Installation Instructions

CompactLogix SERCOS interface Module

Catalog Number 1768-M04SE

Contents

Publication 1768-IN005A-EN-P - December 2005

Important User Information

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

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

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

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

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

WARNING 	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.
ATTENTION 	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you to identify a hazard, avoid a hazard, and recognize the consequences.
SHOCK HAZARD 	Labels may be located on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.
BURN HAZARD 	Labels may be located on or inside the equipment, for example, a drive or motor, to alert people that surfaces may be dangerous temperatures.

Environment and Enclosure

ATTENTION

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 meters without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA, V2, V1, V0 (or equivalent) if non-metallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

Besides this publication, see:

- Allen-Bradley publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines, for additional installation requirements.
- NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure.

Prevent Electrostatic Discharge

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- If available, use a static-safe workstation.
- When not in use, store the equipment in appropriate static-safe packaging.

North American Hazardous Location Approval

The following information applies when operating this equipment in hazardous locations:

Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.

WARNING

EXPLOSION HAZARD

- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
- Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Substitution of components may impair suitability for Class I, Division 2.
- If this product contains batteries, they must only be changed in an area known to be nonhazardous.

Informations sur l'utilisation de cet équipement en environnements dangereux:

Les produits marqués “CL I, DIV 2, GP A, B, C, D” ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.

AVERTISSEMENT **RISQUE D'EXPLOSION**

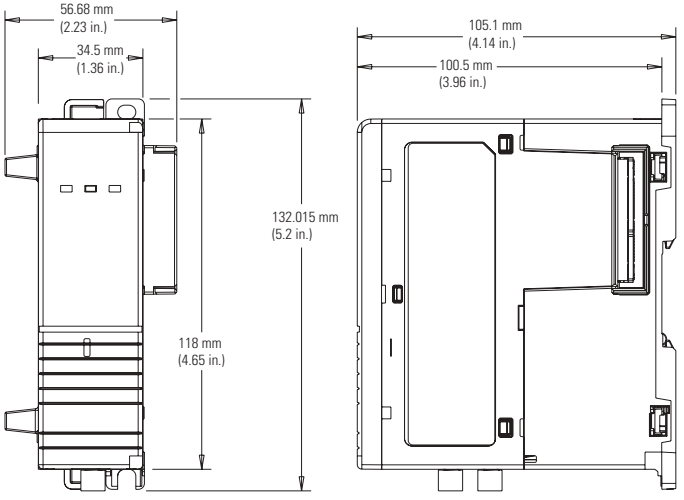
- Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement.
- Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit.
- La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2.
- S'assurer que l'environnement est classé non dangereux avant de changer les piles.s

Catalog Number Explanation

1768 - M 04 SE

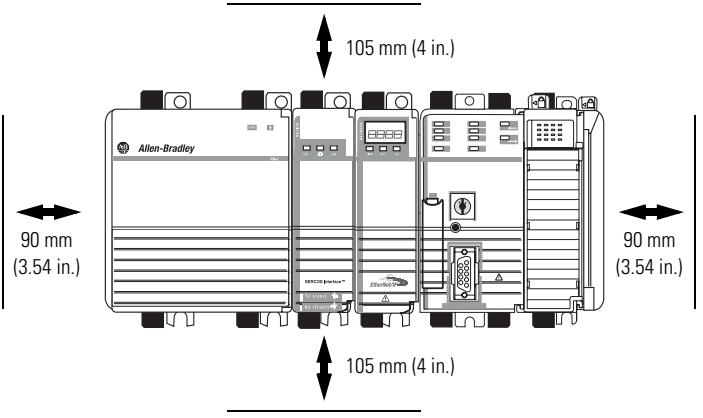
- Use this module with a 1768 CompactLogix controller
- Use this module for motion control
- Control up to 4 drives
- Control SERCOS interface drives

Product Dimensions



Minimum Spacing

Plan for this minimum spacing from enclosure walls, wireways, and other equipment.



What You Need

IMPORTANT This product is grounded through the DIN rail to chassis ground. Use zinc plated yellow-chromate steel DIN rail to assure proper grounding. The use of other DIN rail materials (e.g. aluminum, plastic, etc.) that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding. Secure DIN rail to mounting surface approximately every 200 mm (7.87 in.) and use end-anchors appropriately.

Item	Catalog Number or Size	
1768 CompactLogix power supply	1768-PA3	
1768 CompactLogix controller	1768-L43	
1769 end cap[1]	1769-ECR	
fiber optic cables	See Choose Your Fiber Optic Cables.	
DIN rail or mounting screws (one or the other but not both)	DIN rail	Either of these sizes: • 35 x 7.5 mm (EN 50022 - 35 x 7.5) • 35 x 15 mm (EN 50022 - 35 x 15)
	screws	M4 or #8 panhead screws

(1) You need a 1769-ECR end cap even if you aren't using any 1769 I/O modules. Put it on the right side of the controller.

Choose Your Fiber Optic Cables

For This Distance	Then	See Page
Up to 32 m (105 ft)	Choose a Plastic Fiber Optic Cable	10
More than 32 m (105 ft)	Choose a Glass Fiber Optic Cable	11

Choose a Plastic Fiber Optic Cable

For Use In	Use This Type of Plastic Cable	Length	Allen-Bradley Catalog Number
Electrical cabinet	Non-jacketed (chlorinated polyethylene)	0.1 m (5.1 in.)	2090-SCEP0-1
		0.2 m (7 in.)	2090-SCEP0-2
		0.3 m (1 ft)	2090-SCEP0-3
		1 m (3.2 ft)	2090-SCEP1-0
		3 m (9.8 ft)	2090-SCEP3-0
		5 m (16.4 ft)	2090-SCEP5-0
		8 m (26.2 ft)	2090-SCEP8-0
		10 m (32.8 ft)	2090-SCEP10-0
		15 m (49.2 ft)	2090-SCEP15-0
		20 m (65.5 ft)	2090-SCEP20-0
		25 m (82 ft)	2090-SCEP25-0
		32 m (105 ft)	2090-SCEP32-0
Normal environments outside of an electrical cabinet	Standard jacket (polyvinyl chloride)	0.1 m (4 in.)	2090-SCVP0-1
		0.3 m (1 ft)	2090-SCVP0-3
		0.9 m (2.9 ft)	2090-SCVP0-9
		1 m (3.2 ft)	2090-SCVP1-0
		3 m (9.8 ft)	2090-SCVP3-0
		5 m (16.4 ft)	2090-SCVP5-0
		8 m (26.2 ft)	2090-SCVP8-0
		10 m (32.8 ft)	2090-SCVP10-0
		15 m (49.2 ft)	2090-SCVP15-0
		20 m (65.5 ft)	2090-SCVP20-0
		25 m (82 ft)	2090-SCVP25-0
		32 m (105 ft)	2090-SCVP32-0

For Use In	Use This Type of Plastic Cable	Length	Allen-Bradley Catalog Number
Harsh environment	Nylon jacketed	0.1 m (4 in.)	2090-SCNP0-1
		0.3 m (1 ft)	2090-SCNP0-3
		0.9 m (2.9 ft)	2090-SCNP0-9
		1 m (3.2 ft)	2090-SCNP1-0
		3 m (9.8 ft)	2090-SCNP3-0
		5 m (16.4 ft)	2090-SCNP5-0
		8 m (26.2 ft)	2090-SCNP8-0
		10 m (32.8 ft)	2090-SCNP10-0
		15 m (49.2 ft)	2090-SCNP15-0
		20 m (65.5 ft)	2090-SCNP20-0
		25 m (82 ft)	2090-SCNP25-0
		32 m (105 ft)	2090-SCNP32-0

Choose a Glass Fiber Optic Cable

These cables have a polyvinyl chloride jacket for use in normal environments.

Length	Allen-Bradley Catalog Number
50 m (164.2 ft)	2090-SCVG50-0
100 m (328.3 ft)	2090-SCVG100-0
150 m (492.5 ft)	2090-SCVG150-0
200 m (656.7 ft)	2090-SCVG200-0

Install Your Modules

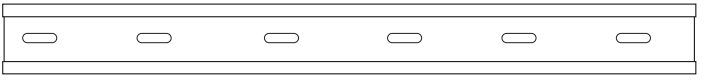
IMPORTANT **Do not** use both screws and DIN rail to mount the modules. It is possible to break the mounting tabs off if you screw the modules to the panel while they are on DIN rail.

If You Are Using Screws to Mount Your Modules

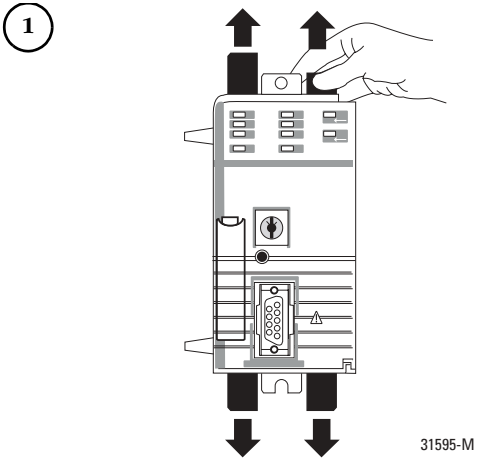
The steps in these instructions show how to mount the modules on DIN rail. If you are using screws instead of DIN rail, make these changes to the instructions:

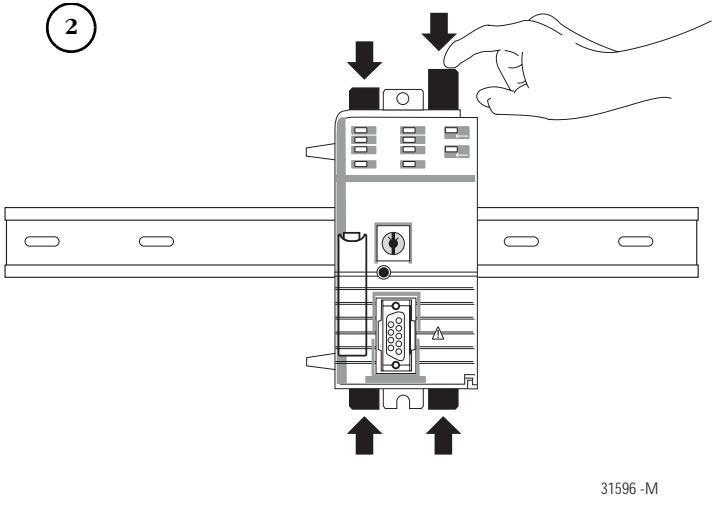
1. Follow the steps in Mount the Modules on the DIN Rail to connect the modules together.
2. Use the modules as a template and mark pilot holes on your panel.
3. Drill the pilot holes for M4 or #8 screws.
4. Use M4 or #8 screws to mount the modules to your panel.

Install the DIN Rail

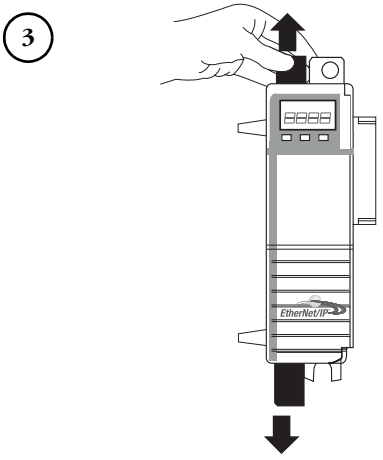


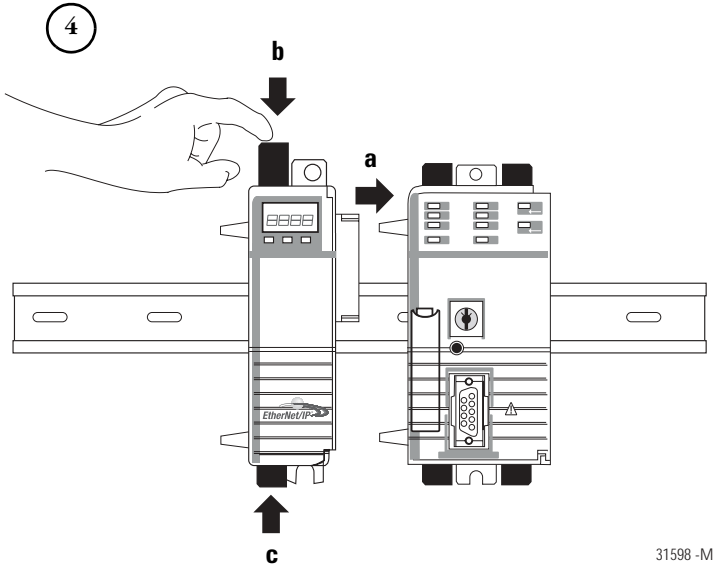
Mount the Modules on the DIN Rail



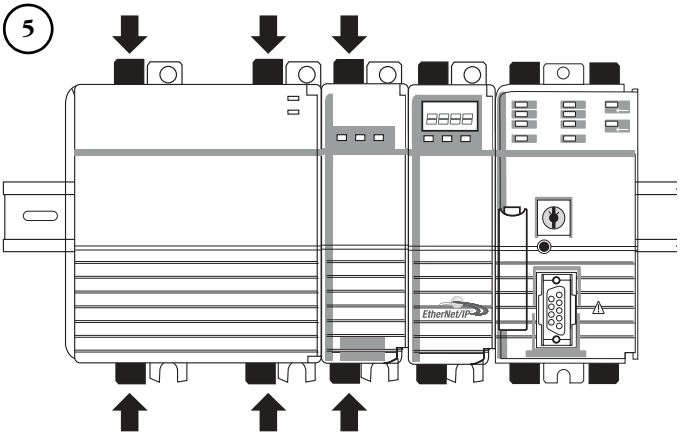


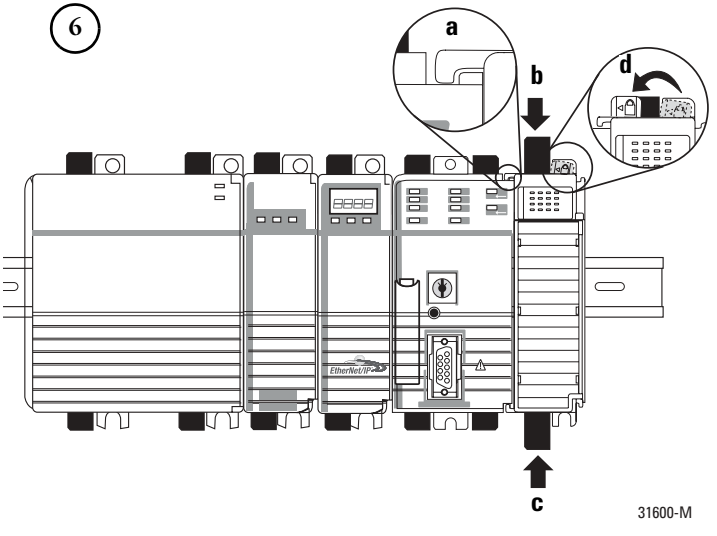
Mount the Modules on the DIN Rail — Continued



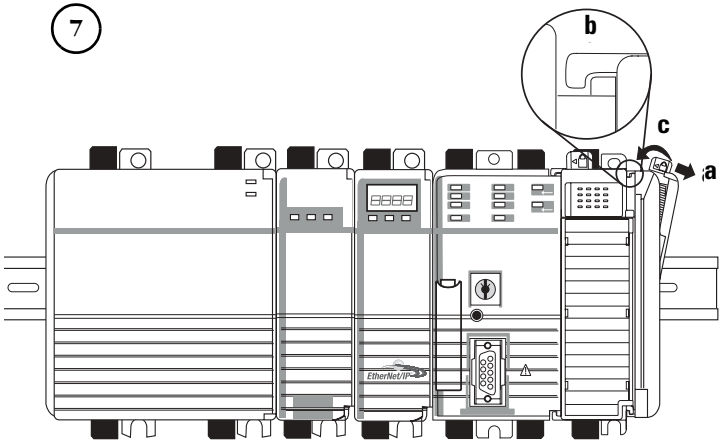


Mount the Modules on the DIN Rail — Continued





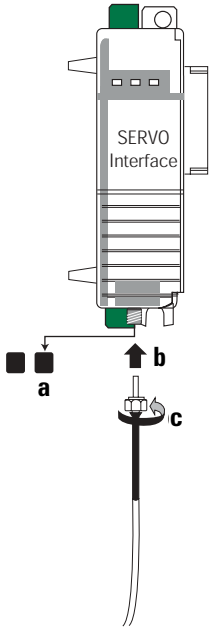
Mount the Modules on the DIN Rail — Continued



Connect the Fiber Optic Cables

ATTENTION

Under certain conditions, viewing the optical port may expose the eye to hazard. When viewed under some conditions, the optical port may expose the eye beyond the maximum permissible exposure recommendations.



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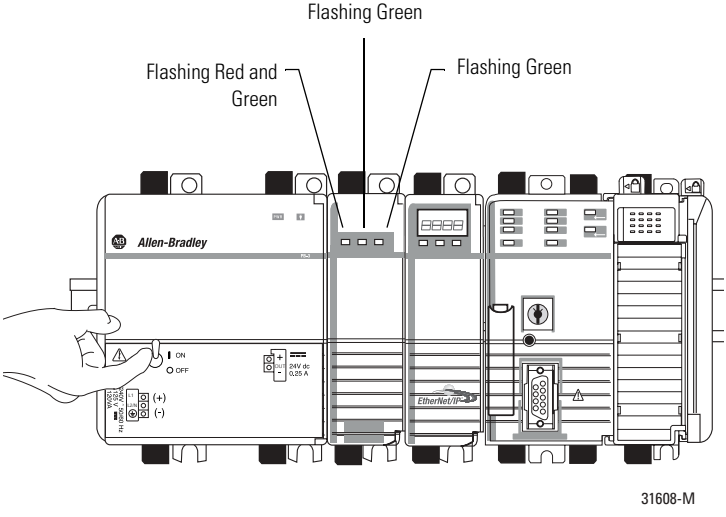
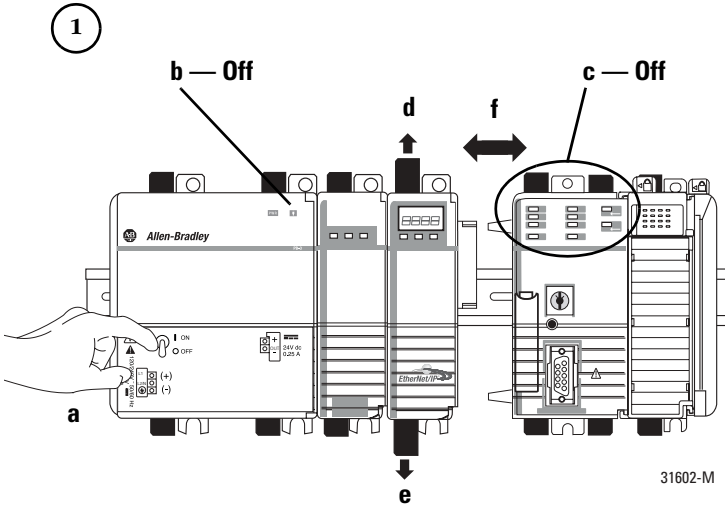
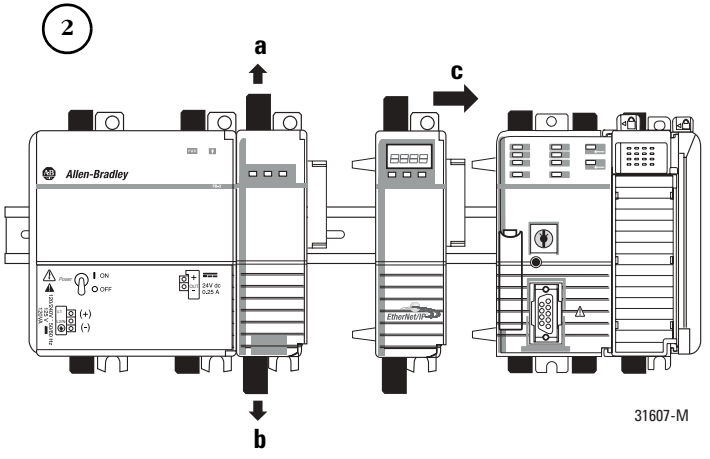
Confirm Your Installation



See Troubleshoot the Module on page 21 if the lights are in other states.

Remove a Module





Why Wait for the Lights to Turn Off Before I Remove a Module?

After you turn off the power, wait for all of the lights on the power supply and controller to turn off before you disconnect any modules.

- When you turn off the power, the controller writes its project to Flash memory.
- The MEM SAVE light turns on while the controller writes its project to Flash memory.
- If you don't wait for the lights to turn off, you will lose your project.

Care of Fiber Optic Cables

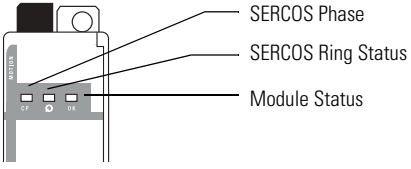
Keep the fiber optic ports clean. Dirt and dust block the optic path and reduce performance.

- Cap the ports and cables when you aren't using them.
- Clean the ends of the cables with either:
  - compressed air
  - lint and strand free cotton swab and one of these cleaners:

Alcohols	Aliphatics	Other
methyl	hexane	soap solution
isopropyl	heptane	naphtha
isobutyl		

For more information, see Fiber Optic Cable Installation and Handling Instructions, publication number 2090-IN010.

Troubleshoot the Module



If the lights on the module look like this			Then do this
CP	**Ring**	**OK**	
Off	Off	Off	• Make sure the module is connected and locked to the other modules. • Check the power supply and controller to make sure the backplane has power.
Off	Off	Flashing Red	Wait! Someone is updating the firmware of the module.
Flashing Orange	Off	Flashing Green	• Look for cables that are broken, unplugged, or in the wrong port. • Check the drives for faults.
Solid Orange	Flashing Red	Flashing Green	• Make sure each drive has its own address. • Make sure that all of the drives have the same baud rate. • Set the Data Rate of the SERCOS interface module to Auto-Detect. • Check the Cycle Time of the SERCOS interface module. See Specifications on page 23.
Flashing Red and Green	Flashing Green	Flashing Green	Did you configure the module? • NO — Use RSLogix 5000 software to configure the module. • YES — Check the configuration of the module and drives in RSLogix 5000 software.

If the lights on the module look like this			Then do this
CP	**Ring**	**OK**	
Flashing Green	Flashing Green	Flashing Green	Check the configuration of the axes in RSLogix 5000 software.
Solid Green	Solid Green	Flashing Green	• Check the configuration of the drives in RSLogix 5000 software. • Check the motion group, drives, and axes for faults.
Solid Green	Solid Green	Solid Green	None — the axes are ready.
Solid Green	Solid Green	Flashing Red	Check the motion group and axes for faults.
Solid Red	Solid Red	Solid Red	1. Cycle power to the module. 2. If the lights keep turning solid red, contact your distributor, Rockwell Automation representative, or Rockwell Automation support.

Specifications

CompactLogix SERCOS interface Module - 1768-M04SE

Attribute	Value
Backplane Current (mA)	969 mA @ 5.2V dc
Connections Consumed	3
Dimensions (HxWxD), Metric, Approx.	Overall — 132.015 x 56.68 x 105.1 mm Installed and including mounting tabs — 132.015 x 34.5 x 105.1 mm Installed but not including mounting tabs — 118 x 34.5 x 105.1 mm
Dimensions (HxWxD), Imperial, Approx.	Overall — 5.2 x 2.23 x 4.14 in. Installed and including mounting tabs — 5.2 x 1.36 x 4.14 in. Installed but not including mounting tabs — 4.65 x 1.36 x 4.14 in.
Fiber Optic Bend Radius	Plastic cable without a jacket — 25 mm (0.98 in.) Plastic cable with a standard jacket — 25 mm (0.98 in.) Plastic cable with a nylon jacket — 40 mm (1.6 in.) Glass cable — 30 mm (1.2 in.)
Fiber Optic Cable Attenuation	Plastic cable — 140 dB/km @ 650 nm Glass cable — 6.0 dB/km @ 820 nm
Fiber Optic Cladding Diameter	Plastic cable — 1000 µm ± 60 µm Glass cable — 230 µm +0/-10 µm
Fiber Optic Connector	F-SMA standard screw-type connector
Fiber Optic Core Diameter	Plastic cable — 980 µm ± 60 µm Glass cable — 200 µm ± 4 µm
Fiber Optic Operating Temperature	Plastic cable — -55…85 °C Glass cable — -20…85 °C

CompactLogix SERCOS interface Module - 1768-M04SE (Continued)

Attribute	Value
Fiber Optic Transmission Range	Plastic cable — 1…32 m Glass cable — 1…200 m
Mounting Screw Torque	1.16 Nm (10 lb-in.), using M4 or #8 screws
Number of Axes, per Module, Max.	4 drives and 2 auxiliary feedback axes
Power Dissipation	5.04 W
Power Supply Distance Rating	2 — Keep the module within 2 slots from the power supply.
SERCOS Class	Class B (Position or Velocity)
SERCOS Data Rate	4 M or 8 M
SERCOS Operating Cycle	**Important**: Only Kinetix 6000 drives let you use a 0.5 ms Cycle Time. • 4 M Data Rate and up to 2 drives — 0.5 ms Cycle Time • 4 M Data Rate and up to 4 drives — 1 ms Cycle Time • 8 M Data Rate and up to 4 drives — 0.5 ms Cycle Time
Weight, Imperial	7.11 oz
Weight, Metric	0.20 kg
North American Temp Code	T4A

Environmental Specifications

Attribute	Value
Operating Temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock):

Environmental Specifications (Continued)

Attribute	Value
	0…60 °C (32…140 °F)
Non-Operating Temperature	IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold),
	IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat),
	IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock):
	-40…85 °C (-40…185 °F)
Relative Humidity	IEC 60068-2-30 (Test Db, Un-packaged Damp Heat):
	5…95% non-condensing
Vibration	IEC 60068-2-6 (Test Fc, Operating):
	5 g @ 10…500 Hz
Operating Shock	IEC 60068-2-27 (Test Ea, Unpackaged Shock):
	30 g
Non-Operating Shock	IEC 60068-2-27 (Test Ea, Unpackaged Shock):
	50 g
Emissions	CISPR 11:
	Group 1, Class A
ESD Immunity	IEC 61000-4-2:
	4 kV contact discharges
	8 kV air discharges

Environmental Specifications (Continued)

Attribute	Value
Radiated RF Immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80%AM from 30…2000 MHz 10V/m with 200 Hz 50% Pulse 100%AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100%AM at 1890 MHz 1V/m with 1 kHz sine-wave 80%AM from 2000…2700 MHz
Enclosure Type Rating	None (open-style)

Certifications

These certifications apply when the product is marked with them. See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Certification	Value
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 89/336/EEC EMC Directive, compliant with: EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
C-Tick	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions

Additional Resources

Publication	Publication Number
1768 CompactLogix Power Supplies Installation Instructions	1768-IN001
CompactLogix Controller Installation Instructions	1768-IN004
CompactLogix EtherNet/IP Communication Module Installation Instructions	1768-IN002
CompactLogix Controllers User Manual	1768-UM001
Motion Modules in Logix5000 Control Systems User Manual	LOGIX-UM002
Logix5000 Controller Motion Instructions Reference Manual	1756-RM007
1394 SERCOS Interface Multi Axis Motion Control System Installation Manual	1394-IN002
1394 SERCOS Integration Manual	1394-IN024
Ultra3000 Digital Servo Drives Installation Manual	2098-IN003
Ultra3000 Digital Servo Drives Integration Manual	2098-IN005
Kinetix 6000 Installation Manual	2094-IN001
Kinetix 6000 Integration Manual	2094-IN002
8720MC High Performance Drive Installation Manual	8720MC-IN001
8720MC High Performance Drive Integration Manual	8720MC-IN002

Rockwell Automation Support

Rockwell Automation provides technical information on the web to assist you in using its products. At http://support.rockwellautomation.com, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect Support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://support.rockwellautomation.com.

Installation Assistance

If you experience a problem with a hardware module within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your module up and running:

United States	1.440.646.3223 Monday – Friday, 8am – 5pm EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

Rockwell tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned:

United States	Contact your distributor. You must provide a Customer Support case number (see phone number above to obtain one) to your distributor in order to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for return procedure.

www.rockwellautomation.com

Corporate Headquarters
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