



See iTRAK 5750 Fault Codes Reference Data, publication [2198T-RD002](#) for fault codes; download the spreadsheets now to ensure offline access.



# iTRAK 5750 System

Bulletin Number 2198T



**Allen-Bradley**

by ROCKWELL AUTOMATION

User Manual

Original Instructions

## Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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.

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



**WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

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**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

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### IMPORTANT

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

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These labels may also be on or inside the equipment to provide specific precautions.



**SHOCK HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.

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**BURN HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

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**ARC FLASH HAZARD:** Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

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The following icon may appear in the text of this document.



Identifies information that is useful and can help to make a process easier to do or easier to understand.

Rockwell Automation recognizes that some of the terms that are currently used in our industry and in this publication are not in alignment with the movement toward inclusive language in technology. We are proactively collaborating with industry peers to find alternatives to such terms and making changes to our products and content. Please excuse the use of such terms in our content while we implement these changes.

## Product Overview

### Preface

Conventions.....	9
Appropriate Use .....	9
Additional Resources .....	9
iTRAK 5750 and Kinetix System Resources .....	9
Programmable Controllers Resources .....	10
EtherNet/IP Resources.....	10
CIP Security Resources .....	10
Functional Safety Resources.....	10

### Chapter 1

About the iTRAK 5750 System .....	11
Catalog Number Explanations.....	17
Assembled iTRAK 5750 System .....	17
Modular iTRAK 5750 System Components .....	18
Motor Modules.....	22
Motor Module Status Indicators.....	27
Connector Modules.....	27
Connector Module Status Indicators.....	30
Integrated Support Frame .....	31
Rail System .....	33
Straight Rail Segments.....	33
Curve Rail Segments.....	34
Infield Cover .....	35
Mover .....	36
Power Supplies .....	37
Programmable Controllers.....	37
Typical Communication Configurations.....	38
Linear Topology.....	38
Device Level Ring Topology .....	39
Star Topology.....	40
Safety Information .....	41
Risk Assessment .....	41
General Assembly Instructions .....	41
Machine Guarding .....	42
Avoid Accidents, Injury, and Property Damage .....	43
Remove Power from the iTRAK 5750 System.....	43
Avoid Electrical Shock .....	44
Protection Against Contact with Hot Parts .....	44
Protection Against Magnetic and Electromagnetic Fields.....	44
Safe Magnet Handling.....	47
Mover Motor Magnet Plate Keeper.....	47
CIP Security.....	48
Storage.....	48

**Mechanical Installation****Chapter 2**

Installation Safety	50
General Handling Instructions	50
Installation Tools	51
Hardware Specifications	51
Unpack and Find the Weight of the Track	52
Prepare the Mounting Site or Structure	53
Applications that Require Subframe Mounting	53
Mounting Surface Requirements	53
Mounting Plate Dimensions	53
Plan Lubrication Segment Locations	54
Move a Track Section	55
Install an Oval Track	56
Install a Rectangle Track	61
Electrically Ground the Track	70
Install the Lubrication System	71
What You Need	71
Mount the Lubricator Pumps	72
Lubrication Pump Wiring	74
Lubrication Pump Configuration	74

**Power and Communication Connections****Chapter 3**

Typical iTRAK 5750 System	76
Provide Power to the iTRAK System	77
Connect Power to the iTRAK 5750 System	78
One iTRAK Power Supply	78
Multiple iTRAK Power Supplies	79
Connect the Power Cable	80
Connect an EtherNet/IP Network to the iTRAK 5750 System	80
EtherNet/IP Address Rotary Switches	80
Communication Control DIP Switch	83
Connect the Ethernet Cable	84
Cybersecurity Considerations	85

**Configuration and Startup****Chapter 4**

Studio 5000 Logix Designer	87
Configure the iTRAK 5750 System	88
Set the IP Address	88
Protected Mode	88
Configure and Customize the Project File	90
Configure the Controller	90
Configure the Kinetix 5700 Power Supply	92
Configure the Kinetix 5700 iTRAK Power Supply	96
Configure the iTRAK 5750 Motor Modules	99
Continue iTRAK 5750 Motor Module Configuration	104
Configure the Motion Group	110
Configure the Section Axis Properties	112
Configure the Mover Axis Properties	113

Download the Program . . . . .	116
Apply Power to the iTRAK 5750 System . . . . .	117
Bus-sharing Group Configuration . . . . .	118
Bus-sharing Groups Example . . . . .	118
Configure Bus-sharing Groups . . . . .	120
Commission the iTRAK 5750 System . . . . .	122
Motor Module Section Gap Position Compensation . . . . .	122
Calculate and Store Position Gap Compensation Values . . . . .	123
Tune the Axes . . . . .	123
Tune the Axes with Load Observer . . . . .	123

## Chapter 5

### Troubleshooting

Safety Precautions . . . . .	127
Interpret Fault Codes . . . . .	127
Fault Code Overview . . . . .	128
Mover Numbers in Fault Codes . . . . .	129
Motor Module Numbers in Fault Codes . . . . .	129
Interpret Status Indicators . . . . .	129
Motor Module Status Indicators . . . . .	129
Connector Module Status Indicators . . . . .	131
Axis Troubleshooting . . . . .	132
Logix 5000 Controller and iTRAK System Behavior . . . . .	134
Kinetix 5700 iTRAK Power Supply Behavior . . . . .	135
iTRAK 5750 Motor Module and Mover Behavior . . . . .	135

## Chapter 6

### Maintenance

Before You Begin Maintenance . . . . .	139
Preventive Maintenance . . . . .	139
Install or Replace Components . . . . .	140
Replacement Hardware . . . . .	140
Installation and Replacement Procedure List . . . . .	140
Replace a Mover Position Magnet Assembly . . . . .	141
Replace a Mover Motor Magnet . . . . .	143
Replace a Mover . . . . .	144
Replace a Straight Motor Module . . . . .	147
Replace a Curve Motor Module . . . . .	150
Replace Mover Cam-follower Wheels or Flexures . . . . .	153
Replace a Lubrication Segment of a Top or Bottom Rail . . . . .	162
Replace a Straight Segment of the Top or Bottom Rail . . . . .	164
Replace a Curve Segment of the Top or Bottom Rail . . . . .	168
Replace a Lubrication Segment of a Middle Rail . . . . .	173
Replace a Straight Segment of the Middle Rail . . . . .	174
Replace a Curve Segment of the Middle Rail . . . . .	177
Replace a Connector Module . . . . .	180
Replace an Infield Cover . . . . .	181
Replace a Lubricant Cartridge . . . . .	182
Lubrication . . . . .	182
Lubrication Using an iTRAK Lubrication System . . . . .	182
Lubrication Using a Customer Provided Oil Bleed System . . . . .	187

**System Integrated Safety****Chapter 7**

Certification .....	189
Important Safety Considerations .....	189
Safety Application Requirements .....	190
Category 3 Requirements According to EN ISO 13849-1 .....	190
Stop Category Definition .....	190
Performance Level (PL) and Safety Integrity Level (SIL) .....	190
Probability of Dangerous Failure Per Hour .....	191
Out-of-Box State .....	191
Out-of-Box State Support .....	191
Safe Torque Off Function .....	194
Safe Torque Off (STO) Function Operation .....	194
Safe Torque Off (STO) State Reset .....	196
Safe Torque Off (STO) Specifications .....	196
Safe Torque Off (STO) Assembly Tags .....	197
Safe Torque Off (STO) Mode .....	198
Safe Torque Off (STO) Behavior in an iTRAK 5750 System .....	198
iTRAK 5750 System Safety Considerations .....	198
Functional Safety Considerations .....	199
Timed SS1 Stopping Function .....	199
Safety Function Operation .....	199
Timed SS1 Request Removed .....	202
Motion Direct Commands in Motion Control Systems .....	203
Safe Torque Off Bypass When Using Motion Direct Commands .....	203
Studio 5000 Application Warning Messages .....	204
Torque Permitted in a Multi-workstation Environment .....	206
Warning Icon and Text in Axis Properties .....	206
Explicit Messages .....	208
Safe Monitor Network Communication .....	209
Troubleshoot the Safe Stop Function .....	214
Integrated Safety Motor Module Replacement .....	214
Replace an Integrated Safety Motor Module in a GuardLogix System .....	215
Configure Only When No Safety Signature Exists .....	215
Configure Always .....	216

**Update the System Firmware****Appendix A**

Before You Begin .....	217
Inhibit the Module .....	218
Update Your Firmware .....	219
Use ControlFLASH Plus to Update Your iTRAK 5750 System Firmware .....	219
Use ControlFLASH to Update Your iTRAK 5750 System Firmware .....	223
Configure Your Communication Path with RSLinx .....	223
Start the ControlFLASH Software .....	225
Verify the Firmware Update .....	229

**High-speed Data Logging Service****Appendix B**

Configure and Use the Message Instruction .....	231
iTRAK System Data Logging Parameters .....	239

**Index ..... 241**

**Notes:**



This manual provides information and instructions for how to assemble, lift, mount, connect, configure, troubleshoot, and maintain an iTRAK® 5750 system. This manual is intended for engineers or technicians that implement the design, installation, and wiring of the iTRAK 5750 system. This manual is also intended for programmers that configure, operate, and maintain the iTRAK 5750 system with a programmable logic controller and EtherNet/IP™ network.

To learn more about the iTRAK 5750 system, contact your Rockwell Automation sales representative for information on available training courses.

Rockwell Automation recognizes that some of the terms that are currently used in our industry and in this publication are not in alignment with the movement toward inclusive language in technology. We are proactively collaborating with industry peers to find alternatives to such terms and making changes to our products and content. Please excuse the use of such terms in our content while we implement these changes.

## Conventions

These conventions are used throughout this manual: Bulleted lists provide information, not procedural steps. Numbered lists provide steps or hierarchical information.

## Appropriate Use

Read and understand the safety instructions before using the iTRAK 5750 system.



**ATTENTION:** Incorrect installation, operation, and maintenance of this product can cause personal injury or property damage. You are responsible for the product safety of your completed machinery. An incorrectly applied or installed iTRAK 5750 system can result in component damage or a reduction in product life.

Critical guidelines for appropriate use include:

- Hardware must remain in its original state; never make structural changes.
- Do not de-compile software or alter source codes.
- Do not use damaged or faulty components.
- Install the system in the manner that is described in this manual.
- Operate the system in the ambient conditions that are described in iTRAK 5750 System Technical Data, publication [2198T-TD004](#).

## Additional Resources

These documents contain additional information concerning related products from Rockwell Automation. You can view or download publications at [rok.auto/literature](http://rok.auto/literature).

### iTRAK 5750 and Kinetix System Resources

These resources provide information about the iTRAK 5750 system and related Kinetix® products.

Resource	Description
iTRAK 5750 System Technical Data, publication <a href="#">2198T-TD004</a>	Product specifications for Rockwell Automation® iTRAK 5750 system components, with performance, environmental, certifications, load force, and dimension drawings.
Kinetix 5700, 5500, 5300, and 5100 Servo Drives Specifications Technical Data, publication <a href="#">KNX-TD003</a>	Provides product specifications for Kinetix Integrated Motion over the EtherNet/IP network and EtherNet/IP networking servo drive families.
Kinetix 5700 iTRAK Power Supply and iTRAK Bus Conditioner Module Supply Installation Instruction, publication <a href="#">2198T-IN001</a>	Provides information for wiring and connecting the Kinetix 5700 iTRAK power supply to the iTRAK system.
Kinetix 5700 Servo Drives User Manual, publication <a href="#">2198-UM002</a>	Provides user information for Kinetix 5700 servo drives, which are used in the iTRAK 5750 system.
3D CAD Models of iTRAK Components available at <a href="https://motionanalyzer.rockwellautomation.com/Products/iTrak">https://motionanalyzer.rockwellautomation.com/Products/iTrak</a>	Provides 2D outline, assembly, and system drawings, STEP files for the movers and motor modules, and hyper links to complete system STEP files.
Independent Cart Technology Libraries, available on the Product Compatibility and Download Center website, <a href="http://rok.auto/pcdc">rok.auto/pcdc</a>	Provides standardized object-oriented libraries for iTRAK systems.

Resource	Description
Servo Drive Installation Best Practices, publication <a href="#">MOTION-AT004</a>	Provides a quick reference guide of installation best practices for Rockwell Automation single-axis and multi-axis servo drive systems.
System Design for Control of Electrical Noise Reference Manual, publication <a href="#">GMC-RM001</a>	Information, examples, and techniques that are designed to minimize system electrical noise failures.
Industrial Automation Wiring and Grounding Guidelines, publication <a href="#">1770-4.1</a>	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, <a href="#">rok.auto/certifications</a>	Provides declarations of conformity, certificates, and other certification details.

## Programmable Controllers Resources

These resourced provide information about programmable controllers.

Resource	Description
ControlLogix® 5580 and GuardLogix® 5580 Controllers User Manual, publication <a href="#">1756-UM543</a>	Provides information about designing a system, operating a ControlLogix or GuardLogix-based controllers system, and developing applications.
GuardLogix 5580 and Compact GuardLogix 5380 Controller Systems Safety Reference Manual, publication <a href="#">1756-RM012</a>	Describes the GuardLogix 5580 and Compact GuardLogix 5380 controller systems, which are type-approved and certified for use in safety applications.
CompactLogix™ 5480 Controllers User Manual, publication <a href="#">5069-UM002</a>	Provides information on how to use CompactLogix 5480 controllers.
Compact GuardLogix 5380 Controllers User Manual, publication <a href="#">5069-UM001</a>	Provides information on how to install, configure, program, and use CompactLogix and Compact GuardLogix controllers.
Integrated Motion on the EtherNet/IP Network Reference Manual, publication <a href="#">MOTION-RM003</a>	Provides information on the AXIS_CIP_DRIVE attributes and the Studio 5000 Logix Designer® application Control Modes and Methods.
Logix 5000™ Controllers Motion Instructions Reference Manual, publication <a href="#">MOTION-RM002</a>	Provides a programmer with details about motion instructions for use with Logix 5000 controllers.

## EtherNet/IP Resources

These resourced provide information about EtherNet/IP systems.

Resource	Description
EtherNet/IP Network Devices User Manual, publication <a href="#">ENET-UM006</a>	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.
EtherNet/IP Device Level Ring Application Technique, publication <a href="#">ENET-AT007</a>	Describes Device Level Ring (DLR) topologies, configuration considerations, and diagnostic methods.
Integrated Motion on the EtherNet/IP Network Configuration and Startup User Manual, publication <a href="#">MOTION-UM003</a>	Provides information on configuring and troubleshooting your ControlLogix and CompactLogix EtherNet/IP network modules.

## CIP Security Resources

Resource	Description
CIP Security with Rockwell Automation Products Application Technique, publication <a href="#">SECURE-AT001</a>	Provides information on CIP Security™, including which Rockwell Automation products support CIP Security.
System Security Design Guidelines Reference Manual, <a href="#">SECURE-RM001</a>	Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment.
Security Configuration User Manual, <a href="#">SECURE-UM001</a>	Describes how to configure and use Rockwell Automation products to improve the security of your industrial automation system.

## Functional Safety Resources

Resource	Description
Kinetix 5700 Safe Monitor Functions Safety Reference Manual, publication <a href="#">2198-RM001</a>	Explains how Kinetix 5700 drives can be used in up to Safety Integrity Level (SIL 3), Performance Level (PLe) applications.

## Product Overview

Use this chapter to become familiar with the design, installation, and safety requirements for an iTRAK® 5750 system.

Topic	Page
About the iTRAK 5750 System	11
Catalog Number Explanations	17
Motor Modules	22
Connector Modules	27
Integrated Support Frame	31
Rail System	33
Infield Cover	35
Mover	36
Power Supplies	37
Programmable Controllers	37
Typical Communication Configurations	38
Safety Information	41
CIP Security	48
Storage	48

### About the iTRAK 5750 System

The iTRAK 5750 system is a modular, scalable, linear motor system that provides independent control of multiple movers on straight and curvilinear paths. Straight and curved motor modules are combined to build multiple track shapes and manage a wide variety of dynamic processes. Motor modules, connector modules, and movers are modular and designed to accommodate system growth and varied power demands. The system can be expanded to up to 64 motor modules, each with a track length of 400 mm (15.7 in.). At this maximum track length, the distance a mover travels to make a complete revolution around the track is 25.6 m (83.98 ft).

The motor modules are integrated drive and motor coil units with feedback capability. Each motor module can operate and control multiple movers. Temperature sensors that are embedded in the motor coils of the motor modules provide motor over-temperature protection.

Connector modules provide power and network communication connections to the motor modules. The power and control input connector module provides both the power connection between the iTRAK power supply and a motor module, and the communication connection between an EtherNet/IP™ network and a motor module. Additional connector modules provide either an additional power input and communication pass-through connection, or a power pass-through and communication pass-through connection.

Movers provide the platform for your application effectors. Movers can be synchronized or independently controlled and positioned accurately on any point of the track.

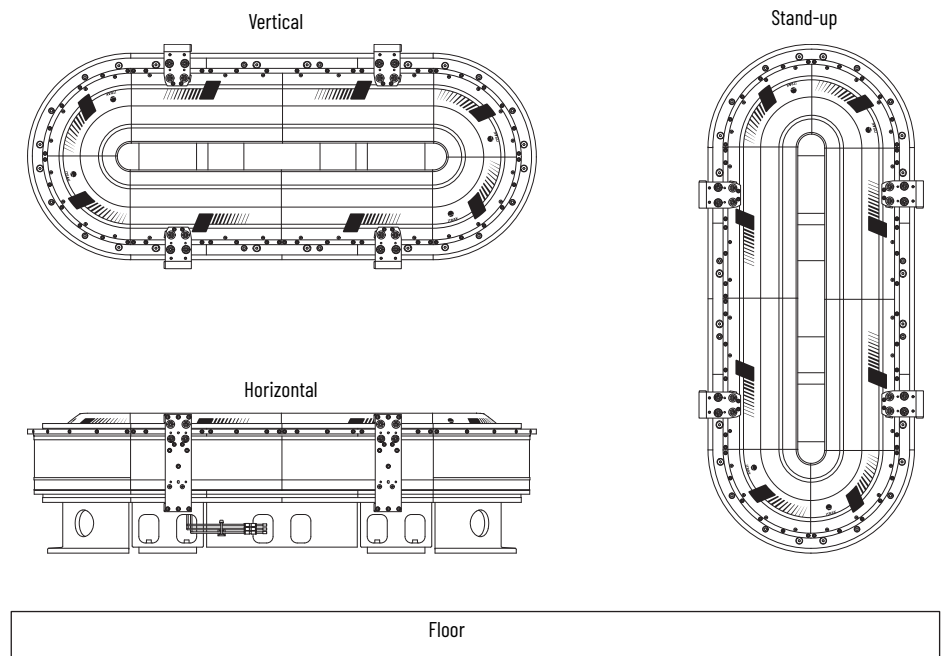
The optional infield covers fit over the connector modules and connection wires and provide IP66 protection against water, dirt, and debris.

The lubrication system intermittently applies lubricant to the three rails. The lubricant is distributed around the track by the mover wheels. The lubrication system helps to prevent wear on the track and mover components and provides a smoother, quieter system.

Standardized base plates, support plates, and mounting plates are used to create an integrated support structure for any size system. There are three recommended mounting orientations for the iTRAK 5750 system: vertical, horizontal, and stand-up. [Figure 1](#) shows an oval track as an example. A rectangle track can have the same orientations, following these principles:

- for a vertical orientation, the sides that are parallel to the floor are longer than the sides that are perpendicular to the floor
- for a stand-up orientation, the sides that are parallel to the floor are shorter than the sides that are perpendicular to the floor

**Figure 1 - Mounting Orientations**

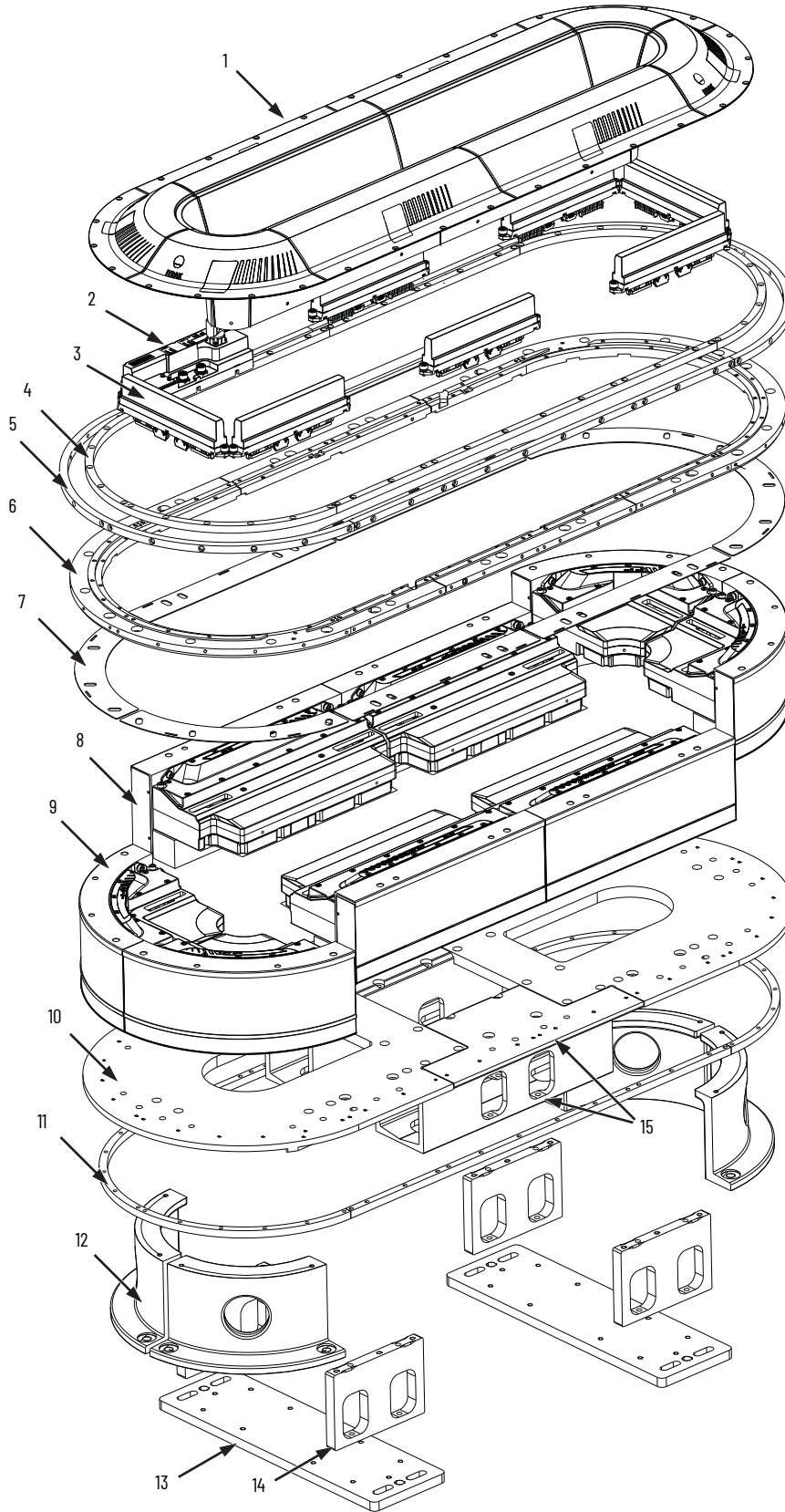


An example of a typical iTRAK 5750 system is shown in [Typical iTRAK System with an iTRAK Power Supply on page 76](#). A track that is disassembled into its components is shown in [Figure 2 on page 13](#).

The iTRAK 5750 system is built from a combination of the components in the following tables:

- [Electromechanical Components of an iTRAK 5750 System on page 14](#)
- [Power and Control Components of an iTRAK 5750 System on page 15](#)
- [Accessory and Replacement Components of an iTRAK 5750 System on page 16](#) (optional infield covers)

Figure 2 - Exploded View of the Servo and Mechanical Components of an iTRAK 5750 System Track



Item	Description
1	Infield covers (optional)
2	Power and control input connector module
3	Power and control pass-through connector module
4	Top rail
5	Middle rail
6	Top plate
7	Motor shims
8	Straight motor module
9	Curve motor module
10	Curve bottom plate
11	Bottom rail
12	Curve support plate
13	Mounting plate
14	Straight support plate
15	Straight base extrusion

**Table 1 - Electromechanical Components of an iTRAK 5750 System**

iTRAK 5750 Component	Catalog Number	Description
Motor module	Straight 50 mm (1.97 in.): 2198T-L20-T0504-A00-S2 Straight 100 mm (3.97 in.): 2198T-L20-T1004-A00-S2 Curve 50 mm (1.97 in.): 2198T-L20-T0504-B09-S2 Curve 100 mm (3.97 in.): 2198T-L20-T1004-B09-S2	The motor modules each consist of a motor coil unit (referred to as a section in the firmware), a multiple target absolute position sensor, and an integrated 400V servo drive. The modules have feedback capability, IP65 rating, and Safe Torque Off over network. See <a href="#">Motor Module Catalog Number Explanation on page 18</a> .
Base plates: straight base extrusion and curve bottom plate	—	The base plates support the motor modules and the bottom rail.
Top plates	—	The top plates are assembled to the top of the motor frame and provide support for the top and middle rails.
Mounting plate	—	The mounting plate is used between the support plates and the mounting surface to mount the track. There are two types of mounting plate, one for oval tracks, and one for rectangle tracks.
Brace plate	—	The brace plate is a stiffener plate that is only used for oval tracks that are 1600 mm (62.99 in.) or longer in straight module length per straight side of the oval. It is not used on rectangular tracks. A brace plate is not present in <a href="#">Figure 2 on page 13</a> because the track is not long enough to require one. A brace plate is shown in <a href="#">Figure 16 on page 32</a> .
Curve support plate	—	The curve support plate is located under each curve motor module.
Straight support plate	—	The straight support plates are located under the straight motor modules between the straight base extrusion and the curve support plate.
Joiner plate	—	The joiner plate is used to connect multiple track sections for long track systems. A joiner plate is not present in <a href="#">Figure 2 on page 13</a> because the track is not long enough to require one. A joiner plate is shown in <a href="#">Figure 17 on page 32</a> .
Rail system: top rail, middle rail, bottom rail	—	The rails attach to the top plates and base plates. This system of rails provides high-precision guidance for the mover track rollers. Rail system parts are available for individual sale only through an Engineered To Order process. The straight rails come in segments that are multiples of 400 mm (15.75 in.) from 400...2000 mm (15.75...78.74 in.). The 400 mm (15.75 in.) straight rail segment is the only rail segment that has lubrication ports. The curve rails come in either 90° or 180° segments.
Mover	50 mm (1.97 in.) wide, 50 mm (1.97 in.) long: 2198T-VT0505-F 50 mm (1.97 in) wide, 100 mm (3.94 in.) long: 2198T-VT0510-F 100 mm (3.94 in.) wide, 50 mm (1.97 in.) long: 2198T-VT1005-F 100 mm (3.94 in.) wide, 100 mm (3.94 in.) long: 2198T-VT1010-F	A mover rolls along the rails. The application end effector must be attached to the mover. A mover uses two magnets: <ul style="list-style-type: none"> <li>Motor magnet: This is a passive magnetic component. Because of the motor magnet, the mover moves along the track in response to the magnetic fields generated by the motor modules. A motor magnet comes with the mover.</li> <li>Position magnet: This magnet allows sensors in the track to detect the position of the mover. A position magnet does not come with the mover. A position magnet must be ordered separately and installed on the mover.</li> </ul> <p>There are four types of movers defined by the type of motor magnet they use. The types of motor magnets are defined by their length and width, and the mover types are divided into the same length and width combinations. These dimensions are explained in the mover motor magnet description in the following row.</p> <p>In a mover catalog number, the width code comes before the length code. In a mover motor magnet catalog number, the length code comes before the width code. See <a href="#">Assembled Mover Catalog Number Explanation on page 21</a>.</p>
Mover motor magnet	50 mm (1.97 in.) long, 50 mm (1.97 in.) wide: 2198T-M0505-A000-SS 50 mm (1.97 in) long, 100 mm (3.94 in.) wide: 2198T-M0510-A000-SS 100 mm (3.94 in.) long, 50 mm (1.97 in.) wide: 2198T-M1005-A000-SS 100 mm (3.94 in.) long, 100 mm (3.94 in.) wide: 2198T-M1010-A000-SS	A mover motor magnet is included on a mover so that the mover will move along the track in response to the magnetic fields generated by the motor modules. There are four types of mover motor magnets defined by their length (direction of motion) dimension, and their width (perpendicular to direction of motion) dimension. A mover motor magnet is included with each mover. Mover motor magnets are also available for individual sale. See <a href="#">Mover Motor Magnet Catalog Number Explanation on page 20</a> .
Mover position magnet	Reference Mover Position Magnet: 2198T-N1-5750 Standard Mover Position Magnet: 2198T-NN-5750	A position magnet on a mover actuates sensors in the track, allowing the iTRAK system to detect the position of that mover. There are two types of position magnet, one that designates the mover it is installed on as a reference mover (Mover 1), and one that designates the mover it is installed on as a standard mover (Mover N). A position magnet is not included with a mover. A position magnet must be purchased separately from the mover and installed on the mover before the mover is used on the track. See <a href="#">Position Magnet Catalog Number Explanation on page 19</a> .

Table 2 - Power and Control Components of an iTRAK 5750 System

iTRAK 5750 Component	Catalog Number	Description
Motor module power supply	DC-bus power supply: 2198-Pxxx iTRAK power supply: 2198T-W25K-ER	A Kinetix 5700 DC-bus power supply (2198) and Kinetix 5700 iTRAK 12.5 A power supply (2198T) provide the DC bus voltages that are required for the iTRAK 5750 motor modules. The Kinetix 5700 power supply is used with other Kinetix 5700 components to provide branch circuit protection.
24V DC control power supply	1606-XLxxx	Bulletin 1606 24V DC power supply for control circuitry.
AC line filters	2198-DBR20-F, 2198-DBR40-F, 2198-DBR90-F, 2198-DBR200-F	2198 three-phase AC line filters are required to meet CE and UK certifications and are available for use with DC-bus power supplies.
AC contactor	100-Cxxxxx, 100-Dxxxxx, 100-Exxxxx	The AC three-phase contactor control string must be wired in series with the contactor-enable relay at the CED connector to make sure that three-phase power is removed under various fault conditions to protect the power supply.
Branch circuit protection	See the Kinetix 5700 Servo Drives User Manual, publication <a href="#">2198-UM002</a>	AC branch circuit protection is required for UL or other applicable agencies.
Power and control input connector module <sup>(1)</sup>	2198T-CT-CP	The power and control input connector module provides the power connection between the iTRAK power supply and a motor module and a communication connection from an EtherNet/IP network and a motor module. This module is used for the primary power and ground and Ethernet connections for your iTRAK 5750 system. See <a href="#">Connector Module Catalog Number Explanation on page 19</a> .
Power input with control pass-through connector module <sup>(1)</sup>	2198T-CT-P	The power input with control pass-through connector module provides the power connection between the iTRAK power supply and a motor module. This module is used to provide an additional power source connection when a system requires an additional Kinetix 5700 iTRAK power supply. This module provides a pass-through Ethernet connection only. For more information on when multiple iTRAK power supplies are required, see <a href="#">Provide Power to the iTRAK System on page 77</a> .
Power and control pass-through connector module <sup>(1)</sup>	2198T-CT	The power and control pass-through connector module provides continuous power between the motor modules and communication with the EtherNet/IP network.
Power cable	6 m (19.7 ft): 2198T-CHBFLS8-12AA06 9 m (29.5 ft): 2198T-CHBFLS8-12AA09 12 m (39.4 ft): 2198T-CHBFLS8-12AA12 15 m (49.2 ft): 2198T-CHBFLS8-12AA15 30 m (98.4 ft): 2198T-CHBFLS8-12AA30	This cable provides DC-bus and control power from the iTRAK power supply to the power and control input and power input with control pass-through connector modules. Use only the cables that are referenced in this user manual.
EtherNet/IP communication cable	Straight - Right Angle 1 m (3.3 ft): 1585D-E8TGJM-1 2 m (6.6 ft): 1585D-E8TGJM-2 3 m (9.8 ft): 1585D-E8TGJM-3 5 m (16.4 ft): 1585D-E8TGJM-5 10 m (32.8 ft): 1585D-E8TGJM-10 Straight - Straight 1 m (3.3 ft): 1585D-M8UGJM-1 2 m (6.6 ft): 1585D-M8UGJM-2 3 m (9.8 ft): 1585D-M8UGJM-3 4 m (13.1 ft): 1585D-M8UGJM-4 5 m (16.4 ft): 1585D-M8UGJM-5 6 m (19.7 ft): 1585D-M8UGJM-6 8 m (26.2 ft): 1585D-M8UGJM-8 9 m (29.5 ft): 1585D-M8UGJM-9 10 m (32.8 ft): 1585D-M8UGJM-10 15 m (49.2 ft): 1585D-M8UGJM-15 20 m (65.6 ft): 1585D-M8UGJM-20 25 m (82.0 ft): 1585D-M8UGJM-25 30 m (98.4 ft): 1585D-M8UGJM-30	This M12 X-code Ethernet cable provides EtherNet/IP communication to the power and control input connector module and connected motor modules. Use only the cables that are referenced in this user manual. A Straight - Straight cable has a straight connector on both ends, which connects in-line with or straight on with the cable. A Straight - Right Angle cable has a straight connector on one end and a right angle connector on the other. The right angle connector forms a right angle between the cable and the connector. The distances that are listed are the distances between the connectors.  <b>IMPORTANT</b> If your system uses motor modules of the 50 mm (1.97 in.) wide size, and uses an infield cover, you must use a Straight - Right Angle cable and connect to the power and control input connector module using the right angle connector. A straight connector is not compatible with a 50 mm (1.97 in.) motor module when used with an infield cover.
Logix 5000 <sup>®</sup> controller platform	Bulletin 1756, Bulletin 1769, Bulletin 5069	Integrated Motion on the EtherNet/IP network in ControlLogix <sup>®</sup> 5580, CompactLogix <sup>™</sup> 5480, GuardLogix <sup>®</sup> 5580, and Compact GuardLogix 5380 controllers and Integrated Safety in Compact GuardLogix 5380 controllers. Linear, Device Level Ring (DLR), and star topologies are supported.
Studio 5000 <sup>®</sup> environment	—	Studio 5000 Logix Designer <sup>®</sup> application, version 36 or later, provides support to program, commission, and maintain the ControlLogix, CompactLogix, GuardLogix, and Compact GuardLogix controller families that you use with the iTRAK 5750 system.

(1) Connector modules must be Series B or later.

Table 3 - Accessory and Replacement Components of an iTRAK 5750 System

iTRAK 5750 Component	Catalog Number	Description
Lubrication system	2198T-AL-SYS	The lubrication system supplies lubricant to the rail system.
Lubrication system replacement cartridge	2198T-AL-RES	Replacement cartridge with 250 cc (8.45 oz) lubricant capacity.
Infield cover	Straight section cover: 2198T-AS-C-A-04-U Curve section cover: 2198T-AS-C-B-90	These covers provide additional protection for the connector modules and power and Ethernet cable connections on the modules. See <a href="#">Infield Cover Catalog Number Explanation on page 21</a> .
Infield cover screw replacement kit	2198T-BE-KITCON-4	These screws are used to install the infield covers.
Rail straightening bar tool	2198T-A17	The rail straightening bar is used for replacement of a straight rail segment of the top or bottom rail. It is not used for the middle rail. This tool helps to align straight rail segments to provide a smooth transition of movers from one rail to another.
Rail alignment tool kit	2198T-A22	This kit contains four types of tools: <ul style="list-style-type: none"> <li>• Middle rail positioner tool. Three of this type of tool are included in the kit. This tool is used to align a straight rail segment of the middle rail to the proper position relative to the motor top plate.</li> <li>• Straight rail to straight rail joint alignment tool. One of this type of tool is included in the kit. This tool has the following uses: <ul style="list-style-type: none"> <li>Align the joint between two straight rail segments of either the top rail, the bottom rail, or the middle rail.</li> <li>Align the joint between a straight rail segment and a curve rail segment of the middle rail. The name of the tool "straight rail to straight rail" suggests it cannot be used this way, but for the middle rail, it can be used this way.</li> </ul> </li> <li>• Straight rail to left curve rail joint alignment tool. One of this type of tool is included in the kit. This tool is used to align the joint between a straight rail segment and a left curve rail segment of the top or bottom rail. This tool cannot be used on the middle rail.</li> <li>• Straight rail to right curve rail joint alignment tool. One of this type of tool is included in the kit. This tool is used to align the joint between a straight rail segment and a right curve rail segment of the top or bottom rail. This tool cannot be used on the middle rail.</li> </ul>
Mover cam-follower wheel flexure installation tool	2198T-A16	This tool is used to hold the flexure in position tightly against a plate of the mover while the flexure is being secured. The flexure needs to be removed and reinstalled for mover wheel replacement.
Mover removal tool kit	2198T-A03	This kit contains two mover removal tools used to remove a mover from the track. The mover removal tools are segments of straight rail. These segments are installed at the beginning of a curve in the track instead of a curved rail segment so that you can pull a mover off of the track by moving it straight instead of turning into the curve.
Mover replacement wheel	2198T-AV-WHL-C1	This kit is used to replace mover wheels that are worn out or damaged.
Rail screw replacement kit	2198T-BE-KITCON-1	These screws are used to install the rails. This kit is used to replace screws that have been lost or damaged.
Motor screw and joiner plate screw replacement kit	2198T-BE-KITCON-2	These screws are used to install a motor and joiner plate. This kit is used to replace screws that have been lost or damaged.



## Catalog Number Explanations

The modular, scalable design of the iTRAK 5750 allows you to purchase an assembled system that is suited to your specific application. Use the information in this section to understand and identify the catalog numbers of your iTRAK 5750 assembled system and system components.

### Assembled iTRAK 5750 System

The following tables explain an assembled iTRAK 5750 system catalog number.

#### Assembled iTRAK 5750 System Catalog Number Explanation

Catalog number example:  $\frac{2198T}{a} - \frac{F}{b} \frac{05}{c} \frac{H}{d} \frac{024}{e} \frac{016}{f} \frac{E}{g} \frac{05}{h} \frac{006}{i} \frac{C}{j} - \frac{01234}{k}$

a		b		c		d	
Bulletin Number		Module Type		Motor Coil Width		Orientation	
Code	Description	Code	Description	Code	Description	Code	Description
2198T	iTRAK Intelligent Track System	F	iTRAK 5750 system	05	50 mm (1.97 in.)	H	Horizontal (both dimensions horizontal)
				10	100 mm (3.94 in.)	V	Vertical (short dimension vertical only)
						S	Stand up (long dimension vertical only)
e		f		g		h	
Long Dimension (length)		Short Dimension (width)		Mechanical Solution Style		Mover Magnet Stack Length	
Code	Description	Code	Description	Code	Description	Code	Description
###	Total length of straight motor modules in the long dimension in decimeters	###	Total length of straight motor modules in the short dimension in decimeters	E	iTRAK 5750 TriMax	05	50 mm (1.97 in.)
		000	Oval			10	100 mm (3.94 in.)
		00A	Linear				
i		j		k			
Mover Quantity		Power and Control Configuration		Customized			
Code	Description	Code	Description	Code	Description		
###	Number of movers	C	Kinetix 5700 iTRAK power supply and cables	Qxxxx	Quote reference number		

## Modular iTRAK 5750 System Components

For some of the purchasable iTRAK 5750 system components, there are multiple catalog numbers included under a single module type. For these module types, an explanation of the meaning of individual catalog numbers is provided in this section.

### Motor Module (Section) Catalog Numbers

Catalog Number	Description
2198T-L20-T0504-A00-S2	iTRAK motor module, 50 mm (1.97 in.) wide coil, 400 mm (15.75 in.) long, with multiple target absolute position sensor, integrated 400V servo drive, IP65 with stainless steel cover, Safe Torque Off over network
2198T-L20-T0504-B09-S2	iTRAK curve motor module, 50 mm (1.97 in.) wide coil, 90° arc, 254 mm (10.00 in.) radius, with multiple target absolute position sensor, integrated 400V servo drive, IP65 with stainless steel cover, Safe Torque Off over network
2198T-L20-T1004-A00-S2	iTRAK motor module, 100 mm (3.94 in.) wide coil, 400 mm (15.75 in.) long, with multiple target absolute position sensor, integrated 400V servo drive, IP65 with stainless steel cover, Safe Torque Off over network
2198T-L20-T1004-B09-S2	iTRAK curve motor module, 100 mm (3.94 in.) wide coil, 90° arc, 254 mm (10.00 in.) radius, with multiple target absolute position sensor, integrated 400V servo drive, IP65 with stainless steel cover, Safe Torque Off over network

### Motor Module Catalog Number Explanation

Catalog number example:  $\frac{2198T}{a} - \frac{L}{b} - \frac{20}{c} - \frac{T}{d} - \frac{05}{e} - \frac{04}{f} - \frac{A}{g} - \frac{00}{h} - \frac{S2}{i}$

a		b		c		d	
Bulletin Number		Module Type		Nominal Voltage		Motor Orientation	
Code	Description	Code	Description	Code	Description	Code	Description
2198T	iTRAK Intelligent Track System	L	Motor module (section)	20	400V bus	T	Transverse

e		f		g		h		i	
Motor Coil Width		Motor Length		Radius Type		Arc Angle		Functional Safety	
Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
05	50 mm (1.97 in.)	04	400 mm (11.81 in.)	A	Linear	00	Linear	S2	Integrated Network Safe Stop
10	100 mm (3.94 in.)			B	Constant radius	09	90°		

## Connector Module Catalog Numbers

Cat. No.	Description
2198T-CT-CP	The power and control input connector module provides the power connection between the iTRAK power supply and a motor module and a communication connection from an EtherNet/IP network and a motor module. This module is used for the primary power and ground and Ethernet connections for your iTRAK 5750 system.
2198T-CT-P	The power input with pass-through control connector module provides the power connection between the iTRAK power supply and a motor module. This module is used to provide additional power for larger systems. This module provides a pass-through Ethernet connection only.
2198T-CT	The power and control pass-through connector module provides continuous power between the motor modules and communication with the EtherNet/IP network.

## Connector Module Catalog Number Explanation

Catalog number example:  $\frac{2198T}{a} - \frac{CT}{b} - \frac{CP}{c}$

a		b		c	
Bulletin Number		Module Type		Input Option	
Code	Description	Code	Description	Code	Description
2198T	iTRAK Intelligent Track System	CT	Connector terminal (between motor modules)	CP	Communication and power inputs
				p	Power input with communication pass-through
				<blanks>	Communication and power pass-through

## Position Magnet Catalog Numbers

Catalog Number	Description
2198T-N1-5750	If your system uses a reference mover (Mover 1), the reference mover must use the iTRAK 5750 reference mover position magnet (cat. no. 2198T-N1-5750). This magnet has a polarity that identifies its mover as Mover 1. When a reference mover is used, there is one reference mover and thus one reference mover position magnet in the system. The reference mover position magnet is identified by a black colored magnet backplate.
2198T-NN-5750	iTRAK 5750 standard mover position magnet (Mover N). This is the mover position magnet for movers that are not a reference mover. This magnet has a polarity that identifies its mover as Mover N, where N is any standard (not reference) mover. The standard mover position magnet is identified by a silver colored magnet backplate.

## Position Magnet Catalog Number Explanation

Catalog number example:  $\frac{2198T}{a} - \frac{N}{b} \frac{N}{c} - \frac{5750}{d}$

a		b		c		d	
Bulletin Number		Module Type		Magnet Type		Mounting Hardware	
Code	Description	Code	Description	Code	Description	Code	Description
2198T	iTRAK Intelligent Track System	N	Position magnet	1	Reference mover (Mover 1) position magnet	5750	Pairs with iTRAK 5750 mover
				N	Standard mover (Mover N) position magnet		

### Mover Motor Magnet Catalog Numbers

The length of the magnet is the dimension in the direction of motion. The width is the other dimension that is described in the catalog number, and it is perpendicular to the direction of motion.

Catalog Number	Description
2198T-M0505-A000-SS	Mover motor magnet size 50 mm (1.97 in.) long, 50 mm (1.97 in.) wide
2198T-M0510-A000-SS	Mover motor magnet size 50 mm (1.97 in.) long, 100 mm (3.94 in.) wide
2198T-M1005-A000-SS	Mover motor magnet size 100 mm (3.94 in.) long, 50 mm (1.97 in.) wide
2198T-M1010-A000-SS	Mover motor magnet size 100 mm (3.94 in.) long, 100 mm (3.94 in.) wide

### Mover Motor Magnet Catalog Number Explanation

Catalog number example:  $\frac{2198T}{a} - \frac{M}{b} \frac{05}{c} \frac{05}{d} - \frac{A}{e} \frac{000}{f} - \frac{SS}{g}$

a		b	
Bulletin Number		Type	
Code	Description	Code	Description
2198T	iTRAK Intelligent Track System	M	Mover motor magnet

c	
Magnet Length	
Code	Description
05	50 mm (1.97 in.) long (motion direction)
10	100 mm (3.94 in.) long (motion direction)

d	
Magnet Width	
Code	Description
05	50 mm (1.97 in.) wide (perpendicular to motion direction)
10	100 mm (3.94 in.) wide (perpendicular to motion direction)

e	
Motor Module Shape	
Code	Description
A	Linear (radius type)

f	
Motor Module Shape	
Code	Description
000	Linear (arc angle)

g	
Magnet Cover Type	
Code	Description
SS	Stainless steel cover

## Assembled Mover Catalog Numbers

Catalog Number	Description
2198T-VT0505-F	iTRAK mover (excludes position magnet), 50 mm (1.97 in.) wide, 50 mm (1.97 in.) long
2198T-VT0510-F	iTRAK mover (excludes position magnet), 50 mm (1.97 in.) wide, 100 mm (3.94 in.) long
2198T-VT1005-F	iTRAK mover (excludes position magnet), 100 mm (3.94 in.) wide, 50 mm (1.97 in.) long
2198T-VT1010-F	iTRAK mover (excludes position magnet), 100 mm (3.94 in.) wide, 100 mm (3.94 in.) long

## Assembled Mover Catalog Number Explanation

Catalog number example:  $\frac{2198T}{a} - \frac{V}{b} - \frac{T}{c} - \frac{05}{d} - \frac{05}{e} - \frac{F}{f}$

a		b		c	
Bulletin Number		Module Type		Coil Orientation	
Code	Description	Code	Description	Code	Description
2198T	iTRAK Intelligent Track System	V	Assembled mover	T	Transverse

d		e		f	
Motor Coil Width <sup>(1)</sup>		Magnet Length		Mover Identification	
Code	Description	Code	Description	Code	Description
05	50 mm (1.97 in.) (perpendicular to motion direction)	05	50 mm (1.97 in.) (motion direction)	F	5750 design
10	100 mm (3.94 in.) (perpendicular to motion direction)	10	100 mm (3.94 in.) (motion direction)		

(1) Motor coil width is equal to mover motor magnet width.

## Infield Cover Catalog Numbers

Catalog Number	Description
2198T-AS-C-A-04-U	Straight section cover
2198T-AS-C-B-90	Curve section cover

## Infield Cover Catalog Number Explanation

Catalog number example:  $\frac{2198T}{a} - \frac{AS}{b} - \frac{C}{c} - \frac{A}{d} - \frac{04}{e} - \frac{U}{f}$

a		b		c	
Bulletin Number		Type		Item	
Code	Description	Code	Description	Code	Description
2198T	iTRAK Intelligent Track System	AS	Accessory	C	Cover

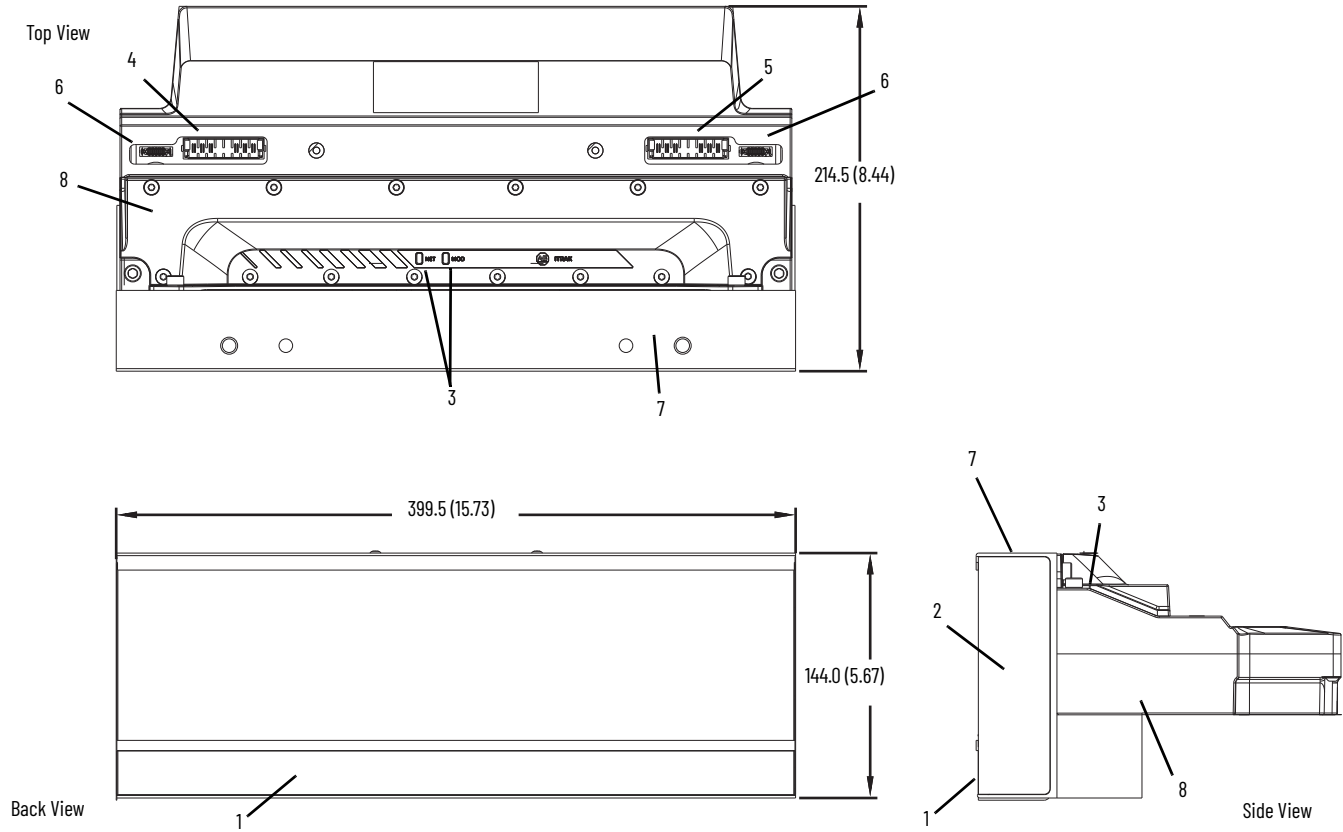
d		e		f	
Motor Module Shape		Motor Module Size		Logo	
Code	Description	Code	Description	Code	Description
A	Straight	04	400 mm (15.75 in.)	(blank)	Allen-Bradley
B	Curve	90	90°	U	No logo

## Motor Modules

There are four types of motor modules that can be used in an iTRAK 5750 system. [Figure 3](#) through [Figure 9 on page 26](#) show the dimensions and features of the four types of motor modules. There are two sizes of motor module, which can form two sizes of track. The sizes are 50 mm (1.97 in.) wide and 100 mm (3.94 in.) wide, based on one of the dimensions of their corresponding mover motor magnet plates. The sizes are as follows:

- 50 mm (1.97 in.) wide motor module: the mover motor magnet plate for this size motor module is 50 mm (1.97 in.) on the magnet dimension that is perpendicular to the direction of motion of the mover.
- 100 mm (3.94 in.) wide motor module: the mover motor magnet plate for this size motor module is 100 mm (3.94 in.) on the magnet dimension that is perpendicular to the direction of motion of the mover.

**Figure 3 - 50 mm (1.97 in.) Wide Straight Motor Module, 2198T-L20-T0504-A00-S2, Two-dimensional Views, Dimensions in mm (in.)**



Item	Description
1	Mover position magnet sensing area
2	Motor coil assembly
3	Motor module status indicators
4	Incoming power bus connection (from connector module)

Item	Description
5	Outgoing power bus connection (from connector module)
6	Ethernet connector (from connector module)
7	Motor mounting surface
8	Drive housing

**Figure 4 - 50 mm (1.97 in.) Wide Straight Motor Module, 2198T-L20-T0504-A00-S2, Isometric View**

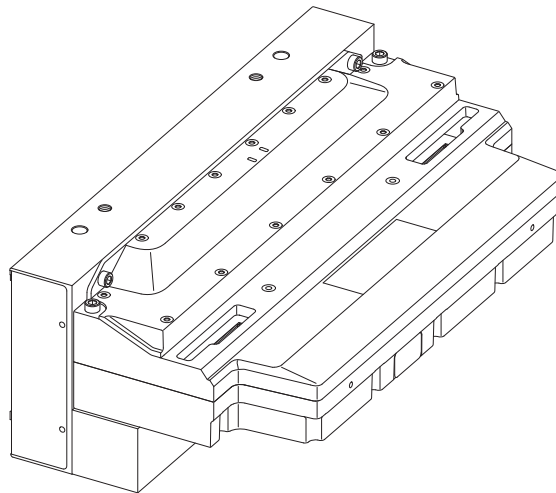
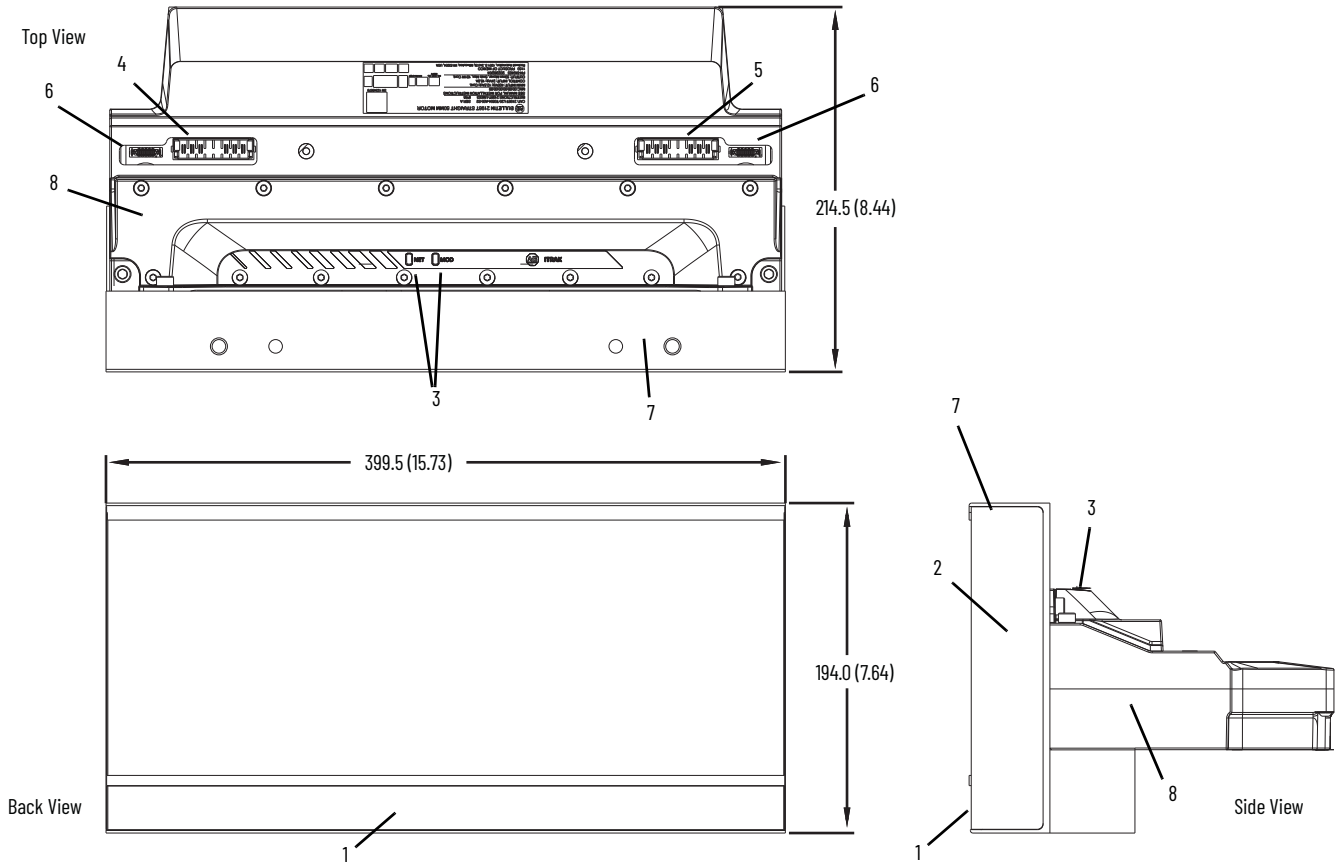


Figure 5 - 100 mm (3.94 in.) Wide Straight Motor Module, 2198T-L20-T1004-A00-S2, Two-dimensional Views, Dimensions in mm (in.)



Item	Description
1	Mover position-magnet sensing area
2	Motor coil assembly
3	Motor module status indicators
4	Incoming power bus connection (from connector module)

Item	Description
5	Outgoing power bus connection (from connector module)
6	Ethernet connector (from connector module)
7	Motor mounting surface
8	Drive housing

Figure 6 - 100 mm (3.94 in.) Wide Straight Motor Module, 2198T-L20-T1004-A00-S2, Isometric View

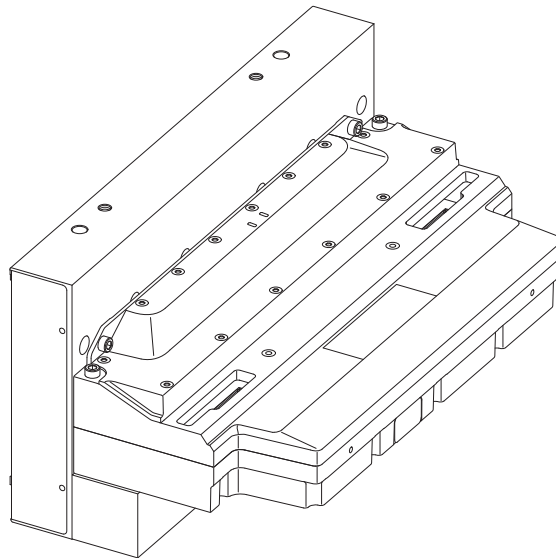
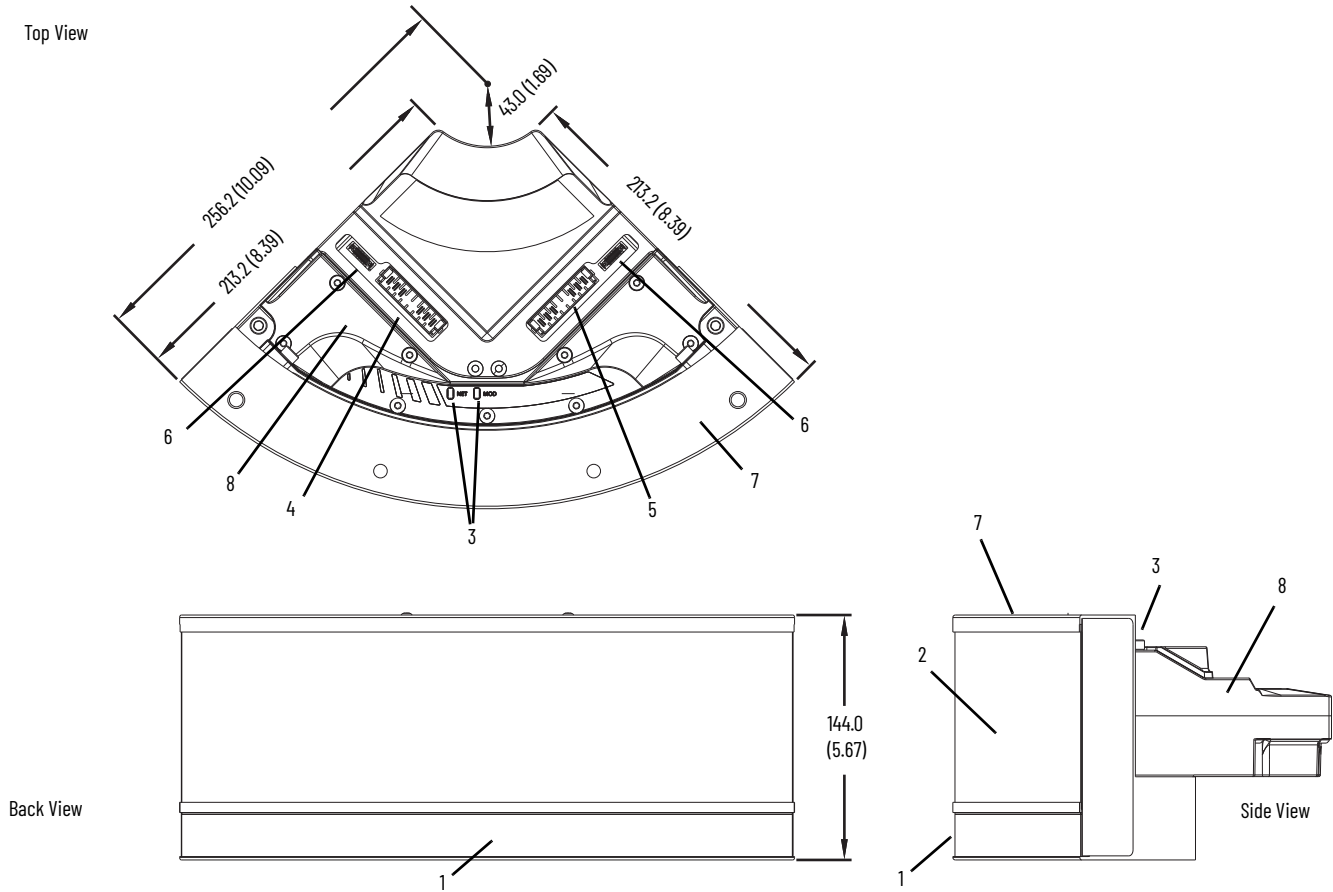




Figure 7 - 50 mm (1.97 in.) Wide Curve Motor Module, 2198T-L20-T0504-B09-S2, Two-dimensional Views, Dimensions in mm (in.)



Item	Description
1	Mover position-magnet sensing area
2	Motor coil assembly
3	Motor module status indicators
4	Incoming power bus connection (from connector module)

Item	Description
5	Outgoing power bus connection (from connector module)
6	Ethernet connector (from connector module)
7	Motor mounting surface
8	Drive housing

Figure 8 - 50 mm (1.97 in.) Wide Curve Motor Module, 2198T-L20-T0504-B09-S2, Isometric View

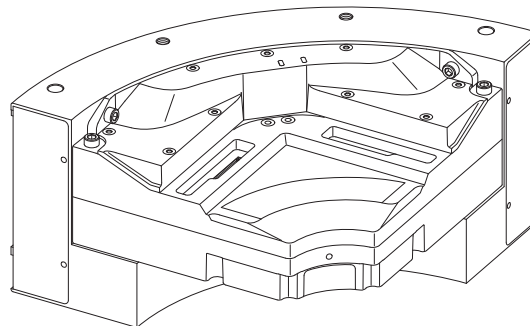
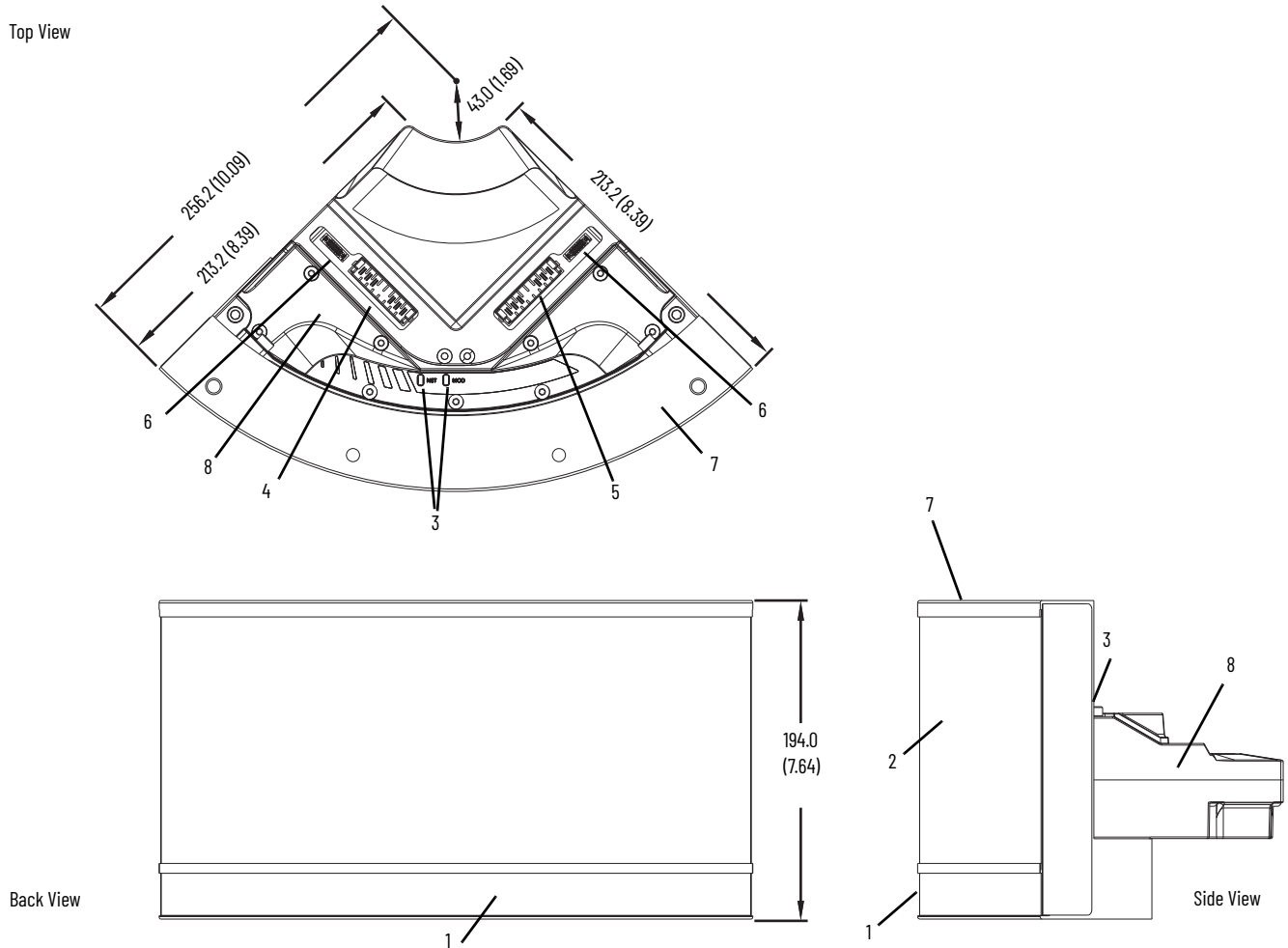


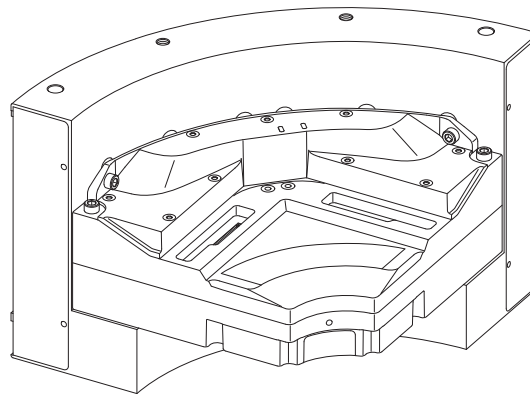
Figure 9 - 100 mm (3.94 in.) Wide Curve Motor Module, 2198T-L20-T1004-B09-S2, Two-dimensional Views, Dimensions in mm (in.)



Item	Description
1	Mover position-magnet sensing area
2	Motor coil assembly
3	Motor module status indicators
4	Incoming power bus connection (from connector module)

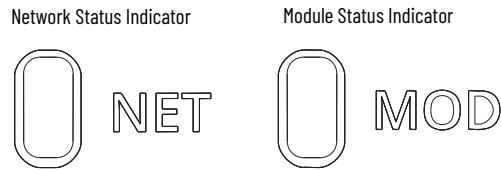
Item	Description
5	Outgoing power bus connection (from connector module)
6	Ethernet connector (from connector module)
7	Motor mounting surface
8	Drive housing

Figure 10 - 100 mm (3.94 in.) Wide Curve Motor Module, 2198T-L20-T1004-B09-S2, Isometric View



## Motor Module Status Indicators

Each motor module has a module status indicator and a network status indicator. For a description of these status indicators, see [Motor Module Status Indicators on page 129](#).

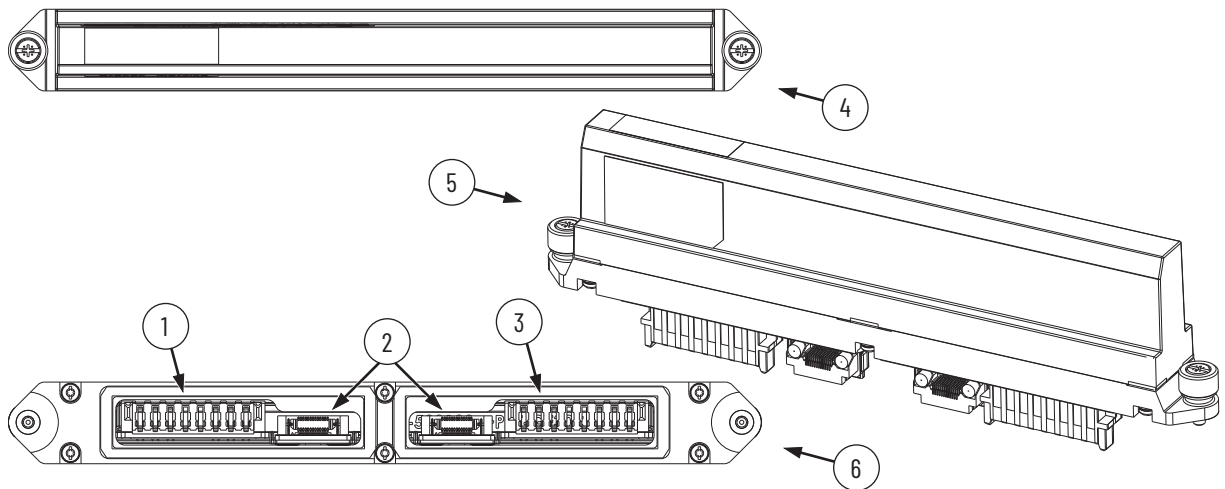


## Connector Modules

The iTRAK 5750 system can use three types of connector modules:

- [Figure 11](#) shows the features of the power and control pass-through connector module. This connector module provides a continuous power bus and Ethernet connection for the iTRAK 5750 system.
- [Figure 12 on page 28](#) shows the features of the power input with control pass-through connector module. This connector module provides a secondary power source connection and continuous Ethernet connection for the iTRAK 5750 system.
- [Figure 13 on page 29](#) shows the features of the power and control input connector module. This connector module provides a power source and Ethernet connection for the iTRAK 5750 system.

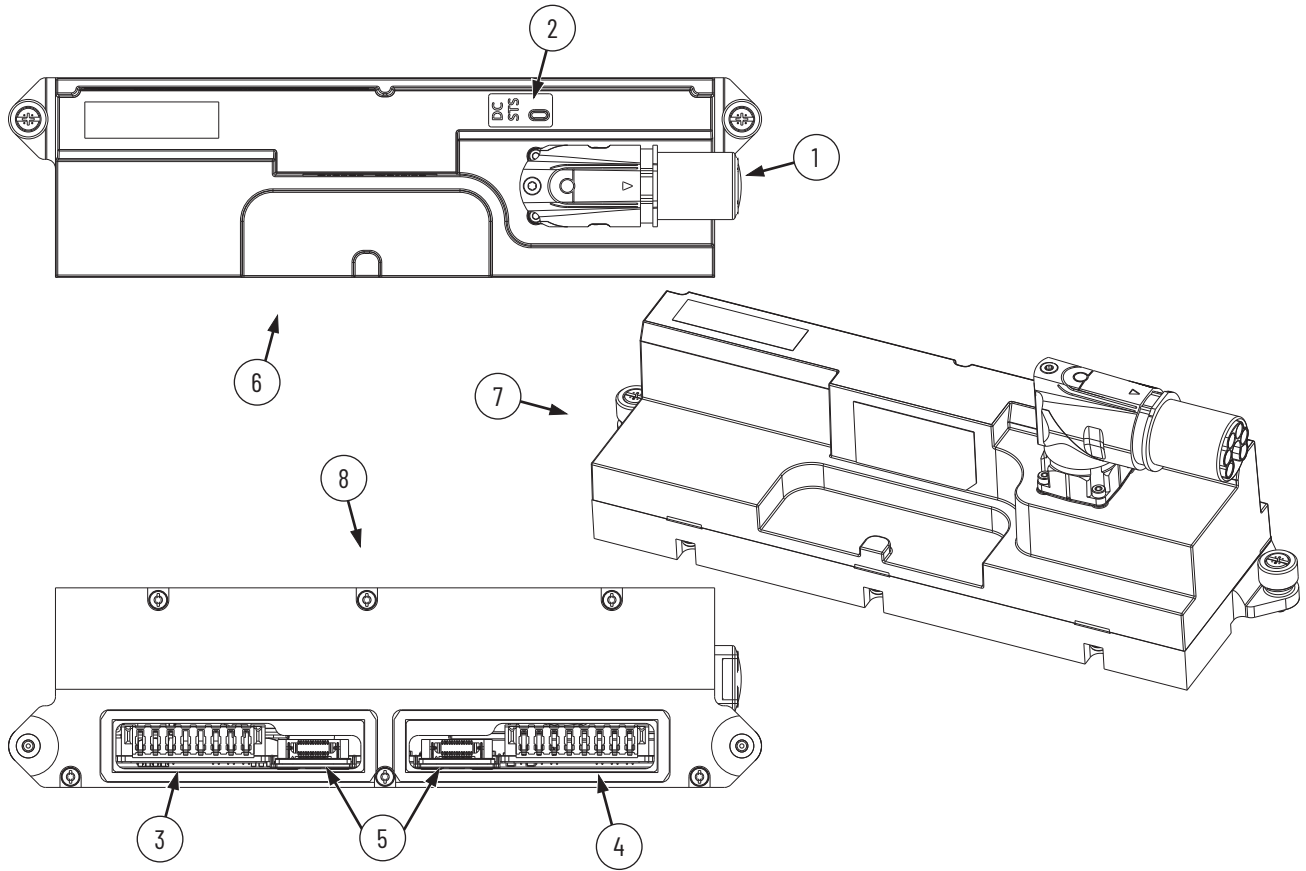
Figure 11 - Power and Control Pass-through Connector Module



Item	Description
1	Incoming power bus connection
2	Pass-through Ethernet network connectors
3	Outgoing power bus connection

Item	Description
4	Top view
5	Isometric view
6	Bottom view

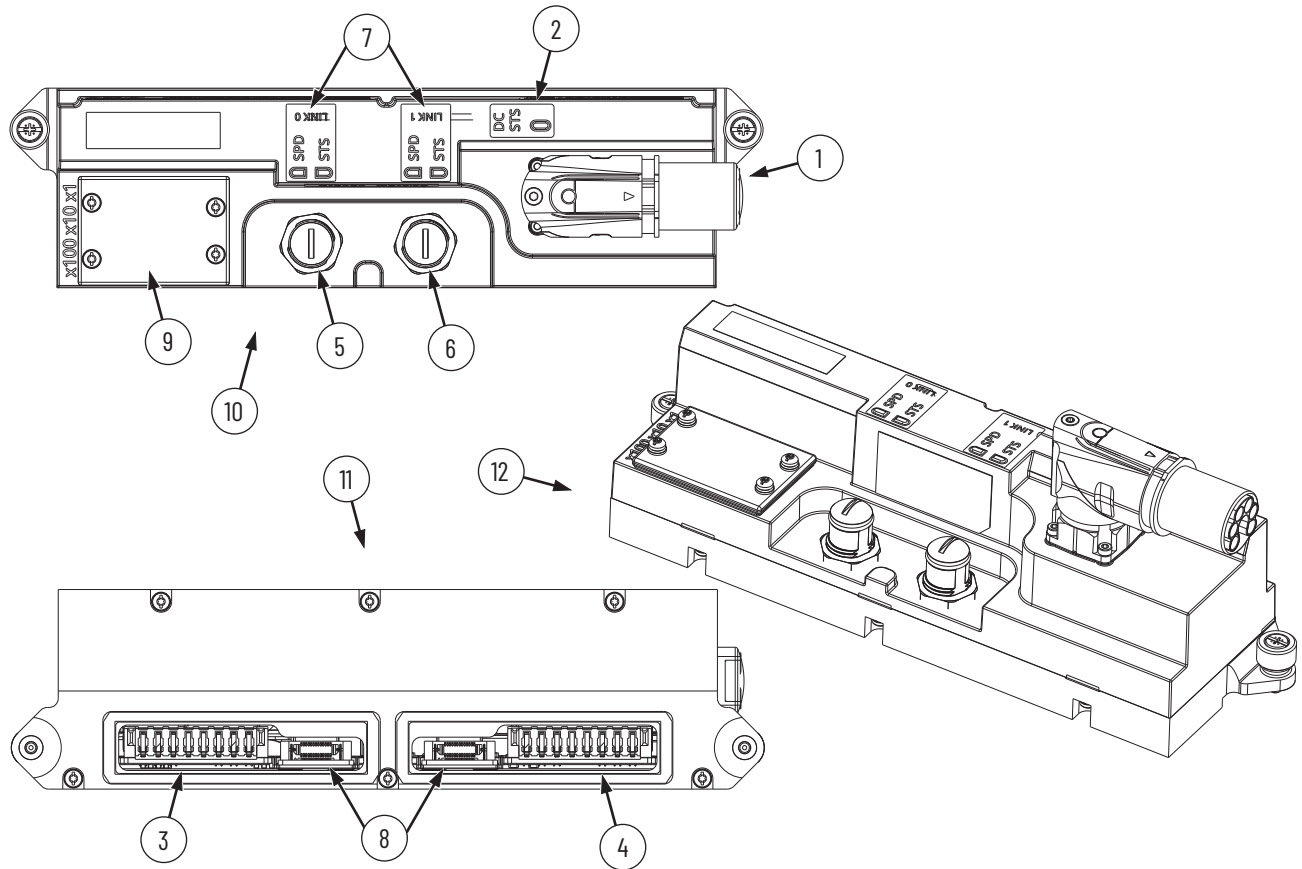
Figure 12 - Power Input With Control Pass-through Connector Module



Item	Description
1	Incoming power connector
2	Power status indicator
3	Incoming power bus connection
4	Outgoing power bus connection

Item	Description
5	Pass-through Ethernet network connectors
6	Top view
7	Isometric view
8	Bottom view

Figure 13 - Power and Control Input Connector Module



Item	Description
1	Incoming power connector
2	Power status indicator
3	Incoming power bus connection
4	Outgoing power bus connection
5	Incoming Ethernet network connector
6	Outgoing Ethernet network connector

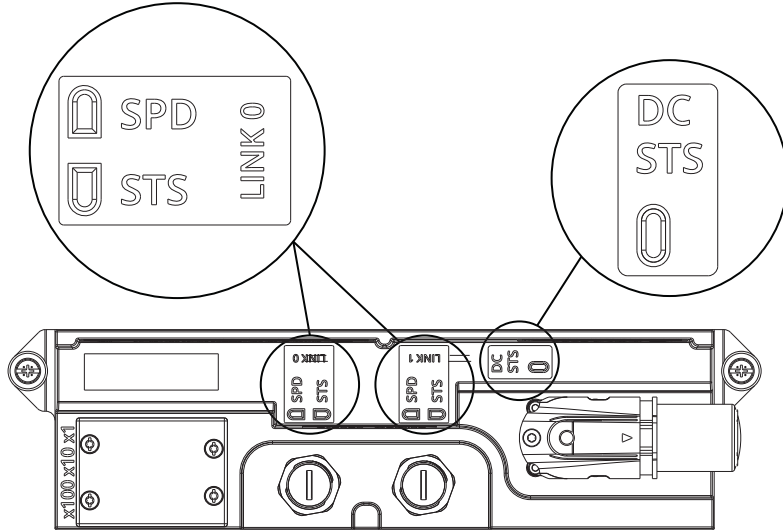
Item	Description
7	Network status indicators
8	Pass-through Ethernet network connectors
9	EtherNet/IP address selectors and control DIP switch (below access cover) <sup>(1)</sup>
10	Top view
11	Bottom view
12	Isometric view

(1) See [Connect an EtherNet/IP Network to the iTRAK 5750 System on page 80](#) for details on these switches.

## Connector Module Status Indicators

The power and control input connector module and power input with control pass-through connector module include the following status indicators. These indicators provide a visual status of the power and communication connections. For a description of these status indicators, see [Connector Module Status Indicators on page 131](#).

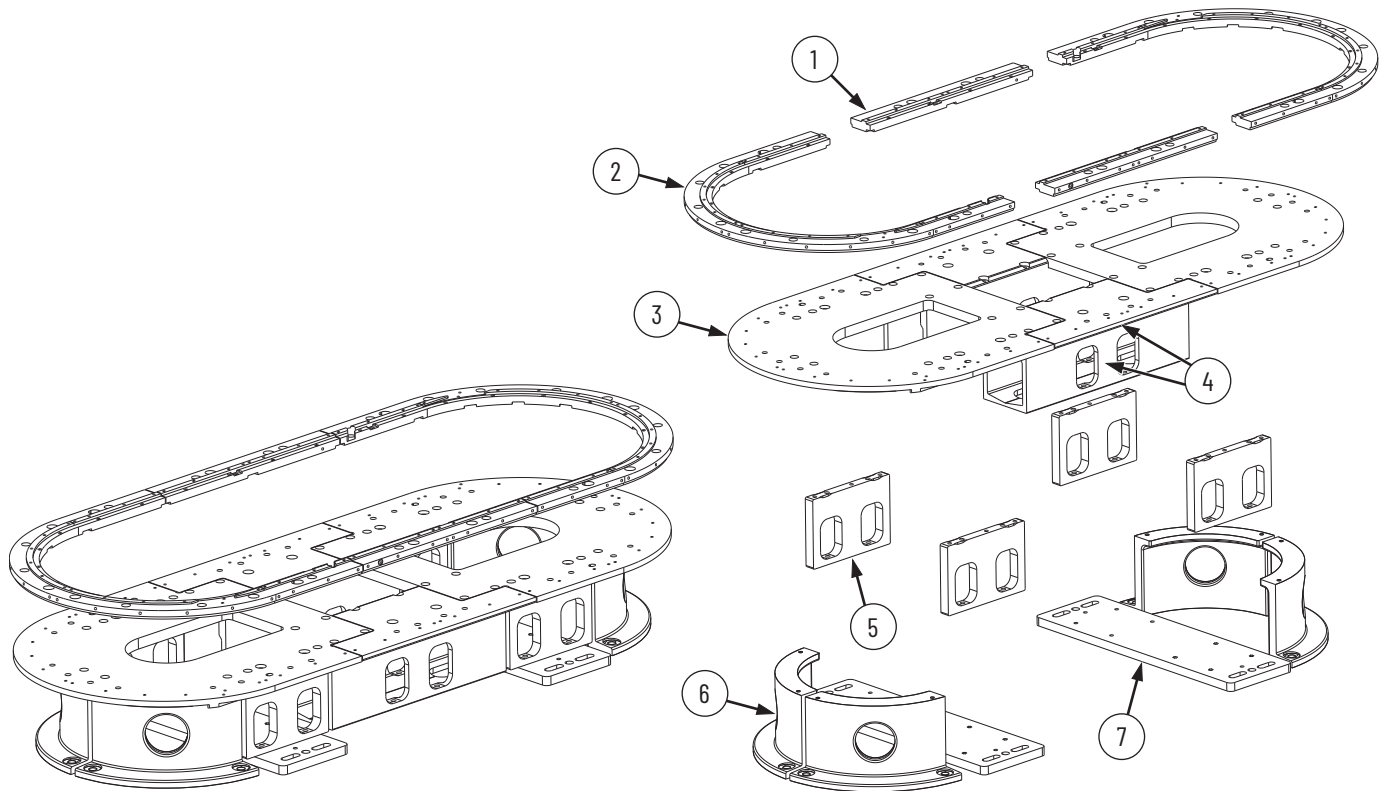
Figure 14 - Power and Control Input Connector Module, Top View



## Integrated Support Frame

The iTRAK 5750 system track has a frame to support the motor modules and rails.

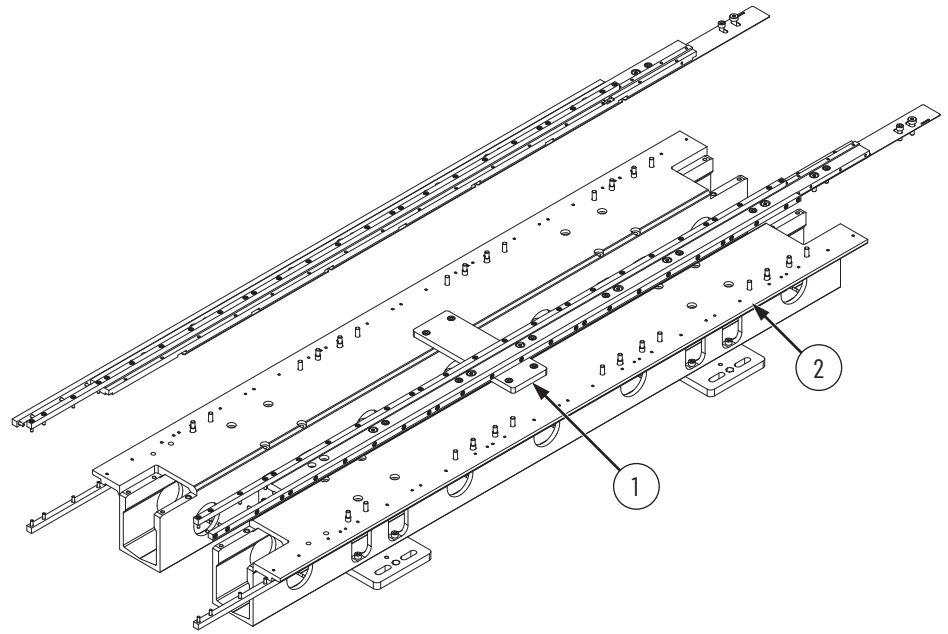
Figure 15 - Integrated Support Frame Assembled and Disassembled



Item	Description
1	Straight segment of top plate
2	Curve segment of top plate
3	Curve bottom plate
4	Straight base extrusion

Item	Description
5	Curve support plate
6	Curve mounting foot
7	Mounting foot

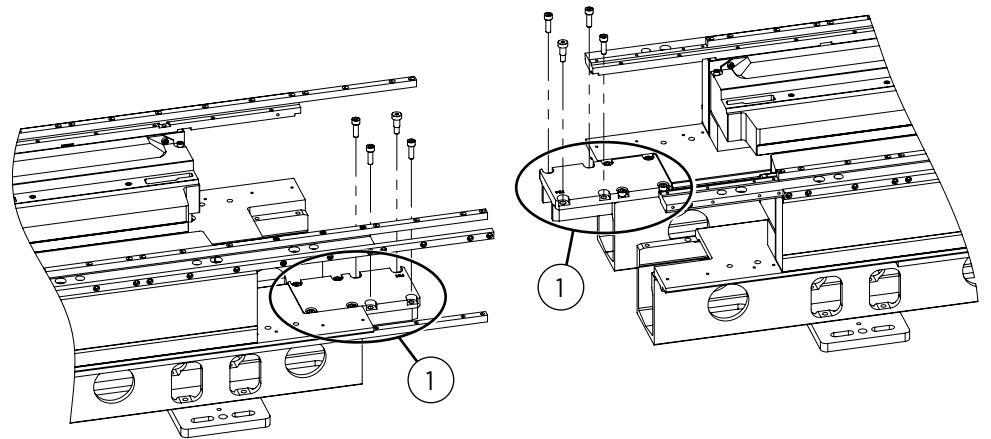
Figure 16 - Additional Integrated Support Frame Components for 1600 mm (62.99 in.) and Longer Oval Tracks



Item	Description
1	Brace plate, for structural support and keeping a constant distance between the straight sides of the track

Item	Description
2	Extended version of the straight base extrusion

Figure 17 - Joiner Plate, Oval Track Example



Item	Description
1	Joiner plate for tracks shipped divided into multiple track sections



## Rail System

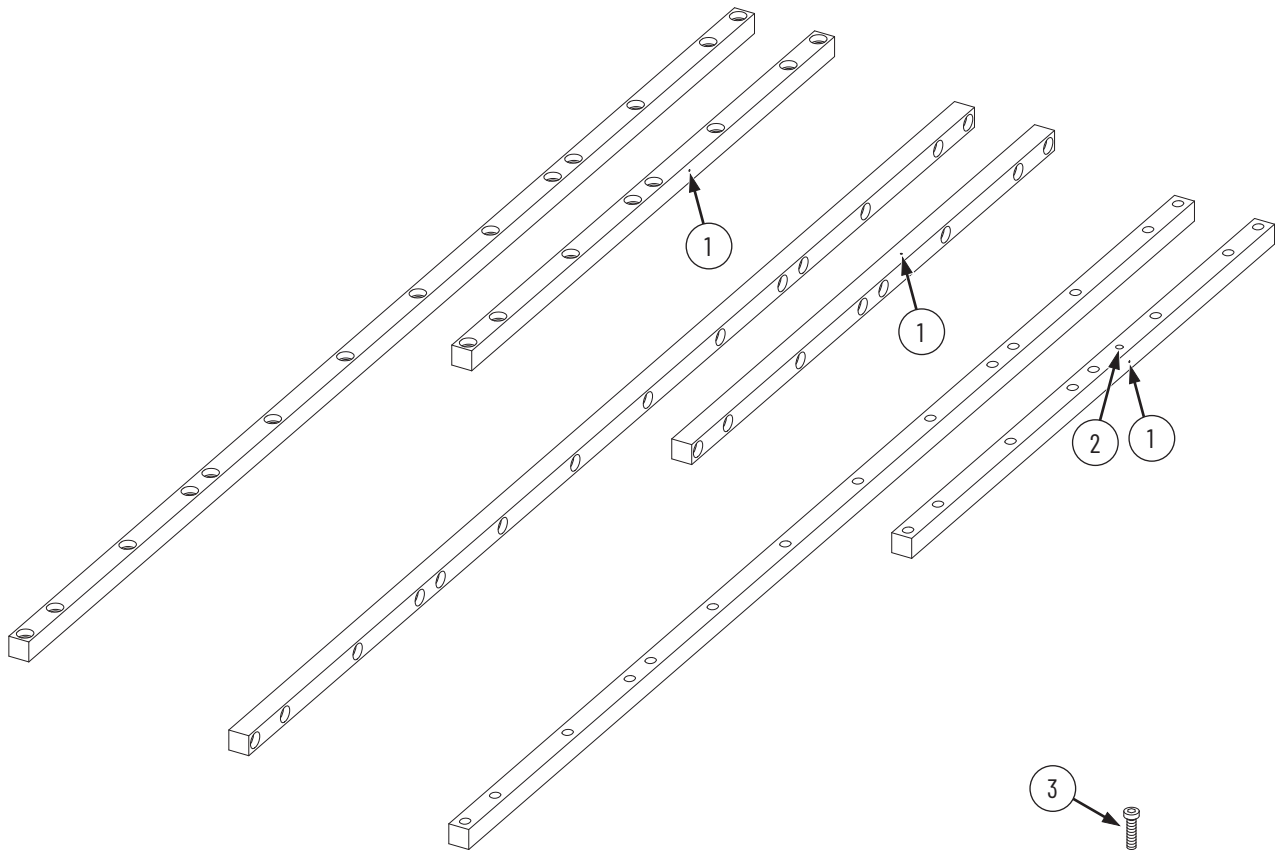
The top and middle rails are installed on the top plate, which is mounted to the top of the motor modules. The bottom rail is installed on the bottom plate, which is mounted to the bottom of the motor modules.

**IMPORTANT** To be sure that the rails are secured and aligned to the mounting plates properly, you must use the fasteners that come with the system. Using customer supplied fasteners can affect system operation. A spare hardware kit is available. See [Accessory and Replacement Components of an iTRAK 5750 System on page 16](#).

### Straight Rail Segments

The top, middle, and bottom rails all use the same types of straight rail segments. Straight rail segments are available in 400 mm (15.7 in.), 800 mm (31.5 in.), 1200 mm (47.2 in.), and 1600 mm (63.0 in.) lengths. On the underside of the 400 mm (15.7 in.) rail segment, there is a port to connect the lubrication system that is used to lubricate the rail. [Figure 18](#) shows a 400 mm (15.7 in.) and 800 mm (31.5 in.) straight rail segment in three positions. From left to right, the positions are: screw entry holes facing upward, facing to the side, and facing downward. These positions correspond to the mounting orientations when used as a top rail, middle rail, or bottom rail, respectively.

Figure 18 - 400 mm (15.7 in.) and 800 mm (31.5 in.) Straight Rail Segments



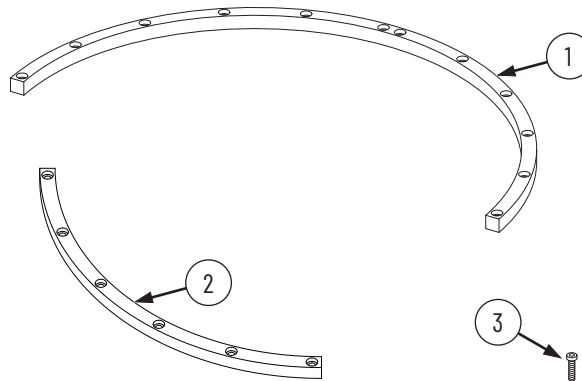
Item	Description
1	Lubrication weep holes, two on each 400 mm (15.7 in.) straight rail segment
2	Lubrication port, one on each 400 mm (15.7 in.) straight rail segment
3	M5 x 20 mm screw used to install the rails

## Curve Rail Segments

Curve rail segments are 180° for oval tracks and 90° for rectangle tracks. There are two types of curve rail segments, one type for the top and bottom rails, and one type for the middle rail:

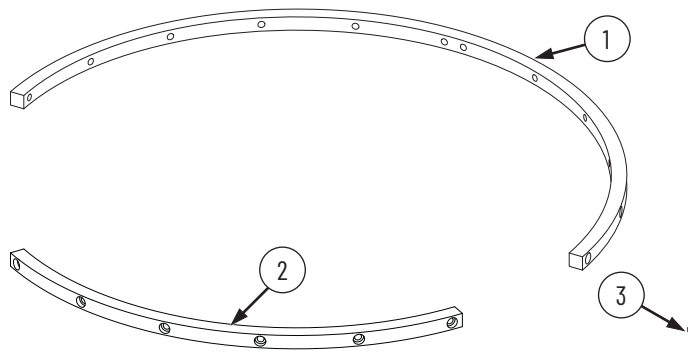
- The top and bottom rails use curve rail segments in which the screw holes are aligned vertically in the rail.
- The middle rail uses curve rail segments in which the screw holes are aligned horizontally in the rail, running from the outside curve of the rail to the inside curve of the rail.

Figure 19 - Curve Segments of the Top and Bottom Rails



Item	Description
1	180° curve segment of the top or bottom rail
2	90° curve segment of the top or bottom rail
3	M5 x 20 mm screw used to install the rails

Figure 20 - Curve Segments of the Middle Rail



Item	Description
1	180° curve segment of the middle rail
2	90° curve segment of the middle rail
3	M5 x 20 mm screw used to install the rails

## Infield Cover

Infield covers are an optional accessory component. They can be used to provide the following:

- A higher ingress protection rating to the motor modules. Without covers installed, the motor modules have IP65 ingress protection. With the covers installed, the motor modules have IP66 ingress protection.
- Easier cleaning of the system.
- Aesthetic effect.

There are two types of infield cover, a straight section infield cover, and a curve section infield cover. The same infield covers are used for both the 50 mm (1.97 in.) size motor module and 100 mm (3.94 in.) size motor module. The top screw hole is used for the smaller size and the bottom screw hole is used for the larger size. Both motor module sizes use the four screws on the perimeter of a cover.

The screws provided to attach an infield cover to the track are M4 flat head hex screws. The recommended torque for the screws is 0.8 N•m (7 lb•in).

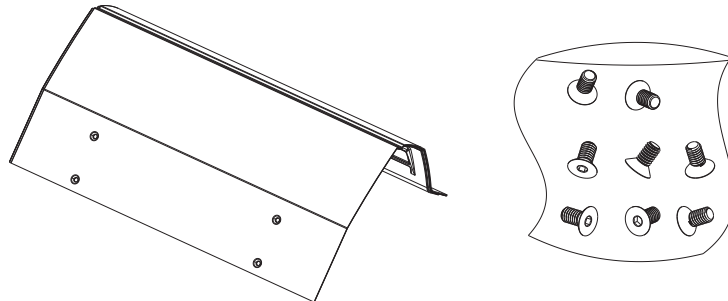
There are eight screws provided with the straight cover:

- six for installation
- two for spares

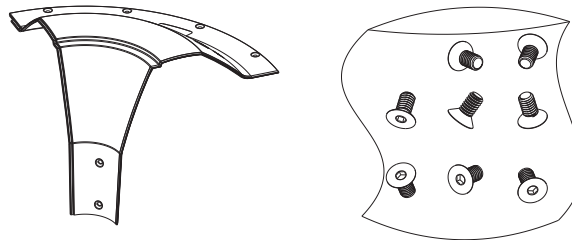
There are eight screws provided with the curve cover:

- five for installation
- three for spares

**Figure 21 - Straight Infield Cover**



**Figure 22 - Curve Infield Cover**



# Mover

Movers come in four combinations of the following dimensions:

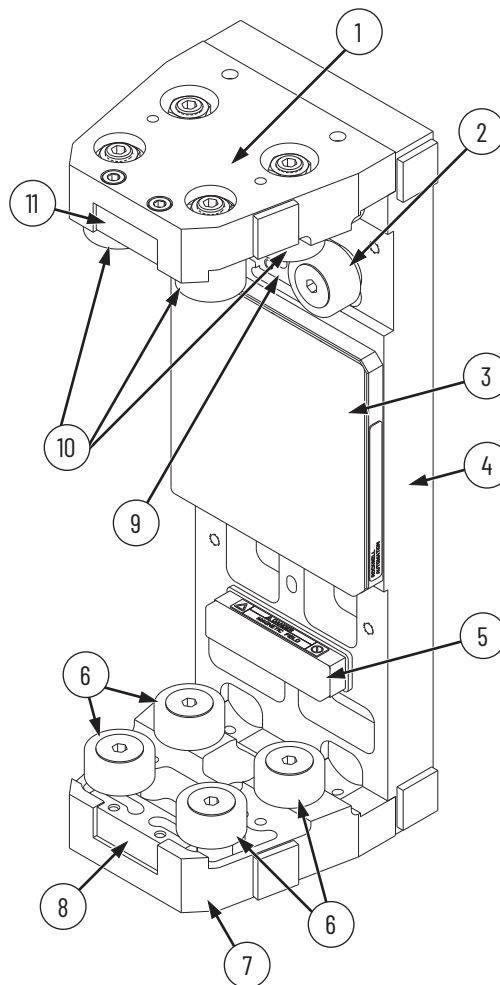
- 72.2 mm (2.84 in.) or 103.2 mm (4.06 in.) long, in the direction of motion
- 256.6 mm (10.10 in.) or 306.6 mm (12.07 in) wide, in the direction perpendicular to the direction of motion

See the iTRAK 5750 System Technical Data, publication [2198T-TD004](#), for the force-speed curves. Do not exceed the force-speed parameters when programming your system.



**ATTENTION:** A hazard of personal injury or equipment damage exists. An uninstalled mover must always have the motor magnet covered with a magnet plate keeper. See [Mover Motor Magnet Plate Keeper on page 47](#). Before handling a mover with a mover magnet installed, read the [Safety Information](#) that begins on page [41](#).

**Figure 23 - Assembled Mover (100 mm [3.94 in.] Wide, 100 mm [3.94 in.] Long Motor Magnet Model)**



Item	Description
1	Mover top plate
2	Middle rail cam-follower wheel, outside diameter 26 mm (1.02 in.)
3	Motor magnet plate. The motor magnet plate in this example has the following dimensions: <ul style="list-style-type: none"> <li>• 100 mm (3.94 in.) wide: dimension perpendicular to direction of motion, top to bottom in this view</li> <li>• 100 mm (3.94 in.) long: dimension in the direction of motion, side to side in this view</li> </ul>
4	Mover middle plate
5	Position magnet (different versions for reference mover [Mover 1] versus standard mover [Mover N], sold separately from the mover)
6	Bottom rail cam-follower wheel, outside diameter 26 mm (1.02 in.)
7	Mover bottom plate
8	Bottom plate flexure assembly
9	Part of middle plate used to hold the middle rail cam-follower wheels
10	Top rail cam-follower wheel, outside diameter 26 mm (1.02 in.)
11	Top plate flexure assembly

## Power Supplies

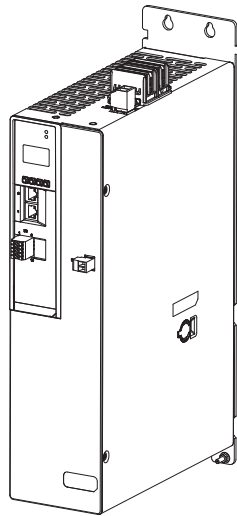
Power is supplied to the iTRAK 5750 system by using a scalable Kinetix 5700 iTRAK power supply. See [Provide Power to the iTRAK System on page 77](#) for more information on the required iTRAK power supply and system power requirements.

The iTRAK power supply is used in combination with a Kinetix 5700 DC-bus power supply as part of a Kinetix 5700 system.

- For Kinetix 5700 iTRAK power supply installation instructions, see the Kinetix 5700 iTRAK Power Supply and iTRAK Bus Conditioner Module Installation Instructions, publication [2198T-IN001](#).
- For Kinetix 5700 DC-bus power supply details and use, see the Kinetix 5700 Servo Drives User Manual, publication [2198-UM002](#).

When using the Kinetix 5700 iTRAK power supply, you must use firmware revision 12.001 or later. If you are using a Kinetix 5700 iTRAK power supply at lower firmware revisions, contact [ICTSupport@ra.rockwell.com](mailto:ICTSupport@ra.rockwell.com) for assistance and selection.

**Figure 24 - iTRAK Power Supply**



## Programmable Controllers

The iTRAK 5750 is designed to work with the programmable controllers that are shown in [Table 4](#).

**Table 4 - Compatible Controllers**

Platform	Controller	Compatible Firmware Revision
ControlLogix	5580	36.001 or later
CompactLogix	5380 <sup>(1)</sup>	36.001 or later
	5480	36.001 or later
GuardLogix	5580	36.001 or later
Compact GuardLogix	5380 <sup>(1)</sup>	36.001 or later

(1) The memory requirements and CPU utilization of typical iTRAK applications can reduce the possible catalog numbers available in these families. Work with Rockwell Automation application engineering to determine suitability.

## Typical Communication Configurations

The iTRAK 5750 system supports linear, Device Level Ring (ring or DLR), and star Ethernet topologies, by using ControlLogix, GuardLogix, CompactLogix, or Compact GuardLogix controllers and Stratix® Ethernet switch (where applicable).

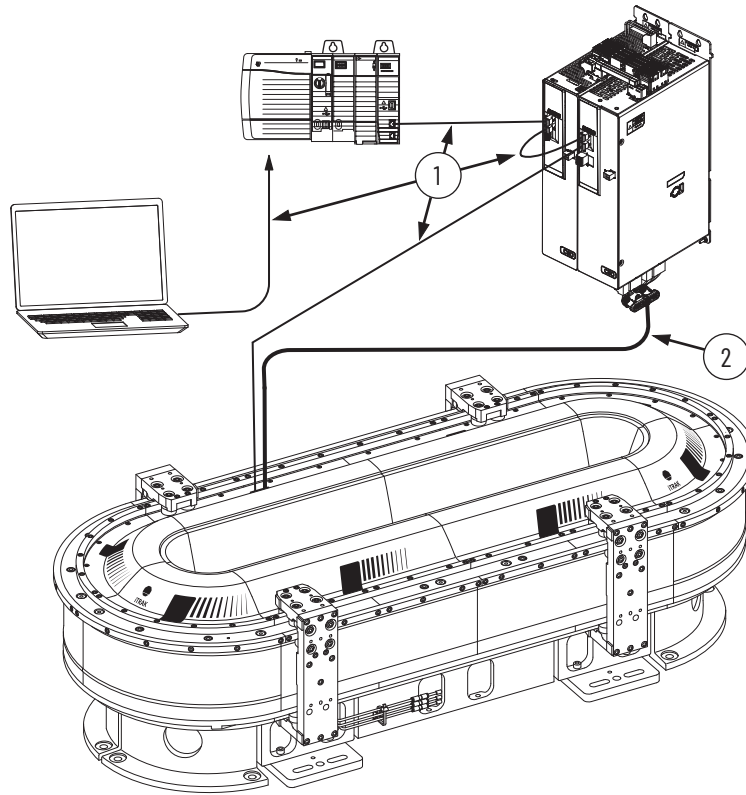
The power and control input connector module option with power and Ethernet connection ports provides ports for Ethernet network connections and contains rotary switches for defining a manual or dynamic IP address scheme that is used for your iTRAK 5750 system.

The iTRAK 5750 system supports 1 GB CIP communications. The bank master communicates the network speed to all other motor modules in the track. In the DLR topology only, port 2 of the last motor module independently negotiates Ethernet speed based on connection.

### Linear Topology

The iTRAK 5750 connector modules include dual-port connectivity, however, if any device becomes disconnected, all devices downstream of that device lose communication. The devices in this example are connected by using linear topology.

Figure 25 - iTRAK 5750 System Linear Communication Installation



Item	Description
1	Ethernet cable
2	Power cable

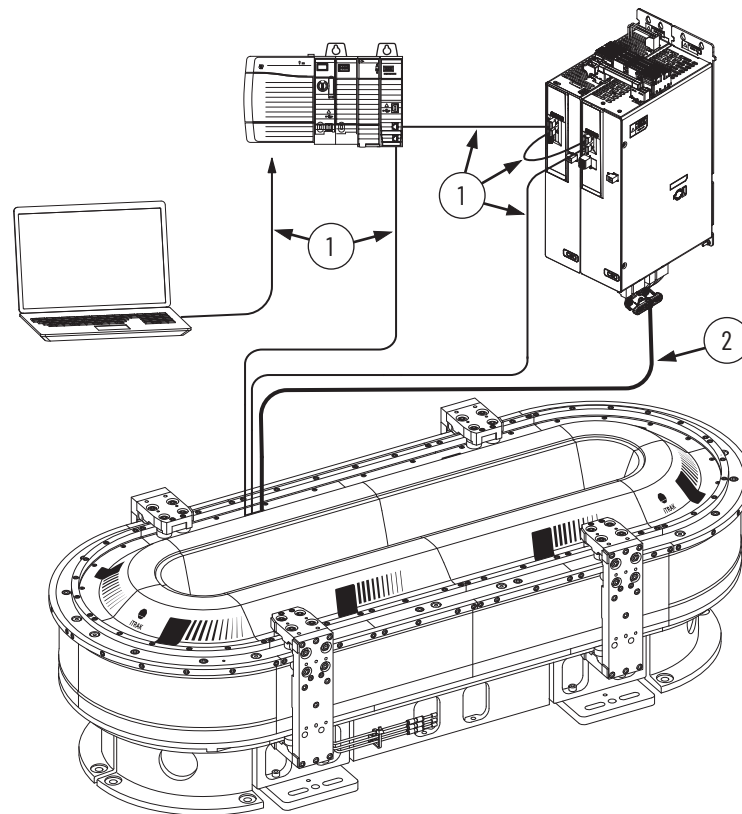
## Device Level Ring Topology

Device Level Ring (DLR) is an EtherNet/IP protocol that is defined by ODVA. DLR provides a means to detect, manage, and recover from single faults in a ring-based network. A DLR network includes the following types of ring nodes.

Node	Description
Ring supervisor	A ring supervisor provides these functions: <ul style="list-style-type: none"> <li>• Manages traffic on the DLR network</li> <li>• Collects diagnostic information for the network</li> </ul> A DLR network requires at least one node to be configured as ring supervisor. By default, the supervisor function is disabled on supervisor-capable devices.
Ring participants	Ring participants provide these functions: <ul style="list-style-type: none"> <li>• Process data that is transmitted over the network.</li> <li>• Pass on the data to the next node on the network.</li> <li>• Report fault locations to the active ring supervisor.</li> </ul> When a fault occurs on the DLR network, ring participants reconfigure themselves and relearn the network topology.
Redundant gateways (optional)	Redundant gateways are multiple switches that are connected to a DLR network and also connected together through the rest of the network. Redundant gateways provide DLR network resiliency to the rest of the network.

Depending on their firmware capabilities, both devices and switches can operate as supervisors or ring nodes on a DLR network. Only switches can operate as redundant gateways. For more information about DLR, see the EtherNet/IP Device Level Ring Application Technique, publication [ENET-AT007](#).

Figure 26 - iTRAK 5750 System Ring Communication Installation



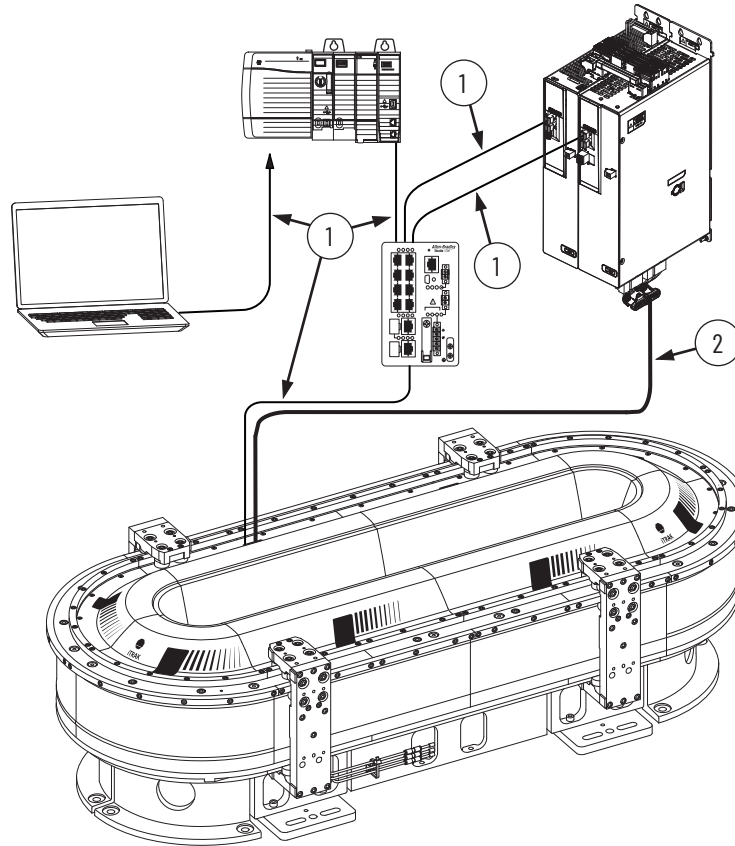
Item	Description
1	Ethernet cable
2	Power cable

## Star Topology

In a star topology, each device is connected directly to an Ethernet switch. In this example, the devices are connected by using star topology.

The iTRAK 5750 connector modules have dual ports, so linear topology is maintained from one module to another, but the iTRAK 5750 system and other devices operate independently. The loss of one device does not impact the operation of other devices.

Figure 27 - iTRAK 5750 System Star Communication Installation



Item	Description
1	Ethernet cable
2	Power cable



## Safety Information

Follow all safety information that is presented in this section while working with or near an iTRAK 5750 system.



**SHOCK HAZARD:** To avoid a shock hazard or personal injury, make sure that all power has been removed before proceeding. Complete lockout and tagout procedures to remove input power before servicing.

Before installation, read the [General Assembly Instructions](#). For applicable installations, before working with an iTRAK 5750 system or components, review the declaration of conformity and declaration of incorporation that are appropriate for your installation. All certification information, including the following declarations of conformity and declarations of incorporation can be viewed at: [rok.auto/certifications](http://rok.auto/certifications).

- EU:
  - EU Declaration of Conformity, Directive 2006/42/EC, publication [2198T-CT001](#)
  - 2198T Series iTRAK 5730/5750 System - CE Declaration of Incorporation, publication [2198T-CT008](#)
- UK:
  - UK Declaration of Conformity, Regulation 2008 No. 1597, publication [2198T-CT025](#)
  - 2198T Series iTRAK 5730/5750 System - UK Declaration of Incorporation, publication [2198T-CT021](#)

The iTRAK 5750 system is partially completed machinery. This machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the relevant provisions of the Machinery Directive or UK Supply of Machinery (Safety) Regulations.

### Risk Assessment

A risk assessment must be prepared for the installation of the machine, within its application conditions, and with the system components installed. As a result of the risk assessment, you must implement functions that monitor and provide for a higher-level measurement of personal safety. The safety regulations applicable to the installation of the machine must be considered. Unintended machine movements or other malfunctions are possible if safety devices are disabled, bypassed, or not activated.

### General Assembly Instructions

Follow these general assembly instructions during installation of your iTRAK 5750 system.

- When integrating the iTRAK 5750 system with tools and external machinery, see <https://motionanalyzer.rockwellautomation.com/Products/iTrak> for models and outline drawings.
- See the iTRAK 5750 System Technical Data, publication [2198T-TD004](#) for operational ratings. Do not exceed these ratings.
- The iTRAK 5750 system must only be used in the environment specified.
- See [Chapter 2 - Mechanical Installation on page 49](#), and the Kinetix 5700 iTRAK Power Supply and iTRAK Bus Conditioner Module Installation Instructions, publication [2198T-IN001](#), for system installation instructions.
- The system components have IP65 protection (IP66 with infield cover in place). However, you should minimize water exposure for the mover cam-follower wheels and track rails because water exposure causes these components to corrode over time.
- Track rails must be lubricated. See [Install the Lubrication System on page 71](#) for details.
- If necessary, additional precautions must be taken to help prevent excess lubrication from product contamination or external machinery.
- Power and data cables must be managed or located to help prevent trip hazards for machine operators.

- When you install tools on movers, consider that there can be high accelerations and forces, in particular when movers transition between straight and curved modules.
  - Consider the mass and center of gravity of the tools that are mounted to movers.
  - When you fasten tools and machinery to movers, use the two dowel pins, and four 5 mm (0.20 in.) screws. Make sure that the screws engage 8...16 mm (0.32...0.63 in.) of thread. Make sure that the screws are locked in place.
  - When you load movers with product, be sure that they are fastened securely for all anticipated forces and accelerations.
- Do not install ferromagnetic material near the movers. Maintain a minimum distance of 50 mm (2.0 in.) for any installed ferromagnetic material.
- Help prevent the risk of operator contact with parts that move by the use of guards and protective devices. See [Machine Guarding](#) for more information.
- Complete all installation instructions as directed in this manual. The National Electrical Code (NEC) and local codes outline provisions for safe installation of electrical equipment.



**ATTENTION:** A hazard of personal injury or equipment damage exists. An E-stop is not provided with the iTRAK 5750 System. Consult your national and local electrical codes and provide an E-stop if necessary.

- 
- Control systems must be designed and constructed in such a way as to help prevent hazardous situations from occurring. See [System Integrated Safety on page 189](#). Movers can fall when motor power is removed or servo control is disabled on vertical or stand-up iTRAK 5750 system installations.



**ATTENTION:** A hazard of equipment damage or personal injury exists. Movers can fall when motor power is removed or servo control is disabled on vertical or stand-up iTRAK 5750 system installations. Control systems must be designed and constructed in such a way as to help prevent hazardous situations from occurring. See [System Integrated Safety on page 189](#).

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## Machine Guarding

The movers, which contain application loads, can have high acceleration. The movers experience more acceleration in the curved sections of the track due to vector directional changes. Machine guards and safety enclosures must be implemented to offer protection to personnel. The shielding and enclosure must be designed to help protect against tangential projectiles along the system perimeter.

## Avoid Accidents, Injury, and Property Damage

Follow these guidelines to help avoid accidents, injury, and property damage:

- Mount emergency stop switches in the immediate reach of the operator.
- Keep free and clear of the range of motion of the machine and the parts that move. Help prevent personnel from accidentally entering the range of motion by using:
  - Safety fences
  - Protective coverings
  - Safety guards
- Safety fences and protective coverings must be strong enough to resist the maximum kinetic energy of the system. See [Machine Guarding on page 42](#).
- Light barriers are not recommended without a detailed risk assessment, due to the high kinetic energy of the movers.
- Avoid the operation of high-frequency, remote control, and radio equipment near system electronics and the power supply cables. If the use of a high-frequency, remote control, or radio device is necessary, check that the device does not interfere or cause malfunctions in the machine operation. We recommend performing an electromagnetic compatibility test before putting the system into service.
- Electrostatic discharge (ESD) prevention measures are necessary to avoid electrostatic discharge to the system. Avoid electrostatic discharge when operating and maintaining the system by taking proper precautions.

## Remove Power from the iTRAK 5750 System

1. Stop the motion of all movers.
2. If your system uses a vertical or stand-up mounting orientation (see [Figure 1 on page 12](#)), then when power is removed, any movers that are on the non-horizontal parts of the track fall. Take this into consideration in your application design. To help prevent movers from falling, there are multiple actions that you can take before removing power:
  - For vertical orientations: You may be able to move all movers to horizontal parts of the track where they will not fall when power is removed.
  - For stand-up orientations: Move all movers so that they are grouped at the lowest point in the track. Make sure the highest mover on each side of the group is at the same height as the other, so that they are in equilibrium and will not move when power is removed.
  - For vertical or stand-up orientations: Mechanically secure the movers that are on non-horizontal parts of the track using an external brake, arrester, or clamp mechanism; use protective equipment such as heat protective gloves to avoid burn hazards while installing the mover securing mechanisms. See [Protection Against Contact with Hot Parts on page 44](#).
3. Remove mains input power from the system.
4. Remove 24V DC control power from the system.
5. Before proceeding with installation or maintenance tasks, wait at least 5 minutes to avoid electric shock hazard, and whatever time is necessary for the system to cool to avoid burn hazard. Cooling can take up to 140 minutes.

## Avoid Electrical Shock



**SHOCK HAZARD:** To avoid a shock hazard or personal injury, verify that all power has been removed before proceeding with installation or maintenance tasks. The motor modules and Kinetix 5700 iTRAK power supply require 5 minutes to discharge before you handle wire and cable connections.

## Protection Against Contact with Hot Parts



**BURN HAZARD:** A burn hazard exists. Some components of the system have hot surfaces. To avoid personal injury, do not touch hot surfaces as indicated by a burn hazard label.

Temperatures of the motor-module stator covers can be higher than 60° C (140° F) during or after operation. After you remove power from the iTRAK 5750 system, motor modules can require up to 140 minutes to cool. Let the motor modules cool before you touch or service the system.

One exception to the rule to wait for cooling before touching the system is when removing power to a vertical or stand-up system. In this situation, you may want to install mechanical securing mechanisms onto the movers on the non-horizontal parts of the track before removing power, to help prevent them from falling when power is removed. Therefore, the system is still powered and hot while installing the mechanical securing mechanisms. To help prevent burns, use heat protective gloves and any other necessary protective equipment while installing the mechanical securing mechanisms. Also follow these precautions when removing the mechanical securing mechanisms, because power is on and the motors are producing heat during the removal of the mover securing mechanisms.

## Protection Against Magnetic and Electromagnetic Fields

The following components pose a danger to persons with heart pacemakers, metal implants, and hearing aids:

- motor modules, when in use
- mover magnets



**ATTENTION:** The mover uses strong magnets. There is a risk of health hazard for persons with heart pacemakers, metal implants, and hearing aids while in proximity of magnetic components and the magnetic field produced by components. The magnetic field that is generated can disrupt the functionality of an automatic implantable cardioverter defibrillator (AICD). People with cardiac pacemakers must not work near the iTRAK 5750 system.



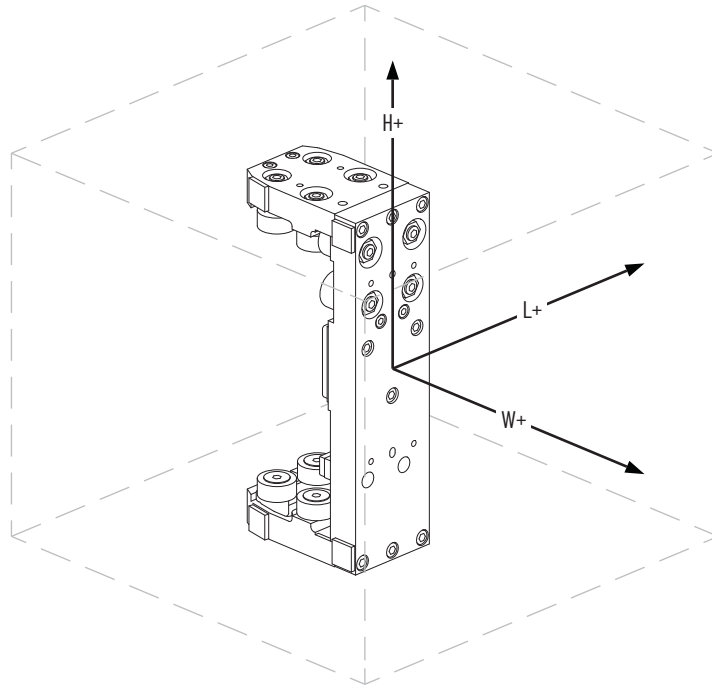
**ATTENTION:** A pinch point hazard exists while installing a mover. A mover can have sudden and fast motion due to magnetic attraction. To avoid personal injury, do not put your fingers between the mover and the motor module.

## Magnetic Field Strength

The iTRAK 5750 system movers contain components with strong magnetic fields. The motor modules also produce magnetic fields while movers are being commanded. This section provides the strength of the magnetic field for an uninstalled mover, an installed and enabled mover, and an uninstalled position magnet.

When motion is present on the system, the magnetic field does not exceed 0.05 mT at 500 mm (19.7 in.) in any direction from the track. Ferrous metals can influence the magnetic field direction and strength. For the most accurate data, measure the magnetic field strength on a track that is installed in its final configuration.

**Figure 28 - Mover Magnetic Field Orientation**



[Table 5](#) lists the distances from the center point of an uninstalled mover at which certain levels of magnetic field strength are found. Maintain these minimum distances to avoid interaction with the specified level of magnetic field strength. Distances are rounded to the nearest 10 mm (0.4 in.)

**Table 5 - Magnetic Field Strength of an Uninstalled Mover**

Cat. No.	Magnetic Strength											
	0.05 mT				0.1 mT				0.5 mT			
	L(+/-) mm (in.)	W+ mm (in.)	W- mm (in.)	H(+/-) mm (in.)	L(+/-) mm (in.)	W+ mm (in.)	W- mm (in.)	H(+/-) mm (in.)	L(+/-) mm (in.)	W+ mm (in.)	W- mm (in.)	H(+/-) mm (in.)
2198T-VT0505-F 50 mm (1.97 in.) long, 50 mm (1.97 in.) wide	120 (4.7)	160 (6.3)	150 (5.9)	140 (5.5)	90 (3.5)	100 (4.0)	140 (5.5)	120 (4.7)	60 (2.4)	40 (1.6)	100 (4.0)	60 (2.4)
2198T-VT1005-F 100 mm (3.94 in.) long, 50 mm (1.97 in.) wide	340 (13.4)	100 (4.0)	150 (5.9)	100 (4.0)	220 (8.7)	50 (2.0)	110 (4.3)	10 (.40)	80 (3.1)	NA	40 (1.6)	NA
2198T-VT0510-F 50 mm (1.97 in.) long, 100 mm (3.94 in.) wide	200 (7.9)	170 (6.7)	110 (4.3)	250 (9.8)	170 (6.7)	120 (4.7)	100 (4.0)	180 (7.1)	70 (2.8)	50 (2.0)	70 (2.8)	100 (4.0)
2198T-VT1010-F 100 mm (3.94 in.) long, 100 mm (3.94 in.) wide	400 (15.7)	100 (4.0)	170 (6.7)	110 (4.3)	300 (11.8)	20 (.80)	100 (4.0)	60 (2.4)	60 (2.4)	NA	60 (2.4)	40 (1.6)

Table 6 lists the distances from the center point of an installed mover at which certain levels of magnetic field strength are found. Maintain these minimum distances to avoid interaction with the specified level of magnetic field strength. Distances are rounded to the nearest 10 mm (0.4 in.)

Table 6 - Magnetic Field Strength of an Installed Mover, Enabled at Zero Speed

Cat. No.	Magnetic Strength								
	0.05 mT			0.1 mT			0.5 mT		
	L(+/-)	W+	H(+/-)	L(+/-)	W+	H(+/-)	L(+/-)	W+	H(+/-)
2198T-VT0505-F 50 mm (1.97 in.) long, 50 mm (1.97 in.) wide	150 (5.9)	140 (5.5)	160 (6.3)	80 (3.1)	90 (3.5)	100 (4.0)	50 (2.0)	70 (2.8)	40 (1.6)
2198T-VT1005-F 100 mm (3.94 in.) long, 50 mm (1.97 in.) wide	140 (5.5)	20 (.80)	150 (5.9)	90 (3.5)	5 (.20)	NA	70 (2.8)	NA	NA
2198T-VT0510-F 50 mm (1.97 in.) long, 100 mm (3.94 in.) wide	170 (6.7)	240 (9.4)	210 (8.3)	130 (5.1)	130 (5.1)	180 (7.1)	70 (2.8)	40 (1.6)	90 (3.5)
2198T-VT1010-F 100 mm (3.94 in.) long, 100 mm (3.94 in.) wide	140 (5.5)	80 (3.1)	180 (7.1)	100 (4.0)	40 (1.6)	60 (2.4)	70 (2.8)	20 (.80)	NA

Figure 29 - Position Magnet Field Orientation

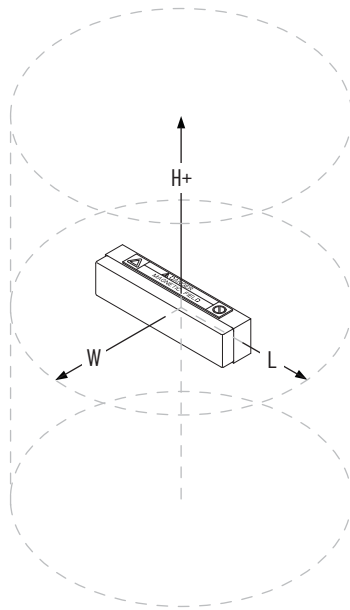


Table 7 lists the magnetic field strength at distances from the center point of an uninstalled position magnet. Maintain these minimum distances to avoid interaction with the magnetic field.

Table 7 - Magnetic Field Strength of an Uninstalled Position Magnet

Cat. No.	Magnetic Strength								
	0.05 mT			0.1 mT			0.5 mT		
	L mm (in.)	W mm (in.)	H (+/-) mm (in.)	L mm (in.)	W mm (in.)	H (+/-) mm (in.)	L mm (in.)	W mm (in.)	H (+/-) mm (in.)
2198T-N1-5750, 2198T-NN-5750	75 (3)	52 (2)	29 (1.1)	58 (2.3)	42 (1.7)	25 (1)	33 (1.3)	26 (1)	16 (0.6)

## Safe Magnet Handling



**ATTENTION:** The strong magnets on the mover can attract metal objects that are in its proximity. When you handle and install movers with motor magnetic plates, maintain a distance between the mover and ferrous metal mounting surfaces or structures.

Maintenance personnel must avoid the use of metallic tools and secure items such as badge clips and other personal effects that could be attracted to the strong magnetic field.

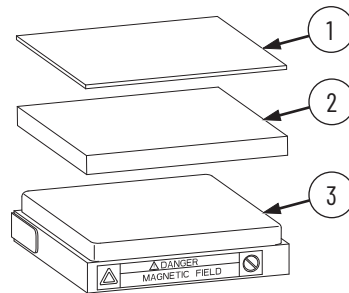
Strong magnets can erase magnetic media. Never let credit cards or electronic media contact or get near the mover and motor magnet or iTRAK 5750 system.

- The track creates strong magnetic fields while energized during operation.
- Persons with heart pacemakers, metal implants, or hearing aids must not enter these places:
  - Areas where the iTRAK 5750 system components are mounted, commissioned, and operated.
  - Areas where strong magnets are stored, repaired, or mounted.

## Mover Motor Magnet Plate Keeper

Exposed or uninstalled magnet plates, whether they are mounted to a mover or free-standing, must have a keeper that covers the entire magnet face. The keeper must consist of 5...10 mm (0.2...0.4 in.) wood or cardboard over the magnet plate and a 0.5...1.5 mm (0.02...0.06 in.) thick ferrous sheet metal over the wood or cardboard.

**Figure 30 - Magnet Plate Keeper**



Item	Description
1	Ferrous sheet metal
2	Wood or cardboard
3	Magnet plate

Magnet plates that are covered with a keeper are fairly safe to handle. They must be kept at least 305 mm (12 in.) away from other magnet plates and other ferrous metal parts such as hardware and tools.

Magnet plates without keepers must be kept a minimum of 1 m (3.3 ft) away from other magnet plates and ferrous metal parts.

## CIP Security

CIP Security™ is a standard, open-source communication method that helps to provide a secure data transport across an EtherNet/IP network. It lets CIP-connected devices authenticate each other before transmitting and receiving data.

CIP Security uses the following security properties to help devices protect themselves from malicious communication:

- Device Identity and Authentication
- Data Integrity and Authentication
- Data Confidentiality

Rockwell Automation uses the following products to implement CIP Security:

- FactoryTalk® Services Platform, version 6.11 or later, with the following components enabled:
  - FactoryTalk Policy Manager
  - FactoryTalk System Services
- FactoryTalk Linx, version 6.11 or later
- Studio 5000® Design Environment, version 32.00.00 or later
- CIP Security-enabled Rockwell Automation® products, for example, the iTRAK 5750

For more information on CIP Security, including which products support CIP Security, see the CIP Security with Rockwell Automation Products Application Technique, publication [SECURE-AT001](#).

## Storage

If you must store the iTRAK 5750 system after you receive it, take the following precautions:

- Do not store the equipment outdoors.
- Do not store the equipment in a corrosive or humid environment.
- If opened, reseal and store the equipment in the shipping container.
- Store the equipment in a clean and dry location.



## Mechanical Installation

Use this chapter to install an iTRAK® 5750 track and lubrication system.

Topic	Page
Installation Safety	50
Installation Tools	51
Hardware Specifications	51
Unpack and Find the Weight of the Track	52
Prepare the Mounting Site or Structure	53
Plan Lubrication Segment Locations	54
Move a Track Section	55
Install an Oval Track	56
Install a Rectangle Track	61
Electrically Ground the Track	70
Install the Lubrication System	71

Consider the following when planning the location for your iTRAK 5750 installation:

- Overall finished assembly dimensions
- Future product expansion
- Alignment with other equipment
- Installation of safety guards
- System cable lengths
- Vibration free surfaces
- Operator access to iTRAK components and lubrication system



**ATTENTION:** Before you start the installation of the system, read the See [Safety Information on page 41](#) to reduce the risk of injury and property damage.



**WARNING:** Improper use of these components, failure to follow the safety instructions, tamper with the product, or disable the safety devices can result in property damage, injury, electric shock, or death.

## Installation Safety



**ATTENTION:** There is a risk of injury by improper handling. You can be injured by being crushed, cut, hit, or sheared while handling system components.

- Only qualified persons can work with components of the system or within their proximity.
- Observe the relevant statutory regulations of accident prevention.
- Use protective equipment such as hard hat, safety goggles, safety shoes, safety gloves while handling system.
- Proper transport, storage, mounting and installation, and care in operation and maintenance are prerequisites for optimal and safe operation of the system.
  - Use suitable equipment for mounting and transport.
  - Use proper tools and use special tools if specified.
  - Use hoist equipment and tools in the correct manner.
  - Avoid jamming and crushing by using safety measures.
  - Do not stand under loads.
- Follow the safety regulations and requirements of the country in which the system is operated.
- Only operate if the national Electromagnetic Compatibility (EMC) regulations for the application are met.
- In accordance with EMC requirements, the machine or installation manufacturer is responsible for compliance with the limit values as prescribed in the national regulations.

### General Handling Instructions

Rockwell Automation recommends that you follow these handling instructions for an assembled iTRAK 5750:

- Use properly rated equipment and hardware to lift and move the product.
- Qualified professionals must inspect all lifting equipment before it is used to move the product.
- All lifting cables or straps must meet or exceed the maximum weight capacity requirements.
- Wear appropriate personal protection equipment (PPE), including gloves, safety glasses, and safety shoes, when working with kit components and assembling the product.

## Installation Tools


[Table 8](#) provides a list of the tools that are required to assemble and install an iTRAK 5750 system.

**Table 8 - Installation Tools**





Tool	Details
#2 Phillips bit	Used to remove or install connector modules
2 mm Hex driver	Used for the M3 lube cover and the optional infield covers
4 mm Hex driver	Used for the M5 rail screws
5 mm Hex driver	Used for the M10 shoulder screws
6 mm Hex driver	Used for the M8 socket head cap screws
Rubber mallet	Used to install the 6 mm threaded alignment pin
M4 X 0.7 screw	Used to remove the 6 mm threaded alignment pin
Torque wrench	Used for a multiple steps. Can be electronic or manual, 2.25...6.8 N•m (20...60 lb•in).
Lint-free cloth	Used to clean system rail components
Isopropyl alcohol	Used to clean system rail components
Tools specific to the iTRAK 5750	See <a href="#">Accessory and Replacement Components of an iTRAK 5750 System on page 16</a> .

## Hardware Specifications

The assembly illustrations throughout this section may contain hardware specification tables (as shown here) that identify the following: sequence number (if necessary), type of fastener, fastener size, tool type and size, and final assembly torque.

Sequence Number	Fastener Type	Fastener Size	Final Assembly Torque	Tool Type and Size
1		M4 x 10 mm T20 or F - 6.4 mm (0.25 in.) 4.8 N•m (42 lb•in)		

Fastener Type			
	Hexagonal screw		Torx screw
	Hexagonal bolt		Phillips screw

Tool Type and Size	
Px	Phillips screwdriver/bit and size
Txx	Torx screwdriver/bit and size
xx mm	Hexagonal socket wrench/bit

## Unpack and Find the Weight of the Track

Use the following steps to find the weight of your track sections and the entire track. Track sections are parts of a track that were shipped separated from one another, and that need to be re-assembled to form the track.

1. Unpack the track or track sections within their crates so that the holes in the base of the track are accessible, and you can see how many motor modules are in each track section.
2. Calculate the following weight or weights using the appropriate equation in the following table:
  - If there are multiple track sections, calculate the weight of each track section.
  - Calculate the weight of the entire track. This can be done by using an equation in the following table, or by adding the weights of all track sections.

**IMPORTANT** The following equations provide the maximum weight of a track section or entire assembled track. Make sure that your hoist machinery is rated to lift the weight calculated for the track or track section that it is used to lift.

Track Shape	Motor Coil Width	Equation for Approximate Maximum Weight of Track Section or Entire Track <sup>(1) (2)</sup>
Oval	50 mm (1.97 in.)	(24.5 kg x [total number of straight motor modules in track section]) + (47.0 kg x [total number of 180° curves in track section]) = Weight of track section in kg
		(54.0 lb x [total number of straight motor modules in track section]) + (103.6 lb x [total number of 180° curves in track section]) = Weight of track section in lb
	100 mm (3.94 in.)	(29.5 kg x [total number of straight motor modules in track section]) + (55.0 kg x [total number of 180° curves in track section]) = Weight of track section in kg
		(65.0 lb x [total number of straight motor modules in track section]) + (121.3 lb x [total number of 180° curves in track section]) = Weight of track section in lb
Rectangle	50 mm (1.97 in.)	(26.0 kg x [total number of straight motor modules in track section]) + (23.0 kg x [total number of 90° curves in track section]) = Weight of track section in kg
		(57.3 lb x [total number of straight motor modules in track section]) + (50.7 lb x [total number of 90° curves in track section]) = Weight of track section in lb
	100 mm (3.94 in.)	(31.0 kg x [total number of straight motor modules in track section]) + (27.0 kg x [total number of 90° curves in track section]) = Weight of track section in kg
		(68.3 lb x [total number of straight motor modules in track section]) + (59.5 lb x [total number of 90° curves in track section]) = Weight of track section in lb

(1) Example calculation for the weight of an entire oval track with catalog number "2198T-F050-H008000...": This is an oval track using 50 mm coil motors, with each side of the oval being 800 mm (or two straight motor modules) long. Total weight of track = (24.5 kg x [2+2]) + (47 kg x 2) = 192 kg  
 (2) Example calculation for the weight of an entire rectangle track with catalog number "2198T-F100-H012008...": This is a rectangle track using 100 mm coil motors, with two sides of the rectangle being 1200 mm (or three straight motor modules) long each, and two sides of the rectangle being 800 mm (or two straight motor modules) long each. Total weight of track = (31 kg x [3+3+2+2]) + (27 kg x 4) = 418 kg

## Prepare the Mounting Site or Structure

### Applications that Require Subframe Mounting

The following combinations of track shape and mounting orientation require subframe mounting:

- oval track with stand-up mounting orientation
- rectangle track with vertical mounting orientation
- rectangle track with stand-up mounting orientation

In subframe mounting, you must first mount the track to a customer designed subframe in a horizontal orientation. Then lift the subframe into an upright position to achieve the final track mounting orientation

You can also use the subframe method for an oval track with vertical mounting orientation, but it is not required.

If you will use a subframe for mounting, make sure that the subframe meets the requirements of your application, considering the following:

- the weight of the entire track, which was calculated in [step 2 on page 52](#)
- any inertial forces involved in your application

### Mounting Surface Requirements

Make sure that the mounting surface or subframe is flat so that it can support the track evenly. An even mounting surface helps to keep the track free of mechanical stress and distortion.

If you will mount the iTRAK track directly to the mounting surface, make sure that the mounting surface has a flatness of 0.05 mm per 300 x 300 mm (0.002 in. per 11.8 x 11.8 in.). For systems longer than 2400 mm (94.48 in.), we recommended that you use leveling feet between iTRAK mounting plates and the mounting surface. For example, Misumi Adjuster Feet - Resin Rubber Type, Misumi part number AJPDR16-100E.

### Mounting Plate Dimensions

See [Figure 35 on page 57](#) for oval track mounting plate dimensions.

See [Figure 38 on page 70](#) for rectangle track mounting plate dimensions.

## Plan Lubrication Segment Locations

Determine which of the straight sections of your track has a lubrication rail segment, which is a rail segment with a lubrication tube connected to the rail. There could be one or two straight sections with lubrication rail segments. These sections can be identified by the quick connect lubrication connectors on the outside of the track, shown in [Figure 41 on page 72](#). Take the lubrication segment location or locations into consideration when planning which side of your track will face in which direction.

It is important to know where the lubrication straight sections are if you are using any of the following combinations of track shape and mounting orientation:

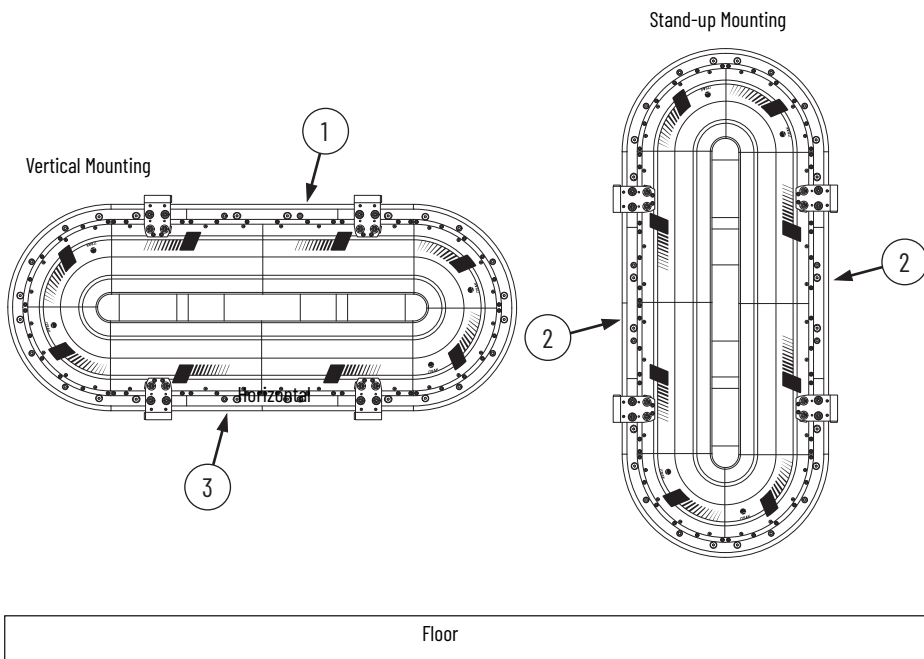
- oval track with vertical mounting orientation
- rectangle track with vertical mounting orientation
- rectangle track with stand-up mounting orientation

If any of these combinations of track shape and mounting orientation apply to your system, the lubrication straight sections must not be on the bottom straight section of the track. The lubrication straight sections must be either a vertical straight section, or the top horizontal straight section.

**IMPORTANT**

If the lubrication straight sections were to be used as the bottom horizontal straight section, lubricant would drip away before movers could spread it on the rails. Therefore, the rails and movers would not be lubricated and would be damaged as a result.

Figure 31 - Lubrication Rail Segment Location in Vertical or Stand-up Mounting



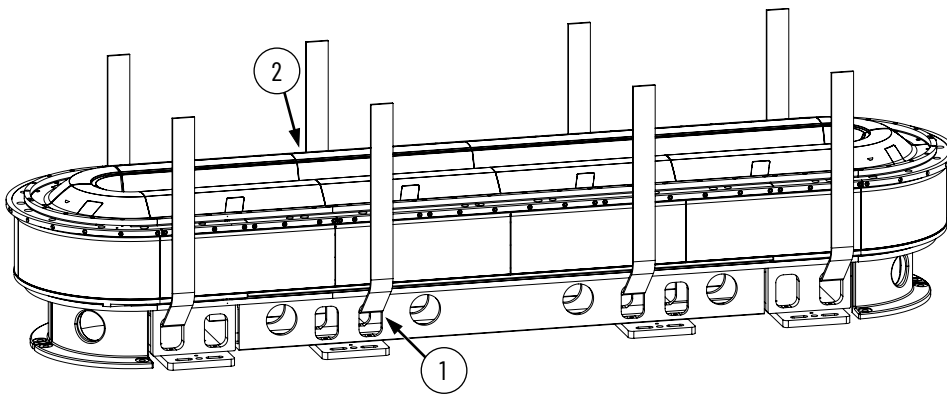
Item	Description
1	Top horizontal straight section: acceptable location for a lubrication rail segment
2	Vertical straight section: acceptable location for a lubrication rail segment
3	Bottom horizontal straight section: unacceptable location for a lubrication rail segment. Do not have a lubrication rail segment in this location.

## Move a Track Section

Use the following steps to lift and transport a track or track section to the mounting location. Make sure that you have read and understood the information in [Installation Safety on page 50](#) before you proceed.

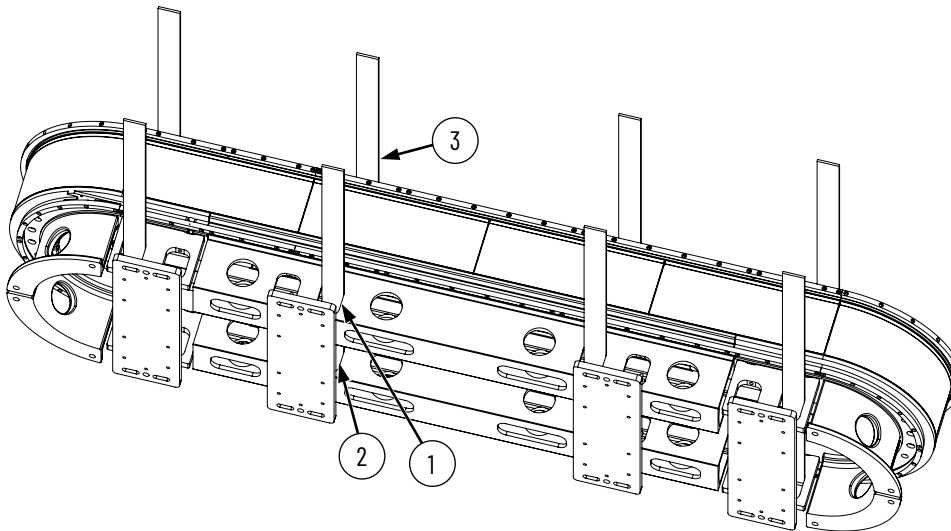
1. Route lifting straps through the rounded rectangular cutouts in the base of the track, and under and around the track so that the track is held in a "U" shape formed by the strap. Use the method shown that is appropriate for how you will first mount the track to the mounting surface or subframe, before the subframe (if used) is raised. Use one lifting strap per straight motor module length of track.
2. Secure the lifting straps to the hoist machinery.

Figure 32 - Strap Position for Mounting While In Horizontal Mounting Orientation



Item	Description
1	Strap is threaded through a rounded rectangular cutout on one side of the track.
2	Strap is routed under the track and is threaded through the corresponding rounded rectangular cutout on the other side of the track.

Figure 33 - Strap Position for Mounting While In Vertical Mounting Orientation (Oval Track Only)



Item	Description
1	Strap is threaded through a rounded rectangular cutout on one side of the track.
2	Strap is threaded through the corresponding rounded rectangular cutout on the other side of the track.
3	Strap is wrapped under and around the track.

3. Lift and transport the track section to the mounting location.
4. Proceed to the appropriate installation procedure for your track shape:
  - [Install an Oval Track on page 56](#)
  - [Install a Rectangle Track on page 61](#)

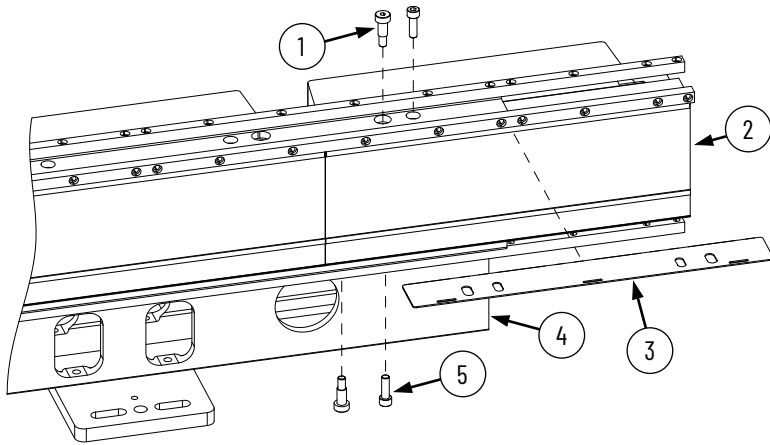
## Install an Oval Track

Use this procedure to assemble oval track sections into a whole track and mount the track, or mount a track that is already fully assembled.

1. If your track was shipped as a whole track, not divided into sections, skip to [step 2](#). If your track was shipped divided into multiple track sections, then continue with this step. At each track section end that has a motor module extending out beyond the end of the track base, remove the motor module as follows:

- a. Remove the top and bottom shoulder screws and socket head screws.

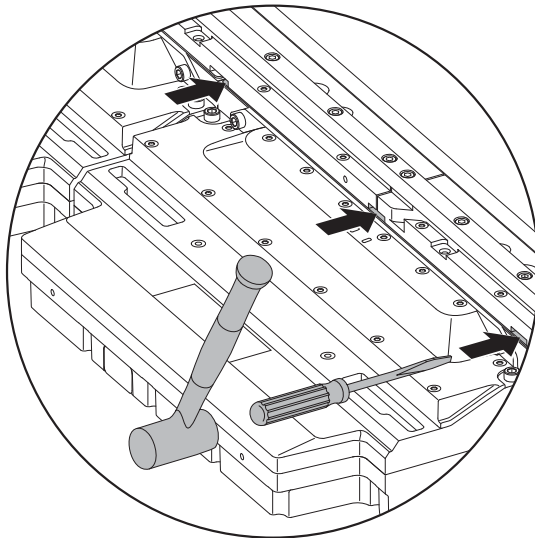
This drawing shows only one side of the track. This procedure must be completed on the other side of the track as well.



Item	Description
1	Shoulder screw, 10 mm x 16 mm x M8 x 1.25 mm (quantity 2)
2	Motor module that extends beyond the end of the track base
3	Motor module shim
4	Track base
5	Socket head cap screw, M8 x 25 mm (quantity 2)

- b. There is a shim between the straight motor module and the top plate. Use a flathead screwdriver and rubber mallet to push the shim towards the outside of the track via the shim access cutouts.

This drawing shows a shim being removed on a fully assembled track, but the same procedure applies to a motor module at the end of a track section.



- c. Remove the shim.
- d. Remove the motor module.



2. Using a lifting method described in [Move a Track Section on page 55](#), place the first track section, or entire track if it is already assembled, into its mounting position.
  - If you are mounting the track section in vertical position, continue lifting the track section using the lifting straps until all mounting hardware for the track section is installed in [step 3](#).

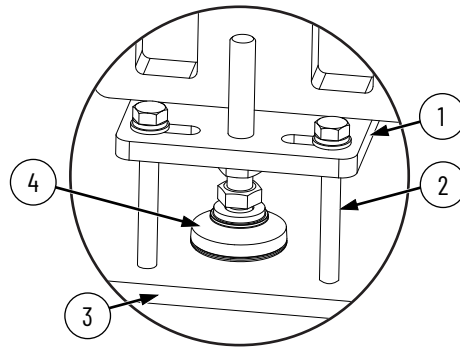


**ATTENTION:** When mounting a track section to the mounting surface while in vertical position, it is important to make sure all mounting hardware is installed before removing the lifting strap. Failure to do so could result in the track section falling off of the vertical mounting surface.

- If you are mounting the track section in horizontal position, leave the lifting straps in place until all mounting hardware for the track section is installed in [step 3](#), as you may need to adjust the position of the track section during mounting.
3. Mount the first track section by using the two M16 threaded holes and four slots on the ends of each mounting plate. See [Figure 34](#) through [Figure 36 on page 58](#).

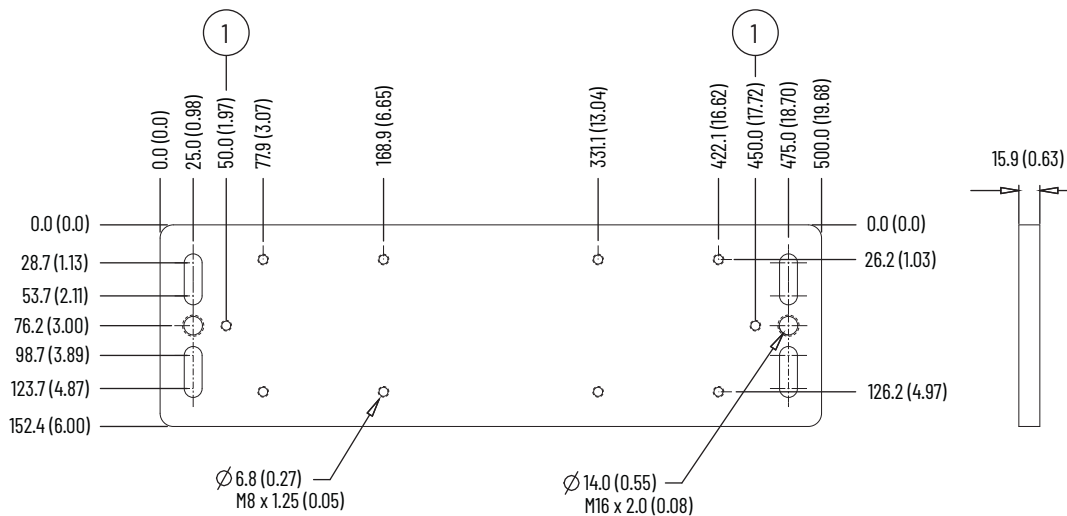
We recommend using two leveling feet at each mounting plate between the mounting plate and the mounting surface. For example, Misumi Adjuster Feet - Resin Rubber Type, Misumi part number AJPDR16-100E.

Figure 34 - Leveling Foot



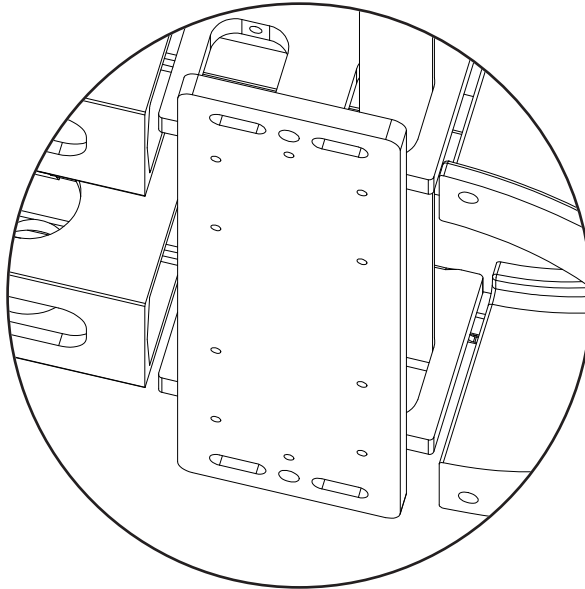
Item	Description
1	Mounting plate
2	M12 hold down screws, four per mounting plate
3	Mounting surface
4	Leveling foot, two per mounting plate

Figure 35 - Oval Track Mounting Plate Dimensions in mm (in.)



Item	Description
1	Hole for wire that is used to ground the track

Figure 36 - Oval Track Mounting Plate Installed on Bottom of Track

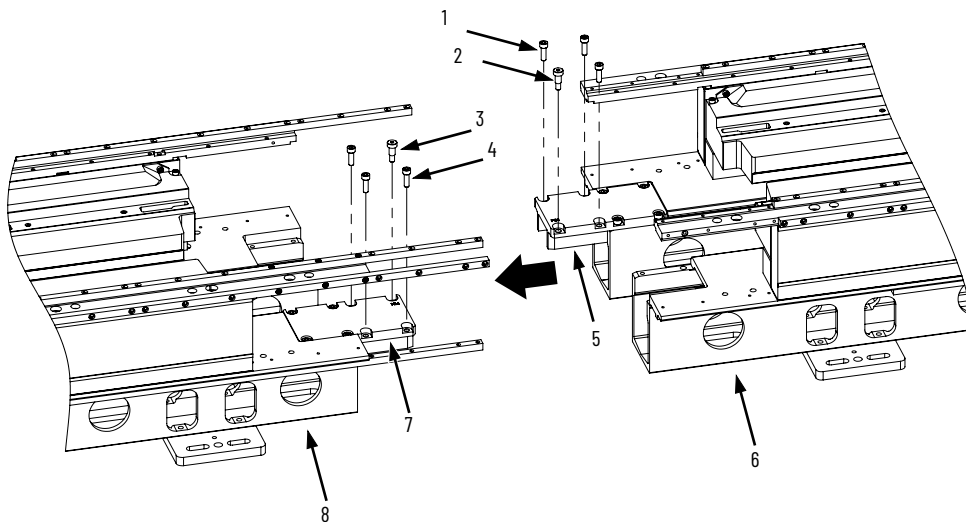


4. Once the track section is securely mounted, remove the lifting straps.
5. If your track was shipped as a fully assembled track, skip to [Electrically Ground the Track on page 70](#). If your track was shipped in multiple sections, continue with [step 6](#).

6. Add another track section onto the track using [step a](#) through [step o](#).
  - a. For any screws that are installed in the following steps, apply Loctite 243 to the screw before installing it.
  - b. Use one of the lifting methods shown in [Move a Track Section on page 55](#) to transport the additional track section to the location where the first track section has been mounted.
  - c. While the additional track section is still in the lifting straps, slide the additional track section into fully seated contact with the track section that is already mounted.

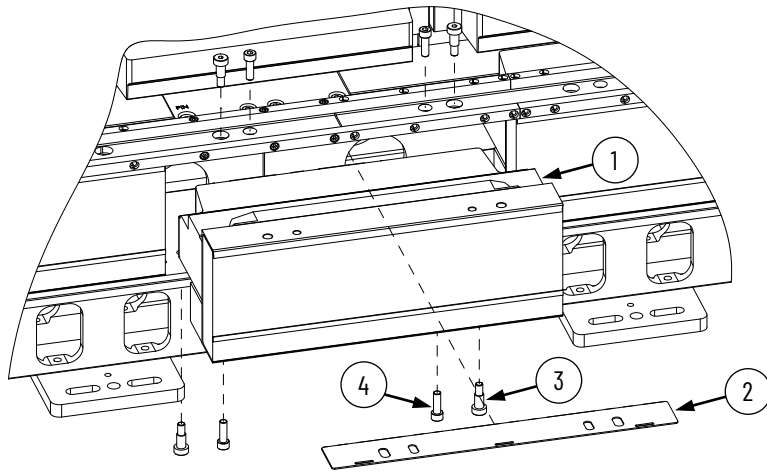
**IMPORTANT** When you slide the sections together, take care not to bend or distort the projecting rails. The joiner plates are chamfered to facilitate sliding the two sections together.

- d. Loosely connect the mounted track section joiner plate to the additional track section base extrusion with the M8 screws.
- e. Loosely connect the additional track section joiner plate to the mounted track section base extrusion with the M8 screws.
- f. Insert the two M10 shoulder screws, one per joiner plate.
- g. Adjust the position of the additional track section so that the two M10 shoulder screws align the joiner plates to the base extrusions.
- h. Tighten the M8 screws and M10 shoulder screws to 22 N•m (16.2 lb•ft).



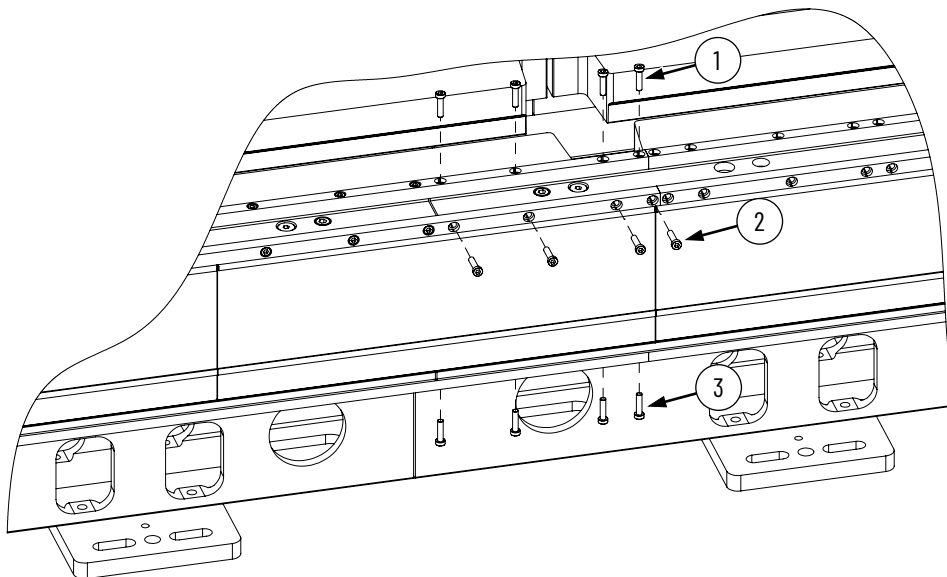
Item	Description
1	M8 screws for connecting the additional track section joiner plate to the mounted track section base extrusion (quantity 3)
2	M10 shoulder screw for aligning the additional track section joiner plate to the mounted track section base extrusion (quantity 1)
3	M10 shoulder screw for aligning the mounted track section joiner plate to the additional track section base extrusion (quantity 1)
4	M8 screws for connecting the mounted track section joiner plate to the additional track section base extrusion (quantity 3)
5	Additional track section joiner plate
6	Additional track section
7	Mounted track section joiner plate
8	Mounted track section (mounting hardware not shown)

- i. Two straight motor modules and their shims were removed from the track section joining location in [step 1](#). Reinstall both of the motor modules and shims using [step j](#) through [step l](#).
- j. Place the motor module and shim into place.
- k. Install the M10 shoulder screws that attach the module to the top and bottom plate, and tighten to 22 N•m (16.2 lb•ft).
- l. Install the M8 socket head cap screws that attach the module to the top and bottom plate, and tighten to 22 N•m (16.2 lb•ft).



Item	Description
1	Straight motor module
2	Straight motor module shim
3	Shoulder screws, shoulder Ø10 mm, shoulder length 20 mm, thread M8 x 25 mm (quantity 4)
4	M8 x 25 mm socket head cap screws (quantity 4)

- m. The mounted track section rail ends that connect to the additional track section had the last four M5 screws of each rail end removed before shipment. Align the rail joints and install the four screws for each rail end, tightened to 9 N•m (6.6 lb•ft). Follow the instructions in the following sections:
  - [Replace a Straight Segment of the Top or Bottom Rail on page 164](#)
  - [Replace a Straight Segment of the Middle Rail on page 174](#)



Item	Description
1	Top rail segment four end screws, M5 x 0.8 x 20 mm low head cap socket screw
2	Middle rail segment four end screws, M5 x 0.8 x 20 mm low head cap socket screw
3	Bottom rail segment four end screws, M5 x 0.8 x 20 mm low head cap socket screw

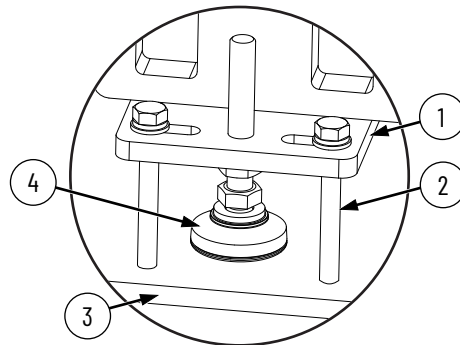
- n. Mount the additional track section using the method in [step 3](#) on [page 57](#).
- o. Once the track section is securely mounted, remove the lifting straps.
- 7. Repeat [step 6](#) for each additional track section.
- 8. Proceed to [Electrically Ground the Track on page 70](#).

## Install a Rectangle Track

Use this procedure to assemble rectangle track sections into a whole track and mount the track.

1. We recommend using two leveling feet at each mounting plate between the mounting plate and the mounting surface. For example, Misumi Adjuster Feet - Resin Rubber Type, Misumi part number AJPDR16-100E. Leveling feet are installed into the two M16 threaded holes on the ends of the mounting plate. If you are going to use leveling feet, install them on all of the mounting plates of all of the track sections before you place the track sections on the mounting surface. To install leveling feet on that track section, you may need to lift a track section using a lifting method in [Move a Track Section on page 55](#).

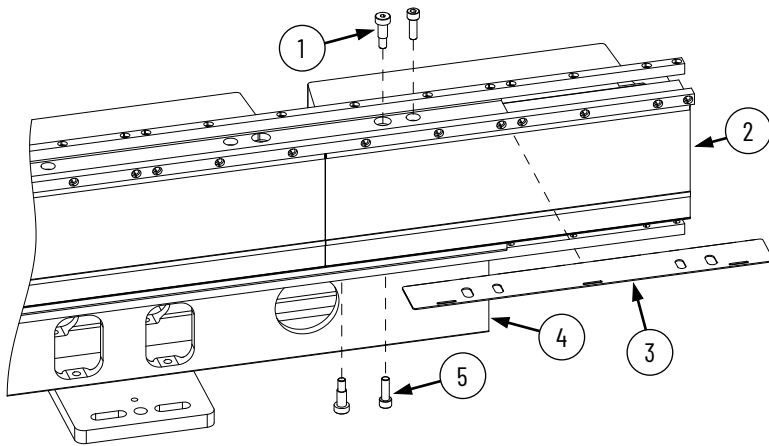
Figure 37 - Leveling Foot



Item	Description
1	Mounting plate
2	M12 hold down screws, four per mounting plate
3	Mounting surface
4	Leveling foot, two per mounting plate

2. Select a track section that contains a curve motor module to use as the first track section.
3. Place the first track section, or entire track if it is already assembled, into its mounting position using the horizontal lifting method in [Move a Track Section on page 55](#).
4. If your track was shipped as a fully assembled track, proceed to [step 14 on page 70](#). If your track was shipped in multiple sections, continue with [step 5](#).

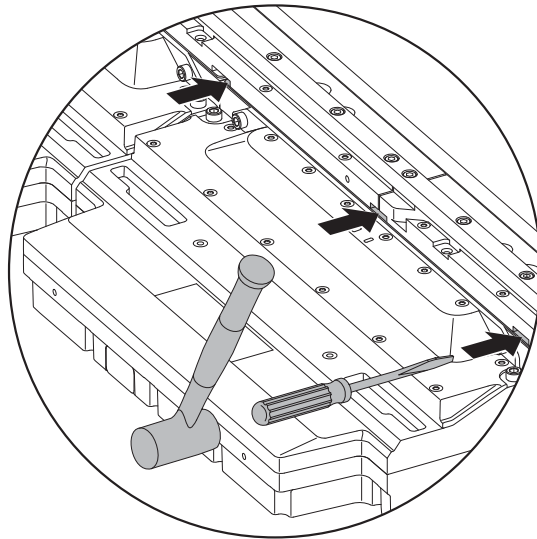
5. At each track section end that has a motor module extending out beyond the end of the track base, remove the motor module as follows:
  - a. Remove the top and bottom shoulder screws and socket head screws.



Item	Description
1	Shoulder screw, 10 mm x 16 mm x M8 x 1.25 mm (quantity 2)
2	Motor module that extends beyond the end of the track base
3	Motor module shim
4	Track base
5	Socket head cap screw, M8 x 25 mm (quantity 2)

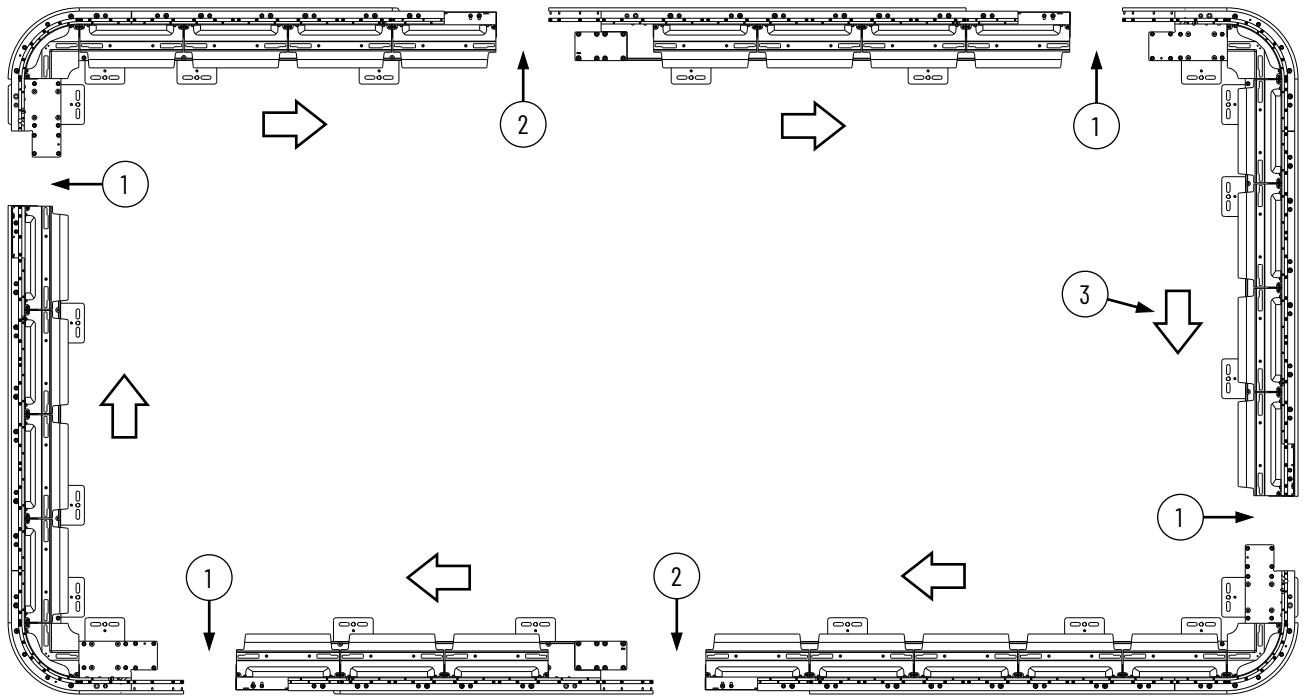
- b. There is a shim between the straight motor module and the top plate. Use a flathead screwdriver and rubber mallet via the shim access cutouts.

This drawing shows a shim being removed on a fully assembled track, but the same procedure applies to a motor module at the end of a track section.



- c. Remove the shim.
      - d. Remove the motor module.

6. Working your way around the track in a clockwise direction, join each additional track section to the last placed section, as follows:
- At each straight-motor-module-to-straight-motor-module joining, use the joining procedure in [step 7](#).
  - At each straight-motor-module-to-curve-motor-module joining, use the joining procedure in [step 8](#).

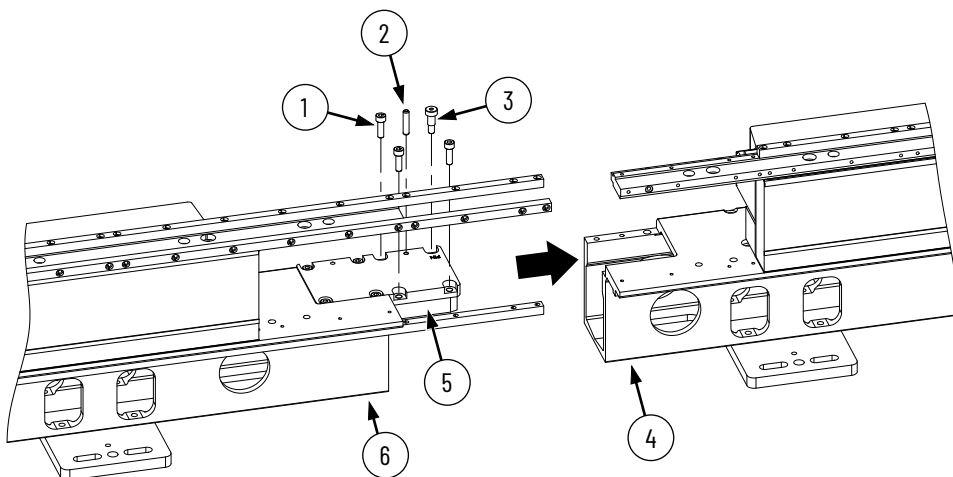


Item	Description
1	Straight-motor-module-to-curve-motor-module joining
2	Straight-motor-module-to-straight-motor-module joining
3	White arrows indicate the order to perform joinings. The order is to start with a corner section and proceed in a clockwise direction from a top view perspective.

7. Make a straight-motor-module-to-straight-motor-module joining using [step a](#) through [step n](#).
  - a. For any screws that are installed in the following substeps, apply Loctite 243 to the screw before installing it.
  - b. If you are using leveling feet, make sure that leveling feet are installed on the mounting plates of the additional track section, which is the track section that you are adding to the track.
  - c. Using the horizontal lifting method described in [Move a Track Section on page 55](#), transport the additional track section to the location where the already placed track section has been placed.
  - d. While the additional track section is still in the lifting straps, slide the additional track section into fully seated contact with the track section that is already placed.  
 In the following steps, the track section with the joiner plate is the additional section, but the additional section could be a section that does not have a joiner plate. In that situation, the placed section has a joiner plate.

**IMPORTANT** When you slide the sections together, take care not to bend or distort the projecting rails. The joiner plates are chamfered to facilitate sliding the two sections together.

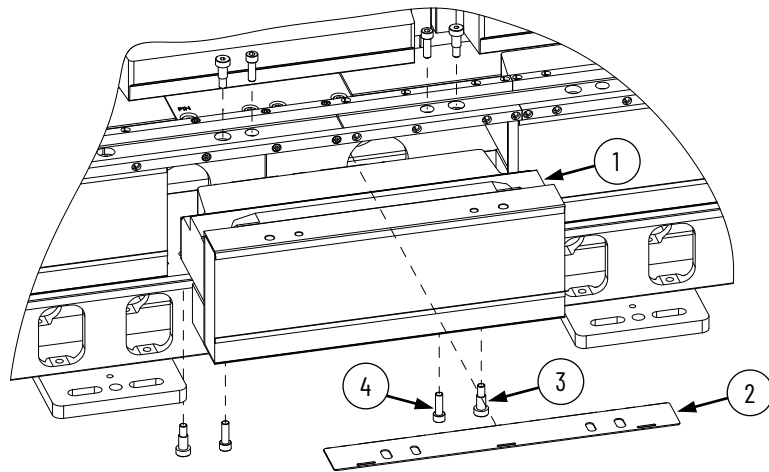
- e. Loosely connect the additional track section joiner plate to the placed track section base extrusion with the M8 screws.
- f. Loosely insert the 8 mm diameter dowel pin and M10 shoulder screw.
- g. Adjust the additional section to allow the shoulder screw and the dowel pin to align the additional section joiner plate to the placed section base extrusion.
- h. Fully insert the dowel pin.
- i. Torque the M8 screws and the M10 shoulder screw to 22 N•m (16.2 lb•ft).
- j. Remove the lifting straps from the additional section.



Item	Description
1	M8 screws for connecting the placed track section joiner plate to the additional track section base extrusion (quantity 3)
2	8 mm diameter dowel pin (quantity 1)
3	M10 shoulder screw for aligning the placed track section joiner plate to the additional track section base extrusion (quantity 1)
4	Placed track section
5	Additional track section joiner plate
6	Additional track section (mounting hardware not shown)

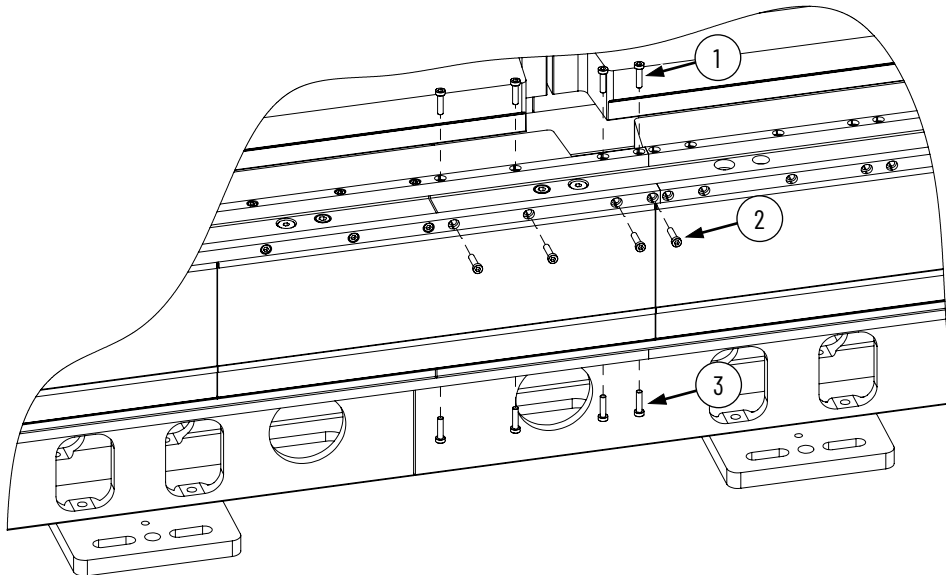


- k. Place the motor module and shim that were removed in [step 5](#), into place.
- l. Install the M10 shoulder screws that attach the module to the top and bottom plate, and tighten to 22 N•m (16.2 lb•ft).
- m. Install the M8 socket head cap screws that attach the module to the top and bottom plate, and tighten to 22 N•m (16.2 lb•ft).



Item	Description
1	Straight motor module
2	Straight motor module shim
3	Shoulder screw, 10 mm x 16 mm x M8 x 1.25 mm (quantity 4)
4	M8 x 25 mm socket head cap screws (quantity 4)

- n. At the reinstalled straight motor module, the last four M5 screws of each rail end were removed before shipment. At each rail end, align the rail joint and install the four screws, tightened to 9 N•m (6.6 lb•ft). Follow the instructions in the following sections:
  - [Replace a Straight Segment of the Top or Bottom Rail on page 164](#)
  - [Replace a Straight Segment of the Middle Rail on page 174](#)

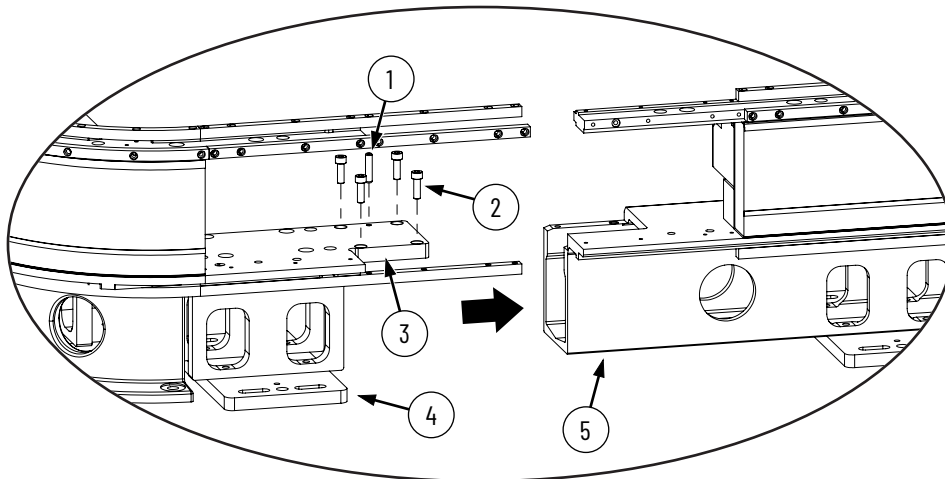


Item	Description
1	Top rail segment four end screws, M5 x 0.8 x 20 mm low head cap socket screw
2	Middle rail segment four end screws, M5 x 0.8 x 20 mm low head cap socket screw
3	Bottom rail segment four end screws, M5 x 0.8 x 20 mm low head cap socket screw

8. Make a straight-motor-module-to-curve-motor-module joining using [step a](#) through [step g](#).
  - a. For any screws that are installed in the following substeps, apply Loctite 243 to the screw before installing it.
  - b. If you are using leveling feet, make sure that leveling feet are installed on the mounting plates of the additional track section, which is the track section that you are adding to the track.
  - c. Using a lifting method described in [Move a Track Section on page 55](#), transport the additional track section to the location where the already placed track section has been placed.
  - d. While the additional track section is still in the lifting straps, slide the additional track section into fully seated contact with the track section that is already placed.  
 In the following steps, the track section with the joiner plate is the additional section, but the additional section could be a section that does not have a joiner plate. In that situation, the placed section has a joiner plate.

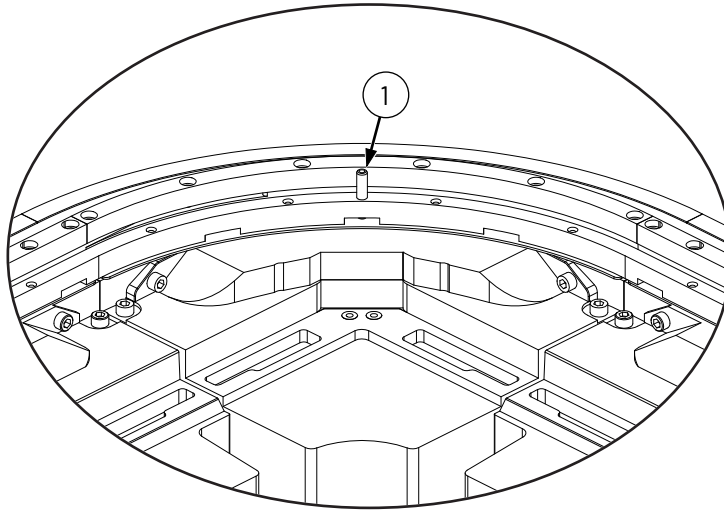
**IMPORTANT** When you slide the sections together, take care not to bend or distort the projecting rails. The joiner plates are chamfered to facilitate sliding the two sections together.

- e. Loosely install the M8 screws that connect the additional track section joiner plate to the placed track section base extrusion.
- f. Adjust the additional section to align the dowel pin holes in the additional section joiner plate and the placed section base extrusion.
- g. Install the 8 mm diameter dowel pin. Do not tighten the M8 screws now, they are tightened later in the procedure.



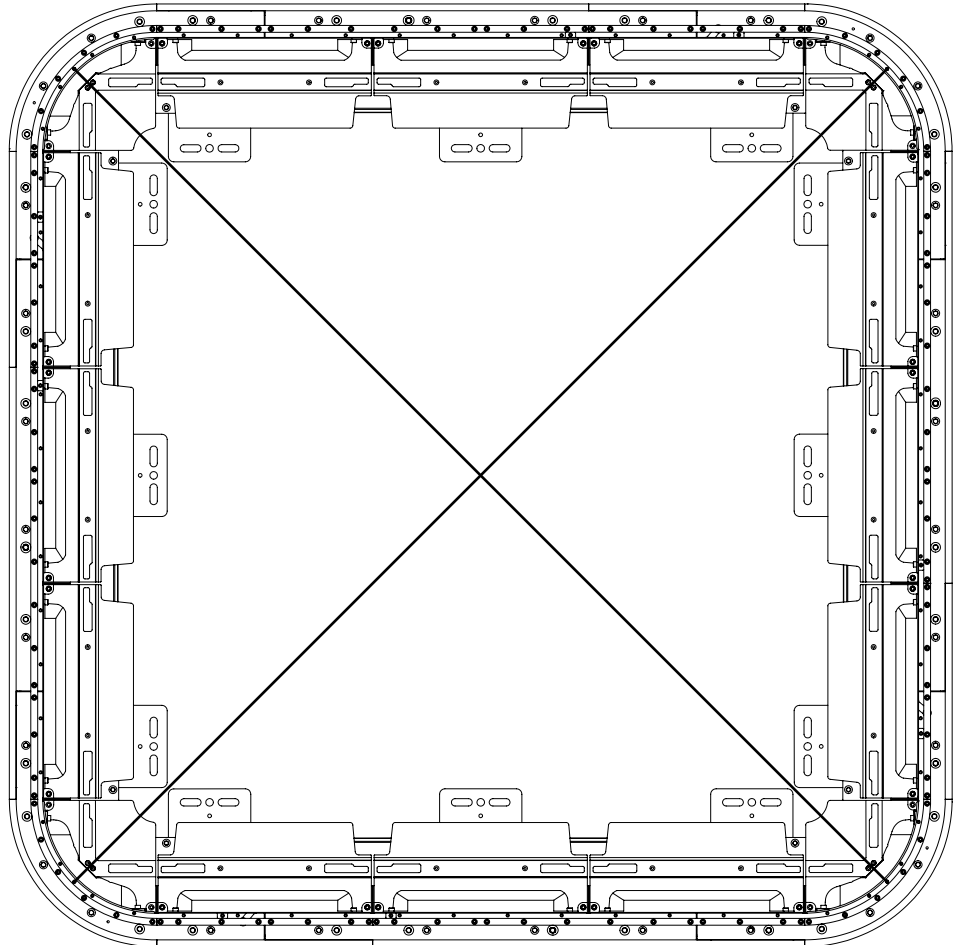
Item	Description
1	8 mm (0.31 in.) diameter dowel pin (quantity 1)
2	M8 screws for connecting the placed track section joiner plate to the additional track section base extrusion (quantity 4)
3	Additional track section joiner plate
4	Placed track section (mounting hardware not shown)
5	Additional track section

9. Once [step 7](#) has been performed at each straight-motor-module-to-straight-motor-module joining location, and [step 8](#) has been performed at each straight-motor-module-to-curve-motor-module joining location, use [step a](#) through [step c](#) to square the track.
  - a. Install a temporary 6 mm (0.24 in.) threaded dowel pin into the corner hole provided in each curve top plate.



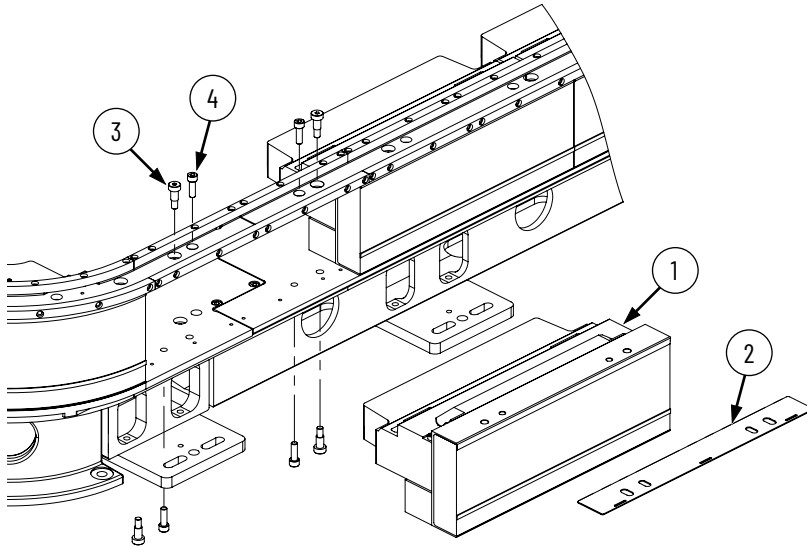
Item	Description
1	6 mm (0.24 in.) diameter threaded dowel pin (quantity 1 per corner of rectangle track, 4 per rectangle track)

- b. Measure the diagonal distances between the 6 mm dowel pins.
- c. If the difference between the diagonal distances is greater than 0.8 mm (0.03 in.), equalize these distances to within 0.8 mm (0.03 in.) by making adjustments to the alignment of the track sections. Once the distances are equalized, the track is square.



- 10. At all four corners of the track, tighten the M8 screws that were loosely installed in [step 8](#), substep [step e](#) to 22 N•m (16.2 lb•ft).
- 11. Remove the four 6 mm threaded dowel pins from the top plate curves.

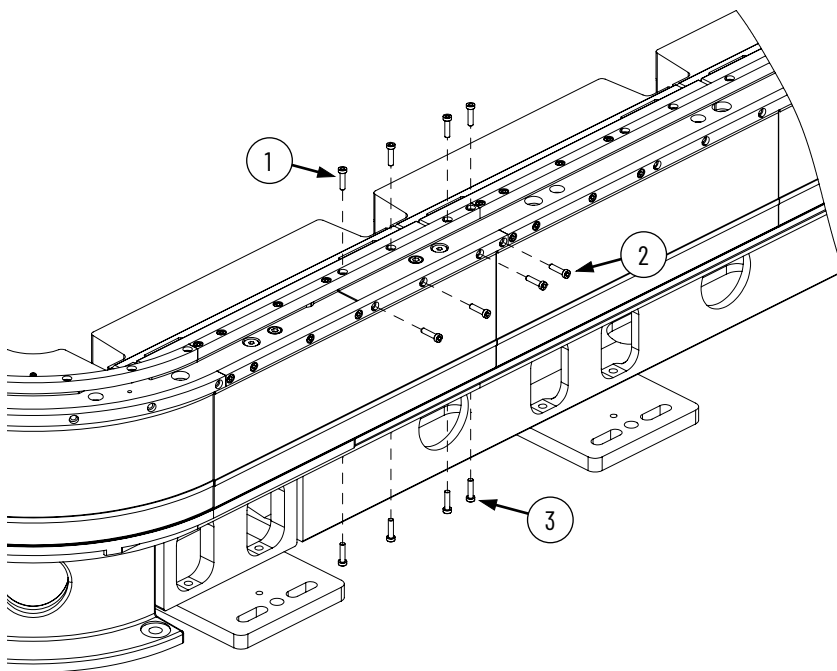
12. Next to each curve in the track, a straight motor module and motor shim were removed in [step 5](#). Reinstall each of the motor modules and shims using [step a](#) through [step c](#).
- Place the motor module and shim into place.
  - Install the M10 shoulder screws that attach the module to the top and bottom plate, and tighten to 22 N•m (16.2 lb•ft).
  - Install the M8 socket head cap screws that attach the module to the top and bottom plate, and tighten to 22 N•m (16.2 lb•ft).



Item	Description
1	Straight motor module
2	Straight motor module shim
3	Shoulder screws, shoulder Ø10 mm, shoulder length 20 mm, thread M8 x 25 mm (quantity 4)
4	M8 x 25 mm socket head cap screws (quantity 4)

13. At each of the straight motor modules that you installed in [step 12](#), the last four M5 screws of each rail end were removed before shipment. At each rail end, align the rail joint and install the four screws, tightened to 9 N•m (6.6 lb•ft). Follow the instructions in the following sections:

- [Replace a Straight Segment of the Top or Bottom Rail on page 164](#)
- [Replace a Straight Segment of the Middle Rail on page 174](#)



Item	Description
1	Top rail segment four end screws, M5 x 0.8 x 20 mm low head cap socket screw
2	Middle rail segment four end screws, M5 x 0.8 x 20 mm low head cap socket screw
3	Bottom rail segment four end screws, M5 x 0.8 x 20 mm low head cap socket screw

14. Mount all track sections in the track by using the four slots on the ends of each mounting plate. See [Figure 37 on page 61](#), [Figure 38](#), and [Figure 39 on page 70](#).

Figure 38 - Rectangle Track Mounting Plate Dimensions in mm (in.)

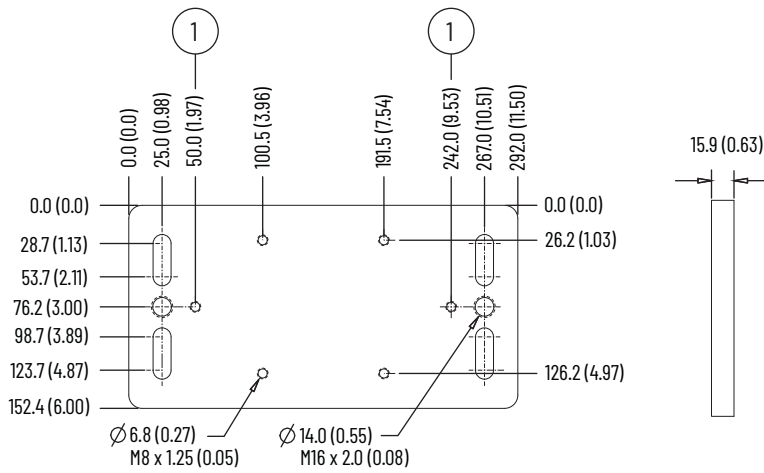
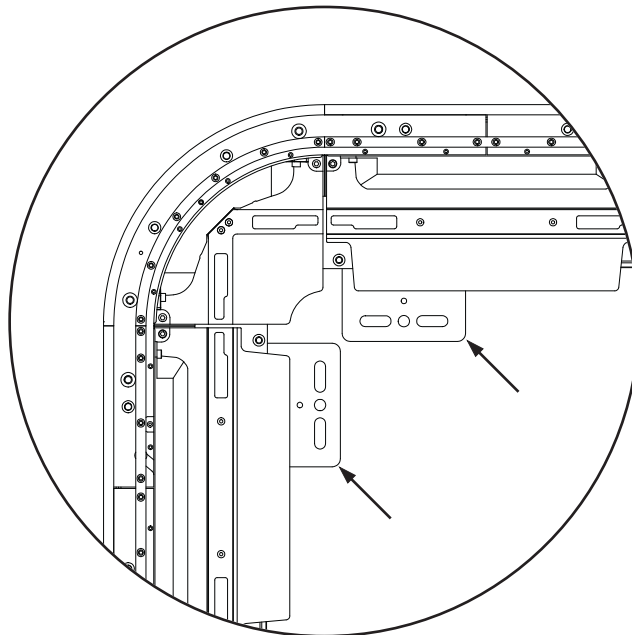


Figure 39 - Rectangle Track Mounting Plates Installed on Bottom of Track



15. Proceed to [Electrically Ground the Track](#).

## Electrically Ground the Track

Ground the track according to the following requirements. To reduce the effects of electromagnetic interference (EMI), the iTRAK 5750 system must be bonded to earth ground via system structure. If this does not provide a low impedance path, we recommend that you connect the structure to ground with a braided ground strap. Keep the braided ground strap as short as possible for optimum bonding. For best grounding practices, refer to the following publications:

- System Design for Control of Electrical Noise Reference Manual, publication [GMC-RM001](#)
- Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#)
- Servo Drive Installation Best Practices, publication [MOTION-AT004](#)

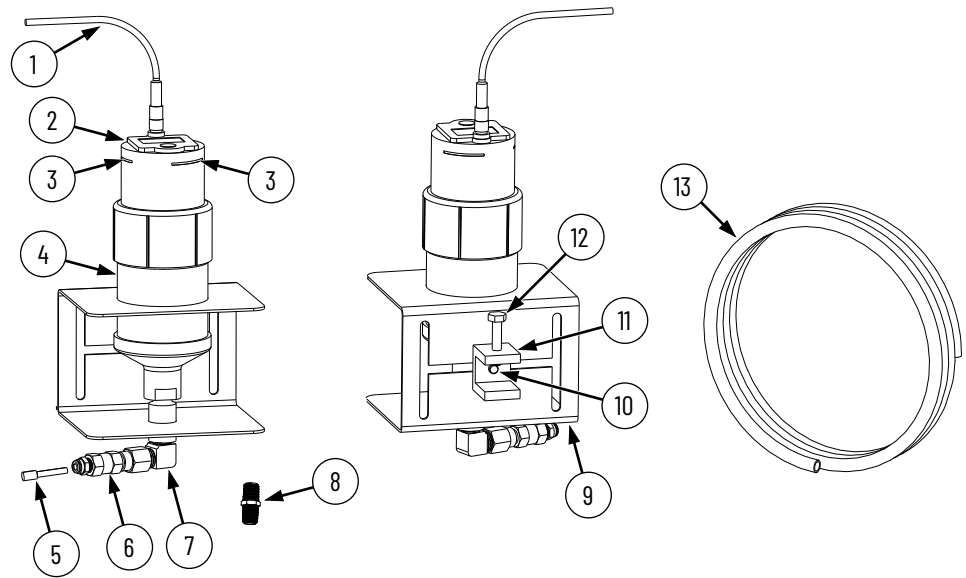
## Install the Lubrication System

The iTRAK lubrication system comes with a coil of tube to connect system fittings to the remotely located pumps and system fittings. Three pump assemblies are included in the system, one for the top rail, one for the middle rail, and one for the bottom rail. The assembled pumps have push-to-connect connectors with plugs. These plugs help prevent oil from leaking during shipment. Remove these plugs only immediately before you connect the tubes. The pump fittings contain a check valve to help prevent backflow when a replacement reservoir is installed.

The lubrication system is assembled with right angle fittings. Additional straight brass hex nipple fittings are provided to let you redirect pump tubing. If your system requires straight exit from the pump, use the supplied straight fittings to replace the right angle fittings. Use Teflon tape for the tapered NPT threads.

The reservoir uses a straight 1/4 BSP thread. A sealing washer is supplied.

**Figure 40 - Lubrication Pump, Mounting Hardware, and Connection Materials**



Item	Description	Item	Description
1	5 m (16.4 ft) Digital signal cable	8	Straight brass fitting <sup>(1)</sup>
2	Digitally activated pump	9	Mounting bracket
3	Pump status indicators	10	0.25-20 x 0.5 screw
4	Lubricant cartridge	11	Beam clamp
5	Plug	12	0.25-20 x 1.25 screw
6	Check valve	13	Lubrication tube
7	Brass elbow fitting		

(1) If your installation requires the tubing to exit the pumps vertically, you can replace the brass elbow fittings with the straight brass fittings that are supplied with the lubrication system.

### What You Need

7/16 in. open-end wrench

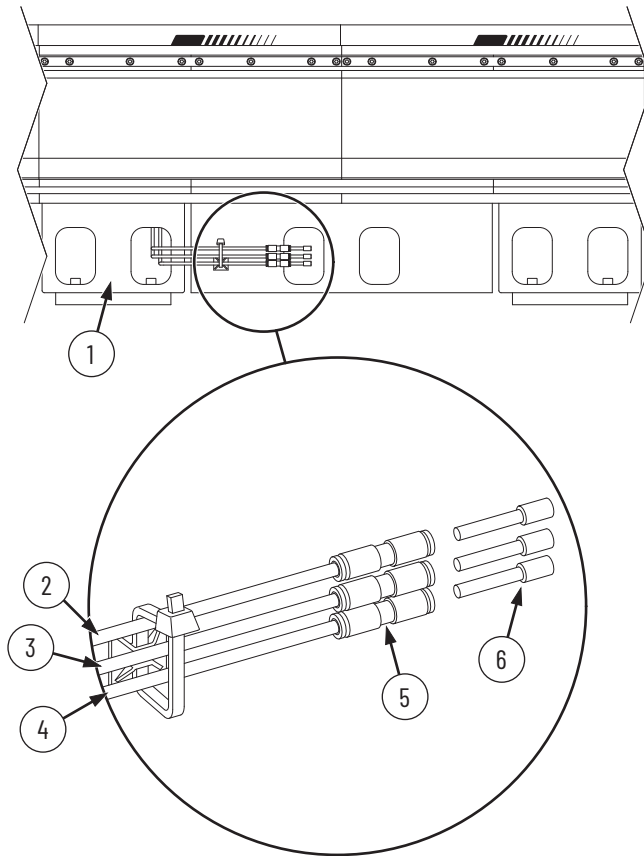
## Mount the Lubricator Pumps

To mount the lubricator pumps, complete these steps.

1. Locate a mounting position for the pumps.

The pump must be located within the 10 m (32.8 ft) of tube routing distance to the iTRAK system lubrication connectors shown in [Figure 41](#) and 5.0 m (16.4 ft) of the power cable routing distance to the 24V I/O port of your controller. The location must be accessible for maintenance and visible for monitoring the pump status indicators. Observe the clearance requirements that are shown in [Figure 42 on page 73](#).

Figure 41 - Track Connections to Lubrication System

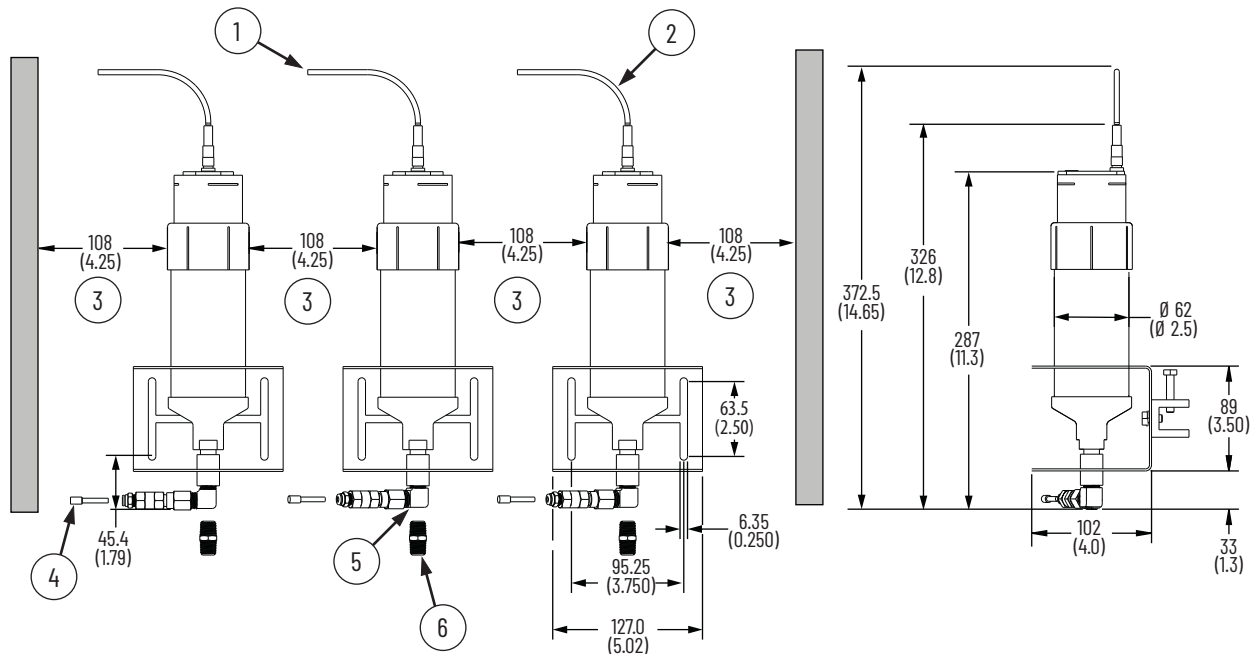


Item	Description
1	Support plate
2	Top rail lubrication tube
3	Middle rail lubrication tube
4	Bottom rail lubrication tube
5	Straight push-to-connect tube connector
6	Plug



2. If needed to accommodate the mounting location, adjust the location of the beam clamp within the "H" pattern of the mounting bracket.
  - a. Loosen the beam clamp for location adjustment, using a 7/16 in. open-end wrench.
  - b. Reposition the beam clamp to another position within the "H" pattern.
  - c. Secure the beam clamp using a 7/16 in. open-end wrench.
3. Clamp the beam clamp to its mounting location by using a 7/16 in. open-end wrench.

Figure 42 - Mounting Dimensions and Clearance, Dimensions In mm (in.)



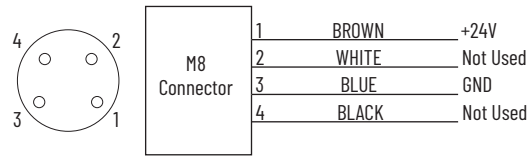
Item	Description
1	Power cable length 5.0 (16.4)
2	Minimum static bend radius 22.0 (0.87)
3	Minimum clearance

Item	Description
4	Plug (quantity 3)
5	Elbow fitting (quantity 3)
6	Straight fitting (quantity 3)

4. Label, route, and secure the tubes from the lubrication connectors on the iTRAK system to the pumps.
5. Remove the plugs from the lubrication connectors on the iTRAK system. See [Figure 41 on page 72](#).
6. Connect the lubrication tubes to the connectors on the iTRAK system by pushing the tubes into the push-to-connect tube connectors.
7. Remove the plug from the lubricator pump connector and immediately connect the tubing to the connector.  
To remove the plug, pull back on the connector face and pull out the plug.
8. Repeat [step 7](#) for the two other pumps.

## Lubrication Pump Wiring

Connect the power cable to the 24V I/O port of your controller.



An initial coating of oil is required on the entire track before operating the iTRAK and auto lubrication systems.

---

**IMPORTANT** The motion of the mover cams is required to distribute oil on the track. The movers should be put in motion shortly after the pump is activated. Otherwise the oil drips away.

---

## Lubrication Pump Configuration

Table 9 - Recommend Lubrication Pump Setting

Feature	Setting
Mode	Impulse

To perform initial lubrication, and configure an automatic lubrication schedule for normal operation, see [Lubrication on page 182](#).

## Power and Communication Connections

This chapter provides information on how to connect your iTRAK® 5750 system components, make cable connections, and set your system IP addresses.

Topic	Page
Typical iTRAK 5750 System	76
Provide Power to the iTRAK System	77
Connect an EtherNet/IP Network to the iTRAK 5750 System	80
Cybersecurity Considerations	85

Use this chapter with the Kinetix® 5700 iTRAK Power Supply and iTRAK Bus Conditioner Module Installation Instructions, publication [2198T-IN001](#) to install and connect the Kinetix 5700 iTRAK power supply to an iTRAK 5750 system.

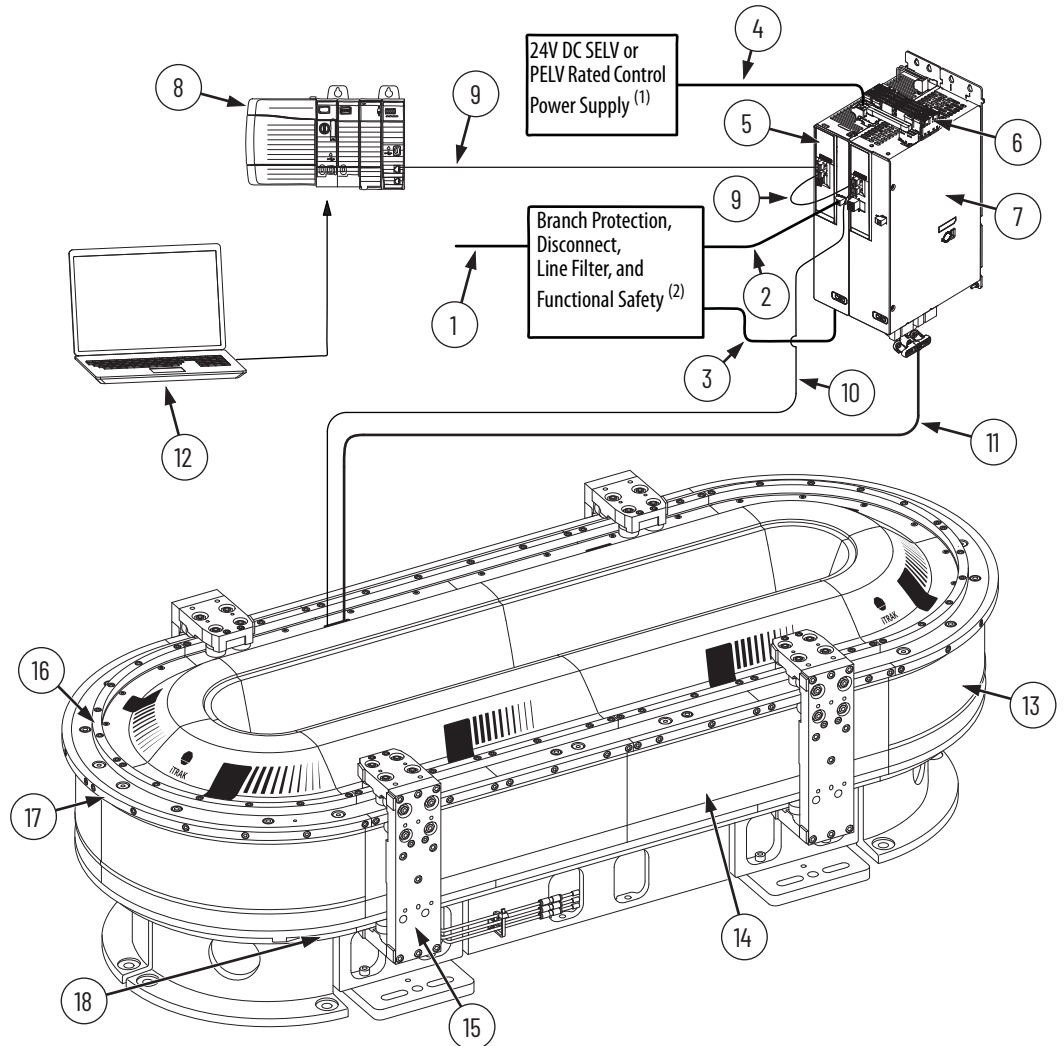
For detailed information on how to install a Kinetix 5700 iTRAK power supply into a Kinetix 5700 system, see the Kinetix 5700 Servo Drives User Manual, publication [2198-UM002](#). The Kinetix 5700 Servo Drives User Manual publication contains the information that is needed for using the other components of the Kinetix 5700 system, including:

- 2198-Pxxx Kinetix 5700 DC-bus power supply
- Other Kinetix 5700 components that can be part of your Kinetix 5700 system
- Branch protection, disconnect, and line filter hardware
- Enclosure requirements
- Requirements for EMC and agency compliance
- Kinetix 5700 hardware mounting
- Bonding, wire routing, EMC considerations

# Typical iTRAK 5750 System

Figure 43 provides a complete view of a typical iTRAK 5750 system that includes required and customer-supplied components, iTRAK solutions, and wiring.

Figure 43 - Typical iTRAK System with an iTRAK Power Supply



- (1) In this example, 24V DC control power uses a shared-bus connection system between the Kinetix 5700 power supply and the Kinetix 5700 iTRAK power supply. The 24V DC power comes from a separate SELV/PELV rated power supply.
- (2) See Kinetix 5700 Servo Drives User Manual, publication [2198-UM002](#), for more information on these components.

Item	Description
1	Mains power (480V nom)
2	Contactor enable signal line
3	Kinetix 5700 line voltage
4	24V DC control power
5	Kinetix 5700 DC-bus power supply
6	DC busbar 100 mm (3.94 in.) link
7	Kinetix 5700 iTRAK power supply (number of power supplies varies by system)
8	Programmable logic controller (PLC)
9	Machine Ethernet

Item	Description
10	Ethernet cable from the iTRAK power supply to connector module (connects to connector module under infield cover)
11	Power cable (DC-bus and 24V DC) from the iTRAK power supply to connector module (connects to connector module under infield cover)
12	Studio 5000® Programming Interface (not supplied with system)
13	Curved motor module
14	Straight motor module
15	Mover
16	Top rail
17	Middle rail
18	Bottom rail

## Provide Power to the iTRAK System

Follow the guidance and instructions in this section to plan and complete the power connections between the Kinetix 5700 iTRAK power supply and the iTRAK 5750 system. See the iTRAK 5750 System Technical Data, publication [2198T-TD002](#), for detailed system power requirements.

The 24V DC power comes from a separate SELV/PELV rated power supply.

You can use multiple iTRAK power supplies when your iTRAK system requires a higher current draw than can be supported by using one power supply. Use [Table 10](#) and [Table 11](#) to calculate your system current requirements.

**Table 10 - Current Draw for Motor Modules**

Motor Module Type	Current Draw at 24V DC
Straight (cat. no. 2198T-L20-T0504-A00-S2 or 2198T-L20-T1004-A00-S2)	0.34 A
Curved (cat. no. 2198T-L20-T0504-B09-S2 or 2198T-L20-T1004-B09-S2)	0.34 A

**Table 11 - Maximum Number of Motor Modules that Can Connect to One iTRAK 5700 Power Supply**

Cable Length <sup>(1)</sup> [m (ft)]	Maximum Number of Motor Module Sections <sup>(2) (3)</sup>	
	Using One Power Cable	Using Two Power Cables
3 (9.8)	26	30
6 (19.7)	25	30
9 (29.5)	23	30
12 (39.4)	21	28
15 (49.2)	19	28
18 (59.1)	18	28
21 (68.9)	16	26
24 (78.7)	15	26
27 (88.6)	14	26
30 (98.4)	13	24

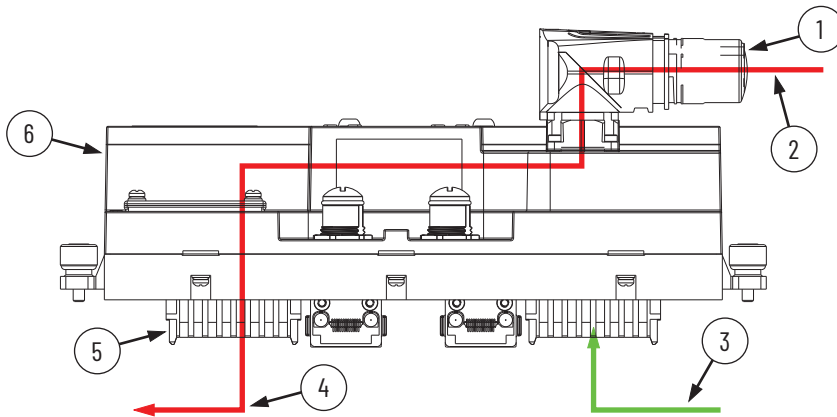
(1) The cable lengths that are shown are for the cable from the iTRAK power supply to the first motor module, which is the lowest numbered motor module in the system.

(2) These numbers of motor modules are valid for control power utilization only. Bus power consumption reduces maximum motor module count.

(3) At nominal control voltage or greater.

### Connect Power to the iTRAK 5750 System

We recommend that you install the power and control input connector module or the power input with control pass-through connector module, on a curved motor module to provide maximum system power. These connector modules connect DC-bus and 24V DC control power to the iTRAK 5750 system. Power, which is connected to the input power connector on the module, flows through the bottom output connector on the opposite end of the module (as shown here). Connect the bottom output power connector to the input power connector on the next motor module.

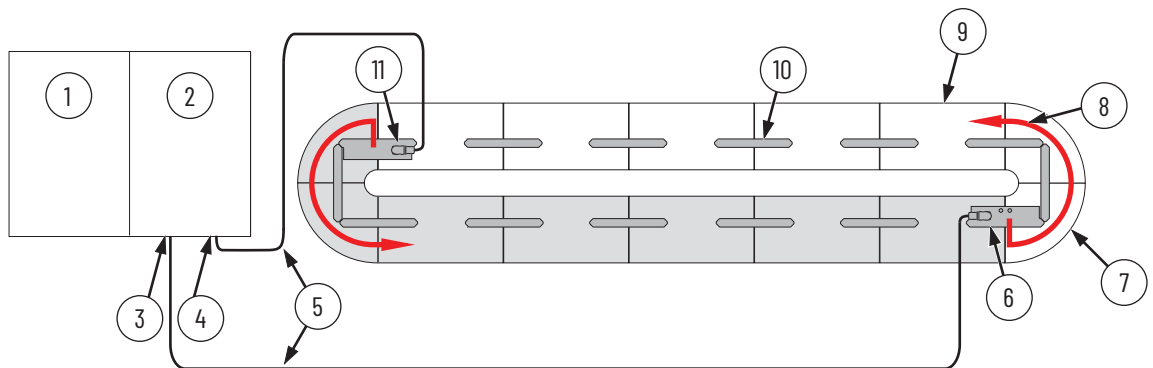


Item	Description
1	Input power connector
2	DC-bus and 24V DC control power flow
3	Ground only from adjacent motor module
4	DC-bus and 24V DC control power flow to adjacent motor module
5	Connector for DC-bus and 24V DC control power flow to adjacent motor module
6	Power and control input connector module

### One iTRAK Power Supply

Figure 44 illustrates a typical system wiring diagram when using one iTRAK power supply. The power supply power output A is connected to a power and control input connector module. Power supply power output B is connected to power with a control pass-through connector. The power flow through the modules is shown in the diagram and identifies where the power connector modules are installed.

Figure 44 - Wire an iTRAK 5750 System with an iTRAK Power Supply



Item	Description
1	2198-Pxxx Kinetix 5700 power supply
2	2198T-W25K-ER Kinetix 5700 iTRAK power supply
3	2198T-W25K-ER Kinetix 5700 iTRAK power supply output A
4	2198T-W25K-ER Kinetix 5700 iTRAK power supply output B
5	iTRAK power supply to motor module cable (Cat. No. 2198T-CHBFLS8-12Axx)
6	Power and control input connector module 1 (Cat. No. 2198T-CT-CP)

Item	Description
7	Curve motor module (one section)
8	Power flow
9	Straight motor module (one section)
10	Power and control pass-through connector module (Cat. No. 2198T-CT)
11	Power input with control pass-through connector module (Cat. No. 2198T-CT-P)

## Multiple iTRAK Power Supplies

Follow these guidelines when using multiple iTRAK power supplies in an iTRAK system. A typical iTRAK 5750 system with two power supplies is shown in [Figure 45](#).

The iTRAK power supply is not designed to have the output buses of multiple power supplies connected together to create one bus of higher current capacity.

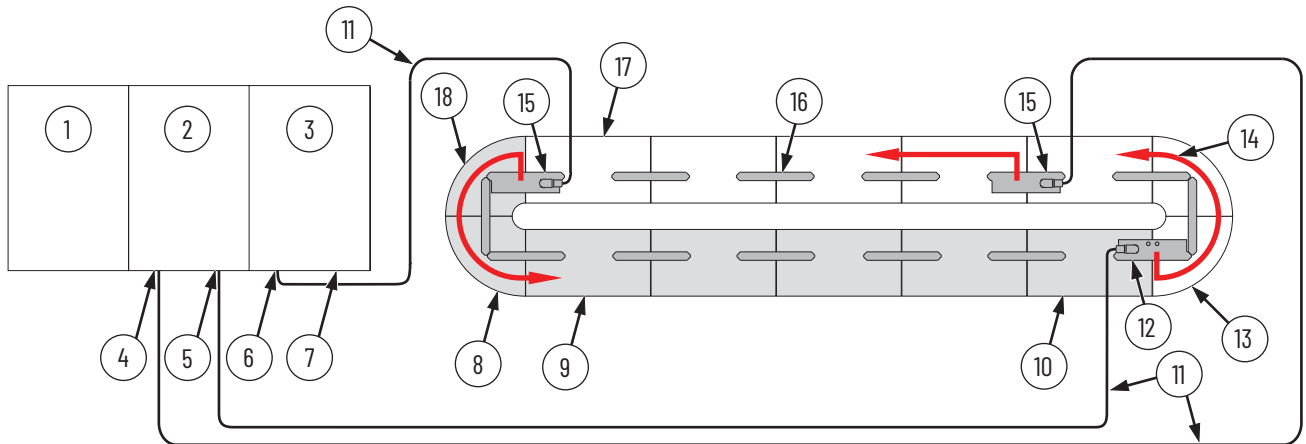


**ATTENTION:** To avoid personal injury and equipment damage, when multiple iTRAK power supplies are used, do not connect the DC output power bus on an iTRAK power supply to the DC output power bus on another iTRAK power supply.

When using multiple iTRAK power supplies, the system must be divided into separate electrical sections for each of the iTRAK power supplies. Use the following example to understand the use of multiple iTRAK power supplies for systems that require a higher current draw.

In this example, part of the track has a high power demand, and the rest of the track has a lower power demand. In this example, iTRAK power supply 1 uses two power output connections (A, B) to provide power to the first seven motor sections (01...07). iTRAK power supply 2 uses one power output connection (A) to provide power to the remaining seven motor sections (08...14). The DC buses of these two groups are electrically isolated from each other as shown in the diagram.

**Figure 45 - Connecting Multiple iTRAK Power Supplies in a System**



Item	Description
1	2198-Pxxx Kinetix 5700 power supply
2	2198T-W25K-ER Kinetix 5700 iTRAK power supply 1
3	2198T-W25K-ER Kinetix 5700 iTRAK power supply 2
4	2198T-W25K-ER Kinetix 5700 iTRAK power supply 1 output A
5	2198T-W25K-ER Kinetix 5700 iTRAK power supply 1 output B
6	2198T-W25K-ER Kinetix 5700 iTRAK power supply 2 output A
7	2198T-W25K-ER Kinetix 5700 iTRAK power supply 2 output B
8	Curved motor module (one section)
9	Straight motor module (one section)

Item	Description
10	Motor section 14
11	iTRAK power supply to motor module cable (Cat. No. 2198T-CHBFLS8-12AAxx)
12	Power and control input connector module 1 (Cat. No. 2198T-CT-CP)
13	Motor section 01
14	Power flow
15	Power input with control pass-through connector module (Cat. No. 2198T-CT-P)
16	Power and control pass-through connector module (Cat. No. 2198T-CT)
17	Motor section 07
18	Motor section 08

## Connect the Power Cable



**SHOCK HAZARD:** Do not make any cable connections when power is applied to any component in the iTRAK 5750 system. To avoid a shock hazard, verify that system power is not applied before you begin the procedures in this chapter.

Use an iTRAK 5750 power cable to connect the output power from an iTRAK power supply to a power input connector module installed on the iTRAK 5750 system. Follow these steps to connect the power cable to a connector module.

1. Verify that power is disconnected from the iTRAK 5750 system.
2. Connect the iTRAK 5750 power cable to the iTRAK power supply. See the Kinetix® 5700 iTRAK Power Supply and iTRAK Bus Conditioner Module Installation Instructions, publication [2198T-IN001](#), for instructions.
3. Remove the protective cap from the power input connector on the connector module.
4. Verify that the cable connector outer housing is in the unlocked position.
5. Align the arrow on the cable connector with the arrow on the power input connector on the connector module.
6. Insert the cable connector into the power input connector on the connector module until it is fully seated.
7. Rotate the cable connector outer housing to the locked position.

## Connect an EtherNet/IP Network to the iTRAK 5750 System

The iTRAK 5750 system is connected to an EtherNet/IP™ network by using a Bulletin 1585D M12 Xcode Ethernet cable (catalog number 1585D-E8TGJM-xx) connected to the power and control input connector module.

### EtherNet/IP Address Rotary Switches

Every device in an EtherNet/IP network must have a unique IP address. The power and control input connector module contains rotary switches (S1, S2, and S3) to enable Dynamic Host Configuration Protocol (DHCP) or set static EtherNet/IP addresses manually. [Figure 46](#) identifies the location of the rotary switches. [Table 12](#) describes the possible settings for the rotary switches S1, S2, and S3.

**Figure 46 - EtherNet/IP Rotary Switches and DIP Switch Locations**

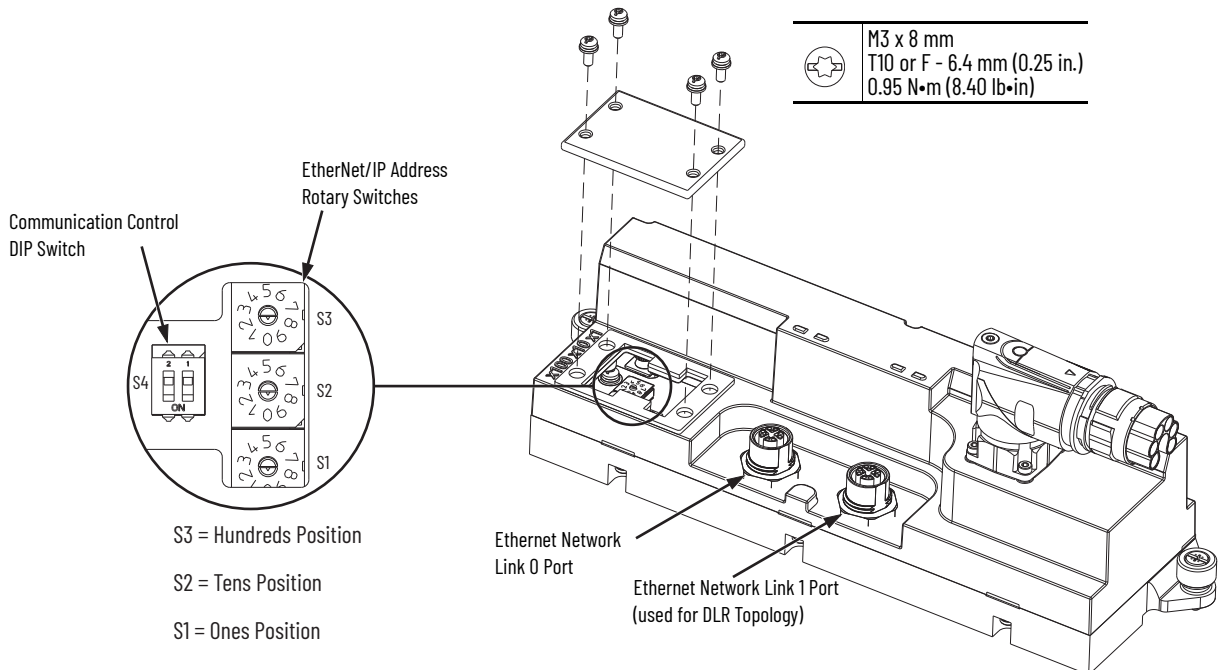




Table 12 - EtherNet/IP Rotary Switch Settings

Switch Setting	Function <sup>(1)</sup>
000	Used to disable Protected Mode on all downstream motor modules. See <a href="#">Protected Mode on page 88</a> for instructions on disabling Protected Mode.
001...254	Sets the last octet of the IP address to the value indicated (xxx in 192.168.1.xxx) on the connected motor module. Every subsequent motor module is assigned an IP address with the last octet incremented by one, moving counter-clockwise around the track.
888	A power cycle after the switches are set to 888 restores all factory default settings on all downstream motor module sections. Before you use this setting, read the first <b>IMPORTANT</b> statement on page 81 for critical functional safety considerations.
900	Used to enable Protected Mode on all downstream motor modules to prevent configuration changes. See <a href="#">Protected Mode on page 88</a> for instructions on enabling Protected Mode.
999	Sets the IP address on all downstream motor modules to a value determined by either DHCP or an address that is stored in nonvolatile memory. IP addresses can be changed through the Module Configuration dialog box in RSLinx <sup>®</sup> software. '999' is the default setting.
All other values	Reserved. Applying power to the iTRAK 5750 system with the switches set to a reserved value results in an "Illegal Address" exception on all downstream motor modules.

(1) Downstream modules include all motor modules up to the next installed power and control input connector module.

**IMPORTANT**

Before changing the EtherNet/IP address rotary switch settings to 888, consider the following:

- Restoring the factory default settings clears all functional safety configurations, resets safety ownership, clears security configuration, and returns the motor module to the out-of-box-state.
- Only authorized personnel should attempt to reset the safety ownership.
- When the motor module returns to the out-of-box state, Safe Torque Off (STO) safety integrity is lost.
- When drives are configured to the out-of-box state, they reset and power up, flashing the NET status indicator LED red. Only then is it safe to power down and configure the rotary switches for normal operation.

*Dynamic Host Configuration Protocol Configuration*

The IP address rotary switches are set to '999' at the factory to enable Dynamic Host Configuration Protocol (DHCP). DHCP assigns IP address information from a pool of available addresses to newly connected devices (DHCP clients) in the network. You must use a BOOTP/ DHCP software tool to set the IP addresses by using the hardware (MAC) addresses of the motor modules. The hardware address is on a label on the motor module.

With DHCP enabled, you must configure the IP address for each subsequent motor module in the Studio 5000 Logix Designer<sup>®</sup> application. IP addressing can also be changed through the Module Configuration dialog box in RSLinx<sup>®</sup> software. For more information about DHCP, see the Ethernet Reference Manual, publication [ENET-RM002](#).

An Ethernet switch configured as a DLR ring supervisor can also act as a DHCP server to assign designated IP addresses to ring participants. Assignment of IP addresses is based on ring participant position. If a ring participant fails, a replacement device can be installed in the same position in the ring and automatically receive the same IP address as the replaced device.

### Static IP Address Configuration

Manually set the rotary switches when working on a simple, isolated Ethernet network (for example, 192.168.1.xxx, where xxx is the last octet of the IP address). Switch S1 sets the '1's place, S2 the '10's place and S3 the '100's place.

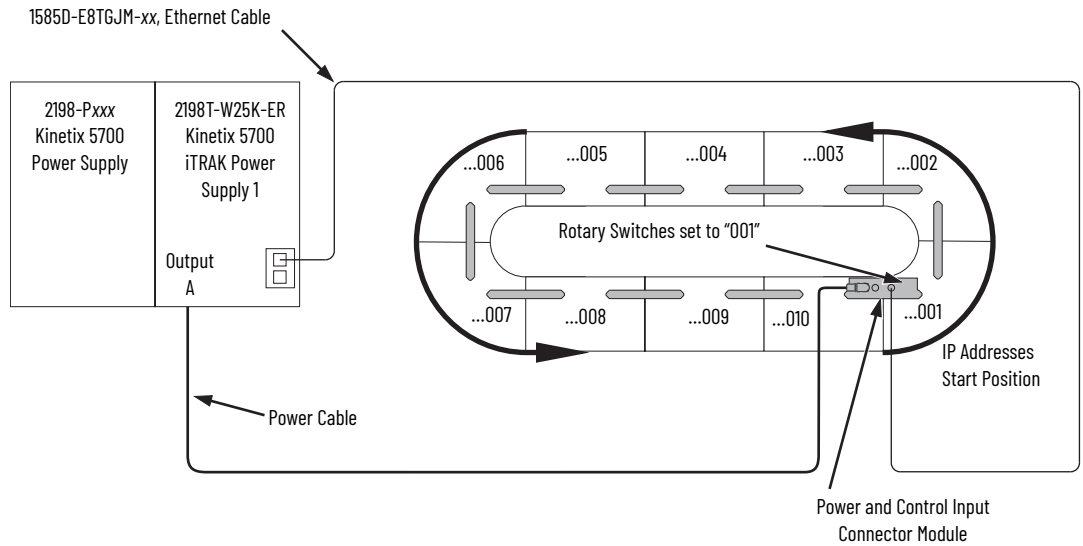
---

**IMPORTANT** Changes to the EtherNet/IP address rotary switches settings only take effect after a power cycle.

---

When setting static IP addresses, the switches set the last octet for the motor module to which the connector module is connected and above which the switches are located, as shown in [Figure 47](#). Every subsequent motor module is assigned an IP address with the last octet incremented by one, moving counter-clockwise around the track. For an example of an iTRAK 5750 system that uses two Ethernet networks and two power and control input connector modules, see [Figure 48 on page 83](#).

**Figure 47 - iTRAK 5750 System Static IP Address Configuration and Assignment**




---

**IMPORTANT** The base IP address of the first motor module plus the total number of motor modules cannot exceed 254.

---

For access to the rotary switches, see [Figure 46 on page 80](#). Always replace the protective cover before placing the iTRAK 5750 system into operation. For instructions on how to set the IP address manually on the power and control input connector module, see [Set the IP Address on page 88](#).

---

**IMPORTANT** Do not reconnect a track entry connector module to a different section after initial deployment. Doing so causes reassignment of the sections. Depending on rotary switch settings, doing so may also reassign multiple sections' IP addresses. If a safety connection was established before, then reconnecting a control input connector module to a different section leads to conflicts with the safety process.

---

## Communication Control DIP Switch

The communication control DIP switch (S4) is used to identify the backplane communication master for an iTRAK 5750 system and enables or disables access to the iTRAK 5750 diagnostic webpage. DIP switch S4 is contained on the power and control input connector module. See [Figure 46 on page 80](#) for switch location. [Table 13](#) identifies the possible switch settings.

**Table 13 - Backplane Communication Control DIP Switch (S4) Settings**

Switch	Position	Description
S4-1	ON	The power and control input connector module is the backplane communication master and initializes backplane communication for the entire track. 'ON' is the factory default setting.
	OFF	The power and control input connector module section is not the backplane communication master.
S4-2	ON	Enables access to the iTRAK 5750 diagnostic webpage.
	OFF	Disables access to the iTRAK 5750 diagnostic webpage. 'OFF' is the default setting.

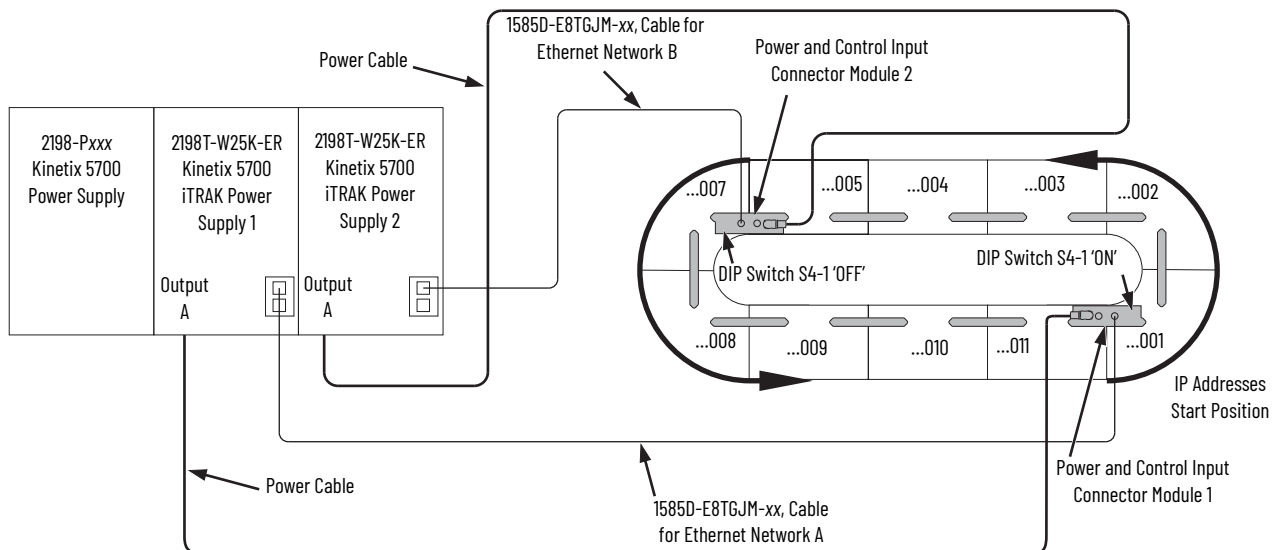
**IMPORTANT** Verify that DIP switch S4-1 is set to "ON" for one power and control input connector module per system only.

**IMPORTANT** Changes to the DIP switch S4 settings only take effect after a power cycle.

[Figure 48](#) provides an example of static IP addressing used in an iTRAK 5750 system with two Ethernet networks. Using two Ethernet networks is never required when using Gigabit Ethernet, but may be required in some applications that do not use Gigabit Ethernet. In this example, the Kinetix 5700 iTRAK power supply 1 is on a separate Ethernet network from the Kinetix 5700 iTRAK power supply 2. The rotary switches on power and control input connector module 1 are set to "001". The rotary switches on power and control input connector module 2 must be set to "006" or greater.

DIP switch S4-1 on the power and control input connector module 1 is set to 'ON,' defining the module as the backplane communication master. DIP switch S4-1 on the power and control connector 2 must be set to "OFF."

**Figure 48 - iTRAK 5750 System with Multiple Ethernet Networks and Static IP Addresses**



## Connect the Ethernet Cable

Use one of the Ethernet cables that are listed in [Power and Control Components of an iTRAK 5750 System on page 15](#) to connect the Ethernet port of the iTRAK power supply to the iTRAK 5750 system. Follow these steps to connect the Ethernet cable to a connector module.

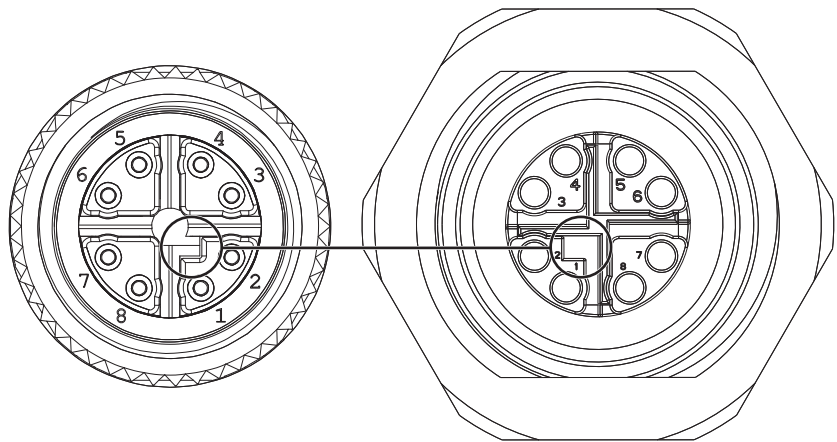


It is recommended that you connect the Ethernet cable to the connector module before installing the connector module on a motor module.

1. Remove the protective caps from the Ethernet ports on the connector module. If only one port is used, remove the protective cap from the Link 0 port only.
2. Verify that the connector pins are aligned and insert the Ethernet cable connector into the Ethernet connector on the connector module.

Connector Module Ethernet Port Connector

Ethernet Cable (cat. no. 1585D-E8TGJM-xx)



3. By turning the cable outer housing clockwise, secure the cable to the connector module mounting ring until the cable is fully seated.

## Cybersecurity Considerations

From the cybersecurity perspective, remote access is only possible via the Ethernet connection cable. See [Connect an EtherNet/IP Network to the iTRAK 5750 System on page 80](#) to page 84. This connection is used for communication with the following:

- Logix controller
- FactoryTalk® Linx
- FactoryTalk® Policy Manager
- Studio environment
- Optionally, the diagnostic webpage

From the security perspective, unless CIP Security™ is deployed, communication with both Logix controller and FactoryTalk Linx environment is not encrypted/signed and may be easily monitored by a potential adversary. Analysis of such traffic can expose device state information and program routines. To mitigate such a threat, CIP Security may be deployed. See [CIP Security on page 48](#).

The device can use both Transport Layer Security (TLS)-based cryptography and Pre-Shared Keys (PSK)-based cryptography. We encourage the use of TLS based encryption as PSK requires much more conscious and cautious handling of cryptographic keys.

The diagnostic web page uses HTTP protocol only. For security reasons, we recommend disabling the webpage by keeping switch S4-2 in the “off” state. See [Figure 46 on page 80](#).

Physical security should be considered when installing and using the device. Physical access to housing, power, and Ethernet connectors by a potential adversary may compromise device accessibility, integrity, and confidentiality.

Special attention is required regarding the power and control input connector module. This connector module provides a power source and Ethernet connection for the iTRAK 5750 system.

---

**IMPORTANT** Reconnecting the connector to a different section may result in reallocation of IP addresses and safety connection failure.

---

Detailed information about defense in depth strategy, including network topology and physical security, can be found in the System Security Design Guidelines Reference Manual, publication [SECURE-RM001](#). That publication provides guidelines for how to use Rockwell Automation products to improve the security of your industrial automation system.

**Notes:**

## Configuration and Startup

This chapter provides configuration and start-up procedures for your iTRAK® 5750 system with a Logix 5000® controller by using the Studio 5000 Logix Designer® application.

Topic	Page
Studio 5000 Logix Designer	87
Configure the iTRAK 5750 System	88
Configure and Customize the Project File	90
Configure the Motion Group	110
Configure the Section Axis Properties	112
Download the Program	116
Apply Power to the iTRAK 5750 System	117
Bus-sharing Group Configuration	118
Commission the iTRAK 5750 System	122
Tune the Axes	123

### Studio 5000 Logix Designer

To configure your iTRAK 5750 system, use a personal computer and the Studio 5000 Logix Designer application, version 36 or later. For the rest of this chapter, the Studio 5000 Logix Designer application is referred to as the Studio 5000® application. For help with using the Studio 5000 application as it applies to configuring the ControlLogix® or GuardLogix® controllers, see [Additional Resources on page 9](#).

We recommend you develop your application program by using the standardized object-oriented Independent Cart Technology Libraries. Independent Cart Technology Libraries are application-centric library objects that are tested, documented, and life-cycle managed by Rockwell Automation for use with the Studio 5000 Application Code Manager. You can access and download the Independent Cart Technology Libraries on the Product Compatibility and Download Center website, [rok.auto/pcdc](http://rok.auto/pcdc).

## Configure the iTRAK 5750 System

You can include the iTRAK 5750 system in your Studio 5000 application by adding it to a configured EtherNet/IP™ module or controller under the I/O configuration tree. After setting network parameters, you can view the iTRAK 5750 system status information in the Studio 5000 environment and use it in your Studio 5000 application.



Before you begin, make sure that you know the catalog numbers for the Kinetix® 5700 power supply, iTRAK 5750 power supply, Logix module and /or controller, and the iTRAK motor modules used in your motion control application.

### Set the IP Address

You can choose between static IP addresses or DHCP. See [Connect an EtherNet/IP Network to the iTRAK 5750 System on page 80](#) before you complete this procedure. This procedure is used to set static IP addresses for the motor modules in your iTRAK 5750 system. IP addresses are formatted to private IP address values of 192.168.1.xxx.



The IP address rotary switches on the power and control input connector module are set to '999' with DHCP enabled at the factory.

Follow these steps to set the iTRAK 5750 system to static IP addresses on the power and control input connector module.

1. To access the rotary switches, remove the protective cover from the connector module chassis. For cover removal information, see [EtherNet/IP Address Rotary Switches on page 80](#).
2. Set the rotary switches between 001...254 to configure the last octet of the IP address.



The base address of the first motor module plus the total number of motor modules cannot exceed 254.

Settings are stored in nonvolatile memory. IP addressing can also be changed through the Module Configuration dialog box in RSLinx® software. Changes to the IP addressing take effect after power is cycled.

### Protected Mode

The iTRAK 5750 system supports Protected Mode. When the system is in Protected Mode, the motor modules do not allow any configuration changes, resets, or firmware updates when a controller connection is open. Protected Mode is enabled by default.

---

#### IMPORTANT

CIP Security™ cannot be deployed for the first time if Protected Mode is enabled. Thus, to configure CIP Security, Protected Mode must be disabled first. After CIP Security is deployed, you can re-enable Protected Mode.

After the first deployment of CIP Security, further updates to CIP Security configuration are allowed in Protected Mode, if those configuration changes are made over a CIP Security connection.

---



### *Enable Protected Mode*

To enable Protected Mode, follow these steps:

1. Set the rotary switches on the power and control input connector module to setting 900.
2. Apply power to the iTRAK 5750 system as described in [Apply Power to the iTRAK 5750 System on page 117](#).
3. Verify that the status indicators provide these indications:
  - The motor module Module (MOD) status indicators are flashing red
  - The motor module Network (NET) status indicators are off
  - The connector module Link (LINK 0/1) status indicators turn off
4. Remove power from the iTRAK 5750 system as described in [Remove Power from the iTRAK 5750 System on page 43](#).
5. Set the switches on the power and control input connector module for normal operation.
6. Apply power to the iTRAK 5750 system as described in [Apply Power to the iTRAK 5750 System on page 117](#).

All motor modules downstream of the power and control connector module are now in Protected Mode.

### *Disable Protected Mode*

To disable Protected Mode, follow these steps:

1. Set the rotary switches on the power and control input connector module to setting 000.
2. Apply power to the iTRAK 5750 system as described in [Apply Power to the iTRAK 5750 System on page 117](#).
3. Verify that the status indicators provide these indications:
  - The motor module Module (MOD) status indicators are flashing red
  - The motor module Network (NET) status indicators are off
  - The connector module Link (LINK 0/1) status indicators turn off
4. Remove power from the iTRAK 5750 system as described in [Remove Power from the iTRAK 5750 System on page 43](#).
5. Set the switches on the power and control input connector module for normal operation.
6. Apply power to the iTRAK 5750 system as described in [Apply Power to the iTRAK 5750 System on page 117](#).

All motor modules downstream of the power and control connector module now have Protected Mode disabled.

## Configure and Customize the Project File

These procedures assume that you have wired your iTRAK 5750 system. In this example, the GuardLogix® 5584ES safety controller dialog boxes are shown.

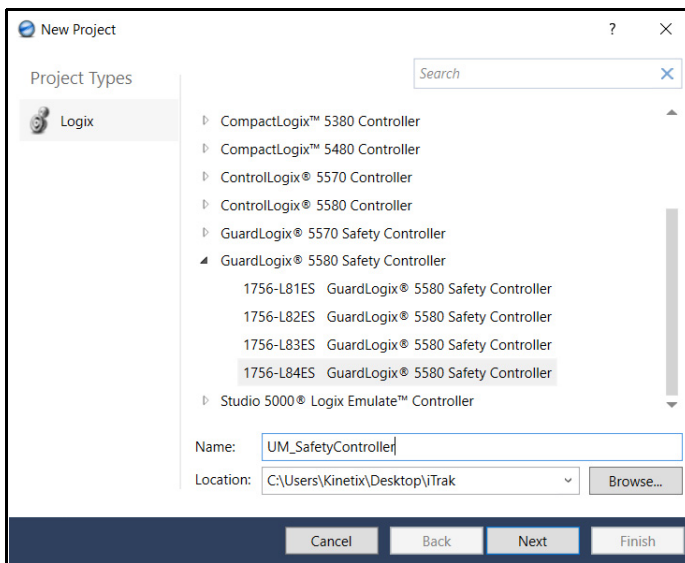
### Configure the Controller

Follow these steps to configure the controller.

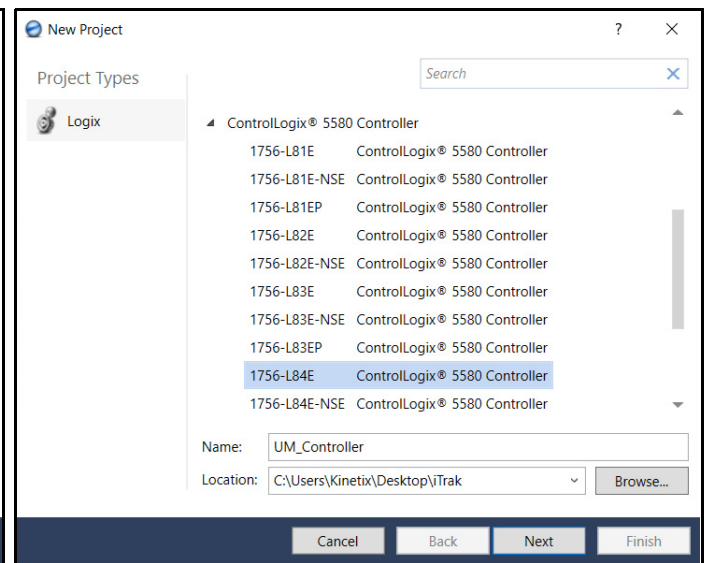
1. Apply power to your controller and open your Studio 5000 application.



2. From the Create menu, choose New Project.  
The New Project dialog box appears.



Example Module Properties Dialog Box with GuardLogix® Controller Selections



Example Module Properties Dialog Box with ControlLogix Controller Selections

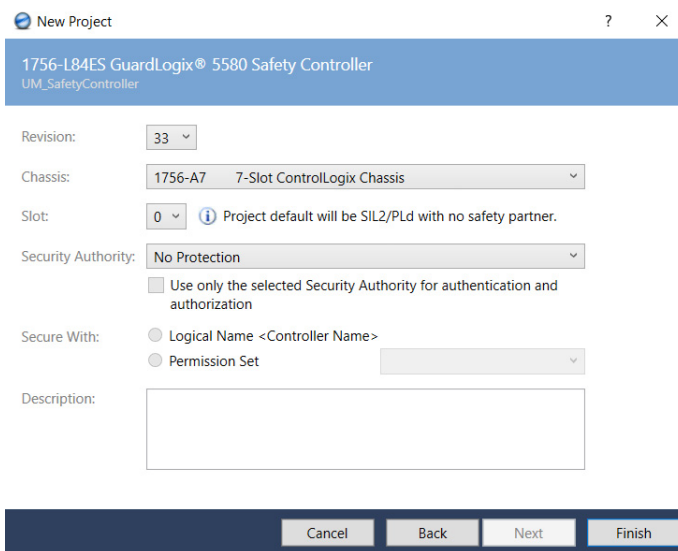
#### IMPORTANT

If you are configuring a safety application, you must use a GuardLogix 5580 or Compact GuardLogix 5380 safety controller.

In this example, the typical dialog boxes for GuardLogix 5584ES controllers with embedded Ethernet are shown.

3. Expand the Logix 5000 controller family and select your controller.
4. Type the file Name.
5. Click Next.

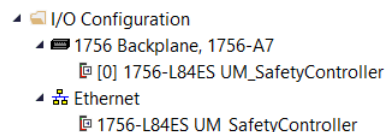
The New Project dialog box appears.



6. From the Revision pull-down menu, choose your software version.

7. Click Finish.

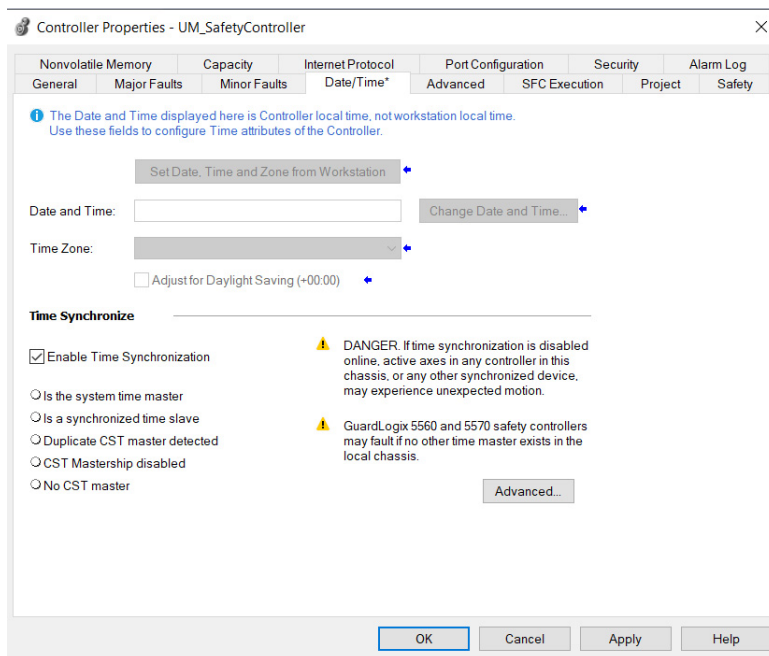
The new controller appears in the Controller Organizer under the I/O Configuration folder.



8. From the Edit menu, choose Controller Properties.

The Controller Properties dialog box appears.

9. Click the Date/Time tab.



10. Check Enable Time Synchronization.

The motion modules set their clocks to the module that you assign as the Grandmaster.

---

**IMPORTANT** Check Enable Time Synchronization for all controllers that participate in CIP Sync™. The overall CIP Sync network automatically promotes a Grandmaster clock, unless the priority is set in Advanced.

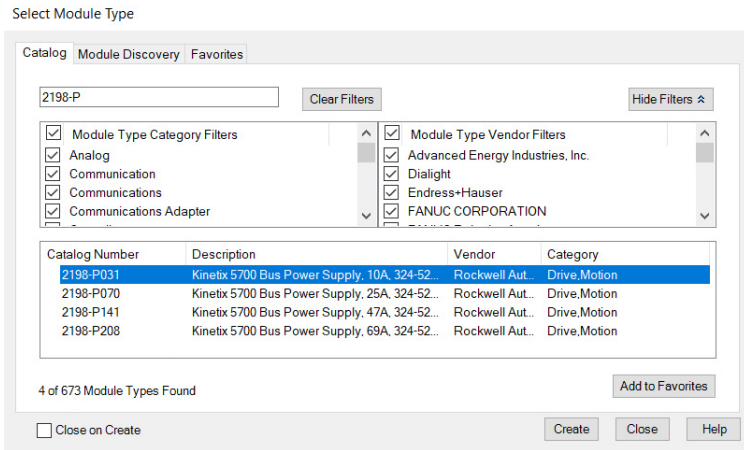
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11. Click OK.

## Configure the Kinetix 5700 Power Supply

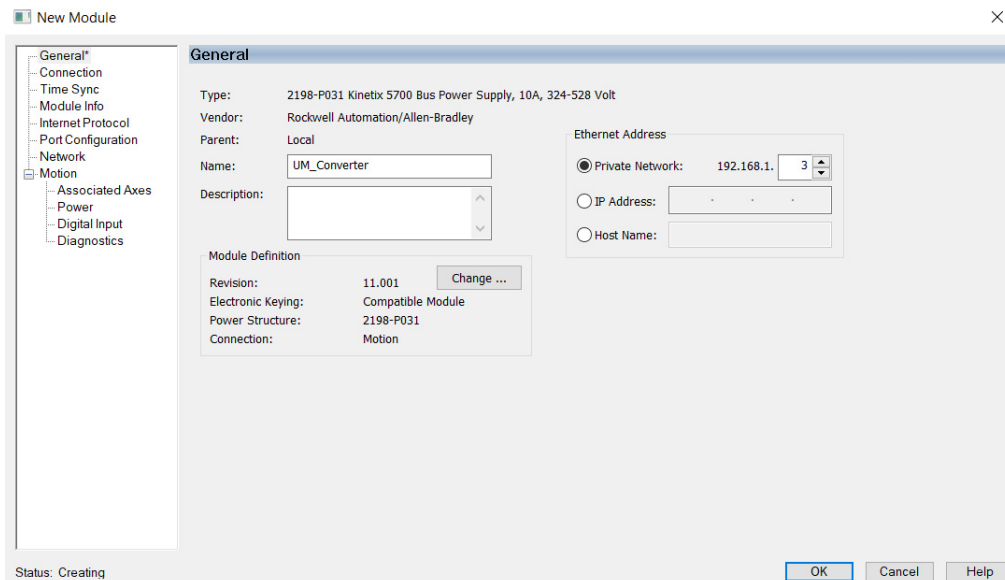
Follow these steps to configure a Kinetix 5700 DC-bus power supply.

1. Below the controller you created, right-click Ethernet, and choose New Module. The Select Module Type dialog box appears.

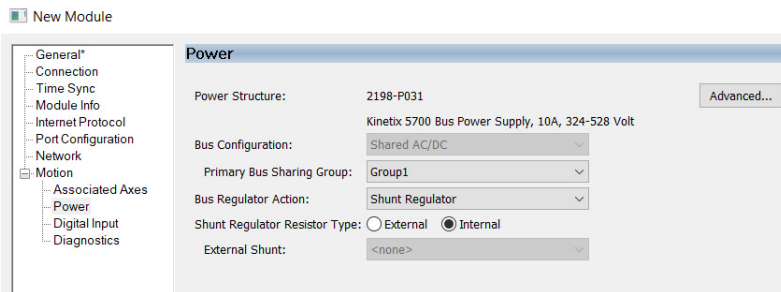


2. By using the filters, put a check in the Motion checkbox and the Allen-Bradley checkbox.
3. Select your 2198-Pxxx DC-bus power supply as appropriate for your hardware configuration.
4. Click Create.

The New Module dialog box appears.



5. Configure the new module.
  - a. Type the module Name.
  - b. Select an Ethernet Address option.  
 In this example, the Private Network address is selected.
  - c. Enter the address of your 2198-Pxxx DC-bus power supply.  
 In this example, the last octet of the address is 3.
6. Click the Power category.



7. From the pull-down menus, choose the power options appropriate for your hardware configuration.

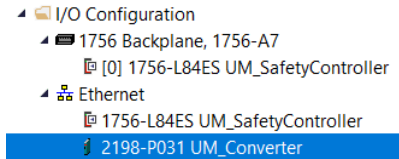
Attribute	Menu	Description
Bus Configuration	Shared AC/DC <sup>(1)</sup>	Applies to 2198-Pxxx DC-bus power supply (converter) modules.
Bus-sharing Group <sup>(2)</sup>	<ul style="list-style-type: none"> <li>• Group1</li> <li>• Group2</li> <li>• Group3...</li> </ul>	Applies to any bus-sharing configuration.
Bus Regulator Action	Disabled	Disables the internal shunt resistor and external shunt option.
	Shunt Regulator	Enables the internal and external shunt options.

(1) Shared AC/DC bus configuration is the default selection for DC-bus power supplies.  
 (2) For more information on bus-sharing groups, see [Bus-sharing Group Configuration on page 118](#).



**ATTENTION:** To avoid damage to equipment, all modules that are physically connected to the same shared-bus connection system must be part of the same Bus-sharing Group in the Studio 5000 application.

8. To close the New Module dialog box, click OK.
9. Your 2198-Pxxx DC-bus power supply appears in the Controller Organizer under the Ethernet network in the I/O Configuration folder.



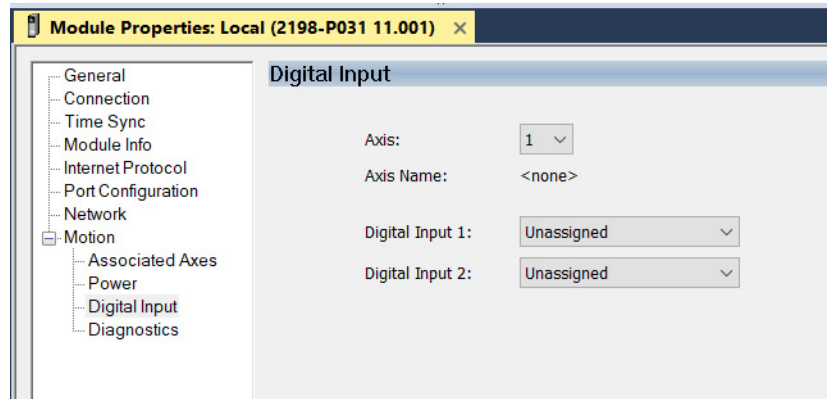
10. To close the Select Module Type dialog box, click Close.
11. Right-click the DC-bus power supply that you created in the Controller Organizer and choose Properties.

The Module Properties dialog box appears.

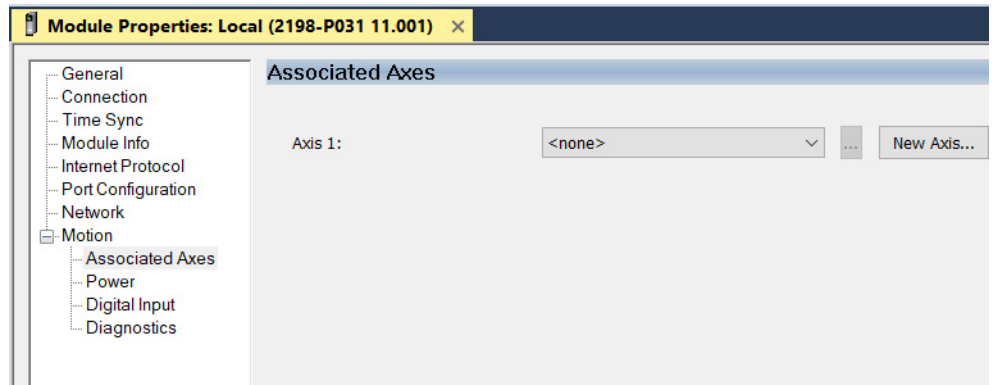


To configure the remaining DC-bus power supply properties, you must close the New Module dialog box and reopen it as the Module Properties dialog box.

12. Click the Digital Input category.

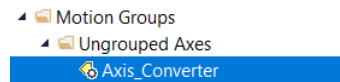


13. From the Digital Input pull-down menu, choose Bus Capacitor OK or Shunt Thermal Switch OK to monitor your capacitor module status or the shunt thermal switch, respectively, depending on your application.
14. Click the Associated Axes category.



15. Click New Axis.  
The New Tag dialog box appears.

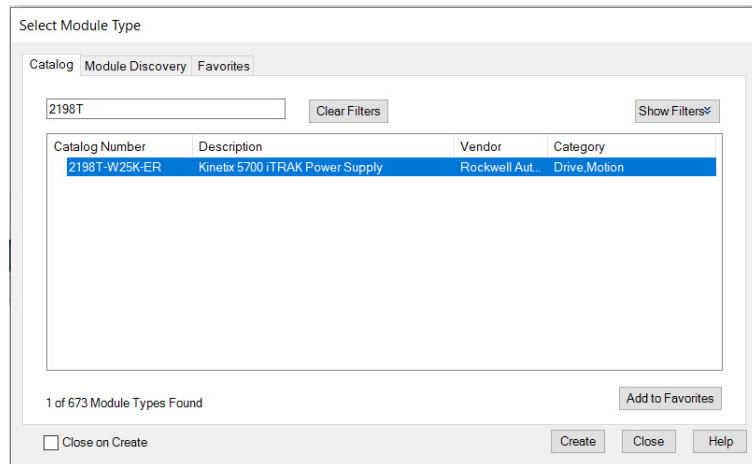
16. Type the axis Name.  
AXIS\_CIP\_DRIVE is the default Data Type.
17. Click Create.  
The axis (Axis\_Converter in this example) appears in the Controller Organizer under Motion Groups > Ungrouped Axes and is assigned as Axis\_Converter.
18. In the Module Properties dialog box, click Apply.
19. If you have multiple 2198-Pxxx Kinetix 5700 DC-bus power supplies, repeat [step 1...step 18](#), beginning on page [92](#). When you have completed adding your DC-bus power supply, continue with [Configure the Kinetix 5700 iTRAK Power Supply on page 96](#).



## Configure the Kinetix 5700 iTRAK Power Supply

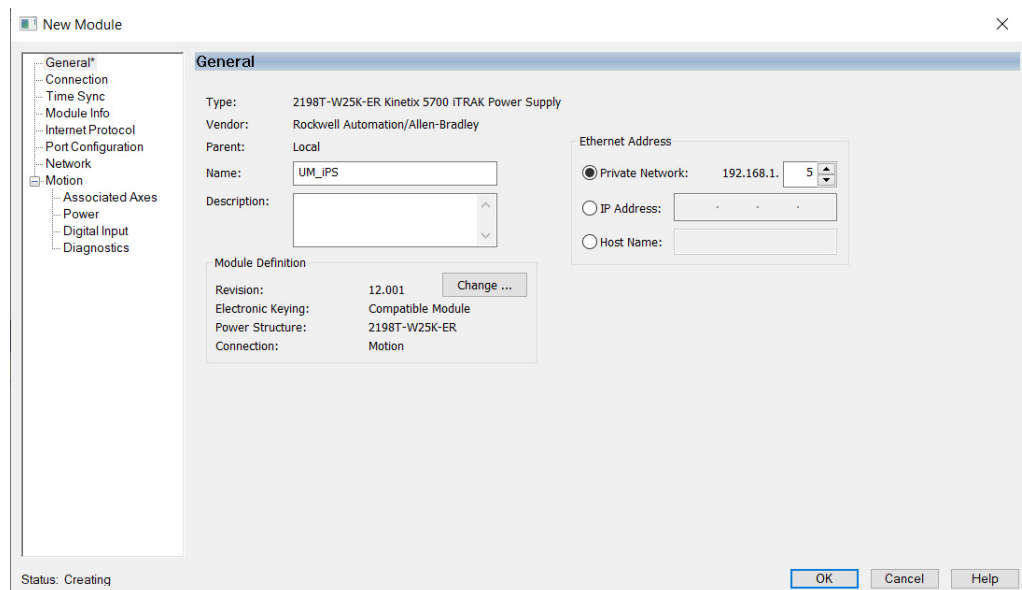
Follow these steps to configure the Kinetix 5700 iTRAK DC-bus power supply.

1. Below the controller you created, right-click Ethernet and choose New Module. The Select Module Type dialog box appears.



2. By using the filter, enter 2198T, and select the Kinetix 5700 iTRAK Power Supply.
3. Click Create.

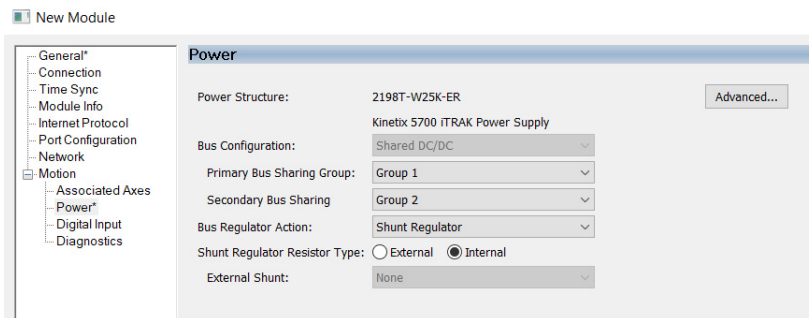
The New Module dialog box appears.



4. Configure the new module.
  - a. Type the module Name.
  - b. Select an Ethernet Address option. In this example, the Private Network address is selected.
  - c. Enter the address of your iTRAK DC-bus power supply. In this example, the last octet of the address is 5.



5. Click the Power category.



6. From the pull-down menus, choose the power options appropriate for your hardware configuration.

Attribute	Menu	Description
Bus Configuration	Shared DC/DC <sup>(1)</sup>	Applies to iTRAK DC-bus power supply modules.
Primary Bus-sharing Group <sup>(2)</sup>	<ul style="list-style-type: none"> <li>• Group1</li> <li>• Group2</li> <li>• Group3...</li> </ul>	Applies to any primary bus-sharing configuration.
Secondary Bus-sharing Group <sup>(2)</sup>	<ul style="list-style-type: none"> <li>• Group1</li> <li>• Group2</li> <li>• Group3...</li> </ul>	Applies to any secondary bus-sharing configuration.
Bus Regulator Action	Disabled	Disables the internal shunt resistor and external shunt option.

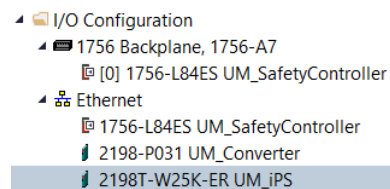
(1) Shared DC/DC bus configuration is the default selection for iTRAK DC-bus power supplies.  
 (2) For more information on bus-sharing groups, see [Bus-sharing Group Configuration on page 118](#).



**ATTENTION:** To avoid damage to equipment, all modules that are physically connected to the same shared-bus connection system must be part of the same Bus-sharing Group in the Studio 5000 application.

7. To close the New Module dialog box, click OK.

8. Your power supply appears in the Controller Organizer under the Ethernet network in the I/O Configuration folder.



9. To close the Select Module Type dialog box, click Close.

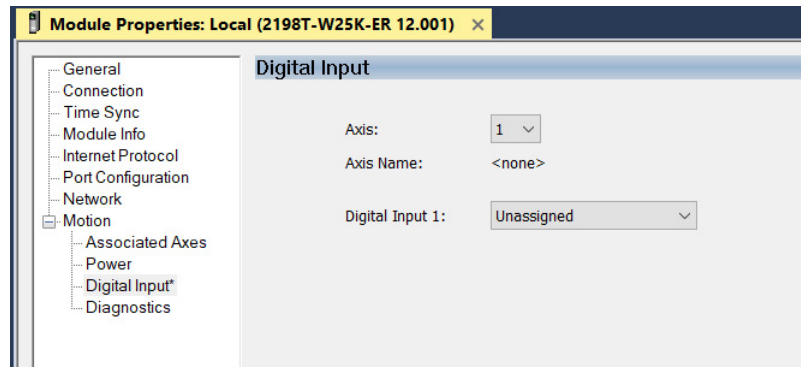
10. Right-click the iTRAK power supply that you created in the Controller Organizer and choose Properties.

The Module Properties dialog box appears.



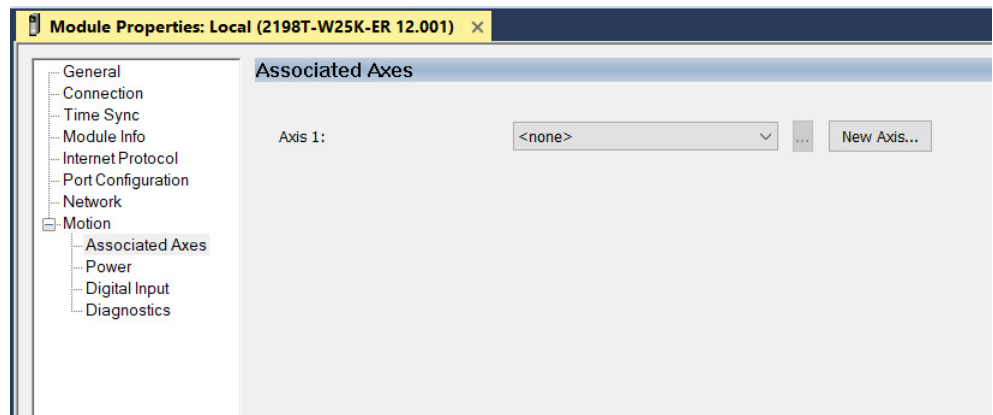
To configure the remaining DC-bus power supply properties, you must close the New Module dialog box and reopen it as the Module Properties dialog box.

11. Click the Digital Input category.



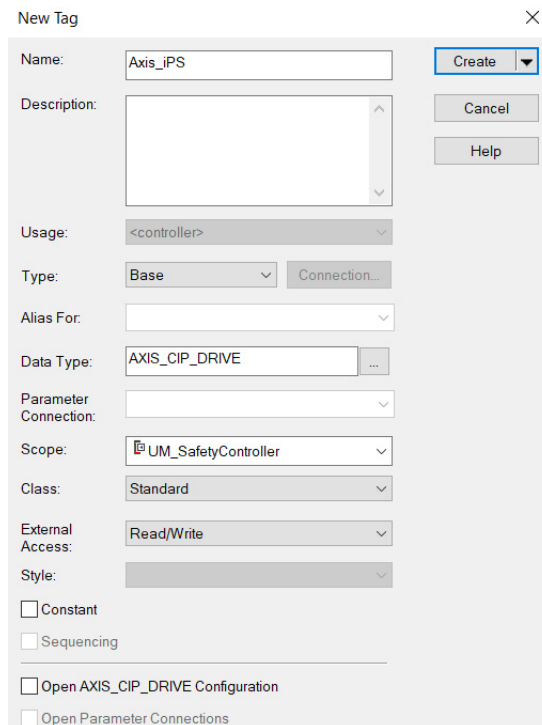
12. From the Digital Input pull-down menu choose Enable or Unassigned, depending on your application.

13. Click the Associated Axes category.



14. Click New Axis.

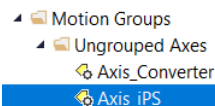
The New Tag dialog box appears.



15. Type the axis Name.  
 AXIS\_CIP\_DRIVE is the default Data Type.

16. Click Create.

The axis (Axis\_iPS in this example) appears in the Controller Organizer under Motion Groups > Ungrouped Axes and is assigned as Axis\_iPS.



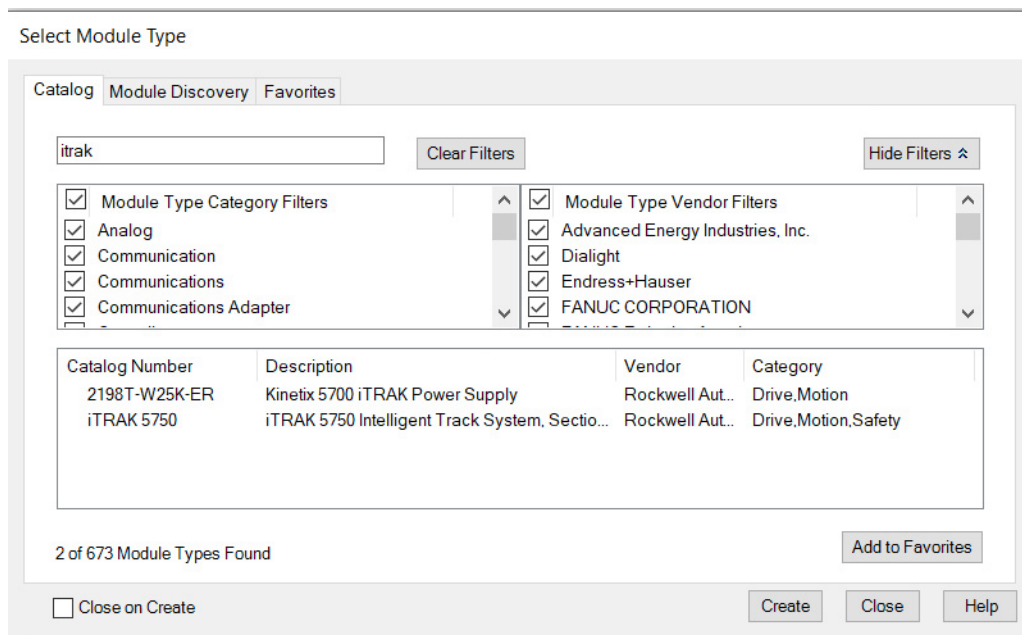
17. Click Apply.

## Configure the iTRAK 5750 Motor Modules

Follow these steps to configure iTRAK 5750 motor modules.

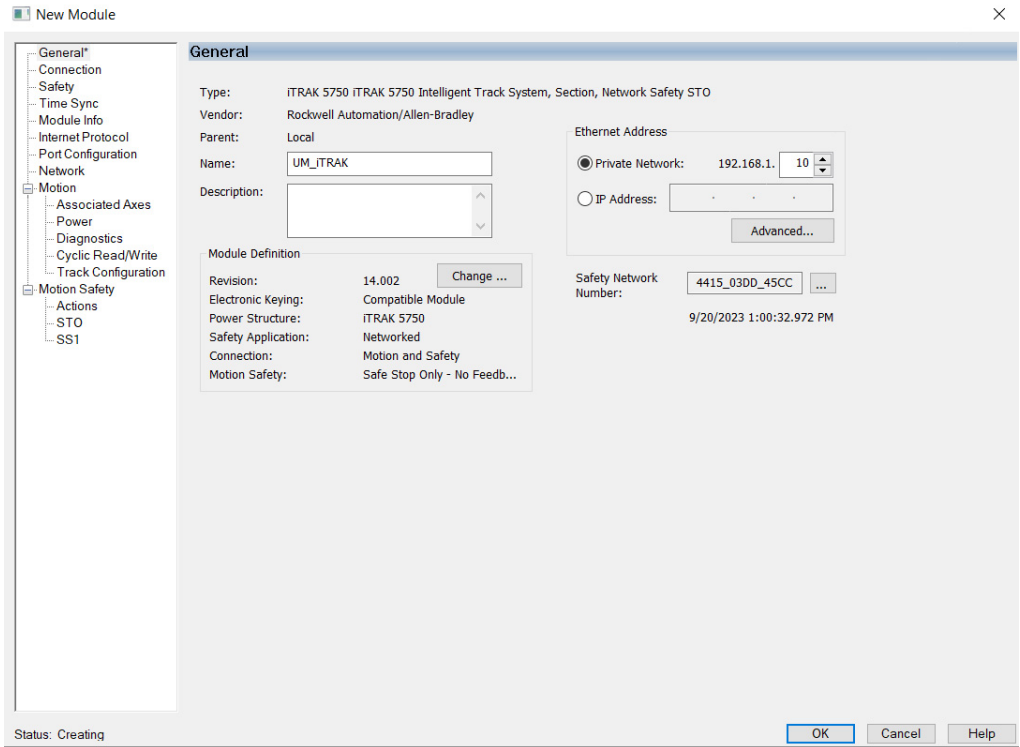
1. Above the DC-bus power supply (converter) you created, right-click Ethernet, and choose New Module.

The Select Module Type dialog box appears.



2. By using the filter, enter iTRAK, and select the iTRAK 5750 Intelligent Track System, Section.
3. Click Create.

The New Module dialog box appears.



Example New Module Dialog Box with GuardLogix Controller Selections

4. Configure the new motor module properties.
  - a. Type the module Name.
  - b. Select an Ethernet Address option.  
In this example, the Private Network address is selected.
  - c. Enter the address of your motor module.  
In this example, the last octet of the address is 10.

### IMPORTANT

In addition to the motor module name and IP address, the motor module is also given a number. You do not enter this number; it is assigned automatically based on the position of the motor module relative to the power and control input connector module. The first motor module that is connected to the power and control input connector module is numbered 0, the next motor module 1, and so on. When a fault about a motor module appears, the fault text includes the motor module number as the sub code at the end of the fault text. For example, fault text "INIT FLT 28 - Sub Code 1" means that the second motor module from the power and control input connector module is affected.

- d. Click Advanced if using Network Address Translation with safety connection to add a drive module configured IP address.
5. Under Module Definition, click Change.

The Module Definition dialog box appears.

6. Define the motor module.
  - a. Select your Electronic Keying option from the pull-down menu (Compatible Module is the default setting).

### IMPORTANT

The device is equipped with a backup file system to be used if the primary file system fails. Switching to the secondary file system is silent and does not produce additional error codes. However, the device may boot with an outdated firmware. For security reasons, it is recommended to set Module Definition Electronic Keying to "Exact Match". When set to "Exact Match", if the device boots with outdated firmware, the module fails and displays Code 16#0116: "Electronic Keying Mismatch: Major and/or Minor revision invalid or incorrect."

- b. From the Safety Application pull-down menu, choose between Safety Off or Networked for an integrated safety application.
  - c. From the Connection pull-down menu, choose the Connection mode for your motion application.

Connection Mode	Safety Options	Description
Motion and Safety	Integrated mode	Motion connections and integrated STO are managed by this controller.
Motion Only	Integrated mode, if there is a secondary safety controller	<ul style="list-style-type: none"> <li>• Motion connections are managed by this controller.</li> <li>• Integrated STO is managed by another controller that has a Safety-only connection to the drive.</li> </ul>
Safety Only	Integrated mode	<ul style="list-style-type: none"> <li>• Integrated STO is managed by this controller.</li> <li>• Motion connections are managed by another controller that has a Motion-only connection to the drive.</li> </ul>

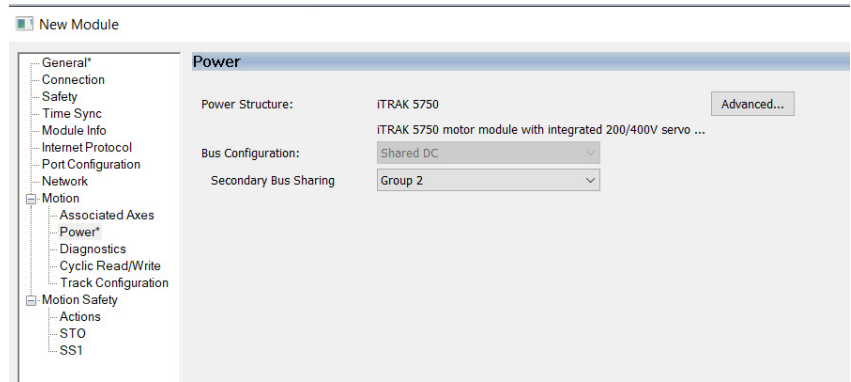


When 'Safety' appears in the Connection mode, integrated safety is implied.

The default setting for Motion and Safety is 'Safe Stop Only - No Feedback.' The (SNN) field populates automatically when the connection mode includes an Integrated Motion and Safety or Safety-only connection.

7. To close the Module Definition dialog box, click OK.

- Click the Power category.



**IMPORTANT** The Studio 5000 application enforces shared-bus configuration rules for iTRAK 5750 motor modules.

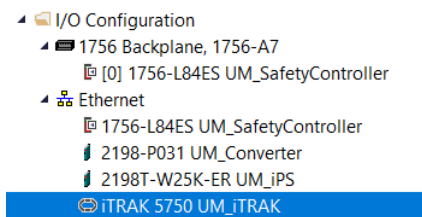
- From the Secondary Bus-sharing pull-down menu, choose the appropriate bus-sharing group for your hardware configuration. For information on bus-sharing groups, see [Bus-sharing Group Configuration on page 118](#).



**ATTENTION:** To avoid damage to equipment, all modules that are physically connected to the same shared-bus connection system must be part of the same Bus-sharing Group in the Studio 5000 application.

- To close the Module Properties dialog box, click OK.
- To close the Select Module Type dialog box, click Close.

Your iTRAK 5750 motor module appears in the Controller Organizer under the Ethernet network in the I/O Configuration folder.



- Right-click the motor module that you created in the Controller Organizer and choose Properties.

The Module Properties dialog box appears.



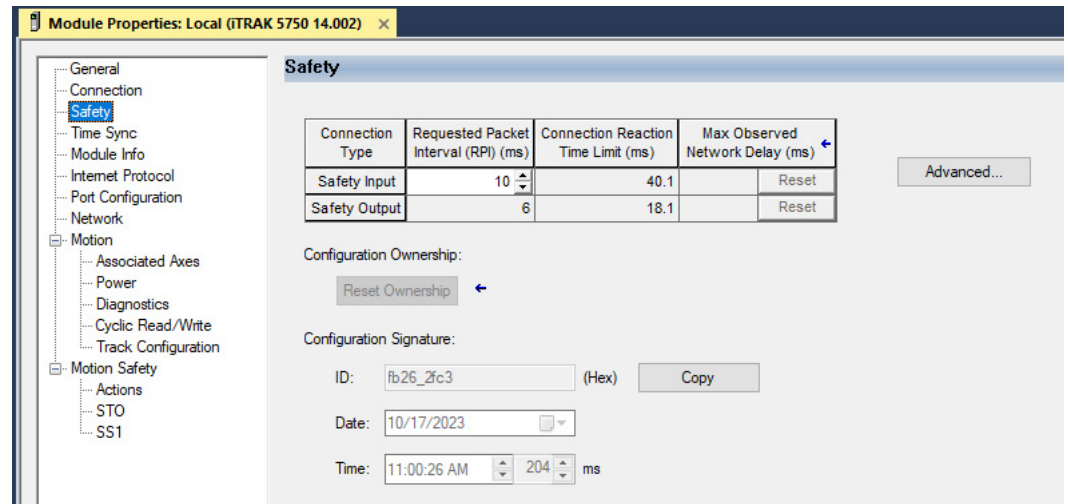
To configure the remaining motor module properties, you must close the New Module dialog box and reopen it as the Module Properties dialog box.

If your application includes integrated safety, continue with [step 13](#). Otherwise, go to [Continue iTRAK 5750 Motor Module Configuration on page 104](#).

## 13. Click the Safety category.

The Safety configuration view appears with the following options available:

- Configuration of the Safety Input and Safety Output connections
- Configuration ownership
- Configuration signature



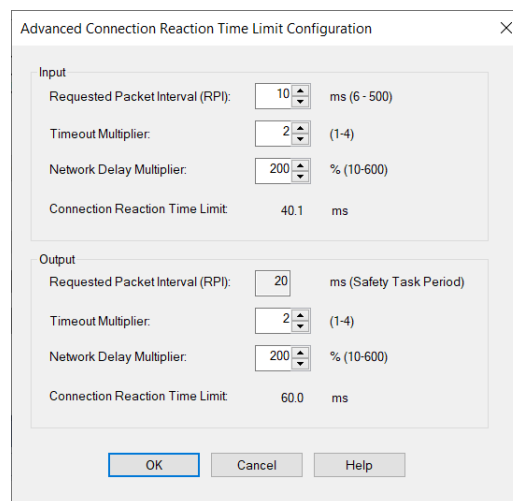
## 14. The connection between the owner and the iTRAK 5750 motor module is based on the following:

- Servo drive
- GuardLogix slot number
- GuardLogix
- Path from the GuardLogix controller to the motor module
- Configuration signature

If any differences are detected, the connection between the GuardLogix controller and the motor module is lost, and the yellow yield icon appears in the controller project tree after you download the program.

## 15. Click Advanced.

The Advanced Connection Reaction Time Limit Configuration dialog box appears.



Analyze each safety channel to determine the appropriate settings. The smallest Input RPI allowed is 6 ms. Selecting small RPI values consumes network bandwidth and can cause spurious trips because other devices cannot get access to the network.

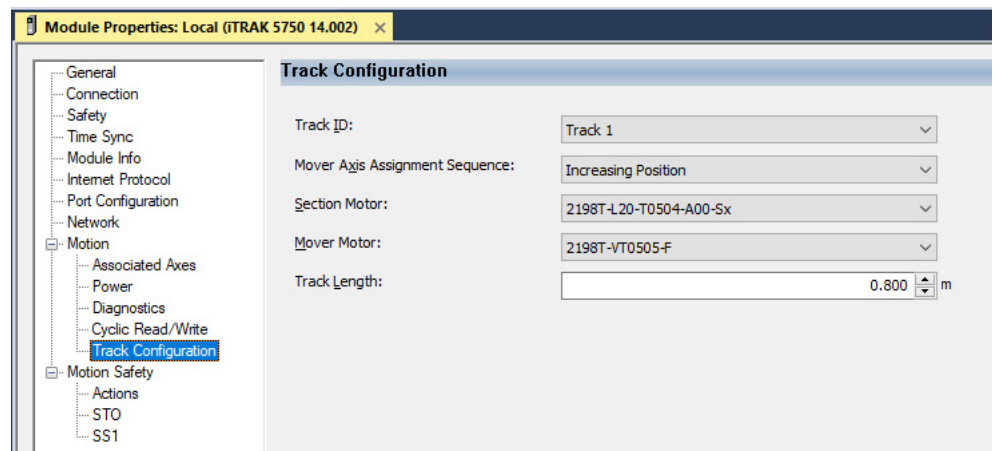
For more information about the Advanced Connection Reaction Time Limit Configuration, refer to [Additional Resources on page 9](#) for the appropriate user manual for your GuardLogix or Compact GuardLogix controller.

16. To close the Advanced dialog box, click OK.
17. To save the Safety category parameters, click Apply.

## Continue iTRAK 5750 Motor Module Configuration

Follow these steps to configure the axes for your iTRAK 5750 system motor modules.

1. Right-click the iTRAK 5750 motor module that you created and choose Properties. The Module Properties dialog box appears.
2. Select the Track Configuration category.



3. From the Track ID pull-down menu, select your Track ID.

When multiple modules share the same Track ID, these modules are identified as being configured as a single "Track System." This Track ID allows the Studio 5000 application to validate the track system as a whole. Motor modules that specify a '0' or 'Not Specified' Track ID are not validated because they are treated as standalone sections when validating track systems.

4. From the Mover Axis Assignment Sequence pull-down menu, choose the Mover Axis Assignment Sequence for your motion application.

This configuration parameter determines how the movers are assigned a number for identification purposes. When a fault about a mover appears, the fault text includes the mover number as the sub code at the end of the fault text. Movers can be numbered based on their position at the time of assignment relative to the track position 0, or relative to a reference mover. If a reference mover is used, it is designated as Mover 1 and is the only mover with a reference mover position magnet (cat. no. 2198T-N1-5750) installed. This magnet electrically identifies it as the reference mover. For descriptions of the possible mover axis assignment sequences, see the following table, [Figure 49 on page 105](#), and [Figure 50 on page 106](#).



Mover Axis Assignment Sequence	Description
Decreasing Position	The motor module assigns movers on the track as decreasing sequential axis instances. The mover with the highest position value is the first mover (Mover 1), followed by movers with decreasing position values (Movers 2, 3, ...).
Increasing Position	The motor module assigns movers on the track as increasing sequential axis instances. The mover with the lowest position value is the first mover (Mover 1), followed by movers with increasing position values (Movers 2, 3, ...).
Decreasing Position from Reference Mover	The motor module assigns movers on the track as decreasing sequential axis instances based on the mover that is identified as the Reference Mover. The Reference Mover is the first mover (Mover 1), followed by the other movers (Movers 2, 3, ...) in the decreasing position direction from the Reference Mover. See <a href="#">Figure 50 on page 106</a> .
Increasing Position from Reference Mover	The motor module assigns movers on the track as increasing sequential axis instances based on the mover that is identified as the Reference Mover. The Reference Mover is the first mover (Mover 1), followed by the other movers (Movers 2, 3, ...) in the increasing position direction from the Reference Mover. See <a href="#">Figure 50 on page 106</a> .

Figure 49 - Examples of Mover Axis Assignment Sequences Based on Track Position

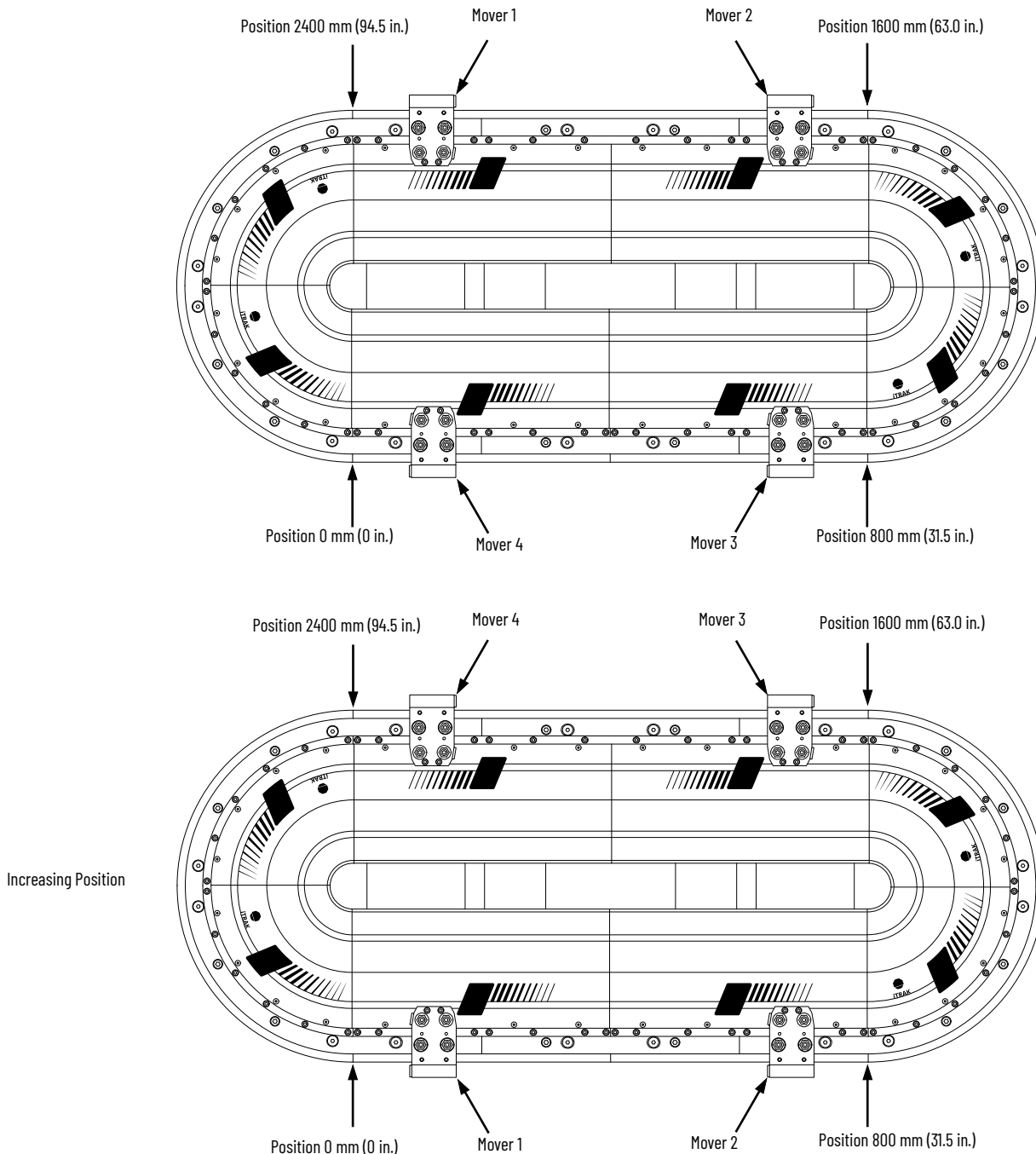
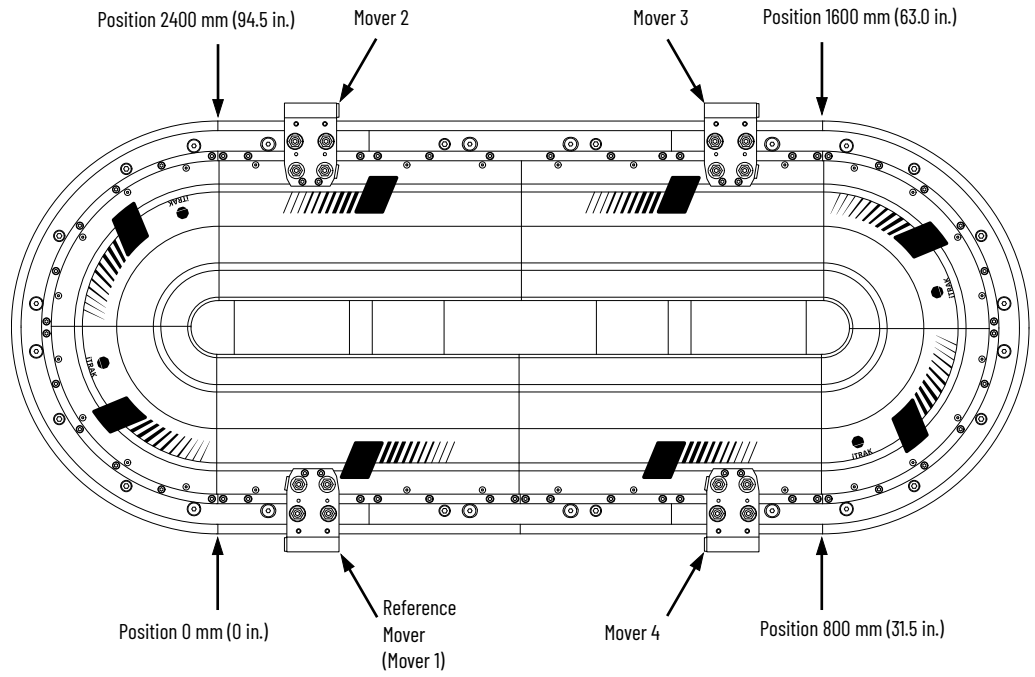
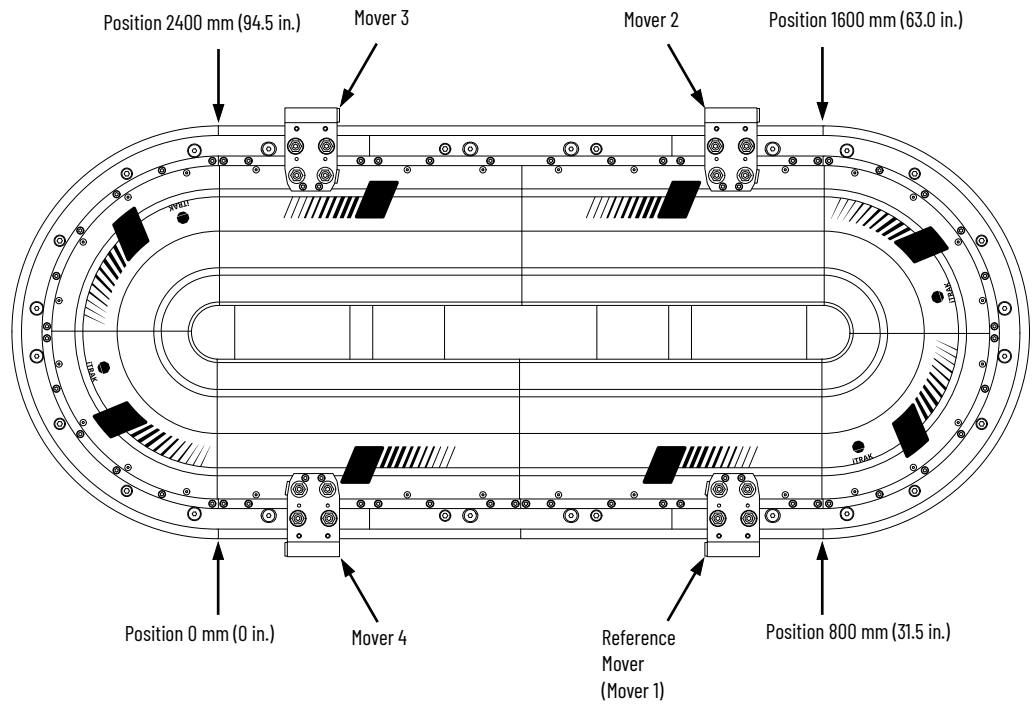


Figure 50 - Examples of Mover Axis Assignment Sequences Based on Reference Mover

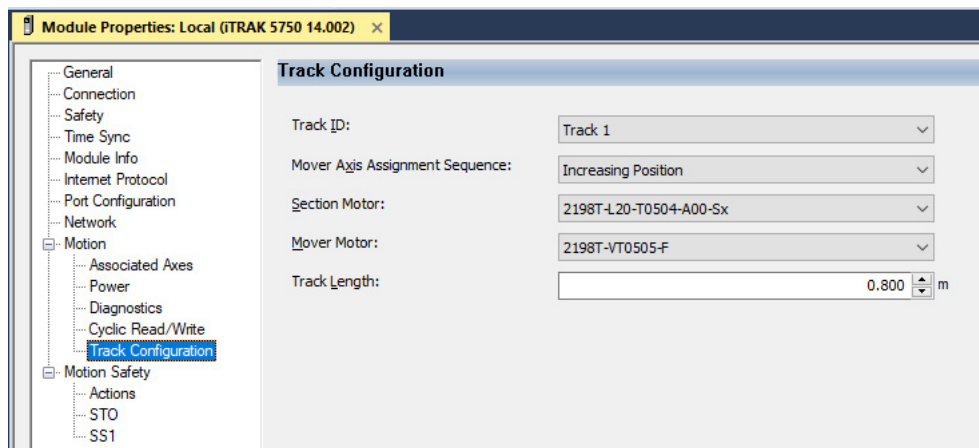
Decreasing Position from Reference Mover



Increasing Position from Reference Mover



- From the Section Motor pull-down menu, select the section motor that corresponds to your motor module. The catalog numbers for the various section types are provided in the [Motor Module \(Section\) Catalog Numbers on page 18](#).

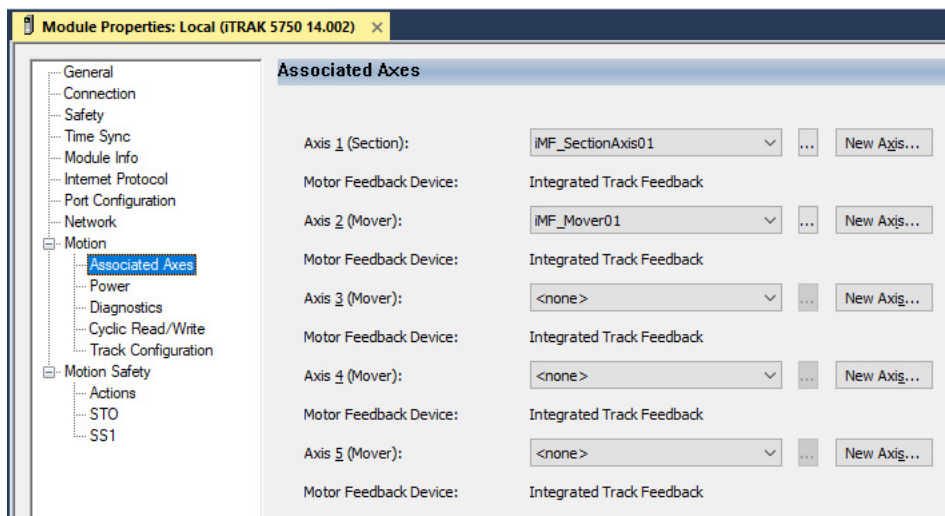


- From the Mover Motor pull-down menu, select the mover catalog number that corresponds to your mover. The catalog numbers for the various mover types are provided in [Assembled Mover Catalog Numbers on page 21](#)
- Enter the length of your track system in the Track Length field.

Use one of the following equations to determine the length of your track system:

$$\begin{aligned} \text{Length of 100 mm wide track} = & \\ & \text{Number of straight sections} \times 400 \text{ mm (15.75 in.)} + \\ & \text{Number of } 90^\circ \text{ curve sections} \times 400 \text{ mm (15.75 in.)} \end{aligned}$$

- To save your changes, click Apply.
- Select the Associated Axes Category.



For each iTRAK 5750 motor module, five axes are possible; one section axis and up to four mover axes.

- Axis 1 is the section axis.
- Axis 2...Axis 5 are the mover axes.

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**IMPORTANT** All iTRAK 5750 motor modules must have an associated section axis.

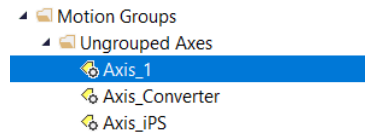
---

- Next to Axis 1 (Section), click New Axis.  
The New Tag dialog box appears.

The 'New Tag' dialog box contains the following fields and options:

- Name:** Text box containing 'Axis\_1'. A 'Create' button is to its right.
- Description:** Large empty text area.
- Usage:** Dropdown menu showing '<controller>'.
- Type:** Dropdown menu showing 'Base' and a 'Connection...' button.
- Alias For:** Empty dropdown menu.
- Data Type:** Text box containing 'AXIS\_CIP\_DRIVE' and a '...' button.
- Parameter Connection:** Empty dropdown menu.
- Scope:** Dropdown menu showing 'UM\_SafetyController'.
- Class:** Dropdown menu showing 'Standard'.
- External Access:** Dropdown menu showing 'Read/Write'.
- Style:** Empty dropdown menu.
- Constant
- Sequencing
- Open AXIS\_CIP\_DRIVE Configuration
- Open Parameter Connections

- Type the axis Name.  
AXIS\_CIP\_DRIVE is the default Data Type.
- Click Create.  
The axis (Axis\_1 in this example) appears in the Controller Organizer under Motion Groups> Ungrouped Axes and is assigned as Axis\_1.



13. To configure a Mover axis, next to Axis *n* (Mover), click New Axis.



If a mover axis is not assigned to the motor axis, continue with [Configure the Motion Group on page 110](#).

The New Tag dialog box appears.

The 'New Tag' dialog box contains the following fields and options:

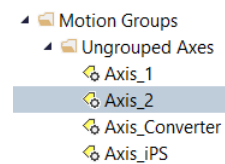
- Name:** Axis\_2
- Description:** (Empty text area)
- Usage:** <controller>
- Type:** Base
- Alias For:** (Empty dropdown)
- Data Type:** AXIS\_CIP\_DRIVE
- Parameter Connection:** (Empty dropdown)
- Scope:** UM\_SafetyController
- Class:** Standard
- External Access:** Read/Write
- Style:** (Empty dropdown)
- Constant
- Sequencing
- Open AXIS\_CIP\_DRIVE Configuration
- Open Parameter Connections

14. Type the axis Name.

AXIS\_CIP\_DRIVE is the default Data Type.

15. Click Create.

The axis (Axis\_2 in this example) appears in the Controller Organizer under Motion Groups> Ungrouped Axes and is assigned as Axis\_2.



16. Click Apply.

17. If you have multiple movers, repeat [step 13](#)...[step 16](#) for each mover.

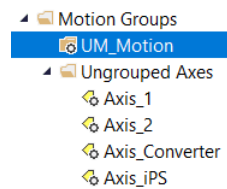
## Configure the Motion Group

Follow these steps to configure the motion group.

1. In the Controller Organizer, right-click Motion Groups and choose New Motion Group. The New Tag dialog box appears.

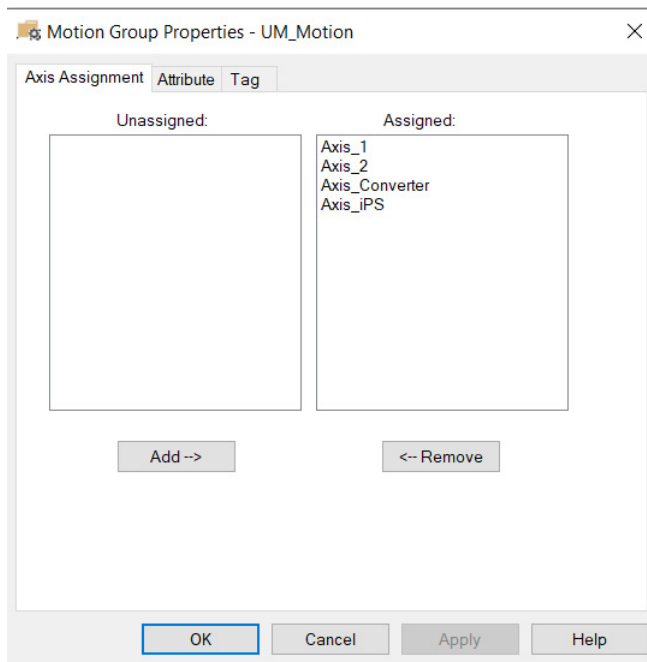
2. Type the new motion group Name.
3. Click Create.

Your new motion group appears in the Controller Organizer under the Motion Groups folder.



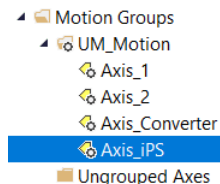
4. Right-click the new motion group and choose Properties.

The Motion Group Properties dialog box appears.



5. On the Axis Assignment tab, select and add each of your axes (created earlier) to the Assigned category.
6. Click the Attribute tab and edit the default values as appropriate for your application.
7. Click OK.

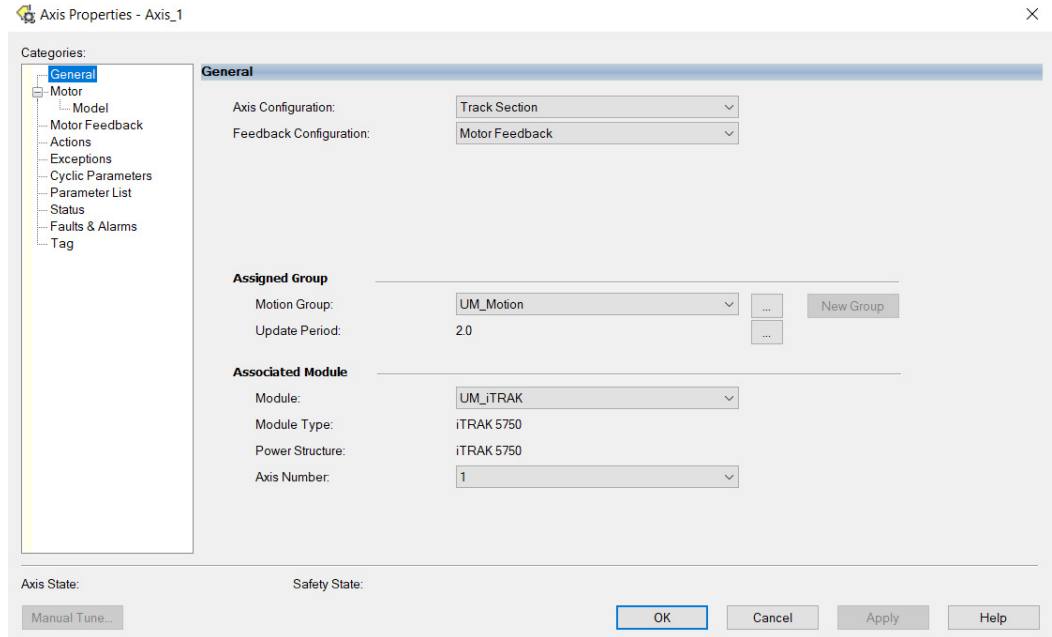
Your axes appear below the new motion group that you created earlier.



## Configure the Section Axis Properties

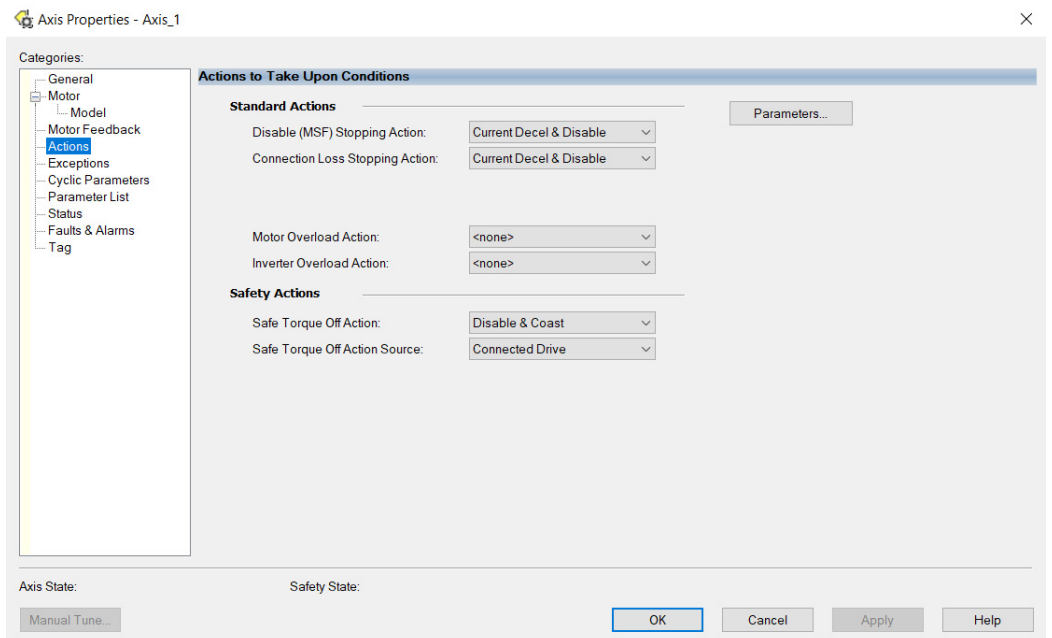
Follow these steps to configure section axis properties.

1. In the Controller Organizer, right-click a section axis and choose Properties.
2. Select the General category.  
The General dialog box appears.



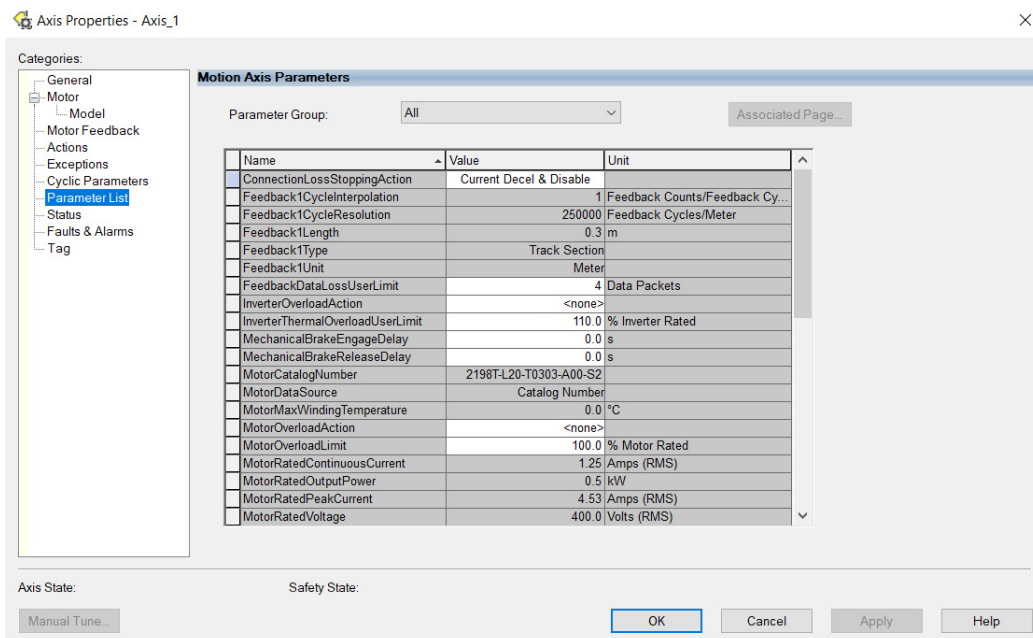
3. In the Associated Module section, in the Module pull-down menu, verify the name of the associated module.  
The iTRAK 5750 system catalog number appears in the Module Type and Power Structure fields.
4. Click Apply.
5. Select the Actions category.

From this dialog box, you can program actions and change the action for exceptions (faults). For more information on configuration selections, see [iTRAK 5750 Motor Module and Mover Behavior on page 135](#).





6. Select the Parameter List category.  
From this dialog box, you can change the values for different parameters as appropriate for your application.

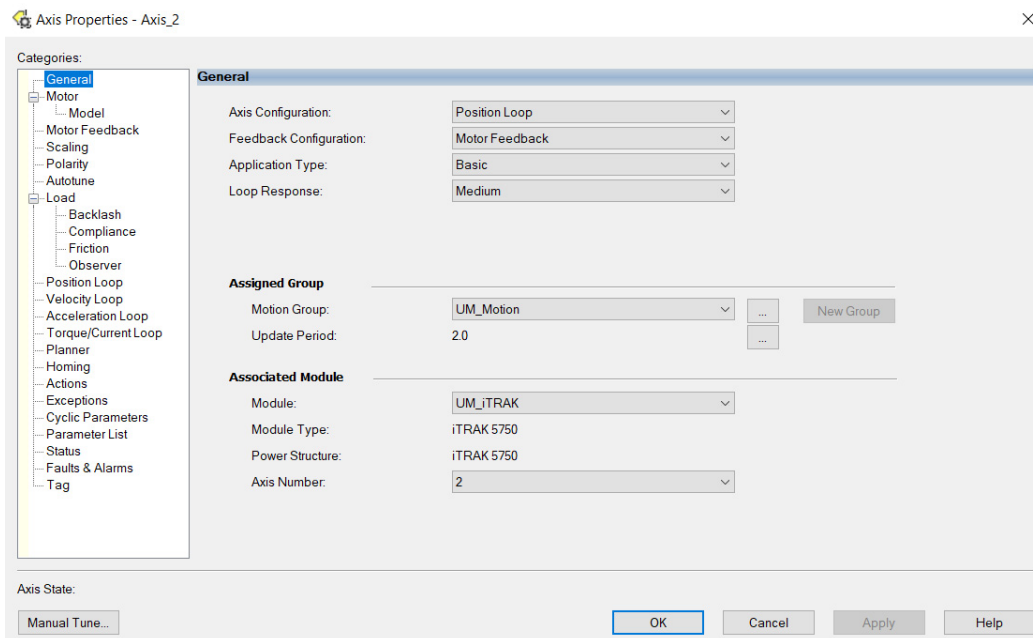


7. Click OK.
8. For each section axis, repeat [step 1...step 7](#).

### Configure the Mover Axis Properties

Follow these steps to configure mover axis properties.

1. In the Controller Organizer, right-click a mover axis and choose Properties.
2. Select the General category.  
The General dialog box appears.

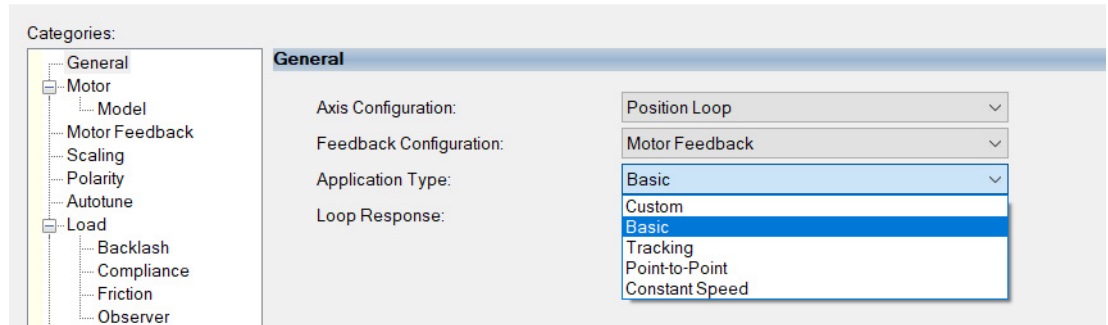


- In the General section, from the pull-down menus change configuration settings as needed for your application.

Attribute	Menu	Description
Axis Configuration	Position Loop	Position Control Mode, Closed Loop Control Method
	Torque Loop	Torque Control Mode, Closed Loop Control Method
Feedback Configuration	Motor Feedback	When Motor Feedback is selected, then commutation, acceleration, velocity, and position feedback signals are all derived from motor-mounted Feedback.

For more information on Control Modes, see the Integrated Motion on the EtherNet/IP Network Reference Manual, publication [MOTION-RM003](#).

- Choose an Application Type, if applicable.

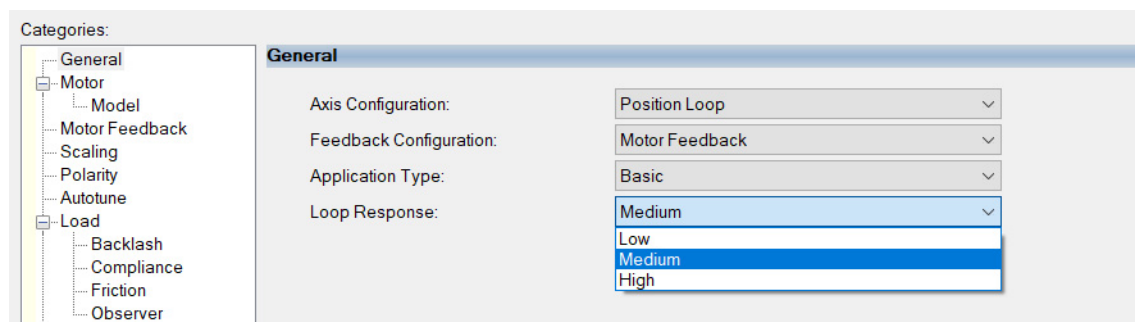


The Application Type determines the type of motion control application. This attribute is used to set the Gain Tuning Configuration Bits. This table lists the gains established based on application type.

Application Type	Kpi	Kvi	iHold	Kvff	Kaff	torqLPF
Custom <sup>(1)</sup>	—	—	—	—	—	—
Basic	No	No	No	Yes	No	Yes
Tracking	No	Yes	No	Yes	Yes	Yes
Point-to-Point	Yes	No	Yes	No	No	Yes
Constant Speed	No	Yes	No	Yes	No	Yes

(1) If you set the type to Custom, you can control the individual gain calculations by changing the bit settings in the Gain Tuning Configuration Bits Attribute.

- Choose a Loop Response, if applicable.



Loop Response settings also impact the calculations that are made that can minimize the need for you to perform an Autotune or a Manual Tune. The loop response impacts the spacing between the position loop and the proportional and integral gains. This response impacts how aggressively a given profile is tracked.

6. In the Associated Module section, from the Module pull-down menu, verify the name of the associated module.  
The iTRAK 5750 system catalog number appears in the Module Type and Power Structure fields.
7. To save your changes, click Apply.
8. Select the Scaling Category and edit the default values as appropriate for your application.

The screenshot shows the 'Axis Properties - Axis\_2' dialog box with the 'Scaling' category selected in the left-hand tree. The main panel is titled 'Scaling to Convert Motion from Controller Units to User Defined Units'. It contains several sections:
 

- Load Type:** Direct Coupled Linear (dropdown), with a 'Parameters...' button.
- Transmission:** Ratio I/O: 1 : 1 Rev.
- Actuator:** Type: <none> (dropdown), Lead: 1.0 (text box) with a 'Millimeter/Rev' dropdown, Diameter: 1.0 (text box) with a 'Millimeter' dropdown.
- Scaling:** Units: Position Units (text box), Scaling: 1.0 (text box) Position Units per 1.0 (text box) Motor Millimeter (dropdown).
- Travel:** Mode: Cyclic (dropdown), Range: 1000.0 (text box) Position Units, Unwind: 2400.0 (text box) Position Units per 1.0 (text box) Cycle. There is an unchecked checkbox for 'Soft Travel Limits' and two text boxes for 'Maximum Positive' and 'Maximum Negative' (both set to 0.0) with 'Position Units' labels.

 At the bottom, there is an 'Axis State' section with a 'Manual Tune...' button and 'OK', 'Cancel', 'Apply', and 'Help' buttons.



The Unwind value is the same as the overall length of your track.

9. To save any changes, click Apply.
10. Select the Load category and edit the default values as appropriate for your application.

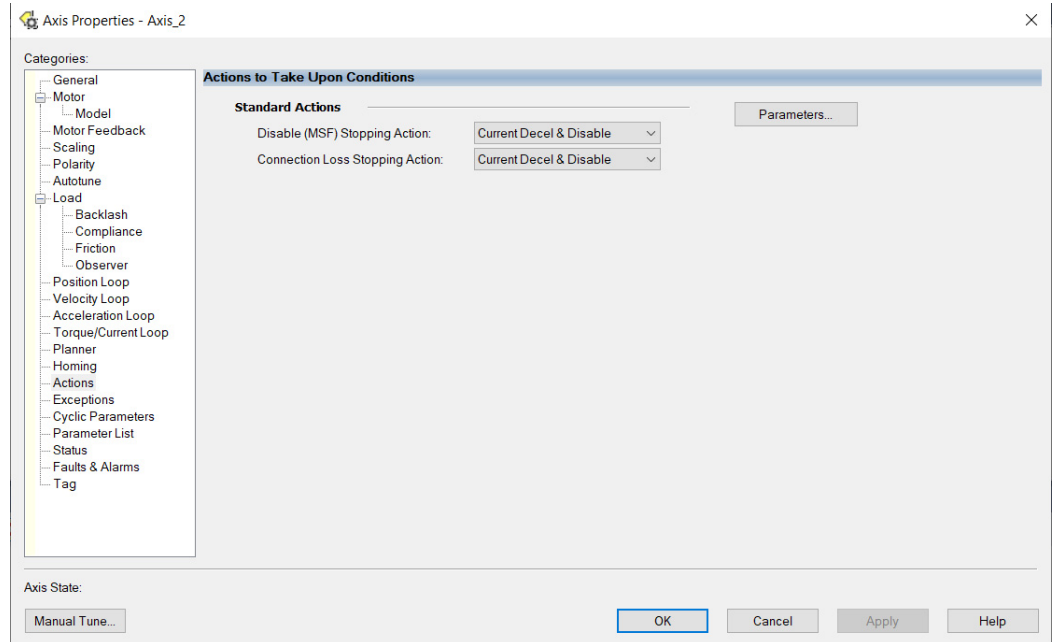
The screenshot shows the 'Axis Properties - Axis\_2' dialog box with the 'Load' category selected in the left-hand tree. The main panel is titled 'Characteristics of Motor Load'. It contains several sections:
 

- Load Inertia/Mass:** Load Coupling: Rigid (dropdown), Use Load Ratio: , Load Ratio: 0.0 (text box), Motor Mass: 0.754 (text box) Kg, Total Mass: 0.754 (text box) Kg.
- Inertia/Mass Compensation:** System Inertia: 1.9389263 (text box) % Rated/(Meter/s<sup>2</sup>), System Acceleration: 51.574936 (text box) Meter/s<sup>2</sup> @100 % Rated.
- Active Load Compensation:** Torque Offset: 0.0 (text box) % Rated.

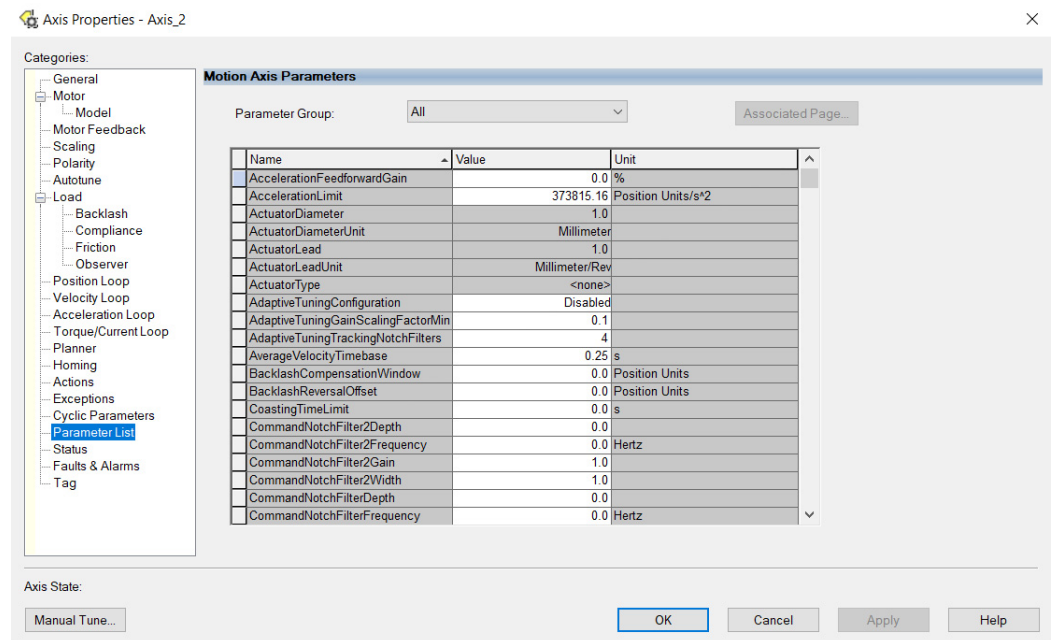
 At the bottom, there is an 'Axis State' section with a 'Manual Tune...' button and 'OK', 'Cancel', 'Apply', and 'Help' buttons.

11. To save any changes, click Apply.

12. Select the Actions category and program any actions and change the action for exceptions (faults) as appropriate for your application.



13. Select the Parameter List category and edit the values for different parameters as appropriate for your application.



14. Click OK.
15. For each mover axis, repeat [step 1...step 14](#).

## Download the Program

After completing the Studio 5000 application and saving the file, you must download your program to the Logix 5000 processor.

## Apply Power to the iTRAK 5750 System

You must complete the installation, power and control connections, and configuration for your iTRAK 5750 system before you complete this procedure.



**SHOCK HAZARD:** To avoid a hazard of electrical shock, complete all installation and power connections of the iTRAK 5750 system components before applying power. Once power is applied, connector terminals can have voltage present even when not in use.

Follow these steps to apply power to the iTRAK 5750 system.

1. Apply 24V DC control power.

The motor module status indicators begin this startup sequence:

- a. During the start-up process, NET and MOD appear steady red.
- b. During the power-up sequence, NET flashes green, red, off, and MOD flashes green, red, green.
- c. When the startup sequence completes, NET appears steady green, MOD continues to flash green.

If the startup sequence does not begin, check the 24V control power connections.

2. When the startup sequence completes, verify that the NET status indicator is steady green and the MOD status indicator is flashing green.

- a. Verify that the Kinetix 5700 DC-bus power supply axis-state is PRECHARGE.
- b. Verify the iTRAK power supply axis-state is PRECHARGE.

If the DC-bus power supply and iTRAK power supply do not reach the specified axis state and the two status indicators are not steady green, refer to [Interpret Status Indicators on page 129](#).

3. Apply mains input power and monitor the DC BUS voltage on the LCD display on the DC-bus power supply and iTRAK power supply.

If the DC BUS does not reach the expected voltage level, check the three-phase input power connections.



It can take as long as 1.8 seconds after input power is applied before the iTRAK 5750 motor modules can accept motion commands (does not apply to the iTRAK power supply).

- a. Verify that the DC-bus power supply axis-state is RUNNING.
- b. Verify that the iTRAK power supply axis-state is RUNNING.
- c. Verify that all motor module status indicators are steady green.

If the DC-bus power supply or iTRAK power supply does not reach the specified axis state, refer to [Fault Code Overview on page 128](#).

4. If the iTRAK system has not yet been commissioned, then before you apply a load to the track and movers, you must commission the iTRAK system. See, [Commission the iTRAK 5750 System on page 122](#).

5. If all of the following statements are true, then perform [step a](#):
  - The system uses a vertical or stand-up mounting orientation (to determine orientation, see [Figure 1 on page 12](#)).
  - The iTRAK system has previously been powered and run and then power was removed (power removal is covered in [Remove Power from the iTRAK 5750 System on page 43](#)).
  - To prevent movers from falling, mechanical securing mechanisms such as an external brake, arrester, or clamp mechanism, were used to secure movers before power was last removed.
  - You intend to use the iTRAK to move the movers before you remove power from the system.
  - a. While the system is powered, and before attempting to move any movers, remove all mover securing mechanisms. Use protective equipment such as heat protective gloves to avoid burn hazards while removing the mover securing mechanisms. See [Protection Against Contact with Hot Parts on page 44](#). If these mechanisms are removed while the system is not powered, the movers they secure will fall and may cause injury or damage.

## Bus-sharing Group Configuration

When configuring the Module Properties > Power category for each iTRAK 5750 motor module axis, you must assign the motor module to the appropriate bus-sharing (power) group. In other words, assign each motor module to the same secondary bus-sharing group as the iTRAK power supply to which it is physically connected.

### Bus-sharing Groups Example

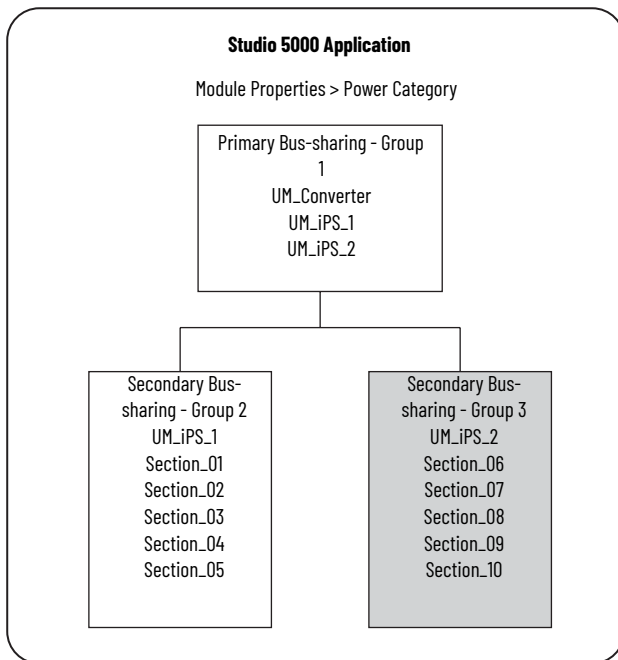
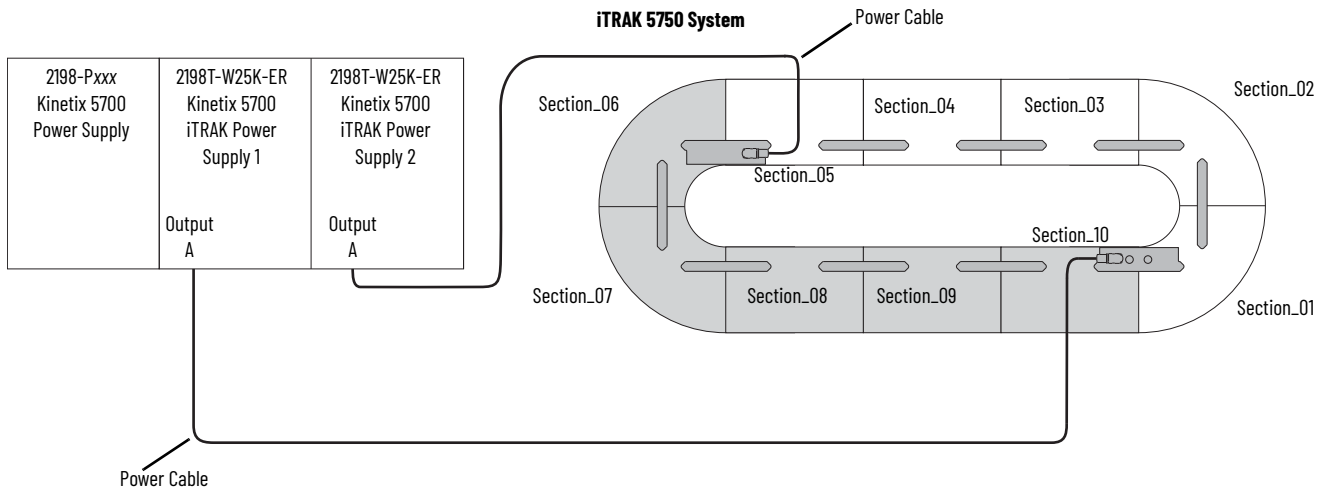
In [Figure 51 on page 119](#), 12 iTRAK 5750 motor module sections are needed to support the motion application. All 12 section axes are configured in the same Motion group in the Studio 5000 application.

However, the 12 motor module sections are also configured as two bus-sharing groups. With two secondary bus-sharing groups, a fault on iTRAK Power Supply 1 only results in a Bus Power Sharing exception on motor modules in Secondary Bus-sharing Group 2. The fault has no effect on the operation of Secondary Bus-sharing Group 3 motor modules. However, a fault on the 2198-Pxxx Kinetix 5700 Power Supply results in Bus Power Sharing exceptions on all motor modules in both secondary bus-sharing groups since both iTRAK Power Supplies are in Primary Bus-sharing Group 1 and cascade the exception to their respective secondary bus-sharing groups.



**ATTENTION:** To avoid damage to equipment, all modules that are physically connected to the same shared-bus connection system must be part of the same Bus-sharing Group in the Studio 5000 application.

Figure 51 - Bus-sharing Groups Example



## Configure Bus-sharing Groups

In both groups, the Bus Configuration for the iTRAK power supply is Shared DC/DC and the Bus Configuration for the iTRAK 5750 system is Shared DC.

Figure 52 - Group 1 Kinetix 5700 iTRAK Power Supply Configuration

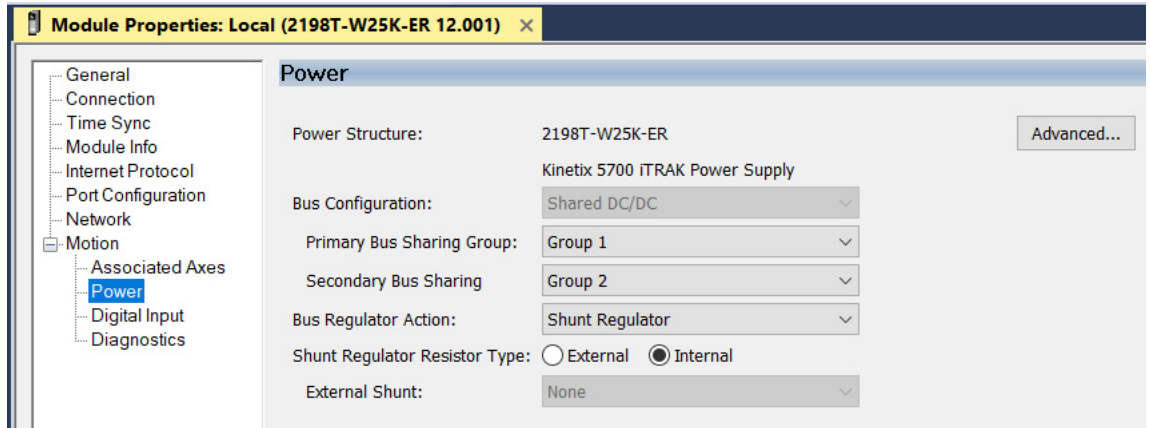


Figure 53 - Group 2 iTRAK 5750 System Configuration

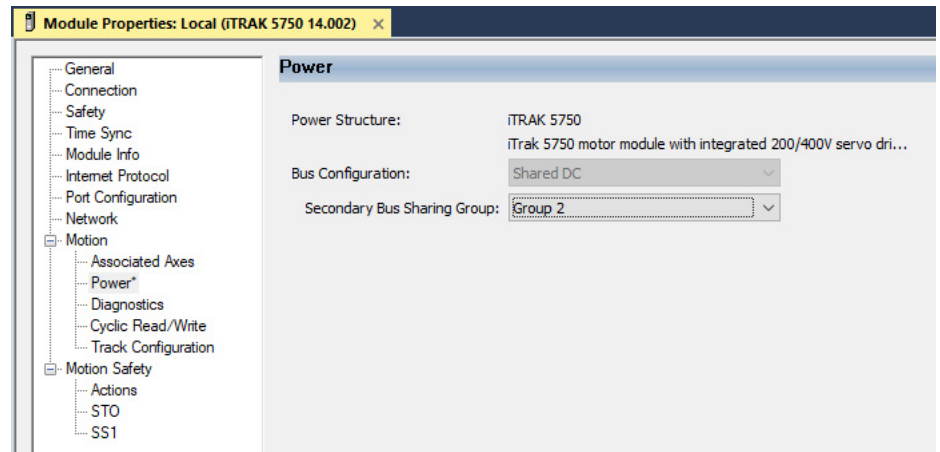




Figure 54 - Group 3 iTRAK Power Supply Configuration

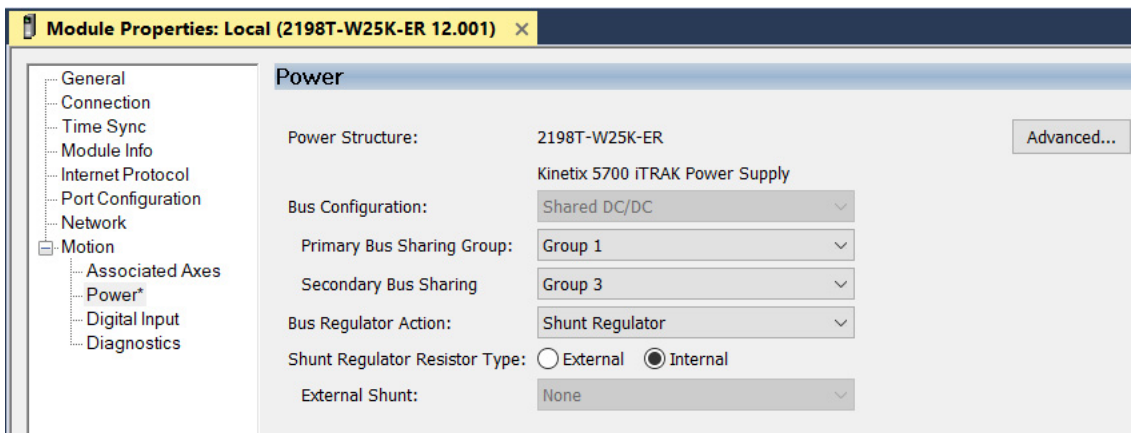
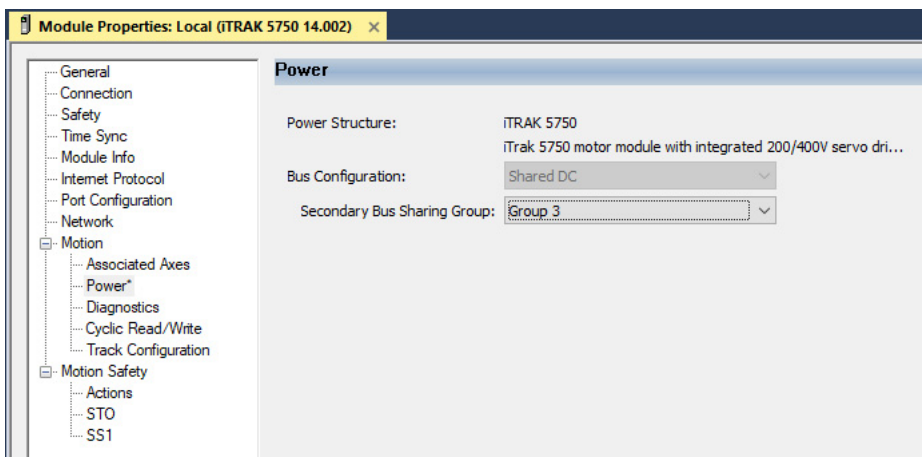


Figure 55 - Group 3 iTRAK 5750 System Configuration



## Commission the iTRAK 5750 System

The iTRAK 5750 system must be commissioned properly to provide accurate mover position feedback on the track system. This section provides instructions on how to establish smooth mover transitions between motor module sections.

### Motor Module Section Gap Position Compensation

To control mover positions accurately on the track system, the motor modules monitor feedback from the mover position magnets. Motor module sections can report different absolute positions at the gap where modules adjoin. To reconcile the difference in the reported absolute positions, the motor module sections calculate a position compensation. The position compensation is applied to the boundaries between sections to produce smooth mover section-to-section transitions.

To calculate the position compensation, the motor module sections must identify the absolute position differences at all transitions as movers traverse the track. The calculated values for the position compensation are measured for each mover and stored in nonvolatile memory. After subsequent power cycles, each motor section reads nonvolatile memory and immediately applies the appropriate position compensation. Take the following into consideration when deciding whether to assign a reference mover:

- When you configure a reference mover, the correct sequence number and position compensation are applied automatically to each mover in the system after a power cycle.
- When you do not configure a reference mover, position accuracy across motor module gaps can be degraded after a power cycle.



**ATTENTION:** A pinch point hazard exists. A mover can have sudden and fast motion due to magnetic attraction. To avoid personal injury, do not put your fingers between the mover and motor module.



You can assign a reference mover and mover sequence numbers in the Mover Axis Assignment Sequence field in the Module Properties - Track Configuration dialog box. For descriptions of how the Mover Axis Assignment Sequence settings work, see [page 104](#).

You must complete the procedure [Calculate and Store Position Gap Compensation Values on page 123](#) in the following situations:

- After the initial iTRAK 5750 system installation is complete, and before the system is put into service
- After a motor module has been replaced
- After a mover has been replaced, or removed from or added to the track system
- After the 'Mover Axis Assignment Sequence' field selection has been changed

This procedure assumes that you have configured your iTRAK 5750 system, your Logix 5000 controller, and applied power to the system.

### IMPORTANT

Before you commission the iTRAK 5750, verify that the MOD and NET status indicators are operating as described in [Interpret Status Indicators on page 129](#).

## Calculate and Store Position Gap Compensation Values

Follow these steps to complete the section gap position-compensation procedure.

1. Enable the iTRAK system with an MSO instruction or motion direct command to all section and mover axes.
2. At a speed of approximately 0.5 m/s, run the movers around the track for 3...5 minutes.



If a motor overspeed fault (FLT S04) occurs, reduce the speed to less than 0.5 m/s, and repeat step 2. If an overspeed fault persists, disable the section and mover axes and manually move the movers around the track. Each mover must be moved back and forth across the motor section gaps at least 2...3 times.

3. Disable the track system with an MSF instruction or motion direct command to all section and mover axes.
4. Save your project.

Previously stored values can make calculating new values problematic. If overspeed errors persist, complete these steps.

1. For all motor modules in the system, in the Track Configuration dialog box, change the 'Mover Axis Assignment Sequence' field.
2. Download the project to delete all position compensation values from nonvolatile memory.
3. For all motor modules, change the 'Mover Axis Assignment Sequence' field back to the original value.
4. Repeat the gap position compensation procedure.

## Tune the Axes

This procedure assumes that you have configured your iTRAK 5750 system, your Logix 5000 controller, and applied power to the system.

### IMPORTANT

Before you tune your axes, verify that the MOD and NET status indicators are operating as described in [Interpret Status Indicators on page 129](#).

For help with using the Studio 5000 application as it applies to tuning your axes with ControlLogix EtherNet/IP modules or CompactLogix 5370 controllers, see [Additional Resources on page 9](#).

## Tune the Axes with Load Observer

The load observer feature provides high-performance motion control without having to manually tune your axis. Using load observer with a default set of gains can yield high-performance right out of the box. Most of the time, there is no need to perform an autotune or further optimize gain settings.

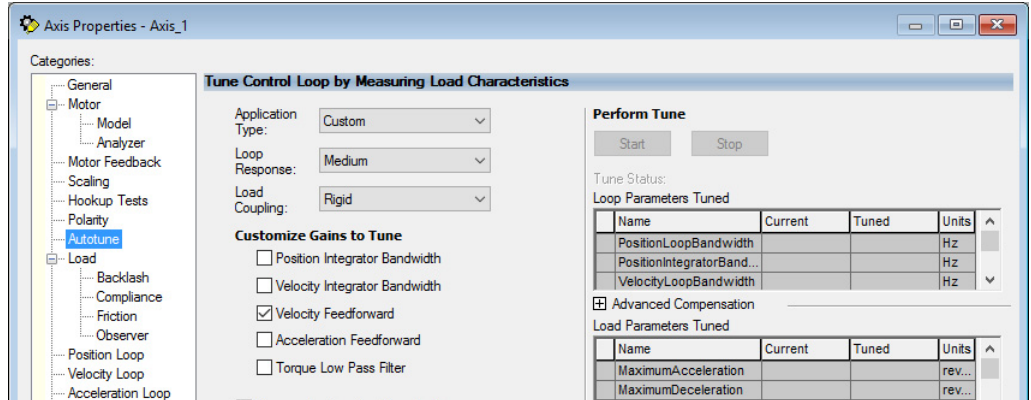
Follow these steps to configure the iTRAK 5750 system for high performance by using the load observer feature.

1. Verify that the load is connected.  
Reattach the load if it was disconnected.

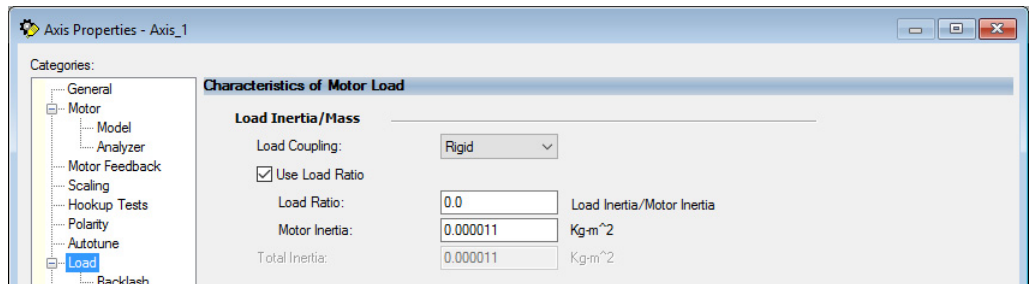


**ATTENTION:** If the iTRAK 5750 system has not been enabled before (new installation), verify that you have safeguards in place to safely remove power from the drive if there is an unstable situation where the drive can produce undesired motion.

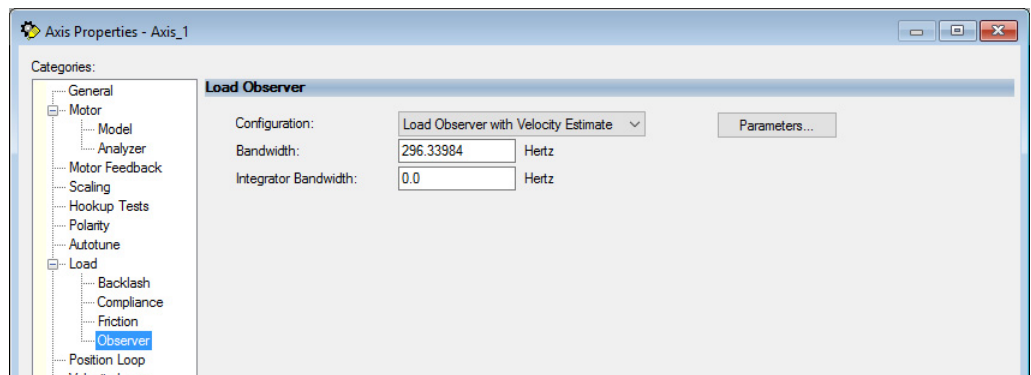
2. Click the Autotune category in the mover Axis Properties dialog box.
  - a. From the pull-down menu for Application Type, choose Custom.
  - b. From the pull-down menu for Loop Response, choose Medium.
  - c. From the pull-down menu for Load Coupling, choose Rigid settings.
  - d. Verify that only the Velocity Feedforward box is checked.
  - e. Uncheck the Torque Low Pass Filter box (that is checked by default).



3. Click the Load category in the Axis Properties dialog box.
  - a. Check Use Load Ratio.
  - b. Set the Load Ratio = 0.

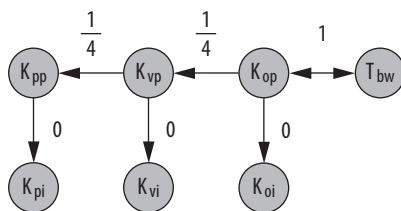


4. Click the Observer category in the Axis Properties dialog box.
  - a. Verify that Load Observer with Velocity Estimate appears in the Configuration field. Load Observer is not available for Torque Loop control.

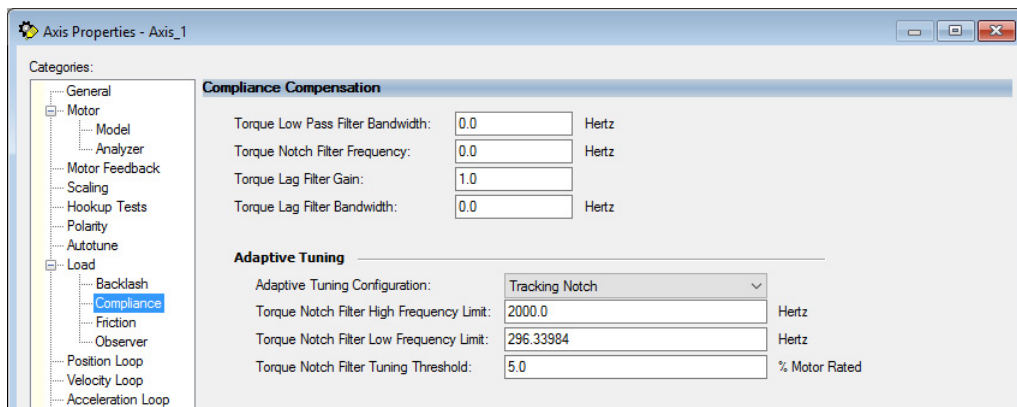


- b. Click Apply and click Yes to update all dependent attributes.

c. The Load Observer Bandwidth and other gains are set automatically.



5. Click the Compliance category in the Axis Properties dialog box.
6. From the Adaptive Tuning Configuration pull-down menu, choose Tracking Notch.



- d. Click Apply.
7. Enable the iTRAK 5750 system for a few seconds with an MSO instruction or motion direct command, followed by an MSF instruction or motion direct command, to make sure that no audible squealing noise is present.

### IMPORTANT

If an audible squealing noise is heard, go to Axis Properties > Load > Compliance category and set the Torque Notch Filter Frequency field (Hz) to remove the noise. See Motion System Tuning Application Techniques, publication [MOTION-AT005](#) (Compensating for High Frequency Resonances), for information on how to set the Torque Notch Filter Frequency field.

8. Repeat Tune the Axes with Load Observer for each axis.

**Notes:**

## Troubleshooting

This chapter provides troubleshooting information for your iTRAK® 5750 system.

Topic	Page
Safety Precautions	127
Interpret Fault Codes	127
Interpret Status Indicators	129
Axis Troubleshooting	132
Logix 5000 Controller and iTRAK System Behavior	134

### Safety Precautions

Observe the following safety precautions when troubleshooting your iTRAK 5750 system.



**ATTENTION:** Capacitors on the DC bus can retain hazardous voltages after input power has been removed. Before working on the system, measure the DC bus voltage to verify it has reached a safe level or wait the full time interval as indicated in the warning on the front of the module. Failure to observe this precaution could result in severe bodily injury or loss of life.



**ATTENTION:** Do not attempt to defeat or override the module fault circuits. You must determine the cause of a fault and correct it before you attempt to operate the system. Failure to correct the fault could result in personal injury and/or damage to equipment as a result of uncontrolled machine operation.



**ATTENTION:** Provide an earth ground for test equipment (oscilloscope) used in troubleshooting. Failure to ground the test equipment could result in personal injury.

### Interpret Fault Codes

See the tables in this section to identify faults, potential causes, and the appropriate actions to resolve the fault. If the fault persists after attempting to troubleshoot the system, contact your Rockwell Automation sales representative for further assistance.



This manual links to the iTRAK 5750 System Fault Codes Reference Data, publication [2198T-RD002](#), for fault codes; download the spreadsheet now for offline access.

## Fault Code Overview

The fault code tables are designed to help you determine the source of the fault or exception. When a fault condition is detected, the motor section or mover performs the appropriate fault action and the fault is added to a persistent fault log (along with diagnostics data). If a fault condition is still active following a Fault Reset service, the fault is again written to the fault log.

However, there can be a delay before the fault is posted again. In a Studio 5000 Logix Designer® application (also called the Studio 5000® application), this delay results as the AxisFault tag on the axis being cleared until the fault is posted again. During this delay, the AxisState tag continues to indicate that the axis is faulted. Use the AxisState tag on the axis object only to determine if an axis is faulted.

Although software overtravel fault codes do not exist, software overtravel detection for the AXIS\_CIP\_DRIVE axis type is determined in the Logix 5000® controller. For more information, see Integrated Motion on the EtherNet/IP™ Network Reference Manual, publication [MOTION-RM003](#).

The iTRAK 5750 maintains a fault log of the last 128 faults. The fault log includes time stamps and is stored in persistent memory. However, the fault log cannot be cleared on the module.

**Table 14 - Fault Code Summary**

Fault Code Type <sup>(1)</sup> <sup>(2)</sup>	Description
FLT Sxx	Standard runtime axis exceptions. The exception can apply to an individual axis or to all axes.
FLT Mxx	Manufacturer-specific runtime axis exception. The exception can apply to an individual axis or to all axes.
INIT FLT Sxx	Exceptions that prevent normal operation and occur during the initialization process.
INIT FLT Mxx	
NODE FLTxx	Exceptions that can prevent normal operation and apply to the entire module and affect all axes.
NODE ALARM xx	Exceptions that can prevent normal operation, but do not result in any action other than reporting the alarm to the controller.
INHIBIT Sxx	Conditions that prevent normal operation and indicate that the axis is prevented from being enabled.
INHIBIT Mxx	
SAFE FLTxx	Exception that is generated by a fault condition that is detected in the safety function.

(1) Sxx refers to Standard exceptions.

(2) Mxx refers to Manufacturer-specific exceptions.



Fault codes triggered by conditions that fall outside factory set limits are identified by FL at the end of the display message. For example, FLT S07 - MTR OVERLOAD FL.

Fault codes triggered by conditions that fall outside user-set limits are identified by UL at the end of the display message. For example, FLT S08 - MTR OVERLOAD UL.



## Mover Numbers in Fault Codes

When a fault about a mover appears, the fault text includes the mover number as the sub code at the end of the fault text. Movers are numbered based on which option you select for the Mover Axis Assignment Sequence configuration parameter, as described on [page 104...page 106](#).

## Motor Module Numbers in Fault Codes

In addition to the motor module name and IP address, the motor module is also given a number. You do not enter this number; it is assigned automatically based on the position of the motor module relative to the power and control input connector module. The first motor module that is connected to the power and control input connector module is numbered 0, the next motor module 1, and so on. When a fault about a motor module appears, the fault text includes the motor module number as the sub code at the end of the fault text. For example, the fault text "INIT FLT 28 - Sub Code 1" means that the second motor module from the power and control input connector module is affected.

## Interpret Status Indicators

Use the information in this section to identify the status of the motor and connector modules by using the status indicators.

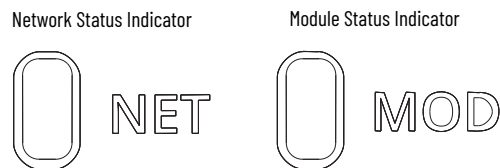
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**IMPORTANT** Status indicators are not reliable for safety functions. Use status indicators only for general diagnostics during commissioning or troubleshooting. Do not attempt to use status indicators to determine operational status.

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## Motor Module Status Indicators

The iTRAK 5750 motor modules have the following status indicators. For the location of these indicators on the motor modules, see [Motor Modules on page 22](#). For descriptions of the functioning of these status indicators, see [Table 15](#), [Table 16 on page 130](#), and [Table 17 on page 130](#).



**Table 15 - Network (NET) Status Indicator Descriptions**

Condition	Status
Steady Off	There is no power applied to the motor module section or the IP address is not configured.
Flashing Green	No Motion or Safety connection is established, but the motor module section has obtained an IP address.
Steady Green	A Motion or Safety connection is established and no timeout has occurred. Normal operation.
Flashing Red	Connection timeout. One or more of the connections, for which this motor module section is the target, has timed out.
Steady Red	Duplicate IP address. The IP address that is specified is already in use.
Flashing Green/Red	Self-test. The motor module section performs a self-test during powerup. Once the self-test is complete, the Flashing Green/Red condition continues if the motor module section is processing a safety device ID proposal.

**Table 16 - Module (MOD) Status Indicator Descriptions**

<b>Condition</b>	<b>Status</b>
Steady Off	There is no power applied to the motor module section.
Steady Green	The motor module section is operational. No faults or failures.
Flashing Green	Standby (motor module section not configured), Precharge (motor module section is configured), or one or more axes are inhibited or shut down.
Flashing Red	Major recoverable fault. The motor module section detected a recoverable fault. For example, an incorrect or inconsistent configuration occurred.
Steady Red	Major fault. The motor module section detected a nonrecoverable fault.
Flashing Green/Red	Self-test. The motor module section performs a self-test during powerup. Once the self-test is complete, the Flashing Green/Red condition continues if the motor module section is waiting for integrated STO safety configuration.

**Table 17 - Network (NET) and Module (MOD) Combined Status Indicator Descriptions**

<b>Condition</b>	<b>Status</b>
NET and MOD alternately Flashing Red	A firmware update is in progress. Control power must NOT be removed during this condition. As different segments of the section complete the firmware update, the status indicators can momentarily exit the firmware update indication. Be sure that the non-firmware update condition is maintained for 1 minute before removing control power.
MOD Flashing Red alternating with NET Flashing Green	A firmware update is required.

## Connector Module Status Indicators

The iTRAK 5750 power and control input and power input with control pass-through connector modules contain the following status indicators.

Figure 56 - Power and Control Input Connector Module, Top View

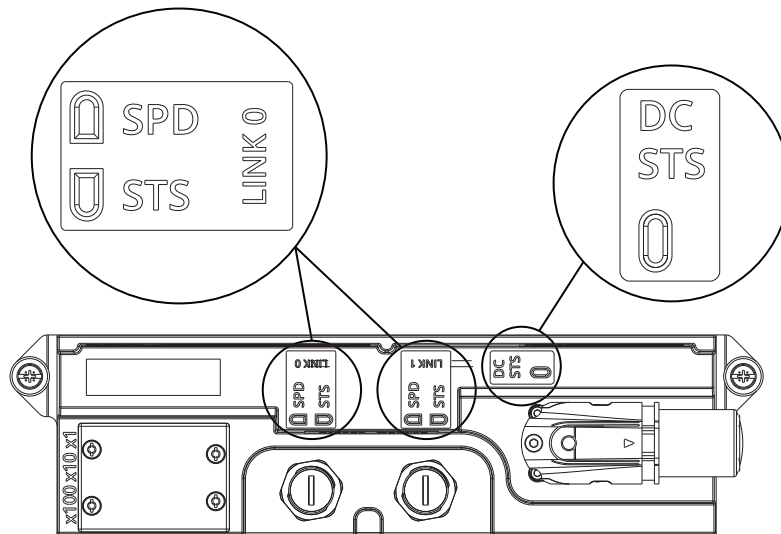


Table 18 - LINK 0/1 Ethernet Link Speed (SPD) Status Indicator Descriptions <sup>(1)</sup>

Condition	Status
Steady Off	No connection or 1 Gb/s link if the STS indicator is flashing
Steady On Yellow	100 Mbit

(1) Present on the power and control connector module only.

Table 19 - LINK 0/1 Ethernet Link/Activity (STS) Status Indicator Descriptions <sup>(1)</sup>

Condition	Status
Steady Off	No link
Steady On Green	Link established
Flashing Green	Network activity or 1 Gb/s link if the SPD indicator is off

(1) Present on the power and control connector module only.

Table 20 - DC Power (DC STS) Status Indicator Descriptions <sup>(1)</sup>

Condition	Status
Steady Off	24V DC control power is off and DC bus voltage is unknown
Steady On Green	24V DC control power is present and the DC bus voltage is < 50V DC
Steady On Amber	24V DC control power is present and the DC bus voltage is > 50V DC

(1) Present on the power and control connector module and power with control pass-through connector module only.



**SHOCK HAZARD:** To avoid a shock hazard or personal injury, verify that all power has been removed before proceeding with installation or maintenance tasks. The motor modules and Kinetix® 5700 iTRAK power supply require 5 minutes to discharge before you handle wire and cable connections.

## Axis Troubleshooting

These conditions do not always result in a fault code, but can require troubleshooting to improve iTRAK 5750 performance.

Table 21 - Axis Troubleshooting

Condition	Potential Cause	Possible Resolution
Axis or system is unstable	Unintentionally in Torque mode.	Check to see what primary operation mode was programmed.
	Motor tuning limits are set too high.	Run Tune in the Studio 5000 application.
	Position loop gain or position controller accel/decel rate is improperly set.	Run Tune in the Studio 5000 application.
	Improper grounding or shielding techniques are causing noise to be transmitted into the position feedback interface, causing erratic axis movement.	Check wiring and ground.
	Mechanical resonance.	<ul style="list-style-type: none"> <li>Notch filter or output filter can be required (see the Axis Properties dialog box, Compliance tab in the Studio 5000 application).</li> <li>Enable adaptive tuning. See <a href="#">Tune the Axes on page 123</a> for more notch filter information.</li> </ul>
You cannot obtain the motor acceleration/deceleration that you want	Torque Limit limits are set too low.	Verify that torque limits are set properly.
	The system inertia is excessive.	<ul style="list-style-type: none"> <li>Check motor size versus application need.</li> <li>Review servo system sizing.</li> </ul>
	The system friction torque is excessive.	<ul style="list-style-type: none"> <li>Check motor size versus application need.</li> <li>Check lubrication system.</li> </ul>
	Available current is insufficient to supply the correct accel/decel rate.	<ul style="list-style-type: none"> <li>Check motor size versus application need.</li> <li>Review servo system sizing.</li> </ul>
	Acceleration limit is incorrect.	Verify limit settings and correct them as necessary.
	Velocity Limit limits are incorrect.	Verify limit settings and correct them as necessary.
Motor does not respond to a command	The axis cannot be enabled until stopping time has expired.	Disable the axis, wait the configured stopping time, and enable the axis.
	The motor module has malfunctioned.	Contact technical support or replace the motor module.
	Primary operation mode is set incorrectly.	Check to see what primary operation mode was programmed.
	Velocity or torque limits are set incorrectly.	Check and properly set the limits.
No movement	The motor module connections are loose or open.	Check motor module connections.
	Foreign matter is lodged in the motor.	Remove foreign matter.
	The motor load is excessive.	Verify the servo system sizing.
	The mover bearings are worn.	Replace the mover for repair.
	The motor brake is engaged (if supplied).	<ul style="list-style-type: none"> <li>Check brake wiring and function.</li> <li>Return the motor for repair.</li> </ul>
Motor overheating	The duty cycle is excessive.	Change the command profile to reduce accel/decel or increase time.
	The mover is partially demagnetized causing excessive motor current.	Return the mover for repair.

Table 21 - Axis Troubleshooting (Continued)

Condition	Potential Cause	Possible Resolution
Abnormal noise	Motor tuning limits are set too high.	Run Tune in the Studio 5000 application.
	Loose parts are present in the mover or section.	<ul style="list-style-type: none"> <li>Remove the loose parts.</li> <li>Return motor for repair.</li> <li>Replace motor module.</li> </ul>
	There is insufficient lubrication on the track.	Adjust lubrication application rate or refill lubrication reservoirs.
	There is foreign debris on the rails.	Clean all rail surfaces and reapply lubricant.
	The rails are misaligned.	Realign all rail joints. The steps to align rail joints are included in the following procedures: <ul style="list-style-type: none"> <li><a href="#">Replace a Straight Segment of the Top or Bottom Rail on page 164</a></li> <li><a href="#">Replace a Curve Segment of the Top or Bottom Rail on page 168</a></li> <li><a href="#">Replace a Straight Segment of the Middle Rail on page 174</a></li> <li><a href="#">Replace a Curve Segment of the Middle Rail on page 177</a></li> </ul>
	The rail system is worn.	Replace damaged rail segments. Use one of the following procedures. <ul style="list-style-type: none"> <li><a href="#">Replace a Lubrication Segment of a Top or Bottom Rail on page 162</a></li> <li><a href="#">Replace a Straight Segment of the Top or Bottom Rail on page 164</a></li> <li><a href="#">Replace a Curve Segment of the Top or Bottom Rail on page 168</a></li> <li><a href="#">Replace a Lubrication Segment of a Middle Rail on page 173</a></li> <li><a href="#">Replace a Straight Segment of the Middle Rail on page 174</a></li> <li><a href="#">Replace a Curve Segment of the Middle Rail on page 177</a></li> </ul>
	A through bolt or coupling is loose.	Tighten bolts.
	The mover bearings are worn.	Perform the procedure in <a href="#">Replace Mover Cam-follower Wheels or Flexures on page 153</a> or return the mover for repair.
Mechanical resonance.	Notch filter can be required (refer to Axis Properties dialog box, Compliance tab in the Studio 5000 application).	
Undesired FLT M32 - TRACK STOP major faults when another axis on the track experiences a fault	The Track Stop exception is configured with an exception Action of Disable or Shutdown.	Change the Track Stop exception Action setting to Ignore or Alarm. Changing the Action setting to Ignore or Alarm allows axes to continue to run when another axis on the track experiences a major fault. Setting the Action to Alarm allows the Logix controller program to respond when a fault occurs. A possible response is to bring other axes to a controlled stop at specific locations. However, the ability to perform the desired response can be affected by the other faulted axis.
Unexpected FLT M33 - LOST MOVER	A mover position magnet assembly is missing or damaged.	Inspect the movers for a missing or damaged position magnet.
	Magnetic interference has occurred.	Remove any foreign materials that can have interfered with the mover position-magnets magnetic field.

## Logix 5000 Controller and iTRAK System Behavior

By using the Studio 5000 application, you can configure how the iTRAK 5750 system responds when a module fault/exception occurs.



The INIT FLT xxx faults are always generated after powerup, but before the axis is enabled, so the stopping behavior does not apply.

NODE ALARM xxx faults do not apply because they do not trigger stopping behavior.

The iTRAK 5750 motor sections and movers support fault actions for Ignore, Alarm, Minor Fault, and Major Fault as defined in [Table 22](#). They also support the configurable stopping actions as defined in the [Table 24 on page 135](#).

**Table 22 - iTRAK 5750 Module Exception Action Definitions**

Exception Action	Definition
Ignore	The motor section or mover completely ignores the exception condition. For some exceptions that are fundamental to the operation of the planner, Ignore is not an available option.
Alarm	The motor section or mover sets the associated bit in the Motion Alarm Status word, but does not otherwise affect axis behavior. Like Ignore, if the exception is so fundamental to the motor section or mover, Alarm is not an available option. When an exception action is set to Alarm, the Alarm goes away by itself when the exceptional condition has cleared.
Minor Fault	The motor section or mover latches the exception condition, but does not execute any exception action.
Major Fault	The motor section or mover latches the exception condition and executes the configured exception action.

You can configure exception behavior in the Studio 5000 application from the Axis Properties dialog box, Actions category. These controller exception actions are mapped to the motor section or mover exception actions.

**Table 23 - Studio 5000 Exception Action Definitions**

Exception Action	Definition
Ignore	The controller completely ignores the exception condition. For some exceptions that are fundamental to the operation of the planner, Ignore is not an available option.
Alarm	The controller sets the associated bit in the Motion Alarm Status word, but does not otherwise affect axis behavior. Like Ignore, if the exception is so fundamental to the axis, Alarm is not an available option. When an exception action is set to Alarm, the Alarm goes away by itself when the exceptional condition has cleared.
Fault Status Only	Like Alarm, Fault Status Only instructs the controller to set the associated bit in the Motion Fault Status word, but does not otherwise affect axis behavior. However, unlike Alarm, an explicit Fault Reset is required to clear the fault once the exceptional condition has cleared. Like Ignore and Alarm, if the exception is so fundamental to the axis, Fault Status Only is not an available option.
Stop Planner	The controller sets the associated bit in the Motion Fault Status word and instructs the Motion Planner to perform a controlled stop of all planned motion at the configured maximum deceleration rate. An explicit Fault Reset is required to clear the fault once the exceptional condition has cleared. If the exception is so fundamental to the axis, Stop Planner is not an available option.
Disable	When the exception occurs, the associated bit in the Fault Status word is set and the axis comes to a stop by using the stopping action that is defined by the axis for the particular exception that occurred. If there is a fault, there is no controller-based configuration to specify what the stopping action is. The stopping action is device-dependent.
Shutdown	When the exception occurs, the axis comes to a stop by using the stopping action defined by the axis (as in Stop Drive) and the power module is disabled. An explicit Shutdown Reset is required to restore the axis to operation.

## Kinetix 5700 iTRAK Power Supply Behavior

See the iTRAK Power Supply Behavior section in Chapter 7 of the Kinetix 5700 Servo Drive User Manual, publication [2198-UM002](#), for details.

## iTRAK 5750 Motor Module and Mover Behavior

For the iTRAK 5750 motor modules and movers, only selected exceptions are configurable. [Table 24](#) provides a list and descriptions of the available configurable stopping actions.

**Table 24 - Configurable Stopping Actions**

Stopping Action	Description
Current Decel & Hold <sup>(1)</sup>	Most control
Current Decel & Disable	Less control
Disable & Coast	Least control

The best available stopping action is the one that maintains the most control over the motor. However, not all faults support every stopping action.

(1) This stop action is support by the movers only.

When a section axis is configured for Current Decel & Disable, the power structure remains enabled until the configured Stopping Time Limit expires. The configured Stopping Time Limit provides time for the Logix controller program to bring the movers to a controlled stop. The section does not initiate any stopping actions on mover axes during the configured Stopping Time Limit.

[Table 25](#) provides a list and description of the available standard and safety actions and behaviors. Actions define the motor section or mover behavior in response to specific conditions. The Actions category includes Standard Actions and Safety Actions. See [Standard Actions](#) and [Safety Actions](#) for detailed descriptions of these actions.

**Table 25 - Actions Definitions**

Action Category	Action Name	Action Trigger Condition	Available Actions
Standard	Disable (MSF) Stopping Action	Execution of an MSF motion instruction.	<ul style="list-style-type: none"> <li>Current Decel &amp; Hold <sup>(1)</sup></li> <li>Current Decel &amp; Disable</li> <li>Disable &amp; Coast</li> </ul>
	Connection Loss Stopping Action	Loss of the motion connection (for example, inhibiting the module or a network cable disconnect).	<ul style="list-style-type: none"> <li>Current Decel &amp; Disable</li> <li>Disable &amp; Coast</li> </ul>
	Motor Overload Action <sup>(2)</sup>	Receiving MTR OVERLOAD fault.	<ul style="list-style-type: none"> <li>Current Foldback</li> <li>None</li> </ul>
	Inverter Overload Action <sup>(2)</sup>	Receiving INV OVERLOAD fault.	<ul style="list-style-type: none"> <li>Current Foldback</li> <li>None</li> </ul>
Safety	Safe Torque Off Action <sup>(2)</sup>	Transition from logic 0 to 1 of the SafeTorqueOffActiveStatus axis tag, which indicates a Safe Torque Off (STO) action was commanded.	<ul style="list-style-type: none"> <li>Current Decel &amp; Disable</li> <li>Disable &amp; Coast</li> </ul>
	Safe Torque Off Action Source <sup>(2)</sup>	Determines whether the connected motor module section or controller initiates the stopping sequence in response to a Safe Torque Off (STO) active condition in the Axis safety status attribute.	<ul style="list-style-type: none"> <li>Connected Drive</li> <li>Running Controller</li> </ul>

(1) This action is supported by the movers only.

(2) This action is supported by the motor sections only.

### Standard Actions

When a controller connection loss (NODE FLT 06) occurs, it is possible that other node faults can occur first, triggering a fault action of Current Decel & Disable. Without knowing if NODE FLT 06 will occur first on a connection loss fault, we recommend that you do not change the default connection loss setting of Current Decel & Disable.



Use DLR ring topology (see [Device Level Ring Topology on page 39](#)) for applications where the possibility of connection loss must be minimized.

### Safety Actions

When the Safe Torque Off Action Source is set to “Running Controller,” the connected motor module does not perform any stopping actions in response to a STO active condition. You must configure your Logix program to perform the desired stopping action in response to a STO active condition. A section axis configured to “Disable” remains enabled until the configured STO Delay expires and the iTRAK 5750 system enters the safe state.

When the Safe Torque Off Action Source is set to “Connected Drive,” the connected motor module performs the configured Safe Torque Off Action. For an iTRAK 5750 motor module section, a “Current Decel & Disable” stopping action only maintains the enabled state of the section axis for the configured stopping time limit before activating the brake control bit and disabling the section axis. The motor module section does not initiate any action on movers.

[Table 26](#), [Table 27 on page 137](#), and [Table 29 on page 138](#) provide the controlling attribute for programmable fault actions.

**Table 26 - Motor Section and Mover Fault Behavior, FLT Sxx Fault Codes**

Exception Fault Code	Exception Text	Section Axis					Best Available Stopping Action (applies to major faults)	Mover Axis					
		Supported	Fault Action					Supported	Fault Action				Best Available Stopping Action (applies to major faults)
			Ignore	Alarm	Minor Fault	Major Fault			Ignore	Alarm	Minor Fault	Major Fault	
FLT S03 - MTR OVERSPEED FL	Motor Overspeed Factory Limit Fault	-	-	-	-	-		X	-	-	-	X	Disable/Coast
FLT S04 - MTR OVERSPEED UL	Motor Overspeed User Limit Fault	-	-	-	-	-	Current Decel/Hold	X	X	X	X	X	
FLT S05 - MTR OVERTEMP FL	Motor Overtemperature Factory Limit Fault	X	-	-	-	X	Disable/Coast	-	-	-	-	-	
FLT S07 - MTR OVERLOAD FL	Motor Thermal Overload Factory Limit Fault	X	-	-	-	X	Disable/Coast	-	-	-	-	-	
FLT S08 - MTR OVERLOAD UL	Motor Thermal Overload User Limit Fault	X	X	X	X	X	Current Decel/Hold	-	-	-	-	-	
FLT S09 - MTR PHASE LOSS	Motor Phase Loss <sup>(1)</sup>	-	-	-	-	-		X	-	-	-	X	Disable/Coast
FLT S10 - INV OVERCURRENT	Inverter Overcurrent Fault	X	-	-	-	X	Disable/Coast	-	-	-	-	-	
FLT S11 - INV OVERTEMP FL	Inverter Overtemperature Factory Limit Fault	X	-	-	-	X	Disable/Coast	-	-	-	-	-	
FLT S13 - INV OVERLOAD FL	Inverter Thermal Overload Factory Limit Fault	X	-	-	-	X	Disable/Coast	-	-	-	-	-	
FLT S14 - INV OVERLOAD UL	Inverter Thermal Overload User Limit Fault	X	X	X	X	X	Current Decel/Hold	-	-	-	-	-	
FLT S22 - AC POWER LOSS	Converter AC Power Loss Fault	X	X	X	X	-	Current Decel/Disable	X	X	X	X	X	Current Decel/Disable
FLT S33 - BUS UNDERVOLT FL	Bus Undervoltage Factory Limit Fault	X	-	-	-	X	Current Decel/Disable	-	-	-	-	-	
FLT S34 - BUS UNDERVOLT UL	Bus Undervoltage User Limit Fault	X	X	X	X	X	Current Decel/Disable	-	-	-	-	-	
FLT S35 - BUS OVERVOLT FL	Bus Overvoltage Factory Limit Fault	X	-	-	-	X	Disable/Coast	-	-	-	-	-	
FLT S37 - BUS POWER LOSS	Bus Power Loss	X	X	X	X	X	Current Decel/Disable	-	-	-	-	-	
FLT S40 - BUS POWER SHARING	Bus Power Sharing Fault	X	X	X	X	X	Current Decel/Disable	X	X	X	X	X	Disable/Coast
FLT S45 - FDBK COMM FL	Motor Feedback Data Loss Factory Limit Fault	X	-	-	-	X	Disable/Coast	X	-	-	-	X	Disable/Coast
FLT S46 - FDBK COMM UL	Motor Feedback Data Loss User Limit Fault	X	X	X	X	X	Current Decel/Disable	-	-	-	-	-	
FLT S47 - FDBK DEVICE FAILURE	Feedback Device Failure	X	-	-	-	X	Disable/Coast	-	-	-	-	-	
FLT S54 - POSN ERROR	Excessive Position Error Fault	-	-	-	-	-		X	X	X	X	X	Disable/Coast
FLT S55 - VEL ERROR	Excessive Velocity Error Fault	-	-	-	-	-		X	X	X	X	X	Disable/Coast
FLT S56 - OVERTORQUE LIMIT	Overtorque Limit Fault	-	-	-	-	-		X	X	X	X	X	Current Decel/ Hold
FLT S57 - UNDERTORQUE LIMIT	Undertorque Limit Fault	-	-	-	-	-		X	X	X	X	X	Current Decel/ Hold

(1) The Motor Phase Loss Fault occurs when an enabled mover is on a motor module that becomes disabled or travels onto an already disabled motor module.



Table 27 - Motor Section and Mover Fault Behavior, FLT Mxx Fault Codes

Exception Fault Code	Exception Text	Section Axis					Best Available Stopping Action (applies to major faults)	Mover Axis					
		Supported	Fault Action					Supported	Fault Action				Best Available Stopping Action (applies to major faults)
			Ignore	Alarm	Minor Fault	Major Fault			Ignore	Alarm	Minor Fault	Major Fault	
FLT M26 - RUNTIME ERROR	Runtime Error	X	—	—	—	X	Disable/Coast	X	—	—	—	X	Disable/Coast
FLT M27 - BACKPLANE COMM	Backplane Communication Error	X	—	—	—	X	Disable/Coast	X	—	—	—	X	Disable/Coast
FLT M28 - SAFETY COMM	Safety Module Communication Error	X	—	—	—	X	Disable/Coast	—	—	—	—	—	
FLT M32 - TRACK STOP	Track Stop <sup>(1)</sup>	X	X	X	X	X	Current Decel/Disable	X	X	X	X	X	Current Decel/Disable
FLT M33 - LOST MOVER	Lost Mover Association	—	—	—	—	—		X	—	—	—	X	Disable/Coast

(1) Occurs on all axes when a major fault occurs on any axis. The subcode indicates the slot number of the section requesting the stop. Check all axes on that section to identify the primary fault.

Table 28 - Motor Section and Mover Fault Behavior, INIT FLT Mxx Fault Codes

Exception Fault Code	Exception Text	Description	Section Axis	Mover Axis
INIT FLT M14 - SAFETY FIRMWARE	Invalid Safety Firmware	The loaded Safety firmware is not compatible with the motor module firmware. See <a href="#">Appendix A on page 217</a> for instructions on how to update the iTRAK 5750 firmware.	X	—
INIT FLT M20 - UNKNOWN MODULE	Unknown Module Fault	The product code of the power board is invalid.	X	X
INIT FLT M21 - FACTORY CONFIG <i>nn</i>	Factory Configuration Error	Factory configuration data is missing or invalid.	X	X
INIT FLT M22 - ILLEGAL ADDRESS	Illegal IP Address	The IP address rotary switches on the power and control input connector module are set to an invalid value. See <a href="#">EtherNet/IP Address Rotary Switches on page 80</a> for details on valid switch settings.	X	—
INIT FLT M25 - MOVER AXIS ASSIGNMENT ERROR <i>nn</i>	Mover-Axis Assignment Error	An error occurred when the movers were assigned to the mover axes. Subcodes: 01: Reference Mover not Found 02: Unexpected Reference Mover Found 03: Detected Fewer Movers than Configured 04: Detected More Movers than Configured 05: Inconsistent Mover Seq 06: Movers in Motion 07: Track Max Mover Count Exceeded	X	X
INIT FLT M26 - TRACK BACKPLANE COMMUNICATION <i>nn</i>	Backplane Communication Initialization Error	An error occurred while establishing backplane communication. Subcodes: 02: Too Many Sections on the Backplane 03: Slot Assignment Failure 04: Track Type Failure	X	X
INIT FLT M27 - UNASSOCIATED SECTION AXIS	Unassociated Section Axis	The motor module section that is associated with this mover axis has detected that no axis instance has been associated with Axis 1 (section axis). All iTRAK 5750 motor module sections must have an associated section axis.	—	X
INIT FLT M28 - TRACK CONFIGURATION	Track Configuration Error	A motor module section has not provided its axis and mover information to the rest of the track when expected. Possible causes of this occurrence include that the module is inhibited or has no axes associated.	X	X

Table 29 - Motor Section and Mover Fault Behavior, NODE FLT Fault Codes

Exception Fault Code	Exception Text	Section Axis					Best Available Stopping Action (applies to major faults)	Mover Axis					Best Available Stopping Action (applies to major faults)
		Supported	Fault Action					Supported	Fault Action				
			Ignore	Alarm	Minor Fault	Major Fault			Ignore	Alarm	Minor Fault	Major Fault	
NODE FLT 01 - LATE CTRL UPDATE	Control Connection Update Fault	X	-	-	-	X	Current Decel/Disable	X	-	-	-	X	Current Decel/Disable
NODE FLT 02 - PROC WATCHDOG	Processor Watchdog Fault	X	-	-	-	X	Disable/Coast	X	-	-	-	X	Disable/Coast
NODE FLT 03 - HARDWARE	Hardware Fault	X	-	-	-	X	Disable/Coast	X	-	-	-	X	Disable/Coast
NODE FLT 04 - DATA FORMAT ERROR	Data Format Error Fault	X	-	-	-	X	Disable/Coast	X	-	-	-	X	Disable/Coast
NODE FLT 05 - CLOCK SKEW FLT	Clock Skew Fault	X	-	-	-	X	Current Decel/Disable	X	-	-	-	X	Disable/Coast
NODE FLT 06 - LOST CTRL CONN	Lost Controller Connection Fault	X	-	-	-	X	Programmable per Connection Loss Stopping Action (see <a href="#">Table 25 on page 135</a> ).	X	-	-	-	X	Programmable per Connection Loss Stopping Action (see <a href="#">Table 25 on page 135</a> ).
NODE FLT 07 - CLOCK SYNC	Clock Sync Fault	X	-	-	-	X	Current Decel/Disable	X	-	-	-	X	Current Decel/Disable
NODE FLT 09 - DUPLICATE IP ADDRESS	Duplicate IP Address Fault	X	-	-	-	X	Disable/Coast	X	-	-	-	X	Disable/Coast
NODE FLT 10 - CONTROL CONNECTION CLOSED	Control Connection Closed Fault	X	-	-	-	X	Current Decel/Disable	X	-	-	-	X	Current Decel/Disable

## Maintenance

This chapter contains information on how to maintain your iTRAK® 5750 system and install or replace components.

Topic	Page
Before You Begin Maintenance	139
Preventive Maintenance	139
Install or Replace Components	140
Lubrication	182

### Before You Begin Maintenance

Before you attempt maintenance on the system, complete these tasks:

- Make sure that the movers are motionless.
- Disconnect electrical power to the system by using the main switch and lockout.

### Preventive Maintenance

To prolong the life of your iTRAK 5750 system, clean the rail system and components. The frequency at which you clean the components depends on the machine usage, the environment in which they are used, and exposure to contaminants. You must determine through best engineering practices how often to perform the following cleaning procedures.

#### *Before You Begin*



**ATTENTION:** Before attempting any service to an iTRAK 5750 system, see [Safety Information on page 41](#).

#### *Rail System*

Clean all rail surfaces.

1. Wipe the rails down with a lint-free cloth.  
If necessary, use isopropyl alcohol on the lint-free cloth.
2. Apply a thin coat of Kluber oil (Kluber 4-UHT-68N) on all exposed rail surfaces.

#### *Track Components*

Clean the following surfaces with isopropyl alcohol and soft lint-free cloth.

- Position sensor
- Motor module coil

If there is ferrous debris on the magnet plates, remove the debris with the sticky side of duct tape or clay.

## Install or Replace Components

The procedures in this section describe how to remove, install, or replace system components.

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**IMPORTANT** The iTRAK 5750 motor modules and safety-related system do not contain customer-serviceable parts. No repair option is provided if there is a motor module anomaly. If there is a failure, replace the motor module.

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### Replacement Hardware

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**IMPORTANT** All hardware that is removed for service must either be replaced with new hardware from kit catalog number 2198T-BE-KITCON-x or have thread lock (such as Loctite 243) applied to the threads before the hardware is reinstalled.

---

Thread patches and thread lock on hardware that is removed for service can become worn during disassembly. If the hardware is reinstalled without having thread lock applied, it will not function correctly. Always apply thread lock, or replace with new hardware. The rail screw replacement kit is catalog number 2198T-BE-KITCON-1, and the motor screw and joiner plate screw replacement kit is catalog number 2198T-BE-KITCON-2. These kits can be used to replace worn hardware.

Component	Quantity
Low head socket cap screw, M5 x 20 mm	25

Component	Quantity
Socket head screw, stainless steel, M8 x 25 mm	18
Shoulder screw, stainless steel, 10 mm x 16 mm x M8 x 1.25 mm	18

### Installation and Replacement Procedure List

Procedure	Page
Replace a Mover Position Magnet Assembly	141
Replace a Mover Motor Magnet	143
Replace a Mover	144
Replace a Straight Motor Module	147
Replace a Curve Motor Module	150
Replace Mover Cam-follower Wheels or Flexures	153
Replace a Lubrication Segment of a Top or Bottom Rail	162
Replace a Straight Segment of the Top or Bottom Rail	164
Replace a Curve Segment of the Top or Bottom Rail	168
Replace a Lubrication Segment of a Middle Rail	173
Replace a Straight Segment of the Middle Rail	174
Replace a Curve Segment of the Middle Rail	177
Replace a Connector Module	180
Replace an Infield Cover	181

## Replace a Mover Position Magnet Assembly

Use this section to install or remove a mover position magnet assembly.

### *Before You Begin*



**ATTENTION:** Before attempting any service to an iTRAK 5750 system, see [Safety Information on page 41](#).

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**ATTENTION:** A hazard of personal injury or equipment damage exists. The motor magnet protective cover must be installed on a mover whenever the mover is not installed. Before handling a mover with a mover magnet installed, read [Safe Magnet Handling on page 47](#).

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### *What You Need*

- 2.5 mm hex driver
- Thread lock (such as Loctite 243)
- A mover position magnet assembly, chosen from the following:
  - Reference mover (Mover 1) position magnet assembly, catalog number 2198T-N1-5750
  - Standard mover (Mover N) position magnet assembly, catalog number 2198T-NN-5750

To determine which position magnet assembly you need, observe the color of the mover position magnet backplate of the assembly that is being replaced. The magnet backplate is located between the mover and the magnet cover plate. The magnet cover plate is silver in both types of position magnet assemblies. The magnet backplate color is different between the two types of position magnet assemblies, and allows you to identify them:

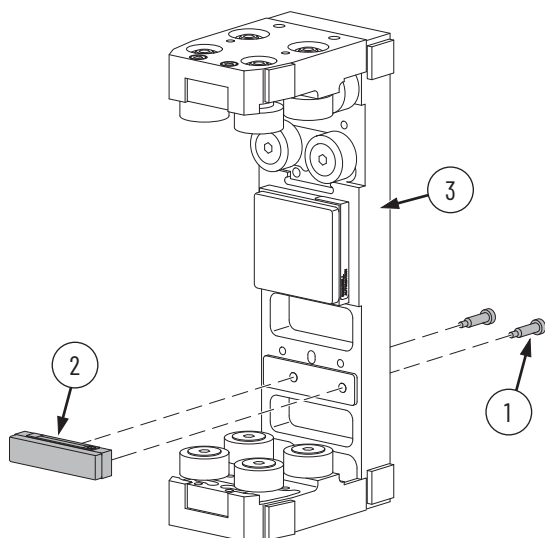
- The reference mover position magnet is identified by a black-colored magnet backplate.
- The standard mover position magnet is identified by a silver-colored magnet backplate.

*Procedure to Remove a Position Magnet Assembly*

1. Remove the mover that the position magnet is on from the track. See [Replace a Mover on page 144](#).
2. Remove the shoulder-socket head cap screws that secure the position magnet assembly to the mover by using a 2.5 mm hex driver.

*Procedure to Install a Position Magnet Assembly*

1. Remove the mover that the position magnet will be installed on from the track. See [Replace a Mover on page 144](#).
2. Clean the shoulder socket-head cap screws and apply fresh Loctite 243.
3. Install the position magnet assembly onto the mover with the shoulder socket-head cap screws by using a 2.5 mm hex driver, with a torque of 0.85 N•m (7.5 lb•in).



Item	Description
1	Shoulder-socket head cap screws
2	Position magnet assembly
3	Mover, shown removed from the track

4. Install the mover onto the track. See [Replace a Mover on page 144](#).
5. If you are using the iTRAK\_Control.Data.MoverOffset tag, recalibrate the mover that has had a new position magnet installed.

---

**IMPORTANT** Failure to recalibrate the mover after a new position magnet is installed on it may result in system malfunction or damage. An incorrect value for the mover offset could result in collisions or improper mover position relative to external tooling. If the mover offsets are set to default or 0, the expected position accuracy is provided in the Static Accuracy table in the iTRAK 5750 Technical Data, publication [2198T-TD004](#).

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## Replace a Mover Motor Magnet

Use this section to install or remove a mover motor magnet assembly.

### Before You Begin



**ATTENTION:** Before attempting any service to an iTRAK 5750 system, see [Safety Information on page 41](#).



**ATTENTION:** If you are using your own design for a mover, make sure of the following.

- The mounting hardware is not too long that it protrudes past or pops through the magnet plate.
- Be sure to use all mounting holes. By using all mounting holes, the magnet maintains the correct orientation of north-south magnet polarity.

### What You Need

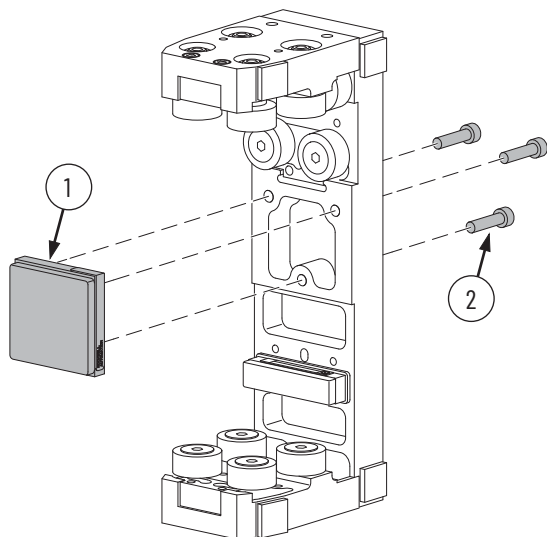
- 6 mm hex driver
- Loctite 243
- Mover motor magnet plate assembly. For options, see [Mover Motor Magnet Catalog Numbers on page 20](#).
- M6 x 25 mm socket head cap screws (SHCS). The quantity depends on which type of mover the plate is being installed on. See the following table.

**Table 30 - Quantity of Screws Required for Mounting Magnet Plates**

Cat. No.	Quantity of M6 x 25 SHCS
2198T-M0505-A000-SS	3
2198T-M0510-A000-SS	5
2198T-M1005-A000-SS	3
2198T-M1010-A000-SS	5

*Procedure to Remove a Mover Motor Magnet Plate Assembly*

1. Remove the mover that the motor magnet plate is on by following the procedure in [Replace a Mover on page 144](#).
2. Remove the motor magnet plate assembly by removing the appropriate number of M6 socket head cap screws listed in [Table 30](#).



Item	Description
1	Motor magnet plate assembly
2	M6 socket-head cap screw, torque 14.9 N•m (11.0 lb•ft).

*Procedure to Install a Mover Motor Magnet Plate Assembly*

1. Clean all screws and apply Loctite 243.
2. Install the mover motor magnet plate assembly by reversing the steps used for removal.

**Replace a Mover**

Use this section to install or remove a mover.

*Before You Begin*



**ATTENTION:** Before attempting any service to an iTRAK 5750 system, see [Safety Information on page 41](#).

Choose an accessible curved section of the track. Position the mover that you want to replace over a straight motor module next to the curved section. Move all other movers off the curved end of the track.

*What You Need*

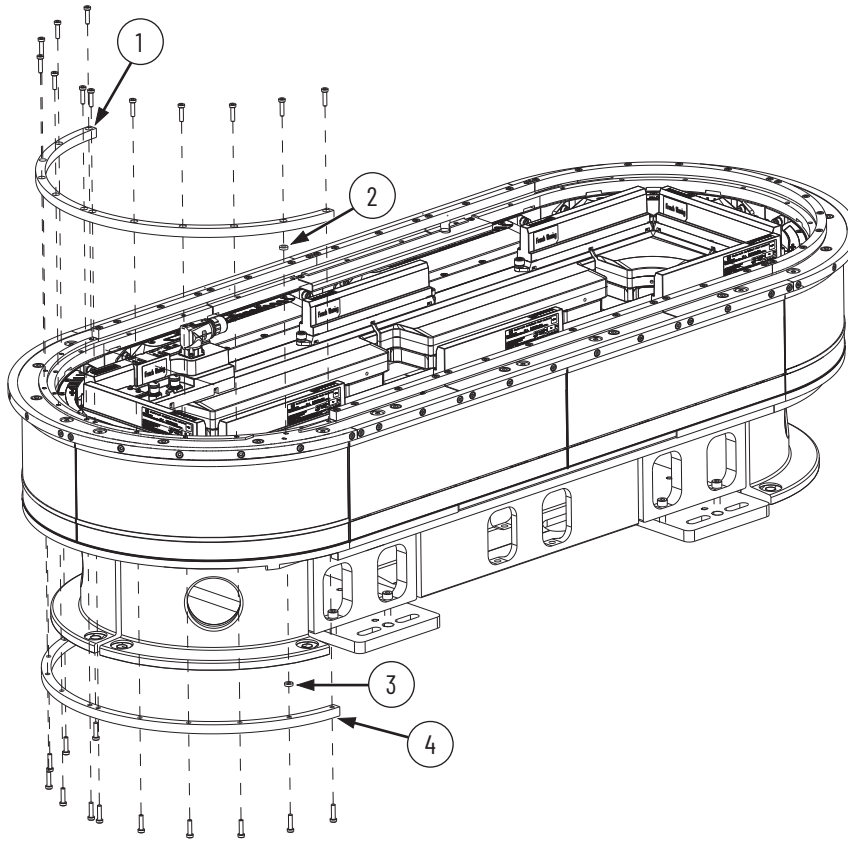
- Left and right straight-to-curved clamps from catalog number 2198T-A22 alignment tool kit.
- 4 mm hex driver.
- Loctite 243.
- Pair of mover installation fixtures, catalog number 2198T-A03.
- Mover. For options, see [Assembled Mover Catalog Numbers on page 21](#).



### Procedure to Install or Remove a Mover

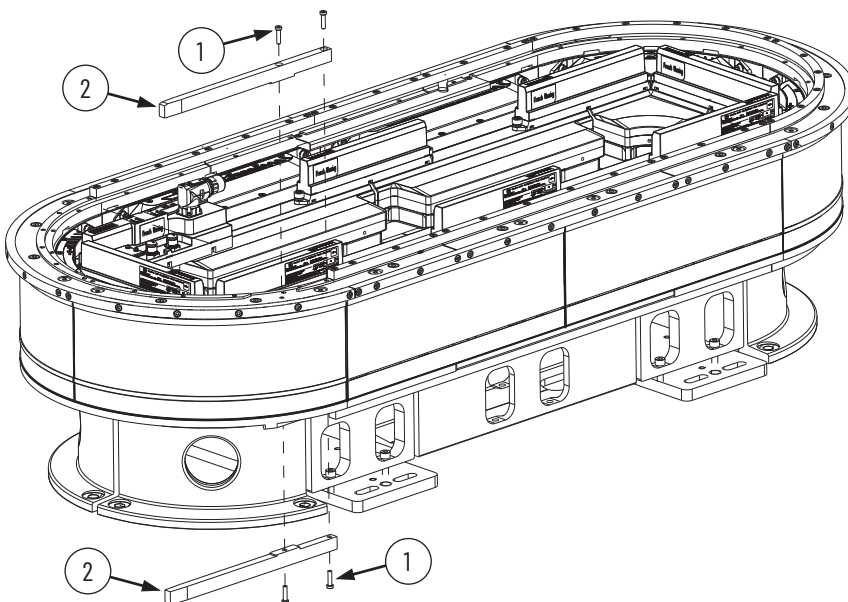
1. Remove the socket head cap screws from the curve segment of the top and bottom rails by using a 4 mm hex driver and remove the rails.

Save the spacer that is located between each rail and the plate it is mounted to. Save the screws for attaching the rail.



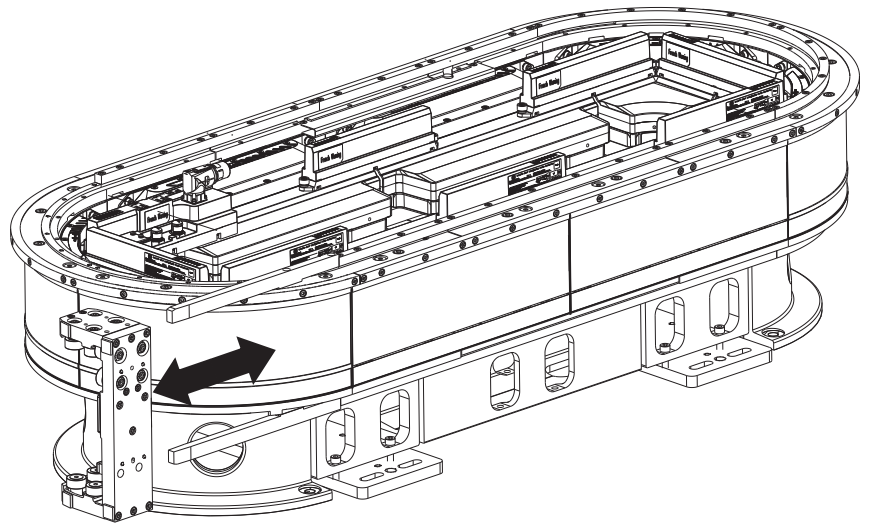
Item	Description
1	Curve segment of top rail
2	Spacer for curve segment of top rail
3	Spacer for curve segment of bottom rail
4	Curve segment of bottom rail

2. Attach the mover installation or removal fixtures to the end of the straight segments of the top and bottom rails by using two socket head cap screws from the curve segments of the top and bottom rails.



Item	Description
1	Socket head cap screws that were used to secure the curve rail segment
2	Mover installation or removal fixture

3. To replace an existing mover, do the following:
  - a. Remove the mover that must be replaced.
  - b. If you want to reuse the position magnet assembly from the mover that must be replaced, remove the position magnet assembly from that mover, and install the position magnet assembly on the replacement mover. See [Replace a Mover Position Magnet Assembly on page 141](#).
  - c. If you want to reuse the motor magnet assembly from the mover that must be replaced, remove the motor magnet assembly from that mover, and install the motor magnet assembly on the replacement mover. See [Replace a Mover Motor Magnet on page 143](#).
  - d. Install the replacement mover.
4. To install a new mover that is not replacing any existing mover, do the following:
  - a. Make sure that the new mover has a position magnet installed. See [Replace a Mover Position Magnet Assembly on page 141](#).
  - b. Make sure that the new mover has a motor magnet installed. See [Replace a Mover Motor Magnet on page 143](#).
  - c. Install the new mover.



5. Remove the mover installation fixtures.
6. Install the top rail using the procedure in [Replace a Curve Segment of the Top or Bottom Rail on page 168](#).
7. Install the bottom rail using the procedure in [Replace a Curve Segment of the Top or Bottom Rail on page 168](#).

## Replace a Straight Motor Module

Use this section to replace a straight motor module.

### Before You Begin



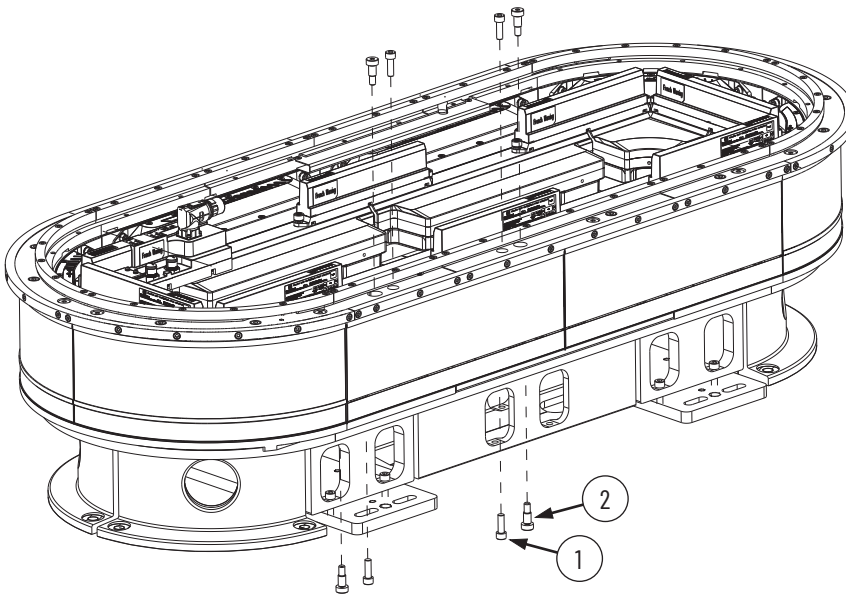
**ATTENTION:** Before attempting any service to an iTRAK 5750 system, see [Safety Information on page 41](#).

### What You Need

- Socket head screw, stainless steel, M8 x 25 mm, and shoulder screw, stainless steel, 10 mm x 16 mm x M8 x 1.25 mm shoulder screw, which are part of kit 2198T-BE-KITCON-2 described in [Replacement Hardware on page 140](#), if needed
- 5 mm and 6 mm hex drivers
- Hard rubber mallet
- Flat head screw driver
- Loctite 243
- Straight motor module. For options, see [Motor Module \(Section\) Catalog Numbers on page 18](#).

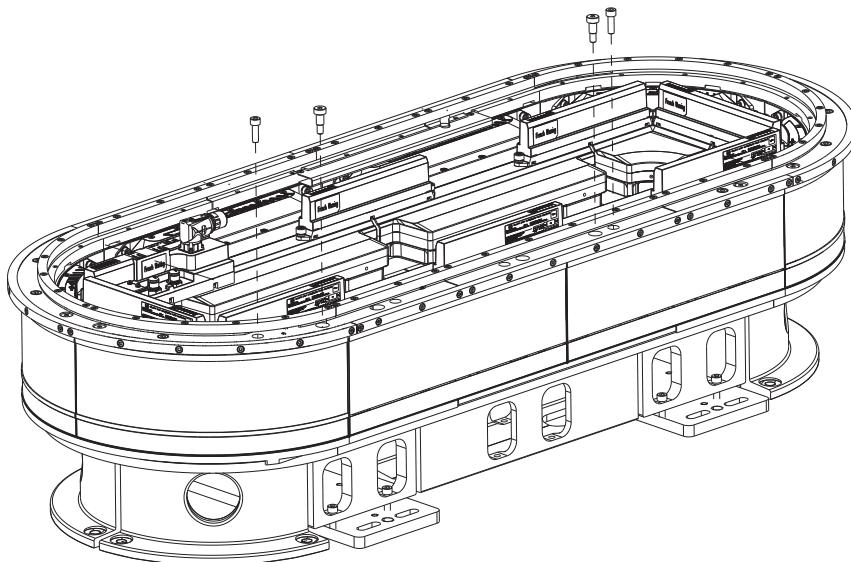
### Procedure to Replace a Straight Motor Module

1. Move movers away from the area where the straight module is to be replaced and the adjacent motor modules.  
If you have to remove movers to accomplish this step, see [Replace a Mover on page 144](#).
2. Remove the M8 x 25 mm socket head cap screws and the 10 mm x 16 mm x M8 x 1.25 mm shoulder screws that secure the motor module to the top and bottom plates.

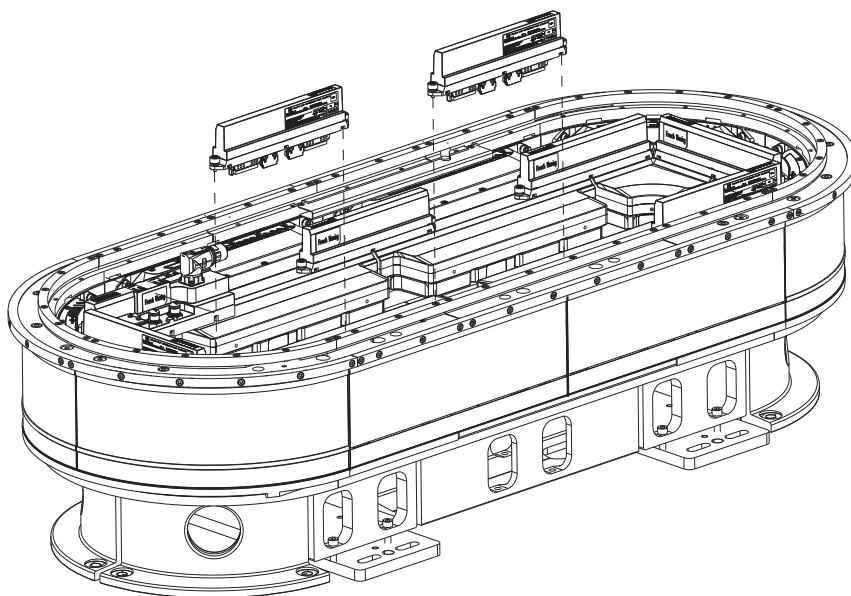


Item	Description
1	Socket head cap screw, M8 x 25 mm (quantity 4)
2	Shoulder screw, 10 mm x 16 mm x M8 x 1.25 mm (quantity 4)

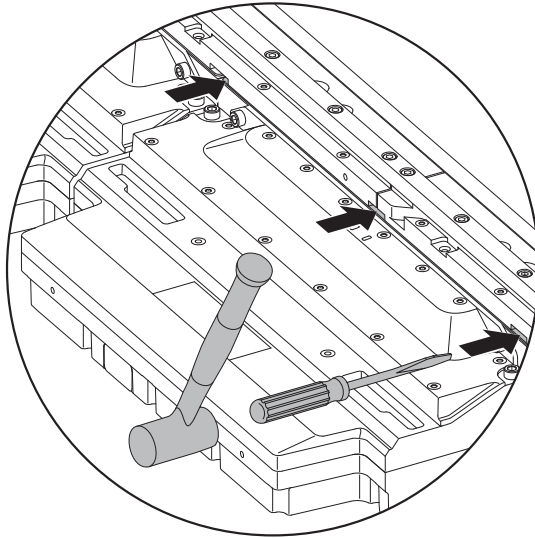
3. On the top of each of the motor modules that are adjacent to the module that you want to replace, do the following:
  - Remove the shoulder screw that is closest to the module you want to replace.
  - Remove the socket head cap screw that is closest to the module you want to replace.



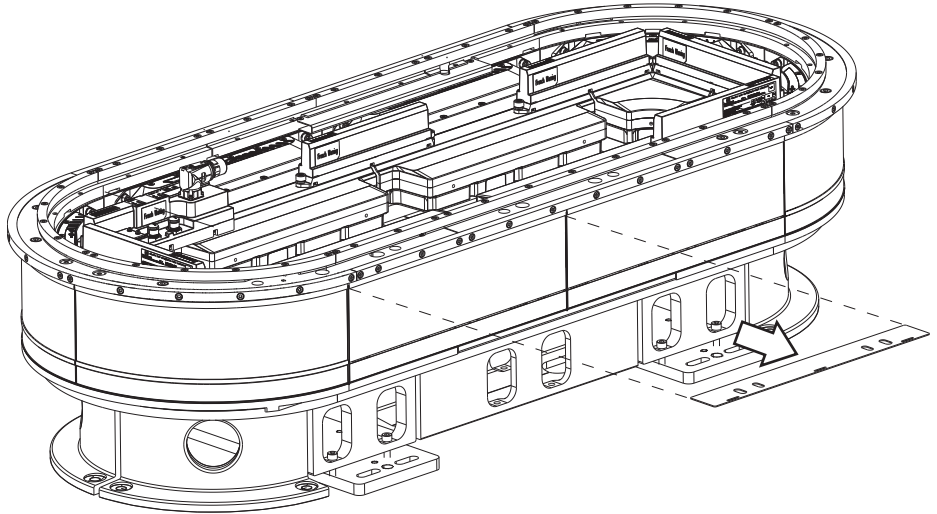
4. Remove the two power and control connector modules (pass-through or input) that are connected to the motor electronics housing.



5. There is a shim between the straight motor module and the top plate. Use a flathead screwdriver and rubber mallet to push the shim towards the outside of the track via the shim access cutouts.

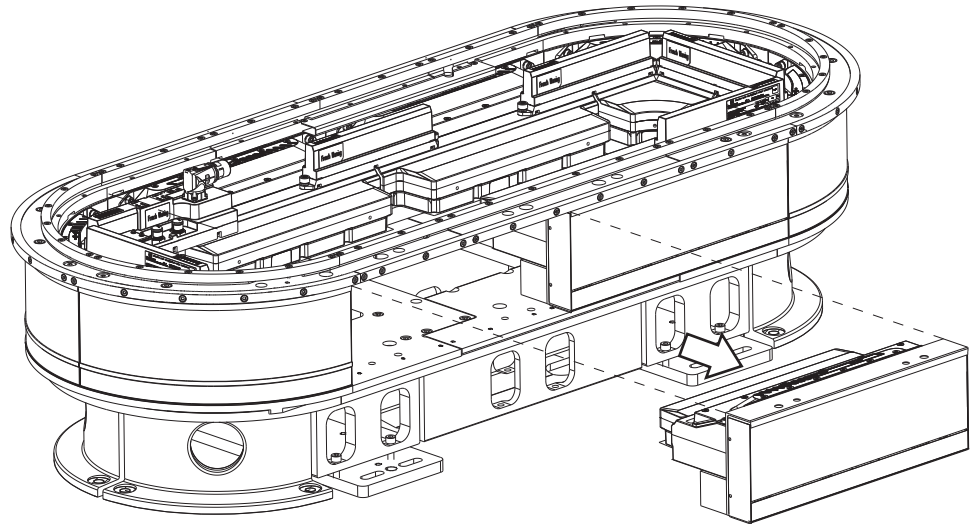


Remove the shim.



**ATTENTION:** The straight motor modules can weigh up to approximately 25 kg (54 lb). Be sure to use a two person lift when moving the straight motor module.

6. Remove the motor module.



7. Clean all screws and apply Loctite 243.
8. Install the new module by reversing [step 6...step 2](#); when you reverse [step 3...step 2](#), do the following:
  - a. Install the shoulder screws first, and torque the shoulder screws to 13 N•m (9.6 lb•ft).
  - b. Install the socket head cap screws second, and torque the socket head cap screws to 22 N•m (16.2 lb•ft).
9. Update the motor module firmware for the newly installed straight motor module. See [Update the System Firmware on page 217](#).

## Replace a Curve Motor Module

Use this section to replace a curve motor module.

*Before You Begin*



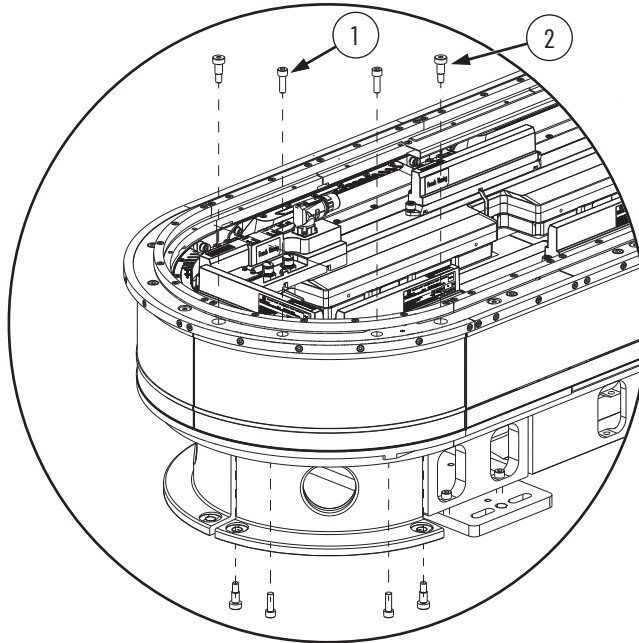
**ATTENTION:** Before attempting any service to an iTRAK 5750 system, see [Safety Information on page 41](#).

*What You Need*

- Socket head screw, stainless steel, M8 x 25 mm, and shoulder screw, stainless steel, 10 mm x 16 mm x M8 x 1.25 mm, which are part of kit 2198T-BE-KITCON-2 described in [Replacement Hardware on page 140](#), if needed
- Hard rubber mallet
- Flat head screw driver
- 3 mm, 5 mm, and 6 mm hex drivers.
- Loctite 243.
- Curve motor module. For options, see [Motor Module \(Section\) Catalog Numbers on page 18](#).

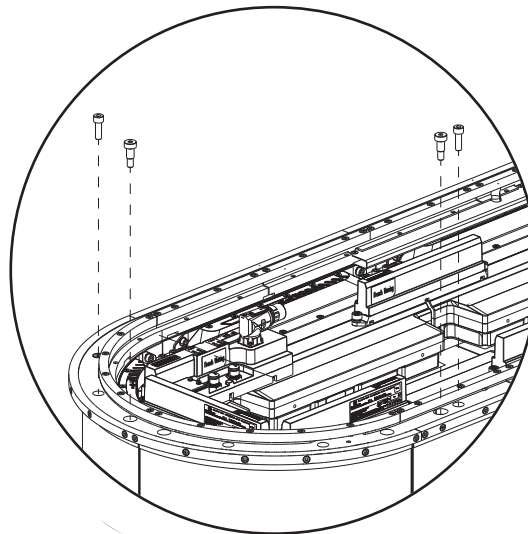
### Procedure to Replace a Curve Motor Module

1. Move movers away from the area where the curve module is to be replaced and the adjacent motor modules.  
If you have to remove movers to accomplish this step, see [Replace a Mover on page 144](#).
2. Remove the M8 x 25 mm socket head cap screws and 10 mm x 16 mm x M8 x 1.25 mm shoulder screws that secure the motor module to the top and bottom frames.

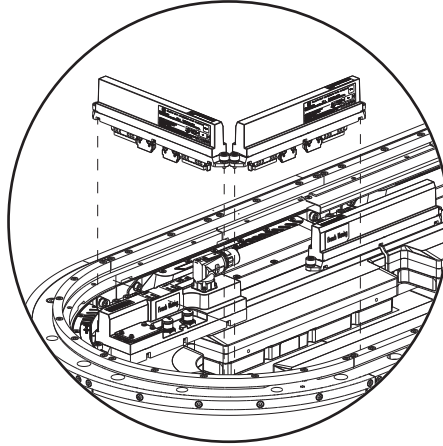


Item	Description
1	Socket head cap screw, M8 x 25 mm (quantity 4)
2	Shoulder screw, 10 mm x 16 mm x M8 x 1.25 mm (quantity 4)

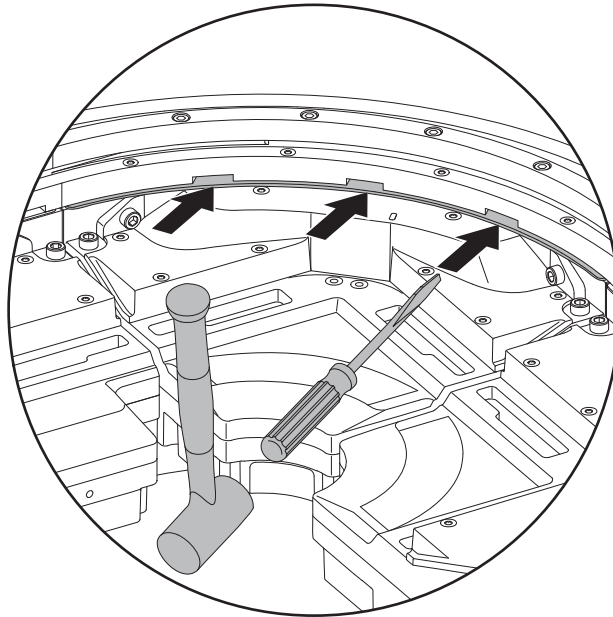
3. On the top of each of the motor modules that are adjacent to the module that you want to replace, do the following:
  - Remove the shoulder screw that is closest to the module you want to replace.
  - Remove the socket head cap screw that is closest to the module you want to replace.



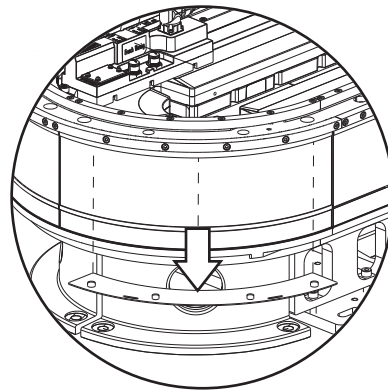
4. Remove the two power and control connector modules (pass-through or input) that are connected to the motor electronics housing.



5. There is a shim between the curve motor module and the top plate. Use a flathead screwdriver and rubber mallet to push the shim towards the outside of the track via the shim access cutouts.

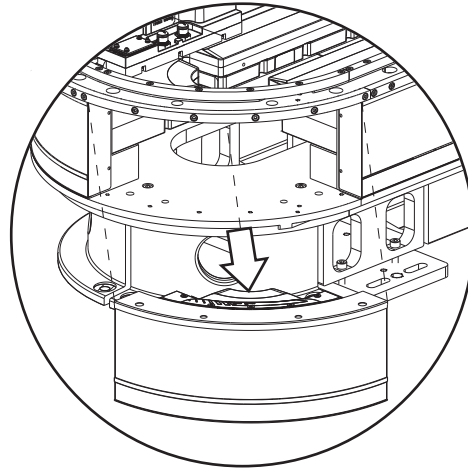


Remove the shim.





6. Remove the curved motor module.



7. Clean all screws and apply Loctite 243.
8. Install the new curved motor module by reversing [step 6...step 2](#): when you reverse [step 3...step 2](#), do the following:
  - a. Install the shoulder screws first, and torque the shoulder screws to 13 N•m (9.6 lb•ft).
  - b. Install the socket head cap screws second, and torque the socket head cap screws to 22 N•m (16.2 lb•ft).
9. Update the motor module firmware for the newly installed curved motor module. See [Update the System Firmware on page 217](#).

## Replace Mover Cam-follower Wheels or Flexures

Use this section to replace the mover cam-follower wheels or flexures.

*Before You Begin*



**ATTENTION:** Before attempting any service to an iTRAK 5750 system, see [Safety Information on page 41](#).

*What You Need*

- 3 mm, 5 mm, and 6 mm hex drivers
- 14 mm socket driver and wrench
- Vise
- Arbor press or similar tool
- Hard rubber mallet
- Loctite 243
- 2198T-A16 rail banking flexure installation tool
- 2198T-AV-WHL-Cx iTRAK TriMax wheel spare kit
- 2198T-AV-FLX-Cx iTRAK TriMax flexure spare kit
- Small rod 9 mm (0.35 in.) in diameter
- Flat metal plate approximately 50 x 50 mm (2.0 x 2.0 in.)

### Procedure to Replace Mover Cam-follower Wheels

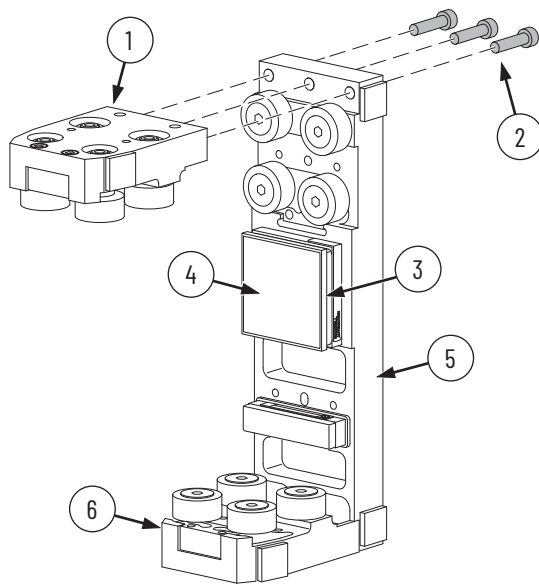
To replace the mover cam-follower wheels, complete these steps. This procedure can be done with the mover fully assembled, or with the plate sub assemblies of the mover separated. The steps in this procedure show the method of separating the plate sub assemblies. The steps are written for the top plate flexure assembly, but are applicable to the middle and bottom flexure assemblies as well.

1. Remove the mover from the track. See [Replace a Mover on page 144](#).
2. Cover the magnet plate with cardboard and a magnet keeper plate. See [Magnet Plate Keeper on page 34](#) for details.



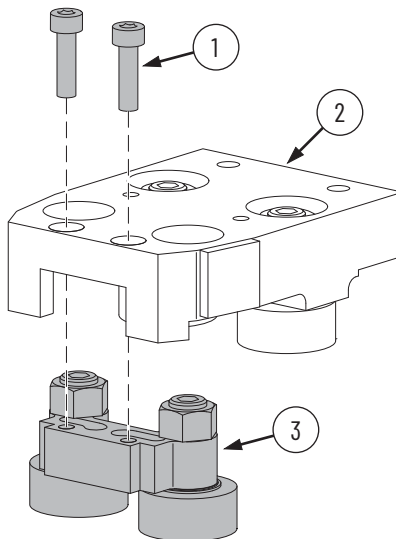
**ATTENTION:** Take care working near the magnet plate with the keeper. It can still have some attractive force.

3. Remove the top plate from the middle plate.



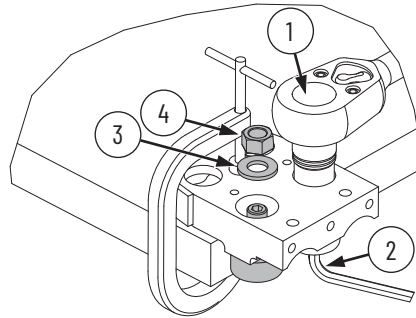
Item	Description
1	Top plate assembly
2	M6 x 25 mm socket head cap screws (quantity 3)
3	Cardboard: layer of motor magnet plate keeper that is closest to the magnet
4	Ferrous sheet metal: layer of motor magnet plate keeper that is farthest from magnet
5	Middle plate assembly
6	Bottom Plate Assembly

4. Remove the flexure assembly from the top plate.



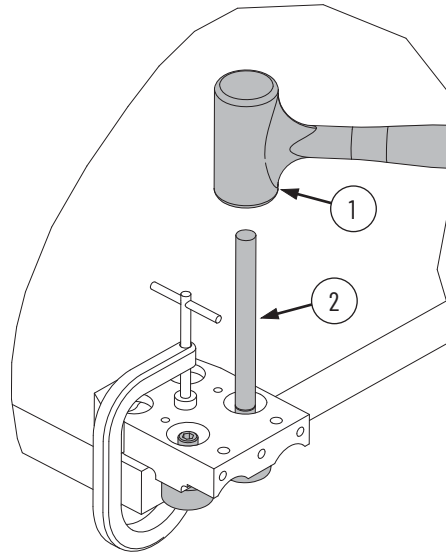
Item	Description
1	M5 X 18 mm socket head cap screws
2	Top plate
3	Flexure assembly

5. Clamp the top plate to a sturdy surface.
6. To remove the fixed cam follower nuts, use a 14 mm socket wrench. To keep the cam follower shafts from turning, use a 5 mm hex driver on the opposite side.
7. Remove the washers.



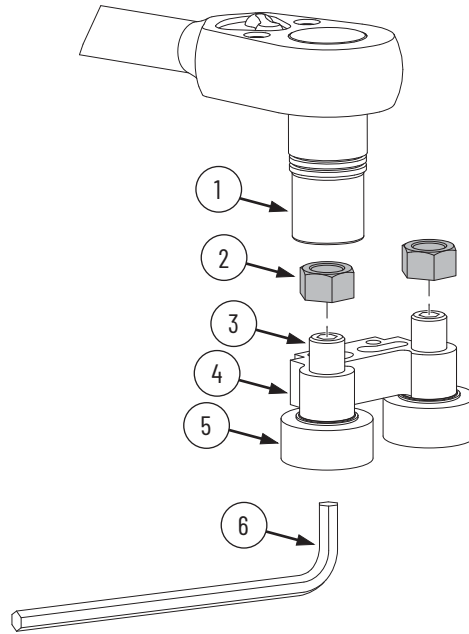
Item	Description
1	14 mm socket wrench
2	5 mm hex driver
3	Washer, quantity 2
4	Cam follower nut, quantity 2

8. To separate the cam followers from the top plate, do the following:
  - a. Place a 9 mm (0.35 in.) diameter rod on the cam follower shaft.
  - b. To push out the cam follower, tap the rod with a hard rubber mallet.



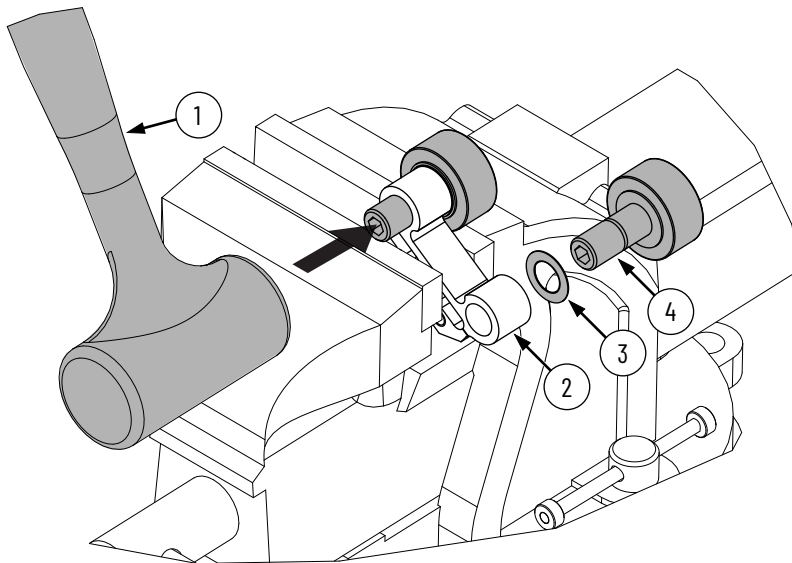
Item	Description
1	Hard rubber mallet
2	Rod with a minimum diameter of 9 mm (0.35 in.)

9. To remove the flexure cam-follower nuts, use a 14 mm socket wrench. To keep the cam follower shafts from turning, use a 5 mm hex driver on the opposite side.



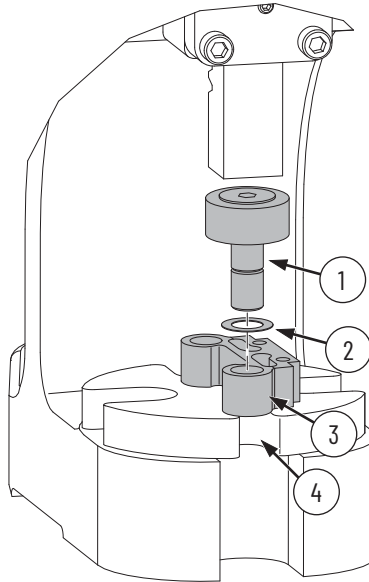
Item	Description
1	14 mm socket wrench
2	Cam follower nut (quantity 2)
3	Cam follower stud (quantity 2)
4	Flexure
5	Cam follower wheel (quantity 2)
6	5 mm hex driver

10. Place the flexure in a vise as shown.
11. To separate the cam followers and the shims from the flexure, use a hard rubber mallet to tap out the cam follower.



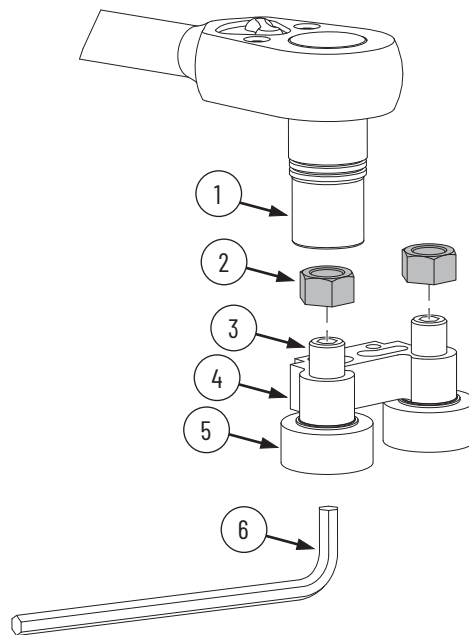
Item	Description
1	Hard rubber mallet
2	Flexure
3	Shim (quantity 2)
4	Cam follower (quantity 2)

12. Install the new cam followers that go into the flexure as follows:
- Place the flexure on the arbor press support plate, aligned so that there is an 11...13.5 mm (0.43...0.53 in.) opening under the hole where the cam follower will be inserted.



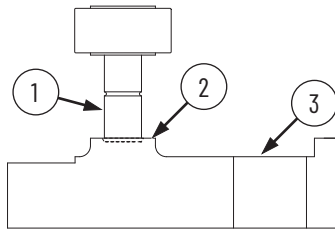
Item	Description
1	Cam follower
2	Shim
3	Flexure
4	11...13.5 mm (0.43...0.53 in.) opening

- Place the shim over the hole in the flexure where the cam follower will be inserted.
- By using the arbor press or similar tool, press the cam follower down until the cam follower is fully seated into the flexure.
- Apply fresh Loctite 243 to the flexure cam follower stud threads.
- Attach the nut to the flexure cam follower stud by using a 14 mm socket wrench and torque to 16 N•m (11.8 lb•ft). To keep the cam follower from turning, use a 5 mm hex driver on the opposite side.



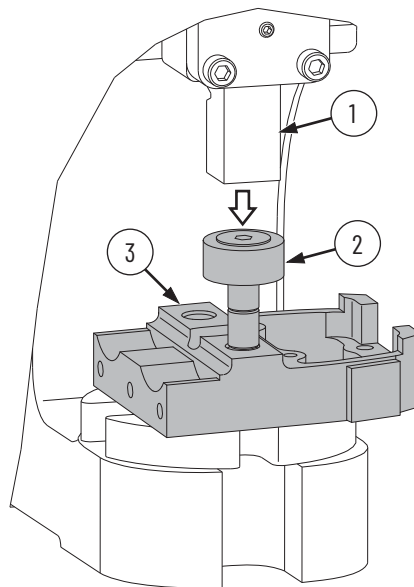
Item	Description
1	14 mm socket wrench
2	Cam follower nut (quantity 2)
3	Cam follower stud (quantity 2)
4	Flexure
5	Cam follower wheel (quantity 2)
6	5 mm hex driver

13. Install each of the new cam followers that go into the top plate, the fixed cam followers, as follows:
  - a. Position the new cam follower stud into the bore in the top plate, and engage with the fixed cam-follower bore chamfer. Make sure that the stud is perpendicular to the support surface as shown.

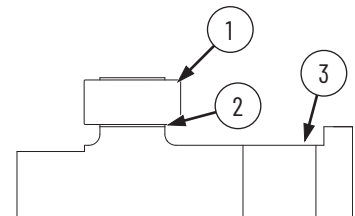


Item	Description
1	Cam follower stud
2	Bore chamfer
3	Top plate

- b. By using an arbor press or similar tool, press down on the cam follower until it is seated on the mover plate.

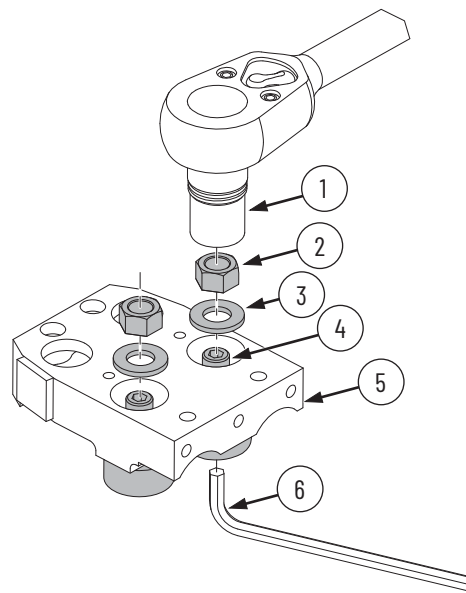


Item	Description
1	Arbor press
2	Cam follower
3	Top plate



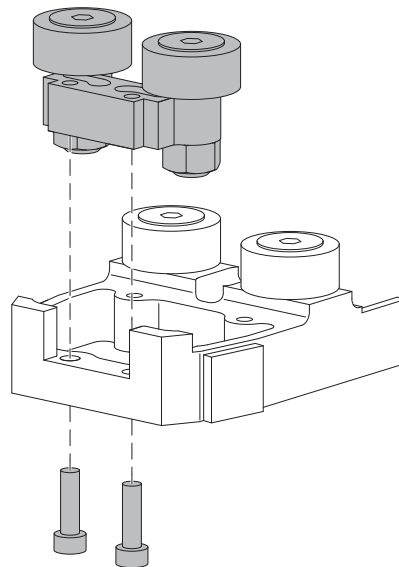
Item	Description
1	Cam follower
2	Fully seated
3	Top plate

- c. Place the washer over the fixed cam follower stud.
- d. Apply fresh Loctite 243 to the fixed cam follower stud.
- e. Attach the nut to the fixed cam follower stud by using a 14 mm socket wrench. To keep the cam follower from turning, use a 5 mm hex driver on the opposite side.



Item	Description
1	14 mm socket wrench
2	Cam follower nut (quantity 2)
3	Washer (quantity 2)
4	Cam follower stud (quantity 2)
5	Top plate
6	5 mm hex driver

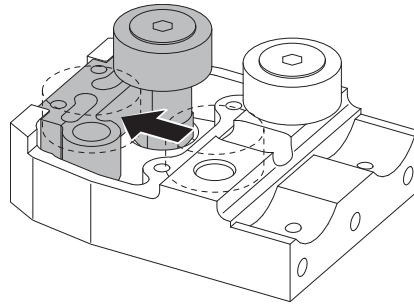
14. Clean the two M5 x 18 mm socket head cap screws that are used to attach the flexure assembly to the top plate, and apply fresh Loctite 243.
15. Place the flexure assembly and two M5 x 18 mm socket head cap screws into the top plate.



16. Pre-mount the flexure assembly to the top plate as follows:

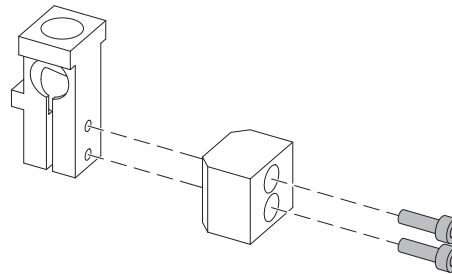
While manually pushing the flexure assembly banking surface against the top plate in the direction shown, lightly torque the two M5 x 18 mm socket head cap screws so that the flexure is snug against the top plate.

The two cam follower wheels in the foreground are shown as dashed outlines to illustrate the direction of push.



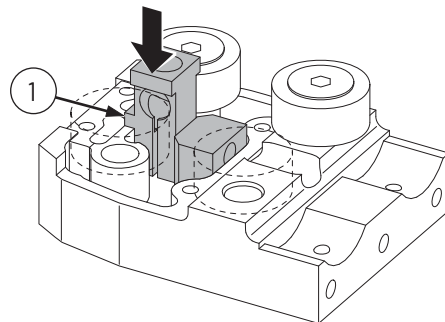
17. Set up the rail banking flexure installation tool, catalog number 2198T-A16, as follows:

- a. If you are installing the flexure assembly onto a top plate or bottom plate of the mover, prepare the tool as follows. Attach the spacer block of the tool to the expansion block of the tool with two M3 x 10 mm socket head cap screws using a 2.5 mm hex driver, hand tightened. If you are installing the flexure assembly onto a middle plate, do not attach the spacer block to the expansion block.



- b. Place the expansion block next to the flexure assembly so that the expansion block ledge rests on the flexure assembly.

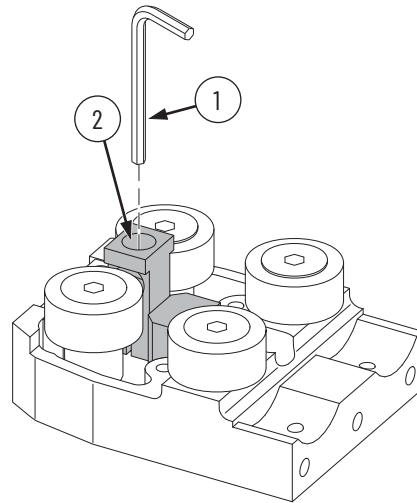
The two cam follower wheels in the foreground are shown as dashed outlines to reveal the positioning of the expansion block.



Item	Description
1	Expansion block ledge



- c. Using a 5/32" hex driver, drive the tapered plug into the expansion block until the expansion block expands enough that it is locked in place, and cannot be moved if you try to wiggle it.

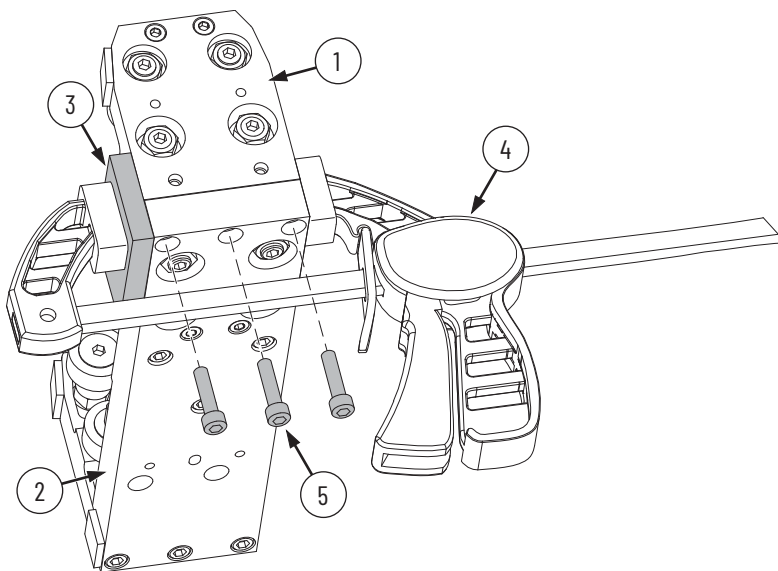


Item	Description
1	5/32" hex driver
2	Tapered plug is hidden inside the expansion block

The result of the block expanding is that the flexure assembly is pushed more tightly against the banking surface, putting it in the proper position to be mounted in place.

18. To secure the flexure assembly in place, torque the two M5 x 18 mm socket head cap screws to 7.5 N•m (5.5 lb•ft).
19. Loosen the tapered plug in the expansion block until the expansion block contracts enough that it can be moved.
20. Remove the rail banking flexure installation tool from the top plate.
21. If you want to replace mover cam follower wheels and flexures on the other plates of the mover, repeat [step 3](#) on [page 154](#) through [step 20](#) for those cam follower wheels and flexures before proceeding to [step 22](#).

22. If mover plates were separated to replace the flexure assembly, follow these steps to reassemble the mover:
  - a. Clean the M6 x 25 mm socket head cap screws and apply fresh Loctite 243.
  - b. Attach the top plate to the middle plate by using the M6 x 25 mm socket head cap screws, but do not tighten.
  - c. Place the top of the top plate on a flat surface and clamp the assemblies together by using a padded bar clamp.
  - d. Torque the M6 x 25 mm socket head cap screws to 16 N•m (11.8 lb•ft).



Item	Description
1	Top plate assembly
2	Middle plate assembly
3	Flat metal plate
4	Padded bar clamp
5	M6 x 25 mm socket head cap screws

23. If another plate connection must be made to reassemble the mover, repeat [step 22](#), but for the connection of the bottom plate to the middle plate instead of the top plate to the middle plate.
24. Remove the magnet keeper from the mover motor magnet. See [Magnet Plate Keeper on page 34](#) for details.
25. Use the procedure [Replace a Mover on page 144](#) to install the mover on the track.

### Replace a Lubrication Segment of a Top or Bottom Rail

Use this section to remove or install a straight segment of a top or bottom rail when the segment has a lubrication port.

#### Before You Begin



**ATTENTION:** Before attempting any service to an iTRAK 5750 system, see [Safety Information on page 41](#).

### What You Need

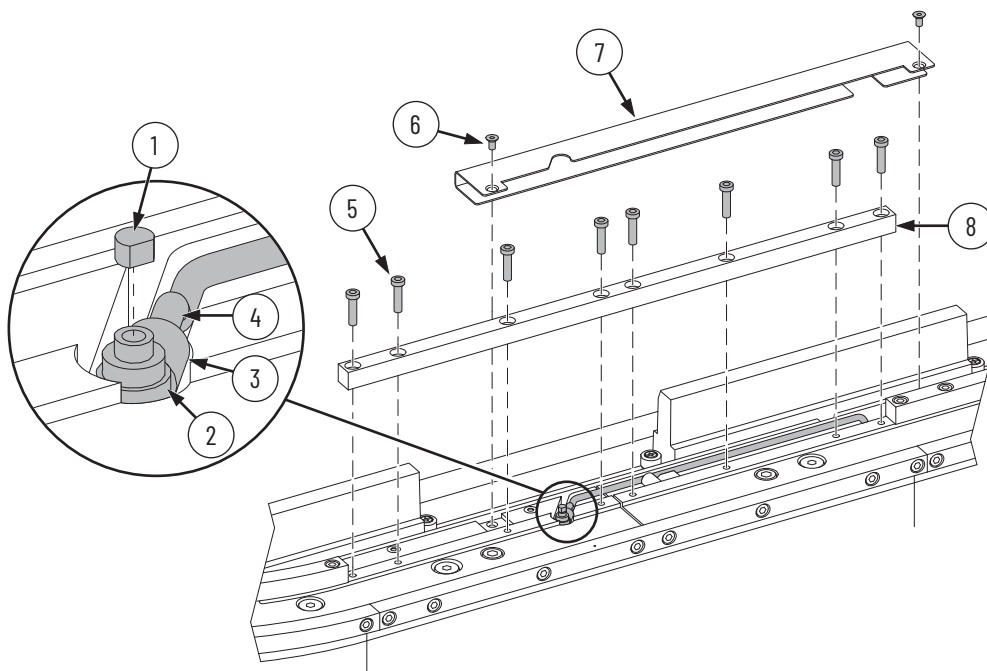
- M5 x 0.8 x 20 mm low head socket cap screws, which are part of kit 2198T-BE-KITCON-1 described in [Replacement Hardware on page 140](#), if needed
- A lubrication segment of a top or bottom rail, which can be ordered through an engineered to order (ETO) process
- 2.5 mm, 3 mm hex drivers
- Loctite 243
- Rail straightening bar tool, catalog number 2198T-A17
- Straight rail to straight rail joint alignment tool, which is part of the rail alignment tool kit, catalog number 2198T-A22

### Procedure to Remove a Lubrication Segment of a Top or Bottom Rail

1. Remove the M4 x 8 mm flat head socket cap screws that secure the lubrication tube cover and remove the lubrication tube cover. Push the rim of the quick release and remove the tubing from the fitting.
2. Remove the M5 x 0.8 x 20 mm low head socket cap screws that secure the lubrication rail to the track plate and remove the lubrication rail.
3. Remove the push fitting from the lubrication rail by using a spanner wrench.
4. Remove the baffle from the lubrication rail threaded hole.

### Procedure to Install a Lubrication Segment of a Top or Bottom Rail

1. Install the baffle into the tapped hole in the rail, orienting the baffle with the flat side facing the outside of the track as shown.
2. Install the push fitting into the lubrication rail segment by using a spanner wrench.
3. Push the lubrication tube into the quick release connector of the push fitting.



Item	Description
1	Baffle
2	Push fitting
3	Quick release connector of the push fitting
4	Lubrication tube
5	M5 x 20 mm low head socket cap screw (quantity 8)
6	M4 x 8 mm flat head cap screw (quantity 2)
7	Lubrication tube cover
8	Lubrication segment of the top rail

4. Install the lubrication rail segment by following the procedure [Replace a Straight Segment of the Top or Bottom Rail on page 164](#).
5. Install the lubrication tube cover with two M4 x 8 mm screws and torque to 4.5 N•m (3.32 lb•ft).

## Replace a Straight Segment of the Top or Bottom Rail

Use this section to replace straight segments of the top or bottom rail. If the rail segment has a lubrication connection, see [Replace a Lubrication Segment of a Top or Bottom Rail on page 162](#).

### Before You Begin

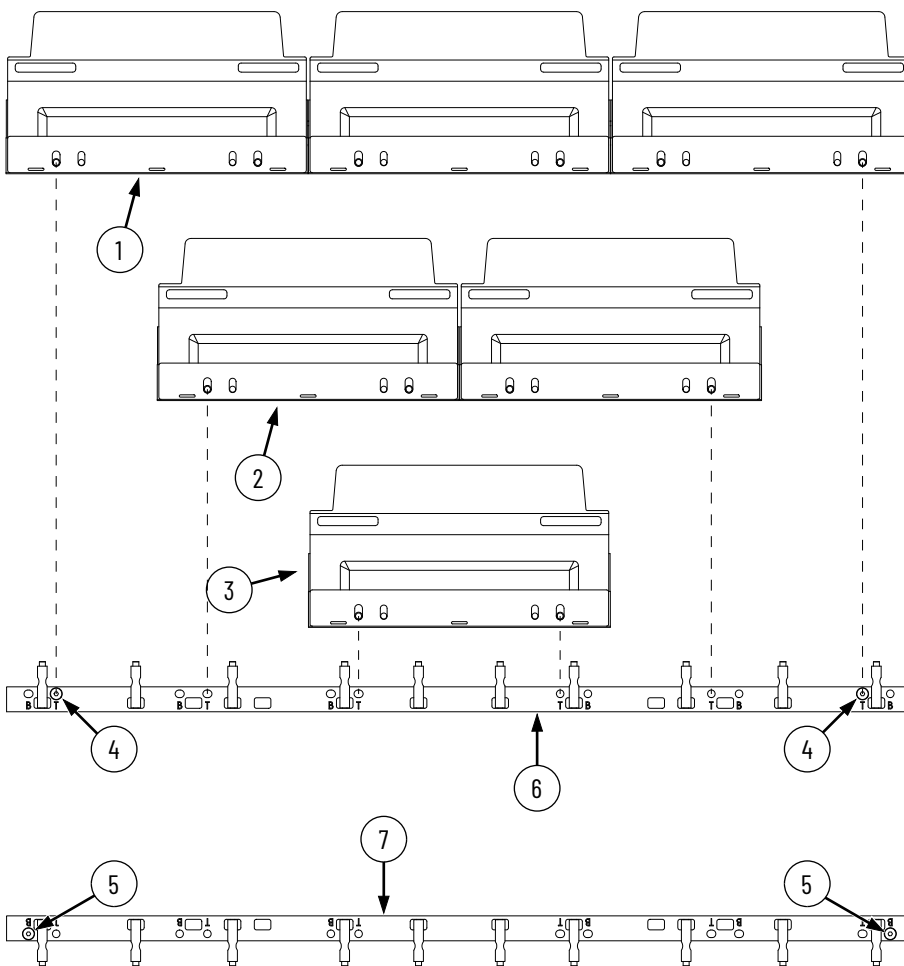


**ATTENTION:** Before attempting any service to an iTRAK 5750 system, see [Safety Information on page 41](#).

The rail straightening bar tool, catalog number 2198T-A17, can be used with the track motor modules in any of the three configurations that are shown in [Figure 57](#). See the following statements about [Figure 57](#):

- The rail straightening bar tool holes correspond to the motor module shoulder screw holes. Shoulder screws that are shown are for the three motor module configuration.
- For simplicity, the track top plate is not shown.

Figure 57 - Rail Straightening Bar Configurations



Item	Description
1	Three motor module configuration (top view)
2	Two motor module configuration (top view)
3	One motor module configuration (top view)
4	Top rail motor module shoulder screw positions for three motor module configuration
5	Bottom rail motor module shoulder screw positions for three motor module configuration
6	For a top rail, the straightening bar must be placed on the outboard side of the rail.
7	For a bottom rail, the straightening bar must be placed on the inboard side of the rail.

### What You Need

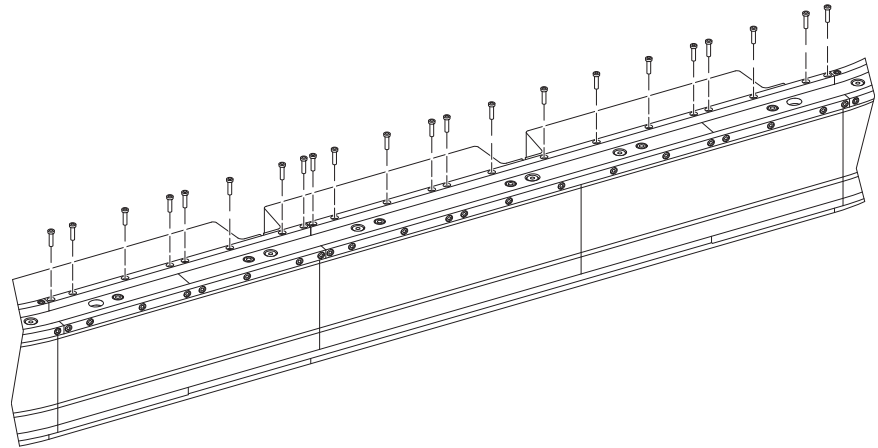
- M5 x 0.8 x 20 mm low head socket cap screws, which are part of kit 2198T-BE-KITCON-1 described in [Replacement Hardware on page 140](#), if needed
- A straight rail segment, which can be ordered through an engineered to order (ETO) process
- 3 mm, 4 mm, and 5 mm hex drivers
- Loctite 243
- Straight segments of the top or bottom rail
- Rail straightening bar tool, catalog number 2198T-A17
- Straight rail to straight rail joint alignment tool, which is part of the rail alignment tool kit, catalog number 2198T-A22

### Procedure to Remove Straight Segments of the Top or Bottom Rail

1. Remove the M5 x 0.8 x 20 mm low head cap socket screws that secure the rail segment to the top plate or bottom plate.
2. Remove the rail segment.

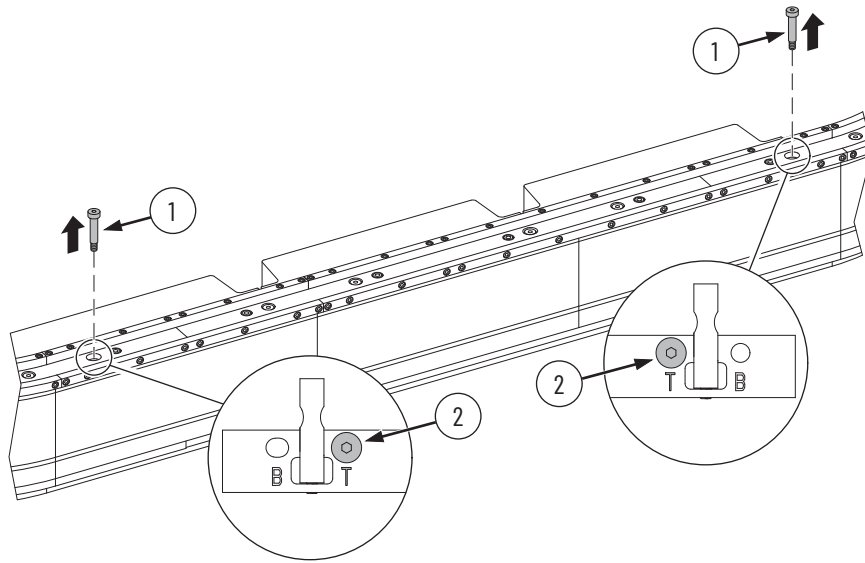
### Procedure to Install Straight Segments of the Top or Bottom Rail

1. Choose the rail configuration that you would like to install from [Figure 57](#).
2. Apply Loctite 243 to the M5 x 0.8 x 20 mm low head cap socket rail screws.
3. Place the straight rail segment or segments into position.
4. Loosely install the M5 x 0.8 x 20 mm low head cap socket screws into the rail segment or rail segments.



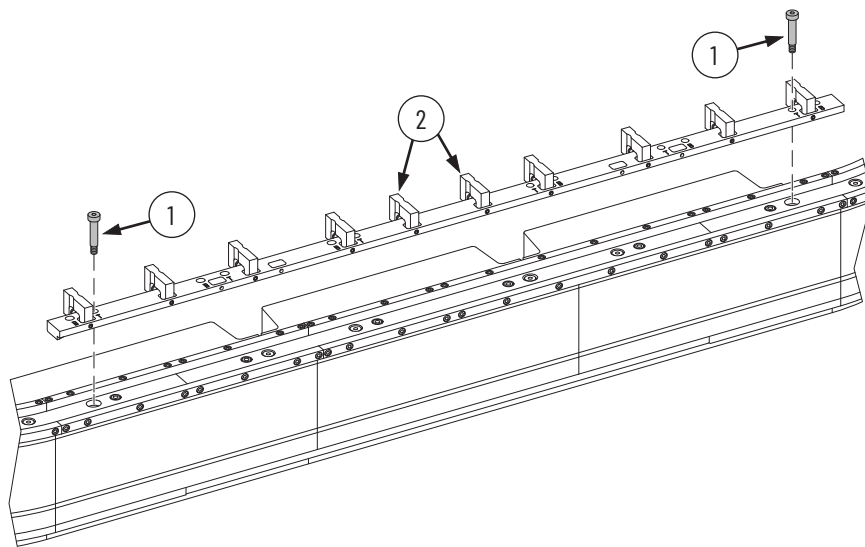
- Remove the motor module shoulder screws that correspond to the straightening bar left and right holes.

Which holes to use as the straightening bar holes depends on how long the rail segments are and whether they are part of the top rail or bottom rail, as shown in [Figure 57 on page 164](#). Use the shoulder screw holes marked "T" for top rail segments. Use the shoulder screw holes marked "B" for bottom rail segments.



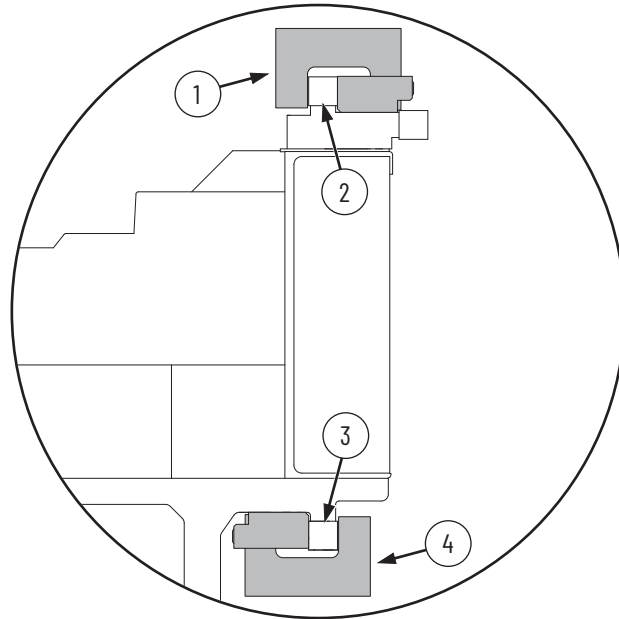
Item	Description
1	10 mm x 16 mm x M8 x 1.25 mm shoulder screw
2	The shoulder screws that align with the "T" holes are removed because this example shows a top rail.

- Mount the rail straightening bar onto the plate that the rail is attached to so that the rail straightening bar clamps hook around the rail. Use two shoulder screws where the shoulder screws were removed in [step 5](#).



Item	Description
1	10 mm x 16 mm x M8 x 1.25 mm shoulder screw
2	Rail straightening bar clamps

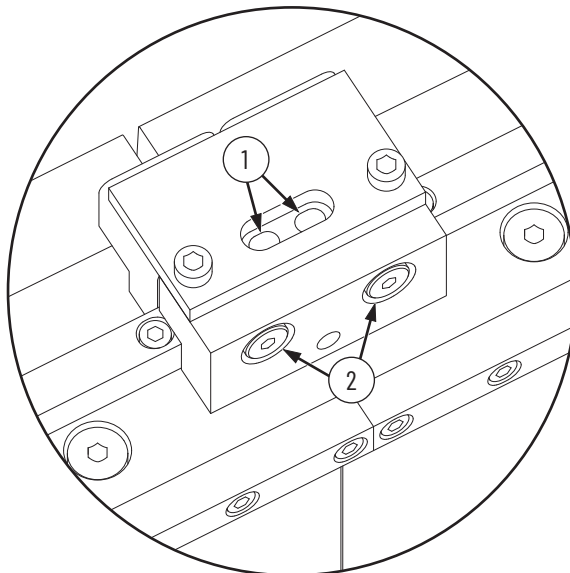
7. To straighten and position the rail, evenly hand tighten all rail straightening bar set screws, which are in the rail straightening bar clamps.
8. Torque all rail straightening bar set screws to 13 N•m (9.6 lb•ft).



Item	Description
1	Access set screws on the track interior side of the straightening bar clamp for the top rail.
2	Top rail
3	Bottom rail
4	Access set screws on the track exterior side of the straightening bar clamp for the bottom rail.

9. Torque all M5 x 0.8 x 20 mm low head cap socket screws in the rail segments to 9 N•m (6.6 lb•ft), except for the rightmost and leftmost screw in each rail segment.
10. Loosen the rail straightening bar set screws so that the clamps no longer clamp the rail.
11. Remove the shoulder screws that were used to mount the rail straightening bar.
12. Remove the rail straightening bar.
13. Clean and apply fresh Loctite 243 to the shoulder screws.
14. Reinstall the shoulder screws into the motor modules and torque to 13 N•m (9.6 lb•ft).
15. Repeat steps [1..14](#) for additional straight rail segments.

16. At the joint between two straight rail segments, place the straight rail to straight rail joint alignment tool, centered over the joint.
17. To align the rail joint, tighten the two shoulder screws of the joint alignment tool using a 4 mm hex driver, hand tight.
18. Tighten the two M5 x 0.8 mm x 20 mm low head cap socket rail screws to a torque of 9 N•m (6.6 lb•ft).



Item	Description
1	M5 x 0.8 x 20 mm low head cap socket screw access holes
2	Straight rail to straight rail joint alignment tool shoulder screws

## Replace a Curve Segment of the Top or Bottom Rail

Use this section to replace a curve segment of the top or bottom rail.

### *Before You Begin*

Install straight segments of the top or bottom rails before you install the curve segments of the top or bottom rails.



**ATTENTION:** Before attempting any service to an iTRAK 5750 system, see [Safety Information on page 41](#).

### *What You Need*

- A 90° or 180° curve segment of the top or bottom rail, which can be ordered through an engineered to order (ETO) process
- M5 x 0.8 x 20 mm low head socket cap screws, which are part of kit 2198T-BE-KITCON-1 described in [Replacement Hardware on page 140](#), if needed
- 4 mm hex driver
- Loctite 243
- Straight rail to left curve rail joint alignment tool, which is part of the rail alignment tool kit, catalog number 2198T-A22
- Straight rail to right curve rail joint alignment tool, which is part of the rail alignment tool kit, catalog number 2198T-A22



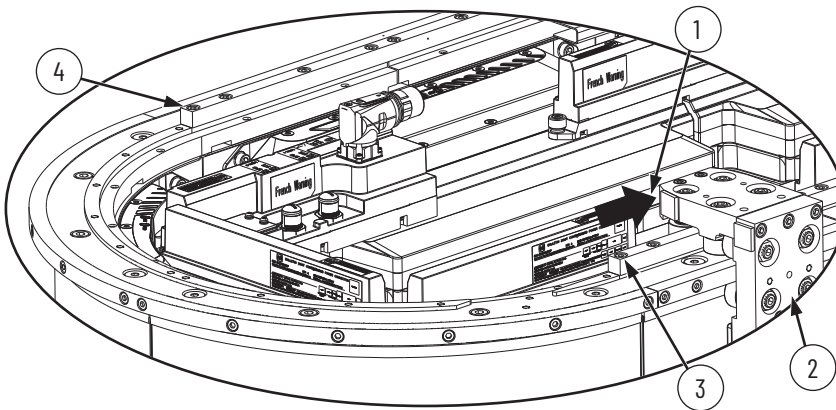
### Procedure to Remove Curve Segments of the Top or Bottom Rail

1. Remove the M5 x 0.8 x 20 mm low head cap socket screws that secure the rail segment to the top plate or bottom plate.
2. Remove the rail segment.

### Procedure to Install Curve Segments of the Top or Bottom Rail

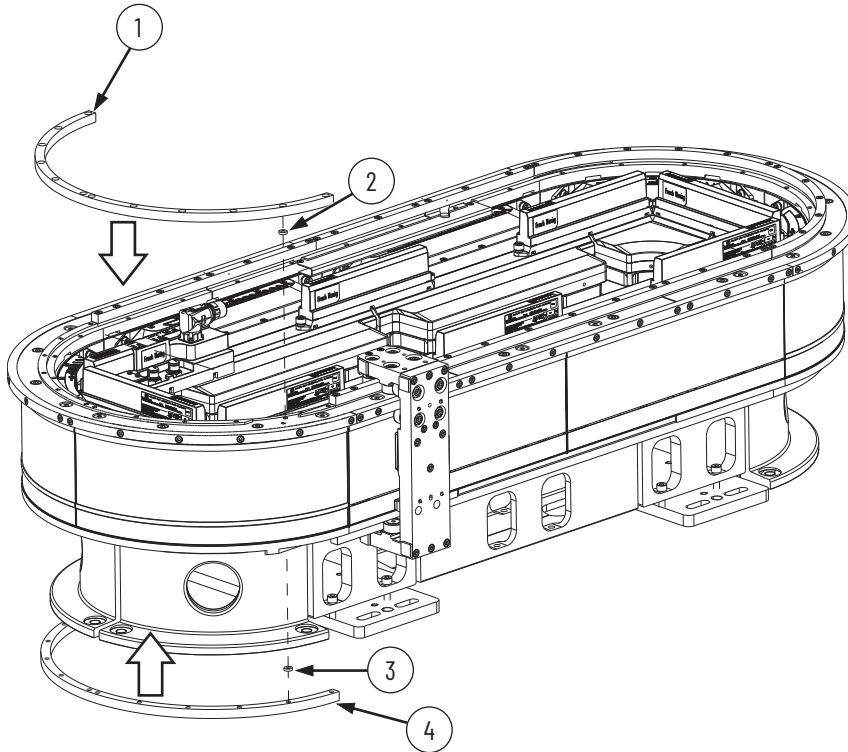
This procedure shows the installation of a 180° curve segment. The same steps apply for the installation of a 90° curve segment.

1. To make the straight rail segment ends that are adjacent to the curve accessible, move movers away from the straight rail segment ends.
2. Loosen the straight rail segment end screw at the right side of the curve, and the straight rail segment end screw at the left side of the curve.



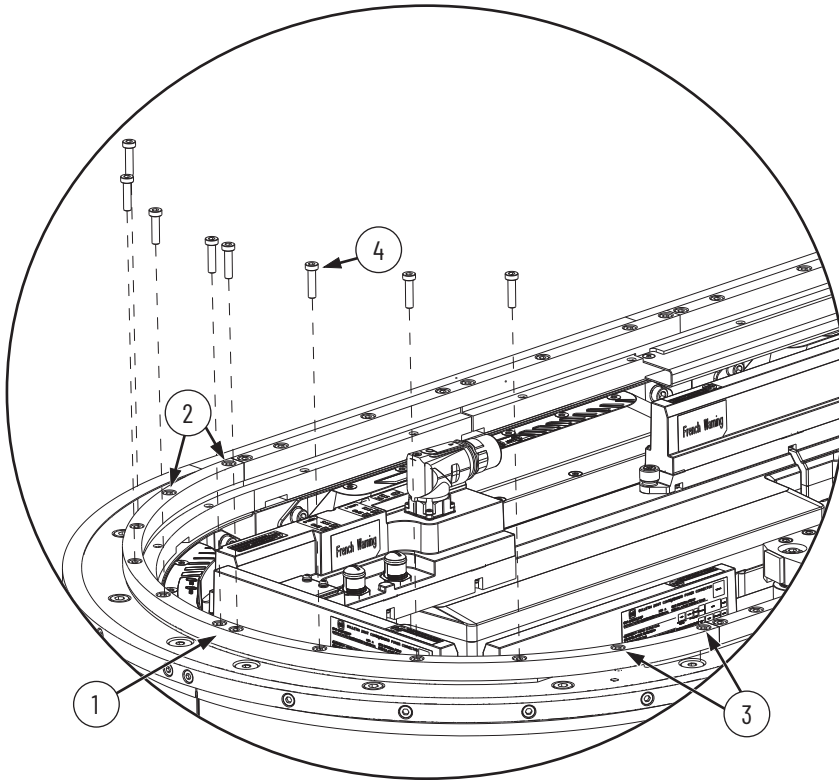
Item	Description
1	Clearance between end of straight rail segment and mover
2	Mover
3	Straight rail segment end screw at the right side of the curve
4	Straight rail segment end screw at the left side of the curve

3. Locate the spacer location on the plate to which the curve rail segment will be mounted. The spacer location is a depression surrounding the second to last screw hole from one of the ends of the curved rail segment. Each top or bottom curved rail segment plate has one spacer location, whether it is a 180° curve segment, or a 90° curve segment.
4. Apply Loctite 243 to the M5 x 20 mm low head socket cap screws that will be used to secure the curve rail segment.
5. Put the spacer in the spacer location, and place the curve rail segment in position.



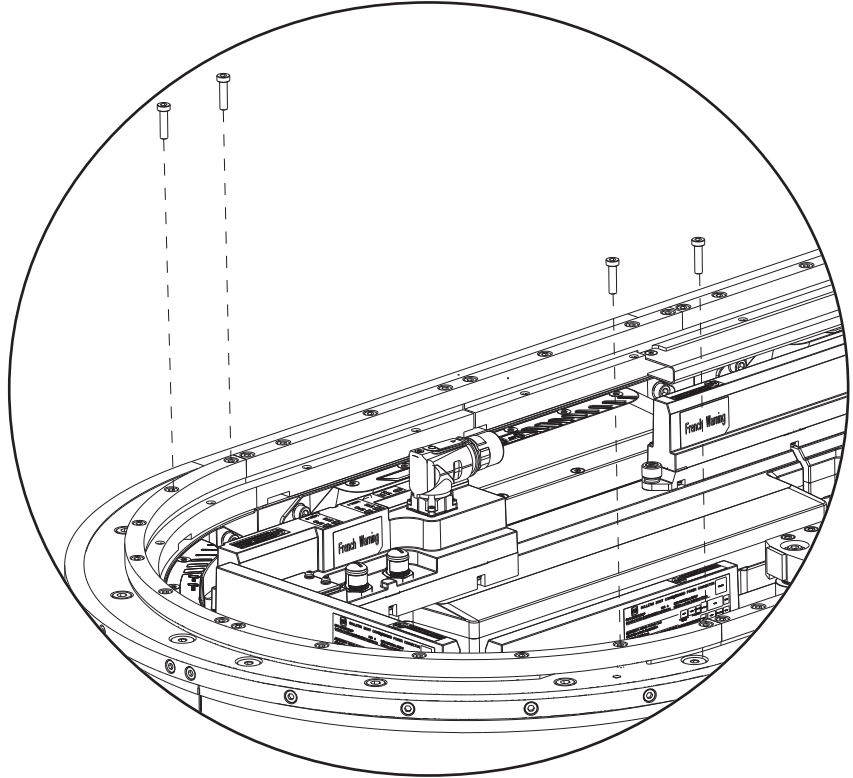
Item	Description
1	Curve segment of top rail
2	Spacer for curve segment of top rail
3	Spacer for curve segment of bottom rail
4	Curve segment of bottom rail

6. Install the screws into the screw holes other than the two screw holes on the right end of the curve and the two screw holes on the left end of the curve, as follows:
  - a. Apply a push force of 44...66 N (10.0...15.0 lb) at the apex of the curve to push the curve rail segment into contact with the surrounding installed rail segments. This force must be applied so that curve rail segment faces are flush with straight rail segment faces. Continue to apply this force through step [step b](#).
  - b. Install the two screws closest to the apex of the curve. Torque the installed screws to 9 N•m (6.6 lb•ft) by using a 4 mm hex driver.
  - c. Stop applying the push force.
  - d. Install the remaining screws for this step, starting with the screws next to the curve apex screws, and working toward the curve segment ends, alternating sides. Torque the installed screws to 9 N•m (6.6 lb•ft) by using a 4 mm hex driver.

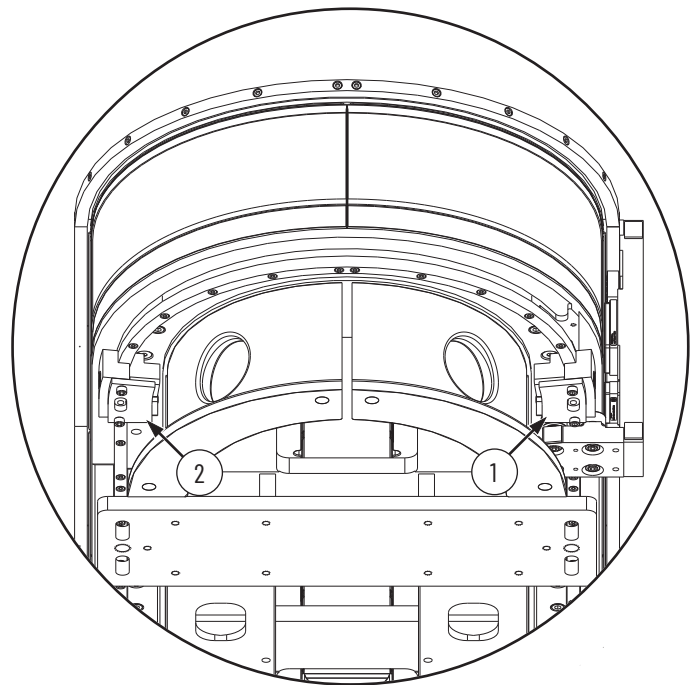
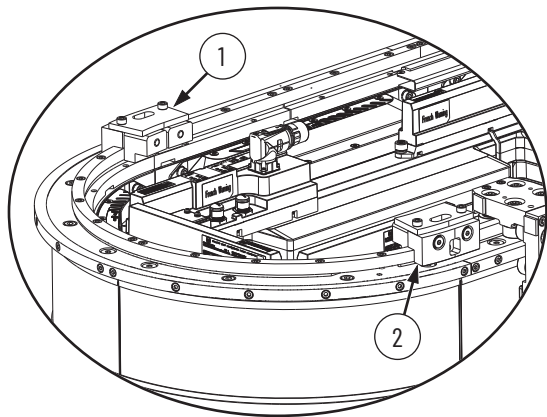


Item	Description
1	Apex of curve rail segment
2	Two screw holes on the left end of the curve. Do not install screws here during this step.
3	Two screw holes on the right end of the curve. Do not install screws here during this step.
4	M5 x 0.8 x 20 mm low head socket cap screw

- Loosely install M5 x 0.8 x 20 mm low head socket cap screws into the two screw holes on the right end of the curve and the two screw holes on the left end of the curve.



- Apply the straight rail to right curve rail joint alignment tool to the straight to right curve rail joint, visually aligning the rail joint alignment tool with the rail joint by using the scribe line. See the image in [step 9](#) for the scribe line location.

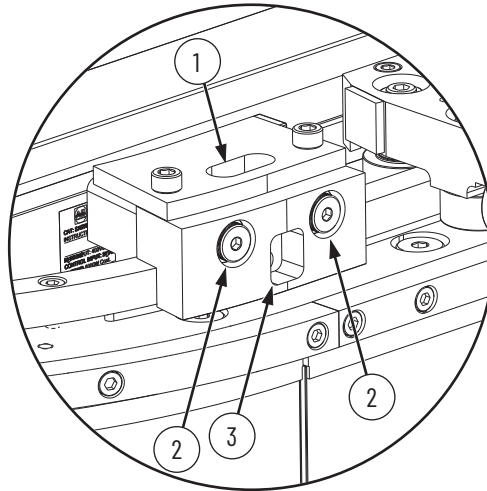


These figures show the location where each type of joint alignment tool is installed on the top and bottom of the track.

Item	Description
1	Straight rail to left curve rail joint alignment tool

Item	Description
2	Straight rail to right curve rail joint alignment tool

9. To align the joint, tighten the two shoulder screws of the straight rail to right curve rail joint alignment tool using a 4 mm hex driver, hand tight.



Item	Description
1	Rail screw access cutout
2	Shoulder screws
3	Cutout for viewing rail joint and scribe line

10. Repeat [step 8](#) and [step 9](#), but using the straight rail to left curve rail joint alignment tool on the straight to left curve rail joint.
11. Tighten the four M5 x 20 mm low head socket cap screws that were loosely installed in [step 7](#). Torque to 9 N•m (6.6 lb•ft). The last screw at each end of the curve segment is installed through the rail screw access cutout in the joint alignment tool.
12. At the ends of the straight rail segments that contact the curve segment, tighten the M5 x 20 mm low head socket cap screws that were loosened in [step 2](#) to a torque of 9 N•m (6.6 lb•ft). These screws are accessed through the cutout in the joint alignment tool.
13. Remove the joint alignment tools.

## Replace a Lubrication Segment of a Middle Rail

Use this section to remove or install a straight segment of a middle rail when the segment has a lubrication port.

### Before You Begin



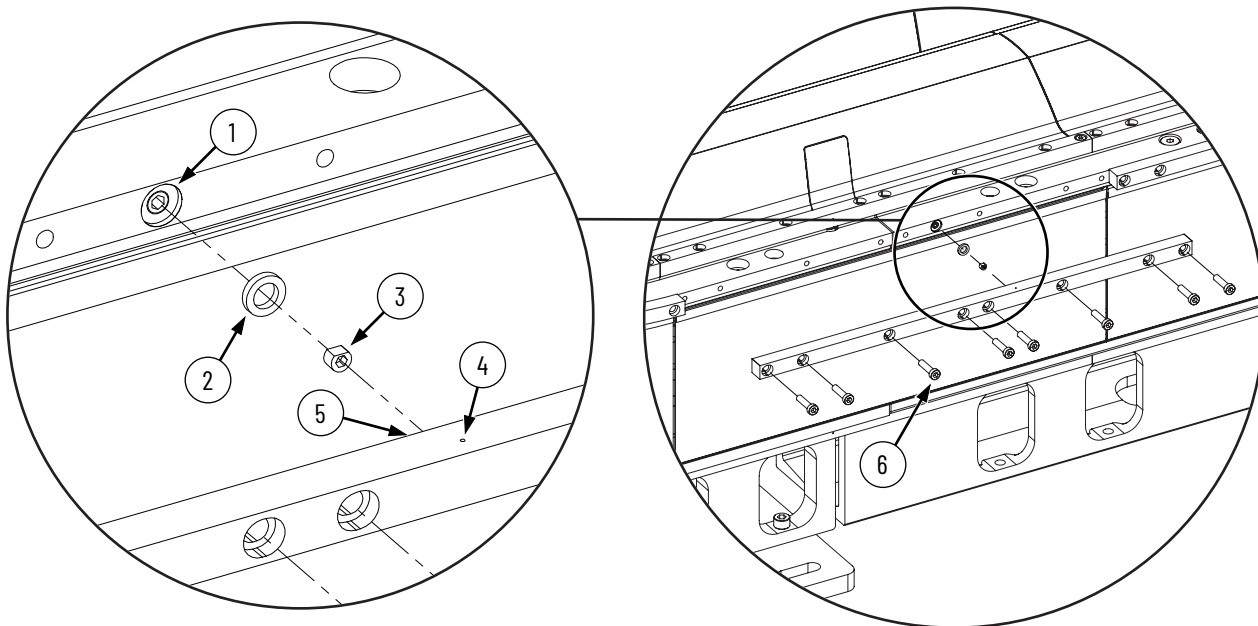
**ATTENTION:** Before attempting any service to an iTRAK 5750 system, see [Safety Information on page 41](#).

### What You Need

- M5 x 0.8 x 20 mm low head socket cap screws, which are part of kit 2198T-BE-KITCON-1 described in [Replacement Hardware on page 140](#), if needed
- A lubrication segment of a middle rail, which can be ordered through an engineered to order (ETO) process
- 2.5 mm, 3 mm hex drivers
- Loctite 243
- Straight rail to straight rail joint alignment tool, which is part of the rail alignment tool kit, catalog number 2198T-A22

*Procedure to Remove a Lubrication Segment of a Middle Rail*

1. Remove the M5 x 20 mm low head socket cap screws that secure the lubrication rail segment to the track top plate, and remove the lubrication rail segment.
2. Remove the baffle from the lubrication rail segment threaded hole with a 2.5 mm hex driver.



Item	Description
1	Lubrication port, present on each top plate
2	O-ring
3	Baffle

Item	Description
4	Lubrication weep hole in rail segment, indicating the location of the lubrication connection on the rail segment
5	Tapped hole in lubrication rail for baffle to thread into (hidden in this view)
6	5M x 20 mm low head socket cap screws

*Procedure to Install a Lubrication Segment of a Middle Rail*

1. Thread the baffle into the tapped hole in the new lubrication rail segment using a 2.5 mm hex driver. Orient the baffle with the flat side facing up, as shown in the drawing.
2. Place the O-ring into the counter bore that surrounds the top plate lubrication port.
3. Install the new lubrication rail segment by following the procedure [Replace a Straight Segment of the Middle Rail on page 174](#).

**Replace a Straight Segment of the Middle Rail**

Use this section to remove or install straight segments of the middle rail. If the rail segment has a lubrication connection, see [Replace a Lubrication Segment of a Middle Rail on page 173](#).

*Before You Begin*



**ATTENTION:** Before attempting any service to an iTRAK 5750 system, see [Safety Information on page 41](#).

### What You Need

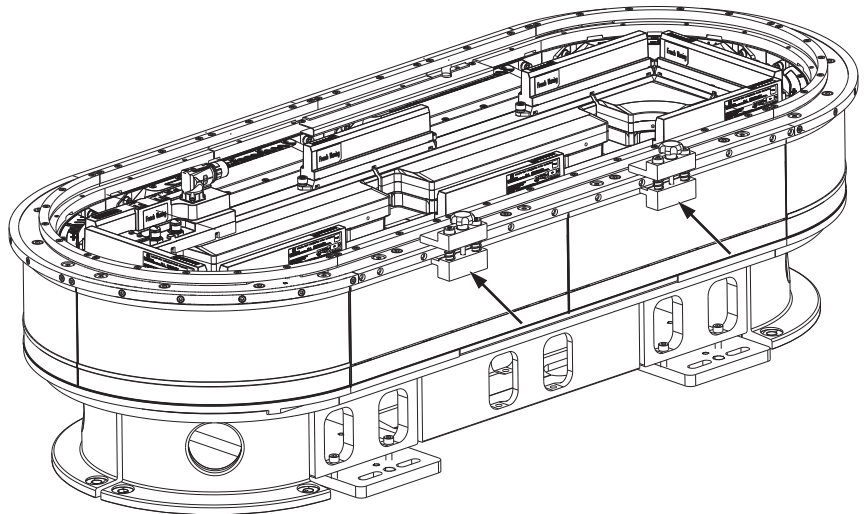
- M5 x 0.8 x 20 mm low head socket cap (LHSC) screws, which are part of kit 2198T-BE-KITCON-1 described in [Replacement Hardware on page 140](#), if needed
- A straight segment of the middle rail, which can be ordered through an engineered to order (ETO) process
- 4 mm hex driver
- Loctite 243
- Three of the middle rail positioner tool, which are part of the rail alignment tool kit, catalog number 2198T-A22
- Straight-rail-to-straight-rail joint alignment tool, which is part of the rail alignment tool kit, catalog number 2198T-A22

### Procedure to Remove Straight Segments of the Middle Rail

1. Remove the M5 x 0.8 x 20 mm low head socket cap screws that secure the rail segment.
2. Remove the rail segment.

### Procedure to Install Straight Segments of the Middle Rail

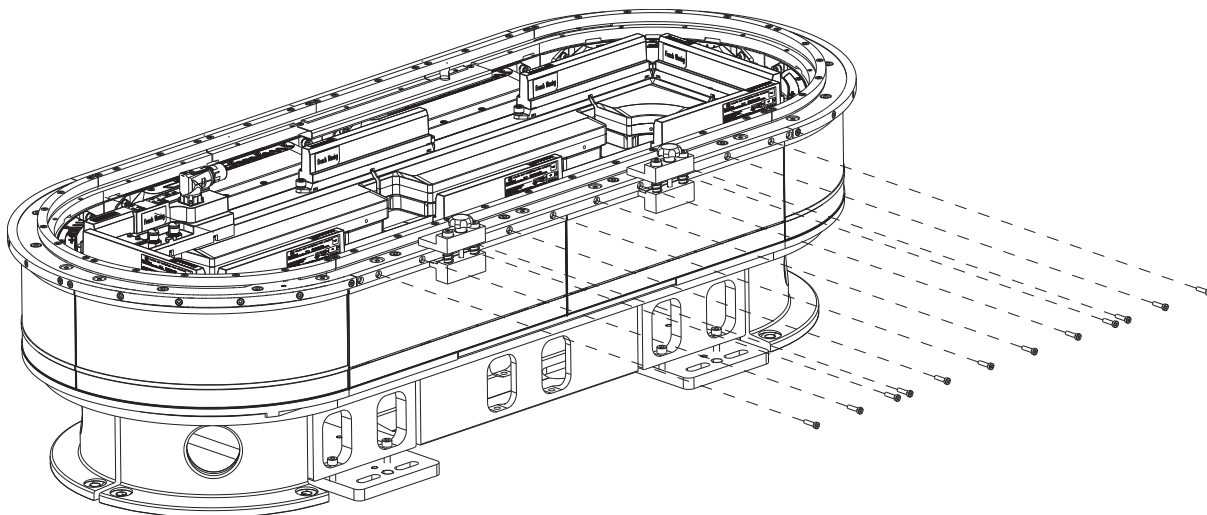
1. Clamp the middle rail segment to the top plate by using up to three middle rail positioner tools as shown. In this drawing, two middle rail positioner tools are used. Use at least one middle rail positioner tool per motor module width of rail segment.



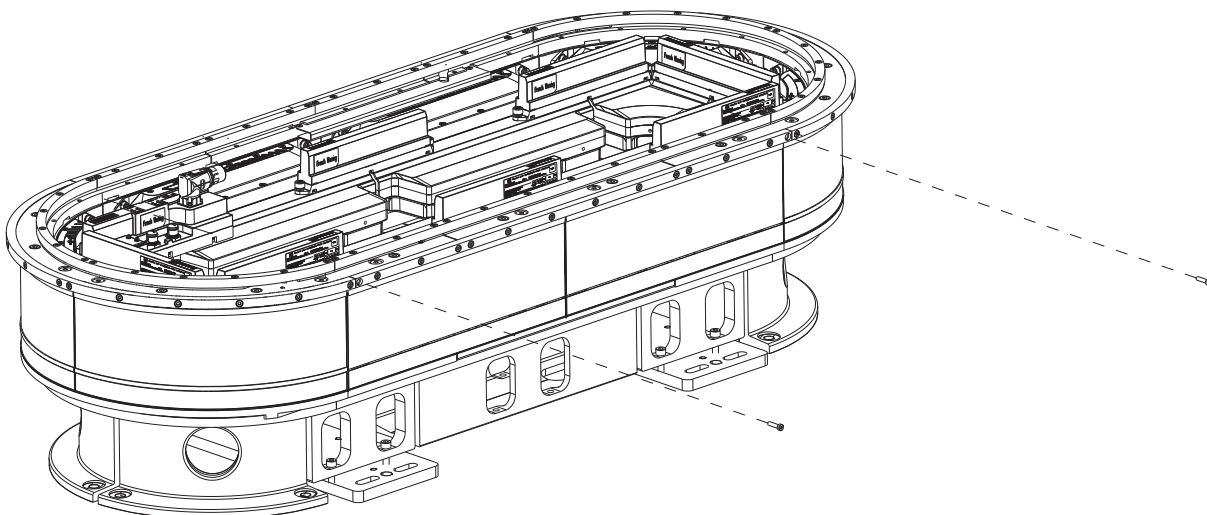
2. Check that the rail end faces are flush with adjacent rails.

3. Apply Loctite 243 to the M5 x 0.8 x 20 mm LHSC rail screws, as required.
4. Install the M5 x 20 low head socket cap screws that are not at the ends of the rail segment as follows. In this step, do not install the left-most screw for the rail segment or the right-most screw for the rail segment.

Starting from the second left-most screw and moving to the right, install each screw with a torque of 9 N•m (6.6 lb•ft); as you move along the rail segment, after each set of three screws is installed, move the leftmost middle rail positioner tool to the next set of three screws. Continue until you have installed the second right-most screw on the rail segment.



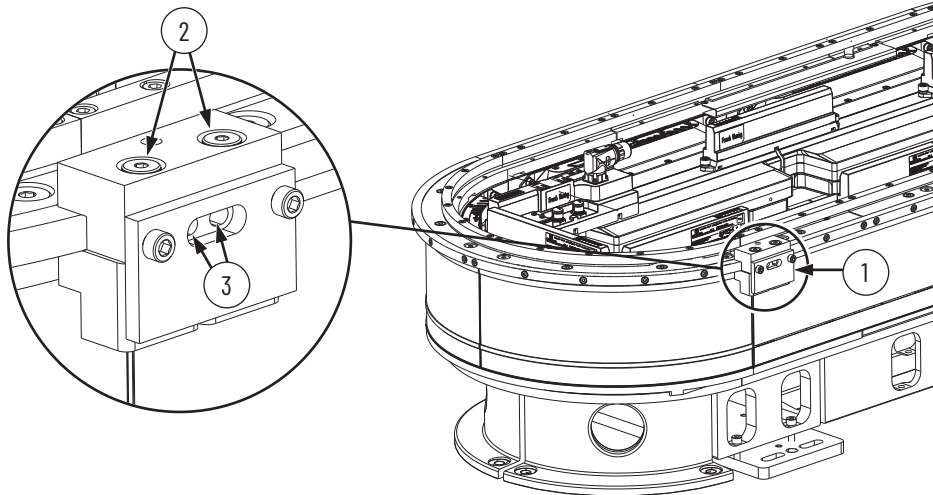
5. Remove the middle rail positioner tools.
6. Loosely install the M5 x 20 mm low head socket cap screws at the ends of the rail segment.



7. If one of the rail segments that are adjacent to the one you are installing is a straight rail segment, repeat steps 1..6 for that straight segment.
8. If one of the rail segments that are adjacent to the one you are installing is a curve rail segment, make sure that at least steps 1..4 of [Replace a Curve Segment of the Middle Rail on page 177](#) are performed for that curve rail segment. If the curve has already been installed past steps 1..4, that is acceptable, you do not need to loosen any curve screws other than the end screw, as described in step 9 of this procedure.
9. Make sure that the rail segments that are adjacent to the rail segment that you are installing have their end screw at the adjoining rail end loosely installed.



10. Place the straight rail to straight rail joint alignment tool at a joint where the straight segment meets an adjacent rail segment. The adjacent rail segment may be straight or curve; for the middle rail, the straight rail to straight rail joint alignment tool is used in either situation.
11. To align the rail joint, tighten the two shoulder screws of the straight rail to straight rail joint alignment tool using a 4 mm hex driver, hand tight.



Item	Description
1	Straight rail to straight rail joint alignment tool
2	Shoulder screws
3	Access holes for M5 x 20 mm low head socket cap screws

12. Secure the ends of the rails at the aligned joint by torquing the M5 x 20 mm low head socket cap screws to 9 N•m (6.6 lb•ft).
13. Remove the straight rail to straight rail joint alignment tool.
14. Repeat steps [10...](#)[13](#) on the opposite side of the straight rail segment.

## Replace a Curve Segment of the Middle Rail

Use this section to remove or install curve segments of the middle rail.

### Before You Begin

Before you begin, make sure that steps [1...6](#) of the procedure [Replace a Straight Segment of the Middle Rail on page 174](#) have been performed on the middle rail straight segments that are adjacent to the curve segment that you are installing.



**ATTENTION:** Before attempting any service to an iTRAK 5750 system, see [Safety Information on page 41](#).

### What You Need

- A 90° or 180° curve segment of the middle rail, which can be ordered through an engineered to order (ETO) process
- M5 x 0.8 x 20 mm low head socket cap screws, which are part of kit 2198T-BE-KITCON-1 described in [Replacement Hardware on page 140](#), if needed
- 4 mm hex driver
- Loctite 243
- One straight rail to straight rail joint alignment tool from the rail joint aligning tool kit, catalog number 2198T-A22

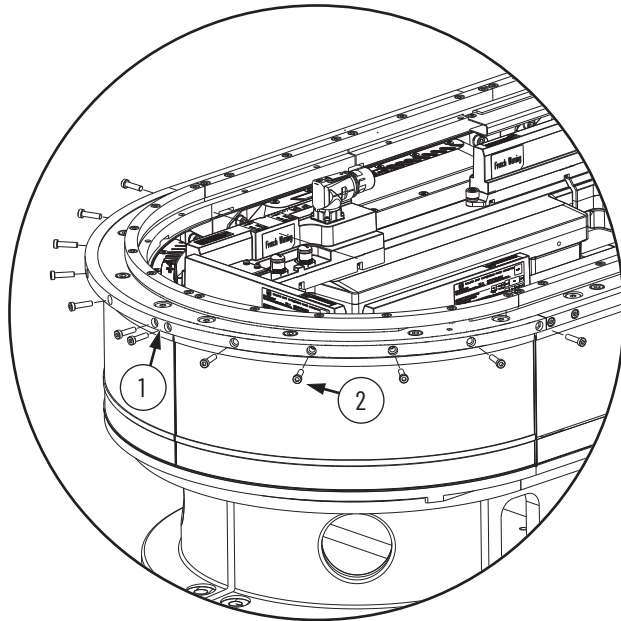
*Procedure to Remove Curve Segments of the Middle Rail*

1. Remove the M5 x 0.8 x 20 mm low head cap socket screws that secure the rail segment.
2. Remove the rail segment.

*Procedure to Install a Curve Segment of the Middle Rail*

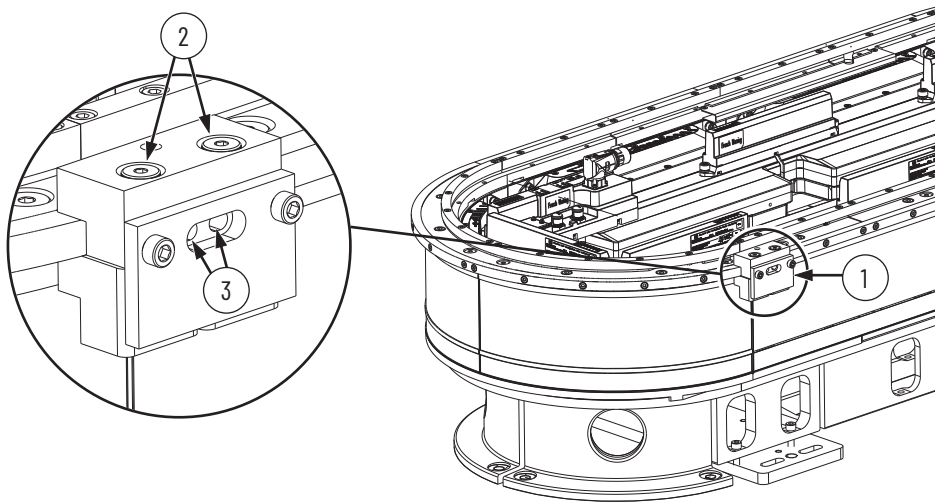
This procedure shows the installation of a 180° curve segment. The same steps apply for the installation of a 90° curve segment.

1. Loosen any straight rail segment end screws that are next to the curve.
2. Apply Loctite 243 to all M5 x 20 mm low head socket cap screws that will be used to secure the curve rail segment.
3. Place the curve rail segment in position.
4. Install the curve rail segment screws as follows:
  - a. Apply a push force of 44...66 N(10.0...15.0 lb) at the apex of the curve to push the curve rail segment into contact with the surrounding installed rail segments. This force must be applied so that curve rail segment faces are flush with straight rail segment faces. Continue to apply this force through step [step b](#).
  - b. Install the two screws closest to the apex of the curve, and torque to 9 N•m (6.6 lb•ft) by using a 4 mm hex driver.
  - c. Stop applying the push force.
  - d. Loosely install the remaining screws.



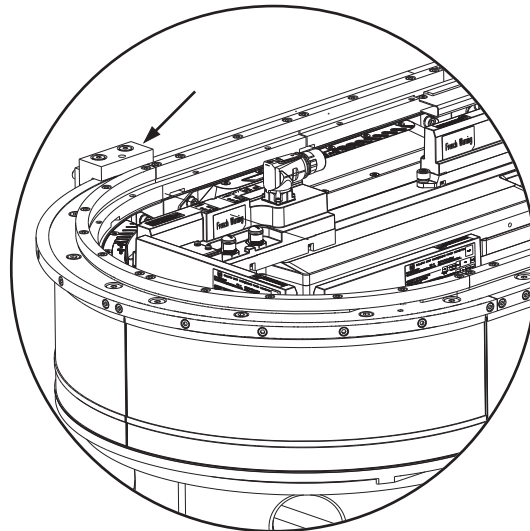
Item	Description
1	Apex of 180° curve rail segment
2	M5 x 20 mm low head socket cap screw. There are 12 screws for a 180° curve rail segment, and 6 screws for a 90° curve rail segment.

5. Apply the straight rail to straight rail joint alignment tool to one of the curve to straight joints.
6. To align the rail joint, tighten the two shoulder screws of the straight rail to straight rail joint alignment tool using a 4 mm hex driver, hand tight.



Item	Description
1	Straight rail to straight rail joint alignment tool
2	Shoulder screws
3	Access holes for M5 x 20 mm low head socket cap screws

7. Working from the curve apex to the aligned rail end, torque the screws to 9 N•m (6.6 lb•ft) by using a 4 mm hex driver. The screws at the ends of the curve segment are accessed through the cutout in the joint alignment tool.
8. At the ends of the straight rail segment that contacts the curve segment, torque the screw to 9 N•m (6.6 lb•ft). This screw is accessed through the cutout in the joint alignment tool.
9. Remove the straight rail to straight rail joint alignment tool.
10. Repeat steps [5](#)–[9](#) on the opposite side of the curve.



## Replace a Connector Module

Use this section to replace a connector module.

*Before You Begin*



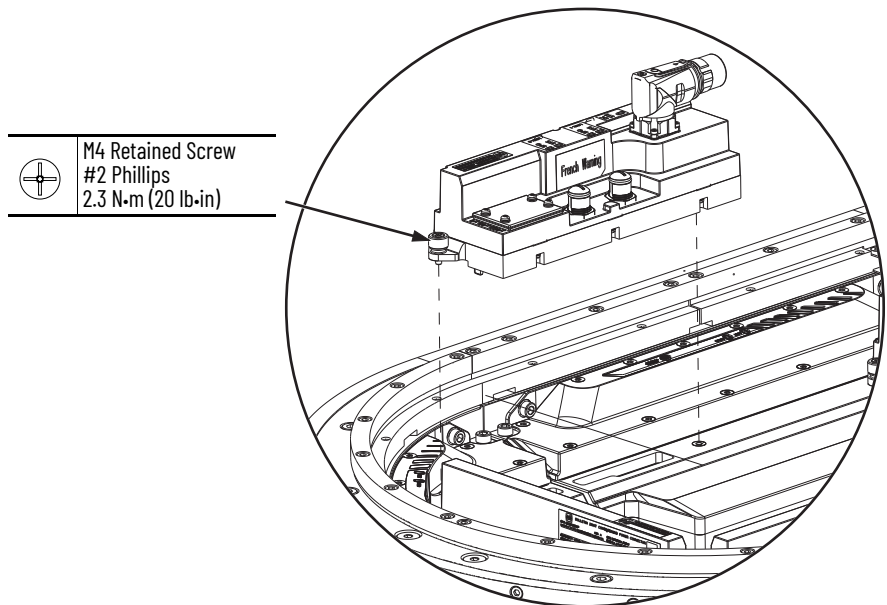
**ATTENTION:** Before attempting any service to an iTRAK 5750 system, see [Safety Information on page 41](#).

*What You Need*

- #2 Phillips bit
- One of the following types of connector module:
  - 2198T-CT-CP, power and control input connector module
  - 2198T-CT-P, power input with control pass-through connector module
  - 2198T-CT, power and control pass-through connector module

*Procedure to Replace a Connector Module*

1. If infield covers are present, remove the infield covers. See [Replace an Infield Cover on page 181](#).
2. If you are replacing a power and control input connector module (catalog number 2198T-CT-CP) or power with control pass-through connector module (catalog number 2198T-CT-P), complete steps a and b.
  - a. Rotate the power cable connector outer housing to the unlocked position.
  - b. Remove the cable connector from the motor power connector on the connector module.
3. If you are replacing a power and control input connector module (catalog number 2198T-CT-CP), complete steps a and b.
  - a. Rotate the Ethernet cable outer housing counter-clockwise until it is free from the cable-connector mounting ring on the connector module.
  - b. Remove the Ethernet cable from the connector on the connector module.
4. Loosen the captive screws on the connector module with a #2 Phillips driver.



5. Remove the connector module.
6. Install the new connector module by reversing the steps used to remove the old connector module.

## Replace an Infield Cover

Use this section to replace an infield cover.

### Before You Begin




**ATTENTION:** Before attempting any service to an iTRAK 5750 system, see [Safety Information on page 41](#).

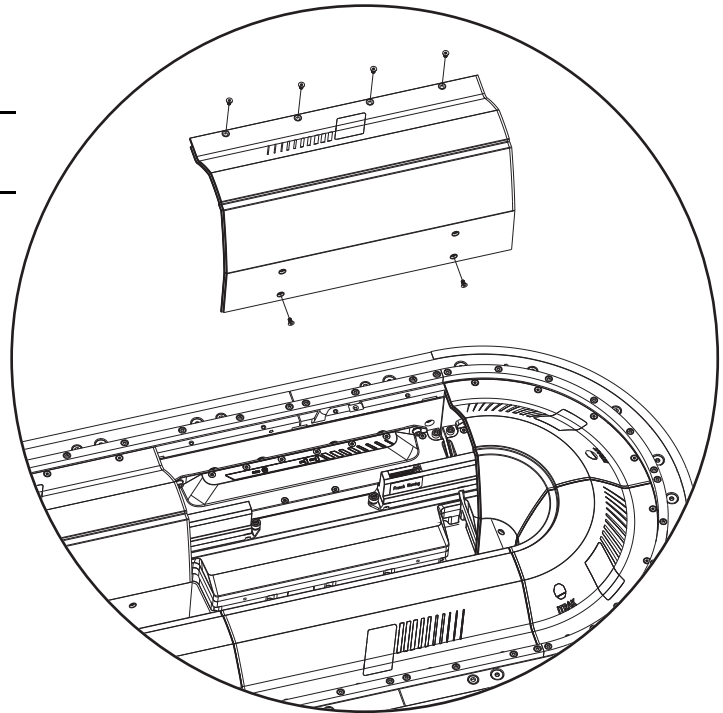
### What You Need

- 2.5 mm hex driver
- Infield cover kit:
  - 2198T-AS-C-A-04-U, straight cover
  - 2198T-AS-C-B-90, 90° curve cover

### Procedure to Replace an Infield Cover

1. Remove the M3 x 8 mm flat head screws.
2. Remove the infield cover.

	M3 x 8 mm flat head 2.5 mm hex driver 0.8 N•m (7.0 lb•in)
---	---



3. Secure the replacement infield cover to the assembly by installing the M3 x 8 mm flat head screws and torquing to 0.8 N•m (7.0 lb•in).

## Replace a Lubricant Cartridge

The lubricant pumps are manufactured by perma and are part of the perma STAR CONTROL product line. See the [perma STAR CONTROL product line webpage](#). That webpage links to the perma STAR CONTROL operating instructions, perma publication 109301\_STAR\_CONTROL\_PE\_A01\_int23. In the operating instructions, see the section “LC exchange”. That section provides the steps to replace a lubricant cartridge.

## Lubrication

The rail and rail bearings are an open system that requires a regular schedule of lubrication. To avoid breakdown of the bearings, the bearings must have a film of oil on them. Typical indications of bearing breakdown are discoloration and excessive wear on the inner and outer bearing surfaces. The time interval between applications of lubricant depends on the length of stroke, duty cycle, and environmental factors. Use 68 viscosity mineral oil, such as Kluber 4-UH1-68N, to lubricate the rails and bearings.

The track includes convenient push-to-connect tube connectors on the outside of the base of the track. There is one lubrication tube for each of the rails: top rail, middle rail, and bottom rail. At these connectors, you can connect the iTRAK Lubrication System or your own oil bleed system.

To provide a regular schedule of lubrication, we recommend that you use the iTRAK Lubrication System. Installation instructions for the lubrication system are provided in [Install the Lubrication System on page 71](#). If you design and supply your own oil bleed system, you can use these installation instructions for guidance.

Once the iTRAK Lubrication System or customer provided oil bleed system is installed, see either [Lubrication Using an iTRAK Lubrication System](#) or [Lubrication Using a Customer Provided Oil Bleed System on page 187](#).

### Lubrication Using an iTRAK Lubrication System

Once the iTRAK lubrication system is installed and wired, use the following procedures to configure the lubrication system:

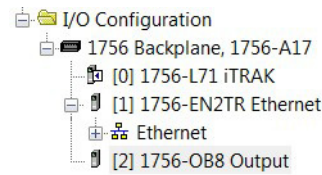
- [Perform Initial Lubrication with an iTRAK Lubrication System on page 182](#)
- [Configure Normal Operation Lubrication with an iTRAK Lubrication System on page 185](#)

#### *Perform Initial Lubrication with an iTRAK Lubrication System*

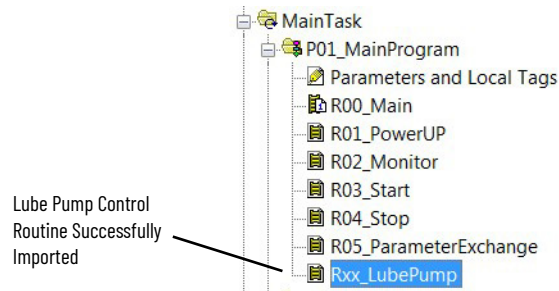
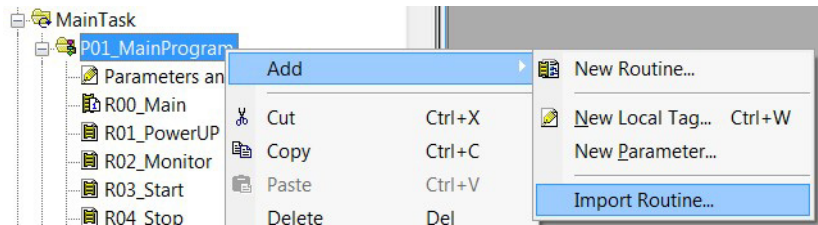
During first-time start or when the rails have been cleaned, complete the following steps.

1. See the [perma STAR CONTROL product line webpage](#). That webpage links to the perma STAR CONTROL operating instructions, perma publication 109301\_STAR\_CONTROL\_PE\_A01\_int23. In the operating instructions, see the section titled Configuration IMPULSE. Use the procedure in Configuration IMPULSE to configure each pump in the system as follows.
  - a. Set the operation mode to IMPULSE mode.
  - b. Set the size of the lubricant cartridge of the pump.
  - c. Set the volume of oil dispensed per impulse to 0.7 cc (0.024 oz).
2. Download the lubrication-system-pump-control routine by clicking this link: [Rxx\\_LubePump \[ROUTINE\].L5X](#).

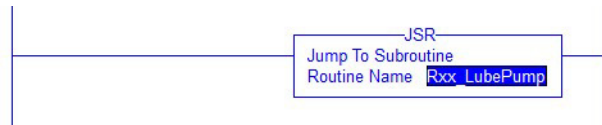
3. Add an output module to the IO tree.



4. Import the lube pump control routine.



5. In the main routine, add a Jump to Subroutine (JSR) that jumps to the lube pump control routine.



6. Open Parameters and Local Tags and search for Out\_LubePump.

Name	Alias For	Base Tag	Usage	Data Type	Description	External Acces	Constant	Style	Connections
Out_LubePump			Output	DINT		Read/Write	<input type="checkbox"/>	Decimal	{0:2} Connections
Out_LubePump.0				BOOL		Read/Write		Decimal	Local:2:0.Data.0
Out_LubePump.1				BOOL		Read/Write		Decimal	Local:2:0.Data.1
Out_LubePump.2				BOOL		Read/Write		Decimal	

7. In the Connections column, configure connections for the outputs to the pumps.
8. Open Parameters and Local Tags and search for the following input parameters:
  - Inp\_PrimePump - signal to start the sequence of lubricant dispensations for initial lubrication. Each dispensation in the sequence corresponds to one impulse to the pumps. The Inp\_PrimePump signal is triggered from the PLC program or HMI.
  - Inp\_PrimeTime - the number of seconds between each lubricant dispensation during initial lubrication.

Name	Alias For	Base Tag	Usage	Data Type	Description	External Acces	Constant	Style	Connections
Inp_PrimePump			Input	BOOL		Read/Write	<input type="checkbox"/>	Decimal	
Inp_PrimeTime			Local	REAL	(time in seconds)	Read/Write	<input type="checkbox"/>	Float	
Inp_RunPump			Input	BOOL		Read/Write	<input type="checkbox"/>	Decimal	RunProduction
Inp_RunTime			Local	REAL	(time in seconds)	Read/Write	<input type="checkbox"/>	Float	

9. Configure the `Inp_PrimePump` parameter as shown in the example in [step 8](#).
10. Configure the `Inp_PrimeTime` parameter as shown in the example in [step 8](#), with one addition; in the Description column, include the number of seconds between each lubrication dispensation during initial lubrication. The recommended value is 600 seconds (10 minutes).
11. To start the prime time, or initial lubrication sequence, trigger the first `Inp-PrimePump` lubrication dispensation using the PLC program or HMI.
12. While initial lubrication is underway, and a sequence of oil dispensations occurs on the interval in `Inp_PrimeTime`, monitor the rails at the oil application sites to see if oil has appeared on the rails. It may be hard to see if oil has appeared. You may need to feel the rails at the oil application sites.
13. Once oil appears on the rails, run the iTRAK 5750 system at 0.5 m/s mover velocity, while letting the `Inp_PrimePump` lubrication sequence continue to run.

**IMPORTANT**

It is important that you not run the iTRAK 5750 system too early, before oil has appeared on the rails. Only run the iTRAK 5750 system once oil has already begun to contact the rails. Running the system with no oil damages the rails.

It is less important, but still a consideration, to avoid starting to run the iTRAK system too long after oil has appeared on the rails. If oil begins to appear on the rails and the lubrication system continues to pump out more oil without the movers moving, oil drips away and is wasted. Once oil appears on the rails, moving the movers allows the mover cams to distribute the oil onto the rails, helping prevent dripping from the application sites.

14. While the iTRAK 5750 system runs, the lubrication system continues to dispense 0.7 cc (0.024 oz) of lubricant onto each rail every 10 minutes. To determine whether each rail has been lubricated along the entire perimeter of the track, monitor the rails. It may be hard to see if each rail has been lubricated along the entire perimeter of the track. If so, you can check if the rails are fully lubricated as follows:
  - a. Stop the motion of the movers.
  - b. Select a test location on each rail that is farthest from the oil application sites.
  - c. At the test location, on the surface of the rail that contacts the mover roller, touch the rail with a finger, and determine if it is adequately lubricated:
    - If oil is not present, there are signs of rusting, or most of the oil is black, more lubrication is required. If this is true, continue running the lubrication system and the iTRAK system to distribute more oil onto the tracks. It is normal for some oil to become black, so if a small percentage of the oil is black, it does not mean you have to add more lubricant to complete the initial lubrication.
    - If oil is present on each rail, and the signs that more lubrication is required are not present, initial lubrication is complete.
15. Once initial lubrication is complete, end the `Inp-PrimePump` lubrication dispensation using the PLC program or HMI.
16. Proceed to configure normal operation lubrication.



### Configure Normal Operation Lubrication with an iTRAK Lubrication System

The frequency of lubricant dispensations and the volume of lubricant dispensed during each dispensation during normal operation depend on many factors. These factors include length of track, number of movers, application motion profile, cleanliness of the operating environment, and other factors. [Table 31 on page 185](#) provides rough guidelines for the lubrication of each rail. Adjust the lubrication frequency and volume as needed for each individual system. Adjust the lubrication frequency and volume to maintain a thin film of oil that evenly coats the rail contact surfaces.

To allow the oil to coat the rails evenly, it is best to have a higher frequency of oil dispensations, with a lower volume of oil dispensed during each dispensation. Avoid over-oiling the rails to an extent that causes excessive oil splatter.



**ATTENTION:** Systems with 16 or more movers may require higher volumes of lubrication than indicated in [Table 31](#). For these systems, monitor the rails closely to help prevent rail damage while determining the proper lubrication schedule for the system.

**Table 31 - Lubrication Guidelines<sup>(1)</sup>**

Total Straight Travel Distance mm (ft) <sup>(2)</sup>	Rail	Volume of Oil Dispensed Onto Each Rail During Each Dispensation cc (oz) <sup>(3)</sup>	Runtime Interval Between Dispensations
1600...2400 (5.2...7.9)	Top rail	0.10 (0.003)	4 hours of runtime
	Middle rail		
	Bottom rail		
2400...4800 (7.9...15.7)	Top rail	0.15 (0.005)	
	Middle rail		
	Bottom rail		
4800...6400 (15.7...21.0)	Top rail	0.20 (0.068)	
	Middle rail		
	Bottom rail		
6400...10,400 (21.0...34.1)	Top rail	0.30 (0.010)	
	Middle rail		
	Bottom rail		
10,400...12,800 (34.1...42.0)	Top rail	0.35 (0.012)	
	Middle rail		
	Bottom rail		
12,800...20,000 (42.0...65.6)	Top rail	0.50 (0.017)	
	Middle rail		
	Bottom rail		
20,000...24,000 (65.6...78.7)	Top rail	0.60 (0.020)	
	Middle rail		
	Bottom rail		

- (1) The values in this table are guidelines. Your application may require a different volume of oil or frequency of dispensations based on operating conditions.
- (2) "Total straight travel distance" is the combined length of all straight motor modules in the track. For example, for a rectangle track with the shorter side straight length of 800 mm (2.6 ft), and the longer side straight length of 1200 mm (3.9 ft), the total straight travel distance is 4000 mm (13.1 ft).
- (3) These oil volumes are the total for each entire rail, spanning all the way around the track. If your track has one lubrication rail segment per rail, the total oil volume for the rail must come from that single lubrication rail segment. If your track has two lubrication rail segments per rail, one half of the total oil volume for the rail must come from each of the lubrication rail segments.

To program an iTRAK lubrication system with a normal operation lubrication schedule, perform the following procedure:

1. Make sure that initial lubrication has been completed. See [Perform Initial Lubrication with an iTRAK Lubrication System on page 182](#).
2. See the [perma STAR CONTROL product line webpage](#). That webpage links to the perma STAR CONTROL operating instructions, perma publication 109301\_STAR\_CONTROL\_PE\_A01\_int23. In the operating instructions, see the section titled Configuration IMPULSE. Use the procedure in Configuration IMPULSE to configure each pump in the system as follows.
  - a. Set the operation mode to IMPULSE mode.
  - b. Set the size of the lubricant cartridge of the pump.
  - c. Set the volume of oil dispensed per impulse to a volume you think is appropriate for your system. It is recommended to use the volumes in [Table 31 on page 185](#) as a starting point. Volumes can be adjusted later if needed.
3. Open Parameters and Local Tags and search for the following input parameters:
  - Inp\_RunPump - signal to start the sequence of lubricant dispensations for normal operation lubrication. Each dispensation in the sequence corresponds to one impulse to the pumps.
  - Inp\_RunTime - the number of seconds of runtime between each lubricant dispensation during normal operation.

Name	Alias For	Base Tag	Usage	Data Type	Description	External Acces	Constant	Style	Connections
Inp_PrimePump			Input	BOOL		Read/Write	<input type="checkbox"/>	Decimal	
Inp_PrimeTime			Local	REAL	(time in seconds)	Read/Write	<input type="checkbox"/>	Float	
Inp_RunPump			Input	BOOL		Read/Write	<input type="checkbox"/>	Decimal	RunProduction
Inp_RunTime			Local	REAL	(time in seconds)	Read/Write	<input type="checkbox"/>	Float	

4. Configure the Inp\_RunPump parameter as shown in the example in [step 3](#). In the Connections column, make sure that there is a parameter connection to the RunProduction tag. This connection allows the sequence of Inp\_RunPump/Inp\_RunTime lubricant dispensations to be triggered when the set amount of runtime has elapsed.
5. Configure the Inp\_RunTime parameter as shown in the example in [step 3](#), with one addition; in the Description column, include the number of seconds of runtime between lubricant dispensations. The recommended value is 10,800 seconds (3 hours) of runtime.
6. Run the iTRAK 5750 system and monitor the rails every few minutes over the course of the period of runtime set in the Inp\_RunTime parameter. Check to see if a thin film of oil is maintained throughout this period. If it is not, reduce the time in the Inp\_RunTime parameter or increase the volume of oil dispensed during each dispensation. Continue to monitor the rails until an oil volume per dispensation and dispensation frequency can be established for the current application.
7. Check that oil dispensations occur on the Inp\_RunTime parameter interval.
8. With the established oil volume per dispensation and dispensation frequency, and an estimate of runtime per day, you can calculate the system rate of oil consumption. With the oil consumption rate and the volume of oil in each lubricant cartridge, you can calculate how often you must replace lubricant cartridges. To ensure proper functioning and help prevent system damage, make sure to provide a regular supply of lubricant. See [Replace a Lubricant Cartridge on page 182](#).

## Lubrication Using a Customer Provided Oil Bleed System

Once the iTRAK lubrication system is installed and wired, use the following procedures to configure the lubrication system.

### *Perform Initial Lubrication with a Customer Provided Oil Bleed System*

During the first-time start or when the rails have been cleaned, complete these steps.

1. To see if oil has appeared on the rails, run your lubrication system and monitor the rails at the oil application sites. It may be hard to see if oil has appeared. You may need to feel the rails at the oil application sites.
2. Once oil appears on the rails, run the iTRAK 5750 system at 0.5 m/s mover velocity, while continuing to run the lubrication system.

---

#### **IMPORTANT**

It is important that you not run the iTRAK 5750 system too early, before oil has appeared on the rails. Only run the iTRAK 5750 system once oil has already begun to contact the rails. Running the system with no oil damages the rails.

It is less important, but still a consideration, to avoid starting to run the iTRAK system too long after oil has appeared on the rails. If oil begins to appear on the rails and the lubrication system continues to pump out more oil without the movers moving, oil drips away and is wasted. Once oil appears on the rails, moving the movers allows the mover cams to distribute the oil onto the rails, helping prevent dripping from the application sites.

---

3. While the iTRAK system runs, use the lubrication system to dispense 0.7 cc (0.024 oz) of lubricant onto each rail every 10 minutes. Continue until each rail has been lubricated along the entire perimeter of the track. It may be hard to see if each rail has been lubricated along the entire perimeter of the track. If so, you can check if the rails are fully lubricated as follows:
  - a. Stop the motion of the movers.
  - b. Select a test location on each rail that is farthest from the oil application sites.
  - c. At the test location, on the surface of the rail that contacts the mover roller, touch the rail with a finger, and determine if it is adequately lubricated:
    - If oil is not present, there are signs of rusting, or most of the oil is black, more lubrication is required. If this is true, continue running the lubrication system and the iTRAK system to distribute more oil onto the tracks. It is normal for some oil to become black, so if a small percentage of the oil is black, it does not mean you have to add more lubricant to complete the initial lubrication.
    - If oil is present on each rail, and the signs that more lubrication is required are not present, initial lubrication is complete.
  - d. Once initial lubrication is complete, proceed to configure normal operation lubrication.

### *Configure Normal Operation Lubrication with a Customer Provided Oil Bleed System*

After initial lubrication has been completed, configure a schedule of lubrication for normal operation of the iTRAK 5750 system. See the general information paragraphs and tables on [page 185](#).

**Notes:**

## System Integrated Safety

Use this chapter to become familiar with the safe stop functions that are integrated with the iTRAK® 5750 system motor modules.

Topic	Page
Certification	189
Out-of-Box State	191
Safe Torque Off Function	194
Safe Torque Off (STO) Specifications	196
Safe Torque Off (STO) Behavior in an iTRAK 5750 System	198
Timed SS1 Stopping Function	199
Motion Direct Commands in Motion Control Systems	203
Explicit Messages	208
Troubleshoot the Safe Stop Function	214
Integrated Safety Motor Module Replacement	214
Replace an Integrated Safety Motor Module in a GuardLogix System	215

The iTRAK 5750 system motor modules are equipped for integrated Safe Torque Off and timed SS1 stopping functions over the EtherNet/IP™ network. Section-based safety functions operate in the motor modules and are activated through the network safety connection.

### Certification

The TÜV Rheinland group has certified the iTRAK 5750 motor modules with support for Safe Torque Off and Timed SS1 safety functions. These safety functions are for use in safety-related applications up to Category 3 / Performance Level e (PLe) per EN ISO 13849-1, SIL 3 per EN 61508, EN 61800-5-2. Removing the motion-producing power is considered to be the safe state.

For product certifications currently available from Rockwell Automation, see [rok.auto/certifications](http://rok.auto/certifications).

### Important Safety Considerations

You, the system user, are responsible for the following:

- Validation of any sensors or actuators that are connected to the system
- Completing a machine-level risk assessment
- Certification of the machine to the desired EN ISO 13849-1 Performance Level or EN IEC 62061 SIL level
- Project management and proof testing performed in accordance with EN ISO 13849-1, EN 61508, EN 61800-5-2 and other functional safety relevant standards.

## Safety Application Requirements

Safety application requirements include evaluating probability of failure rates (PFH), system reaction time settings, and functional verification tests that fulfill SIL 3 criteria. See [Probability of Dangerous Failure Per Hour](#) on [page 191](#) for more PFH information.

Creating, recording, and verifying the safety signature is also a required part of the safety application development process. Safety signatures are created by the safety controller. The safety signature consists of an identification number, date, and time that uniquely identifies the safety portion of a project. The safety portion of a project includes all safety logic, safety data, and safety I/O configuration.

For safety system requirements, including information on the safety network number (SNN), verifying the safety signature, and functional verification tests, see the GuardLogix® 5580 and Compact GuardLogix 5380 Controller Systems Safety Reference Manual, publication [1756-RM012](#).

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**IMPORTANT** You must read, understand, and fulfill the requirements that are detailed in publication [1756-RM012](#) before operating a safety system that uses a GuardLogix controller and motor module.

---

## Category 3 Requirements According to EN ISO 13849-1

Safety-related parts are designed with these attributes:

- A single fault in any of these parts does not lead to the loss of the safety function.
- A single fault is detected whenever reasonably practicable.
- Accumulation of undetected faults can lead to the loss of the safety function and a failure to remove motion-producing power from the motor.

## Stop Category Definition

You must complete a risk assessment to determine the selection of a stop category for each stop function.

- Stop Category 0, as defined in EN IEC 60204-1 or Safe Torque Off (STO) as defined by EN IEC 61800-5-2, is achieved with immediate removal of power to the actuator, which results in an uncontrolled coast-to-stop.
- Stop Category 1, as defined in EN IEC 60204-1 or Safe Stop 1 (Timed SS1) as defined by EN IEC 61800-5-2, is achieved with power available to the machine actuators to achieve the stop. Power is removed from the actuators when the configured stop is achieved.

## Performance Level (PL) and Safety Integrity Level (SIL)

For safety-related control systems, Performance Level (PL), according to EN ISO 13849-1, and Safety Integrity Level (SIL), according to EN IEC 61800-5-2, include a rating of the systems ability to perform its safety functions. All safety-related components of the control system must be included in both a risk assessment and the determination of the achieved levels.

See the EN ISO 13849-1, EN 61508, and EN IEC 62061 standards for complete information on requirements for PL and SIL determination.

## Probability of Dangerous Failure Per Hour

Safety-related systems are classified as operating in a High-demand/continuous mode. The SIL value for a High-demand/continuous mode safety-related system is directly related to the probability of a dangerous failure occurring per hour (PFH).

The PFH calculation is based on the equations from EN 61508, and shows worst-case values. [Table 32](#) provides data for a 20-year mission time and demonstrates the worst-case effect of various configuration changes on the safety parameters data.

**Table 32 - Safety Parameters for 20-year Mission Time**

Attribute	Value
PFH (1e-9/h)	4.05
MTTFd (years)	112
HFT	1

Each motor module functions as one logical section. The PFH value in [Table 32](#) applies to each logical section individually.

### IMPORTANT

Determination of safety parameters is based on the assumptions that the system operates in high-demand/continuous mode and that the safety function is tested at least once every 3 months as per SIL 3, PLe category 3.

## Out-of-Box State

The iTRAK 5750 motor modules ship in the out-of-box state.



**ATTENTION:** In the out-of-box state, the STO function allows motion-producing power unless an integrated safety connection configuration has been applied to the motor module at least once.

In the out-of-box state, you can configure iTRAK 5750 motor modules in the following ways:

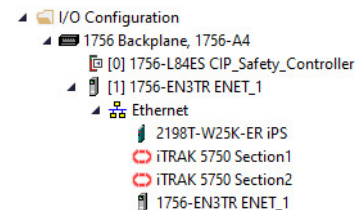
- Without a GuardLogix 5580 or Compact GuardLogix 5380 safety controller for a standard application
- With a GuardLogix 5580 or Compact GuardLogix 5380 safety controller when the STO function is not required

## Out-of-Box State Support

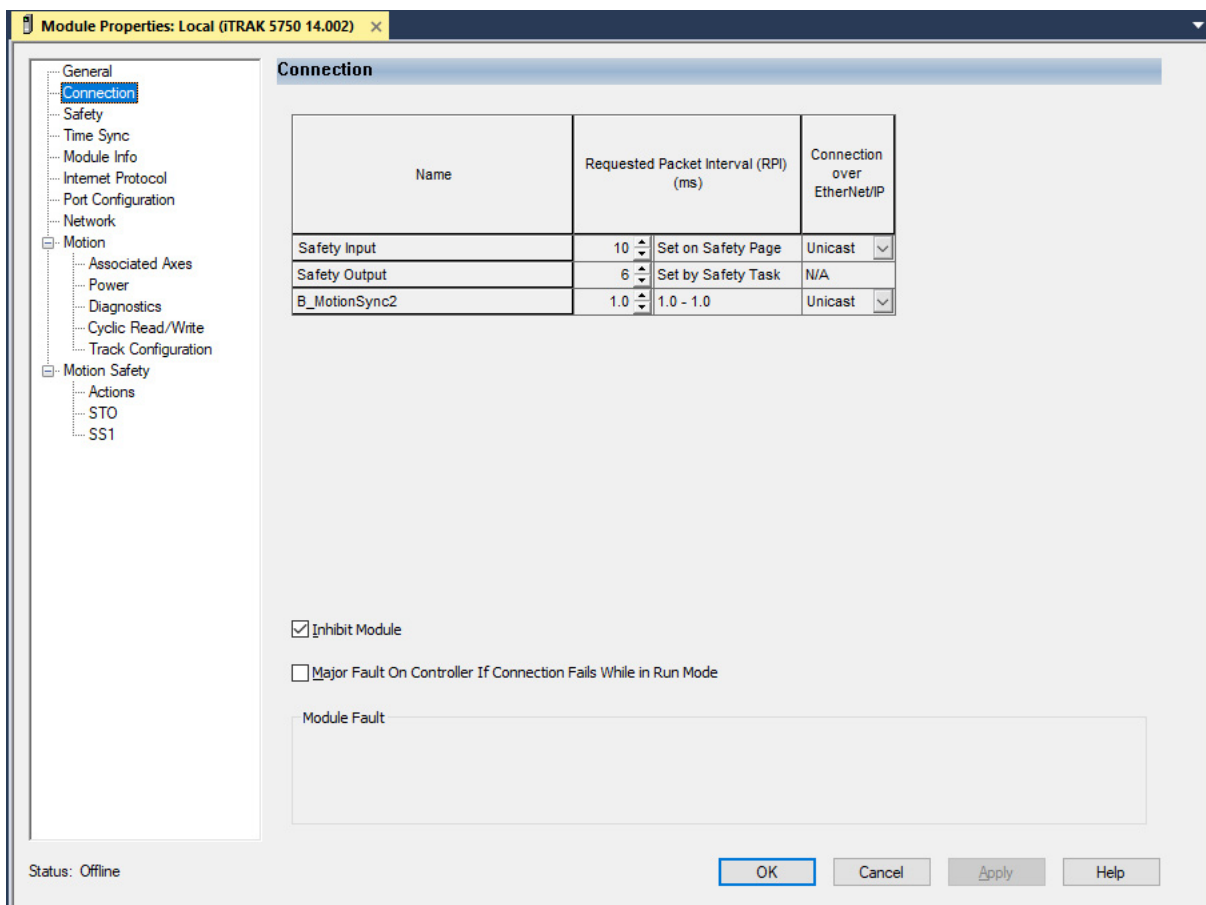
After the integrated safety connection configuration is applied to the iTRAK 5750 motor module at least once, you can restore the motor module to the out-of-box state.

Use a GuardLogix 5580 or Compact GuardLogix 5380 safety controller and follow these steps to restore your iTRAK 5750 motor module to the out-of-box state.

1. Right-click the iTRAK 5750 motor module that you created and choose Properties.



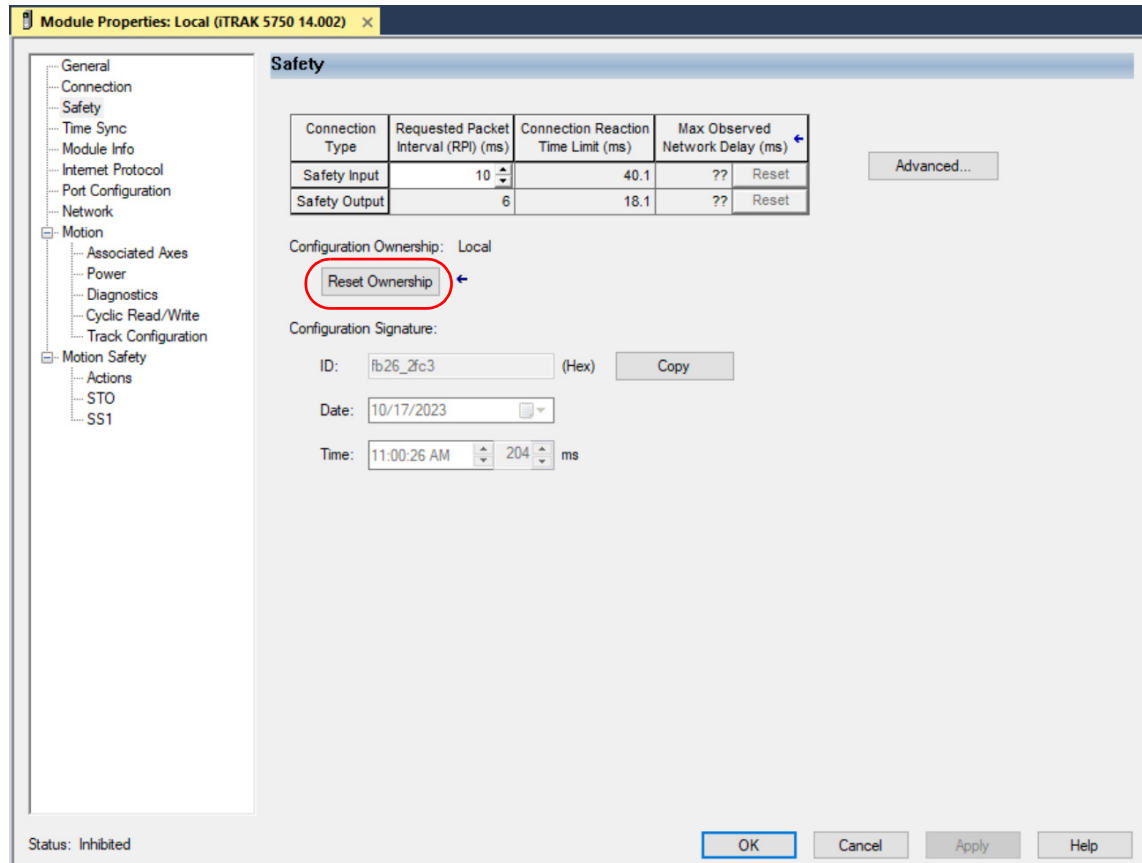
- In the Module Properties dialog box, click the Connection tab. The Connection tab appears.



- Check Inhibit Module.
- Click Apply.



- Click the Safety tab.  
The Safety configuration page appears.



- In the Configuration Ownership field, click Reset Ownership.

---

**IMPORTANT** Only authorized personnel should use the Reset Ownership function.

---

If any active connection is detected, the reset is rejected.

- Cycle power.  
The motor module is in the out-of-box state.

---

**IMPORTANT** If power to the motor module is not cycled after [step 6](#), the module does not transition to the out-of-box state and maintains STO function.

---



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**IMPORTANT** When the motor module returns to the out-of-box state, STO safety integrity is lost.

---

## Safe Torque Off Function

The Safe Torque Off (STO) function, when used with suitable safety components, provides protection according to Category 3 / Performance Level e (Pl e) per EN ISO 13849-1, SIL 3 per EN 61508, EN 61800-5-2. All components in the system must be chosen and applied correctly to achieve the desired level of operator safeguarding.

The STO feature is designed to safely turn off all output-power transistors. You can use the STO feature in combination with other safety devices to achieve Stop Category 0 and protection-against-restart as specified in EN IEC 60204-1.



**ATTENTION:** The STO feature is designed to restrict motion-producing power on the drive system or affected area of a machine. The STO feature does not provide electrical safety.



**SHOCK HAZARD:** In STO mode, hazardous voltages can still be present at the drive. To avoid an electric shock hazard, disconnect power to the system and verify that the voltage is zero before performing any work on the drive.



**ATTENTION:** Personnel responsible for the application of safety-related programmable electronic systems (PES) shall be aware of the safety requirements in the application of the system and shall be trained in using the system.

### Safe Torque Off (STO) Function Operation

The STO function provides a method, with a sufficiently low probability of failure, to force the power-transistor control signals to a disabled state. When the command to execute the STO function is received from the GuardLogix controller, all drive output-power transistors are released from the ON-state. This release from the ON-state results in a condition in which the drive coasts. Disabling the power transistor output does not provide mechanical isolation of the electrical output that is required for some applications.

The iTRAK 5750 motor module response time to a request of the STO function is less than 10 ms. The response time to a request is the delay between the time that the motor module receives the integrated safety packet with an STO request, and the time when the function begins to execute.

The safety function execution time is the amount of time for the safety function to complete execution. The safety function execution time depends on user configurations of the safety function and the periodic rate at which the motor module executes the safety function. The motor module executes the safety function at a periodic rate of 3 ms.

The STO function execution can be delayed using the STO Delay Time parameter. The STO Delay Time parameter can be configured in Module Properties > Motion Safety > STO Category. The STO Delay Time parameter can be configured with a value of 0...65,535 ms. The default value is 0 ms.

The total safety function completion time can be considered as the safety function response time to request plus the safety function execution time. [Table 33](#) provides a STO total safety function completion time example.

**Table 33 - Safe Torque Off (STO) - Safety Function Completion Time Example**

STO Response Time to Request ( $T_{RRT}$ )		10 ms
STO Execution Time ( $T_{ET}$ )	User-configurable STO Delay Time <sup>(1)</sup>	17 ms (rounded up to 18 ms)
Total STO Completion Time ( $T_{TC}$ )		28 ms

(1) The user-configurable delay time is rounded up to the nearest integer multiple of 3 ms.



**ATTENTION:** A hazard of personal injury or equipment damage exists. When these two conditions exist, a limited amount of mover movement can occur:

- Two simultaneous faults occur in the IGBT circuit of an iTRAK motor module section
- A mover is located within 67.0 mm (2.64 in.) of the affected coil

**IMPORTANT** If there is an internal fault, STO is applied immediately without any delay.

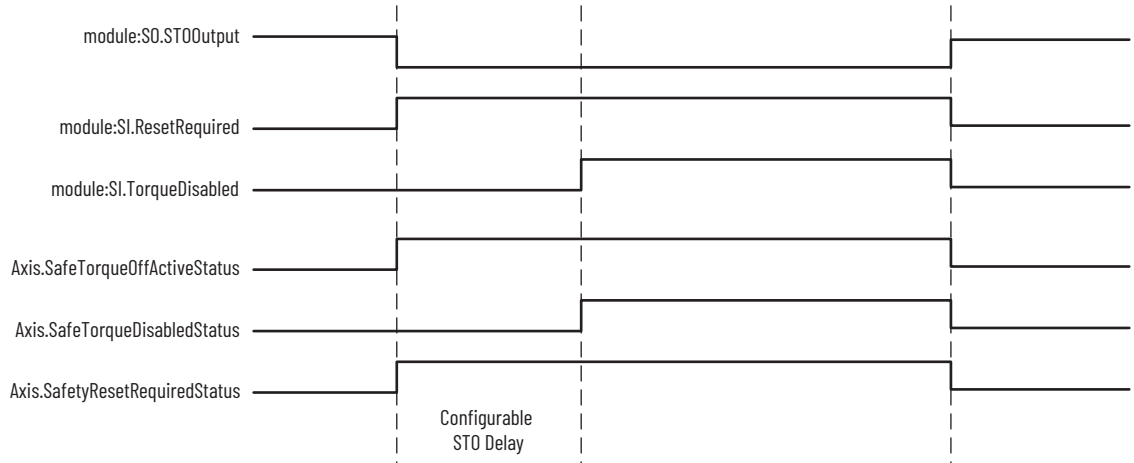
## Safe Torque Off (STO) State Reset

The iTRAK 5750 motor modules support automatic restart only for exiting the STO state. Automatic restart indicates that torque is allowed only by transitioning the SO.STOOutput tag from 0 to 1. The SO.ResetRequest tag is used only for resetting safety faults.

**IMPORTANT** iTRAK 5750 motor modules enter the STO state if any STO function fault is detected.

Figure 58 provides a timing diagram for an automatic restart of an iTRAK 5750 motor module in an STO state.

Figure 58 - iTRAK 5750 Motor Module STO Timing Diagram



## Safe Torque Off (STO) Specifications

This table provides specifications for the STO network.

Table 34 - Safe Torque Off (STO) Network Specifications

Attribute	Value	Studio 5000 Logix Designer® Tag Name
Safety connection RPI, min	6 ms	N/A
Input assembly connections	3	N/A
Output assembly connections	1	N/A
Integrated safety open request support	Type 1 and Type 2 requests	N/A
Axis safety status	Bit 0: Safety fault	Axis.SafetyFaultStatus
	Bit 1: Safety reset request	Axis.SafetyResetRequestStatus
	Bit 2: Safety Reset Required	Axis.SafetyResetRequiredStatus
	Bit 3: Safe Torque Off active	Axis.SafeTorqueOffActiveStatus
	Bit 4: Safe torque disabled	Axis.SafeTorqueDisabledStatus
	Bit 5...31: Undefined (0)	N/A
Axis safety faults	Bit 1: Safety core fault	Axis.SafetyCoreFault
	Bit 3: Safe Torque Off fault	Axis.SafeTorqueOffFault
	All others: Undefined (0)	N/A

## Safe Torque Off (STO) Assembly Tags

In integrated STO mode, a GuardLogix 5580 or Compact GuardLogix 5380 safety controller commands the iTRAK 5750 Safe Torque Off function through the appropriate tag in the safety output assembly.

The SO.Command tags are sent from the GuardLogix safety output assembly to the iTRAK 5750 safety output assembly to control the Safe Torque Off function.

The SI.SafeStatus tags are sent from the iTRAK 5750 motor module axis to the GuardLogix safety input assembly and indicate the iTRAK 5750 safety control status.

The SI.ConnectionStatus tags indicate the safety input connection status.

[Table 35 on page 197](#) lists the safety tags that are added to the controller tags when a iTRAK 5750 motor module section axis is added to a GuardLogix I/O Configuration and the connection is configured for Motion and Safety or Safety Only.

---

**IMPORTANT** The SO.STOOutput and SO.ResetRequest tag names change when Motion Safety in the Module Definition is configured as Safe Stop Only - No Feedback.

---

The attribute values in [Table 35](#) are the Assembly Object attribute values.

**Table 35 - iTRAK 5750 Integrated Safe Torque Off (STO) Specifications**

Studio 5000 Logix Designer Tag Name	Attribute [bit]	Type	Description
SI.ConnectionStatus <sup>(1)(2)</sup>	—	DINT	—
SI.RunMode	[0]	BOOL	Combinations of the RunMode and ConnectionFaulted states
SI.ConnectionFaulted	[1]	BOOL	
SI.SafeStatus <sup>(1)(3)</sup>	—	SINT	—
SI.TorqueDisabled	[0]	BOOL	0 = Torque Permitted 1 = Torque Disabled
SI.SafetyFault	[6]	BOOL	0 = STO fault not present 1 = STO fault present
SI.RestartRequired	[7]	BOOL	0 = Reset is not required 1 = Reset is required
SO.Command <sup>(1)(4)</sup>	—	SINT	—
SO.STOOutput	[0]	BOOL	0 = Disable Permit 1 = Permit Torque
SO.ResetRequest	[7]	BOOL	0 --> 1 = Reset STO fault

(1) Bits not listed are always zero.

(2) ConnectionStatus is determined by the Safety Validator in the GuardLogix controller.

(3) Status is sent from the drive to the controller using the integrated safety protocol.

(4) Commands are sent from the controller to the drive using the integrated safety protocol.

---

**IMPORTANT** Only the data that is listed in [Table 35](#) is communicated with SIL 3 integrity.

---

## Safe Torque Off (STO) Mode

You can use the attribute STO Mode to check if an iTRAK 5750 motor module axis is in STO Bypass mode. STO Bypass mode is used to allow motion while commissioning or troubleshooting a system when Motion Direct Commands (MDC) are needed.

**Table 36 - Safe Torque Off (STO) Mode: MSG**

Parameter	Value	Description
Service Code	0x0E	Get attribute single
Class	0x5A	Safety stop functions
Instance	1	Motor-module safety instance associated with an axis
Attribute	0x104	STO mode
Data Type	SINT	Short integer

**Table 37 - Safe Torque Off (STO) Mode: Values**

Value	Definition
1	Normal operation
2	STO bypass mode

## Safe Torque Off (STO) Behavior in an iTRAK 5750 System

Similar to a multi-axis servo drive system, the STO function is requested for each individual section axis in an iTRAK 5750 system. Therefore, each motor module section in an iTRAK 5750 system must receive an STO request from the GuardLogix controller to place the entire iTRAK 5750 system into the STO state.

Depending on your application, particularly in large iTRAK 5750 systems, it can be desirable to define a safety zone within which the STO function is enabled on discrete motor module sections of the system. In this case, it is possible that movers that are in motion on an enabled motor module section can travel onto a motor module section that is in the STO state.

---

**IMPORTANT** The STO function is configured for each motor module section (axis) independently. As a result, movers in motion on enabled motor module sections can travel onto a motor module section that is in the STO state. You must consider the consequences of active mover motion on enabled sections of an iTRAK 5750 system that are next to a motor module section that is in the STO state.

---

## iTRAK 5750 System Safety Considerations



**ATTENTION:** A hazard of personal injury and equipment damage exists in an iTRAK system that does not enable the STO function on all motor module sections (axis). Consider an MSF stopping action of Coast to Stop and Disable or mechanical guards for motor module sections that are next to a motor module section that enables the STO function.

---

## Functional Safety Considerations



**ATTENTION:** Before maintenance work can be performed in Program mode, the developer of the application must consider the implications of allowing motion through motion direct commands and should consider developing logic for run-time maintenance operations to meet the requirements of machine safety operating procedures.



**ATTENTION:** Motion is allowed when motion direct commands are used in Program mode and the STO function is not available. Motion direct commands issued when the controller is in Program mode causes the drive to bypass the STO Active condition. It is your responsibility to implement additional preventive measures to maintain safety integrity of the machinery during execution of motion direct commands in Program mode.



**ATTENTION:** To avoid personal injury and damage to equipment if there is an unauthorized access or unexpected motion during authorized access, return the controller to RUN mode and remove the key before leaving the machine unattended.

## Timed SS1 Stopping Function

The Timed SS1 function meets the requirements of Category 3 / Performance Level e (Pl e) per EN ISO 13849-1, SIL 3 per EN 61508, EN 61800-5-2.

In Timed SS1 mode, the GuardLogix 5580 or Compact GuardLogix 5380 safety controller issues the SS1 command over the EtherNet/IP network and the iTRAK 5750 motor module section executes the SS1 command.

The Timed SS1 function commands the motor-module axis to stop in a fixed amount of time. The Timed SS1 function does not monitor the speed of the mover axis or whether a mover is stopped.

Setting the SS1 Request tag in the motor-module axis Safety Output Assembly initiates the Timed SS1 function. When the Timed SS1 function is initiated, these actions occur:

1. The motor-module axis receives the SS1 Request
2. The motor-module axis safety status is updated to SS1 Active (high = 1)
3. The controller stops the axis within the SS1 Max Stop Time
4. When the SS1 Max Stop Time expires, SS1 Complete transitions to high (1)
5. The STO function is performed

## Safety Function Operation

The iTRAK 5750 motor module response time to a request of the SS1 function is less than 10 ms. The response time to a request is the delay between the time when the iTRAK motor module receives the integrated safety packet with an SS1 request and the time when the function begins executing.

The safety function execution time is the amount of time for the safety function to complete execution. The safety function execution time depends on the user configuration of the safety function and the periodic rate at which the iTRAK 5750 motor module executes the safety function. The iTRAK 5750 motor module executes the safety function at a periodic rate of 3 ms.

The total safety function completion time can be considered as the safety function response time to request plus the safety function execution time. [Table 38](#) provides a Timed SS1 total safety function completion time example.

**Table 38 - Timed Safe Stop (SS1) - Safety Function Completion Time Example**

SS1 Response Time to Request ( $T_{RRT}$ )		10 ms
SS1 Execution Time ( $T_{ET}$ )	User-configurable SS1 Max Stop Time <sup>(1)(2)</sup>	19 ms (rounded up to 21 ms)
STO Execution Time ( $T_{ET}$ )	User-configurable STO Delay Time <sup>(1)</sup>	17 ms (rounded up to 18 ms)
Total SS1/STO Completion Time ( $T_{TCT}$ )		49 ms

(1) The user-configurable delay time is rounded up to the nearest integer multiple of 3 ms.

(2) Max Stop Time is configured on the SS1 page of the Module Properties and can be read via Attribute 291 (Class 0x5A). The maximum is 4,294,967,296 ms.

---

**IMPORTANT** If there is an internal fault, STO is applied immediately without any delay.

---

In this example, we describe how a motion and safety control system operates and how motion and safety tasks are coordinated. In typical motion and safety system applications, an E-stop switch is used to stop the system. In the following example, the switch is used to initiate the process that brings the axis to a controlled stop before removing power. This type of stop is called Stop Category 1. The motion task and motor module axis are responsible for bringing the axis to a Category 1 stop.

This sequence of events represents the steps that are required for a Timed SS1 safety function.



The words *module*, *instance*, and *axis* (italic) in these steps represent the module, instance, and section axis name assigned in the Studio 5000 Logix Designer application (also called the Studio 5000® application).

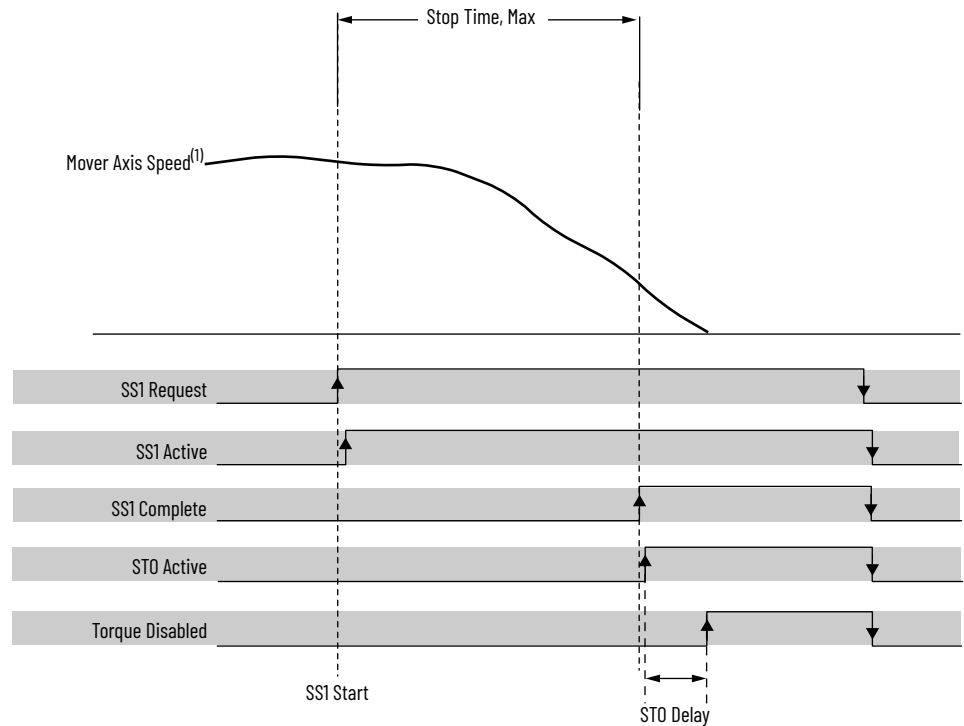
1. The safety task reads the E-stop input and detects the switch actuation.
2. The safety task communicates an SS1 request by setting the bit: *module*:S0.SS1Request[*instance*] tag of the motor module axis motion-safety instance.
3. The motion-safety instance in the motor module axis communicates to the motor module axis motion core of the Axis Safety Status.
4. The motion core communicates with the motion controller running the motion task by updating the motion axis tag *axis*.SS1ActiveStatus.
5. The motion task controls the axis to bring the motor to a stop within the SS1 time limit.
6. When the configured SS1 time lapse has completed, the motion-safety core activates the STO function.

Series of events when an SS1 fault occurs.

1. If an SS1 fault occurs, STO Active goes high (1), and Torque Disabled goes high (1) immediately and ignores STO Delay.  
The safety instance detects a fault and activates the STO function within 6.0 ms of when the fault condition occurred.
2. Restart Required goes high (1) whenever an SS1 fault is present.
3. To reset the SS1 fault, SS1 Request must go low (0), followed by Reset (0-1 transition).



Figure 59 - Timed SS1 Normal Operation



(1) Mover axis speed is independent of motor section axis safety control.

Attribute Name	Tag Name	Description	Value
SS1 Request	<i>module:SO.SS1Request[instance]</i>	An Output Assembly member that requests the motor module axis to initiate its Safe Stop 1 function.	0 - No Request 1 - Request
SS1 Active	<i>module:SI.SS1Active[instance]</i>	The SS1 Active attribute is set to Active when any bit in SS1 Activation is set.	0 - Not Active 1 - Active
SS1 Complete	Tag Name does not apply.	When the SS1 timer expires, the SS1 Complete bit is set, setting STO Active.	0 - Not Active 1 - Active
STO Active	<i>module:SI.STOActive[instance]</i>	When the SS1 timer expires, the STO Activation bit and SS1 Complete are set, setting STO Active.	0 - Not Active 1 - Active
Torque Disabled	<i>module:SI.TorqueDisabled[instance]</i>	When the drive output transistors are released from the ON state and force-producing power has been removed from the motor.	0 - Torque Permitted 1 - Torque Disabled

The Timed SS1 safety function design, which includes the STO function, has a SIL 3/PLe category 3 rating.



The words *module* and *instance* (italic) in these tag names represent the module name and instance name that are assigned in the Studio 5000 application.

#### IMPORTANT

If there is a malfunction, the most likely stop category is Stop Category 0. When designing the machine application, timing and distance must be considered for a coast-to-stop. For more information regarding stop categories, see EN IEC 60204-1.

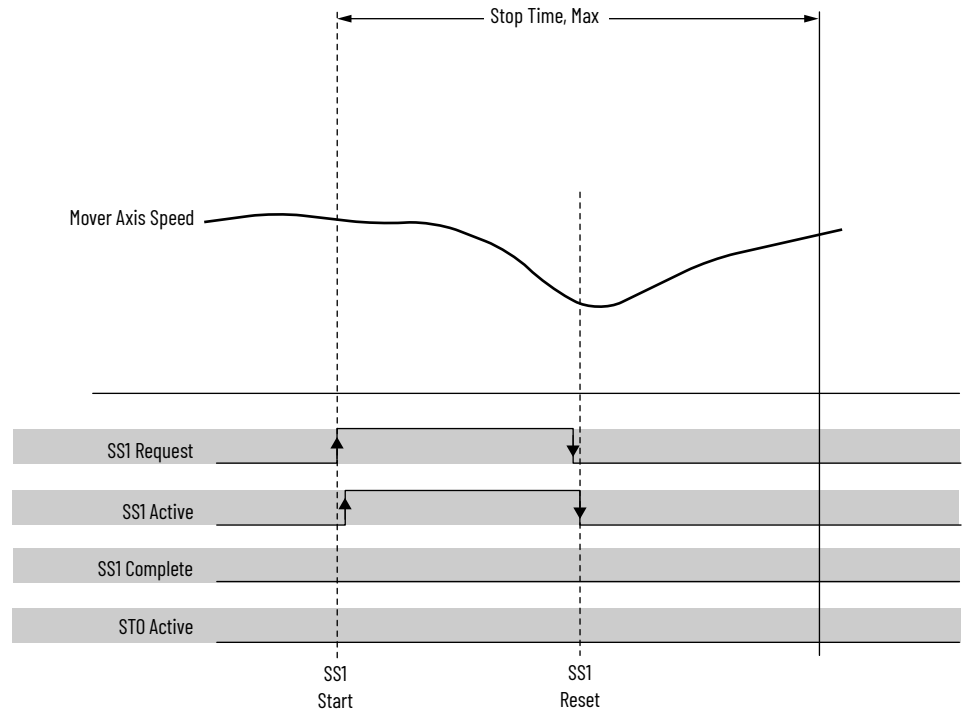
#### IMPORTANT

If multiple safety functions are requested simultaneously, the first to reach the Safe Torque Off state takes precedence.

## Timed SS1 Request Removed

This figure shows what happens when a Timed SS1 Request goes low (0) before completion.

Figure 60 - Timed SS1 Request Removed Before Completion



Attribute Name	Tag Name	Description	Value
SS1 Request	<i>module</i> :S0.SS1Request[ <i>instance</i> ]	An Output Assembly member that requests the motor module axis to initiate its Safe Stop 1 function.	0 - No Request 1 - Request
SS1 Active	<i>module</i> :S1.SS1Active[ <i>instance</i> ]	The SS1 Active attribute is set to Active when any bit in SS1 Activation is set.	0 - Not Active 1 - Active
SS1 Complete	Tag Name does not apply.	When the SS1 timer expires, the STO Activation bit SS1 Complete is set, setting STO Active to Disable Torque.	0 - Not Active 1 - Active
STO Active	<i>module</i> :S1.STOActive[ <i>instance</i> ]	When the SS1 timer expires, the STO Activation bit SS1 Complete is set, setting STO Active to Disable Torque.	0 - Not Active 1 - Active



The words *module* and *instance* (italic) in these tag names represent the module name and instance name that are assigned in the Studio 5000 application.

Series of events when SS1 Request is removed before completion.

1. When SS1 Request goes low (0) before completion, the SS1 function is reset and ready for another operation.
2. The main task reads the SS1 Active axis tag and resumes normal operation.

## Motion Direct Commands in Motion Control Systems

You can use the Motion Direct Command (MDC) feature to initiate motion while the controller is in Program mode, independent of application code that is executed in Run mode. These commands let you perform various functions, for example, move an axis, jog an axis, or home an axis.

A typical use might involve a machine integrator testing different parts of the motion system while the machine is being commissioned. Another use might be a maintenance engineer, under certain restricted scenarios in accordance with safe machine operating procedures, wanting to move an axis (like a conveyor) to clear a jam before resuming normal operation.



**ATTENTION:** To avoid personal injury or damage to equipment, follow these rules regarding Run mode and Program mode.

- Only authorized, trained personnel with knowledge of safe machine operation should be allowed to use Motion Direct Commands
- Additional supervisory methods, like removing the controller keyswitch, should be used to maintain the safety integrity of the system after returning the safety controller to RUN mode

### Safe Torque Off Bypass When Using Motion Direct Commands

If a Safety-only connection between the GuardLogix safety controller and the iTRAK 5750 motor module was established at least once after the module was received from the factory, the module does not allow motion while the safety controller is in Program mode by default.

This default setting is used because the safety task is not executed while the GuardLogix safety controller is in Program mode. This applies to applications running in a single-safety controller (with Motion and Safety connections). When an integrated safety motor module has a Motion connection to a standard controller and a separate Safety connection to a dual-safety controller, the standard controller can transition to Program mode while the safety controller stays in Run mode and continues to execute the safety task.

However, motor module systems are designed with a bypass feature for the STO function in single-safety controller configurations. You can use the MDC feature to allow motion while following all necessary and prescribed steps per machine safety operating procedures.



**ATTENTION:** Consider the consequences of allowing motion by using MDC when the controller is in Program mode. You must acknowledge warning messages in the Studio 5000 application that warn of the module bypassing the STO function and unintended motion can occur. The integrated safety module does not respond to the request of the STO function if MDC mode is entered.

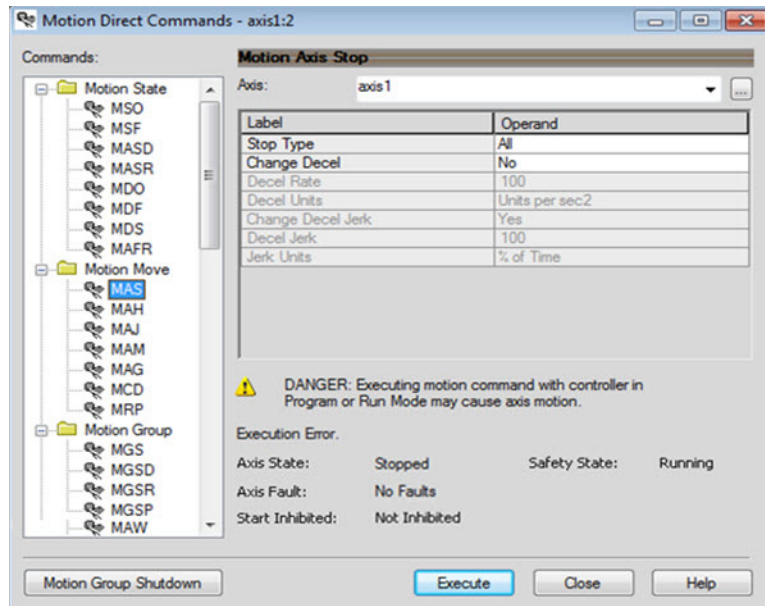


**ATTENTION:** It is your responsibility to maintain machine safety integrity while executing motion direct commands. One alternative is to provide ladder logic for Machine Maintenance mode that leaves the controller in Run mode with safety functions executing.

## Studio 5000 Application Warning Messages

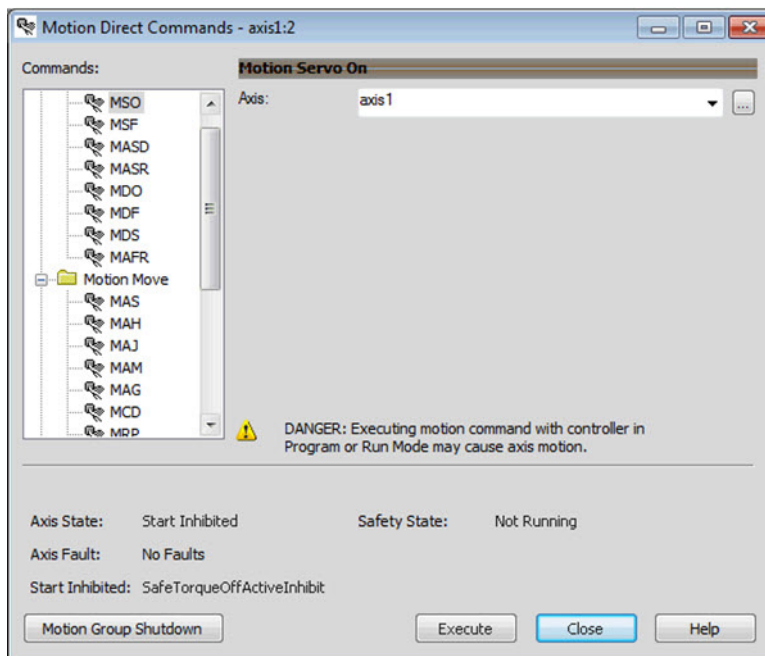
When the controller is in Run mode, executing safety functions, one or more motor modules follow the commands that they receive from the safety controller. Safety state = Running, Axis state = Stopped/Running, as shown in [Figure 61](#).

Figure 61 - Safety State Indications When Controller is in Run Mode (safety task executing)



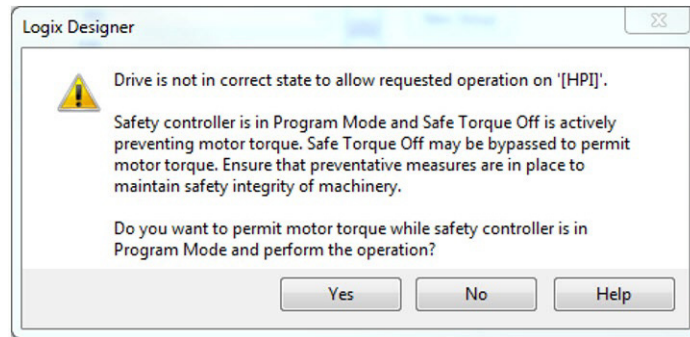
When the controller transitions to Program mode, the integrated safety motor modules are in the safe state (torque not permitted). Safety state = Not Running, Axis state = Start Inhibited, as shown in [Figure 62](#).

Figure 62 - Safety State Indications After Controller Transitions to Program Mode



When you issue a motion direct command to an axis to produce torque in Program mode, for example MSO or MDS, with the safety connection present to the motor modules, a warning message is presented before the motion direct command is executed, as shown in [Figure 63](#).

**Figure 63 - STO Bypass Prompt When the Safety Controller is in Program Mode**



The warning in [Figure 63](#) is displayed the first time a motion direct command is issued.

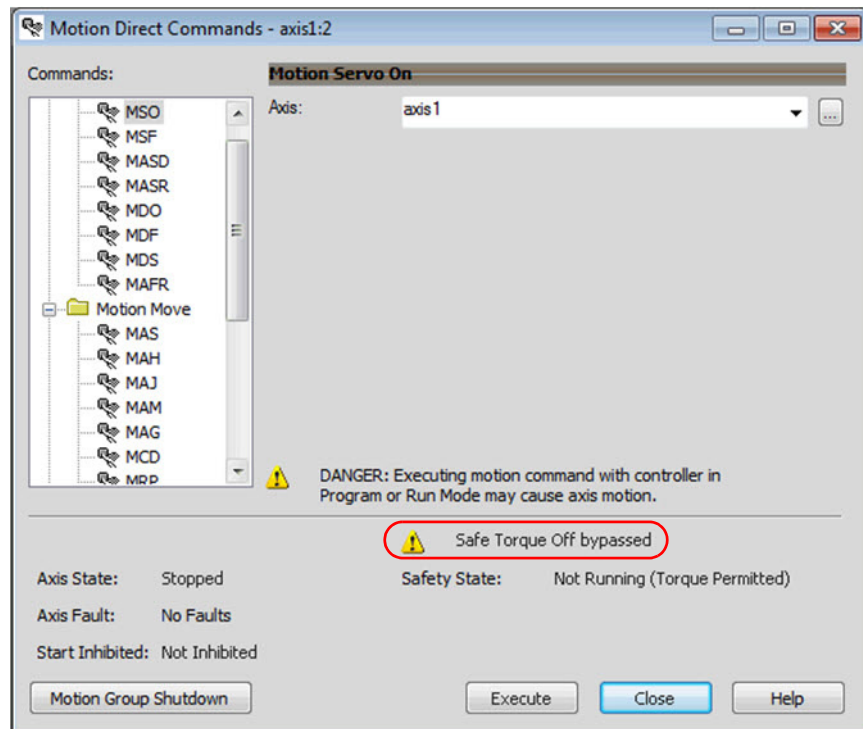
After you acknowledge the warning message by clicking Yes, torque is permitted by the motor modules and a warning message is indicated in the software as shown in [Figure 64 on page 205](#). Safety state = Not Running (torque permitted), Axis state = Stopped/Running, Persistent Warning = Safe Torque Off Bypassed.

---

**IMPORTANT** Switch the controller to Run mode to exit Motion Direct Command mode with the STO function bypassed.

---

**Figure 64 - Safety State Indications After Controller Transitions to Program Mode (MDC executing)**



**IMPORTANT**

The persistent warning message text 'Safe Torque Off bypassed' appears when a motion direct command is executed.

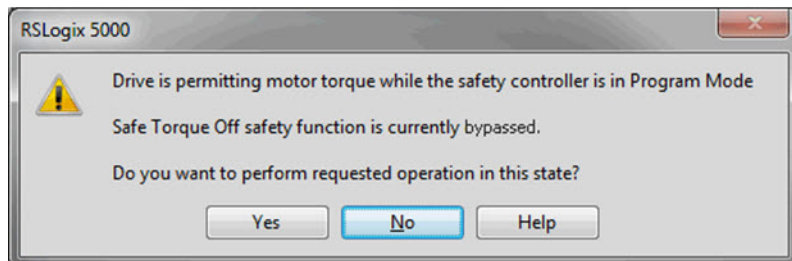
The warning message persists even after the dialog box is closed and reopened as long as the integrated safety motor modules are in STO Bypass mode.

The persistent warning message is removed only after the integrated safety motor modules are restored to the safe state.

## Torque Permitted in a Multi-workstation Environment

The warning in [Figure 65](#) displays to notify a second user working in a multi-workstation environment that the first user has placed the integrated safety motor modules in the STO state and that the current action is about to bypass the STO state and permit torque.

**Figure 65 - STO Bypass Prompt When MDC is Issued in Multi-workstation Environment**



## Warning Icon and Text in Axis Properties

In addition to the other warnings that require your acknowledgment, the Studio 5000 application also provides warning icons and persistent warning messages in other Axis Properties dialog boxes when the integrated safety motor modules are in STO Bypass mode.

**Figure 66 - Axis and Safe State Indications on the Hookup Services Dialog Box**

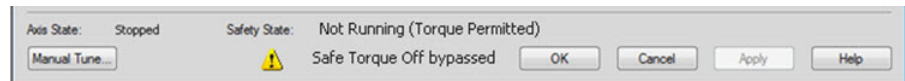


Figure 67 - Axis and Safe State Indications on Motion Direct Commands Dialog Box

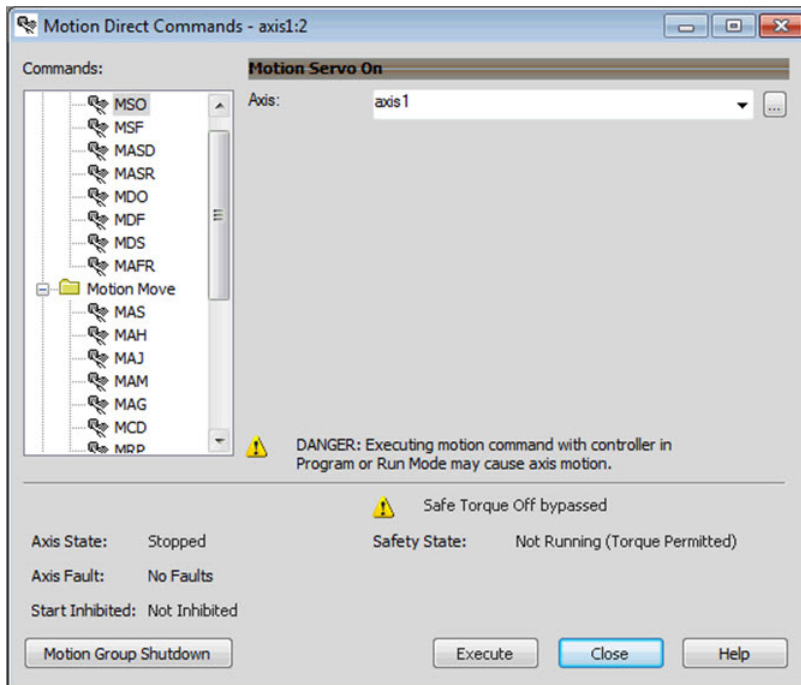
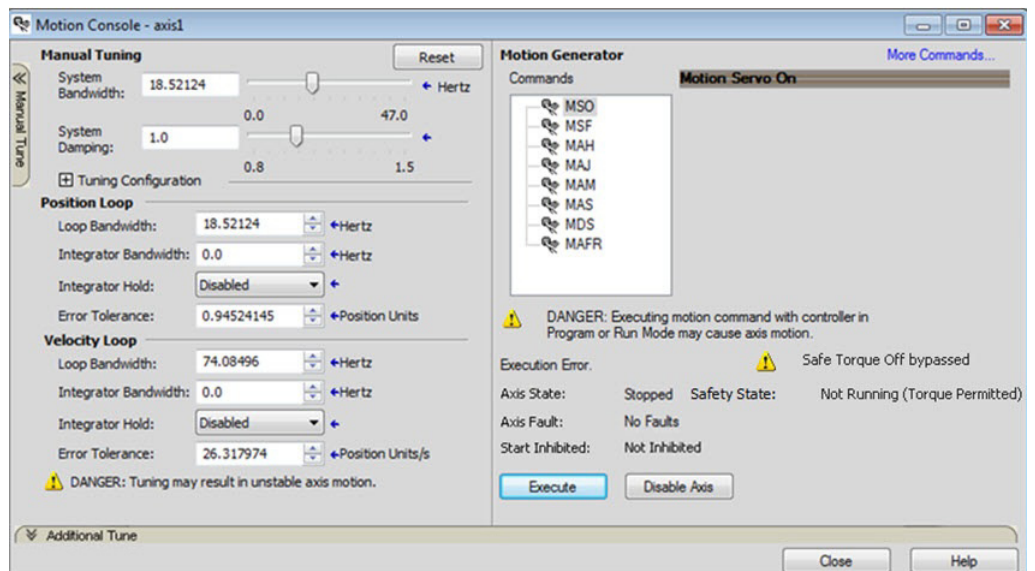


Figure 68 - Axis and Safe State Indications on the Motion Console Dialog Box



## Explicit Messages

Use explicit messages to communicate with a drive and obtain additional fault, status, or configuration information that is not available in the Safety I/O Tag structure. Attribute data is useful for additional diagnostic information. An explicit message can be sent by any controller on the network and used to read any drive module attribute. See [Table 42 on page 209](#) for the drive-module safety attribute names, and numbers to read the attribute values by using an MSG instruction. See [Figure 69 on page 209](#) to see how explicit messages are part of motion and safety communication.

When an explicit message is used, a class ID must be specified. The class ID identifies the safety object type in the drive module that is accessed.

**Table 39 - Object Classes Available in Motion Safety Instances**

Object Class	Object Instances
Safety Supervisor	1
Safe Stop Functions	1

---

**IMPORTANT** Explicit messages must not be used for any safety-related function.

---

### *Safety Supervisor State*

In the motor module, the connection to the safety instance or instances is controlled by a safety supervisor. The supervisor status can be read by the motion controller through the motion connection and the safety controller through the Safety Input Assembly or by an explicit message.

The safety supervisor state provides information on the state of the integrated safety connection and the mode of operation. There is only one safety supervisor object per motor module.

**Table 40 - Safety Supervisor State: MSG**

Parameter	Value	Description
Service Code	0x0E	Get attribute single
Class	0x39	Safety supervisor
Instance	1	Motor-module safety instance associated with an axis
Attribute	0x0B	Device status
Data Type	SINT	Short integer

**Table 41 - Safety Supervisor States**

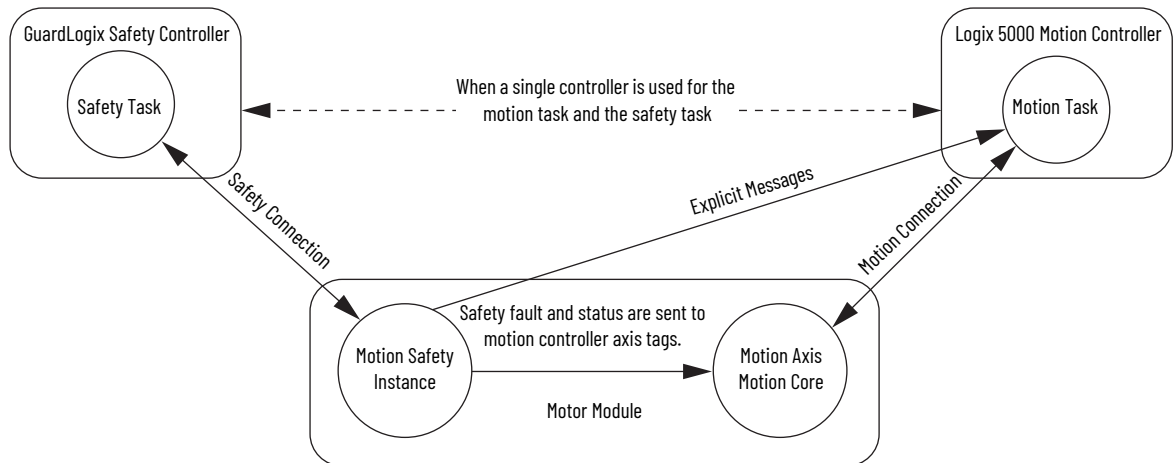
Value	Safety Supervisor State	Definition	Safety Mode
2	Configured (no safety connection)	No active connections	Integrated
4	Running	Normal running state	Integrated
7	Configuring	Transition state	Integrated
8	Not Configured	Awaiting safety controller ownership	Out-of-box
51	Not Configured (torque permitted)	Out-of-box state, safety not used	Out-of-box
52	Running (torque permitted)	STO bypass state	Integrated



## Safe Monitor Network Communication

The safe monitor network executes motion and safety tasks by using the CIP™ protocol.

Figure 69 - Motion and Safety Connections



### Motion Connection

The motion connection communicates motor module axis motion and safety status to the motion task. The motion connection also receives motion commands from the motion task in the motion controller. Data is exchanged at a periodic rate over the connection. To configure the motor-module axis motion connection Axis Properties in the Studio 5000 application, see [Chapter 7 - System Integrated Safety](#) for detailed instructions.

Some of the axis tags are updated from the fault and safety status that is provided by the safety instance in the motor module. The safety instance sends this status to the motion core and then on to the motion controller. Axis tags show the updated status. See [Figure 69 on page 209](#) for an illustration on how status is sent to the motion controller.

**IMPORTANT** Axis tags are for status only and are not used by the safety function.

Table 42 - Motion Connection Axis Tags

Axis Tag Name (motion controller)	Motion Connection Attribute #	Data Type	Description	Safety Output Assembly Tag Name (safety controller)
Axis.AxisSafetyState	760	DINT	Motor module Safety Supervisor state. See the <a href="#">Safety Supervisor State on page 208</a> for more details.	None
Axis.AxisSafetyStatus	761	DINT	Collection of bits indicating the status of the standard safety functions for the axis as reported by Motor Module Safety Instance.	See individual bits in <a href="#">Table 43 on 210</a> .
Axis.AxisSafetyStatusRA	762	DINT	Collection of bits indicating the status of Rockwell Automation specific safety functions for the axis as reported by Motor Module Safety Instance.	See individual bits in <a href="#">Table 43 on 210</a> .
Axis.AxisSafetyFaults	763	DINT	Collection of bits indicating the Safety Fault status of the drive-module safety instances and integrated safety functions.	See individual bits in <a href="#">Table 43 on 210</a> .
Axis.AxisSafetyFaultsRA	764	DINT	Collection of bits indicating the safety fault status of Rockwell Automation safety functions.	See individual bits in <a href="#">Table 43 on 210</a> .
Axis.AxisSafetyAlarms	753	DINT	Reserved for future use.	—

Table 43 provides motion-connection axis tag names that are updated to show safety instance status or controller-based safety function status.



The words *module*, *instance*, and *axis* (italic) in these tag names represent the module, instance, and axis name assigned in the Studio 5000 application.

Table 43 - Motion Connection Axis Tag Names

Axis Tag Name (motion controller)	Motion Connection Attribute Number	Data Type	Description	Safety Output Assembly Tag Name (safety controller)
Axis.AxisSafetyStatus	761	DINT	Collection of bits indicating the status of the standard safety functions for the axis as reported by Motor Module Safety Instance.	See individual bits below.
Axis.SafetyFaultStatus	[0]	BOOL	Any Safe Stop Fault occurring in the Safety Instance. 0 = Not Faulted 1 = Safety Fault	None
Axis.SafetyResetRequestStatus	[1]	BOOL	Indicates the state of the reset request output from the safety controller (in the safety output assembly) connected with the Motor-module Safety Instance. The value of Axis.SafetyResetRequestStatus is the reset input to the safety instance in the motor module. 0 = Reset Request OFF 1 = Reset Request ON	module:SO.ResetRequest[instance]
Axis.SafetyResetRequiredStatus	[2]	BOOL	Indicates that the drive-module safety instance that is associated with this Axis requires a reset of the safety function. 0 = Normal 1 = Reset Required	None
Axis.SafeTorqueOffActiveStatus	[3]	BOOL	Indicates that the state of the STO output from the safety controller, which is the STO input to the motor-module safety instance associated with this axis. 0 = STO Output Is active 1 = STO is not active, STO is not requested	module:SO.STOOutput[instance]
Axis.SafeTorqueDisabledStatus	[4]	BOOL	Indicates that the motor-module safety instance Torque Disabled Status. 0 = Axis power structure is not inhibited by the safety instance 1 = Axis power structure is inhibited	None
Axis.SS1ActiveStatus	[7]	BOOL	Indicates that the controller-based or the motor module-based SS1 function is active. 0 = SS1 Function is not Active 1 = SS1 Function is Active	module:SO.SS1Active[instance]
Axis.SOSActiveStatus	[9]	BOOL	Indicates that the controller-based SOS function is active. 0 = SOS Function is not Active 1 = SOS Function is Active	module:SO.SOSActive[instance]
Axis.SOSStandstillStatus	[10]	BOOL	Indicates that the controller-based SOS function has detected standstill according to the function configuration. 0 = monitored axis is not at Standstill 1 = monitored axis is at standstill	module:SO.SOSLimit[instance]
Axis.SMTActiveStatus	[11]	BOOL	Always 0. This function is not available	None
Axis.SMTOvertemperatureStatus	[12]	BOOL	Always 0. This function is not available.	None
Axis.SSMActiveStatus	[16]	BOOL	For use with a controller-based SSM function.	module:SO.SSMActive[instance]
Axis.SSMStatus	[17]	BOOL	For use with a controller-based SSM function.	module:SO.SSMStatus[instance]
Axis.SLAAActiveStatus	[20]	BOOL	Always 0. This function is not available.	None
Axis.SLALimitStatus	[21]	BOOL	Always 0. This function is not available.	None
Axis.SDIActiveStatus	[22]	BOOL	Indicates that the controller-based SDI function is active. 0 = SDI Function is not Active 1 = SDI Function is Active	module:SO.SDIActive[instance]
Axis.SDILimitStatus	[23]	BOOL	Indicates that the controller-based SDI function detected motion greater than the limit in the unintended direction. 0 = Limit not reached 1 = Unintended motion	module:SO.SDILimit[instance]
Axis.SafePositiveMotionStatus	[24]	BOOL	Always 0. This function is not available.	None
Axis.SafeNegativeMotionStatus	[25]	BOOL	Always 0. This function is not available.	None

Table 43 - Motion Connection Axis Tag Names (Continued)

Axis Tag Name (motion controller)	Motion Connection Attribute Number	Data Type	Description	Safety Output Assembly Tag Name (safety controller)
Axis.SCAActiveStatus	[26]	BOOL	For use with a controller-based SCA function.	<i>module:SO.SCAActive[instance]</i>
Axis.SCAStatus	[27]	BOOL	For use with a controller-based SCA function.	<i>module:SO.SCAStatus[instance]</i>
Axis.SLPActiveStatus	[28]	BOOL	Indicates that the controller-based SLP function is active. 0 = SLP Function is not Active 1 = SLP Function is Active	<i>module:SO.SLPActive[instance]</i>
Axis.SLPLimitStatus	[29]	BOOL	Indicates that the controller-based SLP function has detected the monitored axis position outside of the setpoint limits. 0 = axis position is within the limits 1 = axis position is outside of the limits	<i>module:SO.SLPLimit[instance]</i>
Axis.SafetyOutputConnectionClosed Status	[30]	BOOL	Indicates the safety connection status from the controller to the motor module. 0 = connection open 1 = connection closed	None
Axis.SafetyOutputConnectionIdle Status	[31]	BOOL	Indicates the safety connection status from the controller to the motor module. 0 = connection active 1 = connection idle	None
Axis.AxisSafetyStatusRA	762	DINT	Collection of bits indicating the status of Rockwell Automation specific safety functions for the axis as reported by Motor-module Safety Instance.	See individual bits below.
Axis.SafeBrakeIntegrityStatus	[0]	BOOL	Status of an external safety brake controlled by SBC instruction. The brake status, which can be either released or engaged, is undetermined. 0 = SBC fault 1 = No faults detected	<i>module:SO.SBCIntegrity[instance]</i>
Axis.SafeFeedbackHomedStatus	[1]	BOOL	Status of the controller-based SFX position homing function.	<i>module:SO.SFHome[instance]</i>
Axis.AxisSafetyFaults	763	DINT	Collection of bits indicating the Safety Fault status of the motor-module safety instances and integrated safety functions.	See individual bits below.
Axis.SafetyCoreFault	[0]	BOOL	Indicates that an internal fault occurred within the motor-module safety instance. If there are dual-axis inverters, both safety instances fault. 0 = Normal Operation 1 = Fault	None (use explicit message)
Axis.SafetyFeedbackFault	[2]	BOOL	Indicates that a fault occurred with the safety feedback or with the safety dual-channel feedback. 0 = Normal Operation 1 = Fault	None (use explicit message)
Axis.SafeTorqueOffFault	[3]	BOOL	Indicates that a fault occurred within the STO function of the motor-module safety instance. 0 = Normal Operation 1 = Fault	None (use explicit message)
Axis.SSIFault	[4]	BOOL	Indicates that a fault occurred with the motor module-based or a controller-based SS1 function. 0 = Normal Operation 1 = Fault	<i>module:SO.SSIFault[instance]</i>
Axis.SSMFault	[16]	BOOL	Controller-based SSM fault. 0 = Normal Operation 1 = Fault	<i>module:SO.SSMFault[instance]</i>
Axis.SLSFault	[17]	BOOL	Controller-based SLS fault. 0 = Normal Operation 1 = Fault	<i>module:SO.SLSFault[instance]</i>
Axis.SLAFault	[18]	BOOL	Always 0. This function is not available.	–
Axis.SDIFault	[19]	BOOL	Controller-based SDI fault. 0 = Normal Operation 1 = Fault	<i>module:SO.SDIFault[instance]</i>
Axis.SCAFault	[20]	BOOL	Controller-based SCA fault. 0 = Normal Operation 1 = Fault	<i>module:SO.SCAFault[instance]</i>

Table 43 - Motion Connection Axis Tag Names (Continued)

Axis Tag Name (motion controller)	Motion Connection Attribute Number	Data Type	Description	Safety Output Assembly Tag Name (safety controller)
Axis.SLPFault	[21]	BOOL	Controller-based SLP fault. 0 = Normal Operation 1 = Fault	<i>module:SO.SLPFault[instance]</i>
Axis.AxisSafetyFaultsRA	764	DINT	Collection of bits indicating the safety fault status of Rockwell Automation safety functions.	See individual bits below.
Axis.SFXFault	[1]	BOOL	Controller-based SFX fault. 0 = Normal Operation 1 = Fault	<i>module:SO.SFXFault[instance]</i>

### Safety Connection

The safety controller communicates with the safety instances in the motor module over the safety connection. Cyclic data are passed in each direction over the safety connection that appears in Safety Controller tag structures that are called input and output assemblies. The safety connection cyclic rate is configured in the Studio 5000 application. The Safety Input Assembly tag structure is data from the motor module safety instances to the safety controller. The Safety Output Assembly tag structure is data from the safety controller to the motor module safety instances. There is only one safety assembly per motor module, so a different assembly structure is used for single-axis and dual-axis inverters.

Table 44 - Safety Input Assembly Tags

Safety Input Assembly Tag Name (input to safety controller)	Type/[bit]	Description
<i>module:SI.ConnectionStatus</i>	SINT	See individual bits in <a href="#">Table 46 on 213</a> .
<i>module:SI.StopStatus[instance]</i>	SINT	See individual bits in <a href="#">Table 46 on 213</a> .
<i>module:SI.SafeStatus[instance]</i>	SINT	See individual bits in <a href="#">Table 46 on 213</a> .
<i>module:SI.FunctionSupport[instance]</i>	SINT	See individual bits in <a href="#">Table 46 on 213</a> .

Table 45 - Safety Output Assembly Tags

Safety Output Assembly Tag Name (output to safety controller)	Type/[bit]	Description
<i>module:SO.SafetyStopFunctions[instance]</i>	SINT	See individual bits in <a href="#">Table 47 on 213</a> .

Safety assembly tags are associated with a safety connection from a safety controller to a motor module. The data in these tags are communicated at the configured connection rate.



The words *module* and *instance* (italic) in these tag names represent the module name and instance name that are assigned in the Studio 5000 application.

Data from the motor module to the safety controller is in the safety input assembly. Data from the safety controller to the motor module is in the safety output assembly.

Table 46 - Safety Input Assembly Tag Names

Safety Input Assembly Tag Name (input to safety controller)	Type/[bit]	Description
<i>module:SI.ConnectionStatus</i>	SINT	Collection of bits listed below.
<i>module:SI.RunMode</i>	[0]	Safety Connection 0= idle 1 = Run
<i>module:SI.ConnectionFaulted</i>	[1]	Safety Connection 0=normal 1= Faulted
<i>module:SI.StopStatus[instance]</i>	SINT	Collection of bits listed below.
<i>module:SI.STOActive[instance]</i>	[0]	Indicates STO function status. 0 = STO function not active 1 = STO function active
<i>module:SI.SBCActive[instance]</i>	[1]	Always 0
<i>module:SI.SS1Active[instance]</i>	[2]	Indicates drive-based SS1 active status. 0 = SS1 function not active 1 = SS1 function active
<i>module:SI.SS2Active[instance]</i>	[3]	Always 0
<i>module:SI.SOSStandstill[instance]</i>	[4]	Always 0
<i>module:SI.SafetyFault[instance]</i>	[6]	1 = Safe Stop Fault present
<i>module:SI.RestartRequired[instance]</i>	[7]	1 = Reset is required
<i>module:SI.SafeStatus[instance]</i>	SINT	Collection of bits listed below.
<i>module:SI.TorqueDisabled[instance]</i>	[0]	0 = Torque Permitted 1 = Torque Disabled
<i>module:SI.BrakeEngaged[instance]</i>	[1]	Always 0
<i>module:SI.MotionStatus[instance]</i>	SINT	Collection of bits listed below.
<i>module:SI.MotionPositive[instance]</i>	[0]	Always 0
<i>module:SI.MotionNegative[instance]</i>	[1]	Always 0
<i>module:SI.FunctionSupport[instance]</i>	SINT	Collection of bits listed below.
<i>module:SI.PrimaryFeedbackValid[instance]</i>	[0]	Always 0
<i>module:SI.SecondaryFeedbackValid[instance]</i>	[1]	Always 0
<i>module:SI.DiscrepancyCheckingActive[instance]</i>	[2]	Always 0
<i>module:SI.SBCReady[instance]</i>	[3]	Always 0
<i>module:SI.SS1Ready[instance]</i>	[4]	0 = Drive-based SS1 function is not configured or faulted 1 = Drive-based SS1 function is configured and ready for operation
<i>module:SI.SS2Ready[instance]</i>	[5]	Always 0
<i>module:SI.SOSReady[instance]</i>	[6]	Always 0

Table 47 - Safety Output Assembly Tag Names

Safety Output Assembly Tag Name (output to safety controller)	Type/[bit]	Description
<i>module:SO.SafetyStopFunctions[instance]</i>	SINT	A collection of bits used to activate (request) safety functions as listed below.
<i>module:SO.STOOutput[instance]</i>	[0]	0 = Activate STO Function 1 = Permit Torque
<i>module:SO.SBCOutput[instance]</i>	[1]	Drive-based function not available, set to 0.
<i>module:SO.SS1Request[instance]</i>	[2]	0 = Remove SS1 Request 1 = Activate Drive-based SS1 Function
<i>module:SO.SS2Request[instance]</i>	[3]	Drive-based function not available, set to 0.
<i>module:SO.SOSRequest[instance]</i>	[4]	Drive-based function not available, set to 0.
<i>module:SO.ResetRequest[instance]</i>	[7]	0 -> 1 transition resets the drive-based Safe Stop function.

## Troubleshoot the Safe Stop Function



This manual links to the iTRAK 5750 System Fault Codes Reference Data, publication [2198T-RD002](#), for fault codes; download the spreadsheet now for offline access.

## Integrated Safety Motor Module Replacement

**IMPORTANT** Any time there is a motor module replacement, change of configuration, or firmware update, you must validate the proper operation of the safety function, for example as described in Appendix B of the Kinetix 5700 Safe Monitor Functions Safety Reference Manual, publication [2198-RM001](#).

GuardLogix controllers retain the I/O device configuration onboard and are able to download the configuration to the replacement device.

**IMPORTANT** If an iTRAK 5750 motor module was used previously, clear the existing configuration before installing it on a safety network by resetting the module to its out-of-box condition. See [Out-of-Box State Support](#) on [page 191](#) for instructions.

You must reconfigure a replacement motor module that is part of an integrated safety network due to the unique SNN assigned to each device.

The device number and SNN compose the safety device's DeviceID. Safety devices require this more complex identifier to make sure that duplicate device numbers do not compromise communication between the correct safety devices. The SNN is also used to provide integrity when the configuration is initially downloaded to the motor module.

When the Studio 5000 application is online, the Safety tab of the Module Properties dialog box displays the current configuration ownership. When the opened project owns the configuration, 'Local' is displayed.

Configuration Ownership: Local

'Communication error' is displayed if the module read fails. See [Replace an Integrated Safety Motor Module in a GuardLogix System](#) on [page 215](#) for integrated safety module replacement information.

## Replace an Integrated Safety Motor Module in a GuardLogix System

When you replace an integrated safety motor module, you must configure the device properly and verify the operation of the replacement motor module.

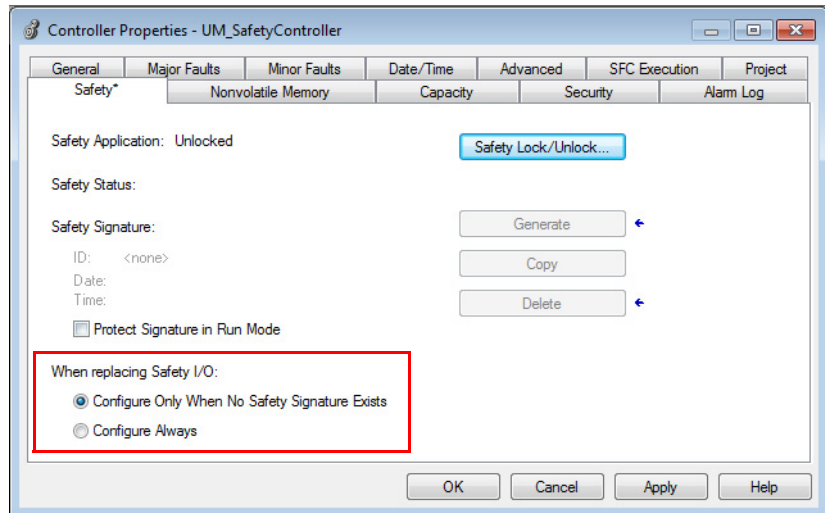


**ATTENTION:** During module replacement or functional test, the safety of the system must not rely on any portion of the affected motor module.

Two options for safety motor module replacement are available on the Safety tab of the Controller Properties dialog box in the Studio 5000 application:

- Configure Only When No Safety Signature Exists
- Configure Always, described on [page 216](#).

**Figure 70 - Safety Motor Module Replacement Options**



### Configure Only When No Safety Signature Exists

This setting instructs the GuardLogix controller to automatically configure a safety motor module only when the safety task does not have a safety task signature, and the replacement module is in an out-of-box condition, meaning that an SSN does not exist in the safety module.

If the safety task has a safety task signature, the GuardLogix controller automatically configures the replacement CIP Safety™ I/O device only if the following is true:

- The device already has the correct SSN.
- The device electronic keying is correct.
- The node or IP address is correct.

For detailed information, see the 'Replace a Safety I/O Device' procedure in the user manual for the controller:

- ControlLogix 5580 and GuardLogix 5580 Controllers User Manual, publication [1756-UM543](#)
- CompactLogix 5380 and Compact GuardLogix 5380 User Manual, publication [5069-UM001](#)

## Configure Always

When the Configure Always feature is enabled, the controller automatically checks for and connects to a replacement motor module that meets all of the following requirements:

- The controller has configuration data for a compatible motor module at that network address
- The motor module has an SNN that matches the configuration



**ATTENTION:** Enable the Configure Always feature only if the entire integrated safety control system is not being relied on to maintain SIL 3 behavior during the replacement and functional testing of an iTRAK 5750 system. If other parts of the integrated safety control system are being relied upon to maintain SIL 3, make sure that the controller's Configure Always feature is disabled.

It is your responsibility to implement a process to make sure that proper safety functionality is maintained during device replacement.

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**ATTENTION:** Do not place any devices in the out-of-box condition on any integrated safety network when the Configure Always feature is enabled, except while following the device replacement procedure in the appropriate user manual for your Logix 5000® controller:

- ControlLogix 5580 and GuardLogix 5580 Controllers User Manual, publication [1756-UM543](#)
  - CompactLogix 5380 and Compact GuardLogix 5380 User Manual, publication [5069-UM001](#)
-



## Update the System Firmware

This appendix provides procedures to update your iTRAK 5750<sup>®</sup> system firmware.

Topic	Page
Before You Begin	217
Update Your Firmware	219
Verify the Firmware Update	229

You can upgrade your iTRAK 5750 system firmware by using ControlFLASH Plus<sup>™</sup> or ControlFLASH<sup>™</sup> software. To upgrade the firmware, you must do the following:

- Configure your communication software (such as RSLinx<sup>®</sup> software).
- Select the section module to upgrade. A section module is the firmware logical section for an individual motor module.
- Complete the firmware updating procedure.



We recommend that you use ControlFLASH Plus software for firmware updates. See the ControlFLASH Plus Quick Start Guide, publication [CFP-0S001](#), for more information.

### Before You Begin

For firmware updates, you must use the software versions that are shown in [Table 48](#).

**Table 48 - iTRAK 5750 System Requirements**

Description	Version
ControlFLASH software kit <sup>(1)</sup>	15.03.00 or later
ControlFLASH Plus software kit <sup>(1)</sup>	3.01 or later
FactoryTalk <sup>®</sup> Linx software <sup>(2)</sup>	6.00.00 or later
RSLinx software <sup>(3)</sup>	4.20.00 or later
Studio 5000 Logix Designer <sup>®</sup> application <sup>(4)</sup>	36.00.00 or later

(1) Download the ControlFLASH kit from the Product Compatibility and Download Center at: [rok.auto/pcdc](#). For more ControlFLASH information (not iTRAK 5750 specific), refer to the ControlFLASH User Manual, publication [1756-UM105](#).

(2) Only required when using ControlFLASH Plus software.

(3) Only required when using ControlFLASH software.

(4) Also called the Studio 5000<sup>®</sup> application.

Gather the following information before you begin the firmware update.

- Network path to the targeted iTRAK 5750 modules you want to update.
- Catalog numbers of the targeted iTRAK 5750 modules you want to update.

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**IMPORTANT** All connector modules must be connected and secured to the motor modules. Control power must be connected to the power and control input connector module and power input with a control pass-through connector module (if used), before updating the firmware.

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**IMPORTANT** For the iTRAK 5750 system, the following status indicators must be flashing green:

- The network (NET) and module (MOD) status indicators on each of the motor modules (firmware section modules)
- Connector modules status (STS), speed (SPD), and DC status (DC STS)

---



**ATTENTION:** To avoid personal injury or damage to equipment during the firmware update due to unpredictable motor activity, do not apply three-phase AC or common-bus DC input power to the iTRAK system.

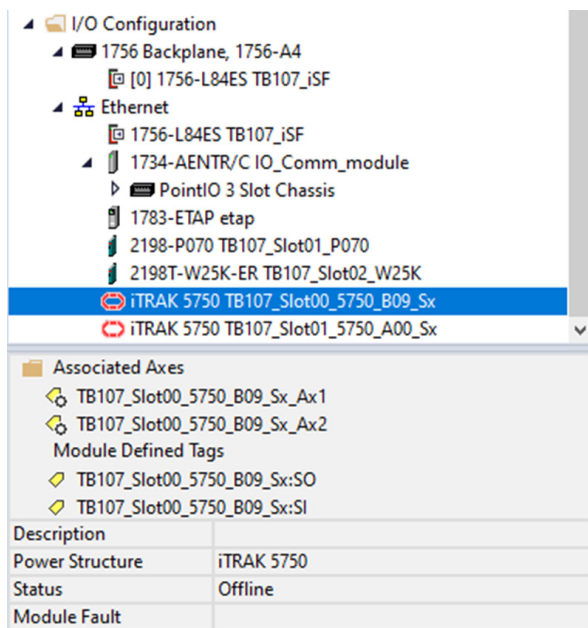
---

### Inhibit the Module

You must inhibit the iTRAK 5750 module before performing the firmware update. If the drive is in protected mode, you must disable protected mode before you can inhibit the module. To enable or disable protected mode, use the rotary switches on the power and control module. See [Table 12 on page 81](#) and [Protected Mode on page 88](#).

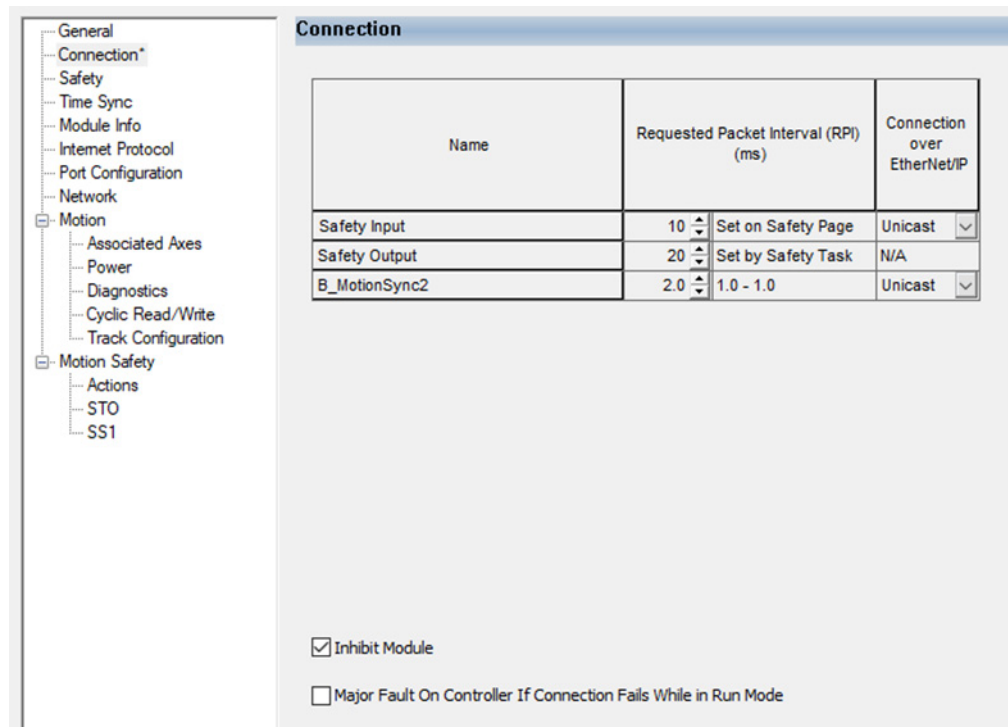
Follow these steps to inhibit a module.

1. Open your Studio 5000 application.
2. Right-click the iTRAK 5750 module you configured and choose Properties.



The Module Properties dialog box appears.

## 3. Select the Connection page.



Name	Requested Packet Interval (RPI) (ms)	Connection over EtherNet/IP
Safety Input	10	Unicast
Safety Output	20	N/A
B_MotionSync2	2.0	Unicast

Inhibit Module

Major Fault On Controller If Connection Fails While in Run Mode

4. Check Inhibit Module.
5. Click OK.
6. Save your file and download the program to the controller.
7. Verify that the network (NET) and module (MOD) status indicators on the motor modules (firmware section modules) are flashing green.

## Update Your Firmware

Use either ControlFLASH Plus or ControlFLASH to update the firmware.

- To update the firmware by using ControlFLASH Plus, see [Use ControlFLASH Plus to Update Your iTRAK 5750 System Firmware](#).
- To update your firmware by using ControlFLASH, see [Use ControlFLASH to Update Your iTRAK 5750 System Firmware on page 223](#).

### Use ControlFLASH Plus to Update Your iTRAK 5750 System Firmware


Follow these steps to select the iTRAK 5750 section module to update.

1. Start ControlFLASH Plus.



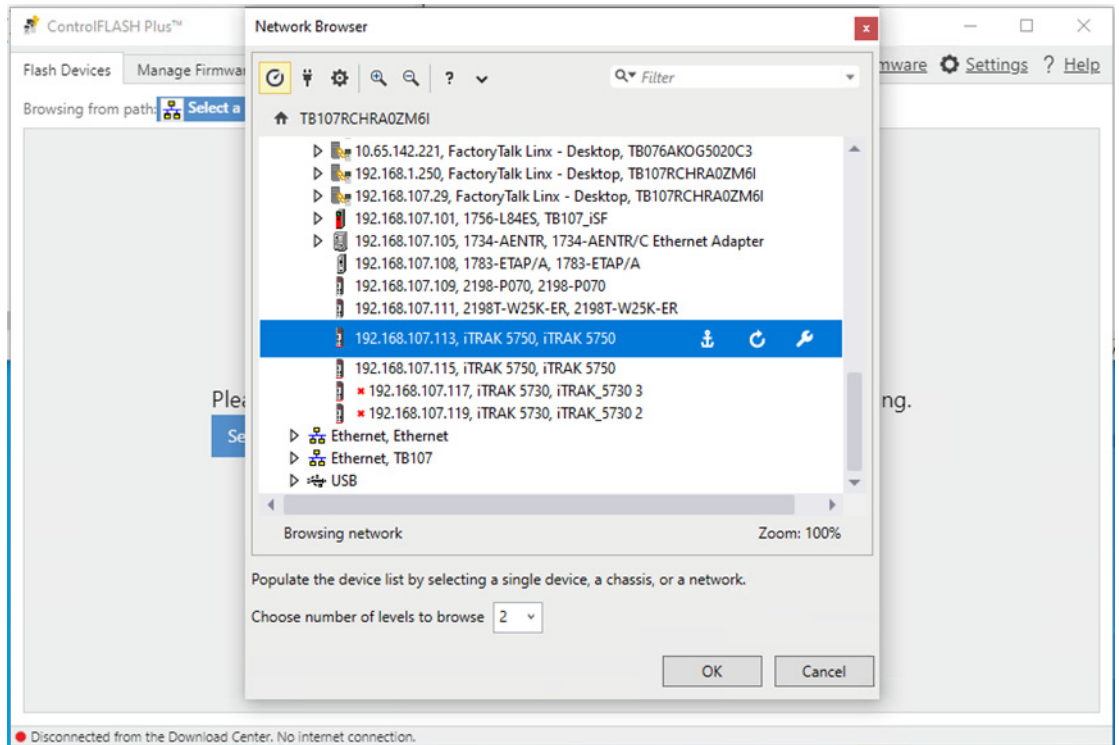
You can choose to select and update the firmware for all section modules in your system. In this procedure, only one module is selected for a firmware update.

2. On the Flash Devices page, if the device is not already present in 'Browsing from path,' complete these steps:

- a. Click  .

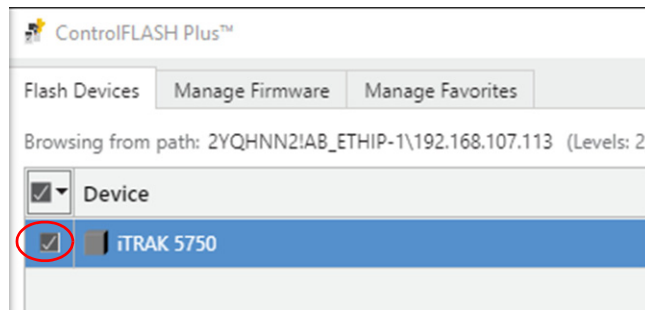


- b. In the Network Browser dialog box, locate and select the device to update.

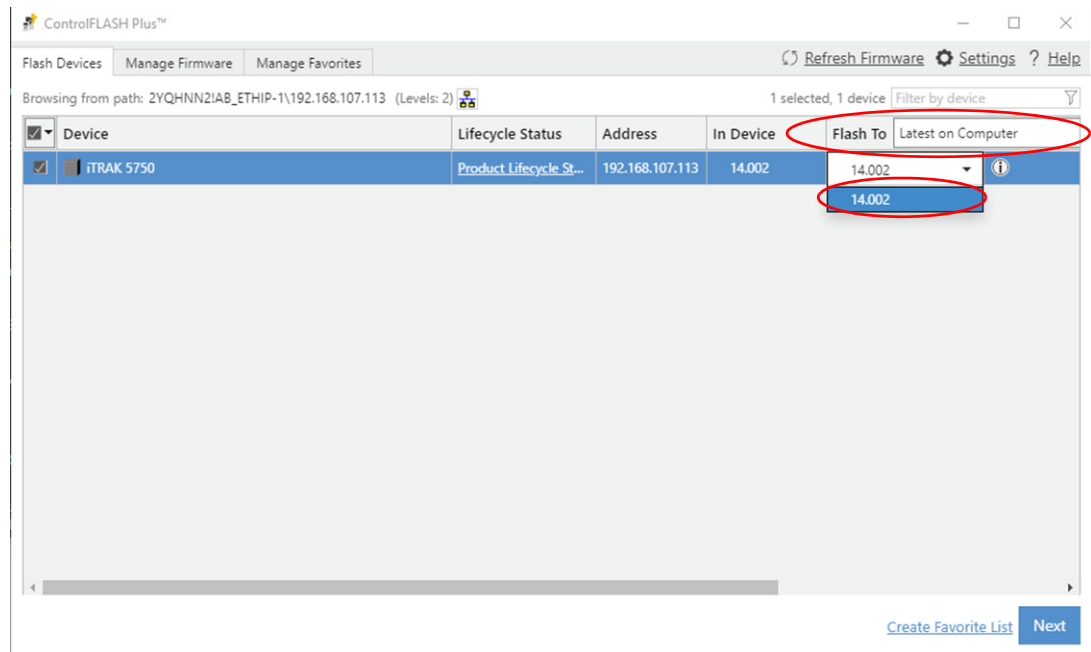


- c. Click OK.

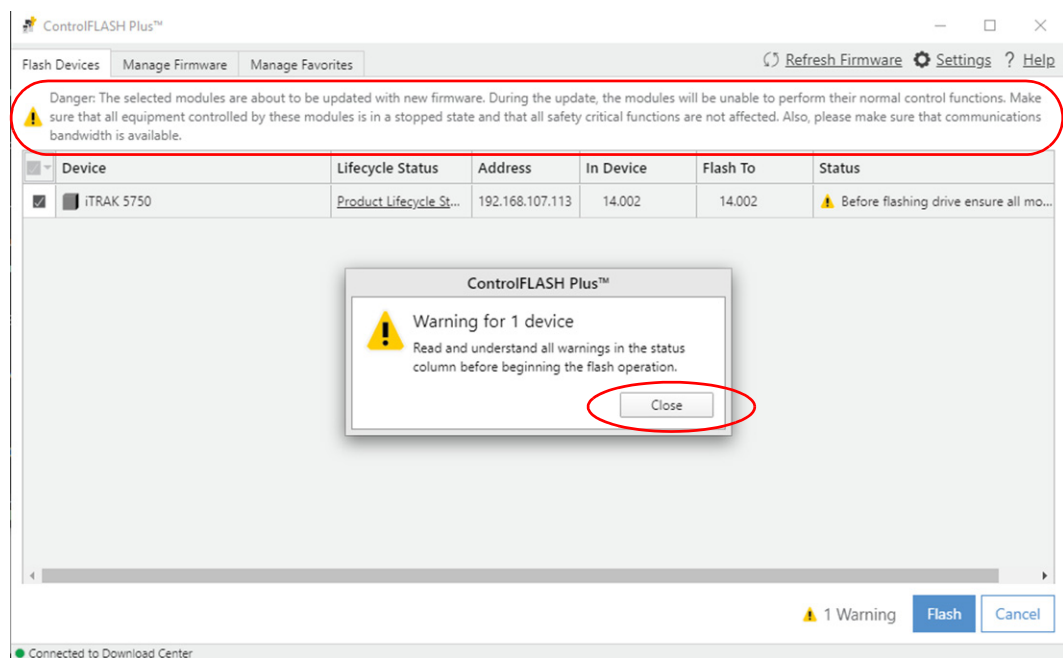
3. On the Flash Devices tab, verify that the checkbox to the left of the device is checked.



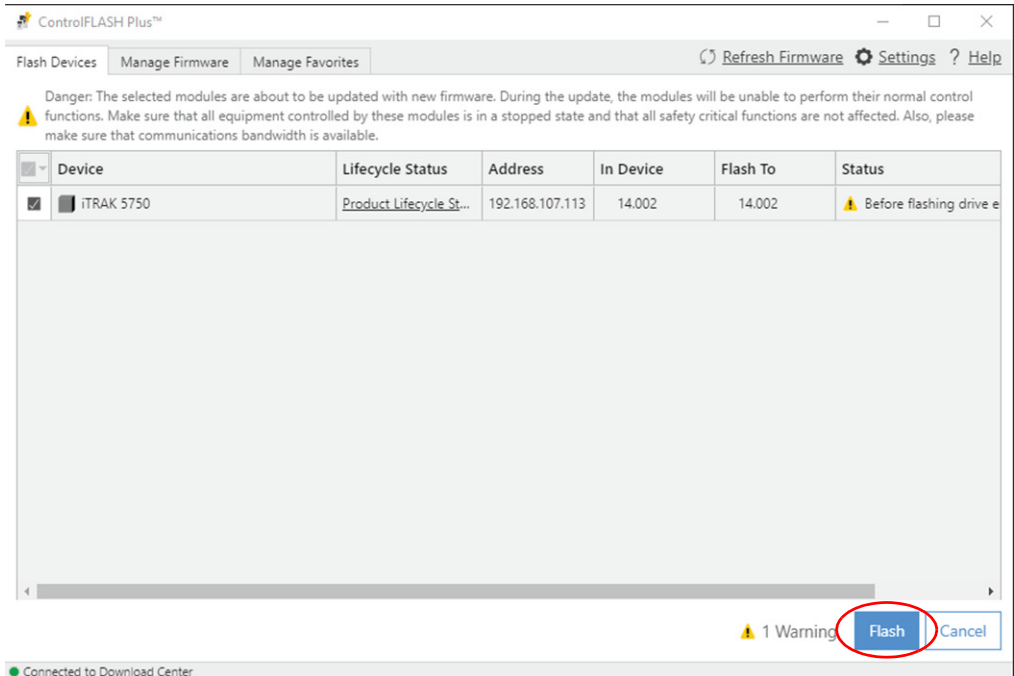
4. Choose the firmware revision that you want to use for the update using one of the following methods:
  - If you have already downloaded the firmware, then next to Flash To, choose Latest on Computer and select the revision to use.
  - Next to Flash To, choose Latest from Download Center and select the revision to use.



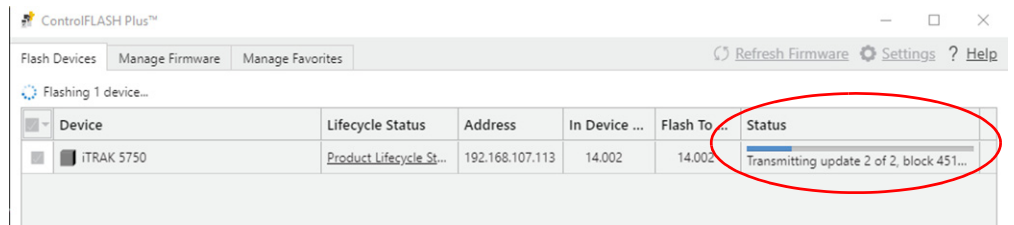
5. Click Next.
6. If a warning dialog box appears, read the warning, complete any recommendations, and click Close.



- After acknowledging all warnings and confirming the revision to use for the update, click Flash.



A progress bar appears to show the status of the firmware update.



After the upgrade information is sent to the iTRAK, the iTRAK resets. During the reset, the module (MOD) and network (NET) status indicators on the motor modules (firmware section modules) change color from flashing green to steady red, or alternately flashing red.

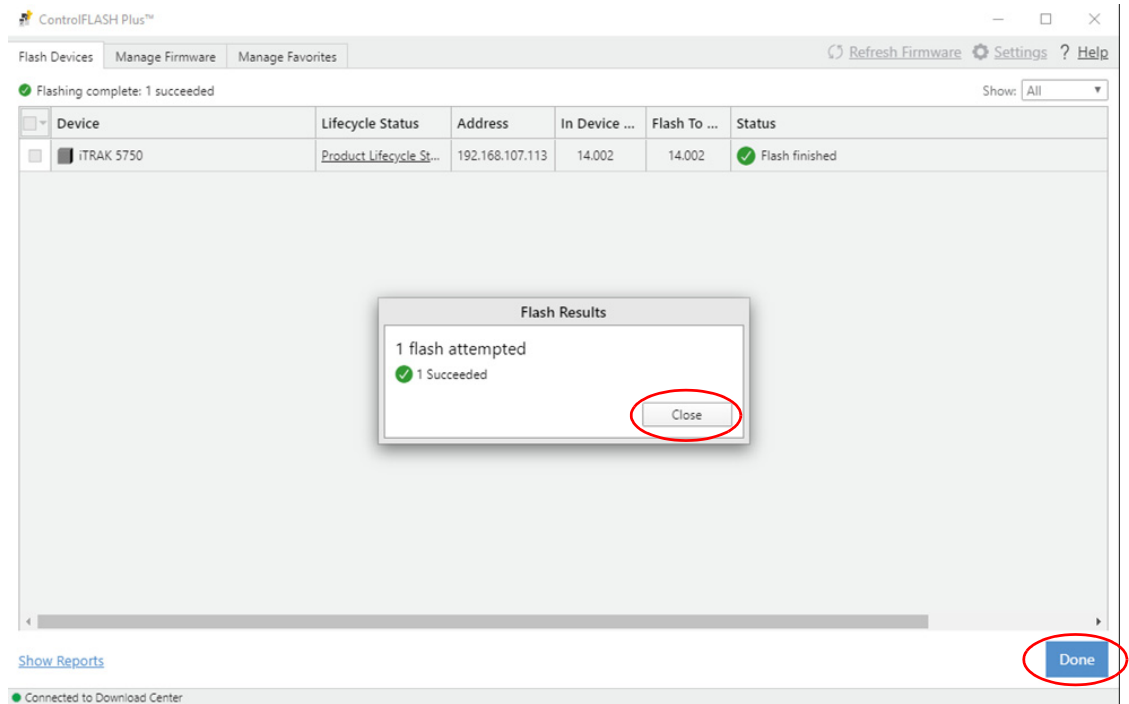
After the download, the device will apply the new firmware and restart, which may take several minutes.

---

**IMPORTANT** Do not cycle power to the iTRAK during this process. A power cycle results in an unsuccessful firmware update and an inoperable module.

---

After the device reboots, ControlFLASH Plus reports the results of the update, indicating whether the update succeeded or failed.



8. To close the update results report, click Close.
9. To complete the process and close the application, click Done.

**IMPORTANT** Before resuming normal operation, you must clear the Inhibit Module checkbox on the Connection page in the iTRAK 5750 Module Properties dialog box. This checkbox was checked before the firmware update in the procedure [Inhibit the Module on page 218](#).

## Use ControlFLASH to Update Your iTRAK 5750 System Firmware

Follow these steps to select the iTRAK 5750 system module to upgrade.



When static IP addresses are assigned, it is recommended that you upgrade the firmware for the last module in the system. The last module is determined by the highest value of the last octet of the IP addresses. When the last module has been upgraded, continue to upgrade modules in descending IP address order.

## Configure Your Communication Path with RSLinx

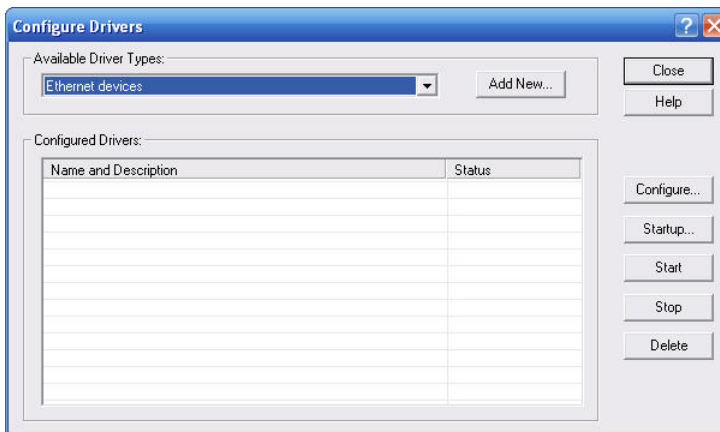
This procedure assumes that your communication method to the target device is the Ethernet network. It also assumes that any Ethernet communication module or Logix 5000® controller in the communication path has already been configured.

For more controller information, see [Additional Resources on page 9](#).

Follow these steps to configure the communications path to the target device.

1. Open your RSLinx Classic software.
2. From the Communications menu, choose Configure Drivers.

The Configure Drivers dialog box appears.



3. From the Available Driver Types pull-down menu, choose Ethernet devices.
4. Click Add New.

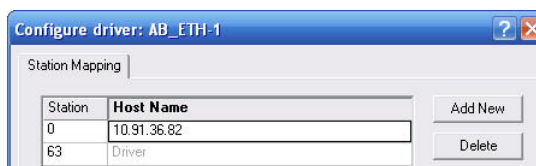
The Add New RSLinx Classic Driver dialog box appears.

5. Type the new driver name.



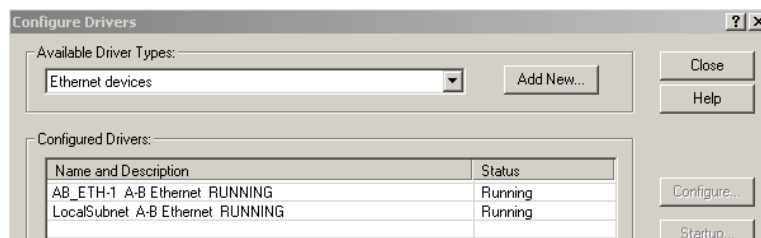
6. Click OK.

The Configure driver dialog box appears.



7. Type the IP address of your Ethernet Module or Controller that bridges between the Ethernet network and the EtherNet/IP network.
8. Click OK.

The new Ethernet driver appears under Configured Drivers.



9. Click Close.
10. Minimize the RSLinx application dialog box.



## Start the ControlFLASH Software

Follow these steps to start ControlFLASH and begin your firmware update.

1. In the Studio 5000 application, from the Tools menu, choose ControlFLASH.



You can also open the ControlFLASH software by choosing Start > Programs > FLASH Programming Tools > ControlFLASH.

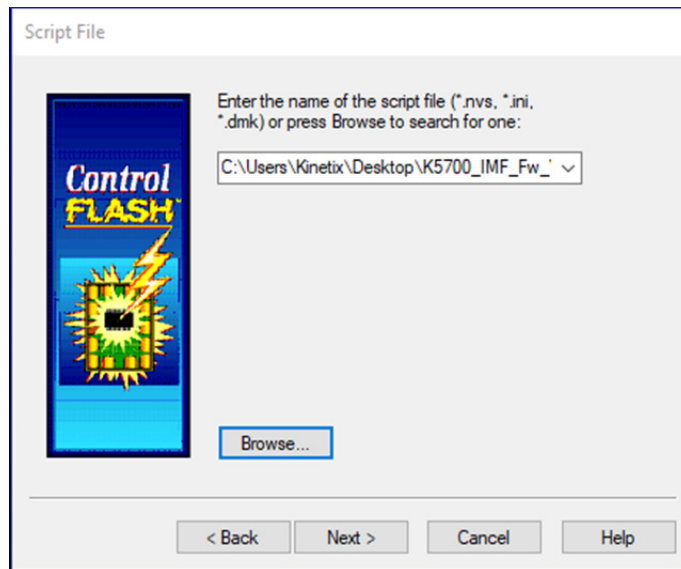
The Welcome to ControlFLASH dialog box appears.



2. Click Next.

The Script File dialog box appears.

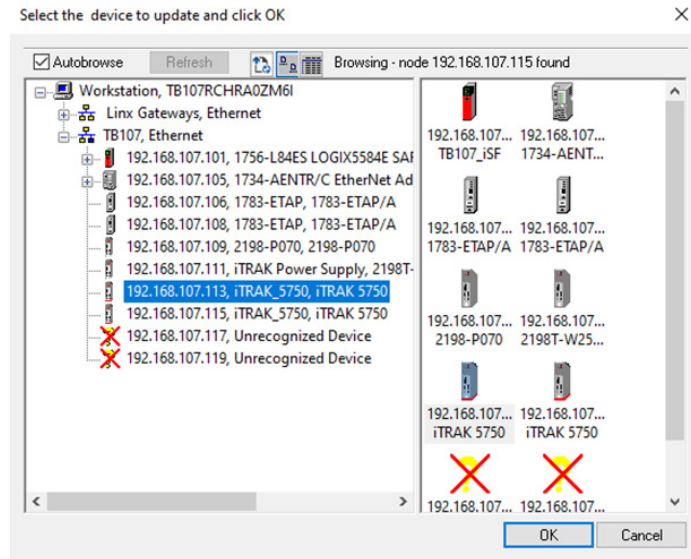
3. Enter the name of the script file.



If your catalog number does not appear, click Browse, select the monitored folder where the firmware kit (DMK files) is located. Click Add and OK.

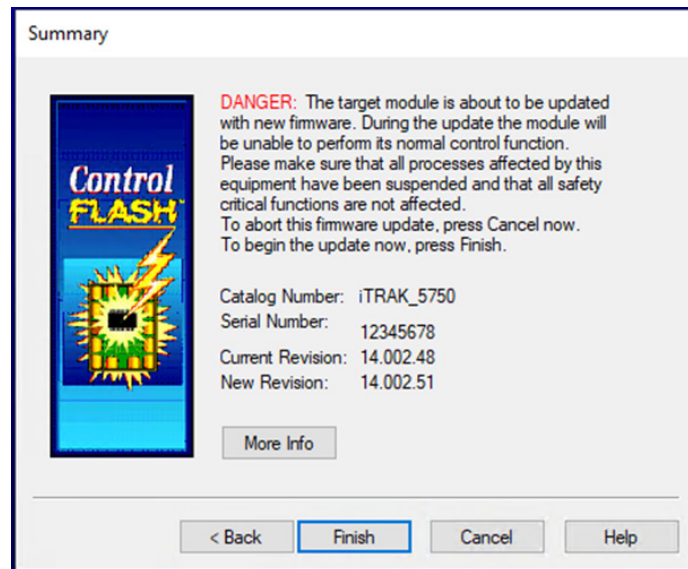
4. Click Next.

The Select Device to Update dialog box appears.



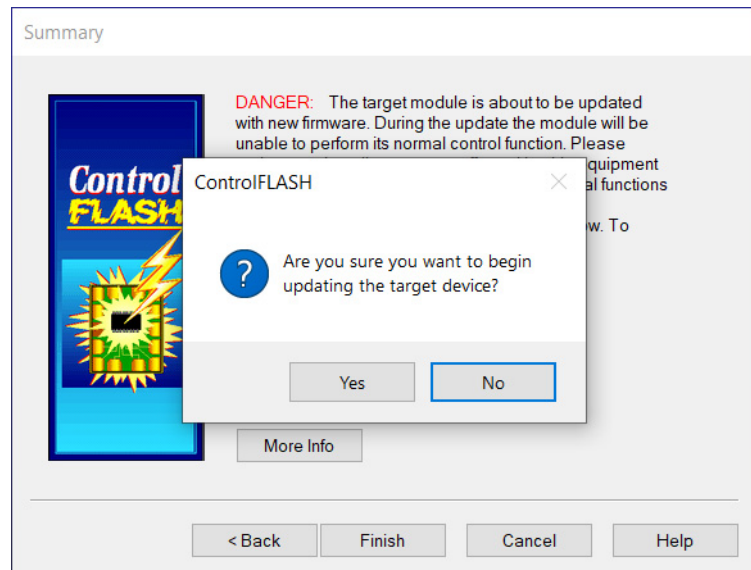
5. Expand your Ethernet node, Logix backplane, and EtherNet/IP network module.
6. Select the iTRAK 5750 system to upgrade.
7. Click OK.

The Summary dialog box appears.



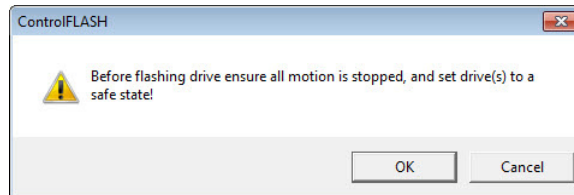
8. Confirm the device catalog number and firmware revision.
9. Click Finish.

This ControlFLASH warning dialog box appears.



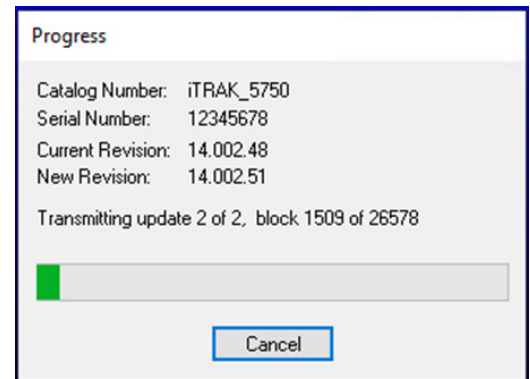
10. To complete the update now, click Yes.

This ControlFLASH warning dialog box appears.

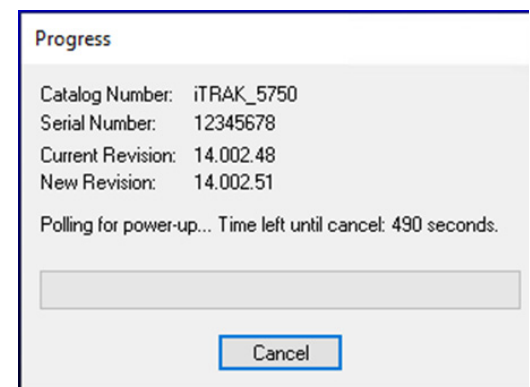


11. Acknowledge the warning and click OK.

The Progress dialog box appears and updating begins.



After the update information is sent to the iTRAK, the iTRAK resets. During the reset, the module (MOD) and network (NET) status indicators on the motor modules (firmware section modules) change color from flashing green to steady red, or alternately flashing red.



12. Wait for the Progress dialog box to time out.  
It is normal for this process to take minutes.

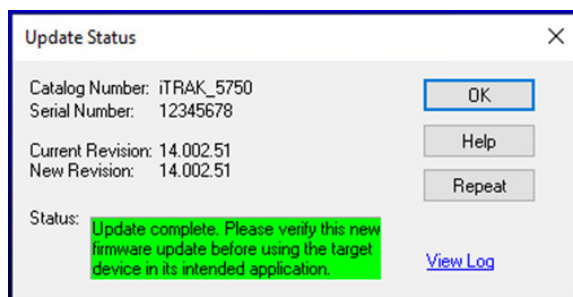
---

**IMPORTANT** Do not cycle power to the iTRAK during this process. A power cycle results in an unsuccessful firmware update and an inoperable module.

---

13. Verify that the module (MOD) and network (NET) status indicators on the motor modules (firmware section modules) are flashing green.
14. Verify that the Update Status dialog box appears and indicates success or failure as described in the following table and image.

Upgrading Status	If
Success	Update complete appears in a green Status dialog box, then go to <a href="#">step 15</a> .
Failure	Update failure appears in a red Status dialog box, then refer to the ControlFLASH User Manual, publication <a href="#">1756-UM105</a> for troubleshooting information.



15. Click OK.

---

**IMPORTANT** If you set the Module Definition Electronic Keying to "Exact Match", remember to modify the Logix project with the updated firmware revision. See [Configure the iTRAK 5750 Motor Modules on page 99](#).

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**IMPORTANT** Before resuming normal operation, you must clear the Inhibit Module checkbox on the Connection page in the iTRAK 5750 Module Properties dialog box. This checkbox was checked before the firmware update in the procedure [Inhibit the Module on page 218](#).

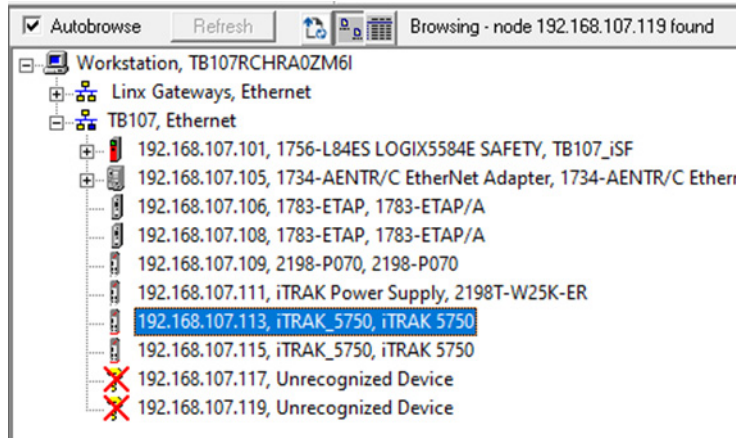
---

## Verify the Firmware Update

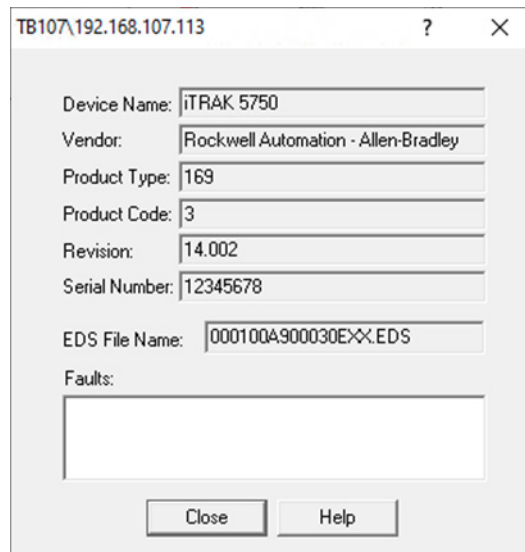
Verifying the new firmware is required for the following reasons. The drive supports a primary file system and a secondary file system. If there is an update failure or file verification failure, the drive may boot to the secondary file system with a potentially outdated firmware.

Follow these steps to verify that your firmware update was successful.

1. Open your RSLinx software.
2. From the Communications menu, choose RSWho.
3. Expand your Ethernet node, Logix backplane, and EtherNet/IP network module.



4. Right-click the iTRAK 5750 module and choose Device Properties. The Device Properties dialog box appears.



5. Verify the new firmware revision level.
6. Click Close.

**Notes:**

## High-speed Data Logging Service

This appendix provides instructions for how to use the high-speed data logging service of the iTRAK® 5750 system.

Topic	Page
Configure and Use the Message Instruction	231
iTRAK System Data Logging Parameters	239

The high-speed data logging service, when used with the iTRAK 5750 system, allows you to log up to 40,000 data points for one to four channels. The sample period of the data logging service can be as low as the Servo Update Rate of the iTRAK module (250 µs). This service can be accessed through message instructions.

For more information regarding the use of the data logging service, sample code, and Add-On instructions, see Knowledgebase Answer ID [0A34226](#).

### Configure and Use the Message Instruction

Follow these steps to configure and use the high-speed data logging service with a message instruction.

1. In your Studio 5000 Logix Designer® project, open the routine where you want to implement data logging.
2. Create a Message instruction.
3. Right click the Message instruction and select New Tag...

The New Parameter or Tag dialog box appears.

The screenshot shows the 'New Parameter or Tag' dialog box with the following configuration:

- Name:** MSG\_1
- Description:** (Empty text area)
- Usage:** Local Tag
- Type:** Base
- Alias For:** (Empty dropdown)
- Data Type:** MESSAGE
- Parameter Connection:** (Empty dropdown)
- Scope:** MainProgram
- External Access:** Read/Write
- Style:** (Empty dropdown)
- Constant
- Sequencing
- Open MESSAGE Configuration
- Open Parameter Connections

4. Type the tag name.
5. Click Create.
6. Open the Configuration dialog box by clicking the ellipsis (...) next to the tag name. The Message Configuration dialog box appears.

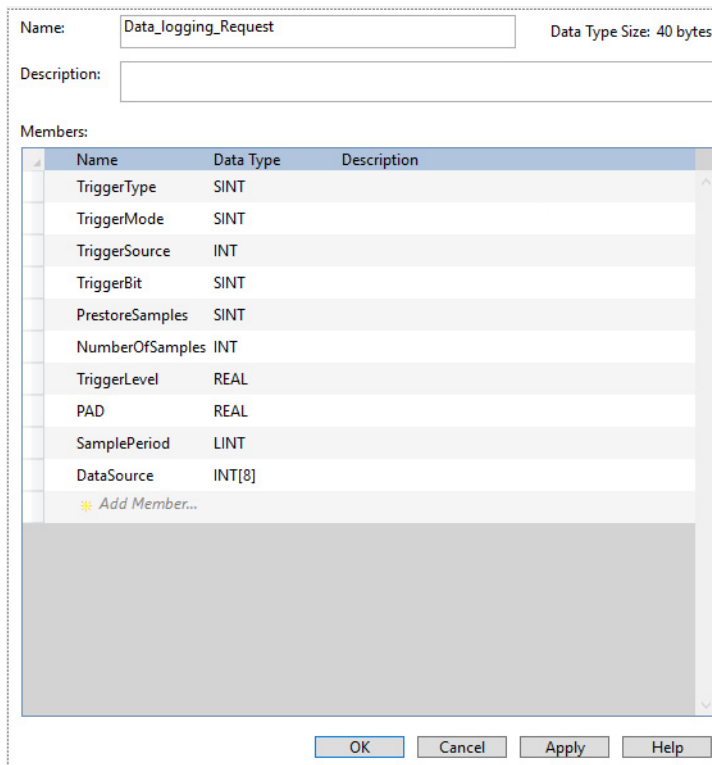
7. On the Configuration tab, set these configuration parameters:
  - Message Type: CIP Generic
  - Service Type: Custom
  - Service Code: 3A<sub>HEX</sub>
  - Instance: Axis Instance that you want log data from
  - Class: 42<sub>HEX</sub>
  - Attribute: 0
  - Source Element: a tag of data type DINT[10]
  - Source Length: 40 bytes (each DINT consists of 4 bytes)



Axis Instance 1 is the section axis, and axis instances 2...5 are mover axes 1...4.



8. The DINT[10] array in the message configuration can be set as follows:
  - a. Create a User-Defined Data Type (UDT) to enter the data logging configuration.



The data structure of a data logging request is shown in this table:

**Table 49 - Data Logging Request Parameters**

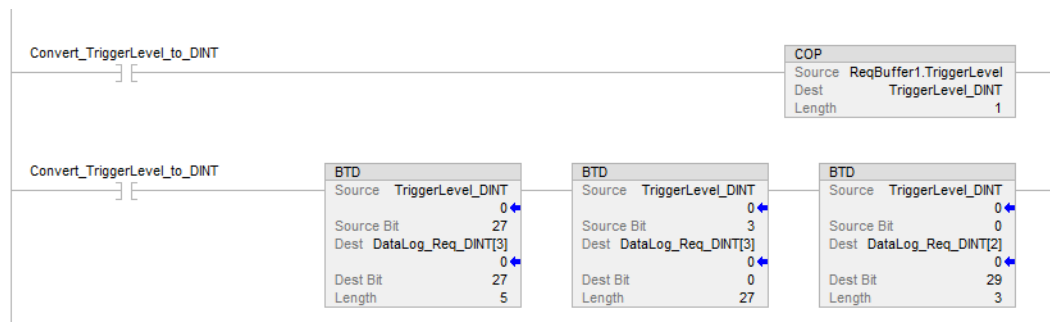
Parameter	Type	Description	Value
Trigger type	USINT	Specifies the type of trigger operation that is performed on the designated attribute. When Signal is selected, the data logger triggers based on the value of the specified attribute relative to the Trigger Level. Attribute can be of integer or floating-point data type. When Boolean is selected, the data logger triggers based on a Boolean state of the attribute or attribute bit.	Enumeration: 0 = Signal 1 = Boolean 2...255 = reserved
Trigger Mode	USINT	Enumerated mode of operation for the triggering algorithm: • A positive (+) Edge Trigger looks for an attribute value transition relative to the Trigger Level. • A Level Trigger simply monitors the current attribute value relative to the Trigger Level.	Enumeration: 0 = Immediate 1 = "+" Edge Trigger 2 = "-" Edge Trigger 3 = ">=" Level Trigger 4 = "<=" Level Trigger 5...255 = reserved
Trigger Source	UINT	ID of the attribute whose value is used to trigger data logging.	—
Trigger Bit	USINT	The attribute bit number whose value is evaluated to trigger data logging. This parameter is only applicable to Boolean trigger types. A value of 0 applies to the least significant bit of the attribute.	—
Pre-store Samples	USINT	The percentage of the data log buffer dedicated to pre-store samples before the trigger event. The remaining buffer is filled with samples after the trigger event. The pre-store range that is allowed is from 0... 100%. Trigger events are detected until the data buffer is sufficiently full.	—
Capture Size	UINT	Specifies the number of samples to store in the data log arrays. Capture Size applies to each Data Log array. Capture Size is limited to the size of the data log array. This value is applied to the attribute, Data Capture Size.	—
Trigger Level	LREAL	The value of the trigger source that causes a trigger event. The units for this value are determined by the selected Trigger source. If a Boolean trigger type is selected, the Trigger Level is set to either 0 or 1.	Attribute-dependent units
Sample Period	LINT	Time period between samples stored in the data buffer. This value shall be an integer multiple of the minimum sample period of the device. For example, if the device can acquire data at 250 μS, the choices shall be 250 μS, 500 μS, 750 μS, and so on.	Nanoseconds

Table 49 - Data Logging Request Parameters (Continued)

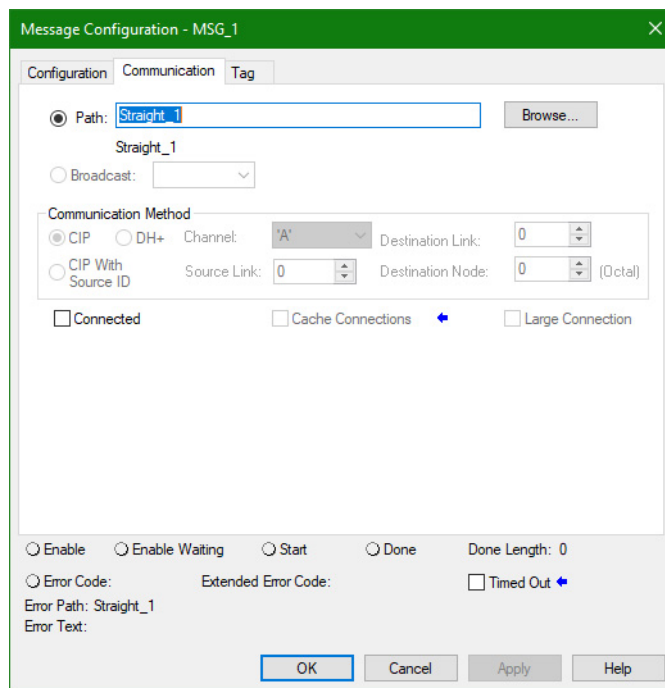
Parameter	Type	Description	Value
Data Source 1	UINT	ID of attribute to store in associated data log.	—
Data Source 2	UINT	ID of attribute to store in associated data log.	—
Data Source 3	UINT	ID of attribute to store in associated data log.	—
Data Source 4	UINT	ID of attribute to store in associated data log.	—
Data Source 5	UINT	ID of attribute to store in associated data log.	Not supported. iTRAK currently supports 4 channels.
Data Source 6	UINT	ID of attribute to store in associated data log.	
Data Source 7	UINT	ID of attribute to store in associated data log.	
Data Source 8	UINT	ID of attribute to store in associated data log.	

- b. Copy this UDT to the DINT[10] with a COP instruction before using it in the Message instruction.
- c. Convert the Trigger Level from Real to LREAL and copy the value into the DINT[10] array.

The trigger level is an LREAL in the iTRAK module. However, LREAL is not a data type supported in the Studio 5000 Logix Designer application. Thus, you must convert the trigger level that is entered in the UDT as a REAL data type to a DINT data type in a format equivalent to an LREAL data type. This conversion must be performed before arming the data logging function using a COP instruction and three BTD instructions:



- 9. On the Communication tab, set the path to the module you want to log data from using the Message Path Browser.



## 10. Click OK.

Data Logging Status (Attribute ID = 940) identifies the status of the data collection process. This attribute can be set to one of the following values:

- 0 = Inactive
- 1 = Buffering
- 2 = Buffered and Armed
- 3 = Triggered and Collecting
- 4 = Collected

## 11. To read Data Logging Status from the iTRAK module, use these configuration parameters in the message instruction:

- Message Type: CIP Generic
- Service Type: Get Attribute Single
- Service Code: E<sub>HEX</sub>
- Instance: Axis Instance that you want log data from
- Class: 42<sub>HEX</sub>
- Attribute: 3AC<sub>HEX</sub>
- Destination Element: a tag of data type DINT

Message Configuration - MSG\_2

Configuration | Communication | Tag

Message Type: CIP Generic

Service Type: Get Attribute Single | Source Element: | Source Length: 0 (Bytes)

Service Code: e (Hex) | Class: 42 (Hex) | Destination Element: Data\_Log\_Status

Instance: 2 | Attribute: 3ac (Hex) | New Tag...

Enable  Enable Waiting  Start  Done Done Length: 0

Error Code: | Extended Error Code: |  Timed Out

Error Path: Straight\_1  
Error Text:

OK Cancel Apply Help

Data Trigger Time Stamp (Attribute ID = 941) identifies the time stamp that is associated with the data logging trigger event in nanoseconds.

12. To read Data Trigger Time Stamp from the iTRAK module, use these configuration parameters in the message instruction:
- Message Type: CIP Generic
  - Service Type: Get Attribute Single
  - Service Code: E<sub>HEX</sub>
  - Instance: Axis Instance that you want log data from
  - Class: 42<sub>HEX</sub>
  - Attribute: 3ADH<sub>HEX</sub>
  - Destination Element: a tag of data type LINT

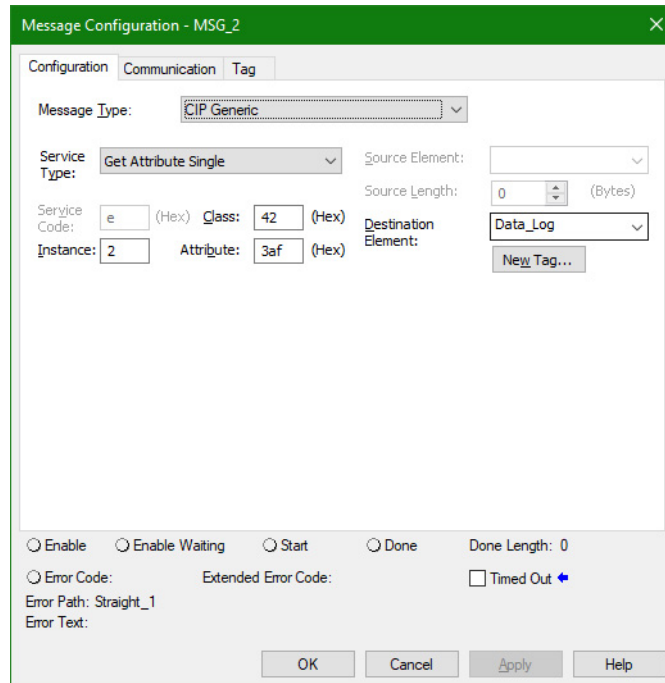
Data Trigger Index (Attribute ID = 942) identifies the index of the data point associated with the data logging trigger event. The trigger index is from 0...39999. For example, if the Pre-store Sample is 10% and the Capture Size is 32000, the Trigger Index would be 3199.

13. To read Data Trigger Index from the iTRAK module, use these configuration parameters in the message instruction:
- Message Type: CIP Generic
  - Service Type: Get Attribute Single
  - Service Code: E<sub>HEX</sub>
  - Instance: Axis Instance that you want log data from
  - Class: 42<sub>HEX</sub>
  - Attribute: 3AE<sub>HEX</sub>
  - Destination Element: a tag of data type DINT

The sampled real-time data are stored in general-purpose array attributes. The iTRAK 5750 system currently supports only four data channels and the log data from each channel is stored in these attributes:

- Data Log 1 (Attribute ID = 943)
- Data Log 2 (Attribute ID = 944)
- Data Log 3 (Attribute ID = 945)
- Data Log 4 (Attribute ID = 946)

14. To read Log Data from the iTRAK module, use these configuration parameters in the message instruction:
  - Message Type: CIP Generic
  - Service Type: Get Attribute Single
  - Service Code: E<sub>HEX</sub>
  - Instance: Axis Instance that you want log data from
  - Class: 42<sub>HEX</sub>
  - Attribute: Attribute ID of the data log channel that you want log data from in Hex.
    - Data Log 1 = 3AF<sub>HEX</sub>
    - Data Log 2 = 3B0<sub>HEX</sub>
    - Data Log 3 = 3B1<sub>HEX</sub>
    - Data Log 4 = 3B2<sub>HEX</sub>
  - Destination Element: a tag of data type REAL[40000]



15. Click OK.

## iTRAK System Data Logging Parameters

The attributes that are listed in the following table can be used as Data Source and Trigger Source parameters.

**Table 50 - Data Logging Parameters**

Attribute ID	Attribute Name	Read or Write	Mover Axis	Section Axis
483	Acceleration Feedback	R	Y	N
452	Acceleration Feedforward Command	R	Y	N
460/216	Acceleration Feedforward Gain	W	Y	N
367	Acceleration Fine Command	R	Y	N
482	Acceleration Reference	R	Y	N
844	Adaptive Tuning Gain Scaling Factor	R	Y	N
522	Current Limit Source	R	N	Y
620/266	DC Bus Voltage	R	N	Y
636	Inverter Capacity	R	N	Y
801	Load Observer Acceleration Estimate	R	Y	N
806	Load Observer Bandwidth	W	Y	N
807	Load Observer Integrator Bandwidth	W	Y	N
802	Load Observer Torque Estimate	R	Y	N
635/259	Motor Capacity	R	N	Y
521	Operative Current Limit	R	N	Y
603	Output Power	R	Y	N
436/131	Position Error	R	Y	N
1402	Position Feedback1	R	Y	N
365	Position Fine Command	R	Y	N
442	Position Integrator Bandwidth	W	Y	N
437	Position Integrator Output	R	Y	N
443	Position Lock Tolerance	W	Y	N
441	Position Loop Bandwidth	W	Y	N
438	Position Loop Output	R	Y	N
432	Position Reference	R	Y	N
431	Position Trim	W	Y	N
496	System Inertia	W	Y	N
495	Torque Estimate	R	Y	N
504/332	Torque Limit Negative	W	Y	N
505/333	Torque Limit Positive	W	Y	N
502	Torque Low Pass Filter Bandwidth	W	Y	N
843	Torque Low Pass Filter Bandwidth Estimate	R	Y	N
792	Torque Notch Filter 2 Frequency Estimate	R	Y	N
793	Torque Notch Filter 2 Magnitude Estimate	R	Y	N
794	Torque Notch Filter 2 Width Estimate	R	Y	N
795	Torque Notch Filter 3 Frequency Estimate	R	Y	N
796	Torque Notch Filter 3 Magnitude Estimate	R	Y	N
797	Torque Notch Filter 3 Width Estimate	R	Y	N
798	Torque Notch Filter 4 Frequency Estimate	R	Y	N
799	Torque Notch Filter 4 Magnitude Estimate	R	Y	N
800	Torque Notch Filter 4 Width Estimate	R	Y	N
841	Torque Notch Filter Frequency Estimate	R	Y	N

Table 50 - Data Logging Parameters (Continued)

Attribute ID	Attribute Name	Read or Write	Mover Axis	Section Axis
842	Torque Notch Filter Magnitude Estimate	R	Y	N
791	Torque Notch Filter Width Estimate	R	Y	N
492	Torque Reference	R	Y	N
493	Torque Reference Filtered	R	Y	N
494	Torque Reference Limited	R	Y	N
491	Torque Trim	W	Y	N
1240...1251	Track Section Coil 1-12 Current Feedback	R	N	Y
1260...1271	Track Section Coil 1-12 Capacity	R	N	Y
455/135	Velocity Error	R	Y	N
454/134	Velocity Feedback	R	Y	N
433	Velocity Feedforward Command	R	Y	N
440/215	Velocity Feedforward Gain	W	Y	N
366	Velocity Fine Command	R	Y	N
462	Velocity Integrator Bandwidth	W	Y	N
456	Velocity Integrator Output	R	Y	N
458	Velocity Limit Source	R	Y	N
461	Velocity Loop Bandwidth	W	Y	N
457	Velocity Loop Output	R	Y	N
469	Velocity Low Pass Filter Bandwidth	W	Y	N
453	Velocity Reference	R	Y	N
451	Velocity Trim	W	Y	N



## Numerics

**24V DC control power supply**  
description 15

## A

**abnormal noise** 133  
**AC contactor**  
description 15  
**AC line filters**  
description 15  
**accessory**  
infield cover 35  
**actions category**  
section axis 112  
**alarm**  
motor section 134  
mover 134  
**application requirement** 190  
**apply power** 117  
**appropriate use** 9  
**assembly tag name**  
input 213  
output 213  
**assembly torque**  
diagram 51  
**assign axis**  
motion group 111  
**assignment sequence**  
mover 104  
**associated axis**  
iTRAK power supply property 98  
Kinetix 5700 DC-bus power supply property 94  
motor module property 107  
**axis**  
configure 104  
troubleshooting 132  
**axis tag**  
motion connection 209  
**axis tag name**  
motion connection 210  
**axis unstable** 132

## B

**base plate**  
description 14  
**behavior**  
motor module 135  
mover 135  
**brace plate**  
description 14, 32  
**branch circuit protection**  
description 15  
**burn hazard** 44

**bus-sharing**  
configuration 93, 97  
group 93  
regulator 93, 97  
**bus-sharing group**  
configure 118, 120  
example 118

## C

**cam-follower wheel**  
location 36  
replace 153  
**catalog number**  
accessory and replacement component 16  
assembled iTRAK 5750 system 17  
electromechanical component 14  
power and control component 15  
**category 3**  
requirement 190  
stop category definition 190  
**certification**  
application requirement 190  
customer responsibility 189  
PL and SIL 190  
TÜV Rheinland 189  
website 189  
**CIP Security** 48  
Protected Mode 88  
**clean**  
component 139  
rail system 139  
**commission** 122  
**communication**  
configuration type 38  
configure path 223  
connect Ethernet cable 84  
control DIP switch 83  
device level ring topology 39  
Dynamic Host Configuration Protocol 81  
EtherNet/IP network 80  
linear topology 38  
set IP address 88  
star topology 40  
static IP address configuration 82  
**compatibility**  
controller 37  
**configure**  
advanced connection reaction time limit  
motor module 103  
always automatically configure safety  
motor module 216  
associated axis  
iTRAK power supply 98  
Kinetix 5700 DC-bus power supply 94  
motor module 107  
bus-sharing group 118, 120  
communication path 223  
controller 90  
Data Logger 231  
date and time  
controller 91  
digital input

- iTRAK 5700 power supply 98
  - iTRAK 5700 power supply property 98
  - Kinetix 5700 DC-bus power supply 94
  - Kinetix 5700 DC-bus power supply property 94
  - IP address 88
  - iTRAK 5700 power supply 96
  - Kinetix 5700 DC-bus power supply 92
  - Kinetix 5700 DC-bus power supply property 93
  - Kinetix 5700 iTRAK power supply 96
  - message instruction 231
  - motion
    - group 110
    - motion group 110
    - motor module 99
    - mover axis 113
    - network parameter 88
    - new axis
      - iTRAK 5700 power supply 99
      - Kinetix 5700 DC-bus power supply 95
      - motor module 108
      - mover 109
    - no safety signature automatically configure safety motor module 215
    - power
      - iTRAK 5700 power supply 97
      - Kinetix 5700 DC-bus power supply 93
      - motor module 102
    - replaced integrated safety motor module 215
    - safety
      - motor module 103
    - section axis 112
    - section axis actions 112
    - section axis parameter 113
    - time synchronization controller 92
  - connector module**
    - feature 27
    - location 78
    - replace 180
    - set EtherNet/IP address 80
    - status indicator 30
    - type 27
  - ControlFLASH Plus software**
    - firmware update 219
  - ControlFLASH software**
    - firmware update 223
    - start 225
    - troubleshooting 228
  - controller** 37
    - and drive behavior 134
    - compatibility 37
    - configure 90
    - property
      - date/time tab 91
      - enable time synchronization 92
  - cover**
    - infield 35
  - curve motor module**
    - replace 150
  - curve motor module 100 mm (3.94 in.)**
    - description 26
  - curve motor module 50 mm (1.97 in.)**
    - description 25
  - curve rail segment** 34
    - curve segment of middle rail**
      - replace 177
    - curve segment of top or bottom rail**
      - replace 168
    - curve support plate**
      - description 14
    - customer responsibility** 189
    - cybersecurity** 85
- ## D
- Data Logger**
    - configure 231
    - parameter 239
  - date/time tab**
    - controller property 91
  - DC power**
    - status indicator 131
  - declaration**
    - of conformity 41
    - of incorporation 41
  - description**
    - 100 mm (3.94 in.) curve motor module 26
    - 100 mm (3.94 in.) straight motor module 24
    - 24V DC control power supply 15
    - 50 mm (1.97 in.) curve motor module 25
    - 50 mm (1.97 in.) straight motor module 23
    - AC contactor 15
    - AC line filters 15
    - base plate 14
    - brace plate 14, 32
    - branch circuit protection 15
    - curve support plate 14
    - EtherNet/IP communication cable 15
    - infield cover 16, 35
    - joiner plate 14
    - Logix 5000 controller platform 15
    - lubrication system 16
    - lubrication system replacement cartridge 16
    - motor module 14
    - motor module power supply 15
    - mounting plate 14
    - mover 14, 36
    - mover motor magnet 14
    - mover position magnet 14
    - position magnet 14
    - power and control input connector module 15, 29
    - power and control pass-through connector module 15, 27
    - power cable 15
    - power input with control pass-through connector module 15, 28
    - rail alignment tool 16
    - rail system 14
    - Studio 5000 environment 15
    - top plate 14
  - device level ring topology** 39
  - diagnostic webpage** 83
  - diagram**
    - assembly torque 51
    - fastener size 51
    - fastener type 51
    - sequence number 51
    - tool size 51
    - tool type 51

**digital input**

- iTRAK 5700 power supply property 98
- Kinetix 5700 DC-bus power supply property 94

**DIP switch** 83**download**

- Logix program 116

**Dynamic Host Configuration Protocol** 81**E****electromagnetic field hazard** 44**electrically ground** 70**electromagnetic compatibility** 43**electromagnetic interference** 70**electromechanical component** 13**Ethernet cable** 84**EtherNet/IP**

- address rotary switch 80
- network 80

**EtherNet/IP communication cable**

- description 15

**exception action**

- motor module 134
- Studio 5000 Logix Designer 134

**explicit message** 208**F****fastener size**

- diagram 51

**fastener type**

- diagram 51

**fault**

- code access 127
- code overview 128
- code summary 128

**firmware update** 217

- ControlFLASH Plus software 219
- ControlFLASH software 223
- system requirements 217
- verify update 229

**flexure**

- location 36
- replace 153
- spare 153

**frame** 31**G****ground** 70**guard** 42**GuardLogix controller** 199**H****handling** 50**horizontal mounting** 12**I****IEC 60204-1** 201**ignore** 134

- motor section 134
- mover 134

**Independent Cart Technology Library** 87**infield cover**

- description 16, 35
- replace 181

**inhibit motor module** 218**initial lubrication**

- using customer provided oil bleed system 187
- using iTRAK Lubrication System 182

**input assembly tag** 212**input assembly tag name** 213**install**

- lubrication system 71
- mover 144
- oval track 56
- rectangle track 61
- track 49

**installation**

- electrically ground the track 70
- move a track section 55
- planning 49
- prepare mounting site or structure 53
- subframe mounting 53
- tool 51
- unpack 52

**integrated safety**

- iTRAK system 189
- motor module replacement 214
- out-of-box state 191
- protocol 203
- safe torque off state reset 196

**integrated safety motor module**

- configure 215

**IP address** 88**ISO 13849-1 CAT 3**

- requirement 190
- stop category definition 190

**iTRAK 5700 power supply**

- property 96

**iTRAK 5700 power supply property** 97

- digital input category 98
- new axis 99

**iTRAK 5750 system**

- catalog number 17

**iTRAK power supply property**

- associated axis category 98

**iTRAK system**

- component 12
- integrated safety 189
- module 12

**J****joiner plate** 32

- description 14

**K****Kinetix 5700 DC-bus power supply** 93

- associated axis 94
- configure 92
- digital input 94
- new axis 95
- property 93

**Kinetix 5700 iTRAK power supply**

- behavior 135
- configure 96

**L****leveling feet** 57, 61**lift track section** 55**linear topology** 38**link network**

- status indicator 131

**link speed**

- status indicator 131

**load observer** 123**Logix 5000 controller platform**

- description 15

**Logix Designer** 87, 90

- exception action 134

**Logix program**

- download 116

**lubrication** 182

- frequency of dispensations 185
- initial lubrication 182
- normal operation lubrication 182
- rail segment 33
- rail segment location 54
- recommended lubricant 182
- replace top or bottom rail lubrication segment 162
- replacement cartridge 16
- straight nipple fittings 71
- track mounting orientation 54
- using customer oil bleed system 187
- using iTRAK Lubrication System 182
- volume per dispensation 185
- weep hole 33

**lubrication pump**

- configuration 74
- installation 72
- mounting dimensions 73
- replace lubricant cartridge 182
- wire 74

**lubrication segment of a middle rail**

- replace 173

**lubrication segment of a top or bottom rail**

- replace 162

**lubrication system**

- description 16
- install 71
- track mounting orientation 54

**M****machine guard** 42**magnet**

- handling 47
- safe handling 47

**magnet plate**

- keeper 47
- magnetic field strength 45, 47
- safe distance 47
- screw 143

**maintenance**

- preventive 139

**major fault**

- motor section 134
- mover 134

**maximum track length** 11**mechanical component** 13**message instruction**

- configure 231

**minor fault**

- motor section 134
- mover 134

**module**

- iTRAK system 12

**motion**

- connection 209
- connection axis tag 209
- connection tag name 210
- group configuration 110

**Motion Direct Command** 203

- safe torque off bypass 203
- warning message 204

**motion group**

- assign axis 111
- configure 110

**motor magnet**

- description 14

**motor magnet plate**

- location 36

**motor module**

- accel/decel problem 132
- behavior 135
- change definition 100
- configure 99
- configure axis 104
- define 101
- description 14
- dimension 22
- fault code 129
- feature 22
- inhibit 218
- integrated safety replacement 214
- module status indicator 130
- network status indicator 129
- number 129
- overheating 132
- restore out-of-box state 191
- size 22
- status indicator 27
- tune 123
- type 22
- velocity 132
- verify firmware update 229

**motor module power supply**

- description 15

**motor module property** 102, 103, 104

- associated axis category 107
- new axis 108

**mounting** 53

- leveling feet 57, 61
- lubrication rail segment location 54
- orientation 12
- plate 57, 70
- plate dimension for oval track 57
- plate dimension for rectangle track 70
- site 53
- structure 53
- subframe 53

**mounting plate**

- description 14

**move track section** 55**mover**

- add new mover axis 109
- behavior 135
- components 36
- description 14, 36
- dimension 36
- fault code 129
- installation 144
- magnetic field strength 45
- Motion Direct Command 203
- motor magnet 14
- number 129
- number assignment 104
- position compensation 122
- position magnet 14
- replace 144
- section transition 122

**mover axis**

- property 113

**mover cam-follower wheel**

- replace 153
- spare 153

**mover cam-follower wheel flexure**

- replace 153
- spare 153

**mover motor magnet**

- description 14
- replace 143

**mover position magnet**

- description 14
- replace 141

**N****network**

- parameter 88
- status indicator 129

**network and module**

- status indicator 130

**new axis**

- iTRAK 5700 power supply property 99
- Kinetix 5700 DC-bus power supply property 95
- motor module property 108
- mover property 109

**noise**

- abnormal 133

**normal operation lubrication**

- using customer provided oil bleed system 187
- using iTRAK Lubrication System 185

**O****out-of-box state** 191

- restore motor module to 191

**output assembly tag** 212**output assembly tag name** 213**oval track**

- install 56
- mounting plate dimension 57

**overtravel detection** 128**P****parameter**

- Data Logger 239
- section axis 113

**Performance Level (PL)** 190**position magnet**

- description 14
- location 36
- magnetic field strength 46

**power**

- apply to system 117
- connect 78, 80
- current requirement 77
- remove from system 43

**power and control input connector module**

- description 15, 29

**power and control pass-through connector module**

- description 15, 27

**power cable**

- description 15

**power category** 93, 97, 102

- bus
  - configuration 93, 97
  - regulator 93, 97
- bus-sharing
  - group 93
- iTRAK 5700 power supply property 97
- Kinetix 5700 DC-bus power supply property 93
- motor module property 102
- primary bus-sharing
  - group 97
- secondary bus-sharing
  - group 97

**power input with control pass-through connector module**

- description 15, 28

**power supply**

- Ethernet cable 84
- firmware 37
- identify 37
- Kinetix 5700 DC-bus configure 92
- Kinetix 5700 iTRAK configure 96
- multiple 79
- single 78

**primary bus-sharing**

- group 97

**probability of dangerous failure per hour** 191**program**

- develop for application 87

**programmable controller** 37

**property**

- iTRAK 5700 power supply 96
- Kinetix 5700 DC-bus power supply 93
- mover axis 113
- section axis 112

**Protected Mode** 88**R****rail alignment tool**

- description 16

**rail segment**

- curve 34
- lubrication 33
- straight 33

**rail straightening bar tool** 164**rail system**

- clean 139
- description 14

**rectangle track**

- install 61
- mounting plate dimension 70

**reference mover**

- decreasing position 105
- increasing position 105

**remote access** 85**remove power** 43**replace**

- connector module 180
- curve motor module 150
- curve segment of middle rail 177
- curve segment of top or bottom rail 168
- infield cover 181
- lubricant cartridge 182
- lubrication segment of a top or bottom rail 162
- lubrication segment of middle rail 173
- mover 144
- mover cam-follower wheel 153
- mover cam-follower wheel flexure 153
- mover motor magnet 143
- mover position magnet 141
- straight motor module 147
- straight segment of middle rail 174
- straight segment of top or bottom rail 164

**risk assessment** 41**RSLinx**

- communication path 223

**S****safe stop**

- troubleshoot 214

**safe torque off**

- assembly tag 197
- behavior 198
- bypass 203
- bypass warning 206
- bypass warning icon 206
- function 194
- mode 198
- safety considerations 198
- specification 196
- state reset 196

**safety** 41

- action 136
- application requirement 190
- configure integrated safety motor module 215
- guidelines 43
- handling 50
- machine guarding 41
- magnet handling 47
- monitor network 209
- risk assessment 41
- supervisor state 208, 209
- Timed SS1 stopping function 199

**safety category** 103

- motor module property 103

**safety connection** 212

- input assembly tag 212
- output assembly tag 212

**Safety Integrity Level (SIL)** 190**safety motor module**

- always automatically configure 216
- no safety signature automatically configure 215

**secondary bus-sharing**

- group 97

**section axis**

- actions category 112
- parameter 113
- property 112

**security** 85

- CIP Security 48

**sequence number**

- diagram 51

**shock hazard** 44**software**

- overtravel detection 128
- Studio 5000 Logix Designer application 90

**standard action** 135**stand-up mounting** 12**star topology** 40**static IP address configuration** 82**status indicator**

- DC power status 131
- link network status 131
- link speed status 131
- motor module 130
- network and module status 130
- network status 129

**stop**

- category 0 201

**stopping action** 135

- configure 135

**stopping function** 199**storage** 48**straight motor module**

- replace 147

**straight motor module 100 mm (3.94 in.)**

- description 24

**straight motor module 50 mm (1.97 in.)**

- description 23

**straight rail segment** 33**straight segment of middle rail**

- replace 174

**straight segment of top or bottom rail**

- replace 164

**Studio 5000 environment**

description 15

**Studio 5000 Logix Designer 87**

application 90

exception action 134

**Studio 5000 Logix Designer application 87****subframe 53**

application 53

mounting 53

**system**

commission 122

**system power**

apply 117

connect 78, 80

current requirement 77

remove 43

**T****time synchronization**

controller property 92

**Timed SS1 stopping function 199**

request removed 202

safety 199

**timing diagram**

request removed 202

timed SS1 201

**tool**

installation 51

**tool size**

diagram 51

**tool type**

diagram 51

**top plate**

description 14

**track**

electrically ground 70

install 49

install oval 56

install rectangle 61

integrated support frame 31

lift 55

maximum length 11

move 55

oval track mounting plate dimension 57

rectangle track mounting plate dimension  
70

unpack 52

weight 52

**track component 13****track configuration category 104**

motor module property 104

**troubleshooting**

alarm 134

axis 132

ControlFLASH software 228

controller/drive fault behavior 134

DC power status indicator 131

fault

code summary 128

fault code overview 128

general system problem 133

axis unstable 132

motor module accel/decel 132

motor module overheating 132

motor module velocity 132

no movement 132

general system problems 133

ignore 134

link network status indicator 131

link speed status indicator 131

major fault 134

minor fault 134

module status indicator 130

motor module behavior 135

mover behavior 135

network and module status indicator 130

network status indicator 129

safety action 136

standard action 135

stopping action 135

definition 135

**tune**

motor module 123

**U****undesired FLT M32 - TRACK STOP 133****unexpected FLT M33 - LOST MOVER 133****unpack 52****update**

firmware 217

**V****verify firmware update 229****vertical mounting 12****W****website**

certification 189

**weep hole 33****weight**

track 52

**wheel 36**

replace 153

spare 153

**wire**

lubrication pump 74

multiple power supply system 79

single power supply system 78







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