A-5 and *Appendix B* for interconnect diagrams.

HF Bonding Your System

Bonding is the practice of connecting metal chassis, assemblies, frames, shields and enclosures to reduce the effects of electromagnetic interference (EMI). For more information on the concept of high-frequency (HF) bonding, the ground plane principle, and electrical noise reduction, refer to *System Design for Control of Electrical Noise* (publication GMC-RM001*x*-EN-P).

Bonding Modules

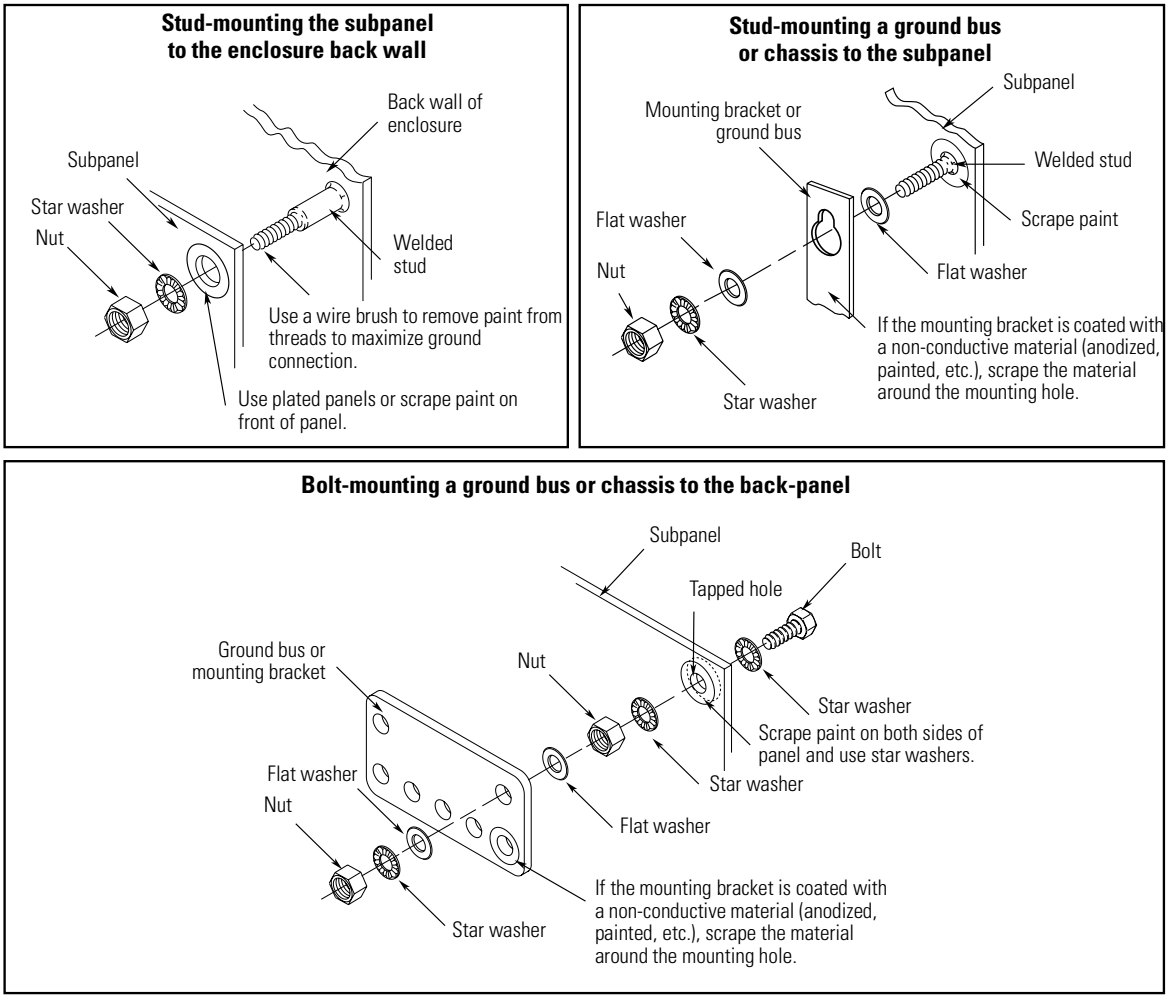
Unless specified, most paints are not conductive and they act as insulators. To achieve a good bond between the drive and the subpanel, surfaces need to be paint-free or plated. Bonding metal surfaces creates a low-impedance return path for high-frequency energy.

IMPORTANT To improve the bond between the drive and subpanel, construct your subpanel out of zinc plated (paint-free) steel.

Improper bonding blocks the direct return path and allows high-frequency energy to travel elsewhere in the cabinet. Excessive high-frequency energy can effect the operation of other microprocessor controlled equipment.

The illustrations that follow (refer to Figure 1.4) show details of recommended bonding practices for painted panels, enclosures, and mounting brackets.

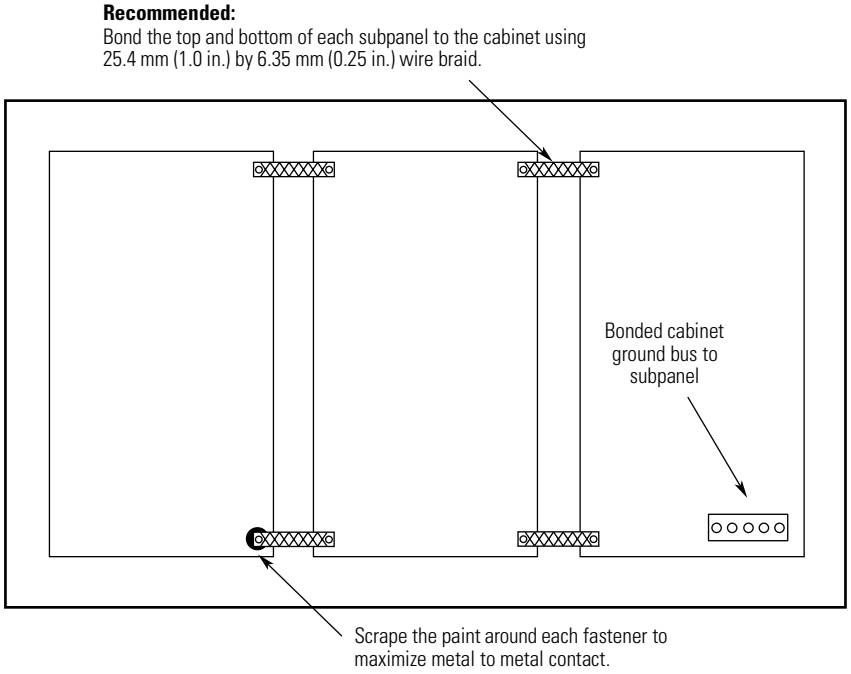
Figure 1.4
Recommended Bonding Practices for Painted Panels



Bonding Multiple Subpanels

Bonding multiple subpanels creates a common low impedance exit path for the high frequency energy inside the cabinet. Subpanels that are not bonded together may not share a common low impedance path. This difference in impedance may affect networks and other devices that span multiple panels. Refer to the figure below for recommended bonding practices.

Figure 1.5
Multiple Subpanels and Cabinet



Planning Your Panel Layout

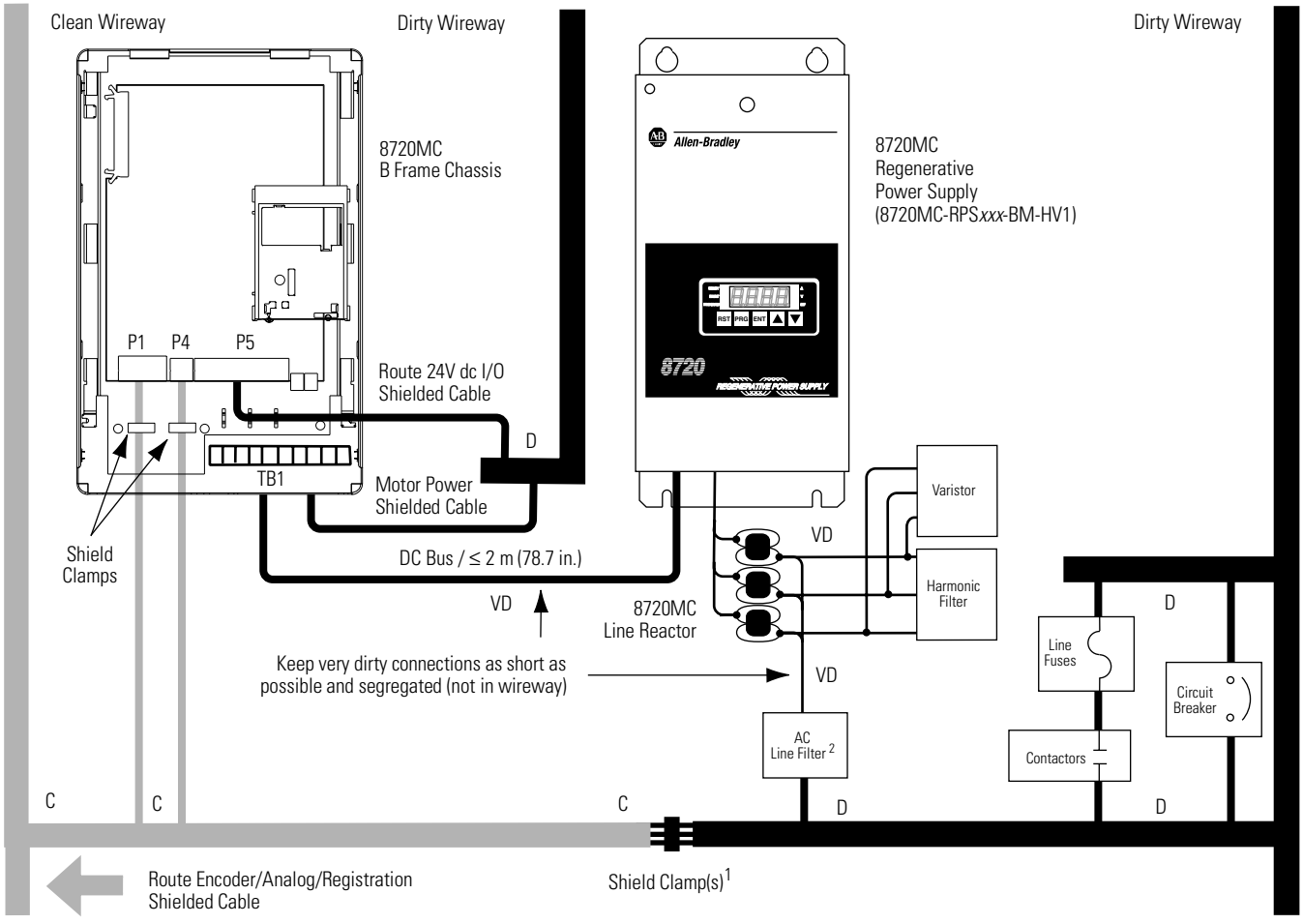
This section outlines the practices which minimize the possibility of noise-related failures as they apply specifically to 8720MC installations. For more information on the concept of electrical noise reduction, refer to *System Design for Control of Electrical Noise* (publication GMC-RM001*x*-EN-P).

Establishing Noise Zones

When a regenerative power supply (8720MC-RPS*xxx*) is used in the 8720MC system and mounted *right* of the drive, observe the following guidelines when laying out your panel (refer to figures 1.6, 1.7, and 1.8 for zone locations).

- The clean zone (C) is beneath and left of the 8720MC and includes the P1 and P4 connector wiring (grey wireway).
- One dirty zone (D) is right of the 8720MC and includes motor power and the P5 connections (black wireway). Another dirty zone is below and right of the 8720MC-RPS and includes fuses, contactors, circuit breakers, and the VAC input to the AC (EMC) line filter.
- The very dirty zone (VD) is beneath and right of the 8720MC and includes the DC bus wiring, AC input from the line filter, 8720MC-RPS, line reactor, varistor, and harmonic filter. Shielded cable is required only if the very dirty cables enter a wireway.
- The SERCOS fiber optic cables are immune to electrical noise.

Figure 1.6
Establishing Noise Zones (Common Bus Configuration with 8720MC-RPS)



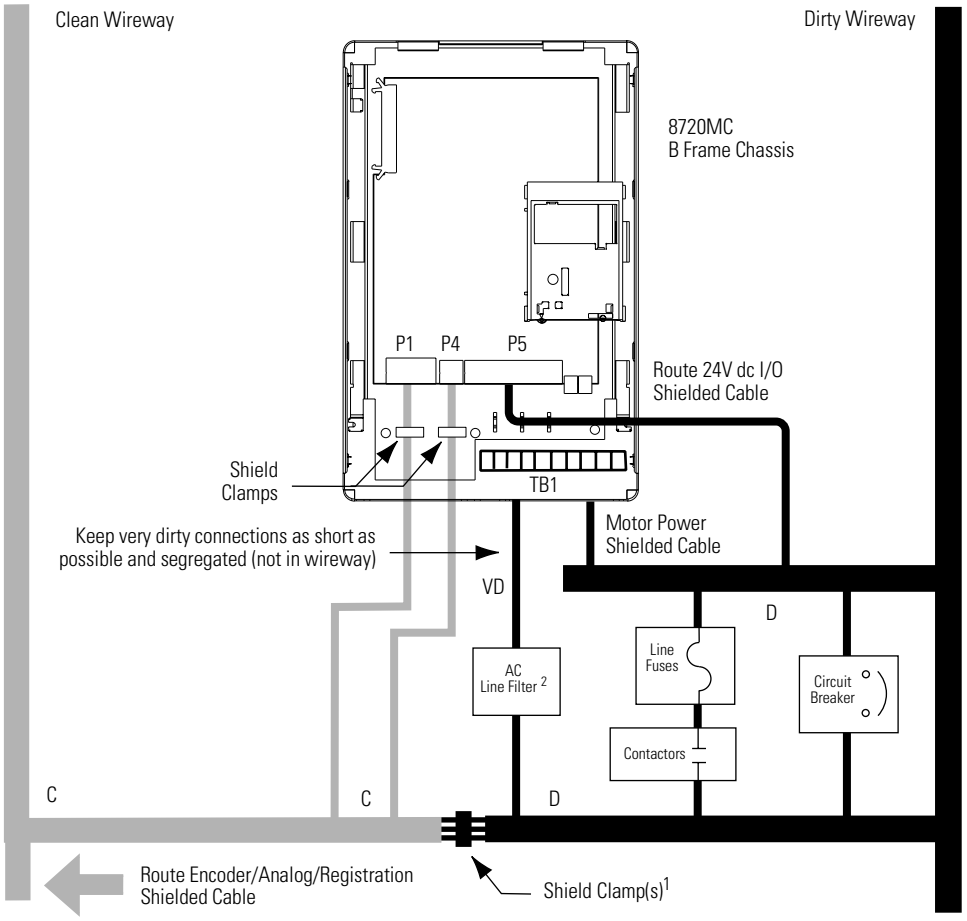
[1] For examples of shield clamp attachment, refer to the *System Design for Control of Electrical Noise Reference Manual* (publication GMC-RM001*x*-EN-P).

[2] If necessary, the AC line filter may be moved ahead of the input contactors and fuses. However, it is important to segregate the very dirty wiring between the filter and drives and keep as short as possible to prevent noise coupling into susceptible circuits.

When a regenerative power supply (8720MC-RPS*xxx*) is *not* used in the 8720MC system, observe the following guidelines when laying out your panel (refer to Figure 1.7 for zone locations).

- The clean zone (C) is beneath the 8720MC left and includes the P1 and P4 connector wiring (grey wireway).
- The dirty zone (D) is beneath the 8720MC to the right (black wireway) and includes fuses, contactors, circuit breakers, and the AC input to the AC (EMC) line filter.
- The very dirty zone (VD) is limited to where the AC line (EMC) filter AC output jumpers over to the 8720MC. Shielded cable is required only if the very dirty cables enter a wireway.
- The SERCOS fiber-optic cables are immune to electrical noise.

Figure 1.7
Establishing Noise Zones (without 8720MC-RPS)



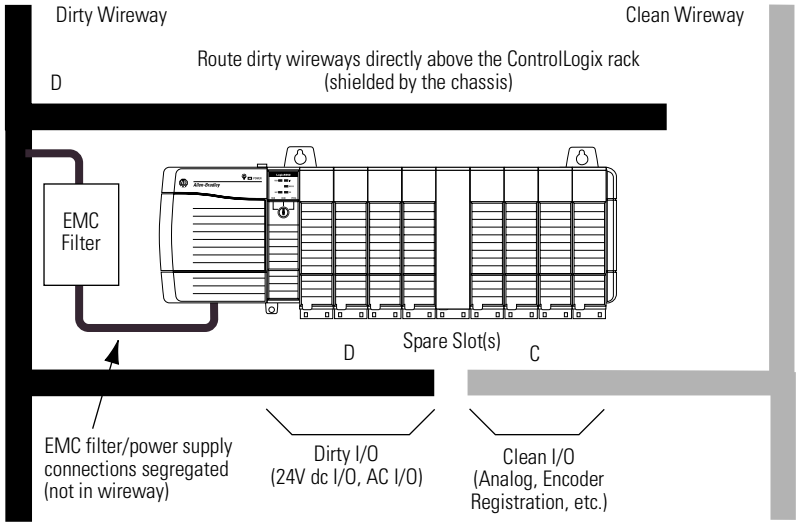
[1] For examples of shield clamp attachment, refer to the *System Design for Control of Electrical Noise Reference Manual* (publication GMC-RM001*x*-EN-P).

[2] If necessary, the AC line filter may be moved ahead of the input contactors and fuses. However, it is important to segregate the very dirty wiring between the filter and drives and keep as short as possible to prevent noise coupling into susceptible circuits.

Observe the following guidelines when installing your 1756-M*xx*SE SERCOS interface module (refer to Figure 1.8 for zone locations).

- The clean zone (C) is beneath the less noisy modules (I/O, analog, encoder, registration, etc. (grey wireway)
- The dirty zone (D) is above and below the power supply and noisy modules (black wireway)
- The SERCOS fiber-optic cables are immune to electrical noise.

Figure 1.8
Establishing Noise Zones (ControlLogix)



Cable Categories for the 8720MC System

The table below indicates the zoning requirements of cables connecting to the 8720MC drive.

Wire/Cable	Connector	Zone			Method	
		Very Dirty	Dirty	Clean	Ferrite Sleeve	Shielded Cable
All 3-phase AC from filter to AC drive (shielded option)	TB1		X			X
All 3-phase AC from filter to AC drive (unshielded option)	TB1	X				
DC power	TB1	X				X
Motor Power	TB1		X			X
Relay Output (0-3)	P5		X			
Digital Output (0-5)	P5		X			
Digital Input (0-9)	P5		X			
Encoder input	P1			X		X
Analog Input	P1			X		X
Analog Output	P4			X		X
Registration input	P4			X		X
Buffered encoder output	P5			X		X

The table below indicates the zoning requirements of cables connecting to the 8720MC-RPS.

Wire/Cable	Connector	Zone			Method	
		Very Dirty	Dirty	Clean	Ferrite Sleeve	Shielded Cable
All 3-phase AC from filter to Converter (shielded option)	TB1		X			X
All 3-phase AC from filter to Converter (unshielded option)		X				
DC power			X			X
DC power		X				
120V ac power	TB2		X			
Run Input	TB3		X			
External Fault Input			X			
Digital Comm input			X			
Fault Reset			X			
Fault Output			X			
VSC Run Output			X			

The table below indicates the zoning requirements of cables connecting to the external active shunt module.

Wire/Cable	Connector	Zone			Method	
		Very Dirty	Dirty	Clean	Ferrite Sleeve	Shielded Cable
DC+, DC- (shielded option)	TB1		X			X
DC+, DC- (unshielded option)		X				
Fan (if present)	N/A		X			

Mounting Guidelines to Reduce Electrical Noise

When mounting AC input components or an external active shunt module refer to the sections below for guidelines designed to reduce system failures caused by excessive electrical noise.

AC Line Filters

Observe the following guidelines when mounting your AC line (EMC) filter (refer to figures 1.6 and 1.7 for examples).

- Mount the AC line filter on the same panel as the 8720MC and as close to the 8720MC as possible.
- Good HF bonding to the panel is critical. For painted panels, refer to Figure 1.4.
- AC input power cable between the AC line filter and 8720MC must be shielded if it enters a wireway.
- Segregate input and output wiring as far as possible.

IMPORTANT CE test certification applies only to AC line filter and single 8720MC drive. Multiple drive loads may perform satisfactorily, but the user takes legal responsibility.

Line Reactor, Harmonic Filter, and Varistor

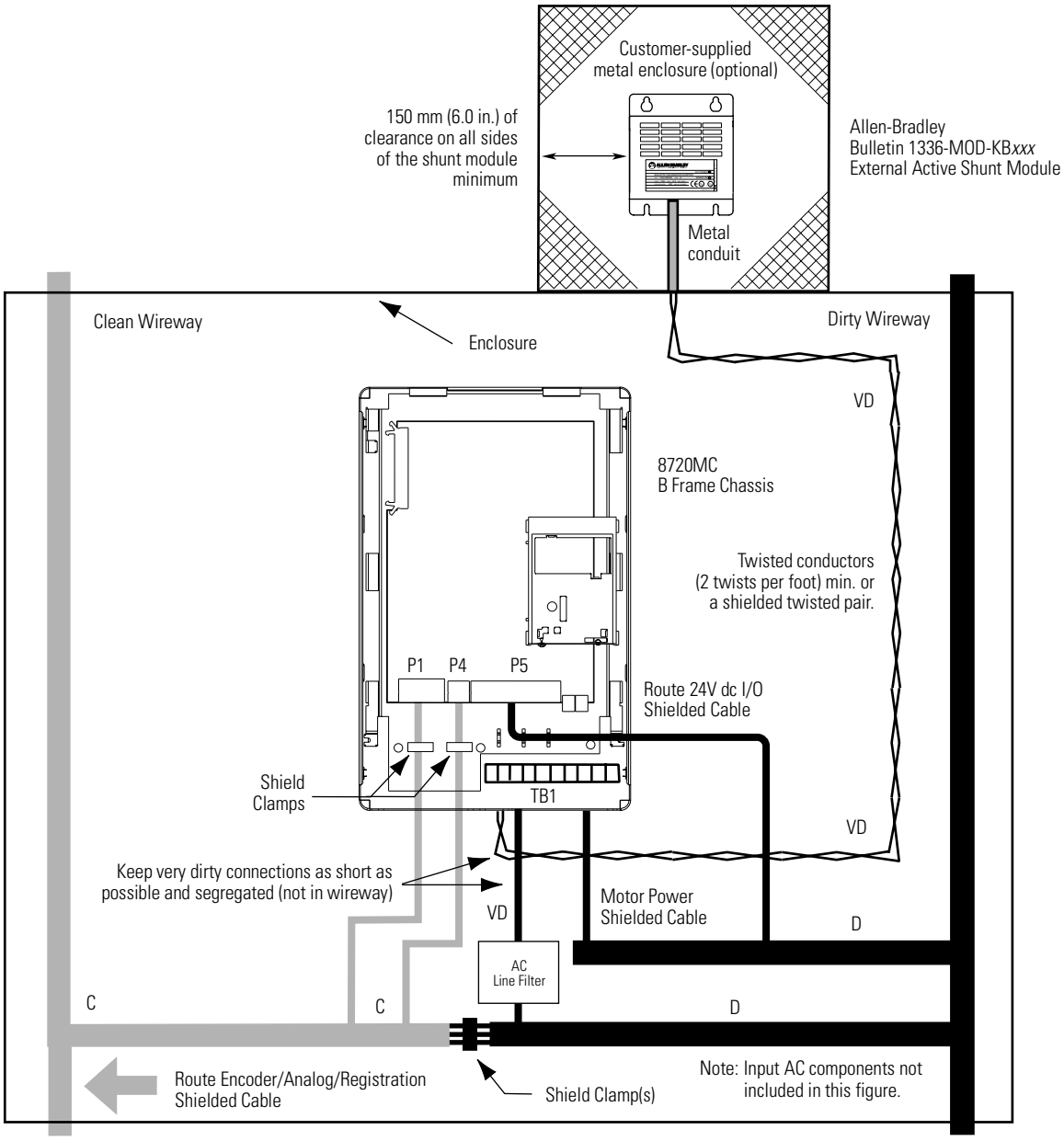
All the guidelines that apply to AC line filters also apply to the line reactor, harmonic filter, and varistor. These components only apply to common bus configurations.

External Active Shunt Module

Observe the following guidelines when mounting your external active shunt module (1336-MOD-KB*xxx*) outside the enclosure. Refer to Figure 1.9 for an example.

- Mount circuit components and wiring in the very dirty zone or in an external shielded enclosure (as shown in the figure below)
- Run shunt power and fan wiring inside metal conduit to minimize the effects of EMI and RFI
- Keep unshielded wiring as short as possible

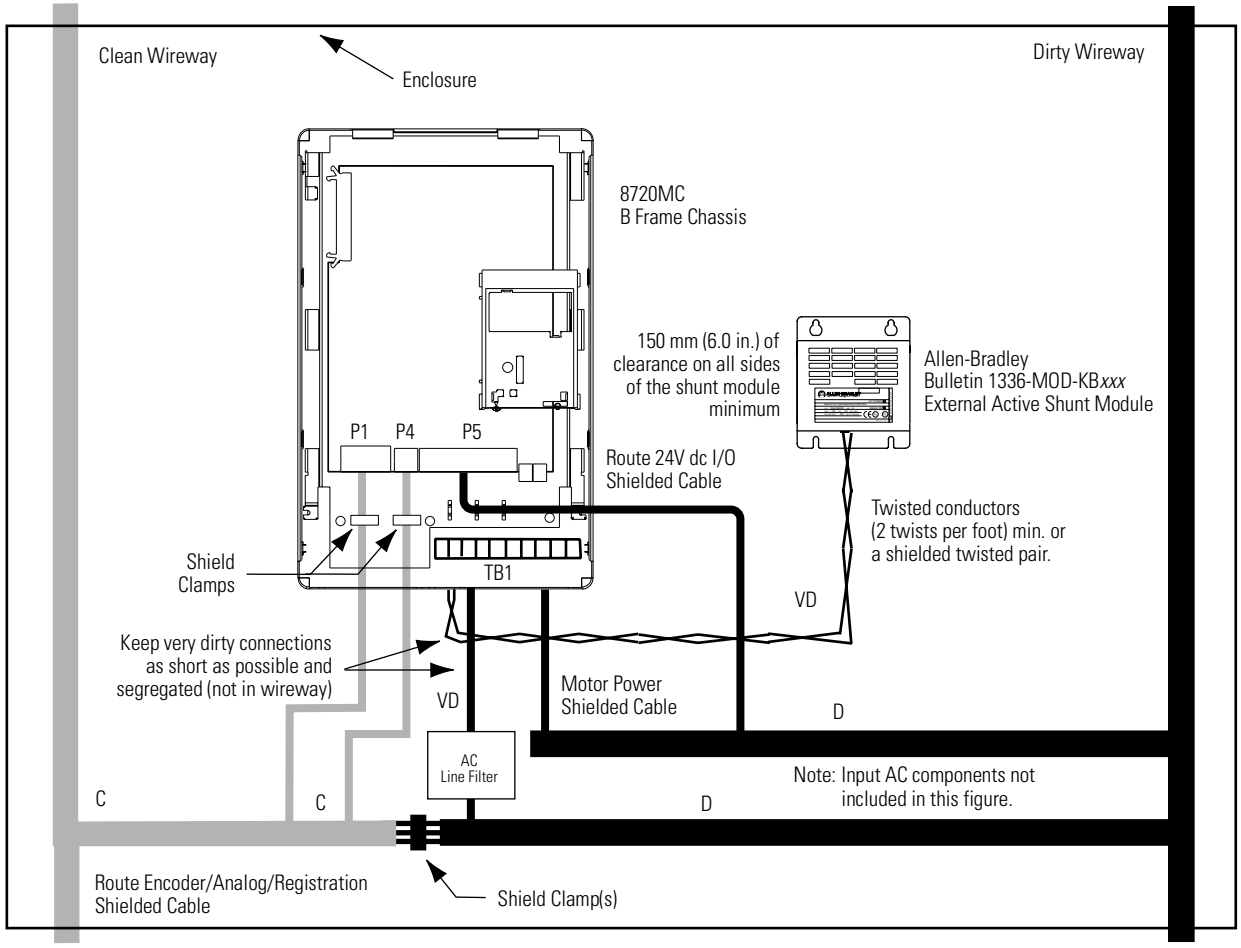
Figure 1.9
External Active Shunt Outside the Enclosure



When mounting your active shunt module inside the enclosure, follow these additional guidelines (refer to Figure 1.10 for an example).

- Metal-clad modules can be mounted anywhere in the dirty zone, but as close to the 8720MC as possible
- Shunt power wires can be run with motor power cables.
- Separate shunt power cables from other sensitive, low voltage signal cables.

Figure 1.10
External Active Shunt Inside the Enclosure



Mounting Your 8720MC Drive System

The procedures in this section assume you have prepared your panel and understand how to bond your system.

For installation instructions regarding equipment and accessories not included here, refer to *Related Documentation* in the *Preface* for the appropriate publication number.

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.

To mount your 8720MC drive:

1. Layout the position for the 8720MC and accessories in the enclosure. Refer to *Establishing Noise Zones* for panel layout recommendations. Mounting hole dimensions for the 8720MC are shown in *Appendix A*.

2. Attach the 8720MC to the cabinet, first using the upper mounting slots of the drive and then the lower. The recommended mounting hardware is M5 metric (1/4-20) or #10 MS bolts. Observe bonding techniques as described in *HF Bonding Your System*.

   IMPORTANT To improve the bond between the 8720MC and subpanel, construct your subpanel out of zinc plated (paint-free) steel.

3. Tighten all mounting fasteners.

8720MC Connector Data

Chapter Objectives

This chapter provides power, feedback, and I/O, connector locations and signal descriptions for your 8720MC drive. This chapter includes:

- Understanding 8720MC Connectors
- Locating 8720MC Drive Connectors and Indicators
- 8720MC Connector Pin-outs
- Understanding I/O Specifications
- Understanding Analog Interface Connections
- Understanding 8720MC Feedback Devices

Switch and LED locations are shown, however for switch and LED configuration, refer to the *8720MC High Performance Drives Integration Manual* (publication 8720MC-IN002*x*-EN-P).

Understanding 8720MC Connectors

The following table provides a brief description of the 8720MC front panel connectors and describes the connector type.

Designator	Description	Connector
P1	Motor/Aux Feedback and Analog Commands	26-pin Weidmueller connector
P4	Analog Outputs and Registration Inputs	8-pin Weidmueller connector
P5	Discrete I/O and A quad B Encoder Feedback Outputs	36-pin Weidmueller connector
TB1	DC Bus, Motor and AC power	10-position screw style barrier terminal strip for B frame (5.5 to 11 kW) drives (8720MC-B014, -B021, and -B027). Refer to Figure 2.6.
		10-position screw style barrier terminal strip for B frame (15 to 22 kW) drives (8720MC-B034, -B042, and -B048) Refer to Figure 2.7.
		10-position screw style barrier terminal strip for C frame (30 to 37 kW) drives (8720MC-D065, and -D078) Refer to Figure 2.8.
		11-position screw style barrier terminal strip for D frame (45 to 93 kW) drives (8720MC-D097, -D120, -D149, and -D180) Refer to Figure 2.9.
TB4	+24V dc Auxiliary Logic Power (user-supplied)	2-position terminal
Tx and Rx	SERCOS Transmit and Receive	SERCOS fiber-optic (2)
SCANport/DPI	SCANport/DPI	SCANport/DPI

Locating 8720MC Drive Connectors and Indicators

Use the figures below to locate the 8720MC drive connectors and indicators. Figure 2.1 illustrates the location of the 8720MC control board and TB1/TB4 on the base driver board. Figure 2.2 illustrates the location of connectors and indicators on the 8720MC control board.

Figure 2.1
B Frame Chassis Connector Layout

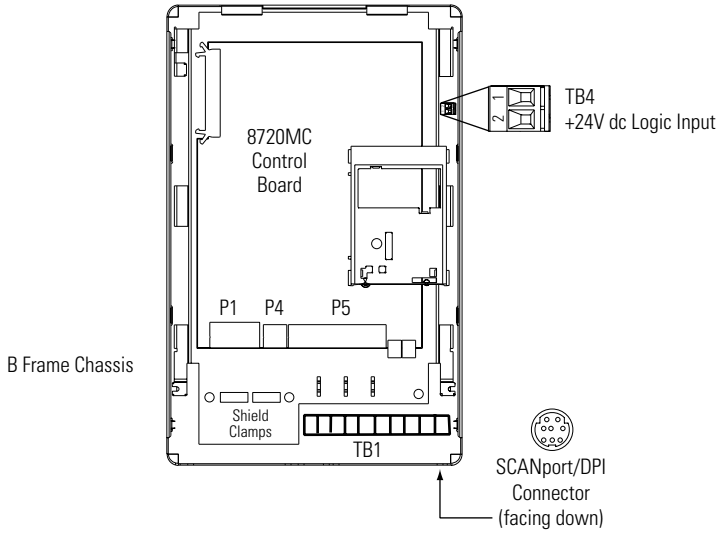
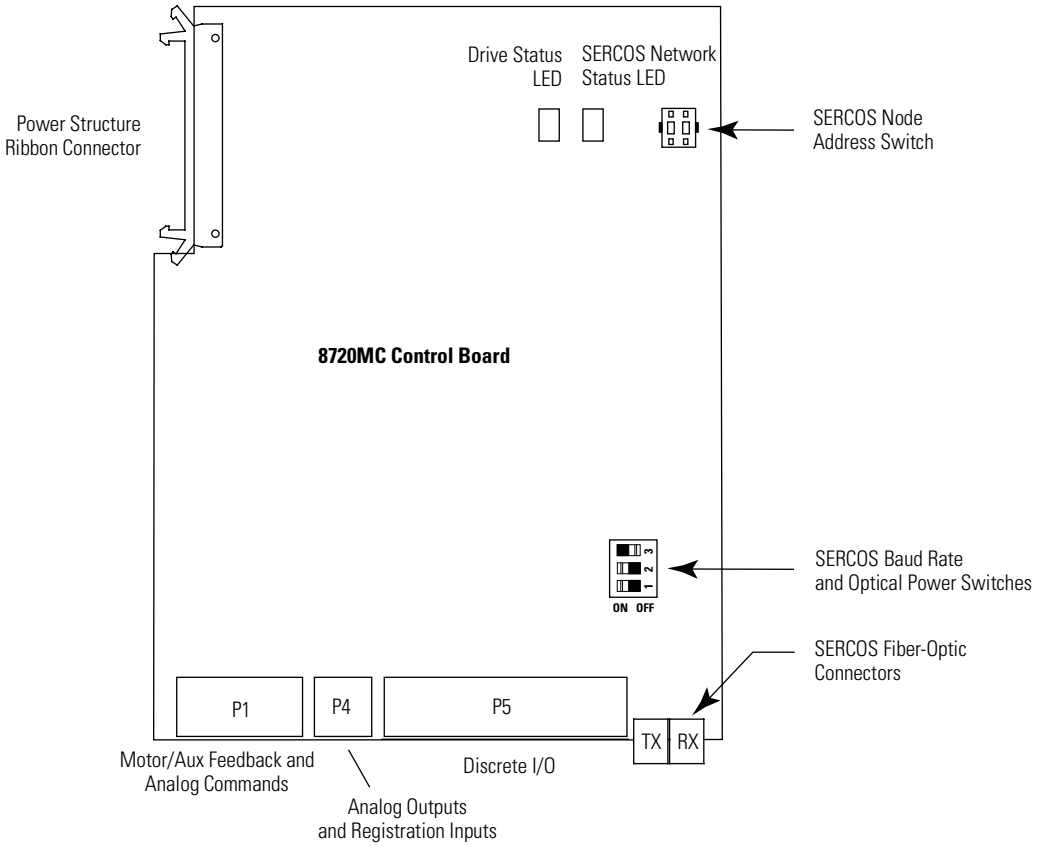
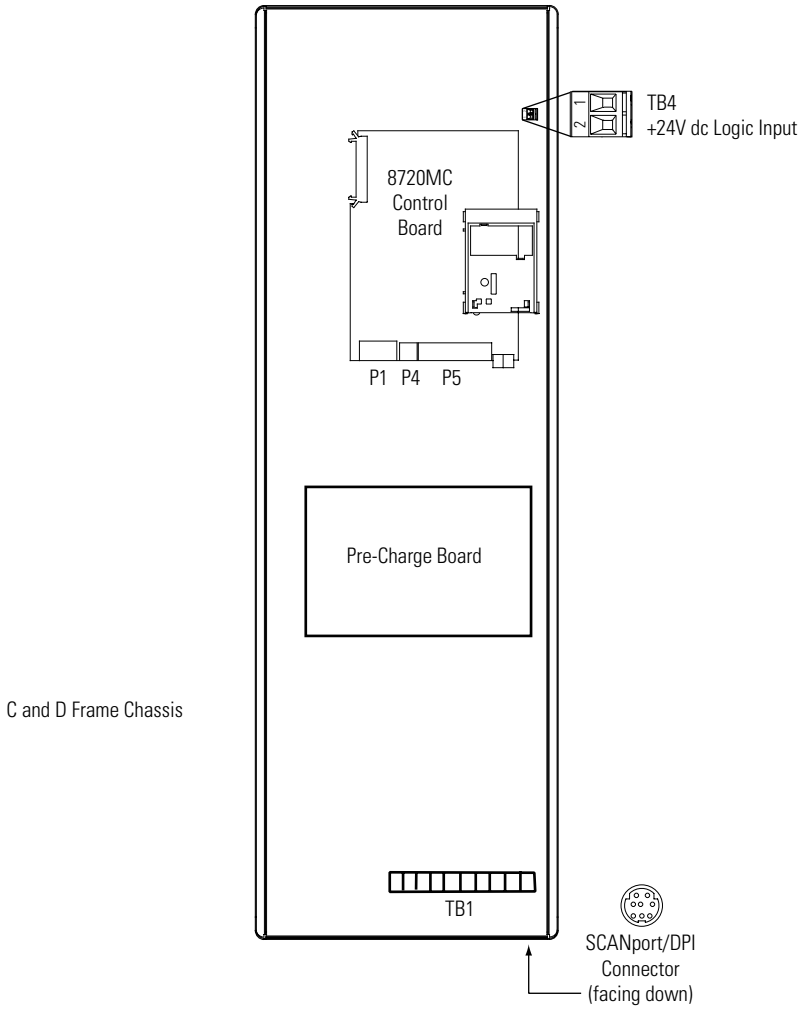


Figure 2.2
8720MC Control Board Connector Layout



Use the figure below to locate the 8720MC (C and D Frame) connectors and indicators. Refer back to Figure 2.2 for 8720MC control board connectors.

Figure 2.3
C and D Frame Chassis Connector Layout



8720MC Connector Pin-outs

This section provides P1, P4, P5, TB4, and TB1 signal descriptions and connector pin-outs.

If your application requires this drive mode:	Refer to the P1, P4, and P5 connector pin-out tables beginning on:	Refer to the TB4 connector pin-out table on:	Refer to the TB1 connector pin-out figures beginning on:
SERCOS interface	page 2-4	page 2-8	page 2-9
Analog interface	page 2-6		

P1 Connector Pin-out (SERCOS)

The following table and figure below provides the signal descriptions and pin-out for the Weidmueller double row 5.00 mm (P1) connector. Refer to Figure 2.4 for connector pin locations.

P1 Pin	Description	Signal
1	Ch1: Sine or A Channel Data (motor)	SINE+
2	Ch1: Sine Return or $\overline{A}$ Channel Data (motor)	SINE-
3	Ch1: Cosine or B Channel Data (motor)	COS+
4	Ch1: Cosine Return or $\overline{B}$ Channel Data (motor)	COS-
5	Ch1: Encoder Power Common (motor)	ECOM
6	Ch1 +9V dc Encoder Power (motor)	EPWR_9VM
7	Ch1 +5V dc Encoder Power	EPWR_5VM
8	Ch1: Index/Communication Non-Inverted Data	IM+
9	Ch1: Index/Communication Inverted Data	IM-
10	Reserved	—
11	Reserved	—
12	Ch1: Motor Thermal Switch Input+	TS+
13	Ch1: Motor Thermal Switch Input-	TS-

P1 Pin	Description	Signal
14	Ch2 Sine or A Channel Data (aux)	SINE+
15	Ch2 Sine Return or $\overline{A}$ Channel Data (aux)	SINE-
16	Ch2 Cosine or B Channel Data (aux)	COS+
17	Ch2 Cosine Return or $\overline{B}$ Channel Data (aux)	COS-
18	Ch2: Encoder Power Common (aux)	ECOM
19	Ch2: +9V dc Encoder Power (aux)	EPWR_9VM
20	Ch2: +5V dc Encoder Power	EPWR_5VM
21	Ch2: Index/Communication Non-Inverted Data	IM+
22	Ch2: Index/Communication Inverted Data	IM-
23	Reserved	—
24	Reserved	—
25	Reserved	—
26	Reserved	—

P4 Connector Pin-out (SERCOS)

The following table provides the signal descriptions and pin-out for the Weidmueller double row 5.00 mm (P4) connector. Refer to Figure 2.4 for connector pin locations.

P4 Pin	Description	Signal
1	Analog Output 1	ANAOUT_CH1
2	+5V dc Registration Input	REG2
3	+24V dc Registration Input	REG1
4	+5V dc Power for Registration Input	REG_5V

P4 Pin	Description	Signal
5	Analog Output 2	ANAOUT_CH2
6	Analog Output Common	ANA_COM
7	Registration Common	REG_COM
8	+5V dc Registration Power Return	REG_5VCOM

P5 Connector Pin-out (SERCOS)

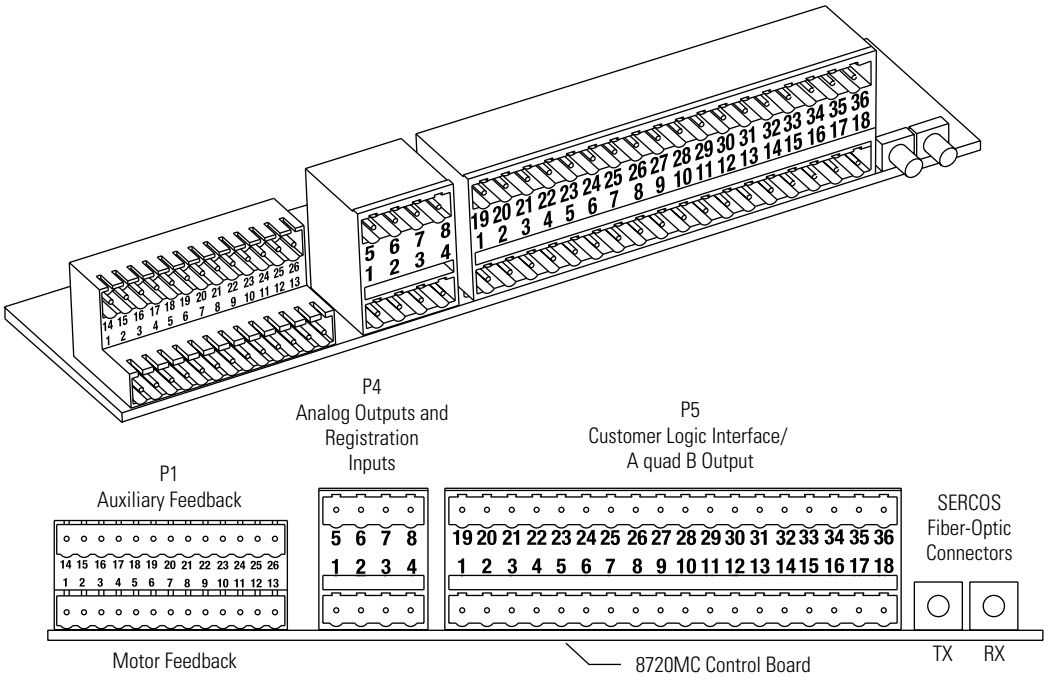
The following table provides the signal descriptions and pin-out for the Weidmueller double row 5.00 mm (P5) connector. Refer to Figure 2.4 for connector pin locations.

P5 Pin	Description	Signal
1	A quad B: A+ Channel Output	AMOUT+
2	A quad B: B+ Channel Output	BMOUT+
3	A quad B: Z+ Channel Output	ZMOUT+
4	A quad B common	ACOM
5	Reserved	—
6	Drive OK	Relay 1
7		
8	Enable Brake Sol.	Relay 2
9		
10	Reserved	—
11	Reserved	—
12	Reserved	—
13	+24V dc Digital Input common	IOCOM
14	Drive Enable	Input 1
15	Drive Error Reset	Input 3
16	Reserved	—
17	Reserved	—
18	Reserved	—

P5 Pin	Description	Signal
19	A quad B: $\overline{A}$ Channel Output	AMOUT-
20	A quad B: $\overline{B}$ Channel Output	BMOUT-
21	A quad B: $\overline{Z}$ Channel Output	ZMOUT-
22	8720MC +24V dc power for inputs	IOPWR
23	8720MC +24V dc input power return	REGCOM
24	Hi Winding Select	Relay 3
25		
26	Lo Winding Select	Relay 4
27		
28	Reserved	—
29	Reserved	—
30	Reserved	—
31	External +24V dc for Digital Outputs	EXTIOPWR
32	Reserved	—
33	Auto/Manual Select	Input 4
34	Reserved	—
35	Home Switch	Input 8
36	Regen PS - OK	Input 10

IMPORTANT To meet CE requirements, motor power and feedback cable lengths must not exceed 90 m (295.2 ft).

Figure 2.4
Pin Orientation for P1, P4, and P5 (SERCOS) Connectors



P1 Connector Pin-out (Analog)

The following table and figure below provides the signal descriptions and pin-out for the Weidmueller double row 5.00 mm (P1) connector. Refer to Figure 2.5 for connector pin locations.

P1 Pin	Description	Signal
1	Ch1: Sine or A Channel Data (motor)	SINE+
2	Ch1: Sine Return or $\overline{A}$ Channel Data	SINE-
3	Ch1: Cosine or B Channel Data (motor)	COS+
4	Ch1: Cosine Return or $\overline{B}$ Channel Data	COS-
5	Ch1: Encoder Power Common	ECOM
6	Ch1 +9V dc Encoder Power (motor)	EPWR_9VM
7	Ch1 +5V dc Encoder Power	EPWR_5VM
8	Ch1: Index/Comm Non-Inverted Data	IM+
9	Ch1: Index/Comm Inverted Data	IM-
10	Reserved	—
11	Reserved	—
12	Ch1: Motor Thermal Switch Input+	TS+
13	Ch1: Motor Thermal Switch Input-	TS-

P1 Pin	Description	Signal
14	Analog Input 1	ANAIN_CH1
15	Analog Input 1 return	ANA_CH1_COM
16	Analog Input 2	ANAIN_CH
17	Analog Input 2 return	ANA_CH2_COM
18	Ch2: Encoder Power Common	ECOM
19	Ch2: +9V dc Encoder Power (auxiliary)	EPWR_9V
20	Ch2: +5V dc Encoder Power	EPWR_5V
21	Ch2: Index/Comm Non-Inverted Data	IM+
22	Ch2: Index/Comm Inverted Data	IM-
23	Reserved	—
24	Reserved	—
25	Reserved	—
26	Reserved	—

P4 Connector Pin-out (Analog)

The following table provides the signal descriptions and pin-out for the Weidmueller double row 5.00 mm (P4) connector. Refer to Figure 2.5 for connector pin locations.

P4 Pin	Description	Signal
1	Analog Output 1	ANAOUT_CH1
2	+5V dc Registration Input	REG2
3	+24V dc Registration Input	REG1
4	+5V dc Power for Registration Input	REG_5V

P4 Pin	Description	Signal
5	Analog Output 2	ANAOUT_CH2
6	Analog Output Common	ANA_COM
7	Registration Common	REG_COM
8	+5V dc Registration Power Return	REG_5VCOM

P5 Connector Pin-out (Analog)

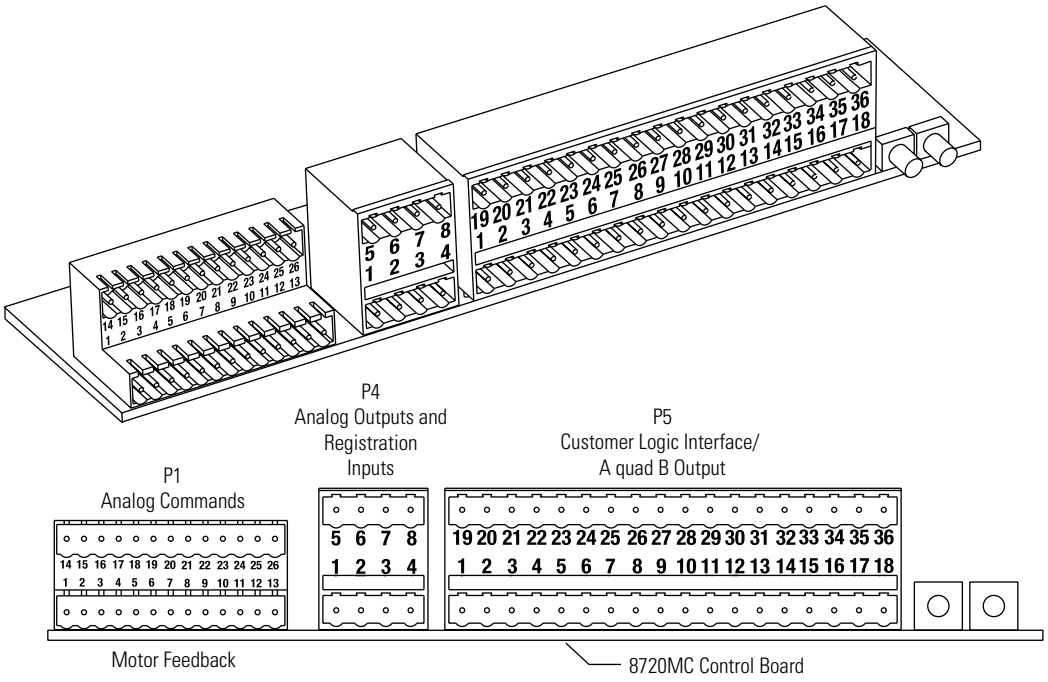
The following table provides the signal descriptions and pin-out for the Weidmueller double row 5.00 mm (P5) connector. Refer to Figure 2.5 for connector pin locations.

P5 Pin	Description	Signal
1	A quad B: A+ Channel Output	AMOUT+
2	A quad B: B+ Channel Output	BMOUT+
3	A quad B: Z+ Channel Output	ZMOUT+
4	A quad B common	ACOM
5	Reserved	—
6	Drive OK	Relay 1
7		
8	Enable Brake Solenoid	Relay 2
9		
10	Zero Speed	Output 5
11	Shut Down Fault	Output 7
12	Auto Reference Enabled	Output 9
13	+24V dc Digital Input common	IOCOM
14	Drive Enable	Input 1
15	Drive Error Reset	Input 3
16	Parameter set bit 2 (high/low)	Input 5
17	Parameter set bit 1	Input 7
18	Parameter set bit 0	Input 9

P5 Pin	Description	Signal
19	A quad B: $\overline{A}$ Channel Output	AMOUT-
20	A quad B: $\overline{B}$ Channel Output	BMOUT-
21	A quad B: $\overline{Z}$ Channel Output	ZMOUT-
22	8720MC +24V dc power for inputs	IOPWR
23	8720MC +24V dc input power return	REGCOM
24	Hi Winding Select	Relay 3
25		
26	Lo Winding Select	Relay 4
27		
28	Orient Complete	Output 6
29	Torque ≥ Torque Limit	Output 8
30	At Speed	Output 10
31	External +24V dc for Digital Outputs	EXTIOPWR
32	Orient Request	Input 2
33	Auto/Manual Select	Input 4
34	Jog	Input 6
35	Reserved	—
36	Regen PS - OK	Input 10

IMPORTANT To meet CE requirements, motor power and feedback cable lengths must not exceed 90 m (295.2 ft).

Figure 2.5
Pin Orientation for P1, P4, and P5 (Analog) Connectors



TB4 Connector Pin-out

The following table provides the signal descriptions and pin-out for the TB4 connector. Refer to figures 2.1 or 2.3 for connector pin locations. Refer to *Power Interconnect Diagrams* in *Appendix B* for interconnect diagrams.

TB4 Pin	Description	Signal
1	+24V dc, 1.25A Auxiliary Logic Power (user supplied)	+24V dc
2	+24V dc Auxiliary Logic Power Common	+24V dc_Com

TB1 Terminal Block Pin-out

The following figures provide the signal descriptions and pin-out for the TB1 connector.

Figure 2.6
TB1 Connections for B Frame (5.5 to 11 kW) Drives

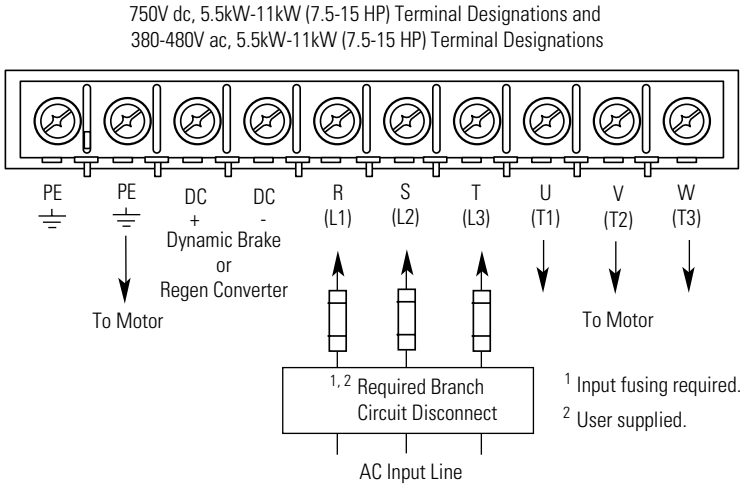


Figure 2.7
TB1 Connections for B Frame (15 to 22 kW) Drives

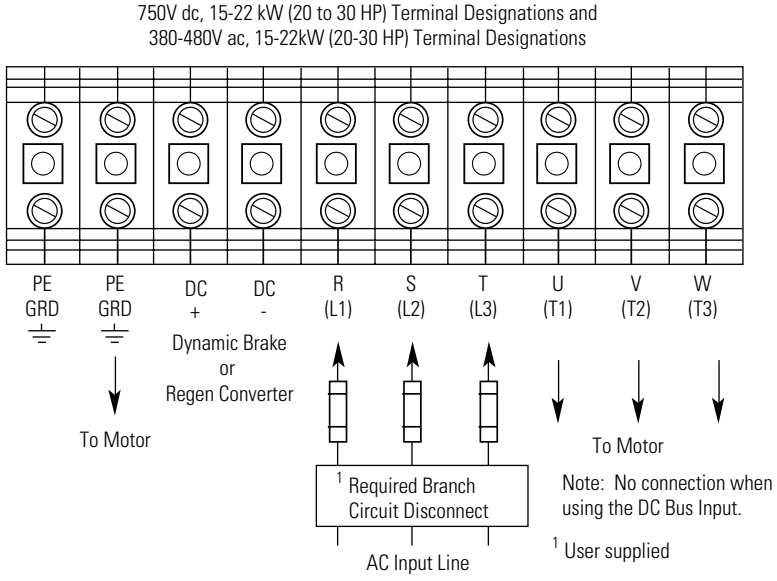


Figure 2.8
TB1 Connections for C Frame Drives

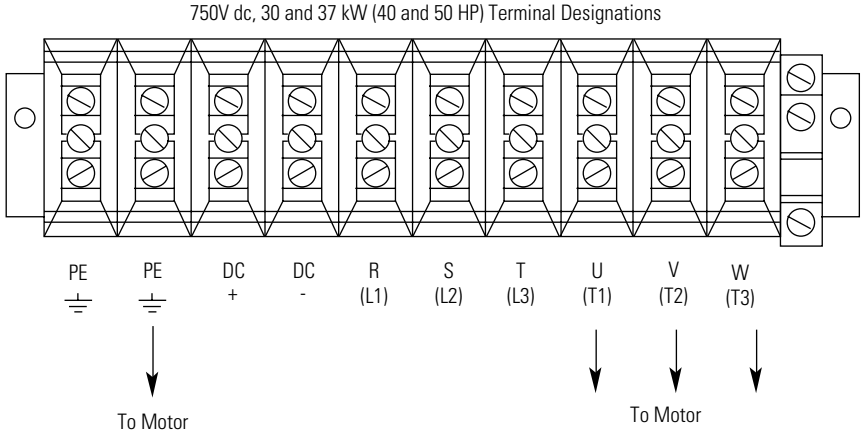
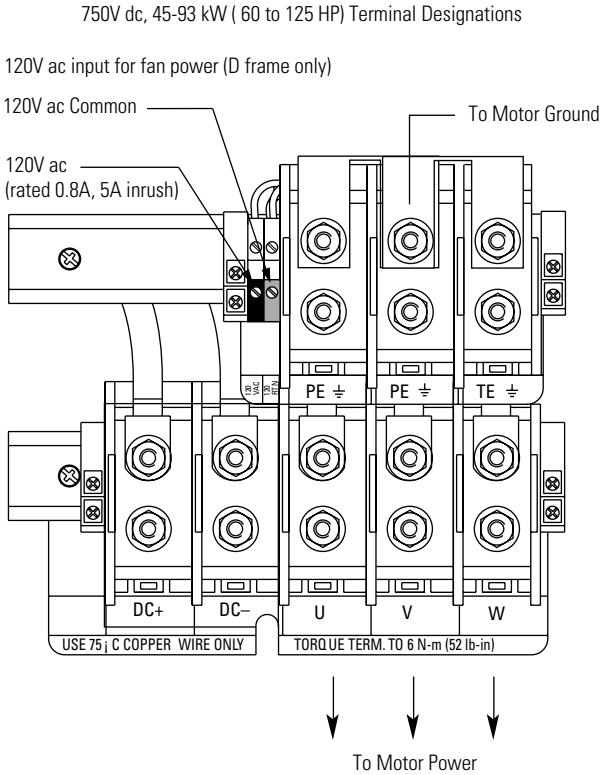


Figure 2.9
TB1 Connections for D Frame Drives



Note: Three-phase motor power connections (terminals U, V, W) may be labeled R2, S2, and T2 respectively.

Understanding I/O Specifications

A description of the 8720MC input/output is provided on the following pages.

Digital Inputs and Outputs

The 8720MC High Performance Drives support 10 digital inputs, 4 relay contact outputs and 6 digital outputs.

These are sinking inputs that require a sourcing device. A 24V power and common connection is provided for use with the inputs.

IMPORTANT To improve registration input EMC performance, refer to the *System Design for Control of Electrical Noise Reference Manual* (GMC-RM001*x*-EN-P).

Digital Input Power

The isolated +24V dc power available from the 8720MC is limited to 120 mA and is adequate for use with the 10 digital inputs but may be inadequate when the full set of 6 digital outputs are used. Keep current requirements below 120 mA (total) when using the 8720MC isolated +24V dc power for digital I/O. If more than 120 mA is required, provide an external (+24V dc) power supply.

Digital Inputs

Digital input specifications for SERCOS drives are shown in the table below. These inputs are optically isolated to 500V from control power. They have hardware filtering with a time constant and a software debounce, which requires stable input prior to validation. Values are shown in the table below. A description of these signals is provided beginning on page 2-12.

Pin	Signal	Capture Time	Edge/Level Sensitive	Hardware Filtering
P5-14	DRIVE ENABLE	5 ms	Level	300 µs
P5-35	HOME SWITCH	5 ms	Level	300 µs

Default Digital Input Descriptions

Drive Enable - The drive enable input is used to inform the drive that the regenerative power supply and the motion controller are ready for the drive to follow the auto or jog reference command. When the drive is enabled the drive will apply torque to the motor as directed by the reference commands (with no internal drive shut down faults). The drive will come to a regen stop when the enable is removed.

Drive Error Reset Request - If a drive shut down fault has occurred, setting the Drive_Err_Reset bit is required in order to reset the fault. The fault cannot be reset unless the drive is disabled and the fault condition is removed. A transition from low to high is required to reset a drive shut down error. Power cycling also resets the drive error.

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 (high or low) is selected. The choices are:

000 = low 0, 001 = low 1, 010 = low 2, 011 = low 3

100 = high 0, 101 = high 1, 110 = high 2. 111 = high 3

When any or all of the 3 bits change and remain changed for a 50 ms filter delay the new parameter set will be enabled.

Orient Request - When the Orient Request bit (parameter 152) is set, an orient will be initiated as determined by Auto Home (parameter 582). In addition the orient parameters 153, orient angle, 154, orient options, 222, orient speed, and 260, positioning acc/dec rate, will be used to characterize the orient move. The orient will terminate when the motor reaches the orient position and the orient complete status bit is set. The drive is placed in positioning mode in order to execute the orient. If holding torque is required after the orient position is achieved, then the orient request must be maintained even if the orient complete output is set. The drive will ignore the reference and hold position until the orient request is removed. The orient can be initiated when the motor is rotating or stationary.

Manual/Auto Select - When the manual mode bit is set true, the manual mode is selected. In this mode the drive can be operated from an Internal HIM, an external HIM or a SCANport™ connected PLC™ via the jog reference and jog bit or the digital interface via analog input 2 (P1-16) and the jog digital input. In auto mode only the configured auto command reference is followed by the drive. Whenever the drive is switched from auto to manual the drive will come to a regenerative stop. It will follow the jog reference from the source that is providing the jog request. If the drive is switched from manual to auto, the drive will also come to a regenerative stop. A positive transition on the drive enable input from 0 to +24V dc is required to restore auto operation of the drive where the drive follows the auto reference command.

Jog Request - When the drive is enabled in manual mode with no drive faults and the jog command bit on digital input 6 (P5-34) is set true, the drive will respond to the jog reference, Analog Input 2 (P1-16, -17).

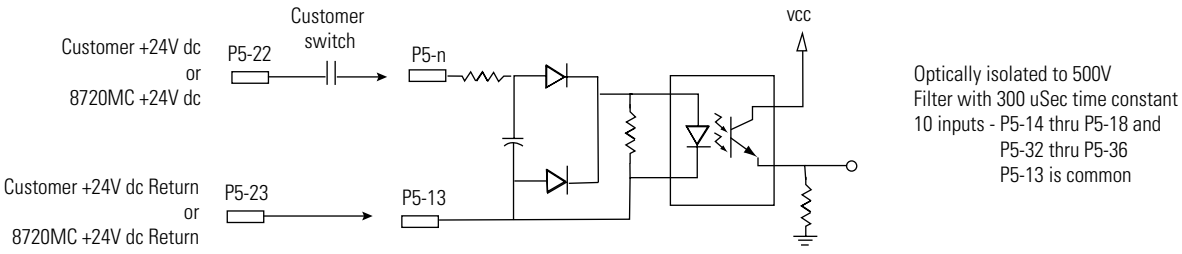
Since jog is a momentary function, the drive will continue to follow the reference until the jog is released. When the jog input is released, the motor will regenerate to a stop.

Regen Power Supply OK - Input 10 (P5-36) is used to interface to the 8720MC - RPS fault output. This is a normally open contact which is closed when there are no RPS faults. Since a high is required on this input it must be tied to +24V dc when the regenerative converter is not used. The external active shunt (thermal switch) can also wire to this input. Refer to figures B.4 and B.5 in *Appendix B* for examples.

Digital input specifications are shown in the table below. Refer to Figure 2.10 for the typical digital input configuration.

Condition	Voltage	Amperage
On	12 - 38V dc	3.3 - 12 mA
Off	less than 6.6V dc	less than 1.5 mA leakage

Figure 2.10
Typical Digital Input Connections



Registration Inputs

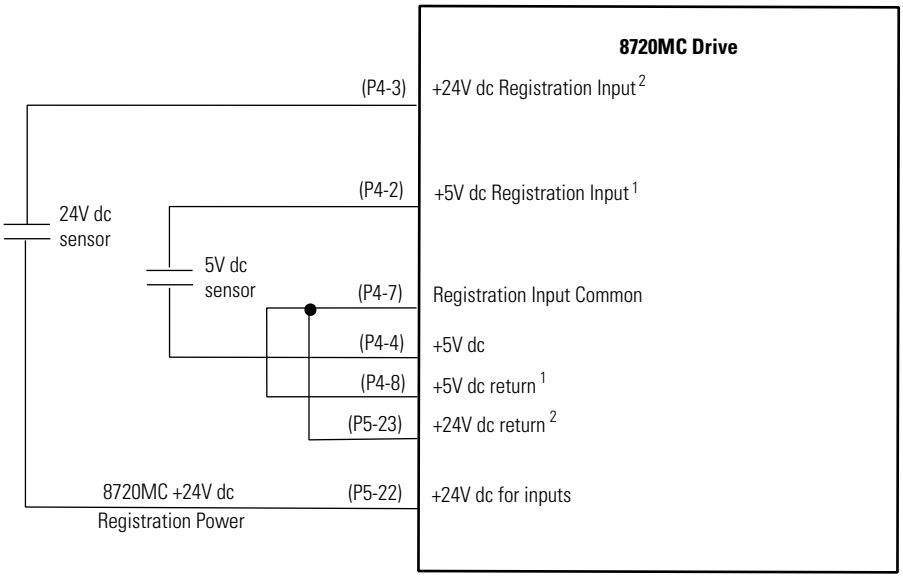
The 8720MC provides 2 registration inputs. One input is for +24V dc operation and one is for +5V dc operation. The 8720MC can provide +5V dc or +24V dc to be used with a switch type registration or orient sensor. Both registration inputs can be used in a given application.

From a software perspective the registration inputs are used by the 8720MC software to capture a position within one microsecond of a closure of the registration sensor. This can be used by the drive for orienting to a registration sensor or used by a SERCOS motion controller for probing or position registration. With a SERCOS motion controller the registered position is returned to the motion controller via the SERCOS link as a result of a Registration Procedure.

Input Power

The registration inputs are isolated and can use either the 8720MC +5V dc or +24V dc power or customer supplied external +5V dc or +24V dc. Figure 2.11 shows the connections required for the sensor inputs when internal dc power is used. Terminals P4-4 and P4-8 provide isolated +5V dc power for use with the +5V dc registration inputs and the A quad B output. This power is limited to 250 mA at 5V dc +/- 10%.

Figure 2.11
Registration Interface Using 8720MC Internal Power



[1] When using the 8720MC supplied +5V dc for the sensor input (P4-2), terminal P4-7 must be tied to P4-8. Do not jumper when external +5V dc is used.

[2] When using the 8720MC supplied +24V dc for the sensor input (P4-3), terminal P4-7 must be tied to P5-23. Do not jumper when external +24V dc is used.

Registration input specifications are shown in the table below. Refer to figures 2.12 and 2.13 for the registration input configurations.

Rating	Condition	Voltage	Position Latch Time	Amperage	Hardware Filtering
+5V dc	On	4 - 7.5V dc	1 µs	5 - 15 mA less than 1.5 mA leakage	800 ns
	Off	less than 2V dc			
+24V dc	On	17.5 - 38V dc			1 µs
	Off	less than 6.9V dc			

Figure 2.12 shows the connections required for the sensor inputs when external (customer supplied +24V dc and/or 5V dc) power is used.

Figure 2.12
Registration Interface Using External Power

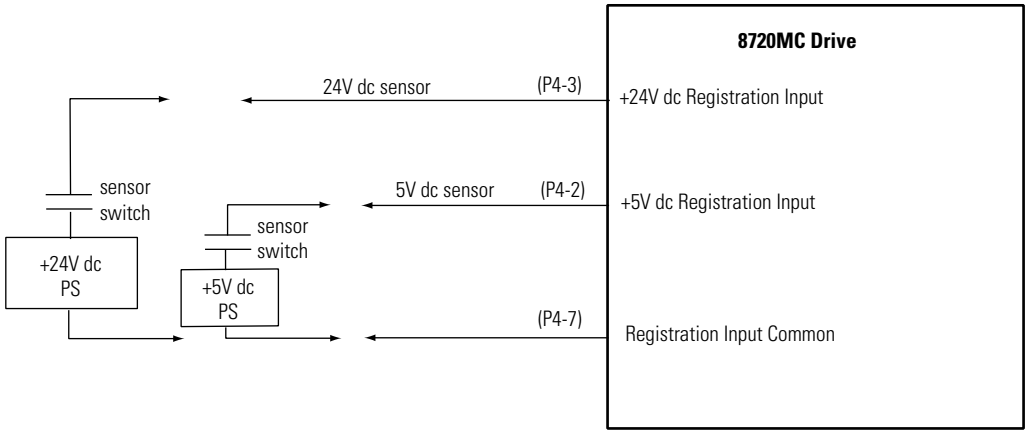
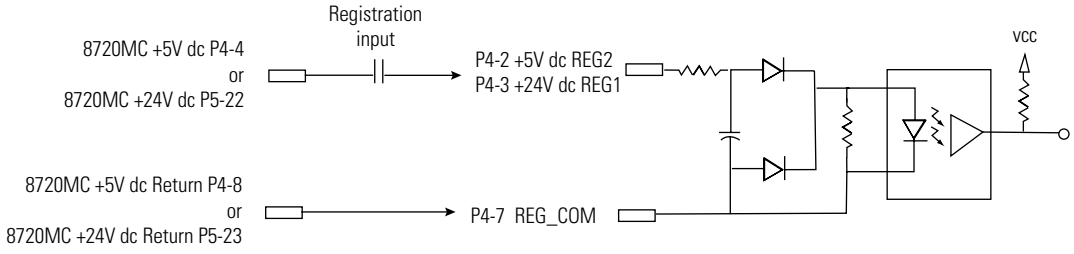


Figure 2.13 shows the typical registration input connections. For connecting the registration inputs use 2 wire, 1 twisted pair, #24 AWG or larger, shielded cable. Alpha 6412 or equal.

Figure 2.13
Typical Registration Input Connections



Digital Outputs

Six discrete solid state DC current sourcing outputs are available in the 8720MC Drive. These outputs are optically isolated to 500V from control power. Considering the limitation of 120 mA (total) at 24V dc of the 8720MC 24V dc power supply, all power to the 24V dc digital I/O should be, in most cases, provided externally by the user.

Default Digital Output Descriptions

Zero Speed - Parameter 124 is used to determine the zero speed window. When the motor velocity falls within the configured zero speed window for 50 ms, the zero speed output is set true.

Shut Down Fault - Parameter 11 contains a bit pattern which describes a set of different conditions which can initiate a shut down fault. When any of these conditions exist, the Shut Down Fault output will be true. Selection of parameter 11 in display mode via the HIM or DriveExplorer™ will allow access to a 16 character display describing the fault.

Auto Reference Enabled - Parameter 529 (P00029) is an event link which indicates that there are no drive faults, the drive is enabled in auto mode, and capable of following the auto reference. This event has a default link to both the digital interface and the SCANport Logic Status Word.

Orient complete - When an orient is initiated and the orient position is achieved, the drive will enter an orient position achieved state. The Orient Complete output is used to indicate to the motion controller that the orient position achieved state is established. The orient complete output is turned off when the motor leaves the orient position.

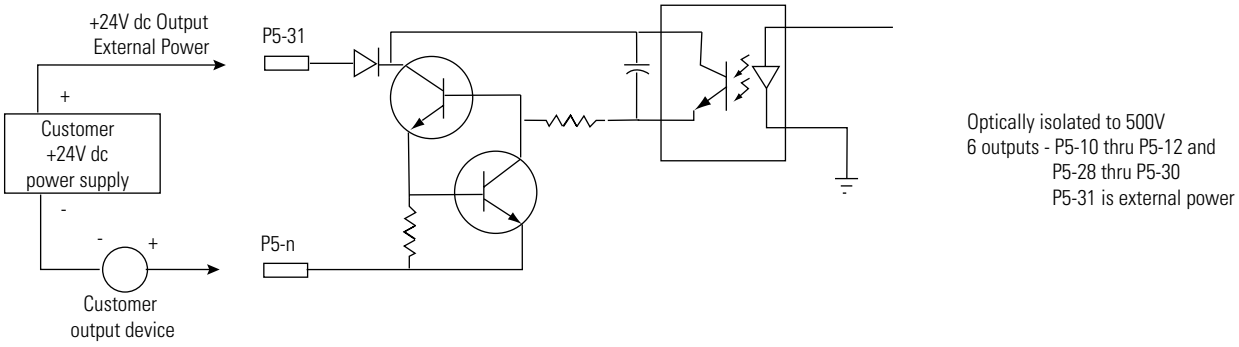
Torque ≥ Torque Limit - Parameters 82 and 83 are configuration parameters which establish the + and - torque limits for the application. There are 8 sets of torque limits since they are part of the servo parameter sets. If any of these torque limits are reached or exceeded, the Torque ≥ Torque Limit Output is enabled. Use Parameter 520 to determine the source of the torque limit

At Speed - Parameter 157 is a configuration parameter which establishes the At Speed Window. When the velocity error represented by the difference between the commanded velocity and the feedback velocity is less than parameter 157, the At Speed output is enabled.

Digital output specifications are shown in the table below. Refer to Figure 2.14 for the typical digital output configuration. Figure 2.14 shows the typical digital output connections. Use # 16 to #18 hook-up wire, Alpha 3075 or 3077 or equal.

Condition	Voltage	Amperage
On	Up to 40V dc	Up to 75 mA current limited
Off	N/A	less than 0.25 mA leakage

Figure 2.14
Typical Digital Output Connections



Relay Outputs

The 8720MC Drive has four discrete outputs in the form of normally open dry relay contacts. The fault outputs from the 8720MC Drive are supplied at terminal blocks. Fault outputs provide warning or fault signals based on drive programming. The following values are the contact ratings for the programmable relays:

Condition	Voltage	Amperage
On	Up to 250V ac	Up to 5A
On	Up to 30V dc	Up to 5A

Figure 2.15 shows a typical isolated relay output circuit. Use #16 to #18 hook-up wire, Alpha 3075 or 3077 or equal.

Default Relay Output Descriptions

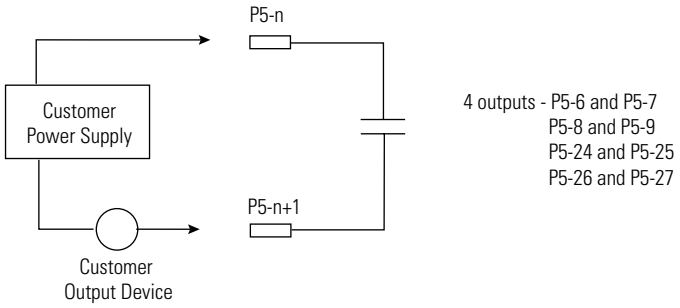
Drive OK - When the drive is clear of all shut down faults, the Drive OK contact is closed. The drive does not have to be enabled to be in the drive ok state. This normally open contact is available for use in the motion controller control stop string. The contact is closed when there are no faults.

Enable Brake Solenoid - This output contact is used to interface to a brake solenoid. The contact closes immediately after the drive enable is applied. The drive will apply zero speed holding torque for a configurable on delay time period after the drive has been enabled (parameter 206). This assures that there is holding torque available while the brake is being released. An additional off time delay is provided (parameter 207). The brake contact will open after a configurable time delay period (parameter 207) from when the drive enable input is removed. The drive will remain enabled for the off delay period to provide regenerative braking until the motor is at zero speed.

High Winding Select - When bit 2 of the parameter set binary code is set to 1 the High Winding Select contact is closed. When interfaced to a contactor, this output is used to select the high motor winding. This contact is closed only when the low contact output is open.

Low Winding Select - When bit 2 of the parameter set binary code is set to 0, the Low Winding Select contact is closed. When interfaced to a contactor this output is used to select the Low motor winding. This contact is closed only when the High contact output is open.

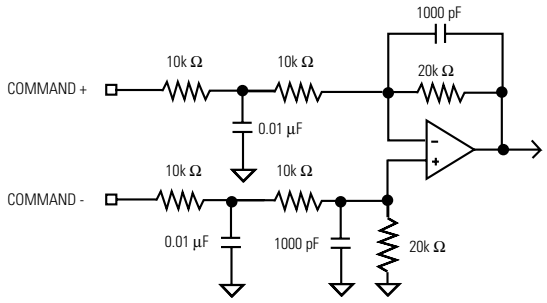
Figure 2.15
Typical Isolated Relay Output Connections



Analog Inputs

The analog input to the drive can provide a velocity command signal. A 14 bit A/D converter digitizes the signal. The configuration of the input is shown in Figure 2.16.

Figure 2.16
Analog Input Configuration



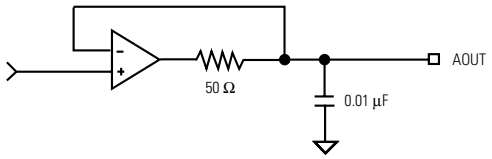
The following table provides a description of the analog input specifications.

Parameter	Description	Minimum	Maximum
Resolution	Number of states that the input signal is divided into which is $2^{(\text{to the number of bits})}$.	14 bits	—
Input Impedance	Open circuit impedance measured between the + and - inputs.	20 kΩ	—
Input Signal Range	Voltage applied to the input	-10V	+10V
Offset Error	Deviation from the correct value expected from analog-to-digital conversion when 0V is applied to the input.	—	50 mV
Gain Error	Deviation of the transfer function from unity gain, expressed in a percent of full scale.	—	1%
Update Rate	Update rate of the firmware-accessible registers.	—	125 µS

Analog Outputs

The 8720MC includes two analog outputs (not supported on the SERCOS models) that can be configured through software to represent drive variables. Figure 2.17 shows the configuration of the analog output. The following table provides a description of the analog output.

Figure 2.17
Analog Output Configuration



IMPORTANT Output values can vary during power-up until the specified power supply voltage is reached.

The following table provides a description of the analog output specifications.

Parameter	Description	Minimum	Maximum
Resolution	Number of states that the output signal is divided into, which is $2^{(\text{to the number of bits})}$.	12 Bits	—
Output Current	Current capability of the output.	-20 mA	+20 mA
Output Signal Range	Range of the output voltage.	-10V	+10V
Offset Error	Deviation when the output should be at0V.	—	100 mV
Gain Error	Deviation of the transfer function from unity gain, expressed in a percent of full scale.	—	5%
Bandwidth	Frequency response of the analog output	50 Hz	7.2 Khz (-3 db)

SERCOS Connections

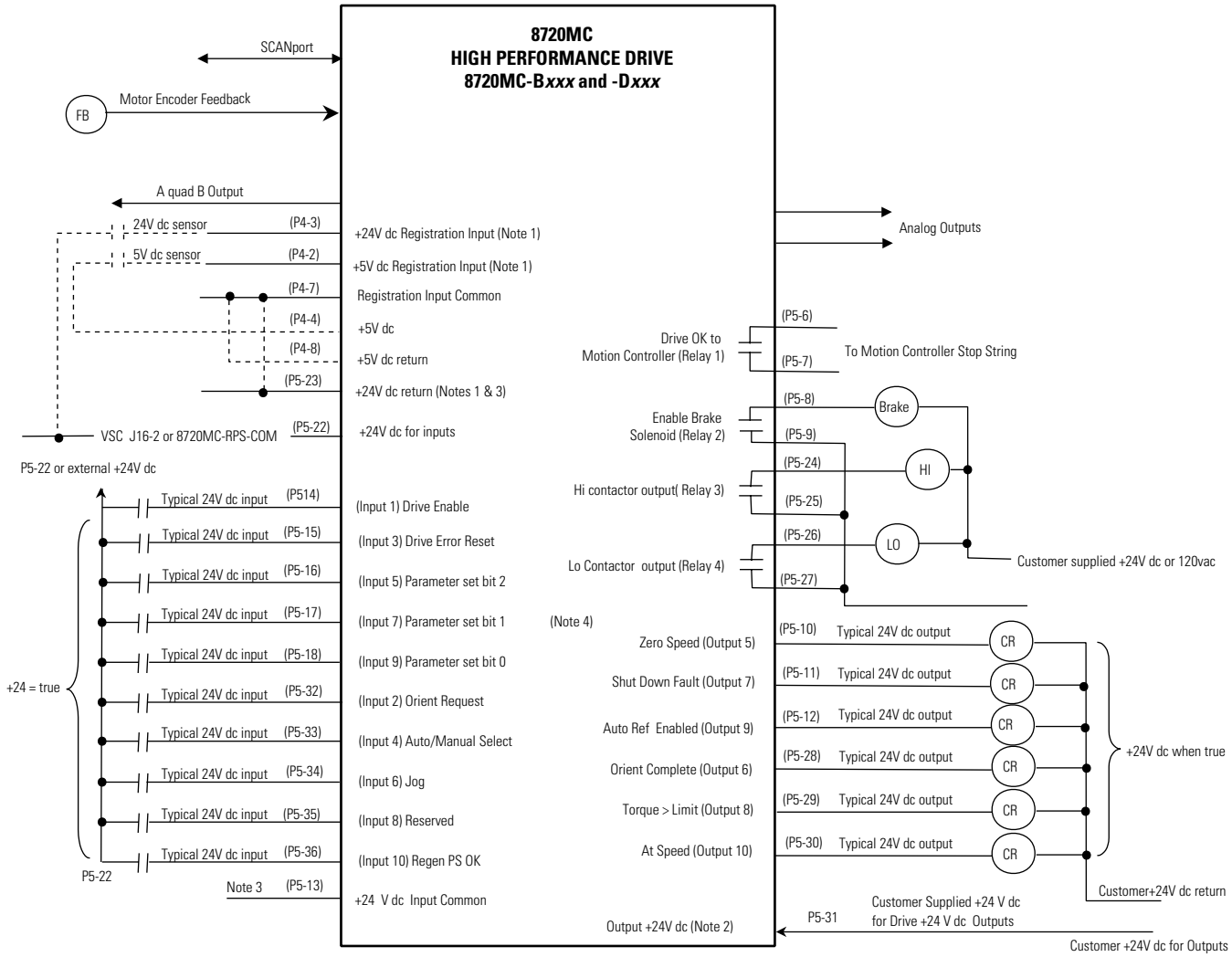
Two fiber-optic connectors (transmit and receive) are provided on the drive. The table below lists SERCOS communication specifications.

Specification	Description
Data Rates	2, 4, and 8 MBd
Node Addresses	00-99

8720MC Input/Output Signals (Analog)

Figure 2.18 provides information about the digital input/output for the 8720MC analog Drive.

Figure 2.18
8720MC Input/Output Wiring



Note 1: When using the 8720MC supplied +5V dc for the sensor input (P4-2), terminal P4-7 must be tied to P4-8. Do not jumper when external +5V dc is used.
When using the 8720MC supplied +24V dc for the sensor input (P4-3), terminal P4-7 must be tied to P5-23. Do not jumper when external +24V dc is used.

Note 2: When using the 6 solid state 24V dc outputs available with the 8720MC, the customer must supply external +24V dc to P5-31.

Note 3: When using the 8720MC supplied +24V dc for the 10 available inputs, terminal P5-13 must be tied to P5-23. Otherwise connect to external +24V dc return.

Note 4: The digital inputs and outputs are shown with the I/O links that occur when the drive is in the analog command configuration.

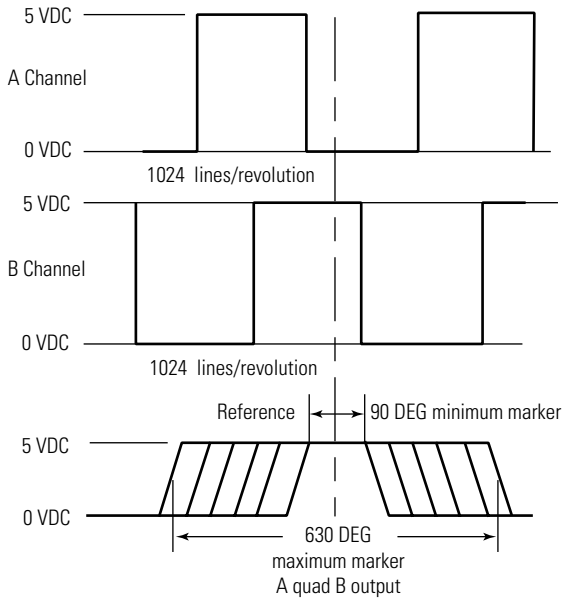
Understanding Analog Interface Connections

A quad B Virtual Encoder Output

A virtual 1024 line encoder output interface is provided for use with any motion controller which provides an analog velocity or torque command and expects a 5V TTL A quad B signal from the motor. The quadrature outputs are connected to P5-1, P5-2, P5-3, P5-19, P5-20 and P5-21, as shown in *Appendix B*.

Figure 2.19 shows the exact nature of the A quad B signals. If the quadrature output signals are required, the SNS-60 (8720SM S3, S4) Sincoder must be the 8720SM motor feedback device. The marker from this feedback device has a random width from encoder to encoder. The edge rise is repeatable for any given encoder. This feedback device is best suited for uni-directional homing and referencing. The 8720MC provides the 5V dc power required to drive the signals. Connect the motion controller encoder ground terminal to the P5-4 terminal (ACOM). This assures that the signals are properly referenced to the motion controller encoder ground. The motion controller will count square wave edges and will achieve a 4096 count per turn resolution.

Figure 2.19
A quad B Output



For connections to the encoder output use 4 twisted pair, #22 AWG or larger, shielded cable, Beldon 8304 or equal. A special multiplier box is available for the Stegmann encoders. This multiplier box can be used to simulate a 5120 lines per revolution virtual encoder. In this instance the motion controller will also count square wave edges but will achieve a 20480 count per turn resolution. For details contact your Rockwell Automation Motion Application Engineer.

Understanding 8720MC Feedback Devices

The 8720MC supports a motor feedback port, an auxiliary feedback port (SERCOS interface only), and an A quad B motion controller position feedback output port (analog interface only).

The table below includes the feedback devices that were tested for compatibility with the 8720MC. There are a variety of other feedback devices which follow standard encoder interface practices which will interface successfully to the 8720MC. Standard A quad B differential TTL encoders and scales, as well as 1 volt peak-to-peak scales and encoders, are examples. Check with your local A-B technical support personnel to assure compatibility with devices not listed.

Device	Vendor	Motor/Aux [3] Support	Output Type	Absolute/ Incremental	Resolution	Power Supply
SNS [1]	Stegmann	8720SM-S3, -S4 Auxiliary	Hiperface™ 1Vpp Differential Sine/Cosine	Incremental	1024 CPR ~1 Million Counts Single Marker	7-12V 60mA
SRS [2]	Stegmann	8720SM-S1 MPL Auxiliary	Hiperface 1Vpp Differential Sine/Cosine	Single-Turn Absolute	1024 CPR >2 Million Counts	7-12V 130mA
SRM [2]	Stegmann	8720SM -S2 MPL Auxiliary	Hiperface 1Vpp Differential Sine/Cosine	Multi-Turn Absolute	1024 CPR >2 Million Counts 4096 Turns	7-12V 130mA
TTL AQB	Various	Auxiliary	5V Differential TTL AQB w/ Z	Incremental	Various	Various [4]
1Vpp Sine/Cosine	Various	Auxiliary	1Vpp Differential Sine/Cosine w/ Z	Incremental	Various	Various [4]

[1] The SNS Device is supported on the motor feedback port only when the 8720MC is used in analog mode.

[2] The SRS and SRM are supported on the motor feedback port only when the 8720MC is used in SERCOS mode.

[3] The auxiliary feedback port is only available when the 8720MC is used in SERCOS mode.

[4] See the Encoder Power section for further information.

IMPORTANT Auto-configuration of intelligent absolute, high-resolution, and incremental encoders is possible only with Allen-Bradley motors.

The Stegmann SNS-60 device is an incremental sine/cosine encoder used for spindle and power servo applications where an analog velocity command is the required motion controller interface. The Stegmann output signals include a marker pulse. This device is required if the 8720MC encoder output signals are interfaced with a motion controller for position feedback.

The Stegmann SRS-660 is a single-turn feedback device used in spindle applications, as well as power servo applications. This is only available in the SERCOS version.

The Stegmann SRM-60 is a multi-turn absolute feedback device capable of providing absolute feedback from 0 to 4096 turns of the motor. Each of these feedback devices outputs accurate sine and cosine signals. The SNS-60, SRS-660 and SRM-60 output 1024 sinusoidal periods per revolution. These sine waves are interpolated by the 8720 MC and provide position resolutions of up to two million counts per revolution.

Motor Option	Feedback Device	Maximum Cable Length	Attainable Resolution	Absolute Capability
S1	SRS-660	90 m (295.2 ft)	4×10^6	1 turn, 32,768 counts
S2	SRM-60	90 m (295.2 ft)	2×10^6	4096 turns, 16,348 counts
S3 and S4	SNS-60	90 m (295.2 ft)	4×10^6	None

Motor and Auxiliary Feedback Specifications

The table below lists motor encoder feedback specifications.

Specification	Description
Encoder Types	Incremental, A quad B, Sine/Cosine, Intelligent, and Absolute
Maximum Input Frequency	1 MHz (TTL input) per channel
	250 kHz (Sine/Cosine input)
Commutation Feedback	N/A

The following table provides a description of the AM, BM, and IM inputs for TTL encoders.

Parameter	Description	Minimum	Maximum
AM, BM, and IM ON State Input Voltage	Input voltage difference between the + input and the - input that is detected as an ON state.	+1.0V	+7.0V
AM, BM, and IM OFF State Input Voltage	Input voltage difference between the + input and the - input that is detected as an OFF state.	-1.0V	-7.0V
Common Mode Input Voltage	Potential difference between any encoder signal and logic ground.	-7.0V	+12.0V
DC Current Draw	Current draw into the + or - input.	-30 mA	30 mA
AM, BM Input Signal Frequency	Frequency of the AM or BM signal inputs. The count frequency is 4 times this frequency, since the circuitry counts all four transitions.	—	1 MHz
IM Pulse Width	Pulse width of the index input signal. Since the index is active for a percentage of a revolution, the speed will determine the pulse width.	125 nS	—
AM / BM Phase Error, 2.5 MHz Line Frequency	Amount that the phase relationship between the AM and BM inputs can deviate from the nominal 90°.	-22.5°	+22.5°
AM / BM Phase Error, 1 MHz Line Frequency	Amount that the phase relationship between the AM and BM inputs can deviate from the nominal 90°.	-45°	+45°

The following table provides a description of the AM and BM inputs for Sine/Cosine encoders.

Parameter	Description	Minimum	Maximum
AM and BM Input Signal Frequency	Frequency of the AM or BM signal inputs.	—	250 kHz
AM and BM Input Voltage	Peak-to-peak input voltages of the AM and BM inputs	0.5V (p-p)	2.0V (p-p)

Encoder Power

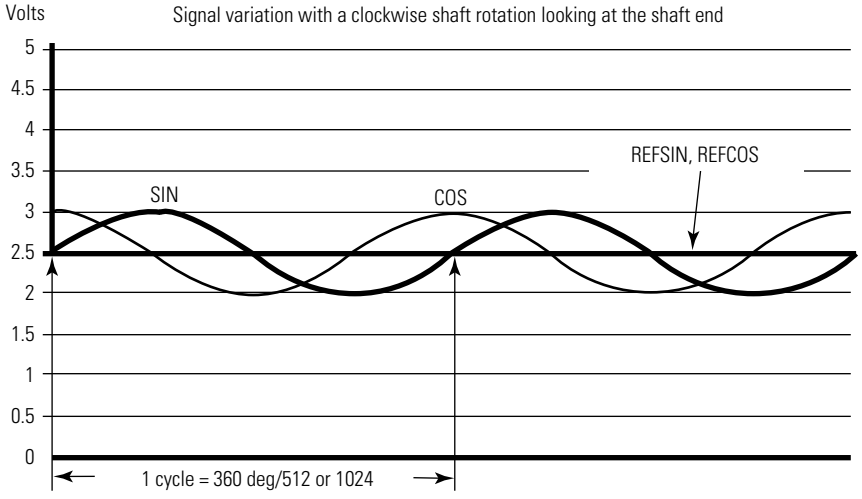
The motor and auxiliary feedback port connector (P1) provides terminals for both 5V dc and 9V dc encoder power. The encoder voltage used is determined by the feedback device selected (refer to the table on page 2-23 for a list of feedback devices and their required input voltages). The standard 8720SM and MP-Series (460V) motor Stegmann feedback devices use 9V dc encoder power. A total of 300 mA of 5V dc encoder current is shared between the two 5V dc encoder power terminals, P1-7 and P1-20. In a like manner, a total of 300 mA of 9V dc encoder current is shared between the two 9V dc encoder power terminals, P1-6 and P1-19. Refer to *8720MC Connector Pin-outs* beginning on page 2-4.

Supply	Reference	Voltage			Maximum Current mA
		Minimum	Nominal	Maximum	
+5V dc	EPWR_5V	5.0	5.25	5.5	300
+9V dc	EPWR_9V	8.3	9.1	9.9	300

Encoder Phasing

The 8720MC feedback interface supports standard one volt peak-to-peak sine/cosine devices and AquadB square wave encoders. The feedback choice is a software configuration option. Figure 2.20 shows the one volt peak-to-peak sine or cosine wave ride on a 2.5V dc offset voltage supplied by a Stegmann encoder.

Figure 2.20
Sinusoidal Encoder Signals, SRS-660, SNS-60 and SRM-60



Thermostat Input

The 8720MC can monitor a thermostat signal from a motor and will generate a fault if the motor overheats. Figure 2.21 shows the configuration of the thermostat input. Figure 2.22 shows a typical connection to a motor with a normally closed thermostat. The logic is designed so that an open condition will generate a fault. If the motor does not have a thermostat signal, the drive can be configured through software to ignore the signal.

Figure 2.21
Thermostat Input Configuration

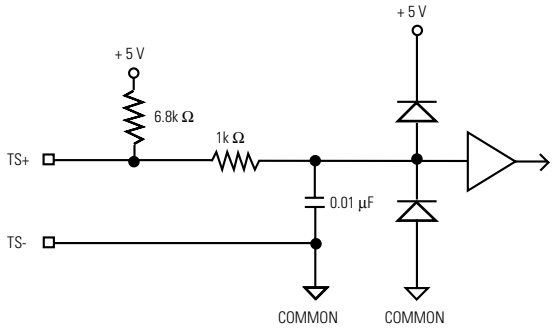
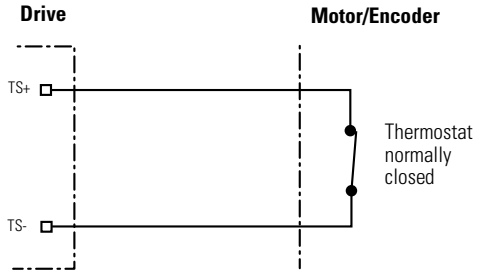


Figure 2.22
Typical Thermostat Connection



Connecting Your 8720MC

Chapter Objectives

This chapter provides procedures for wiring your 8720MC and making cable connections. This chapter includes:

- Understanding Basic Wiring Requirements
- Building Your 8720SM Motor Cables
- Using Lug Connectors
- Grounded Distribution Systems
- Ungrounded Distribution Systems
- Grounding Your 8720MC
- Wiring Your 8720MC
- Connecting Input Power
- Connecting Motor Power
- Wiring the Motor Brake Connector (MP-Series Motors Only)
- Connecting Your SERCOS Fiber Optic Cables
- Connecting to the External Active Shunt Module
- Understanding Feedback and I/O Cables
- Wiring Your Precharge Board (Frames C and D)

Note: Refer to the *8720MC Regenerative Power Supply User Manual* (publication 8720MC-UM001*x*-US-P) for 8720MC-RPS installation instructions.

Understanding Basic Wiring Requirements

This section contains basic wiring information for the 8720MC.

ATTENTION

Plan the installation of your system so that you can perform all cutting, drilling, tapping, and welding with the system removed from the enclosure. Because the system is of the open type construction, be careful to keep any metal debris from falling into it. Metal debris or other foreign matter can become lodged in the circuitry, which can result in damage to components.

IMPORTANT

This section contains common PWM servo system wiring configurations, size, and practices that can be used in a majority of applications. National Electrical Code, local electrical codes, special operating temperatures, duty cycles, or system configurations take precedence over the values and methods provided.

ATTENTION

You are responsible for conforming with the National Electrical Code (NEC) and all other applicable local codes, wiring practices, grounding, disconnects, and over current protection of particular importance. Failure to observe these precautions could result in severe bodily injury or loss of life.

This equipment is at line voltage when AC power is connected. Disconnect and lock out all ungrounded conductors of the AC power line. Failure to observe these precautions could result in severe bodily injury or loss of life.

The maximum recommended cable length is 90 m (295.2 ft). If the distance between the motor and the drive requires long motor cables, you may need to add an output reactor or cable terminators to limit voltage reflections at the motor. Refer to Figure 3.6 for motor power connections.

Building Your 8720SM Motor Cables

When building your own cables for use with the 8720SM motors, follow the guidelines listed below.

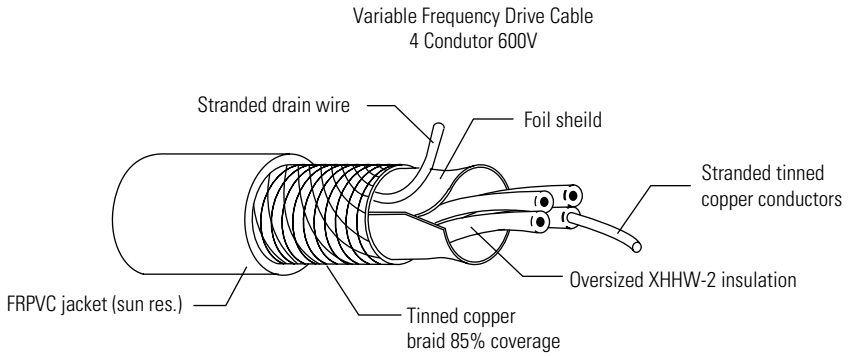
- Connect the cable shield to the connector shells on both ends of the cable with a complete 360° connection.
- Use a twisted pair cable whenever possible, twisting differential signals with each other, and single-ended signals with the appropriate ground return.

Note: MP-Series motor cables are factory supplied. Contact your local Allen-Bradley representative for latest availability.

Shielded Motor Cable

The use of a four-wire type VFD, 600 volt, UL listed cable is strongly recommended for all motor currents at or below 130 amperes. Figure 3.1 illustrates the type of cable required.

Figure 3.1
Required Cable Type



You should always use shielded motor cable. You must connect the shield to the drive chassis (PE) connection and the motor frame. Make the connection at both ends to minimize the external magnetic field.

If you use cable trays or large conduits to distribute the motor leads for multiple drives, use shielded cable to reduce or capture the noise from the motor leads and to minimize cross coupling of noise between the leads of different drives.

Cable Sizes

In the table below the appropriate variable frequency drive shielded cable to use based on 150% overload capability and 25° C (77° F) operating temperature is shown. The cable is shown in Figure 3.1.

1.5x Rated Continuous Motor Current	VFD Cable Size
12 amps	#16 AWG
17 amps	#14 AWG
21 amps	#12 AWG
30 amps	#10 AWG
55 amps	#8 AWG
65 amps	#6 AWG
95 amps	#4 AWG
130 amps	#2 AWG

For applications above 130 amps, use thick insulation lead wire, such as RHW-2 or equal. Make sure you thread the four wires (U, V, W, and ground) through a single, grounded, metal conduit.

Conduit

For applications above 130 amperes, metal conduit is required for cable distribution. Follow these guidelines:

- Drives are normally mounted in cabinets, and ground connections are made at a common ground point in the cabinet. If the conduit is connected to the motor junction box and the drive end is connected to the ground panel in the cabinet, you do not need any additional conduit connections.
- Route no more than three sets of motor leads and a ground wire through a single conduit. This minimizes cross talk that could reduce the effectiveness of the noise reduction methods described. If more than three drive/motor connections per conduit are required, use shielded cable. If practical, each conduit should contain only one set of motor leads.
- It is recommended that you use a thick insulation lead wire, such as type RHW-2 or equal.

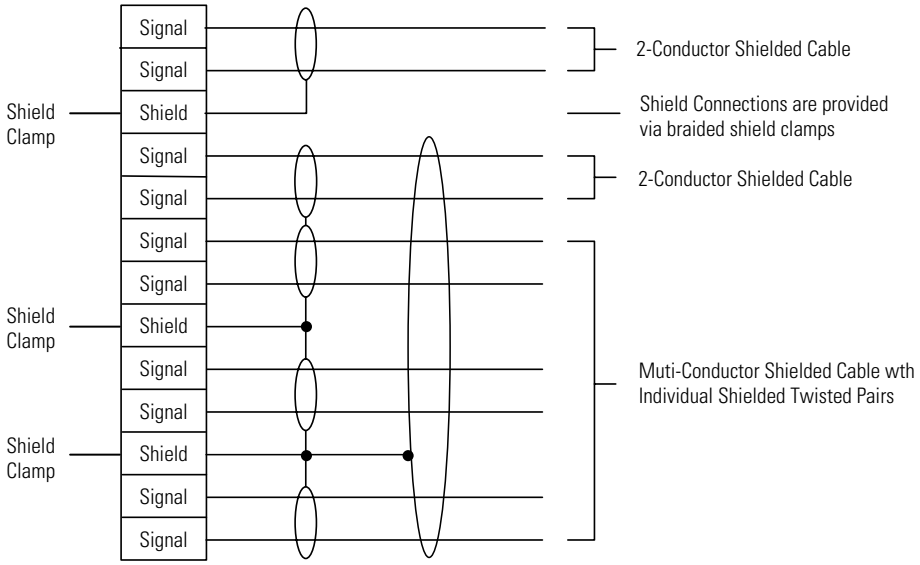
ATTENTION

To avoid a possible shock hazard caused by induced voltages, ground unused wires in the conduit at both ends. For the same reason, if a drive sharing a conduit is being serviced or installed, disable all drives using this conduit. This eliminates the possible shock hazard from cross coupled drive motor leads.

General Wire Guidelines

You should observe all applicable safety and national and local regulations when selecting the appropriate wire size for your system. Due to the drive overload capacity of 150% of the continuous current rating for one minute, the conductors for the transformer primary and secondary must be sized (at a minimum) for 125% to 160% of the maximum continuous input current for the motor selected. The motor conductors must also be rated for a minimum of 125% to 160% of the full load motor continuous current. If less than 150% overload is required the torque limit parameters must be set in the drive accordingly. The distance between the drive and motor may affect the size of the conductors used. To protect against interference, use shielded wire in motor and control circuits. A shielded cable is required for all feedback signal wires.

Figure 3.2
Recommended Shielded Cable Practices



Specific requirements for wiring the feedback and analog I/O shielded cables are found in *Appendix B*.

Routing Power and Signal Wiring

Be aware that when you route power and signal wiring on a machine or system, radiated noise from nearby relays, transformers, and other electronic drives, can be induced into motor or encoder feedback, communications, or other sensitive low voltage signals. This can cause system faults and communication problems.

Refer to *Chapter 1* for examples of routing high and low voltage cables in wireways. Refer to *System Design for Control of Electrical Noise* (publication GMC-RM001*x*-EN-P) for more information.

Using Lug Connectors

The D frame has stud type terminals, which require using lug connectors for cable terminations. The following table shows the lug selection for each possible cable choice. Choose connectors for each installation based on the desired cable sizes, the application requirements, and all applicable national, state, and local codes.

Lug Selection

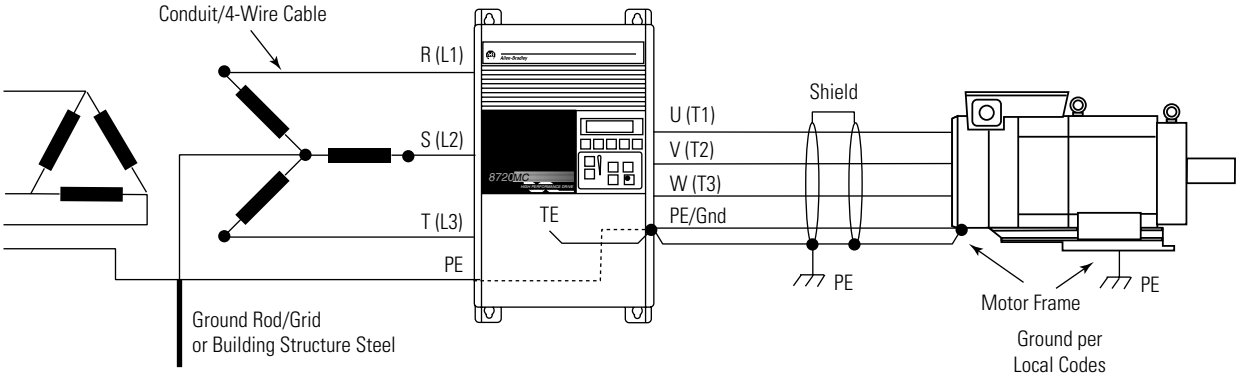
Drive Catalog Number	Output U, V, W and PE		DC+ DC-		TE	
	Cable (per Phase) mm^2 (AWG)	T & B Part No. (8 required)	Cable (per Phase) mm^2 (AWG)	T & B Part No. (2 required)	Cable (per Phase) mm^2 (AWG)	T & B Part No. Number
8720MC-D097	33.6 (2)	54147 [1]	21.2 (4)	54139 [1]	13.3 (6)	54135 [1]
8720MC-D120	53.5 (1/0)	54153 [1]	33.6 (3), (2)	54142 [1]	13.3 (6)	54135 [1]
8720MC-D149	85.0 (3/0)	54163 [1]	53.5 (1/0)	54153 [1]	13.3 (6)	54135 [1]
8720MC-D180	107.2 (4/0)	54168 [1]	67.4 (2/0)	54110 [1]	21.2 (4)	54139 [1]

[1] 5/16 inch stud. All other studs are 3/8 inch.

Grounded Distribution Systems

The AC input drives are designed for use with conventional three-phase supplies that are symmetrical with respect to ground. Surge suppression devices are included to protect the drive from lightning-induced over voltage between line and ground. For this reason, use a neutral grounded system. The drive works with a grounded phase, but you may want to use an isolation transformer to provide a supply balanced with respect to ground.

Figure 3.3
Recommended 8720MC Grounding



Ungrounded Distribution Systems

All 8720MC AC input drives are equipped with a metal oxide varistor (MOV). The MOV provides voltage surge protection, phase-to-phase as well as phase-to-ground, which is designed to meet IEEE 587. The MOV circuit is designed for surge suppression only (transient line protection), not continuous operation.

With ungrounded distribution systems, the phase-to-ground MOV connection could become a continuous current path to ground. MOV line-to-line and line-to-ground voltages should not exceed the input voltage rating shown in *Appendix A*. Exceeding these values may cause physical damage to the MOV.

Grounding Your 8720MC

We recommend that all equipment and components of a machine or process system have a common earth ground point connected to their chassis. A grounded system provides a ground path for short circuit protection. Grounding your system minimizes the shock hazard to personnel and damage to equipment caused by short circuits, transient overvoltages, and accidental connection of energized conductors to the equipment chassis. For CE grounding requirements, refer to *Chapter 1*.

IMPORTANT To improve the bond between the 8720 system components and subpanel, construct your subpanel out of zinc plated (paint-free) steel.

When grounding your 8720MC drive follow these guidelines:

- Identify a good source of earth ground such as a ground rod or a clean low resistance connection to a steel building structure. Connect the PE terminal provided on TB1 to earth ground.
- Define the paths through which the high frequency ground currents flow. Isolate the wires carrying these currents.
- Connect the ground conductor of the motor cable (drive end) directly to the drive ground PE terminal, not to the enclosure ground bus bar.
- Ground the CE filter to the bonded cabinet ground bar.
- The D-frame amplifiers (8720MC-D097, -D120, -D149, and -D180) have a TE terminal. The TE block is used for all control signal shields internal to the drive. It must be connected to the bonded cabinet ground bar by a separate continuous lead.

Connecting the Drive to the System Ground

Connect the drive to earth ground via the power ground (PE) terminal provided on the power terminal block (TB1) as shown in Figure 3.4. You should inspect and test the ground impedance at appropriate and regular intervals.

Note: Even if you have a floating secondary, the building must have a safety (earth) ground.

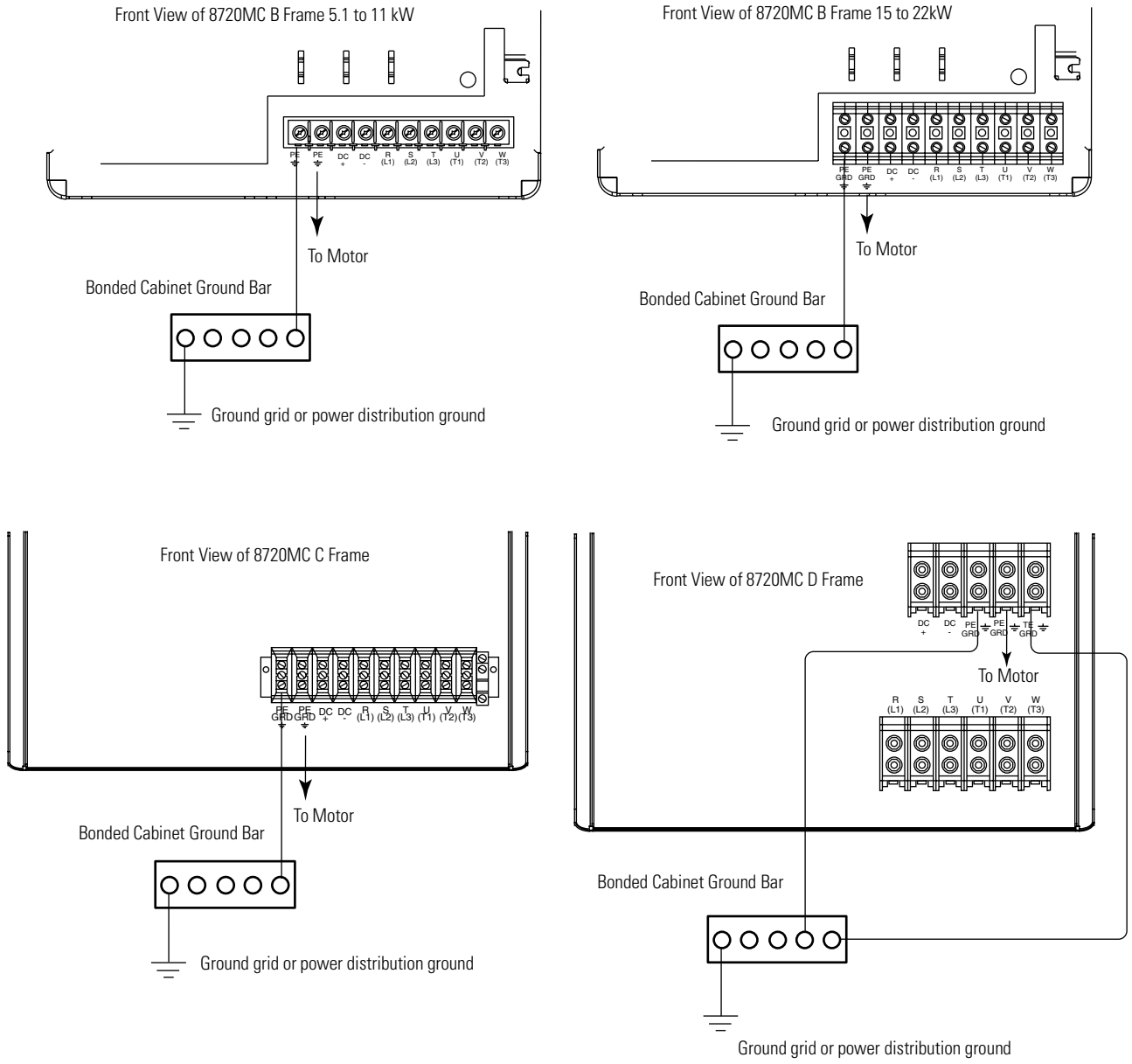
In any cabinet, you should use a single, low-impedance ground point or ground bus bar. You should:

- Ground all circuits independently and directly to this ground point or bus bar.
- Directly connect the AC supply ground conductor to this ground point or bus bar.

ATTENTION

The National Electrical Code contains grounding requirements, conventions, and definitions. Follow all applicable local codes and regulations to safely ground your system. Refer to *Appendix B* for the 8720MC interconnect diagrams.

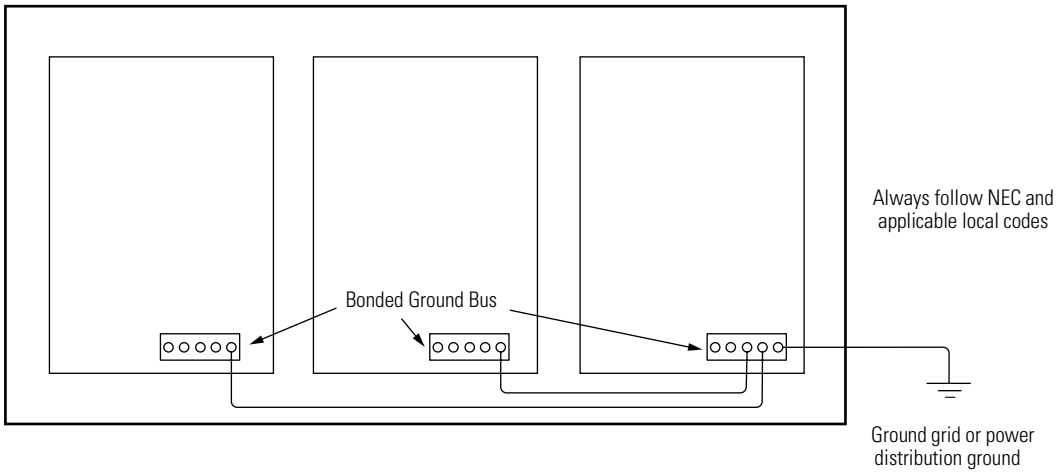
Figure 3.4
Ground Configuration for 8720MC



Grounding Multiple Subpanels

To extend the chassis ground to multiple subpanels, refer to Figure 3.5.

Figure 3.5
Subpanels Connected to a Single Ground Point



Connecting the Ground Conductor of the Motor Cable

Connect the ground conductor of the motor cable (drive end) directly to the drive ground (PE) terminal, not to the enclosure bus bar. Grounding directly to the drive (and filter, if installed) provides a direct route for high-frequency current returning from the motor frame and ground conductor. At the motor end, you should also connect the ground conductor to the motor case ground stud. Shielded or armored four-wire cable is required. Refer to *Building Your 8720SM Motor Cables* on page 3-3 for more information.

Motor Power Cable Shield Terminations

The motor power cable shield must terminate at the drive and where the cable enters the cabinet to meet CE requirements.

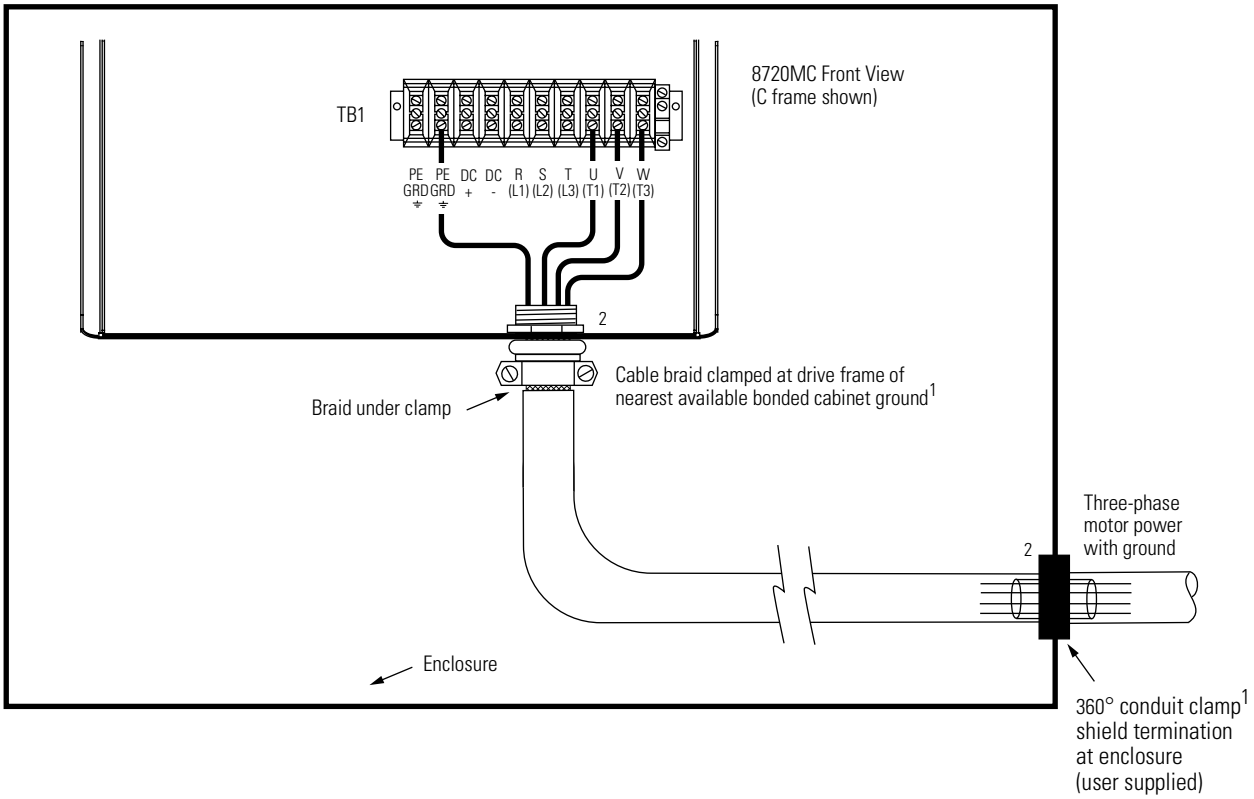
ATTENTION

To avoid hazard of electrical shock, ensure shielded power cables are grounded at a minimum of one point for safety.

A portion of the cable jacket must be removed at the drive end to expose the shield braid and leave an appropriate length for each conductor. The shield must be positioned under the clamp as shown in the figure below.

Another portion of the cable jacket is removed where the cable enters the enclosure and a 360° conduit clamp applied (as shown in the figure below).

Figure 3.6
Motor Power Cable Connection to Drive



[1] For examples of shield clamp attachment, refer to the *System Design for Control of Electrical Noise Reference Manual* (publication GMC-RM001*x*-EN-P).

[2] If cabinet is painted, remove paint (refer to Figure 1.4 in *Chapter 1* for an example).

Wiring Your 8720MC

The following sections provide information and procedures on how to wire your 8720MC. These procedures assume you have mounted your 8720MC components, bonded them to the subpanel, and have no power applied to the system.

Power Wiring Requirements

Power wiring requirements are given in the tables below. Wire should be copper with 75° C (167° F) minimum rating. Phasing of main AC power is arbitrary and earth ground connection is required for safe and proper operation. Input drive power is either AC or DC depending on your drive type and application. For additional information refer to *Power Specifications* in *Appendix A*. Refer to *Appendix B* for the 8720MC interconnect diagrams.

AC Drive Power Wiring Requirements

8720MC Drive	Description	Connects to Terminals TB1	Recommended Wire Size mm^2 (AWG)	Torque Value Nm (lb-in.)
8720MC-B021 and -B027 B frame	AC Input Power	⏚ R (L1), S (L2), T (L3)	6 (10)	1.70 (15)
	Motor Power	⏚ U (T1), V (T2), W (T3)	Motor power cable depends on motor/drive combination.	
8720MC-B034 B frame	AC Input Power	⏚ R (L1), S (L2), T (L3)	10 (8)	
	Motor Power	⏚ U (T1), V (T2), W (T3)	Motor power cable depends on motor/drive combination.	
8720MC-B042 and -B048 B frame	AC Input Power	⏚ R (L1), S (L2), T (L3)	16 (6)	5.65 (50)
	Motor Power	⏚ U (T1), V (T2), W (T3)	Motor power cable depends on motor/drive combination.	

DC Drive Power Wiring Requirements

Drive	Description	Connects to Terminals TB1	Recommended Wire Size mm^2 (AWG)	Torque Value Nm (lb-in.)
8720MC-B014 and -B021 B frame	Input Power	DC+ DC-	2.5 (14)	1.70 (15)
8720MC-B027 and -B034 B frame			4 (12)	
8720MC-B042 B frame			6 (10)	
8720MC-B048 B frame			10 (8)	
8720MC-B014, -B021, -B027, -B034, -B042, and -B048 B frame	Motor Power	⏚ U (T1), V (T2), W (T3)	Motor power cable depends on motor/drive combination.	
8720MC-D065 C frame	Input Power	DC+ DC-	16 (6)	
8720MC-D078 C frame			25 (4)	
8720MC-D097 D frame			35 (2)	5.65 (50)
8720MC-D120 D frame			50 (0)	
8720MC-D120 D frame			70 (00)	
8720MC-D149 D frame			95 (000)	
8720MC-D180 D frame			120 (0000)	
8720MC-D065, -D078 C frame and 8720MC-D097, -D120, -D149, -D180 D frame	Motor Power	⏚ U (T1), V (T2), W (T3)	Motor power cable depends on motor/drive combination.	

External Active Shunt Module Power Wiring Requirements

Shunt Module	Description	Connects to Terminals TB1	Recommended Wire Size mm^2 (AWG)	Torque Value Nm (lb-in.)
1336-MOD-KB005 and -KB010	DC Bus	DC+ DC-	4 (12)	1.70 (15)
1336-MOD-KB050			6 (10)	

For additional information regarding the external active shunt module, refer to the *Allen-Bradley Heavy Duty Dynamic Braking Installation Data* (publication 1336-5.64).

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.

ATTENTION

To avoid personal injury and/or equipment damage, ensure installation complies with specifications regarding wire types, conductor sizes, branch circuit protection, and disconnect devices. The National Electrical Code (NEC) and local codes outline provisions for safely installing electrical equipment.

To avoid personal injury and/or equipment damage, ensure motor power connectors are used for connection purposes only. Do not use them to turn the unit on and off.

To avoid personal injury and/or equipment damage, ensure shielded power cables are grounded to prevent potentially high voltages on the shield.

Connecting Input Power

Terminal strip TB1 is always the power terminal connection point and has terminals for both AC input power and DC input power. If you are using a regenerative power supply input, use the two DC input terminals. Refer to *8720MC Regenerative Power Supply User Manual* (publication 8720MC-RM001*x*-US-P) for information regarding installing the 8720MC-RPS unit. If you have a direct AC input application, use the three AC input terminals for 3 phase 380 to 460V ac incoming power and then the two DC terminals for connection to the active shunt (dynamic brake) module.

Connecting Input Power (With an 8720MC-RPS)

These procedures assume you have mounted your 8720MC drive and RPS and components and are ready to wire your DC input power.

IMPORTANT When tightening screws to secure the wires, refer to *DC Drive Power Wiring Requirements* for torque values.

IMPORTANT To ensure system performance, run wires and cables in the wireway as established in *Chapter 1*.

To wire drive input power:

1. Prepare the incoming wires for attachment to the DC input terminals by removing 10 mm (0.375 in.) of insulation.

   IMPORTANT Use caution not to nick, cut, or otherwise damage the wire as you remove the insulation.

2. Route wires (DC+, DC-) to the TB1 connector. Refer to figures 2.1 and 2.3 for the location of TB1.

3.

Insert this wire from the 8720MC RPS:	Into this terminal on the drive:
DC+	DC+
DC-	DC-

4. Tighten the connectors.

5. Gently pull on each wire to make sure it does not come out of its terminal. Re-insert and tighten any lose wires.

6. Go to *Connecting Motor Power*.

Connecting Input Power (Without an 8720MC-RPS)

These procedures assume you have mounted your 8720MC drive and components and are ready to wire your AC input power.

IMPORTANT When tightening screws to secure the wires, refer to *AC Drive Power Wiring Requirements* for torque values.

IMPORTANT To ensure system performance, run wires and cables in the wireway as established in *Chapter 1*.

To wire drive input power:

1. Prepare the incoming wires for attachment to the AC input terminals by removing 10 mm (0.375 in.) of insulation.

   IMPORTANT Use caution not to nick, cut, or otherwise damage the wire as you remove the insulation.

2. Route the 3 phase power wires (R,S,T) to the TB1 connector. Refer to figures 2.1 and 2.3 for the location of TB1.

3.

Insert this wire from the 3-phase supply:	Into this terminal on the drive:
R	R (L1)
S	S (L2)
T	T (L3)
Bonded ground bar or Terminal E on AC line filter[1]	⏚

[1] Refer to *Appendix B* for power wiring interconnect diagrams.

4. Gently pull on each wire to make sure it does not come out of its terminal. Re-insert and tighten any lose wires.

5. Go to *Connecting Motor Power*.

Connecting Motor Power

These procedures assume you have wired your input power and are ready to wire the motor power connections.

IMPORTANT When tightening screws to secure the wires, refer to the table beginning on page 3-14 for torque values.

IMPORTANT To ensure system performance, run wires and cables in the wireways as established in *Chapter 1*.

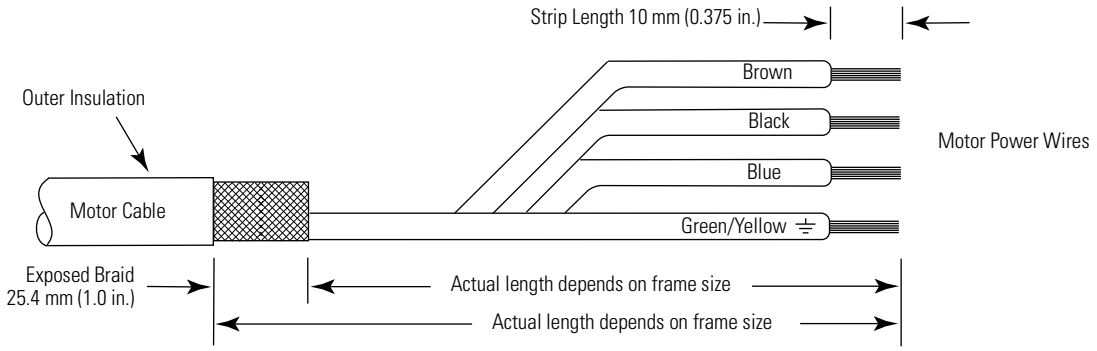
Refer to *Appendix B* for the 8720MC interconnect diagrams.

To connect motor power to your 8720MC drive:

1.

If you have this motor:	Use this Motor Power Cable:	Do this:
MP-Series	2090-CDNPBMP-8S*xx* or 2090-MCNPMP-6S*xx*	1. Cut the motor power cable, removing any existing motor power preparation from the drive end of the cable. 2. Remove outer insulation from the cable (as shown in Figure 3.7) appropriate for your application. 3. Remove all but 25.4 mm (1.0 in.) of the cable braid. 4. Trim each of the wires as shown in Figure 3.7. 5. Go to main step 2.
8720SM	Customer Supplied	

Figure 3.7
Cable Preparation



IMPORTANT Use caution not to nick, cut, or otherwise damage strands as you remove the insulation.

2. Route the motor power cable to the TB1 connector on your drive. Refer to figures 2.1 and 2.3 for the location of TB1.

IMPORTANT To ensure system performance, run wires and cables in the wireways as established in *Chapter 1*.

3.

Insert the motor power wires from this servo motor:		**Into this terminal on 8720MC Drive:**
8720SM (Customer Supplied)	**MP-Series**	TB1
U	U / Brown	U
V	V / Black	V
W	W / Blue	W
⏚	⏚ Green/Yellow	⏚
Shield	Shield	⏚ Clamp

4. Tighten the connections.

5. Gently pull on each wire to make sure it does not come out of its terminal. Re-insert and tighten any loose wires.

6. Connect motor power to your motor.

If you have this motor:	**Do this:**
MP-Series	Insert the motor end cable connector into the motor power connector on the motor.
8720SM	Refer to the *8720SM High Performance AC Induction Motors Installation Instructions* (publication 8720SM-IN001*x*-EN-P).

7.

If your motor is:	**Then:**
8720SM	Go to *Connecting Your SERCOS Fiber Optic Cables*, *Connecting to the External Active Shunt Module*, or *Understanding Feedback and I/O Cables* as needed for you application.
MP-Series	Go to *Wiring the Motor Brake Connector (MP-Series Motors Only)*.

Wiring the Motor Brake Connector (MP-Series Motors Only)

The brake wires are in a separate brake cable and the motor has a brake connector. For the MP-Series motor, use the 2090-UXNBMP-18S*xx* brake cable or the 2090-MPBC-S cable connector kit.

Refer to Figure B.6 in *Appendix B* for the motor brake interconnect diagram.

To wire your motor brake connector:

1. Route the motor brake cable to your drive.

2.

Insert the motor brake wires from the MP-Series Motor:	**Into P5 Connector on the Drive:**	
	Pin	Signal
A / BR+	P5-8	Relay 2
C / BR-	P5-9	Relay 2

3. Tighten the connections.

4. Gently pull on each wire to make sure it does not come out of its terminal. Re-insert and tighten any loose wires.

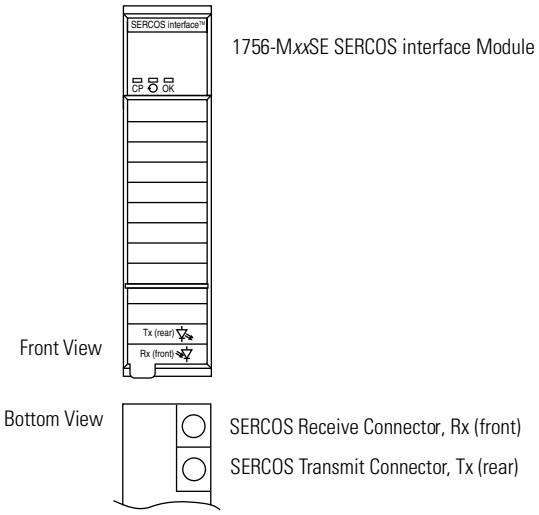
5. Go to *Connecting Your SERCOS Fiber Optic Cables*, *Connecting to the External Active Shunt Module*, or *Understanding Feedback and I/O Cables* as needed for you application.

Connecting Your SERCOS Fiber Optic Cables

This procedure assumes you have your ControlLogix chassis with 1756-M*xx*SE interface and 8720MC SERCOS interface system(s) mounted and are ready to connect the fiber-optic cables.

The SERCOS fiber-optic ring is connected using the SERCOS Receive and Transmit connectors. Refer to Figure 2.4 for the location of the connectors on your 8720MC drive(s) and Figure 3.8 to locate the connectors on your 1756-M*xx*SE interface module.

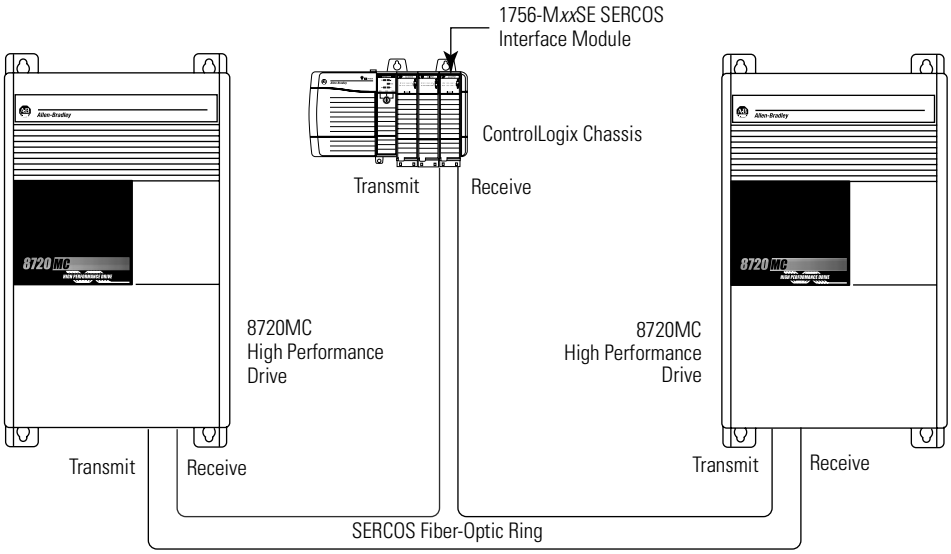
Figure 3.8
SERCOS Fiber Optic Connections



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.

Refer to figures Figure 3.9 for an example of fiber-optic ring connections between the 8720MC drive(s) and the 1756-M*xx*SE SERCOS interface module.

Figure 3.9
Fiber-Optic Ring Connection Example



To connect the SERCOS fiber optic cables:

1. Insert one end of a fiber-optic cable into the Receive SERCOS connector on the 8720MC. Thread the connector on finger tight.

2. Insert the other end of the cable (from step 1) into the Transmit SERCOS connector on the 1756-M*xx*SE interface module. Thread the connector on finger tight.

3. Insert one end of another fiber-optic cable into the Transmit SERCOS connector on the last 8720MC drive in the ring. Thread the connector on finger tight.

4. Insert the other end of the cable (from step 3) into the Receive SERCOS connector on the 1756-M*xx*SE interface module. Thread the connector on finger tight.

5. Complete the ring by connecting the Transmit and Receive connectors from one drive to the next until all are connected (refer to the examples above).

Refer to *Appendix C* for SERCOS fiber optic cable and bulkhead adapter catalog numbers.

Connecting to the External Active Shunt Module

These procedures assume your configuration requires additional shunt capacity, your external active shunt module is mounted to the panel, and you are ready to wire the shunt module.

Use the 1336-MOD-KB*xxx* active shunt with your 8720MC AC drive (refer to *Appendix C* for catalog numbers).

IMPORTANT When tightening screws to secure the wires, refer to the table on page 3-15 for torque values.

IMPORTANT To ensure system performance, run wires and cables in the wireways as established in *Chapter 1*.

Refer to *Appendix B* for the 8720MC interconnect diagrams.

To wire your shunt module:

1. Route the DC bus power wires (DC+, DC-) to TB1 on the drive from your external shunt module.
2.

Insert this wire from the shunt module:	Into this terminal on the drive:
TB1-DC+	TB1-DC+
TB1-DC-	TB1-DC-
TB3-1	115V ac
TB3-2	
TB3-3	P5-22
TB3-4	P5-36

3. Tighten the connections.
4. Gently pull on each wire to make sure it does not come out of its terminal. Re-insert and tighten any loose wires.
5. Go to *Understanding Feedback and I/O Cables*.

Understanding Feedback and I/O Cables

Factory made cables with premolded connectors are designed to minimize EMI and are recommended over hand-built cables to improve system performance. However, other options are available for building your own feedback and I/O cables. Refer to the table below for the available options.

Motor	Analog Interface		SERCOS Interface		
	8720SM-*xxxxxxx*S3	**8720SM-*xxxxxxx*S4**	**8720SM-*xxxxxxx*S1**	**8720SM-*xxxxxxx*S2**	**MPL-B8*xxx* or -B9*xxx* -M, -S**
Feedback Device	SNS60	SNS60	SRS660	SRM60	SRS660 or SRM60
Motor Connector	P-LOC	MP-Series	MP-Series	MP-Series	MP-Series
Mating Connector	Ships with motor	Attached to cable or use 2090-MPFC-S kit	Attached to cable or use 2090-MPFC-S kit	Attached to cable or use 2090-MPFC-S kit	Attached to cable or use 2090-MPFC-S kit
Feedback Cable	User Supplied	2090-CDNFDMP-S*xx*	2090-CDNFDMP-S*xx*	2090-CDNFDMP-S*xx*	2090-CDNFDMP-S*xx*
Power Cable	User Supplied	User Supplied	User Supplied	User Supplied	2090-MCNPMP-S*xx*

Motor Feedback Connector Pin-outs

The following tables provide the signal descriptions and pin-outs for the motor feedback.

Signal	MPL-B8*xxx* and -B9*xxx*, 8720SM-*xxxxxxxx*S1, -*xxxxxxxx*S2, and -*xxxxxxxx*S4 Pin	8720SM-*xxxxxxx*S3 Pin	Drive Connector Pin
SINE+	A	A	1
SINE-	B	B	2
COS+	C	C	3
COS-	D	D	4
DATA+	E	P	8
DATA-	F	R	9
9V	N	F	6
9V COM	P	G	5
TS+	R	K	12
TS-	S	L	13

Feedback and I/O Connectors

Six Weidmueller connectors (3 double row pairs) are used to connect the motor feedback, the auxiliary feedback, the analog I/O, the registration inputs, the digital I/O and the relay outputs.

IMPORTANT The front and back connectors are identical and consequently care must be taken to label the cables so that they can not be inadvertently switched.

IMPORTANT Keep the feedback and signal wiring separated from noise generating sources such as the motor cables. Wherever possible run the control wires in different conduits from the motor leads.

Refer to page 3-25 for available pre-molded cables.

P4, and P5 Connectors

The P4 and P5 connectors on the 8720MC control board have two mating connectors each. One is for the front row and one is for the back row when looking directly at the main control PC board. P4 connections 1-4, back row, are made through the lower mating connector and connections 5-8 are made through the front mating connector. The same is true for P5, but the lower terminations are 1-18 and the upper terminations are 19-36. Refer to Figure 2.4 for the P4 and P5 connectors.

The mating connectors are mechanically keyed and, therefore, it is not possible to put the connectors in backward. It is possible to switch the front and back connectors therefore care must be taken to prevent reversing the upper and lower connectors. You can accomplish this by using connector labels or you can tie wrap the cables to the chassis.

Control Signal Wire Specifications

This Belden wire or equivalent:	Should have these specifications:
8760	0.750 mm^2 (18 AWG), twisted pair, braided shield
8770	0.750 mm^2 (18 AWG) 3 conductor, braided shield
9460	0.750 mm^2 (18AWG) twisted pair, braided shield

Wiring I/O Connections

To wire your P1, P4, and P5 connectors:

1. Prepare your I/O wires by stripping approximately 12.7 mm (0.5 in.) of insulation from the end.

IMPORTANT Use caution not to nick, cut, or otherwise damage strands as you remove the insulation.

2. Use a small blade type screw driver and depress the spring clamp next to the pin you will wire and insert the wire, as shown in Figure 3.10 and Figure 3.11. The P4 and P5 wire terminations are designed for stripped AWG 22 to AWG 14 wire.

Figure 3.10
P1 Connector

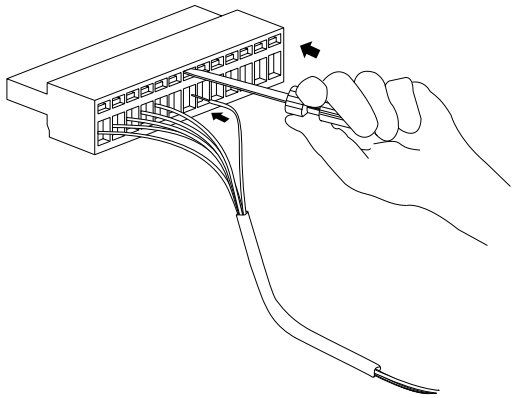
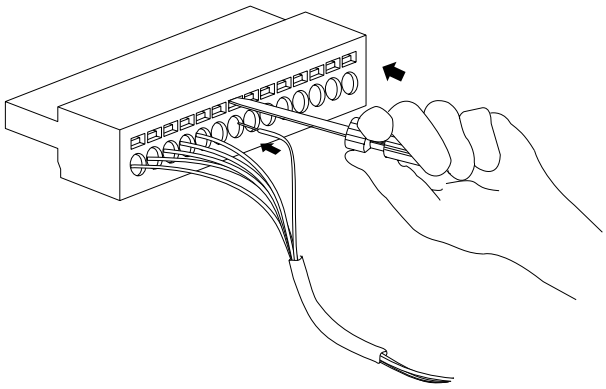


Figure 3.11
P4 and P5 Connector



3. Remove the screw driver and gently pull on the wire to make sure it does not come out of its terminal. Re-insert and test any loose wires.

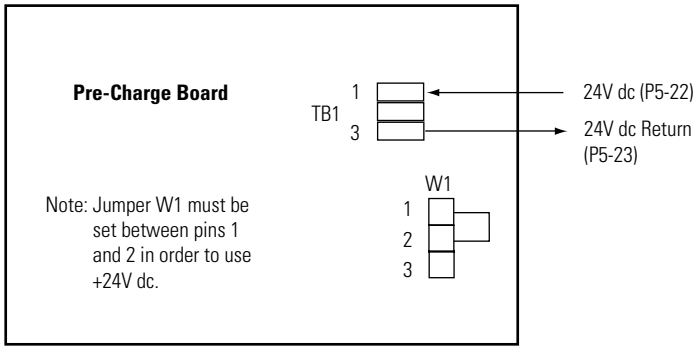
Wiring Your Precharge Board (Frames C and D)

This procedure is for C and D frames only. Refer to Figure 2.3 for the location of the precharge board.

To wire your precharge board:

1. Bring in 24V dc to TB1-T1 on the precharge board.
2. Connect the return to TB1-T3 on the precharge board.
3. Jumper pins W1-1 to W1-2 on the precharge board in order to use 24V dc.

Figure 3.12
Wiring the Precharge Board



Specifications and Dimensions

Chapter Objectives

This appendix covers the following topics:

- Certifications
- Power Specifications
- AC Line Filter Specifications
- Weight and Environmental Specifications
- Weight and Environmental Specifications
- Power Dissipation Specifications
- External Active Shunt Specifications
- Dimensions

For regenerative power supply specifications, refer to the *8720MC Regenerative Power Supply User Manual* (publication 8720MC-RM001*x*-US-P).

Certifications

The 8720MC is certified for the following when the product or package is marked.

- UL listed to U.S. and Canadian safety standards
- CE marked for all applicable directives

Note: Refer to www.ab.com/certification/ce/docs for more information.

Power Specifications

This section contains power specifications for the 8720MC system.

8720MC Drive Specifications

The table below lists general power specifications and requirements for the 8720MC High Performance (B Frame) Drives (8720MC-B014, -B021, -B027, -B034, -B042, and -B048).

Specification	Description					
	8720MC-B014	**8720MC-B021**	**8720MC-B027**	**8720MC-B034**	**8720MC-B042**	**8720MC-B048**
Input Voltage	750V dc	380/460V ac or 750V dc				
AC Input Frequency	N/A	47 - 63 Hz				
Main AC Input Current Nominal, 380/460V ac	N/A	$22A_{rms}$	$28A_{rms}$	$35A_{rms}$	$43A_{rms}$	$49A_{rms}$
DC Input Current Nominal, 750V dc Input	8.9A dc	12.1A dc	16.9A dc	23.3A dc	28.4A dc	33.4A dc
Continuous Output Current	$14A_{rms}$	$21A_{rms}$	$27A_{rms}$	$34A_{rms}$	$42A_{rms}$	$48A_{rms}$
Peak Output Current (1 minute)	$21A_{rms}$	$31.5A_{rms}$	$40.5A_{rms}$	$51A_{rms}$	$63A_{rms}$	$72A_{rms}$
Power Output Peak (1 minute) Continuous	8.25 kW 5.5 kW	11.25 kW 7.5 kW	16.5 kW 11 kW	22.5 kW 15 kW	27.75 kW 18.5 kW	33 kW 22 kW
Rated Input kVA (460V ac only)	N/A	18 kVA	23 kVA	29 kVA	35 kVA	40 kVA

The table below lists general power specifications and requirements for the 8720MC High Performance (C and D frame) Drives (8720MC-D065, -D078, -D097, -D120, -D149, and -D180).

Specification	Description					
	8720MC-D065	**8720MC-D078**	**8720MC-D097**	**8720MC-D120**	**8720MC-D149**	**8720MC-D180**
DC Input Voltage	750V dc					
DC Input Current Nominal, 750V dc Input	44A dc	53.8A dc	65.7A dc	92.6A dc	111A dc	135A dc
Continuous Output Current	$65A_{rms}$	$78A_{rms}$	$97A_{rms}$	$120A_{rms}$	$149A_{rms}$	$180A_{rms}$
Peak Output Current (1 minute)	$97.5A_{rms}$	$117A_{rms}$	$145.5A_{rms}$	$180A_{rms}$	$223.5A_{rms}$	$270A_{rms}$
Power Output Peak (1 minute) Continuous	45 kW 30 kW	55 kW 37 kW	68 kW 45 kW	95 kW 63 kW	112 kW 75 kW	140 kW 93 kW

8720MC Line Reactor Specifications

8720MC Line Reactors 8720MC-	**Specifications**	
	Maximum Continuous Current Amps	**Inductance** uH
LR03-032B	32	850
LR05-048B	48	800
LR10-062B	62	1100
LR14-070B	70	1200
LR10-100B	100	800

Fuse Specifications

Use the following tables to assist you in selecting the appropriate fuses and wire for the 8720MC drives and 8720MC regenerative power supply.

AC Input Line Fuse Ratings (380 to 460V ac Input)

The table below is based on approximately 150% peak motor demand.

Motor Catalog Number 8720SM- 460V ac/ 380V ac	**Drive Catalog Number** 8720MC-	**Max RMS AC Input Fuse Current 380 to 460V ac** Amps	**Bussman Fuse**	**Gould Shawmut Fuse**	**Wire Size** mm^2 (AWG)
005S1BB/ 005S1BC	B021	35	JKS-35	A4J35	6 (10)
007S1CB/ 007S1CC	B027	40	JKS-40	A4J40	6 (10)
011S1DB 011S1DC	B034	50	JKS-50	A4J50	10 (8)
015S1EB	B042	60	JKS-60	A4J60	16 (6)
018S1FB/ 018S1FC	B048	70	JKS-70	A4J70	16 (6)

600V ac Input Fuse Specifications

Use the following table to assist you in selecting the appropriate fuses for the 8720MC-RPS. The data in the table below are based on 25° C (77° F) operating temperature and 70° C (158° F) insulation.

Motor Catalog Number 8720SM-	**Drive Catalog Number** 8720MC-	**Max Input Fuse Current 380 to 460V ac** Amps	**Bussman Fuse**	**Gould Shawmut Fuse**	**Wire Size** mm^2 (AWG)
005S1BA	B014	16	JKS-20	A4J20	2.5 (14)
007S1CA	B021	21	JKS-25	A4J25	4 (12)
011S1DA	B027	32	JKS-35	A4J35	6 (10)
015S2EA	B034	44	JKS-45	A4J45	10 (8)
018S2FA	B042	54	JKS-60	A4J60	16 (6)
022S2GA	B048	63	JKS-70	A4J70	16 (6)
030S4JA	D065	88	JKS-90	A4J90	25 (4)
037S4KA	D078	107	JKS-110	A4J110	25 (4)
045S5NA	D097	63 (master) 63 (slave)	JKS-70	A4J60	16 (6)
055S5PA	D120	73 (master) 73 (slave)	JKS-80	A4J80	16 (6)
063S5QA	D120	92 (master) 92 (slave)	JKS-100	A4J100	25 (4)
075S6SA	D149	110 (master) 110 (slave)	JKS-110	A4J110	25 (4)
093S6TA	D180	90 (master) 2-90 (slaves)	JKS-90	A4J90	25 (4)

1000V dc Input Fuse Specifications

Use the following table to assist you in selecting the appropriate fuses and wire when multiple 8720MC-RPS units and multiple 8720MC drive units are used.

Motor Catalog Number 8720SM-	**Drive Catalog Number** 8720MC-	**Drive input Fuse Current @ 750V dc** Amps	**Bussman Fuse**	**Gould Shawmut Fuse**	**Wire Size** mm^2 (AWG)
005S1BA	B014	15	N/A	A100P15-1	2.5 (14)
007S1CA	B021	20	N/A	A100P20-1	2.5 (14)
011S1DA	B027	30	N/A	A100P-30-1	4 (12)
015S2EA	B034	40	FWJ-40	A100P-40-1	4 (12)
018S2FA	B042	50	FWJ-50	A100P-50-4	6 (10)
022S2GA	B048	60	FWJ-60	A100P-60-4	10 (8)
030S4JA	D065	77	FWJ-80	A100P-80-4	16 (6)
037S4KA	D078	94	FWJ-100	A100P-100-4	25 (4)
045S5NA	D097	115	FWJ-125	A100P-125-4	35 (2)
055S5PA	D120	141.5	FWJ-150	A100P-150-4	50 (0)
063S5QA	D120	162	FWJ-175	A100P-175	70 (00)
075S6SA	D149	194	FWJ-200A	A100P-200-4	95 (000)
093S6TA	D180	236	FWJ-250	A100P-250-4	120 (0000)

Contactor Ratings

The table below lists the recommended contactor ratings for 8720MC drives and regenerative power supplies.

Catalog Number	Contactor
8720MC-B021	100-C23*x*10
8720MC-B027	100-C30*x*10
8720MC-B034	100-C37*x*10
8720MC-B042	100-C43*x*10
8720MC-B048	100-C60*x*10
8720MC-RPS027	100-C30*x*10
8720MC-RPS065	100-C72*x*10

Note: For the contactor recommended for use with the 8720MC-RPS190, refer to the *8720MC Regenerative Power Supply User Manual* (publication 8720MC-RM001*x*-US-P).

AC Line Filter Specifications

The table below shows the specifications for AC line filters that you can use with the 8720MC AC drives (8720MC-B*xxx*) and regenerative power supplies (8720MC-RPS*xxx*).

8720MC Component	AC Line Filter Catalog Number	Specifications						
		Voltage	Phase	Current	Power Loss	Weight	Humidity	Vibration
8720MC-RPS027 or -RPS065	8720MC-RFI80	520V ac 50/60 Hz	Three	80A @ 50° C (122° F)	25.9W	5.3 kg (11.7 lb)	90% RH	10-200 Hz @ 1.8 g
8720MC-RPS190	8720MC-EF190-VB	—	—	—	—	—	—	—
8720MC-B021 or -B027	1336-RFB-27	460V ac 50/60 Hz	Three	27A @ 50° C (122° F)	30W	5.0 kg (11.0 lb)	90% RH	10-200 Hz @ 1.8 g
8720MC-B034, -B042, or -B048	1336-RFB-48	460V ac 50/60 Hz	Three	48A @ 50° C (122° F)	56W	6.0 kg (13.2 lb)	90% RH	10-200 Hz @ 1.8 g

Weight and Environmental Specifications

This section contains weight and environmental specifications for the 8720MC components.

Weight Specifications

Component	Frame Size	Catalog Number 8720MC-	Description kg (lbs)
8720MC Drives	B Frame	B014, B021, B027, B034, B042, B048	22.7 (50)
	C Frame	D065, D078	38.6 (85)
	D Frame	D097, D120, D149, D180	108.9 (240)
Regenerative Power Supplies	N/A	RPS027	11 (24.3)
		RPS065	13.5 (29.7)
		RPS0190	48.5 (108)
Line Reactors	N/A	LR03-032B	17 (37.47)
		LR05-048B	21 (46.29)
		LR10-062B	27 (59.52)
		LR14-070B	38 (83.77)

Environmental Specifications

Specification	Operational Range	Storage Range (non-operating)
Temperature	0° C to 50° C (32° F to 122° F)	-40° C to 70° C (-40° F to 158° F)
Humidity	5 to 95% non-condensing	5 to 95% non-condensing
Altitude	1000 m (3281 ft) without derating [1]	3000 m (9842 ft) during transport
Vibration	0.152 mm (0.006 in.) peak-to-peak displacement (max), 1.0 g peak (max) acceleration @ 5-2000 Hz	0.381 mm (0.015 in.) peak-to-peak displacement (max), 2.5 g peak (max) acceleration @ 5-2000 Hz
Shock	15 g, 11 ms half-sine pulse (3 pulses in each direction of 3 mutually perpendicular directions)	30 g, 11 ms half-sine pulse (3 pulses in each direction of 3 mutually perpendicular directions)

[1] The continuous current rating must be de-rated by 3% for each additional 300 m(984 ft) up to 3000 m (9842 ft).

Power Dissipation Specifications

Use the following table to size an enclosure and calculate required ventilation for your 8720MC system.

Catalog Number 8720MC-	Base Derate Amps[2]	Drive Frame Size	Heat Dissipation (Drive) Watts[1,2]	Heat sink Watts[1,2]	Total Watts[1,2]
380 - 480V ac or 750V dc Input Drives					
B014	14	B	91	270	361
B021	21	B	103	394	497
B027	27	B	117	486	603
B034	34	B	140	628	768
B042	42	B	141	720	861
B048	48	B	141	820	961
D065	65	C	175	933	1108
D078	78	C	193	1110	1303
D097	97	D	361	1708	2069
D120	120	D	361	1708	2069
D149	149	D	426	1944	2307
D180	180	D	522	2664	3186

[1] The open packaged drive ambient operating temperature is 50°C (122° F). The cabinet enclosure should be designed to provide an operating temperature that does not exceed 50°C (122° F) in worst case ambient conditions.

[2] Drive rating is based on altitudes of 1000 meters (3000 feet) or less. If installed at a higher altitude, derate the drive.

External Active Shunt Specifications

The table below lists the ratings for the (optional) external active shunt module (for use with the 8720MC-B021, -B027, -B034, -B042, and -B048).

External Shunt Catalog Number	Drive Voltage V ac	Ratings				Shipping Weight kg (lbs)	Bussmann Replacement Fuse
		Resistance Range Ohms	Peak Power kW	Peak Current Amps	Cont. Power Watts		
1336-MOD-KB005	460	104.0	6	7.5	375	6.8 (15)	A60Q
1336-MOD-KB010	460	52.0	12	15	750		A60Q
1336-MOD-KB050	460	10.0	60	76	3750	33.8 (75)	A70QS35

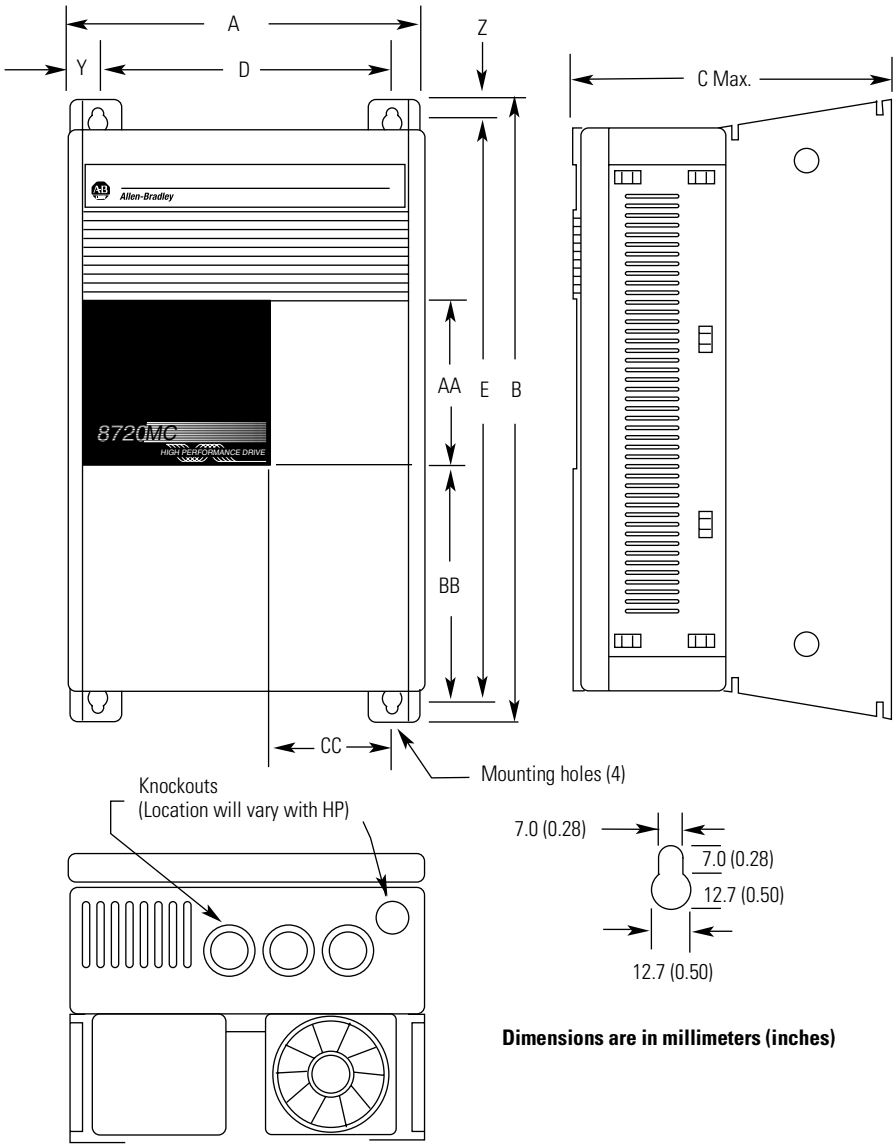
Dimensions

Within this section you will find dimension drawings for the following 8720MC system components:

- 8720MC High Performance Drives
- 8720MC-RPS Regenerative Power Supplies
- 8720MC Line Reactors
- 8720MC Harmonic Filter
- 8720MC Varistor

8720MC High Performance Drive Dimensions

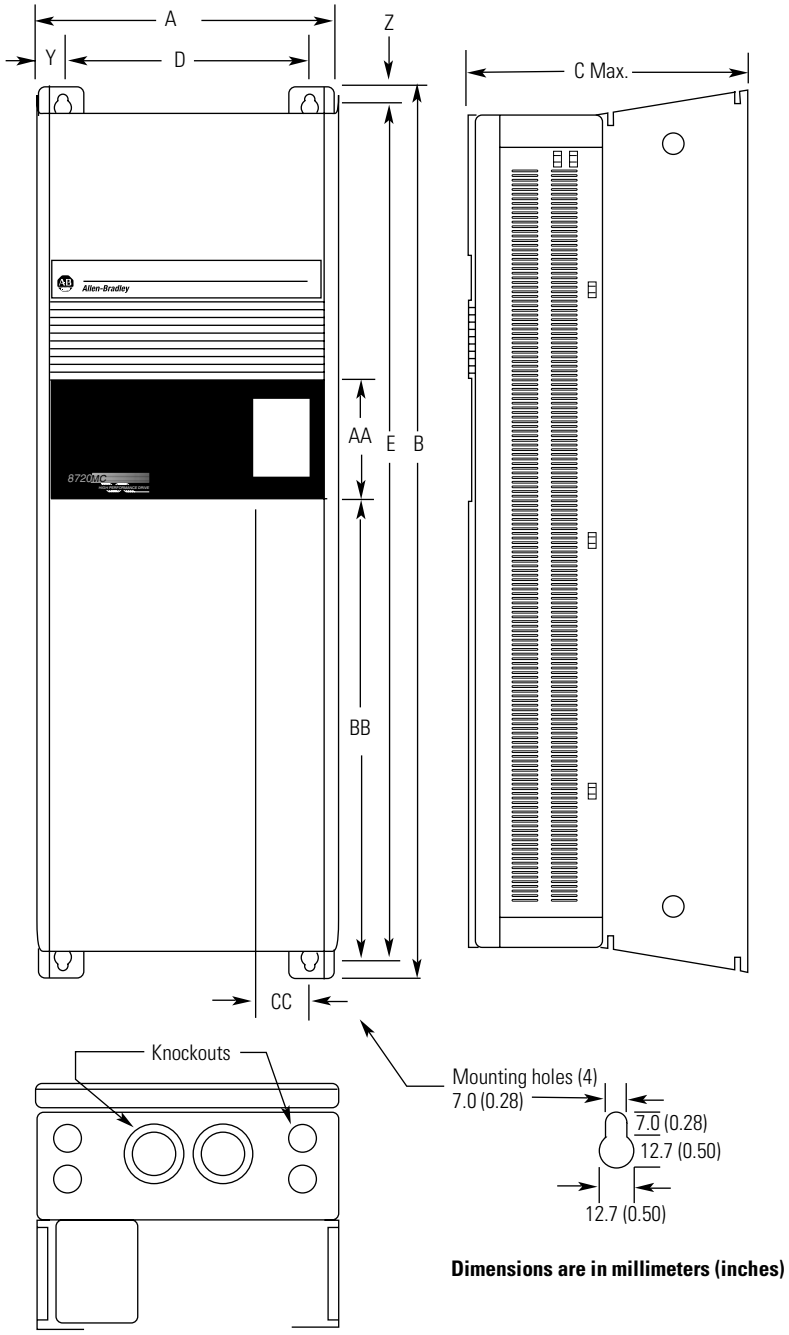
Figure A.1
8720MC High Performance Drive (B and C Frame) Dimensions



Dimensions are in millimeters (inches)

Frame Reference	A	B	C Max	D	E	Y	Z	AA	BB	CC	Knockouts 3-Dual Size, 1 Fixed
B	276.4 (10.88)	476.3 (18.75)	231.0 (9.12)	212.6 (8.37)	461.0 (18.15)	32.0 (1.26)	7.6 (0.30)	131.1 (5.16)	180.8 (7.12)	71.9 (2.83)	28.6/34.9, 22.2 (1.125/1.375, 0.975)
C	301.8 (11.88)	701.0 (27.60)	231.0 (9.12)	238.0 (9.37)	685.8 (27.00)	32.0 (1.26)	7.6 (0.30)	131.1 (5.16)	374.7 (14.75)	71.9 (2.83)	28.6/34.9, 22.2 (1.125/1.375, 0.875)

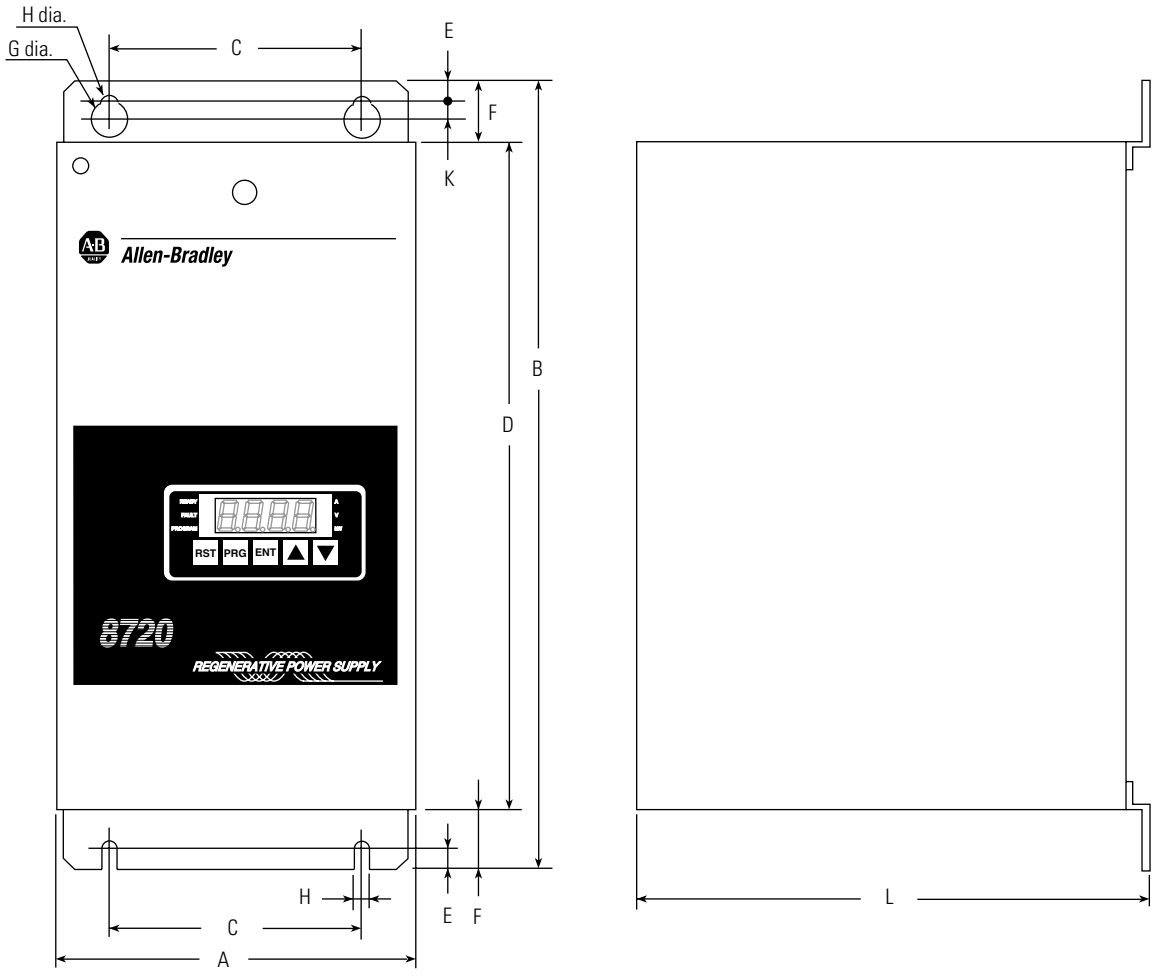
Figure A.2
8720MC High Performance Drive (D Frame) Dimensions



Frame Reference	A	B	C Max	D	E	Y	Z	AA	BB	CC	Knockouts 3-Dual Size, 1 Fixed
D	381.5 (15.02)	1240.0 (48.82)	277.37 (10.92)	325.9 (12.83)	1216.2 (47.88)	27.94 (1.10)	111.9 (0.47)	131.1 (5.16)	688.6 (27.11)	71.9 (2.83)	62.7/6.2, 34.9/50.0, 34.9 (2.47/3.0, 1.38/1.97, 1.38)

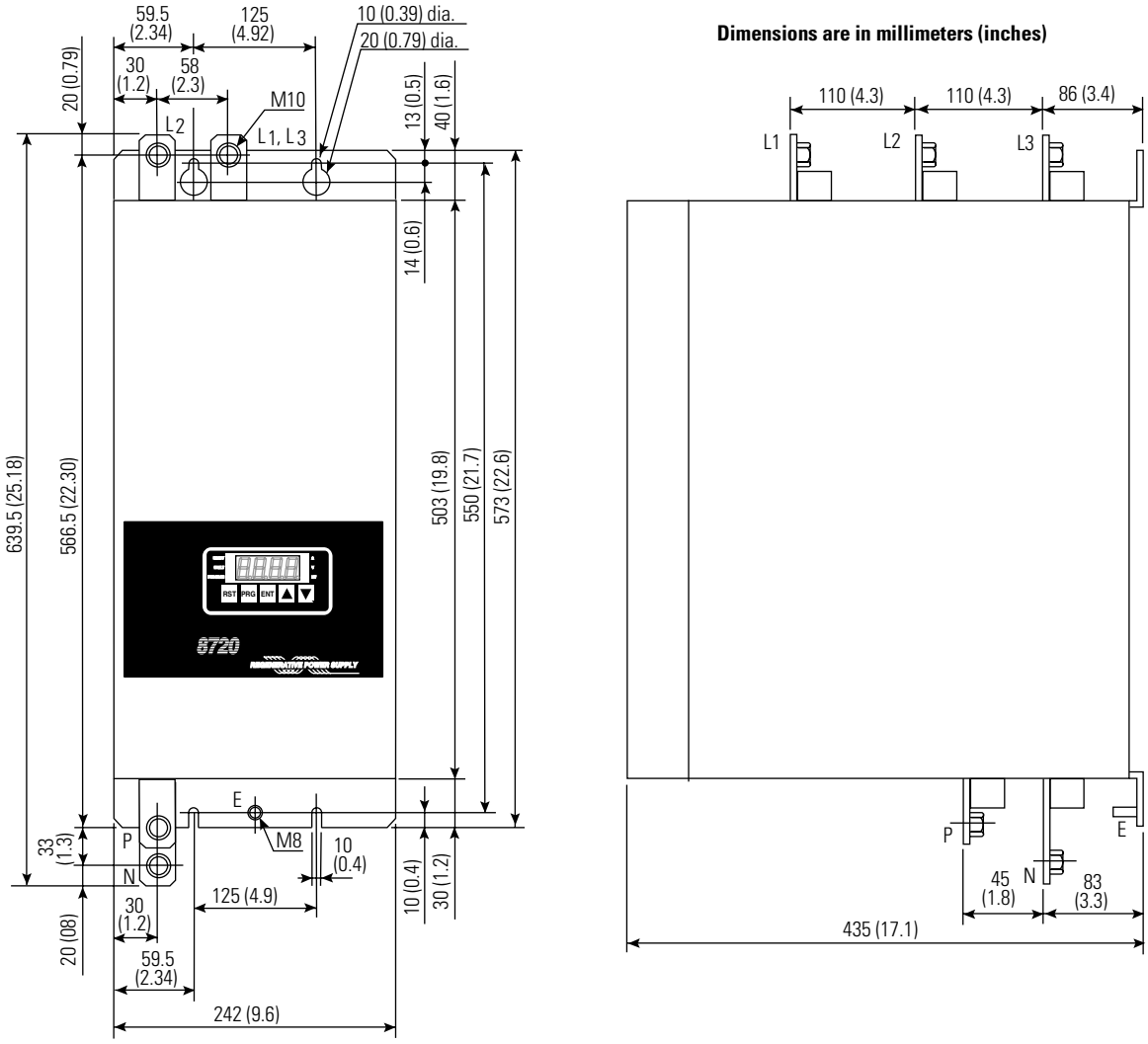
8720MC Regenerative Power Supply Dimensions

Figure A.3
8720MC-RPS027 and -RPS065 Dimensions



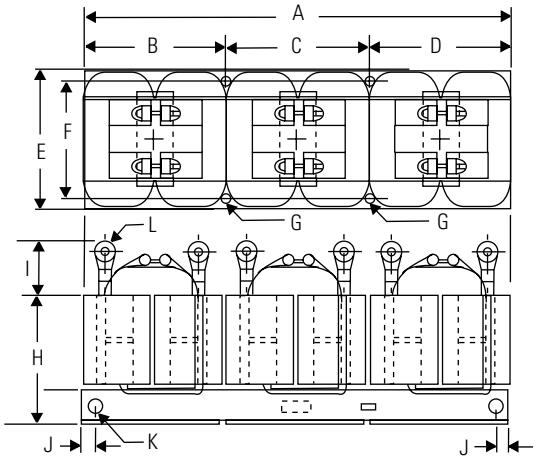
8720MC-	A	B	C	D	E	F	G	H	K	L
RPS-027	167.0 (6.57)	320.0 (12.6)	120.0 (4.72)	260.0 (10.24)	10.0 (0.39)	30.0 (1.2)	17.0 (0.67)	8.2 (0.32)	8.0 (0.31)	310.0 (12.53)
RPS-065	179.4 (7.06)	395.0 (15.60	127.0 (5.0)	333.2 (131.2)	10.0 (0.39)	30.0 (1.2)	18.0 (0.71)	9.0 (0.35)	9.0 (0.35)	318.3 (12.20)

Figure A.4
8720MC-RPS190 Dimensions



8720MC Line Reactor Dimensions

Figure A.5
8720MC-LR03-032B, -LR05-048B, -LR10-062B, -LR14-070B

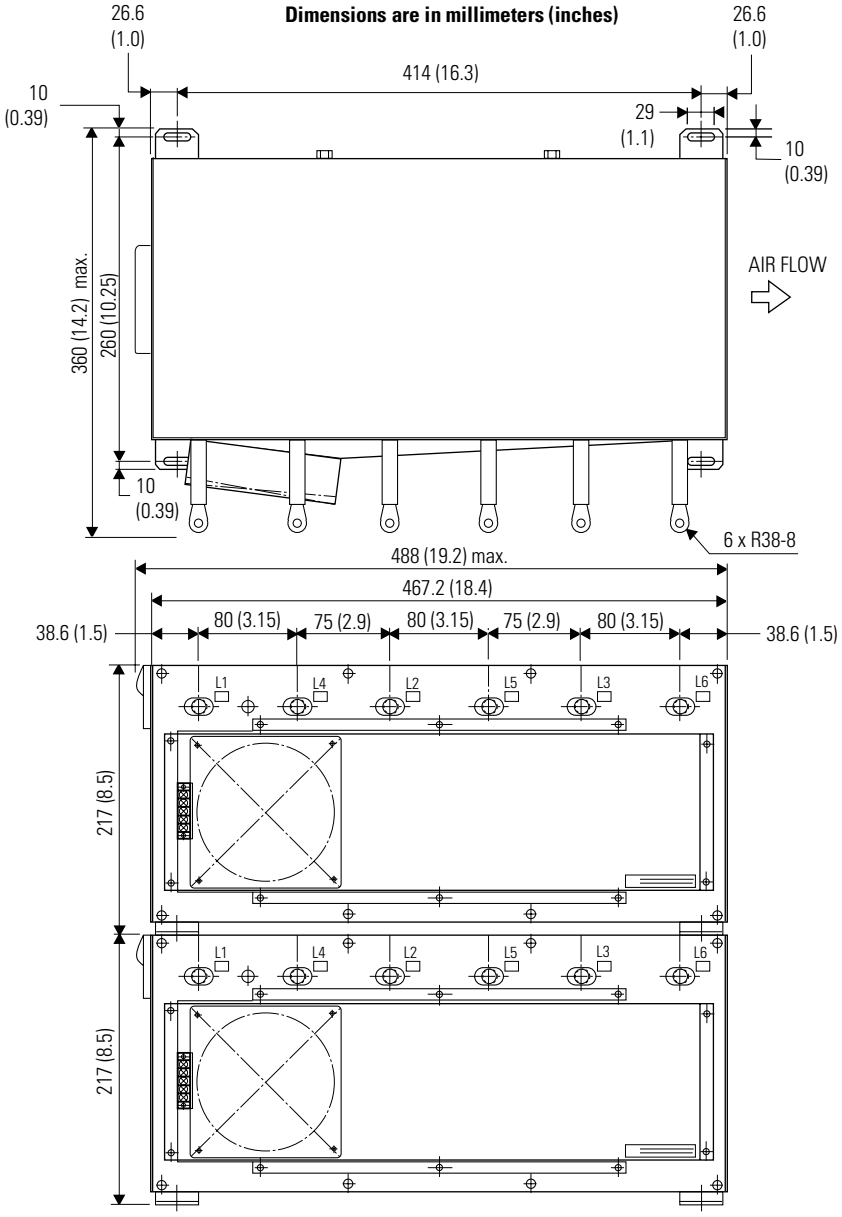


Dimensions are in millimeters (inches)

Reactor 8720MC-	**A**[1]	**B**	**C**[2]	**D**	**E**	**F**[3]	**G**	**H**[4]	**I**[5]	**J**	**K**	**K**
LR03-032B	345 (13.58)	112.5 (4.42)	120 (4.72)	112.5 (4.42)	140 (5.51)	100 (3.93)	4 to 7 (0.15 to 0.27)	127 (4.99)	80 (3.14)	15 (0.59)	4 to 15 (0.15 to 0.59)	6-(R22-6) (0.23)
LR05-048B	400 (15.74)	132.5 (5.21)	135 (5.31)	132.5 (5.21)	155 (6.10)	105 (4.13)	4 to 7 (0.15 to 0.27)	125 (4.92)	80 (3.14)	15 (0.59)	4 to 15 (0.15 to 0.59)	6-(R22-6) (0.23)
LR10-062B	440 (17.32)	145 (5.70)	150 (5.90)	145 (5.70)	160 (6.29)	110 (4.33)	4 to 9.5 (0.15 to 0.37)	125 (4.92)	80 (3.14)	15 (0.59)	4 to 15 (0.15 to 0.59)	6-(R22-6) (0.23)
LR14-070B	460 (18.11)	155 (6.10)	150 (5.90)	155 (6.10)	180 (7.08)	125 (4.92)	4 to 9.5 (0.15 to 0.37)	140 (5.51)	80 (3.14)	15 (0.59)	4 to 15 (0.15 to 0.59)	6-(R38-6) (0.23)

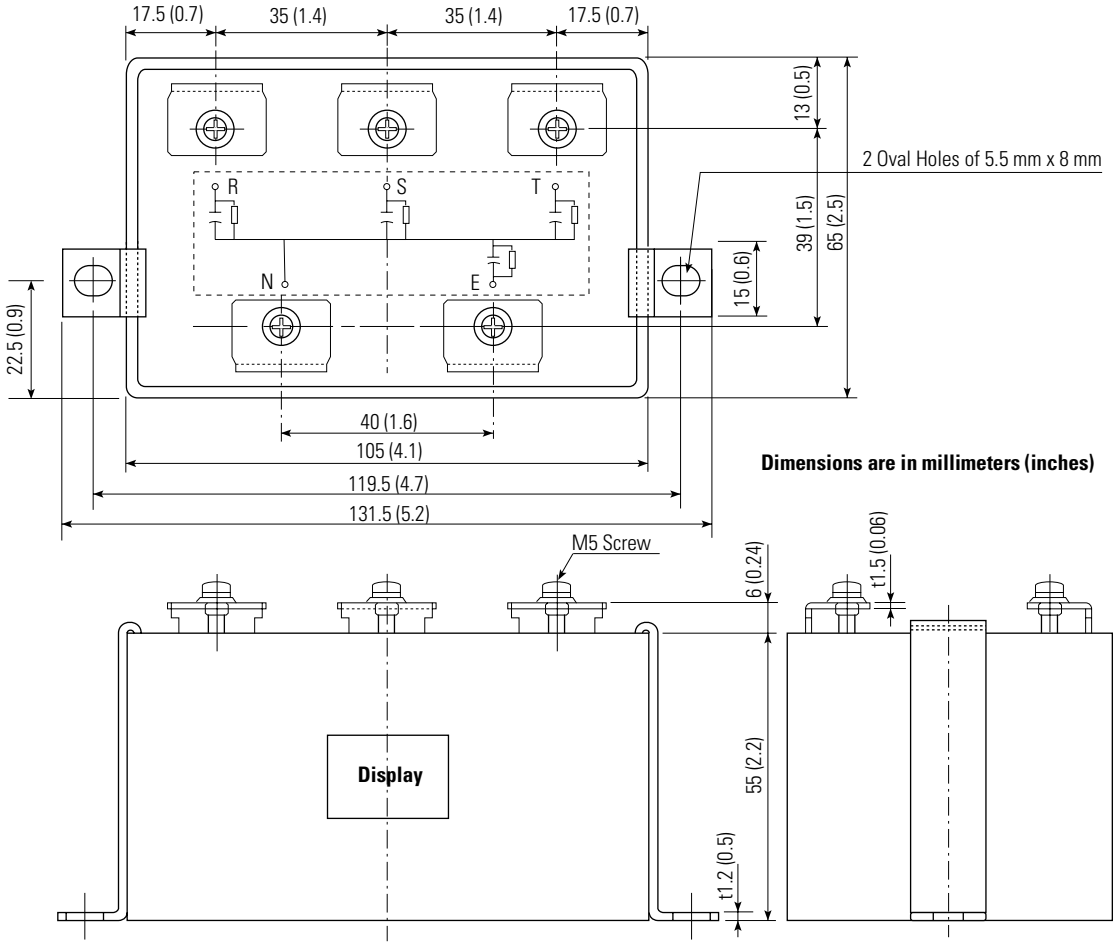
[1] The tolerance is +/-2 mm (0.07 in.).
[2] The tolerance is +/-1 mm (0.03 in.).
[3] The tolerance is +1/-5 mm (+0.03/-0.19 in.).
[4] The tolerance is +/-5 mm (0.19 in.).
[5] The tolerance is +/-10 mm (0.39 in.).

Figure A.6
8720MC-LR10-100B



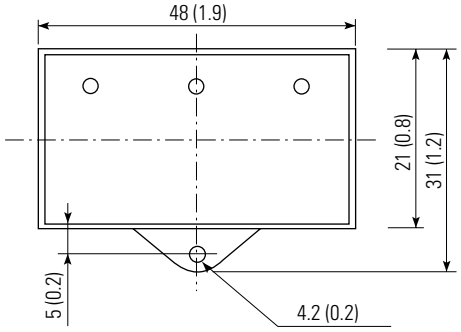
8720MC Harmonic Filter Dimensions

Figure A.7
8720MC-HV-B2

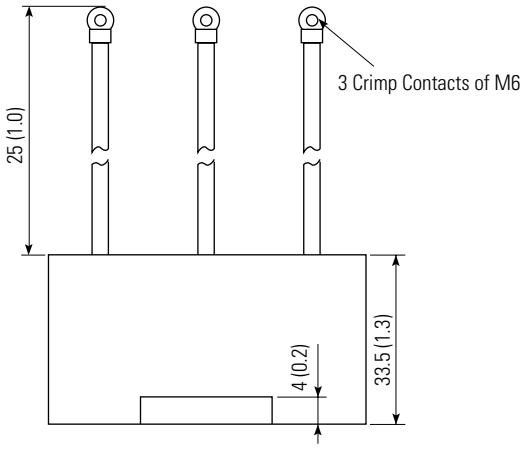


8720MC Varistor Dimensions

Figure A.8
8720MC-VA-*x*



Dimensions are in millimeters (inches)



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.

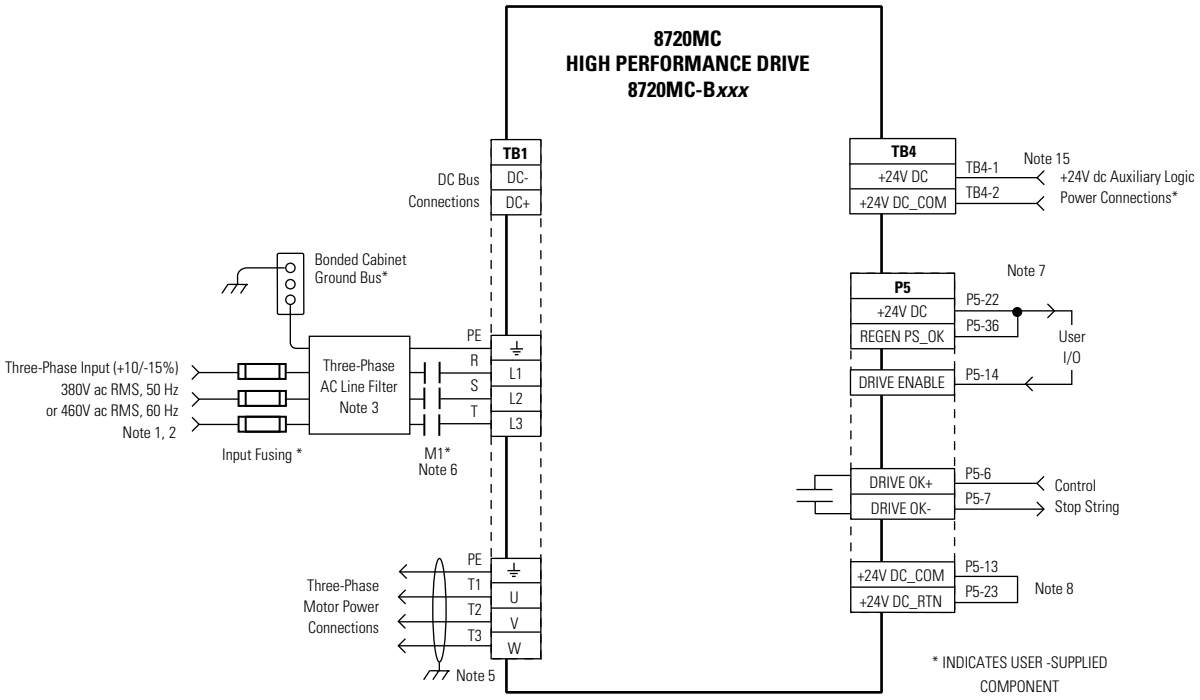
Note:	Information:
1	Refer to *Power Wiring Requirements* in *Chapter 3* for power wiring specifications.
2	Refer to *Fuse Specifications* in *Appendix A* for input fuse sizes.
3	Refer to *AC Line Filter Specifications* in *Appendix A* for AC line filter specifications.
4	Refer to *Motion Control Selection 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 *Meeting CE Requirements* in *Chapter 1* for additional information.
6	Contactor coil (M1) needs integrated surge suppressors for AC coil operation. Refer to *Contactor Ratings* in *Appendix A*.
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 B.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 B.1, B.2, and B.3.

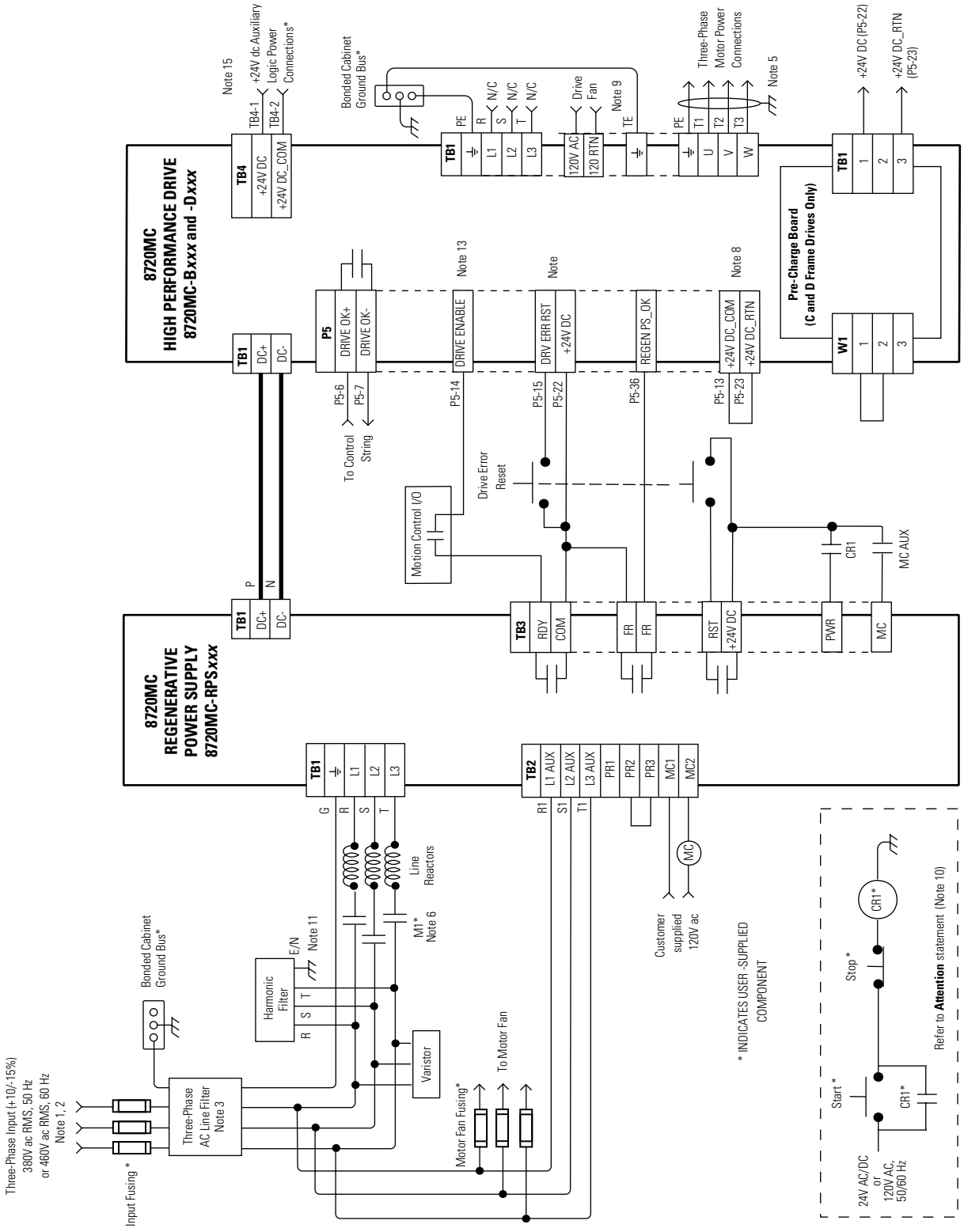
In the configuration below, the 8720MC drive is shown with 380/460V ac (three-phase) input. This configuration applies only to the 8720MC-B021, -B027, -B034, -B042, and -B048 drives.

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



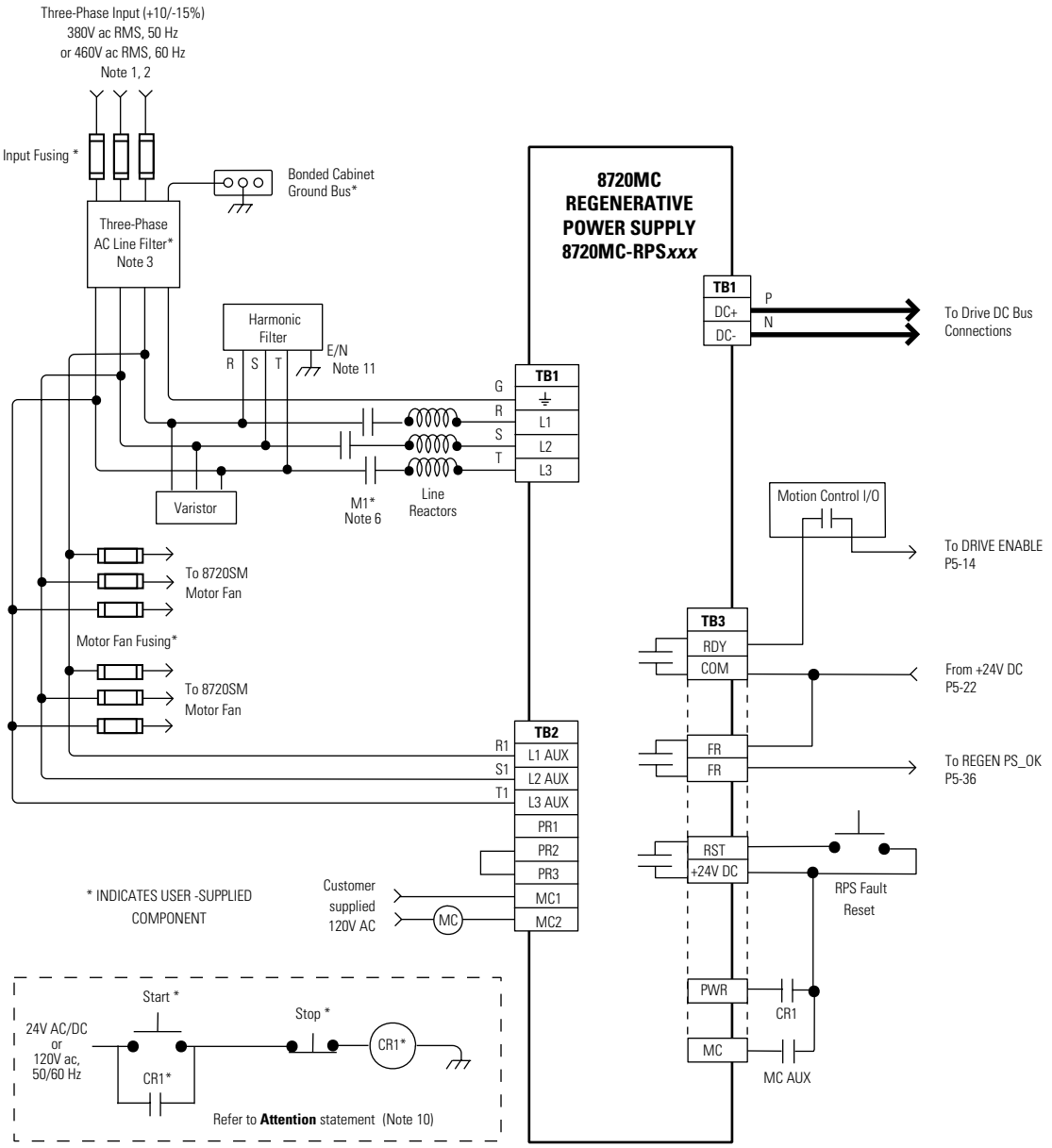
In the configuration below, the 8720MC drive is shown with the 8720MC-RPS and 750V dc (common bus) input. This configuration applies to all 8720MC drives.

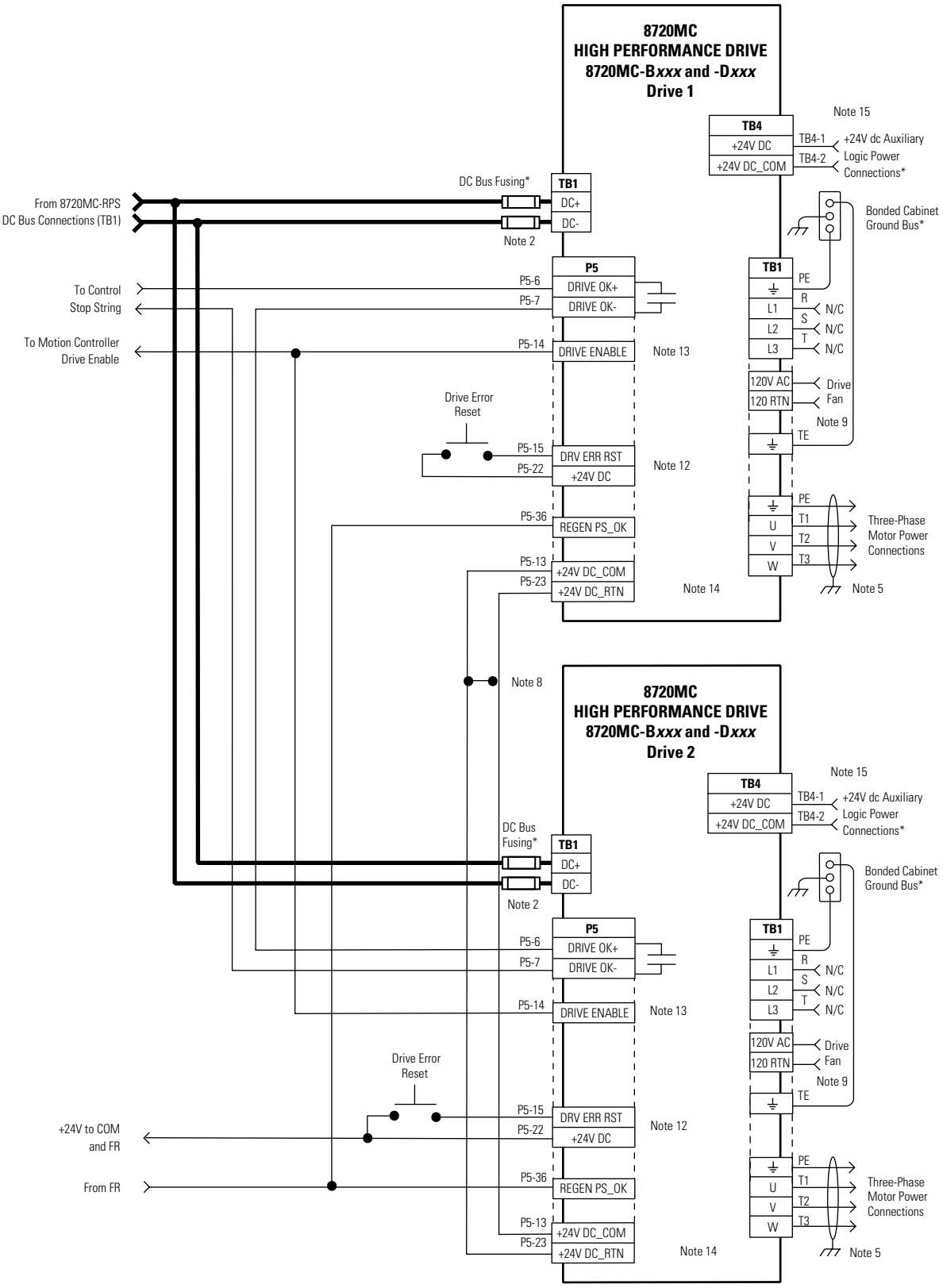
Figure B.2
8720MC Power Interconnect (8720MC with 750V DC Input)



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

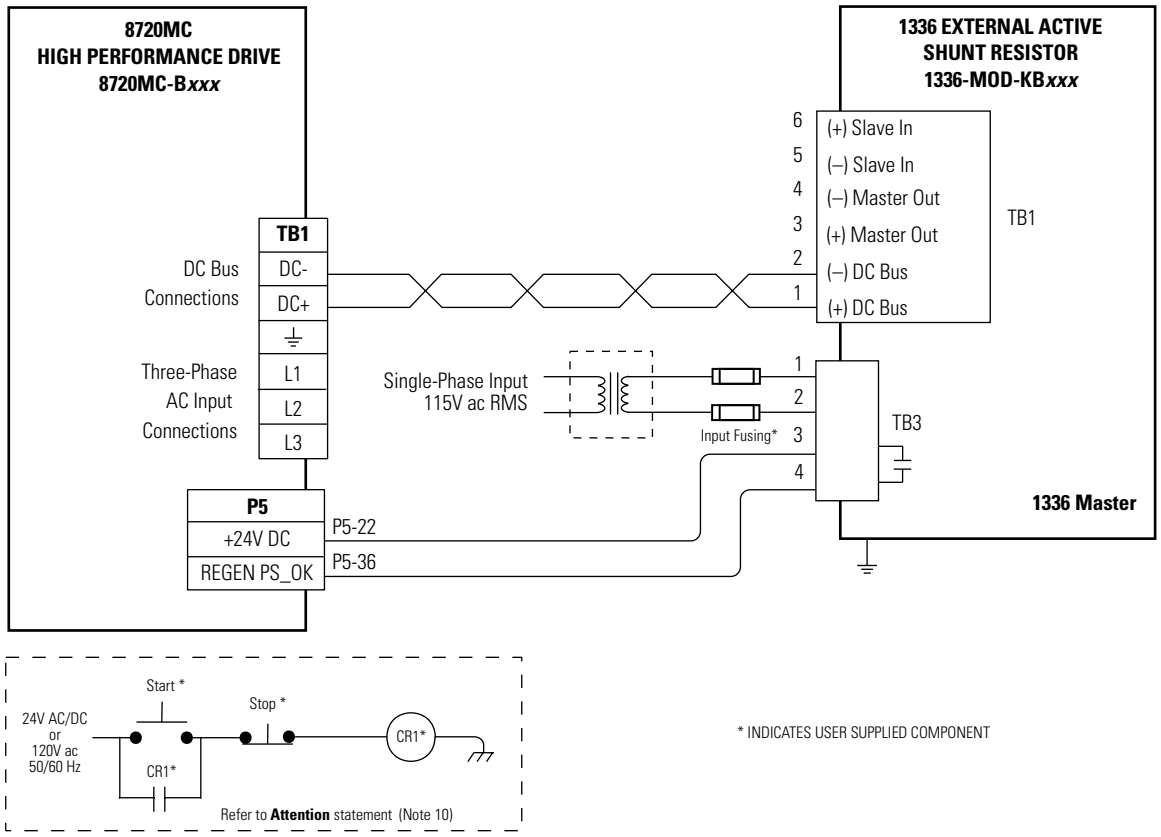



8720MC
HIGH PERFORMANCE DRIVE
8720MC-Bxxx and -Dxxx
Drive 1
TB4
+24V DC
+24V DC_COM
TB4-1
TB4-2
+24V dc Auxiliary
Logic Power
Connections*
Note 15
Bonded Cabinet
Ground Bus*
DC Bus Fusing*
From 8720MC-RPS
DC Bus Connections (TB1)
TB1
DC+
DC-
Note 2
P5
P5-6
DRIVE OK+
P5-7
DRIVE OK-
To Control
Stop String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

External Active Shunt Module Interconnect Diagrams

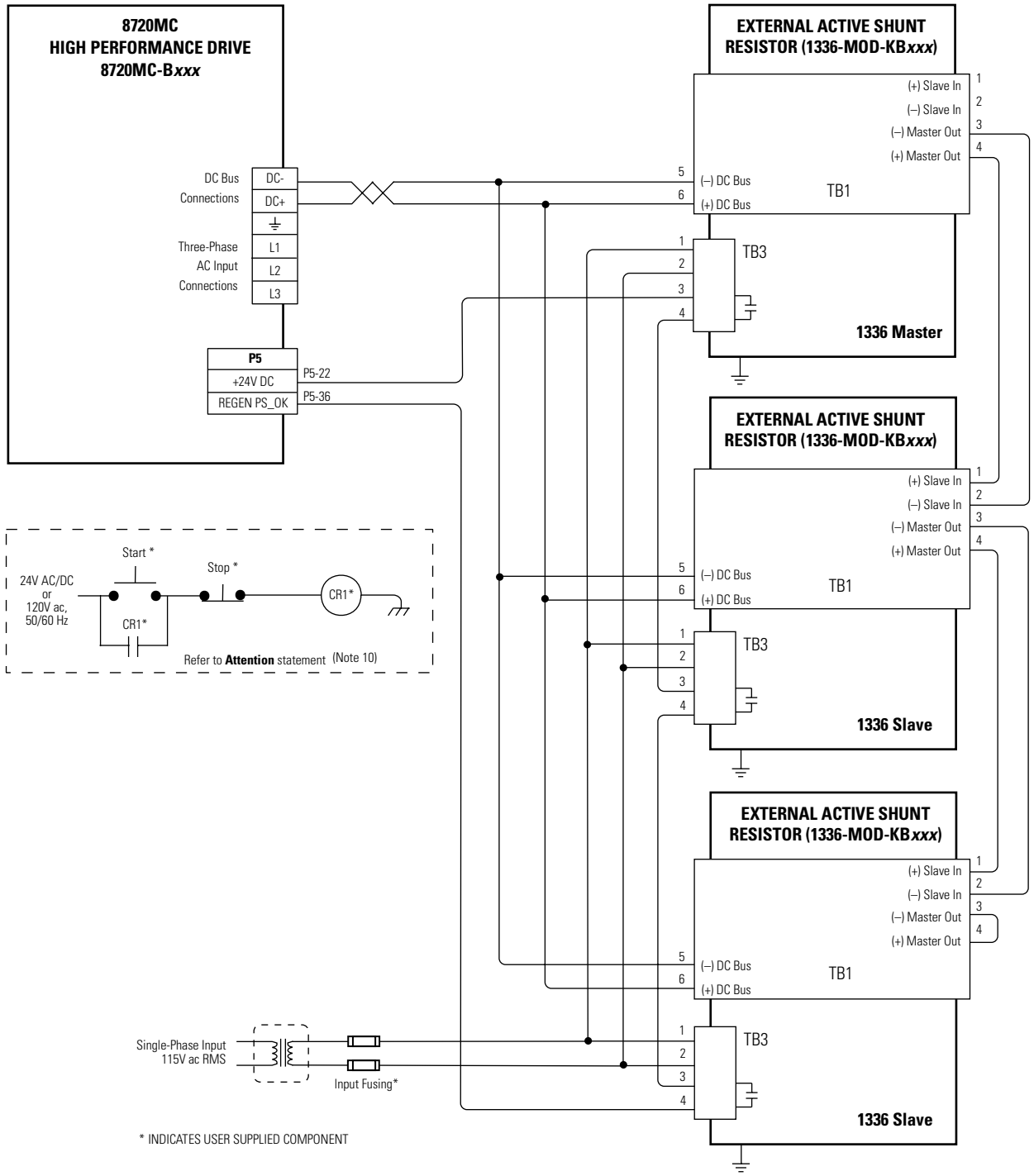
In the figure below, the 8720MC is shown wired with a Bulletin 1336 external active shunt. Refer to *Appendix C* for a list of external active shunt module catalog numbers available for the 8720MC.

Figure B.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 *Appendix C* for a list of external active shunt module catalog numbers available for the 8720MC.

Figure B.5
External Active Shunt Module Interconnect Diagram

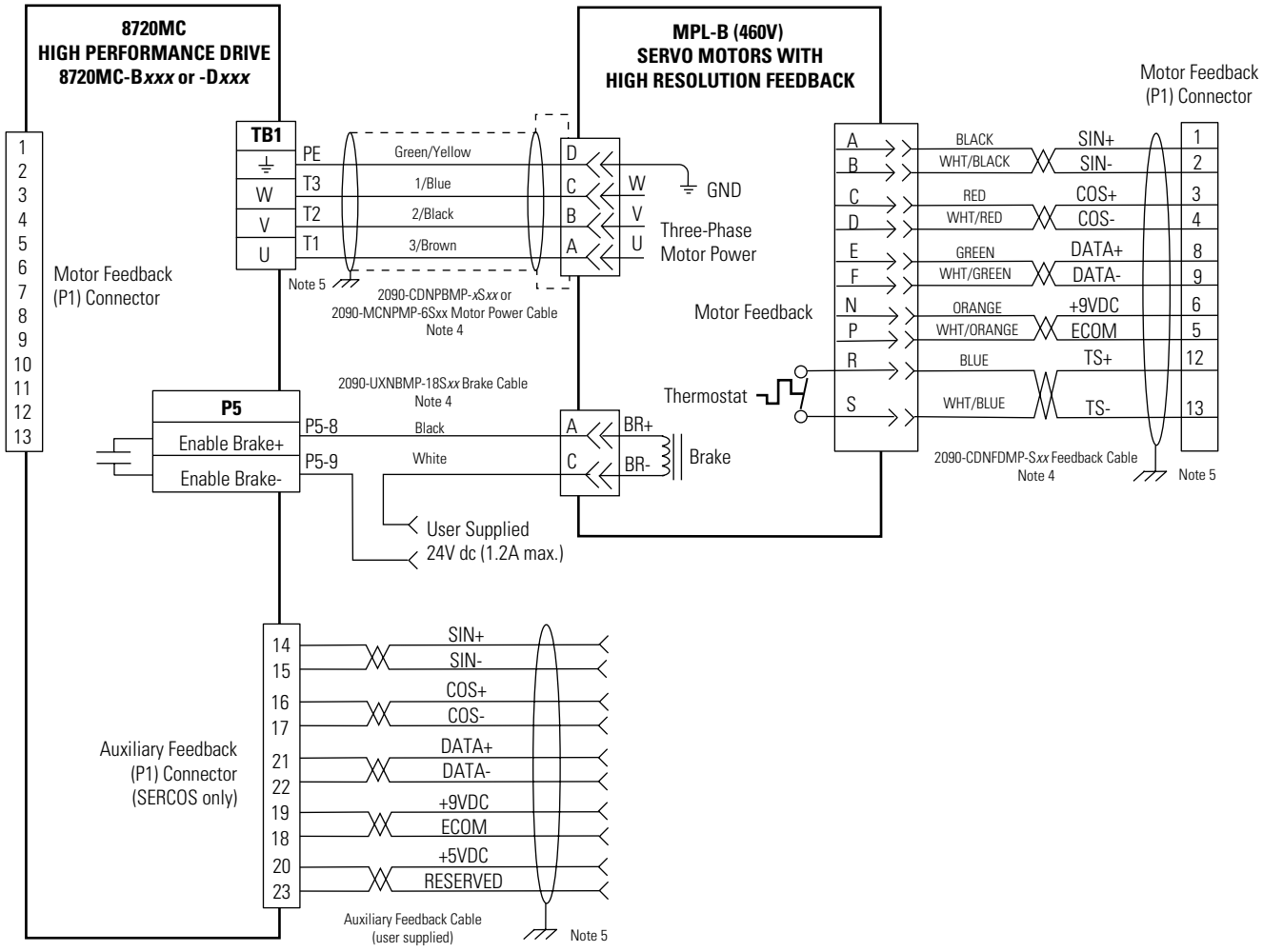


Drive/Motor Interconnect Diagrams (SERCOS)

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.

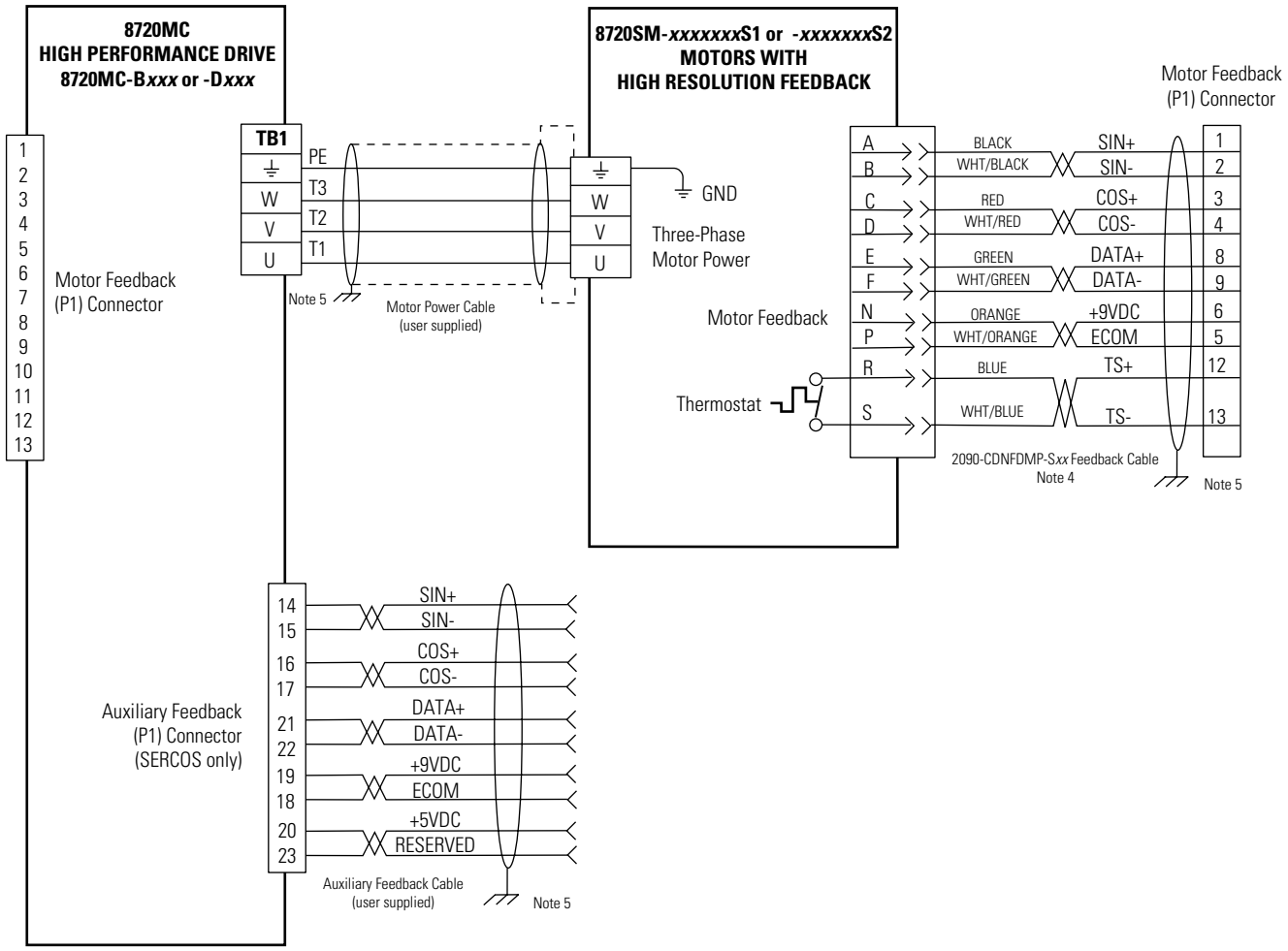
In the configuration below, the 8720MC drive is shown connected to the MPL-B8*xxx* or MPL-B9*xxx* (SERCOS mode) motors.

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

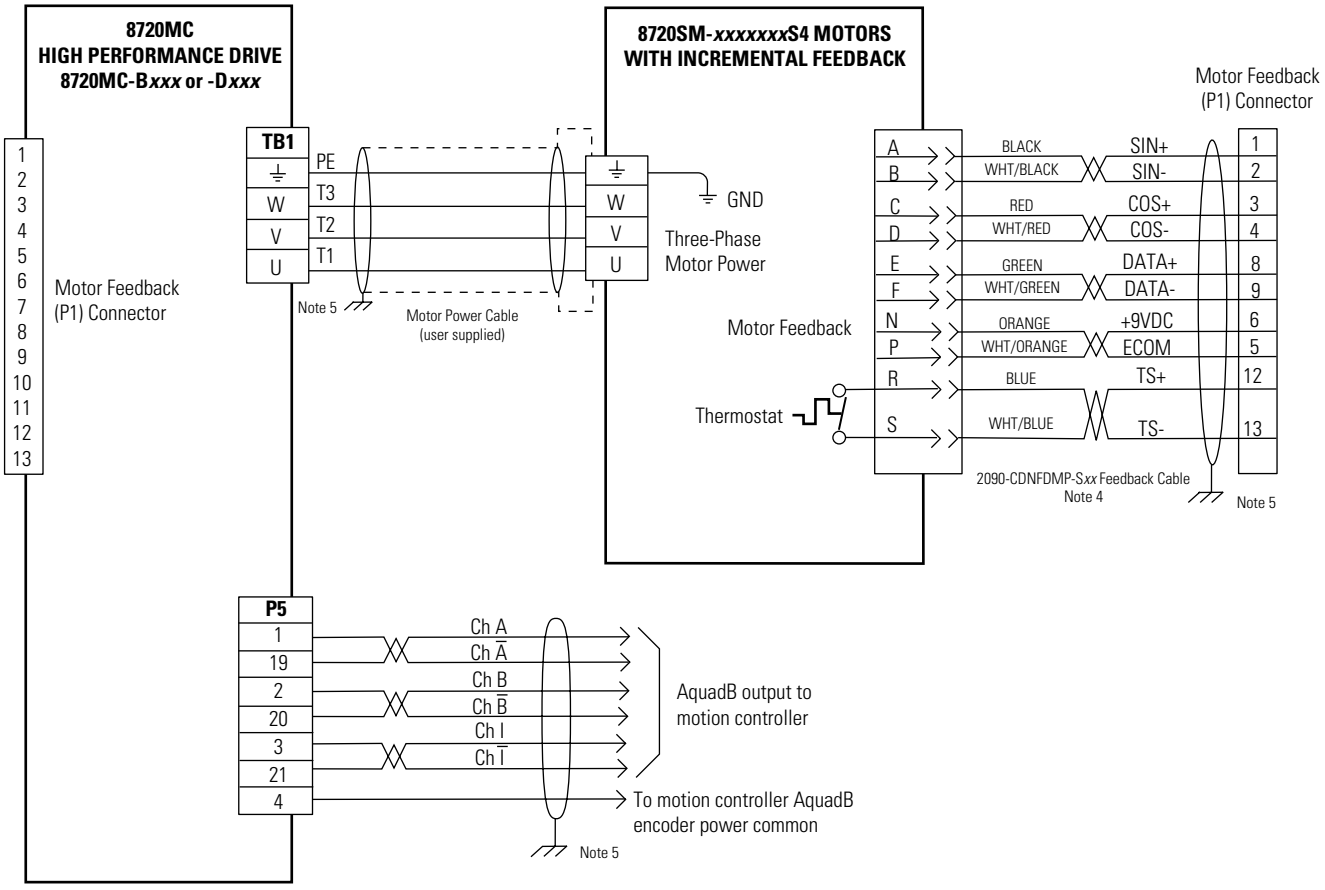


Drive/Motor Interconnect Diagrams (Analog)

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

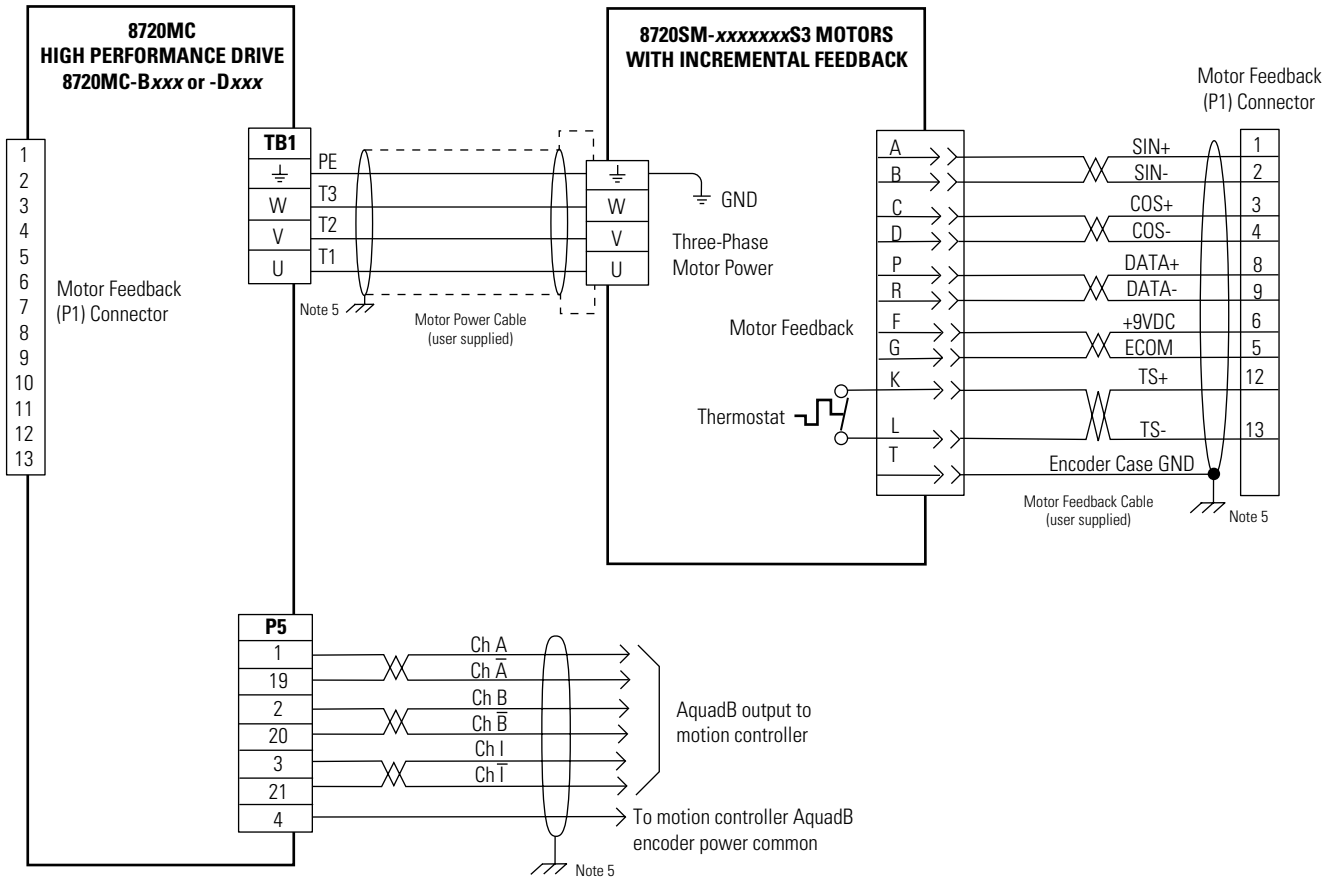
In the configuration below, the 8720MC drive is shown connected to the 8720SM-*xxxxxxx*S4 (analog mode) motors.

Figure B.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.

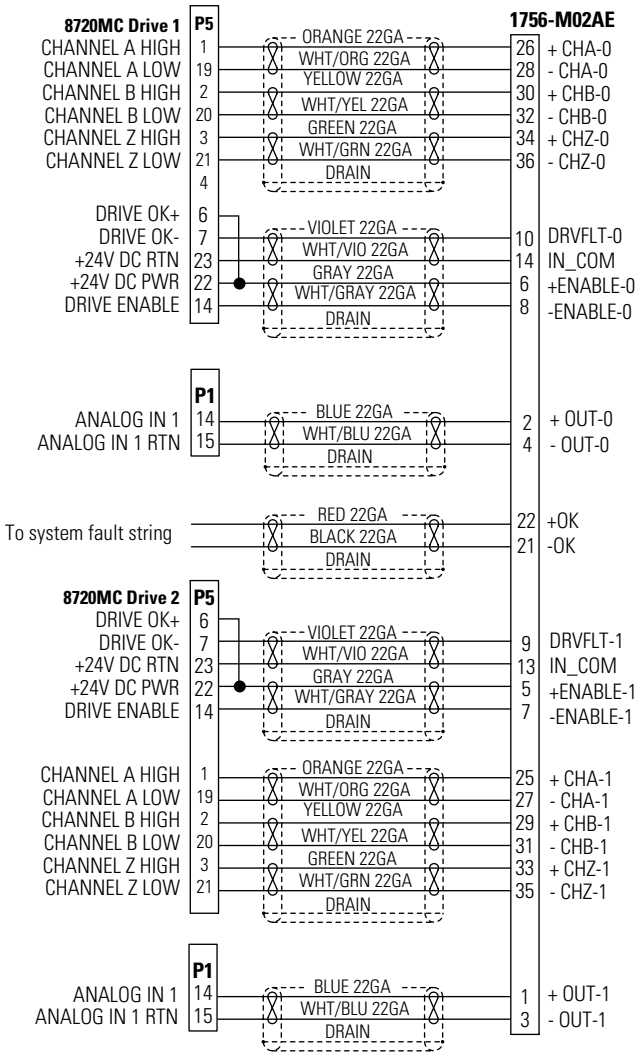
Figure B.9
8720MC Drive/8720SM-*xxxxxxx*S3 Motor Interconnect (Analog Mode)



8720MC Drive and 1756-M02AE Interconnect Diagram

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

Figure B.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.

Catalog Numbers and Accessories

Chapter Objectives

This appendix lists the 8720MC drives and accessory items in tables by catalog number providing detailed descriptions of each component. This appendix describes catalog numbers for:

- 8720MC Drives
- Software
- Regenerative Power Supplies
- Line Reactors
- AC Line Filters
- External Active Shunt Modules
- 8720SM Motors
- Cables
- 8720MC Spare Parts

Contact your local Allen-Bradley sales office for additional information. Refer to the *Motion Control Selection Guide* (publication GMC-SG002*x*-EN-P) for details on products.

8720MC Drives

Use the following table to identify 8720MC (B-Frame) drives with ratings of 14A, 21A, 27A, 24A, 42A, and 48A.

Description	Catalog Number
8720MC drive, 14A, B Frame	8720MC-B014-A*x*[1]-HAS*x*[2]
8720MC drive, 21A, B Frame	8720MC-B021-A*x*[1]-HAS*x*[2]
8720MC drive, 27A, B Frame	8720MC-B027-A*x*[1]-HAS*x*[2]
8720MC drive, 34A, B Frame	8720MC-B034-A*x*[1]-HAS*x*[2]
8720MC drive, 42A, B Frame	8720MC-B042-A*x*[1]-HAS*x*[2]
8720MC drive, 48A, B Frame	8720MC-B048-A*x*[1]-HAS*x*[2]

Use the following table to identify 8720MC (C-Frame) drives with ratings of 65A and 78A.

Description	Catalog Number
8720MC drive, 65A, C Frame	8720MC-D065-A*x*[1]-HAS*x*[2]
8720MC drive, 78A, C Frame	8720MC-D078-A*x*[1]-HAS*x*[2]

Use the following table to identify 8720MC (D-Frame) drives with ratings of 97A, 120A, 149A, and 180A.

Description	Catalog Number
8720MC drive, 97A, D Frame	8720MC-D097-A*x*[1]-HAS*x*[2]
8720MC drive, 120A, D Frame	8720MC-D120-A*x*[1]-HAS*x*[2]
8720MC drive, 149A, D Frame	8720MC-D149-A*x*[1]-HAS*x*[2]
8720MC drive, 180A, D Frame	8720MC-D180-A*x*[1]-HAS*x*[2]

[1] AA = Enclosed
AN = Open

[2] HASP = Standard HIM
HASB = No HIM
HAS1 = Analog HIM
HAS2 = Digital HIM

Software

The 8720MC drives are configured using RSLogix 5000 software. RSLogix 5000 is a Windows® based application that allows drive configuration to be done off-line and saved to disk.

Description	Catalog Number
RSLogix 5000 Software (version 11.11 or above)	9324-RLD300ENE

Regenerative Power Supplies

Use the following table to identify 8720MC-RPS regenerative power supplies with ratings of 27A, 65A, and 190A.

Description	Catalog Number
8720MC-RPS Regenerative Power Supply, Master, 27A	8720MC-RPS027BM-HV1
8720MC-RPS Regenerative Power Supply, Master, 65A	8720MC-RPS065BM-HV1
8720MC-RPS Regenerative Power Supply, Slave, 65A	8720MC-RPS065BS-HV1
8720MC-RPS Regenerative Power Supply, Master, 190A	8720MC-RPS190BM
8720MC-RPS Regenerative Power Supply, Slave, 190A	8720MC-RPS190BS

Line Reactors

Use the following table to identify line reactors with ratings of 32A, 48A, 62A, 70A, and 100A.

Description	Catalog Number
8720MC Line Reactor, 32A	8720MC-LR03-032B
8720MC Line Reactor, 48A	8720MC-LR05-048B
8720MC Line Reactor, 62A	8720MC-LR10-062B
8720MC Line Reactor, 70A	8720MC-LR14-070B
8720MC Line Reactor, 100A	8720MC-LR10-100B

AC Line Filters

Use the following table to identify the AC Line Filter for your 8720MC application.

AC Line Filter Description	AC Line Filter Fuse Block	Catalog Number
The 8720MC-RFI80 three-phase AC line filter is suitable for use with the 8720MC-RPS27 and -RPS65 regenerative power supply.	80 Amp	8720MC-RFI80
The 8720MC-EF190-VB three-phase AC line filter is suitable for use with the 8720MC-RPS190 regenerative power supply.	190 Amp	8720MC-EF190-VB

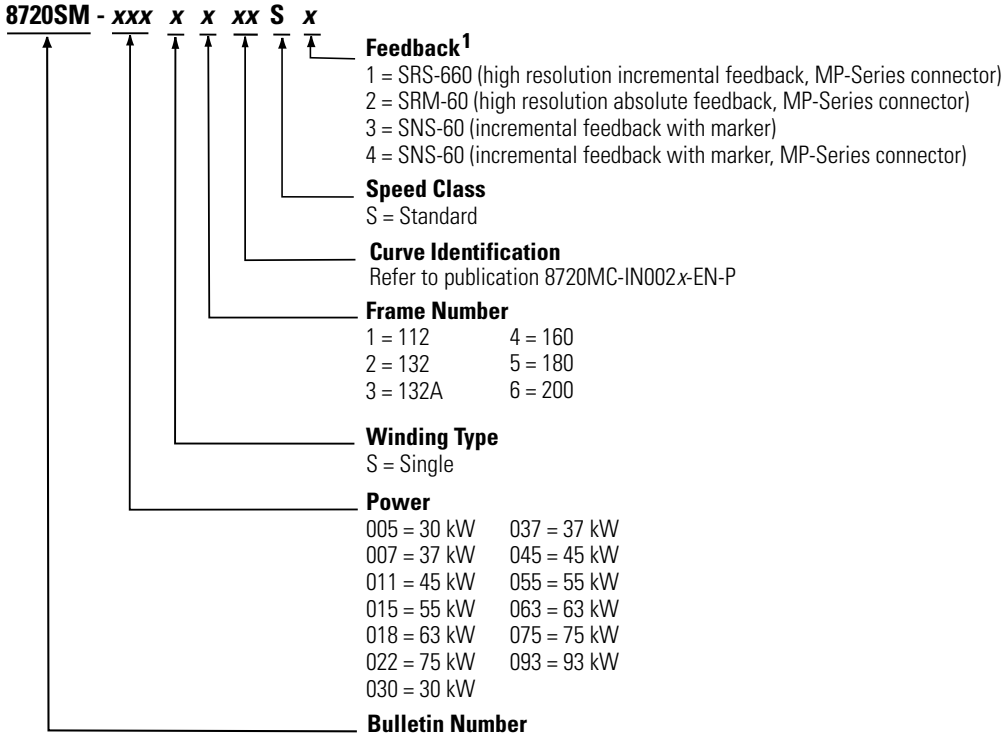
External Active Shunt Modules

Use the following table to identify the external active shunt module for your 8720MC (three-phase AC input) application.

Description	Catalog Number
Active Shunt Module (1336 Heavy Duty Dynamic Braking)	1336-MOD-KB005
Active Shunt Module (1336 Heavy Duty Dynamic Braking)	1336-MOD-KB010
Active Shunt Module (1336 Heavy Duty Dynamic Braking)	1336-MOD-KB050

8720SM Motors

Use the configurator below to identify 8720SM motor catalog numbers.



[1] Feedback options 1 and 2 apply to SERCOS mode applications. Feedback options 3 and 4 apply to Analog mode applications.

Cables

Use the following tables to identify motor power, feedback, and brake cables for your 8720MC drive. Length of cable *xx* is in meters. Refer to your Allen-Bradley representative for available cable lengths.

IMPORTANT To avoid control performance problems, ensure the overall length of motor cable combinations (drive to motor) does not exceed 90 m (295 ft).

Motor Power Cables

Description	Catalog Number
MP-Series Motor Power Cable, non flex, 8 AWG, straight	2090-CDNPBMP-8S*xx*
MP-Series Motor Power Cable, non flex, 6 AWG, straight	2090-MCNPMP-6S*xx* [1]

[1] This cable applies only to the MPL-B980D motor.

Note: Power cables for 8720SM motors are customer supplied.

Motor Feedback Cables

Description	Catalog Number
MP-Series Motor Feedback Cable, non-flex, motor connector to flying leads, straight	2090-CDNFDMP-S*xx*[1]

[1] For use with 8720SM-*xxxxxxx*S1, -*xxxxxxx*S2, -*xxxxxxx*S4, and MPL-B8*xxx*, or -B9*xxx* motors.

Note: Feedback cables for 8720SM-*xxxxxxx*S3 motors are customer supplied.

MP-Series Motor Brake Cable

Description	Catalog Number
MP-Series motor brake cable, 0.75 mm^2 (18 AWG)	2090-UXNBMP-18S*xx*

Motor Connector Kits

Use the following table to identify the motor-end connector kit for your motor power, feedback, and brake cable.

Motor Series	Catalog Number	Description
MPL-B8*xxx*, and -B9*xxx*	2090-MPPC-S-08S	Straight Power Connector Kit, 10 mm^2 (8 AWG)
	2090-MPBC-S	Straight Brake Connector Kit
	2090-MPFC-S	Straight Feedback Connector Kit
8720SM-*xxxxxxx*S1, -*xxxxxxx*S2, and -*xxxxxxx*S4	2090-MPFC-S	
8720SM-*xxxxxxx*S3	8720MC-CNMF	

SERCOS Interface Fiber-Optic Cables

Use the following table to identify the SERCOS interface fiber-optic cables for your 8720MC drive (connectors at both ends).

Description	Catalog Number
SERCOS fiber-optic plastic cable (for use inside enclosure only)	2090-SCEP*x-x*
SERCOS fiber-optic plastic (PVC) cable (for use outside enclosure)	2090-SCVP*x-x*
SERCOS fiber-optic plastic (nylon) cable (for use outside enclosure in harsh environments)	2090-SCNP*x-x*
SERCOS fiber-optic glass (PVC) cable	2090-SCVG*x-x*

Note: Cable length (*x-x*) is in meters. Plastic cable is available in lengths up to 32 m (105.0 ft). Glass cable is available in lengths up to 200 m (656.7 ft).

8720MC Spare Parts

This section contains a listing of the recommended spare parts for the 8720MC drives and regenerative power supplies. To order 8720MC spare parts contact your local Rockwell Automation representative.

For technical assistance, refer to the contact information provided in the *Preface*.

8720MC Drive Spare Parts

A-B Catalog Number	Part Description
8720MC-AQBX5	Stegmann times 5 encoder box for 5120 simulated encoder output
8720MC-CN1	Control Module Mating Connector Kit
8720MC-CNMF	Motor right angle mating connector
8720MC-MCM	Drive Main Control Module - Series A
8720MC-MCM8	Drive Main Control Module - Series B (SERCOS compatible)
1336-FAN-SP1A	Drive fan for the 8720MC B and C frame drives
1336-FAN-SP2A	Drive fan for the 8720MC D frame drives
1336-TR-SP1A	Kit, Thermistor, 8720MC B frame
1336-TR-SP2A	Kit, Thermistor, 8720MC C frame
1336-TR-SP3A	Kit, Thermistor, 8720MC D frame
1336-BDB-SP1D	PCB Kit, Gate Driver, 8720MC-B014, 7.5 hp, 5.5 kW
1336-BDB-SP2D	PCB Kit, Gate Driver, 8720MC-B021, 10 hp, 7.5 kW
1336-BDB-SP3D	PCB Kit, Gate Driver, 8720MC-B027, 15 hp, 11 kW
1336-BDB-SP4D	PCB Kit, Gate Driver, 8720MC-B034, 20 hp, 15 kW
1336-BDB-SP5D	PCB Kit, Gate Driver, 8720MC-B042, 25 hp, 18.5 kW
1336-BDB-SP6D	PCB Kit, Gate Driver, 8720MC-B048, 30 hp, 22 kW
1336-BDB-SP17D	PCB Kit, Gate Driver, 8720MC-D065, 40 hp, 30 kW
1336-BDB-SP18D	PCB Kit, Gate Driver, 8720MC-D078, 50 hp, 37 kW
1336-BDB-SP28D	PCB Kit, Gate Driver, 8720MC-D097, 60 hp, 45 kW
1336-BDB-SP29D	PCB Kit, Gate Driver, 8720MC-D120, 75 hp, 63 kW
1336-BDB-SP30D	PCB Kit, Gate Driver, 8720MC-D149, 100 hp, 75 kW
1336-BDB-SP31D	PCB Kit, Gate Driver, 8720MC-D180, 125 hp, 93 kW

8720MC-RPS Regenerative Power Supply Spare Parts

A-B Catalog Number	Part Description
8720MC-HF-B2	460V ac Harmonic Filter
8720MC-VA-B	460V ac Varistor

8720MC-RPS027 Regenerative Power Supply Spare Parts

REJ Part Number	Part Description
826751	S-B0001 Regulator Board, BDSR-1
286040	500VFA16A Ferraz 16 amp Fuse, 16x32 for Fuse 1 - Precharge
926024	UOA528500 Cooling Fan
926023	UOA528400 Precharge Resistor

8720MC-RPS065 Regenerative Power Supply Spare Parts

REJ Part Number	Part Description
826751	S-B0001 Regulator Board, BDSR-1
286040	500VFA16A Ferraz 16 amp Fuse, 16x32 for Fuse 1 - Precharge
926504	MB-B0012 Cooling Fan
926503	MB-B0011 Precharge Resistor
352311	MB-B0013 Master to Slave Ribbon Cable

8720MC-RPS190 Regenerative Power Supply Spare Parts

REJ Part Number	Part Description
826751	S-B0001 Regulator Board, BDSR-1
286005	6JX30 (600V 30A) Fuse
286007	6JX3 (600V 3A) Fuse
926524	60-03136-00 for CN26 of APS-011 Cooling Fan
926525	60-03136-01 for CN27 of APS-011 Cooling Fan
926526	60-03137-00 Precharge Resistor
926523	60-03170-00 Master to Slave Ribbon Cable

Numerics

A

B

C

T

U

V

W

For more information refer to our web site: **www.ab.com/motion**
For Allen-Bradley Technical Support information refer to: www.ab.com/support or Tel: (1) 440.646.5800

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