

# SuperTrak PHARMA8™

## Operations and Maintenance Manual

Rev. 2, August 2024

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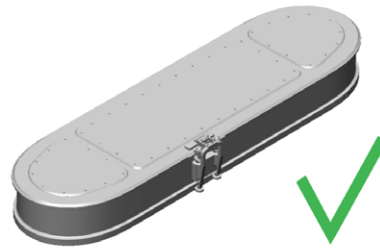
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# Operation and Maintenance Manual

SuperTrak PHARMA8™ Conveyance Platform

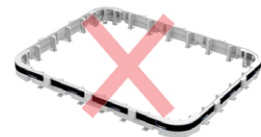
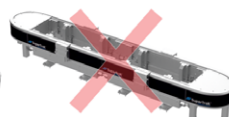
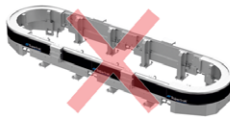
This document is for the following SuperTrak CONVEYANCE™ product:

 **SuperTrak™**  
PHARMA8



This document is **NOT** for the following SuperTrak CONVEYANCE™ products:

 **SuperTrak™**  
HORIZON10



 **SuperTrak™**  
VERTICAL10



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# SuperTrak PHARMA8™ Preface

This section provides the following SuperTrak PHARMA8™ conveyance platform documentation package information:

- *Documentation Package* on page 9
- *Official Website* on page 9
- *Style Conventions* on page 10
- *Special Notations* on page 10
- *Referenced Terms* on page 12

## Documentation Package

SuperTrak CONVEYANCE™ supplies the following documentation and software for the SuperTrak PHARMA8™ conveyance platform:

- SuperTrak PHARMA8™ Design Considerations document available at <https://supertrakconveyance.com/technical-documentation/>
- SuperTrak PHARMA8™ Operation and Maintenance Manual
- SuperTrak PHARMA8™ Component Data Sheets (available by request or coming soon at <https://supertrakconveyance.com/technical-documentation/>)
- TrakMaster™ software (with built-in help)

## Official Website

The SuperTrak website, [www.supertrakconveyance.com](http://www.supertrakconveyance.com), provides resources such as case studies, certification information, videos, and blog posts.

## Style Conventions

This document uses the following styles to indicate different types of information:

- *Italic text* indicates a document title.
- *Italic text with color* indicates hypertext reference information. For example, a web site link or a link to content within the current document.
- **Bold text** indicates a button or control that requires action during a procedure.
- `Grey Courier text` indicates on-screen messages; for example, a fault or warning message on an HMI screen.
- `Courier text` indicates software code.
- CAPITALIZED TEXT indicates an operational state; for example, ON, OFF, MANUAL mode.
- First Letter Capitalized Text indicates the name of an HMI screen, screen menu, or HMI message.
- Bulleted list indicates items where order is not relevant.
- Numbered list indicates a step-by-step procedure where order is relevant.
- A gray vertical line segment in the left margin of a page indicates a section where text or a graphic has been added or updated since the prior revision of this document.

## Special Notations

This document uses five (5) levels of notation:



Warns that failure to comply results in death or serious injury.



Warns that failure to comply could result in death or serious injury.



Warns that failure to comply could result in minor or moderate injury.



Warns that failure to comply may result in property damage.



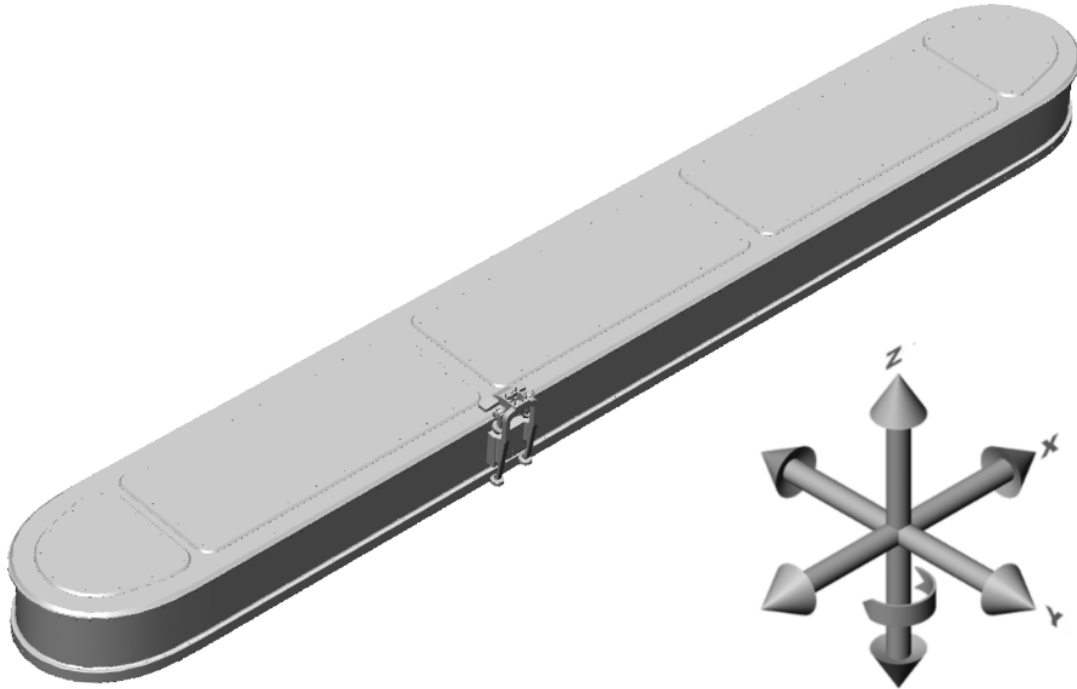
Provides additional information, emphasizes a point, or provides a tip.

## Frame of Reference



- The SuperTrak conveyance platform image is for representational purposes only. It may not reflect the system you have installed.
- The direction of travel on each axis (positive or negative) varies based on configuration.

This document describes tooling movement using the following frame of reference:



Directional statements such as “left” and “right” are based on the perspective of a user looking at the track or the section from the outside of the track.

## Referenced Terms

This section defines terms that are used throughout this document.

Term	Description
SuperTrak	Represents the SuperTrak PHARMA8™ conveyance platform.
TrakMaster	Represents the TrakMaster™ software.
Power supply	Represents the SuperTrak PHARMA8™ conveyance platform power supply.
Control panel	Represents the SuperTrak PHARMA8™ conveyance platform control panel.
Shuttle	Represents the SuperTrak PHARMA8™ conveyance platform shuttle.
Track	Refers generally to the entire track system.
User	Represents all levels of SuperTrak PHARMA8™ conveyance platform users. It includes operators, maintenance personnel, and technicians.
Operator	Represents a user with basic mechanical knowledge.
Maintenance Personnel	Represents a user with knowledge about routine cleaning, and lubrication procedures. They are expected to complete adjustments that are within validated ranges.
Technician	Represents a user that specializes in a discipline such as electrical, mechanical, or programming. They are expected to complete complex SuperTrak PHARMA8™ conveyance platform procedures; such as, replacement procedures or adjustments that are outside of validated ranges.

See [Glossary](#) on page 149 for additional definitions.

# Safety Information

This section provides the following important safety information:

- [Training](#) on page 13
- [General Safety Rules](#) on page 14
- [Personal Protective Equipment](#) on page 15
- [Hazardous Energy](#) on page 16
- [Lockout and Tagout](#) on page 19
- [Label Descriptions](#) on page 21
- [Label Locations](#) on page 24

Read this information thoroughly and completely before operating, or maintaining the SuperTrak PHARMA8™ conveyance platform.

## Training

SuperTrak PHARMA8™ conveyance platform training packages are available on request.

## General Safety Rules

### Everyone:

- Learn how automated equipment works.
- Understand the potential dangers of automated equipment before operating it.
- Energy sources must be shutdown, locked out, and tagged out before preventive maintenance, adjustment, or service.
- Understand and be aware of potential energy sources that exist in the SuperTrak PHARMA8™ conveyance platform after lockout and tagout (for example, the strong permanent magnets when shuttles are removed from the SuperTrak PHARMA8™ conveyance platform).
- Be aware that the magnetic field of the shuttles on the SuperTrak conveyance platform can be harmful to pacemaker wearers.
- Long hair must be tied up and kept away from SuperTrak PHARMA8™ conveyance platform devices to prevent entanglement.
- Do not wear loose clothing or dangling jewelry while operating or maintaining the equipment, to prevent entanglement.
- Wear the appropriate personal protective equipment (PPE) for each task.
- Stay away and do not touch any live electrical wires or circuits. Qualified technicians must wear PPE appropriate to the electrical hazard.
- Do not tamper, remove, or make safety controls ineffective.

### Operators:

- Do not remove guarding, covers, or shields. Procedures that involve removing guarding, covers or shields must only be performed by a trained, qualified technician.
- Do not operate damaged equipment. Safety and protection features are impaired in damaged equipment. Turn OFF energy sources immediately. Do not use the automated equipment until a trained, qualified technician confirms it is safe to operate.

### Technicians:

- Do not perform service work alone. Only attempt internal service or adjustments in the presence of a person capable of rendering first aid.
- Read the current SuperTrak PHARMA8™ Operation and Maintenance Manual before troubleshooting or servicing the equipment.
- Guarding, covers, or shields must not be removed, except for emergency or maintenance purposes.
- If guarding is removed, clearly communicate (for example, with signs or barriers) that the guarding is not functional.
- Guarding around moving devices that has been removed, must be replaced.

- Do not install substitute parts or make any product modifications that are not authorized by SuperTrak CONVEYANCE™ because this may introduce new hazards.
- Use insulated tools when working with electrical equipment. Make sure qualified electrical technicians wear appropriate PPE when completing live electrical work according to the hazard assessment.
- Remove electrical power before changing fuses, or use approved fuse-pullers.
- Never use jumper wires or fuse substitutes to replace fuses.
- Replace the line fuses with fuses of the same voltage, current rating, and type. Do not use repaired fuses or short-circuited fuse holders.
- Be prepared to handle electrical fires by keeping dry powder or carbon dioxide extinguishers on hand at all times.
- Verify that all fittings and connections are tight once repair work is complete.
- Do not use compressed air to clean SuperTrak PHARMA8™ conveyance platform devices. Use clean, lint-free cloths or a vacuum cleaner. Compressed air causes dirt and lubricants to become airborne and contaminate assembly products and tooling.

## Personal Protective Equipment

At a minimum, all users are recommended to wear the following personal protective equipment (PPE) when working with or around the SuperTrak PHARMA8™ conveyance platform:

- Safety glasses that meet the specific standard requirements the local jurisdiction:
  - North America - ANSI Z87.1
  - Europe - EN 166 F
- Safety shoes that meet the specific standard requirements the local jurisdiction:
  - North America - ASTM F2413
  - Europe - EN ISO 20345 S1

## Hazardous Energy

Any energy source that presents a risk of injury to a person working on equipment is considered a hazardous energy source. The SuperTrak PHARMA8<sup>™</sup> conveyance platform contains the following hazardous energy sources:

- [Electrical](#) on page 16
- [Mechanical](#) on page 17
- [Thermal Hazards](#) on page 18

To prevent accidental or unauthorized start-ups, always lockout and tagout hazardous energy before completing any service or maintenance procedures. Lockout and tagout procedures control hazardous energy supplies, making the SuperTrak PHARMA8<sup>™</sup> conveyance platform inoperable.

See [Lockout and Tagout](#) on page 19.

## Electrical



Servicing an electrical panel that is still connected to its power source may cause injury or death. Unless directed otherwise, turn the **main power disconnect switch** to the OFF position. Lock out and tag out the switch before accessing and servicing the electrical panel. Only qualified electrical technicians should perform service on the electrical panel.

See [Lockout and Tagout](#) on page 19.

The control panel contains high voltages. Electrical hazards may be present from damaged or broken wires, open electrical boxes, or open control panels.

The control panel is designed to be integrated with a main electrical panel, which includes a **main power disconnect switch**. Use the **main power disconnect switch** to turn OFF SuperTrak PHARMA8<sup>™</sup> conveyance platform power, but maintain UPS power in the control panel. Use the **SuperTrak PHARMA8<sup>™</sup> conveyance platform power disconnect switch** to isolate the SuperTrak PHARMA8<sup>™</sup> conveyance platform power and turn the UPS OFF. If an electrical hazard occurs:

1. Stop the SuperTrak PHARMA8<sup>™</sup> conveyance platform.
2. Turn the **main power disconnect switch** to the OFF position.
3. Turn the **SuperTrak PHARMA8<sup>™</sup> conveyance platform power disconnect switch** to the OFF position.
4. Allow stored energy of the UPS to discharge until the LED indicator of the UPS is not illuminated.

Do not turn ON power to the SuperTrak conveyance platform until an electrical technician has corrected the situation.

See [Energy Controls](#) on page 44.



## Mechanical

### WARNING

Servicing mechanical components or devices while still connected to energy sources may cause injury. As required for access and service of the mechanical component, open the safety circuit or turn the **main power disconnect switch** to the OFF position and lock out and tag out the **main power disconnect switch**. Only qualified technicians should access mechanical components or devices.

Understand and be aware of stored energy sources (for example; stored electrical energy, or strong magnetic field) that exist in the SuperTrak PHARMA8™ conveyance platform after lockout and tagout.

See [Lockout and Tagout](#) on page 19.

### CAUTION

- The magnetic field generated by the shuttles can be harmful to pacemaker wearers. Maintain a minimum distance of 31 cm (12 in.) between the shuttle and the implant location. The permanent magnets in the shuttles have a strong magnetic field. When the shuttles are installed on the SuperTrak PHARMA8™ conveyance platform, the magnetic field around the shuttle is low. When a shuttle is removed from the SuperTrak PHARMA8™ conveyance platform, the permanent magnets are exposed and the magnetic field is very strong.
- Always install a keeper plate on the shuttle magnet when a shuttle is removed from the SuperTrak PHARMA8™ conveyance platform to reduce the magnetic field to a safe level.
- The magnetic field of the SuperTrak PHARMA8™ conveyance platform may induce magnetic materials into motion, creating potential projectiles or pinch points. Various electronic equipment and magnetic data carriers can also be affected by magnetic fields.

The SuperTrak PHARMA8™ conveyance platform has mechanical hazards from moving tooling components or devices. Crushing, pinching, and impact injuries can result from devices actuated by potential or kinetic energy in the form of rotational, linear force, or gravity.

The magnetic field generated by the shuttles can be harmful to pacemaker wearers. Maintain a minimum distance of 31 cm (12 in.) between the shuttle and the implant location. The permanent magnets in the shuttles have a strong magnetic field. When the shuttles are installed on the SuperTrak PHARMA8™ conveyance platform, the magnetic field around the shuttle is low. When a shuttle is removed from the SuperTrak PHARMA8™ conveyance platform, the permanent magnets are exposed and the magnetic field is very strong.

The magnetic field of the SuperTrak PHARMA8™ conveyance platform may induce magnetic materials into motion, creating potential projectiles or pinch points. Various electronic equipment and magnetic data carriers can also be affected by magnetic fields.

In the event of a mechanical hazard, turn the **main power disconnect switch** to the OFF position. Do not turn ON power to the SuperTrak PHARMA8™ conveyance platform until a qualified technician has corrected the situation.

## Thermal Hazards

**WARNING**

Allow adequate time for hot surfaces to cool before commencing work. Wear the appropriate PPE when working on or near the thermal hazard.  
Use a non-contact thermometer to verify the temperature.

**NOTICE**

The lifespan of some SuperTrak components may be compromised when temperature-related TrakMaster configuration parameters are adjusted from the default value.

For optimum lifespan of SuperTrak conveyance platform components, do not increase the default value of the electronics temperature configuration parameter, and use caution when increasing the coil temperature configuration parameter:

- Coil Temperature Limit (°C); default=60, hard limit=90.
- Electronics Temperature Limit (°C); default=60, hard limit=70.

The SuperTrak PHARMA8™ conveyance platform may include thermal hazards if temperature-related TrakMaster configuration parameters are adjusted from the default value.

Thermal hazards include any excessively hot or cold point of contact. Thermal hazards can cause contact injuries to exposed skin, or create a fire hazard. Use shielding to avoid contact burns. Dissipate thermal to make sure the point of contact is at a moderate temperature before working near it.

See [Access the TrakMaster Built-in Help](#) on page 72 to access the TrakMaster built-in help for more information about configuration parameters.

## Lockout and Tagout



Understand and be aware of stored energy sources (for example; uninterrupted power supply (UPS) energy, or magnetism) that exist in the SuperTrak PHARMA8™ conveyance platform after lockout and tagout.

See [Hazardous Energy](#) on page 16.



This lockout and tagout information is provided for reference only. Follow the lockout and tagout procedures listed below or use an applicable lockout tagout procedure that complies with local requirements.

Lockout and tagout neutralizes all sources of SuperTrak PHARMA8™ conveyance platform energy, making it inoperable and preventing accidental or unauthorized energizing of the SuperTrak PHARMA8™ conveyance platform. Follow an approved lockout and tagout procedure before maintenance or service, or where unexpected SuperTrak PHARMA8™ conveyance platform startup or the release of stored energy may cause injury.

## Lock Prerequisites

An acceptable lock should:

- Be provided by an employer. Ensure standardization (size, shape and color) and purchase from a reputable manufacturer.
- Be able to withstand heat, cold, and humidity.
- Be strong enough that it cannot be removed with heavy force.
- Not be a combination lock.
- Have only one (1) key and are not able to be opened using any other key.

## Tag Prerequisites



A tag must never be used as a substitute for a lock. A tag is a visual warning that does not provide physical protection.

A good tag should:

- Have a clear warning.
- Be easy to read (that is; legible and understandable).
- Have the identification mark of the person who applied it.
- Be secure enough to prevent accidental removal, and durable enough to withstand extreme temperatures, fumes, and caustic chemicals.
- Be secured with something similar to a nylon cable tie that is self-locking, can be attached by hand, can resist release with less than 23 kgs (50 lbs) of pressure, and cannot be reused.

## Lockout and Tagout Locations

The control panel is designed to be integrated with a main electrical panel that includes a main power disconnect switch.

To lock out SuperTrak PHARMA8™ conveyance platform hazardous energy, complete one (1) of the following:

- Lockout and tagout the **main power disconnect switch** when the SuperTrak PHARMA8™ conveyance platform power must be OFF, but the SuperTrak PHARMA8™ conveyance platform UPS power can be ON.
- Lockout and tagout the **main power disconnect switch** and the **SuperTrak PHARMA8™ conveyance platform power disconnect switch** when SuperTrak PHARMA8™ conveyance platform power and UPS power must be OFF.

See [SuperTrak PHARMA8™ Conveyance Platform Power Disconnect Switch](#) on page 44, [SuperTrak PHARMA8™ Conveyance Platform Power ON Behavior](#) on page 68, and [SuperTrak PHARMA8™ Conveyance Platform Power OFF Behavior](#) on page 69.

## Label Descriptions


Labels are applied throughout the SuperTrak PHARMA8™ conveyance platform to warn users of possible or certain hazards. Read this section carefully and comply with the required actions, warnings, or prohibitions.

### Identification Label



An electrical nameplate is located on the door of the control panel. It specifies the SuperTrak PHARMA8™ conveyance platform power requirements and provides the electrical drawing reference number (25202161).

Maintain correct SuperTrak PHARMA8™ conveyance platform power requirements. If power levels fall below or rise above the requirements specified on the identification label, the SuperTrak PHARMA8™ conveyance platform will not work properly and damage may occur.

### Marking Labels



Label	Label Name	Description
	Ground	This label is affixed next to grounded connections. The grounding conductor is the current path that enables protective devices, such as circuit breakers and fuses to operate when a fault occurs.

### Mandatory Action Labels

Label	Label Name	Description
	Read and Understand the Manual	Users should read the Operation and Maintenance Manual before operating the SuperTrak PHARMA8™ conveyance platform. Technicians should read and understand the Operation and Maintenance Manual before conducting any work or service in the referenced area. Personal injury may occur if the label warning is not observed. Label number: 6017X-ISO.
	Mandatory Lockout and Tagout	Personal injury may occur if the label warning is not observed. See <a href="#">Lockout and Tagout</a> on page 19. Label number: 6013X-ISO.

## Other Labels

Label	Label Name	Description
<p><b>⚠ DANGER</b></p> <p>Arc flash and shock hazard. Follow ALL requirements in NFPA 70E for safe work practices and for Personal Protective Equipment.</p> <p><b>⚠ DANGER</b></p> <p>Risque de coup d'arc et de décharge électrique. Observer TOUTES les exigences de la norme NFPA 70E concernant les pratiques de travail sécuritaires et l'équipement de protection personnelle.</p> <p><b>⚠ GEFAHR</b></p> <p>Gefahr einer Bogenfunkenbildung oder eines elektrischen Schlags! ALLEN Anforderungen in NFPA 70E in Bezug auf sichere Arbeitspraktiken und persönliche Schutzausrüstung Folge leisten.</p>	Danger - Arc Flash and Shock	This label warns users of arc flash and shock hazard. Follow ALL requirements in NFPA 70E for safe work practices and for Personal Protective Equipment. Label number: C459-53.
<p><b>⚠ WARNING</b></p> <p>UPS VOLTAGE PRESENT WHEN POWER IS OFF. Contact may cause electric shock or burn. Turn off and lock out UPS output power before servicing.</p> <p><b>⚠ AVERTISSEMENT</b></p> <p>TENSION D'ONDULEUR PRÉSENTE LORSQUE L'ALIMENTATION EST COUPÉE. Le contact peut provoquer un choc électrique ou une brûlure. Sectionner et verrouiller la sortie électrique de l'onduleur avant toute intervention.</p> <p><b>⚠ WARNUNG</b></p> <p>Auch bei ausgeschalteten Hauptschalter unter Spannung. Bei Kontakt elektrischer Schock oder Verbrennungen möglich. Ausschalten und Abstecken der Spannungszufuhr bevor Service durchgeführt wird.</p>	Warning - UPS Voltage Present	This label warns users that UPS voltage is present when power is OFF. Contact may cause electric shock or burn. Turn OFF and lock out UPS output power before servicing. Label number: C459-54.

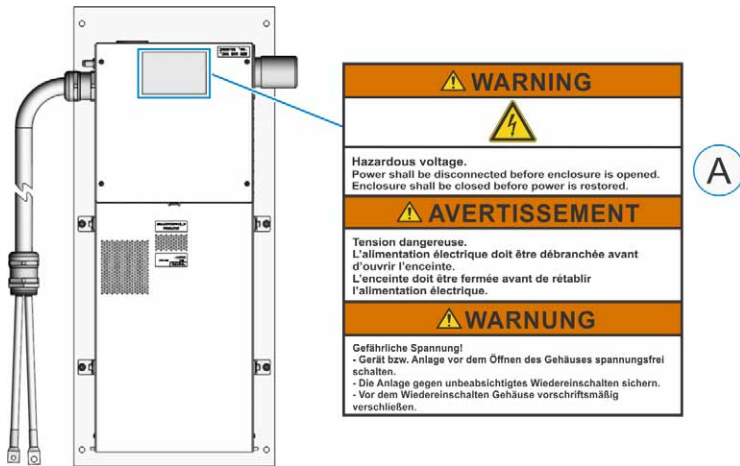
Label	Label Name	Description
 <p><b>WARNING</b></p> <p>Hazardous voltage. Power shall be disconnected before enclosure is opened. Enclosure shall be closed before power is restored.</p> <p><b>AVERTISSEMENT</b></p> <p>Tension dangereuse. L'alimentation électrique doit être débranchée avant d'ouvrir l'enceinte. L'enceinte doit être fermée avant de rétablir l'alimentation électrique.</p> <p><b>WARNUNG</b></p> <p>Gefährliche Spannung! - Gerät bzw. Anlage vor dem Öffnen des Gehäuses spannungsfrei schalten. - Die Anlage gegen unbeabsichtigtes Wiedereinschalten sichern. - Vor dem Wiedereinschalten Gehäuse vorschriftsmäßig verschließen.</p>	Warning - Hazardous Voltage	This label warns users of electrical energy. Only qualified electrical technicians should complete work in these areas. Disconnect power before opening the electrical cabinet working within. Close the electrical cabinet before turning the power ON.  Label number: C459-49.
 <p><b>CAUTION</b> <b>VORSICHT</b> <b>ATTENTION</b></p> <p>Interaction with metallic objects may produce pinch hazards. Persons with medical implants keep back 12cm (93cm)</p> <p><b>STRONG MAGNETIC FIELD</b></p> <p>Magnetische Gegenstände können beeinflusst in Bewegung versetzt werden, was zu möglichen Stürzen/Projekturen/Ausweichungen führen kann. Personen mit Herzschrittmachern/medizinischen Implantaten müssen einen Mindestabstand von 30cm einhalten.</p> <p><b>STARKES MAGNETFELD</b></p> <p>L'interaction avec les parties métalliques peuvent produire des risques de pincement. Les personnes ayant des implants médicaux Garder Retour: 30cm</p> <p><b>CHAMP MAGNÉTIQUE FORT</b></p>	Caution - Strong Magnetic Field	This label warns users of a strong magnetic field. Interaction with metallic objects may produce pinch hazards. Persons with medical implants must keep back 30 cm (12 in.).  Label number: 125309778.

## Label Locations

This section describes the location of the safety labels on the SuperTrak PHARMA8™ conveyance platform.

### Power Supply Label

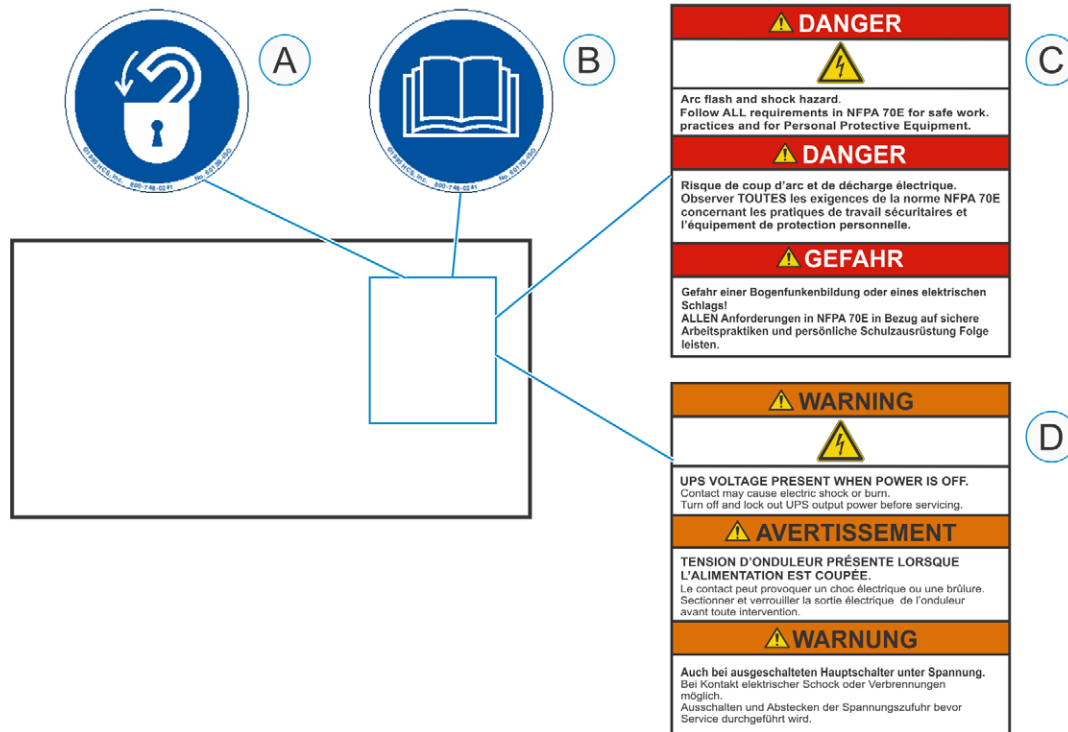
This power supply has the following label:



ID	Label	Location
A	Warning - Hazardous voltage. Label number: C459-49. See <a href="#">Other Labels</a> on page 22.	Side of each shuttle.



## Control Panel Labels



ID	Label	Location
A	Mandatory Lockout and Tagout Label number: 6013X-ISO. See <a href="#">Mandatory Action Labels</a> on page 21.	Outside door of the control panel.
B	Read and Understand the Manual Label number: 6017X-ISO. See <a href="#">Mandatory Action Labels</a> on page 21.	
C	Danger - Arc Flash and Shock Hazard Label number: C459-53. See <a href="#">Other Labels</a> on page 22.	
D	Warning - UPS Voltage Present Label number: C459-54. See <a href="#">Other Labels</a> on page 22.	

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# SuperTrak PHARMA8™ Conveyance Platform Overview

The SuperTrak PHARMA8™ conveyance platform is a high-speed shuttle transport system. It allows the direction, acceleration, speed, and position of each shuttle to be individually programmed. Integrated collision avoidance eliminates shuttle-to-shuttle contact and provides auto-queuing at process stations.

This section provides the following overview information about the conveyance platform:

- [Features](#) on page 27
- [SuperTrak PHARMA8™ Conveyance Platform Configurations](#) on page 28
- [SuperTrak PHARMA8™ Conveyance Platform Components](#) on page 29

## Features

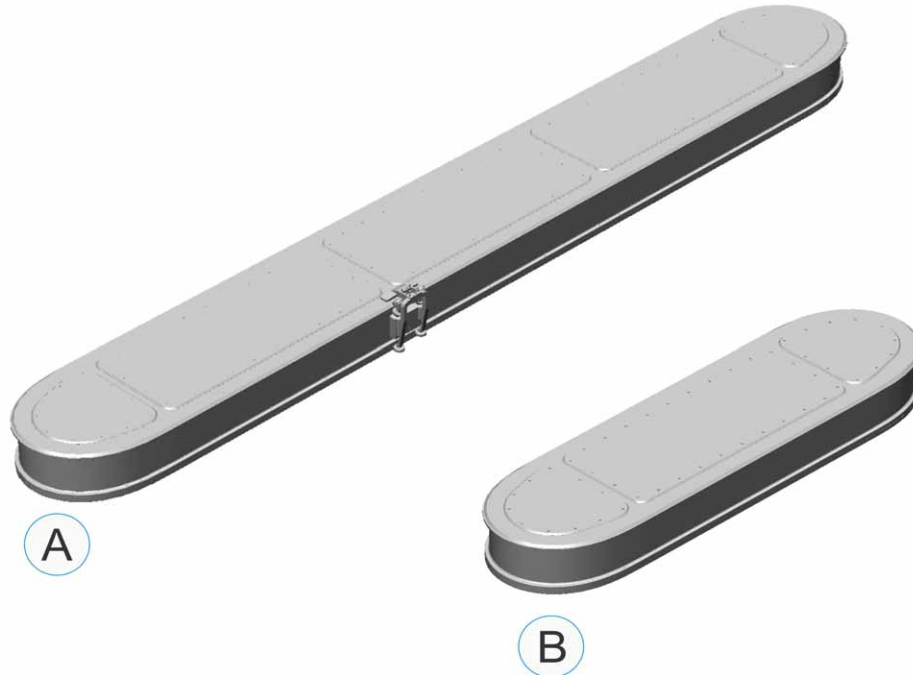
Some features of the SuperTrak PHARMA8™ conveyance platform include:

- Integration flexibility: works with any programmable logic controller (PLC)
- Fast indexing: maximum speed of 2.5 m/s (8.2 ft./s)
- Precision shuttle control: stop repeatability of  $\pm 0.01$  mm (0.00039 in.)
- High payload: each shuttle can hold 8.5 kg (18.7 lb)
- Scalable: modular system provides design flexibility
- Sealed system: Suitable for ISO 5, ISO 14644.1 & EU GMP Annex 1 Grade A
- Low maintenance: has few moving parts

See [System Specifications](#) on page 103 for a complete list of SuperTrak PHARMA8™ conveyance platform specifications.

## SuperTrak PHARMA8™ Conveyance Platform Configurations

The standard SuperTrak PHARMA8™ conveyance platform is available in modular sections to allow for various SuperTrak PHARMA8™ conveyance platform lengths.



*Pictured above: Examples of PHARMA8 system lengths:*

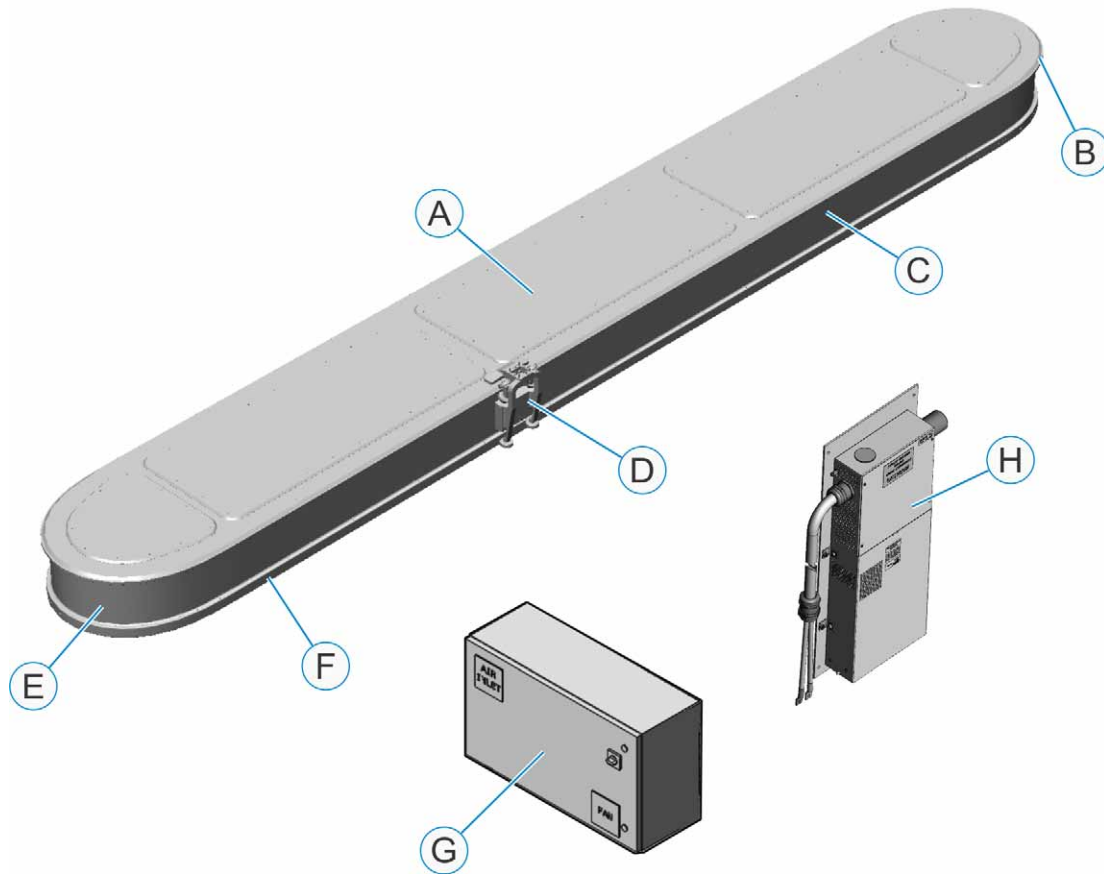
- *A: PHARMA8 three-meter system (part number PHARMA-3)*
- *B: PHARMA8 one-meter system (part number PHARMA-1)*

The SuperTrak PHARMA8™ conveyance platform is designed to be mounted horizontally.

# SuperTrak PHARMA8™ Conveyance Platform Components

SuperTrak PHARMA8™ conveyance platform components are configured based on the required application. This illustration shows the components in a typical SuperTrak PHARMA8™ conveyance platform.

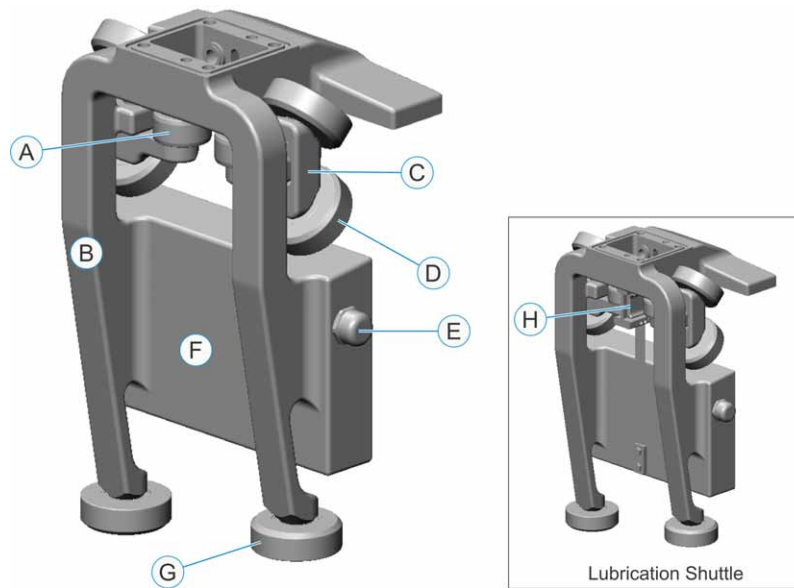
*Note: components pictured below are not to scale.*



A	Hatch (top cover access to each segment's motor and electronics)	E	Curved track segment
B	V-rail (may also be referred to as upper rail)	F	Flat rail
C	Straight track segment(s)	G	Control panel See <a href="#">Control Panel</a> on page 32.
D	Shuttle (may also be referred to as a "pallet") See <a href="#">Shuttle</a> on page 30.	H	Power supply See <a href="#">Power Supply</a> on page 34.

## Shuttle

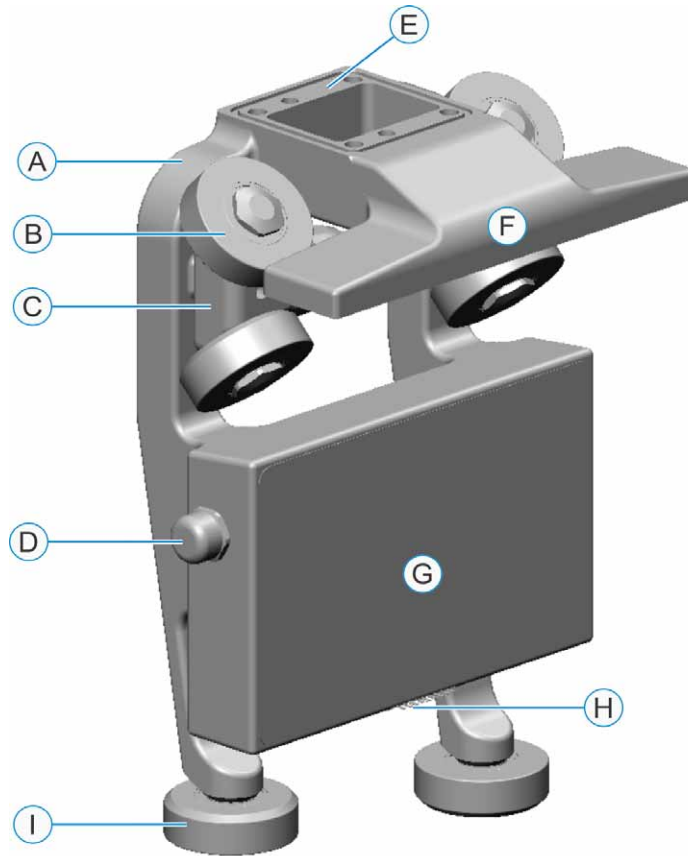
The shuttle provides a transport platform for carrying production parts along a SuperTrak PHARMA8™ conveyance platform. A shuttle may also be referred to as a “pallet.”



### Shuttle - Front View

ID	Component Name	Description
A	Bogie wheel (1 of 2)	Travels on the center of the V-rail of the track
B	Shuttle body	The structural frame of the shuttle
C	Bogie yoke (1 of 2)	Pivoting bracket that holds the bogie wheel and upper flat wheels against the V-rail
D	Upper flat wheels (1 of 4)	Travels on the V-rail at the top of the track
E	Bumper (1 of 2)	Provides cushion to the shuttle when shuttles are manually moved.
F	Magnet enclosure	Houses the magnets
G	Lower flat wheel (1 of 2)	Travels on the flat rail at the bottom of the track
H	Lubricator mount, dry lube block, leaf spring and pin (on lubrication shuttle only)	Contains the spring-loaded dry lube block that lubricates the V-rail. In most cases, only one shuttle on the track will be a lubrication shuttle. The lubrication shuttle is identical to other shuttles with the exception of the additional lubrication components.

**Shuttle - Back View**



ID	Component Name	Description
A	Shuttle body	The structural frame of the shuttle
B	Upper flat wheel (1 of 4)	Travels on the V-rail at the top of the track
C	Bogie yoke (1 of 2)	Pivoting bracket that holds the bogie wheel (hidden in this view) and upper flat wheels against the V-rail
D	Bumper (1 of 2)	Provides cushion to the shuttle when shuttles are manually moved
E	Tooling plate area	Location where optional tooling plates can be attached
F	Shuttle encoder strip assembly	Contains the encoder strip
G	Magnet enclosure	Houses the magnets. A separate keeper plate may be attached to the enclosure by magnetic force when the shuttle is not on the track.
H	Anti-static brush	Dissipates static that is created during shuttle motion
I	Lower flat wheel (1 of 2)	Travels on the flat rail at the bottom of the track

## Control Panel



Servicing an electrical panel that is still connected to its power source may cause injury or death. Unless directed otherwise, turn the main power disconnect switch to the OFF position. Lockout and tagout the switch before accessing and servicing the electrical panel. Only qualified electrical technicians should perform service on the electrical panel.

See [Hazardous Energy](#) on page 16 and [Lockout and Tagout](#) on page 19.

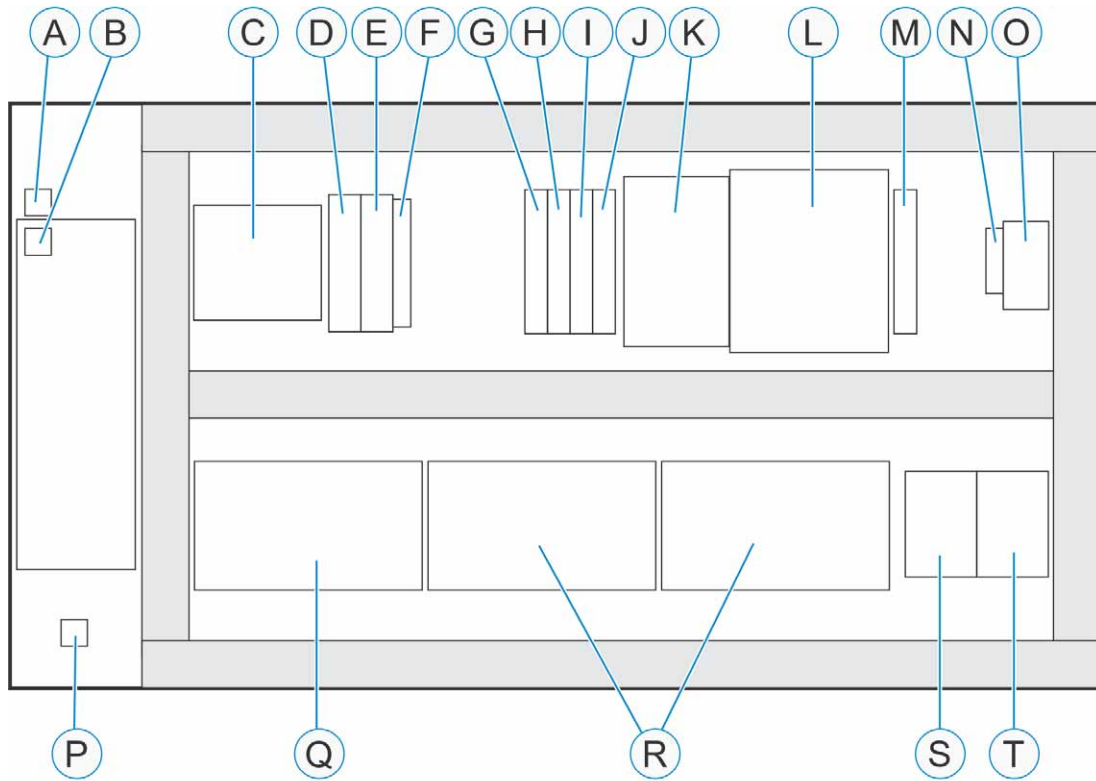


If an ATS control panel is not used, a line filter is required (for example, a Schaffner "FN 3256H-XX").

The control panel provides power to the SuperTrak PHARMA8™ conveyance platform only. It is designed to be integrated with a main electrical panel, and requires a protective earth-ground connection from the main electrical enclosure.

*Diagram on following page.*





A	Ground	K	24V digital power supply
B	Controller - TrakMaster EtherNet connection	L	Uninterrupted power supply (UPS)
C	Terminals	M	10A breaker - 24V digital power supply
D	PLC connection (EtherNet/IP, EtherCAT, or PROFINET)	N	UPS disconnect <sup>a</sup>
E	Bus controller (POWERLINK)	O	SuperTrak PHARMA8™ conveyance platform power disconnect switch (3 phase) <sup>b</sup>
F	Power supply module	P	Single-point earth-ground connection
G	Breaker - enclosure fan	Q	Terminals
H	13A breaker - All SuperTrak PHARMA8™ conveyance platform digital power	R	Power supply breakers (space for 6 or 12 breakers)
I	6A breaker - controller	S	Safety contactor #1
J	2A breaker - I/O bus coupler	T	Safety contactor #2

a.Disconnects the 24V digital battery power

b.Disconnects the AC power to the SuperTrak PHARMA8™ conveyance platform.

## Power Supply



**WARNING**

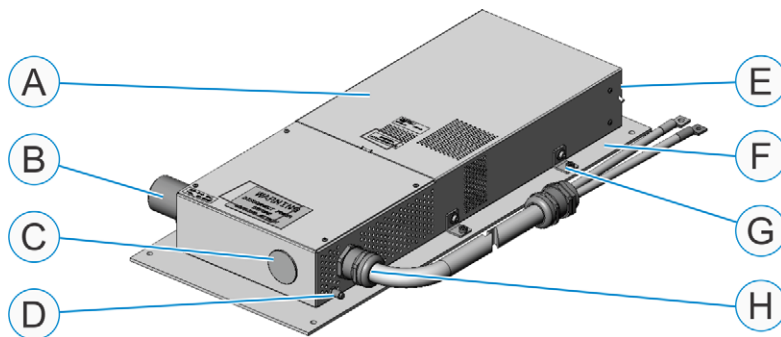
Servicing an electrical panel that is still connected to its power source may cause injury or death. Unless directed otherwise, turn the main power disconnect switch to the OFF position. Lockout and tagout the switch before accessing and servicing the electrical panel. Only qualified electrical technicians should perform service on the electrical panel.

See [Hazardous Energy](#) on page 16 and [Lockout and Tagout](#) on page 19.

The power supply is an AC to DC power supply that provides 28VDC to the SuperTrak PHARMA8™ conveyance platform for shuttle motion. Each power supply is wired to a control panel. Alternating-current (AC) electrical power is supplied to the power supply from the control panel by a cable plug.

The required number of power supplies varies depending on the demands of the specific SuperTrak PHARMA8™ conveyance platform.

Every power supply has a label affixed to it that indicates the date it was tested and the initials of the tester. This label verifies that the power supply was inspected and tested. If this label does not exist or an unauthorized replacement power supply is used, contact SuperTrak CONVEYANCE™ for the correct power supply replacement.



A	Power supply cabinet	E	Power supply filter
B	AC power input plug	F	Power supply mounting plate
C	Alternate 28 VDC power output location	G	Power supply mounting brackets
D	Power supply OK signal	H	28 VDC power output location

# Installation

This section describes how to complete basic setup for the SuperTrak PHARMA8™ conveyance platform.

- [Prerequisites](#) on page 35
- [Mechanical Setup and Installation](#) on page 36
- [Energy Controls](#) on page 44

## Prerequisites

The following services and components are required to successfully install the SuperTrak PHARMA8™ conveyance platform:

- A non-compressing installation surface (for example; a concrete floor)
- Electrical connections to the SuperTrak PHARMA8™ conveyance platform control panel:
  - AC incoming power from the main electrical cabinet
    - North America: 208Y120+PE, 40A (or 20-30A on smaller systems)
    - Europe: 400Y230+PE, 40A (or 20-30A on smaller systems)
  - Safety circuit connection (fail safe digital 24V output to enable motor power)
  - PLC network connections (EtherNet/IP, PROFINET, or alternate)
- TrakMaster software
- Computer with Windows and network connectivity
- Ethernet cable
- Non-marring socket wrench
- Lifting equipment:
  - Two (2) lifting straps, each with a minimum lifting capacity of 100kg (220.5 lbs), for each meter of track
  - Crane or forklift
  - Two (2) M16 rotating eye bolts for each meter of track section
  - Spreader bar

## Mechanical Setup and Installation

This section provides the following information about mechanically setting up the SuperTrak PHARMA8™ conveyance platform.

- [Lift a PHARMA8™ Conveyance Platform](#) on page 36
- [Install a Shuttle](#) on page 38

### Lift a PHARMA8™ Conveyance Platform



Always use appropriate lifting devices (for example, a forklift or crane) and use safe lifting practices and procedures when lifting the track.

SuperTrak CONVEYANCE™ recommends that you obtain relevant information from your national Health and Safety Authority.

This section describes the correct lifting techniques for lifting the system.

**These instructions are based on a 1M track. A longer track will require additional eye bolts, straps, and spreader bars.**

Always use appropriate lifting devices and use safe lifting practices when moving a section. The following tools are required for this procedure:

- Two (2) M16 rotating eye bolts per meter of track.
- Two (2) lifting straps, each with a minimum lifting capacity of 100 kg (220.5 lb) (

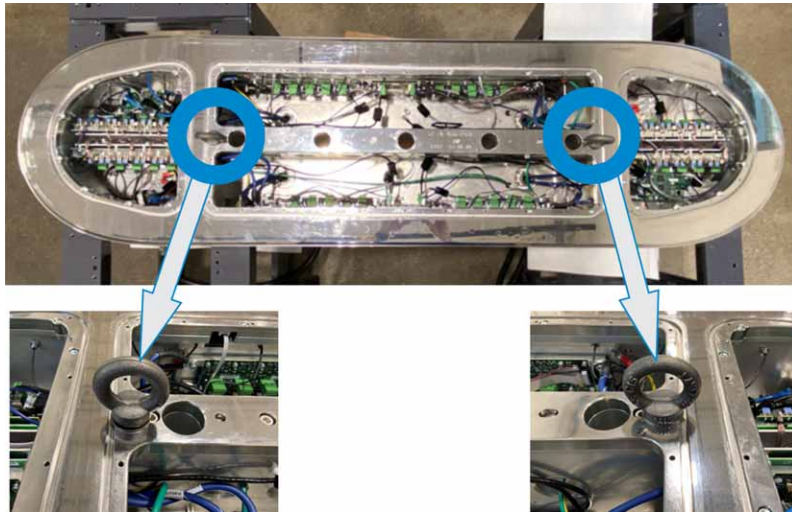


- A spreader bar
- Appropriate lifting device (for example; a forklift or crane)

To lift the PHARMA8™ track:

1. Remove the center hatch cover(s) in order to access the lifting points. See [Remove and Reinstall Hatch Covers](#) on page 103.

2. Thread each of the two rotating eye bolts to the attachment location on the internal frame as illustrated at right



3. Attach the lifting straps to the eye bolts and place a spreader bar between the straps.
4. Use a forklift or crane to raise the track.

## Install a Shuttle

### CAUTION

- The magnetic field generated by the shuttle magnets can be harmful to pacemaker wearers. Maintain a minimum distance of 31 cm (12 in.) between the shuttle and the implant location. The magnetic field may also induce magnetic materials into motion, creating potential projectiles or pinch points. Various electronic equipment and magnetic data carriers can also be affected by magnetic fields.
- Make sure the motor power is OFF when a shuttle is installed on the SuperTrak PHARMA8™ conveyance platform. The external safety circuit must turn the failsafe output to the control panel OFF when the guard doors are open, to disable the motor power.

### NOTICE

The magnetic attraction between the permanent magnets of the shuttle and the motor increases as the distance decreases. Prevent strong impact of the shuttle with the motor or damage can occur.

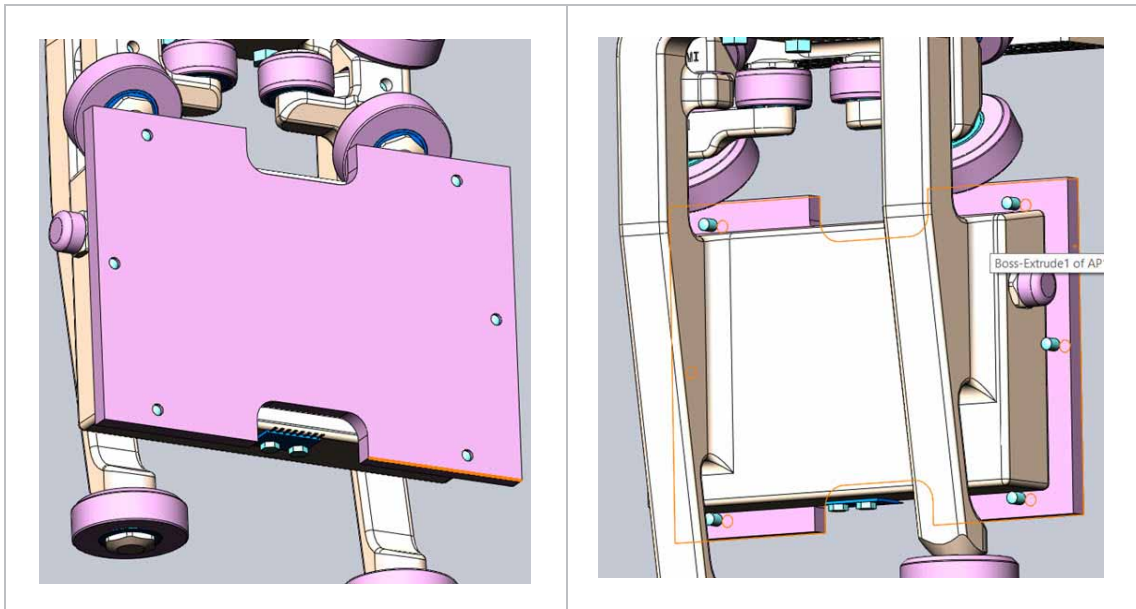
### NOTICE

Handle shuttles carefully to avoid damage to the shuttle components.

## Shuttle Accessories

### Shuttle Magnet Keeper Plate

The shuttle magnet keeper plate shields the magnetic field when the shuttle is not on the track. Whenever a shuttle is removed from the track for maintenance, the keeper plate should be re-installed.



Note that small dowels protrude towards the back of the shuttle from all sides of the keeper plate. These dowels hold the plate in place. Be sure they are positioned properly when securing the plate on the shuttle.

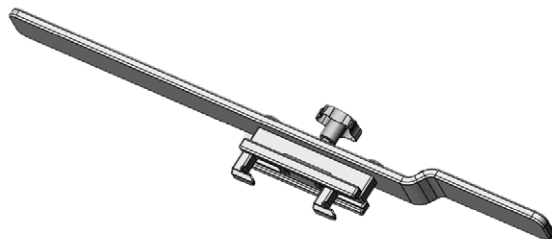
Always use care to not contact the shuttle's anti-static brush when removing or replacing the magnetic keeper plate as doing so can damage the brush.

Before placing the shuttle back on the track, the keeper plate must be removed so the magnets can work properly in concert with the track.

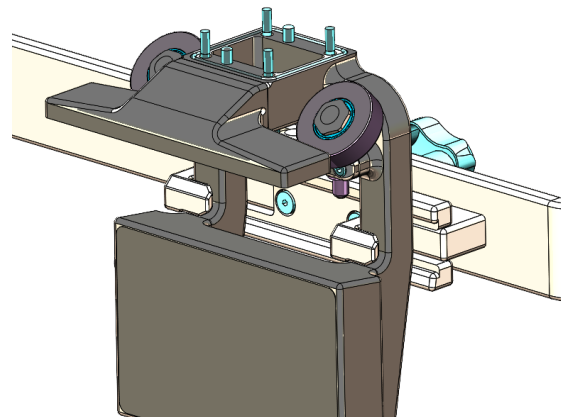
*Shuttle Removal Tool (Optional)*

To install or remove a shuttle safely and easily, use the optional Phama8™ shuttle removal tool. The shuttle removal tool allows you to install the shuttles in alignment with the track. It also is used to remove shuttles by leveraging against the magnetic force holding the shuttle in place.

The shuttle removal tool is used with two hands, but it has a longer handle on one side to provide leverage. The tool also has hooks and a torque knob to attach itself to the shuttle.



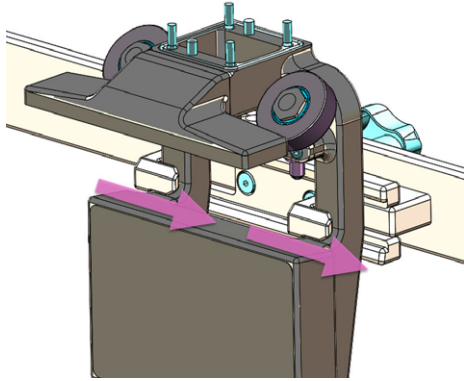
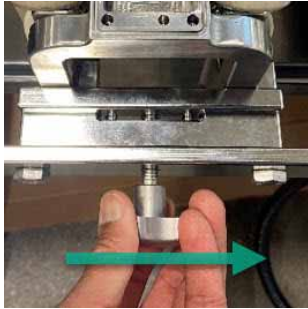
*Shuttle removal tool*




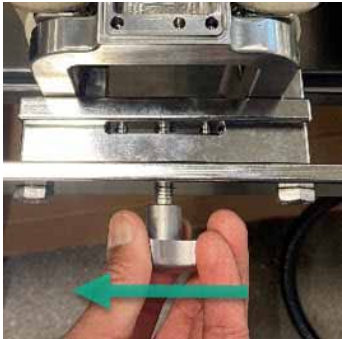
*Close-up of shuttle removal tool attached to shuttle*

### Install the Shuttle Onto the Track

SuperTrak CONVEYANCE™ recommends using the optionally purchased shuttle removal tool to remove and install shuttles.

Step	Illustration
1. Open the safety circuit.	
2. Carefully pull the protective keeper plate off the shuttle magnet assembly.	
3. Attach the shuttle removal tool to the shuttle. <ul style="list-style-type: none"> <li>a. Using both handles, carefully slide the shuttle removal tool onto the front of the shuttle from right to left, securing the hooks of the tool behind the shuttle legs and just above the magnet enclosure but below the flat wheels.</li> </ul>	
<ul style="list-style-type: none"> <li>b. Turn the center knob clockwise to tighten the removal tool against the shuttle until firmly secure without over-tightening.</li> </ul>	



Step	Illustration
<p>4. Firmly grasping both handles of the shuttle removal tool, angle the shuttle and position the left side of the encoder bracket on the V-rail. Then keeping the handle parallel with the ground, gently move the right handle towards the track to secure the shuttle against the track.</p>	
<p>5. Remove the shuttle removal tool from the shuttle by turning the center knob counterclockwise until the tool is loose.</p> <p>Then, holding both handles, slide the tool from left to right to detach its hooks from behind the shuttle body.</p>	

Repeat this process for each shuttle, and be sure that a lubrication shuttle is also installed onto the track. The lubrication shuttle will apply lubrication to the V-rail as it moves around the track.

## Controls and Connections Setup

This section provides the following information about SuperTrak PHARMA8™ conveyance platform controls, and connections:

- [TrakMaster Software](#) on page 43
- [Guarding](#) on page 43
- [Energy Controls](#) on page 44
- [Network and Communication Controls](#) on page 55
- [Internal Track Section Connection Diagrams](#) on page 62

## TrakMaster Software

### NOTICE

The lifespan of some SuperTrak components may be compromised when temperature-related TrakMaster configuration parameters are adjusted from the default value.

For optimum lifespan of SuperTrak conveyance platform components, do not increase the default value of the electronics temperature configuration parameter, and use caution when increasing the coil temperature configuration parameter:

- Coil Temperature Limit (°C); default=60, hard limit=90.
- Electronics Temperature Limit (°C); default=60, hard limit=70.

TrakMaster is a Windows-based application that monitors, configures, and is used to troubleshoot the SuperTrak PHARMA8™ conveyance platform.

## Guarding

### DANGER

Unguarded devices may cause injury or death. Do not start or operate the equipment with guard doors open. Lockout and tagout all energy sources before entering the guarding. Make sure that all guard panels are in place and guard doors are closed before operating the equipment. Never bypass a safety component.

See [Hazardous Energy](#) on page 16 and [Lockout and Tagout](#) on page 19.

Guarding is a protective housing that separates users from dangers; such as, moving devices. The guarding is comprised of a framework fitted with fixed guarding panels, and removable guarding panels.

### Fixed Guard Panels

Fixed guard panels should not be removed.

### Removable Guard Panels

Removable guard panels are available for maintenance and should only be opened by a qualified technician. A tool is required to unlock and remove a panel and to lock a panel in position. These panels are not usually equipped with a safety switch; therefore, the system should not be operated with any of these panels removed.

## Energy Controls

This section describes the energy controls on the SuperTrak PHARMA8<sup>™</sup> conveyance platform.

### SuperTrak PHARMA8<sup>™</sup> Conveyance Platform Power Disconnect Switch



#### WARNING

Servicing an electrical panel that is still connected to its power source may cause injury or death. Unless directed otherwise, turn the main power disconnect switch to the OFF position. Lock out and tag out the switch before accessing and servicing the electrical panel. Only electrical technicians should perform service on the electrical panel.

See [Hazardous Energy](#) on page 16 and [Lockout and Tagout](#) on page 19.

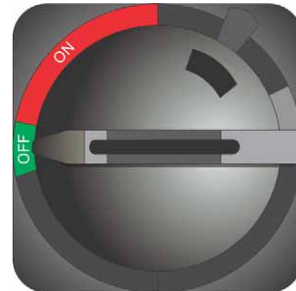


The SuperTrak PHARMA8<sup>™</sup> conveyance platform control panel is designed to be integrated with a main electrical panel, which includes a main power disconnect switch. Use the main power disconnect switch to turn OFF system power, but maintain digital (UPS) power in the control panel. Only use the SuperTrak PHARMA8<sup>™</sup> conveyance platform power disconnect switch when replacing a SuperTrak PHARMA8<sup>™</sup> conveyance platform electrical component.

The SuperTrak PHARMA8<sup>™</sup> conveyance platform power disconnect switch is located on the control panel door.

Use the SuperTrak PHARMA8<sup>™</sup> conveyance platform power disconnect switch when any electronic service or maintenance work is completed.

To isolate the SuperTrak PHARMA8<sup>™</sup> conveyance platform power, turn the SuperTrak PHARMA8<sup>™</sup> conveyance platform power disconnect switch to the OFF position. The switch is lockable in the OFF position to prevent accidental or unauthorized enabling of electrical power to the system.



See [Hazardous Energy](#) on page 16.

### Uninterruptible Power Supply

An uninterruptible power supply (UPS) is located inside the control panel.

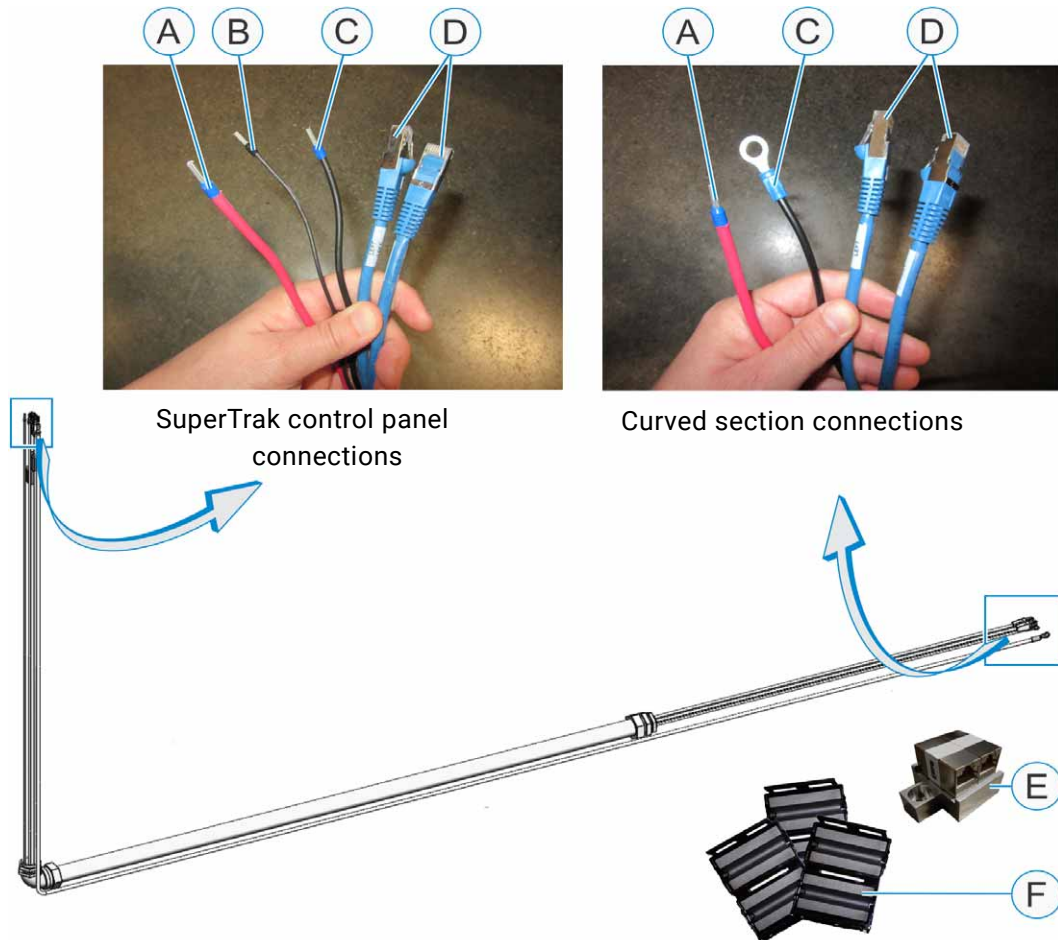
The UPS provides power to the controller and digital electronics. This maintains shuttle position information and allows network communications to continue. The UPS does not provide motor power or cause shuttle movement.

## Install an Electrical Interconnect Between a Curved Section and a SuperTrak Control Panel

**⚠ CAUTION**

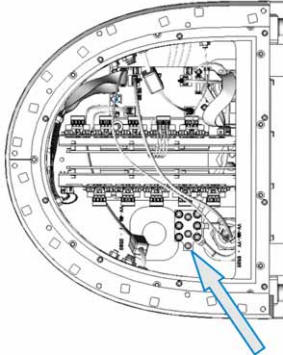


Use only ATS approved network cables for connecting the SuperTrak G3 Controller to the first section; otherwise, the system may operate incorrectly.

The electrical interconnect has four (4) wires on one end and five (5) wires on the other, it also includes a left network patch cable (not shown), an F-F coupler, and three (3) ferrites.

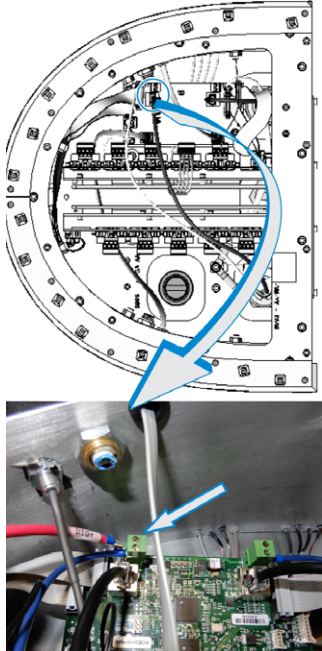




A	24VDC digital power (red or blue)	D	Ethernet cables - left and right network cables (blue)
B	Digital shield cable (black)	E	F-F coupler
C	Common connection (black or white with blue stripe)	F	Ferrite (1 of 3)


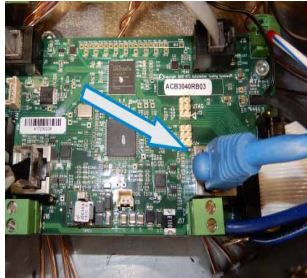
The procedure begins with connecting the end with four (4) wires to the curved section. Reference the table below for the steps.

Step	Illustration
<p>1. Install the F-F coupler: As applicable, align the coupler with the mounting screw hole. Carefully lift the wires so the F-F coupler fits below them.</p>	<p>Remove the top cover to access the mounting location.</p> 
<p>2. As applicable, secure the F-F coupler in position using a screw.</p>	
<p>3. As applicable, remove the black wire plug from the curved section:</p>	<p>The wire plug is located at the bottom.</p> 
<p>4. Feed the four (4) cables of the interconnect cable through the plug opening on the curved section.</p>	
<p>5. Secure the threaded end of the interconnect cable in the plug opening of the curved section using the supplied lock nut.</p>	

Step	Illustration
<p>6. Install a common jumper on the same section where the interconnect cable to the controller is installed. (Ensure that no other curved section have this connection completed.) This common jumper is to be installed between the section's frame/ground and the section's common bus connection point.</p>	
<p>7. As applicable, connect the common connection wire (COM) to the curved section. Remove the mounting screw, align the common connection wire with the screw hole, and then reinstall the mounting screw.</p>	<p>The connection is located near the bottom-right corner of the right coil driver board.</p>

Step	Illustration
<p>8. As applicable, connect the 24 VDC digital power wire (DIG+) to the J17 connector on the Gateway board of the curved section:</p>	<p>The connection is located on the Gateway board inside the section.</p>  <p>The illustration consists of two parts. The top part is a technical diagram of the curved section's interior, showing the Gateway board and various connectors. A blue circle highlights the J17 connector, and a blue arrow points from this circle to a photograph below. The photograph shows the physical Gateway board with a green wire connected to the J17 connector. A blue arrow in the photo points to the connection point.</p>
<p>9. As applicable, connect the two (2) Ethernet cables (left and right network cables) to the F-F coupler.</p>	<p>Connect the cables on the right side (as indicated) of the F-F coupler.</p>  <p>The photograph shows an F-F coupler with two blue Ethernet cables plugged into the right-hand ports. Two white arrows point to these ports. Other cables and components are visible in the background.</p>
<p>10. Install a ferrite onto the left network patch cable.</p>	<p>Make sure the ferrite is within 10 cm (4 in.) of the connector.</p>
<p>11. As applicable, connect the left network patch cable to the F-F coupler</p>	<p>Connect the cable opposite from the left network cable.</p>  <p>The photograph shows a blue network patch cable plugged into the left-hand port of the F-F coupler. A white arrow points to this port. The coupler is mounted on a metal surface with other cables nearby.</p>



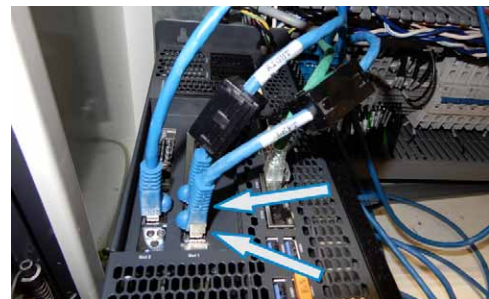
Step	Illustration
12. Verify that a ferrite exists on the end of each Gateway network cable entering the 180 deg. section from the adjoining straight section.	Make sure each ferrite is within 10 cm (4 in.) of the connector.
13. As applicable, connect the Gateway network cable from the adjoining straight section on the right to the F-F coupler:	Connect the cable opposite from the right network cable. 
14. As applicable, connect the other end of the left network patch cable	Connect the cable to the Gateway board within the 180 deg. section. 

steps for all section types continue below. . .

15. Feed the five (5) cables of the interconnect cable through the plug opening at the back of the SuperTrak control panel.
16. Secure the end of the interconnect cable in the opening of the control panel using the supplied lock nut.
17. Install a ferrite on the end of the left and right network cables.
 

Make sure each ferrite is within 10 cm (4 in.) of the connector.
18. Connect the other end of the left and right network cables to the controller in the SuperTrak control panel.
 

See [Left and Right Gateway Networks](#) on page 58.



19. Connect the common connection wire (COM) to -X2:211 in the SuperTrak control panel.

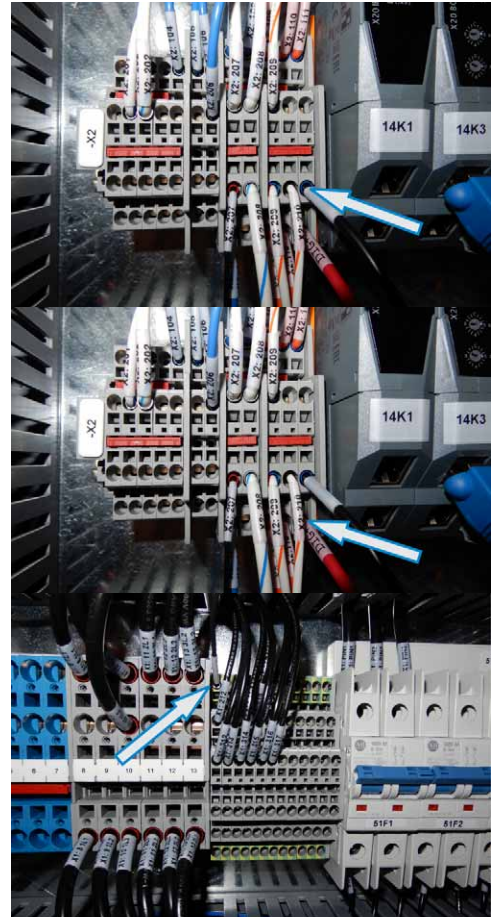
This is a black wire or a white wire with a blue stripe, depending on the system version.

20. Connect the 24VDC digital power wire (DIG+) to -X2:111 in the SuperTrak control panel.

This is a red wire or blue wire, depending on the system version.

21. Connect the digital shield wire (GND) to -X1:112 in the SuperTrak control panel.

This is a black wire.

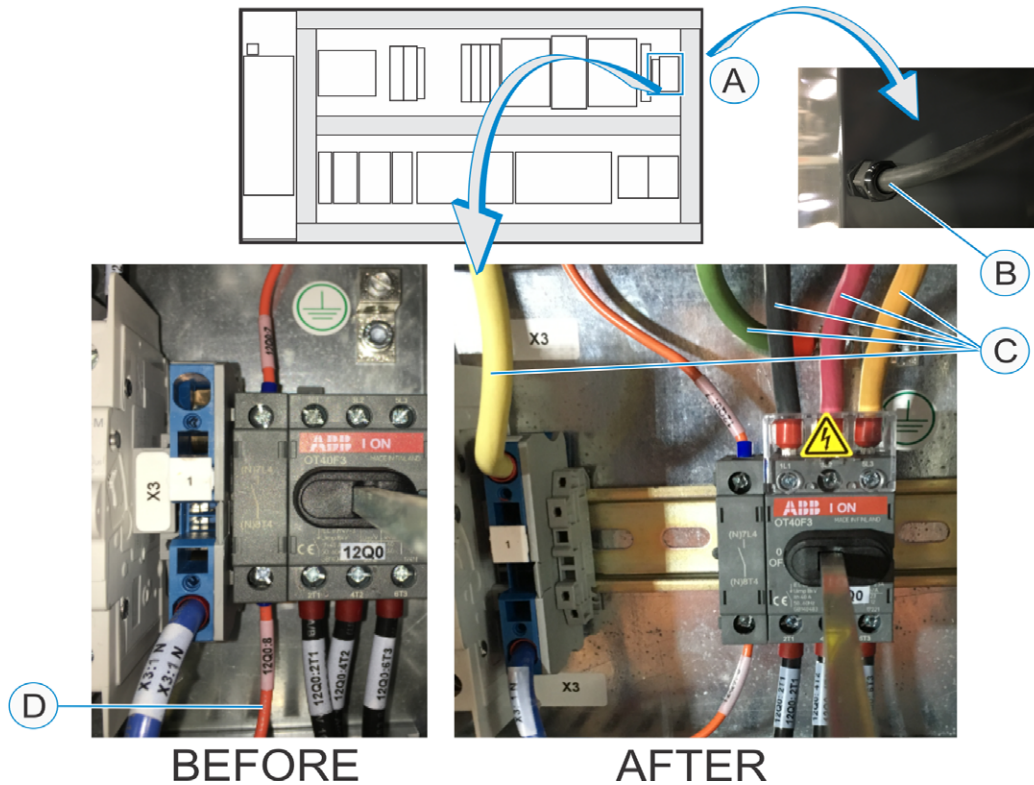


## Main Power Connection



For the power drop connection, phase orientation does not matter.

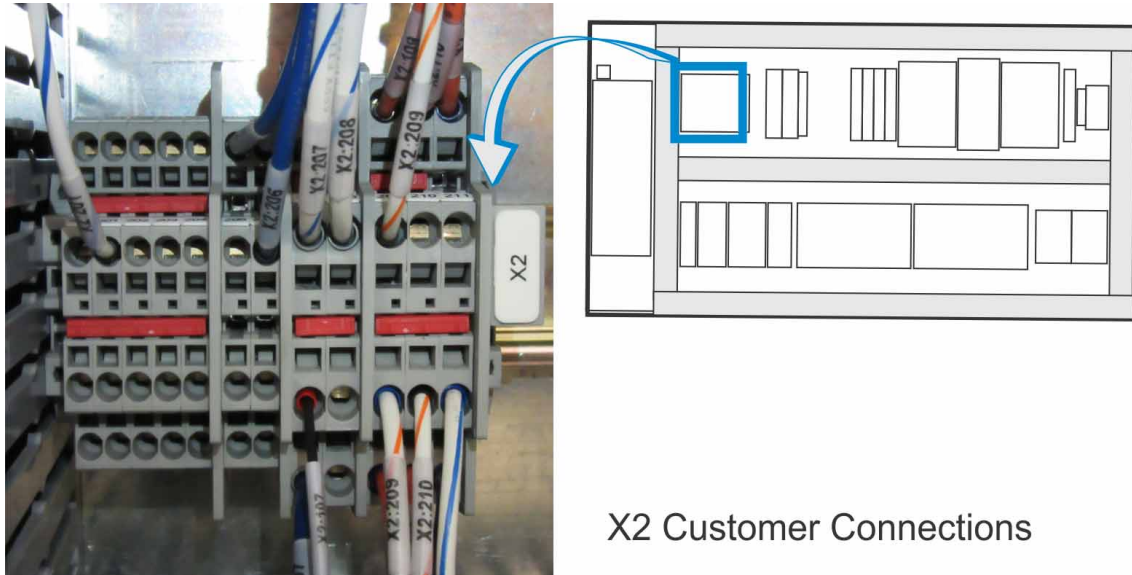
The main power cable (incoming) is wired through the back of the panel and into the main AC power disconnect connection, as illustrated:



ID	Connection Number	Connection Type	Description
A	N/A	N/A	Main power connection location.
B	N/A	Main power cable	Main power supply (incoming) port at the back of the control panel.
C	N/A	Main power connection	Main power supply (incoming) connections: <ul style="list-style-type: none"> <li>• Green - PE (ground)</li> <li>• Black, Red, Orange - Phase 1, 2, or 3 (in any order)</li> <li>• White - Neutral</li> </ul>
D	12Q0:8	UPS	UPS power goes through the auxiliary contact on the main disconnect.

### Safety Circuit Connection

The SuperTrak PHARMA8™ conveyance platform is integrated with a system safety circuit in the control panel. Wire the safety circuit as illustrated:



X2 Customer Connections

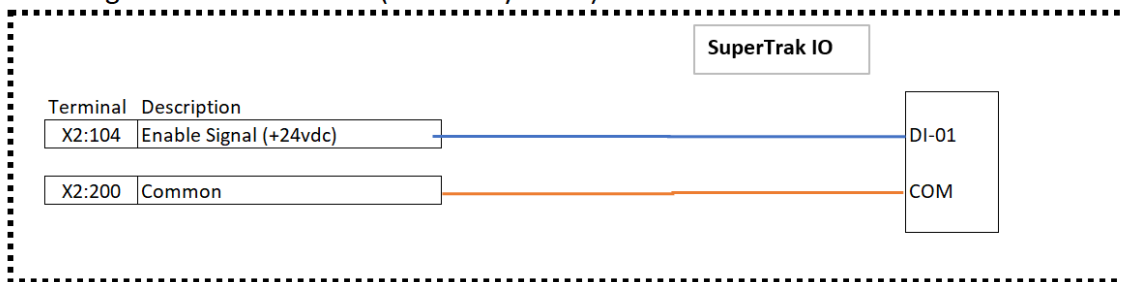
There are two levels of stop signals--immediate stop signal and delayed stop signal.

#### Immediate Stop Signal

The immediate stop signal is hard wired and does not need to be safety rated. This signal is used to bring the track to a controlled stop.

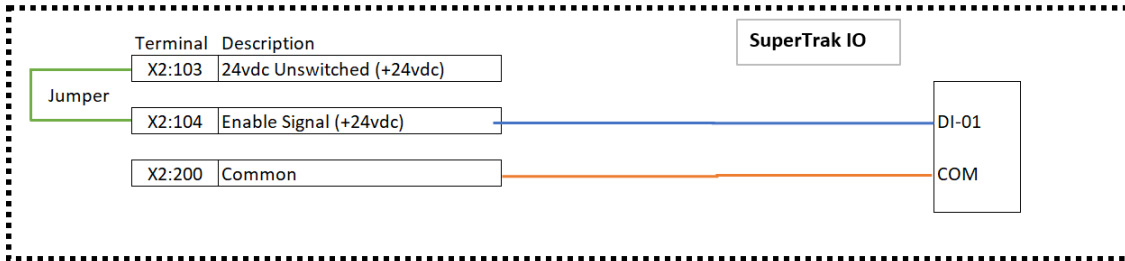
To hardwire the enable signal, connect one wire to X2:104 for the signal and one wire to X2:200 for the common, as diagrammed below.

#### Using a Hardwired Enable (not safety rated)



When not using the hardwired immediate stop signal, ensure there is a jumper between X2:103 and X2:104, as illustrated in the graphic below.

**Not Using a Hardwired Enable (no connections needed)**



In both immediate stop signal diagrams above, X2:104 corresponds to SuperTrak Digital Input 0, which is configured in TrakMaster as “Allow Section Enable” by default. See TrakMaster Help, Digital I/O Configuration for more information.

**Delayed Stop Signal**

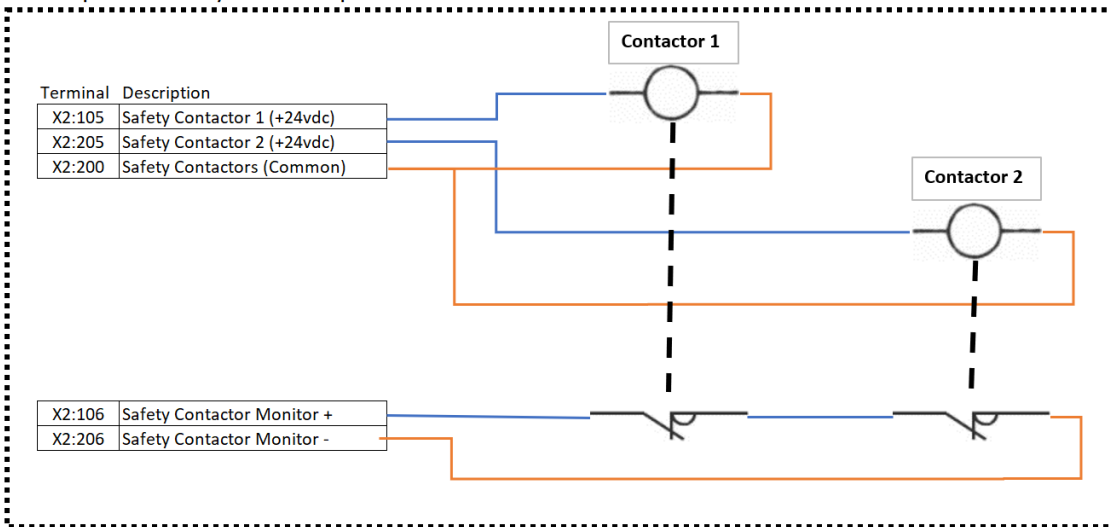
The delayed stop signal is safety rated. It removes motor power from the track.

There are two channels that complete the stopping circuit using monitoring.

- Channel 1 signal is connected to X2:105 for positive and X2:200 for common.
- Channel 2 signal is connected to X2:205 for positive and X2:200 for common.

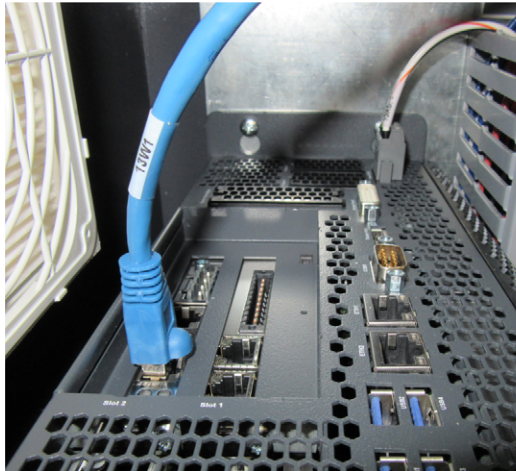
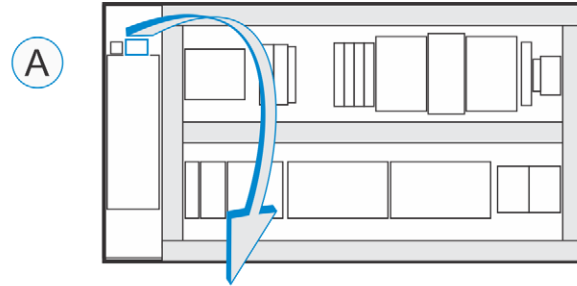
Additionally, the monitoring signal is connected to X2:106 and X2:206.

**Simplified Safety Coil Example**



### Ethernet Port Connection

The Ethernet port (ETH1) connection, located inside the control panel, provides TrakMaster software communication. Any computer (for example; a laptop or HMI) can connect to ETH1 with an Ethernet cable.

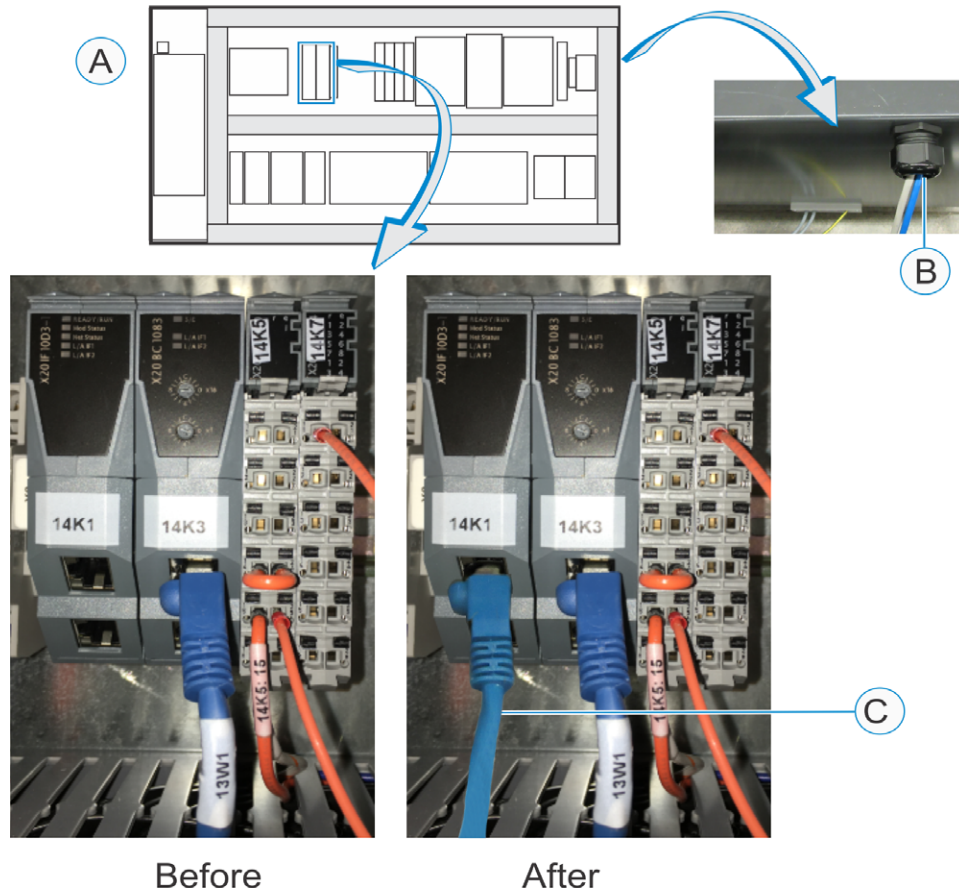


ID	Connection Number	Connection Type	Description
A	N/A	N/A	TrakMaster Ethernet port connection location.
B	ETH1	RJ45 Ethernet	Provides TrakMaster software communication.

## Network and Communication Controls

### PLC Connection

The programmable logic controller (PLC) connection is inside the control panel. An Ethernet cable is wired through the back of the panel and into the 14K1 PLC connection, as illustrated:

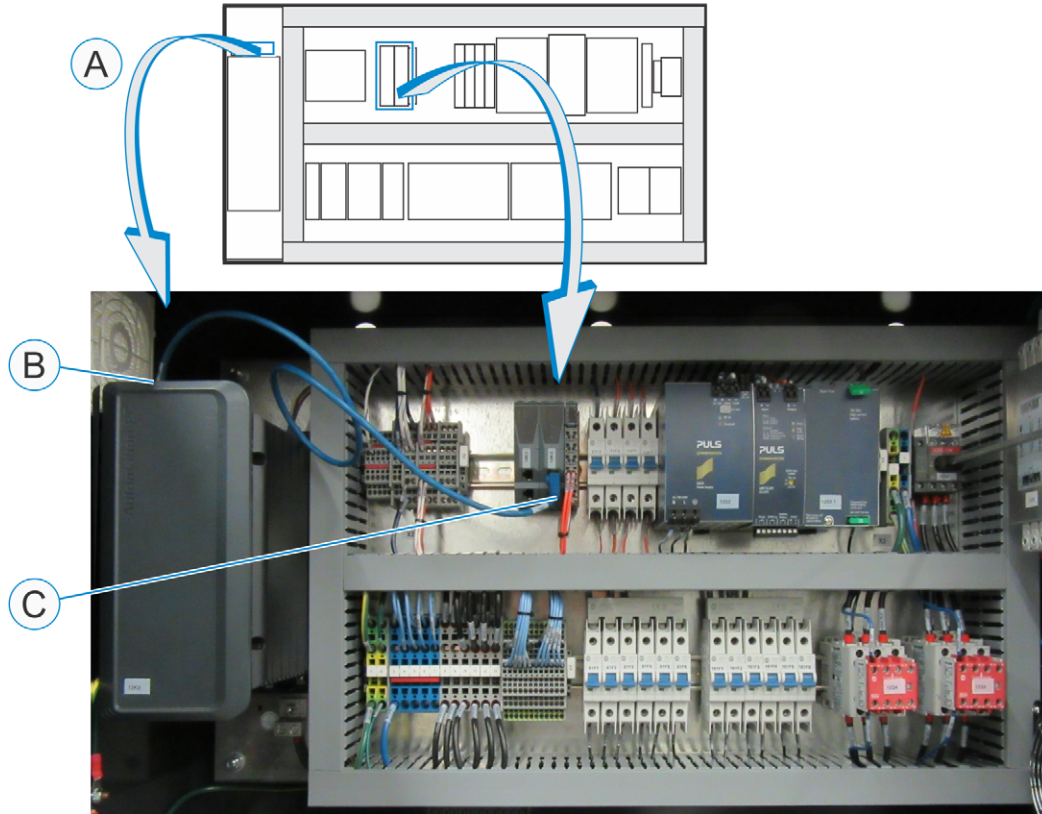


ID	Connection Number	Connection Type	Description
A	N/A	N/A	PLC connection location.
B	N/A	Ethernet cable for PLC connection	Ethernet cable (incoming) port at the back of the control panel.
C	14K1	RJ45 PLC connection	Provides the PLC connection using EtherNet/IP, PROFINET, or alternate. <sup>a</sup>

a.The electrical module is protocol-specific, and is supplied according to customer requirements.

### Ethernet POWERLINK Connection

The Ethernet POWERLINK connection exists in the control panel when it is shipped. One end of an Ethernet cable is plugged into the front port of Slot 2 on the controller, and the other end of the cable is plugged into IF1 of the bus controller, as illustrated:



ID	Connection Number	Connection Type	Description
A	N/A	N/A	Ethernet POWERLINK connection location.
B	13K0:IF1/1	RJ45 POWERLINK connection	Connects to the controller (slot 2, front port).
C	14K3:1F1	RJ45 POWERLINK connection	Connects to the bus controller (upper port).

### Gateway Network Connections

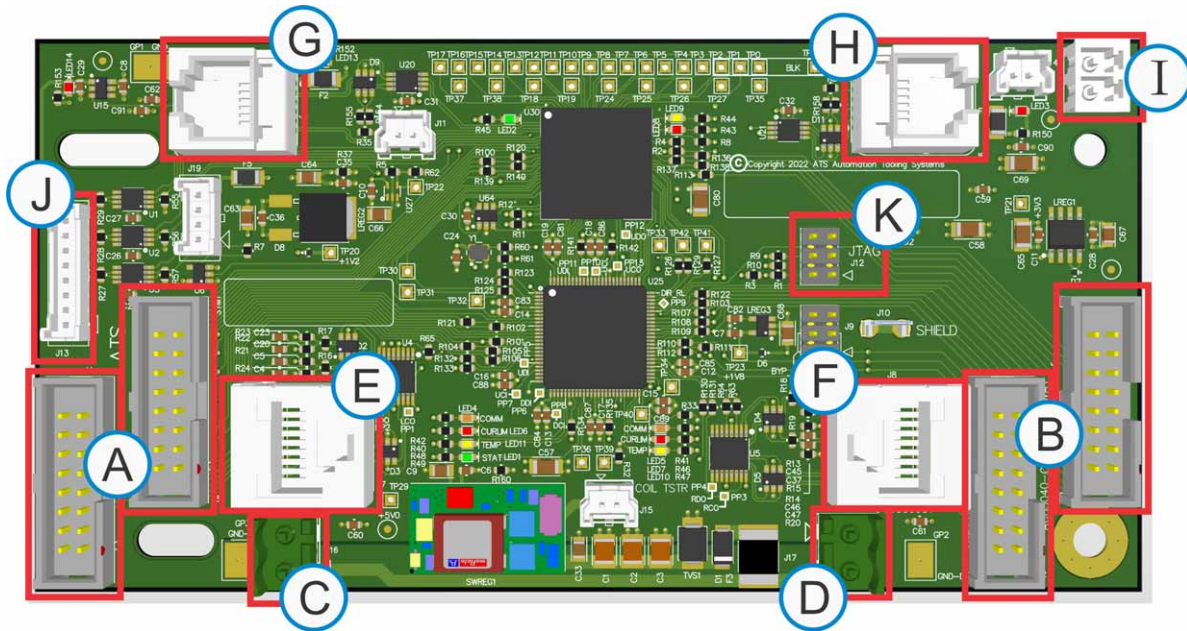
**NOTICE** Turn OFF the 24 V Gateway power, and turn OFF the controller before connecting the Gateway network.



Although the Gateway network connections are implemented using standard Ethernet cables, it is not an Ethernet network and should not be connected to Ethernet devices.



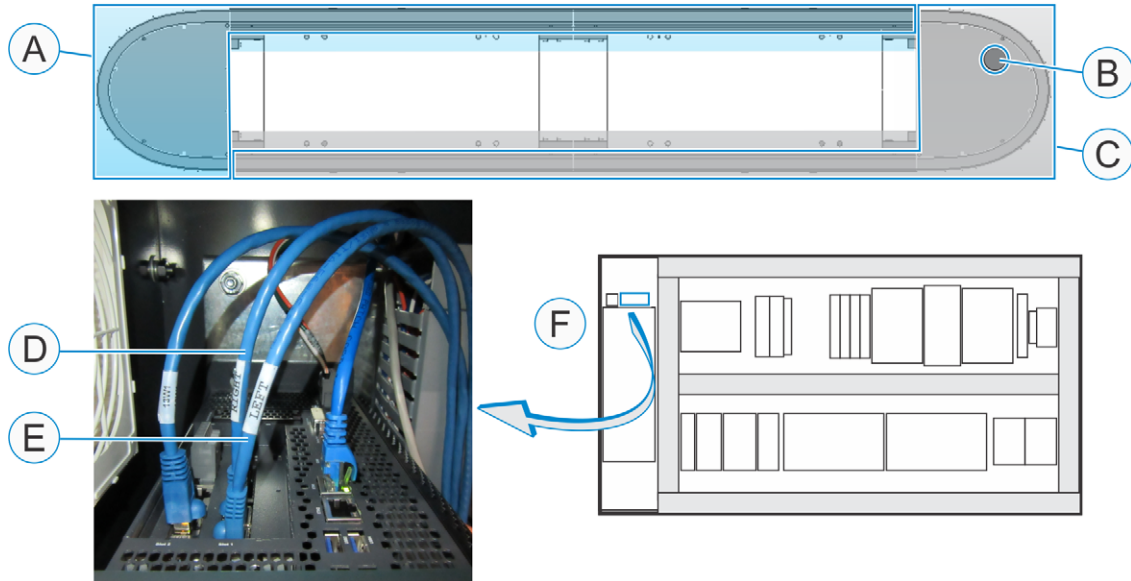
Gateway Board Layout



<b>A</b>	Left coil driver ribbon cable connections
<b>B</b>	Right coil driver ribbon cable connections
<b>C</b>	24VDC power connection (left)
<b>D</b>	24VDC power connection (right)
<b>E</b>	Left Gateway network cable port (RJ45)
<b>F</b>	Right Gateway network cable port (RJ45)
<b>G</b>	Left encoder board cable port (RJ12)
<b>H</b>	Right encoder board cable port (RJ12)
<b>I</b>	24VDC COMMON connection
<b>J</b>	IR tag reader connection
<b>K</b>	JTAG programming port

Left and Right Gateway Networks

The SuperTrak PHARMA8™ conveyance platform is divided into two (2) networks: the left network, and the right network. Each network begins with a cable that is routed through the control panel electrical interconnect to the controller.



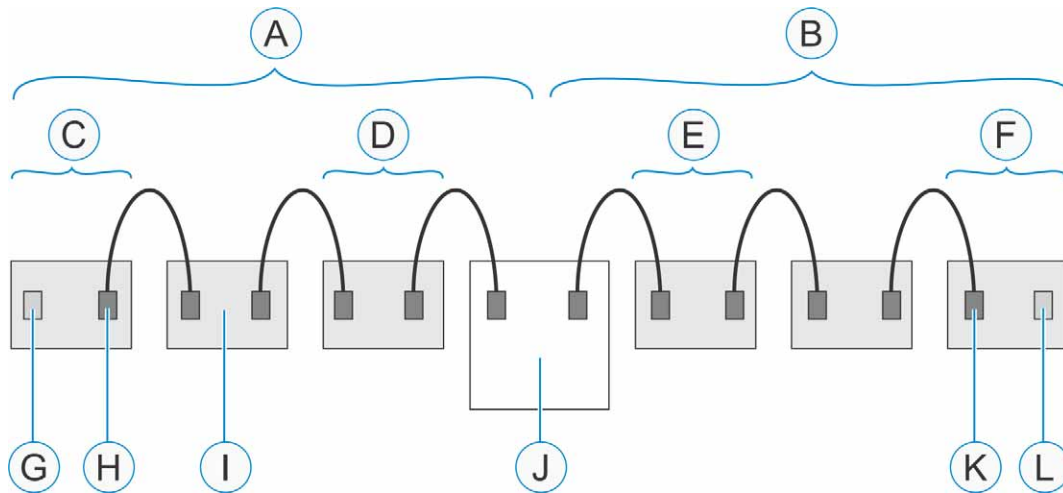
ID	Connection Type	Description
A	N/A	Right Gateway network.
B	N/A	Control panel electrical interconnect. Left and right Gateway network cables route to the control panel through a flexible conduit.
C	N/A	Left Gateway network.
D	RJ45	Right Gateway network Ethernet cable.
E	RJ45	Left Gateway network Ethernet cable.
F	N/A	Left and right Gateway network connection locations.

Gateway Board Connections

**NOTICE**

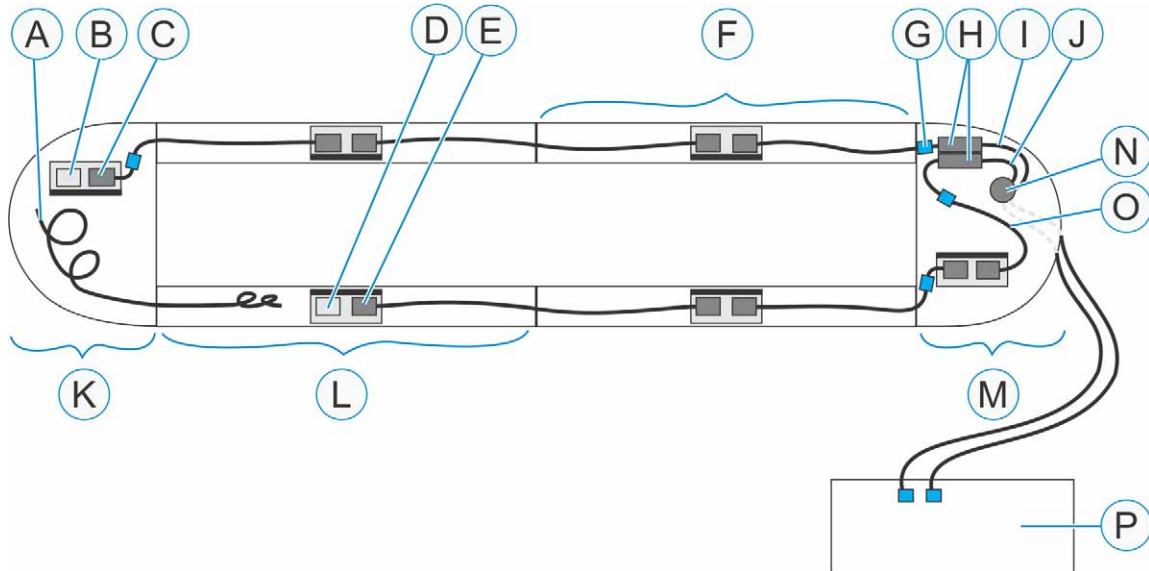
Gateway network cables should never cross one another.

As illustrated below, the left Gateway connections connect to the controller upstream using the right network ports, and connect from the controller downstream using the left network ports. The right Gateway connections are opposite; they connect to the controller upstream using the left network ports, and connect from the controller downstream using the right network ports.



ID	Connection Type	Description
A	N/A	Left Gateway network
B	N/A	Right Gateway network
C	N/A	Left tail section (farthest from the controller)
D	N/A	Left head section (closest to the controller)
E	N/A	Right head section (closest to the controller)
F	N/A	Right tail section (farthest from the controller)
G	RJ45	Left network port (not connected)
H	RJ45	Right network port (connected)
I	N/A	Gateway board (1 of 6)
J	N/A	Controller
K	RJ45	Left network port (connected)
L	RJ45	Right network port (not connected)

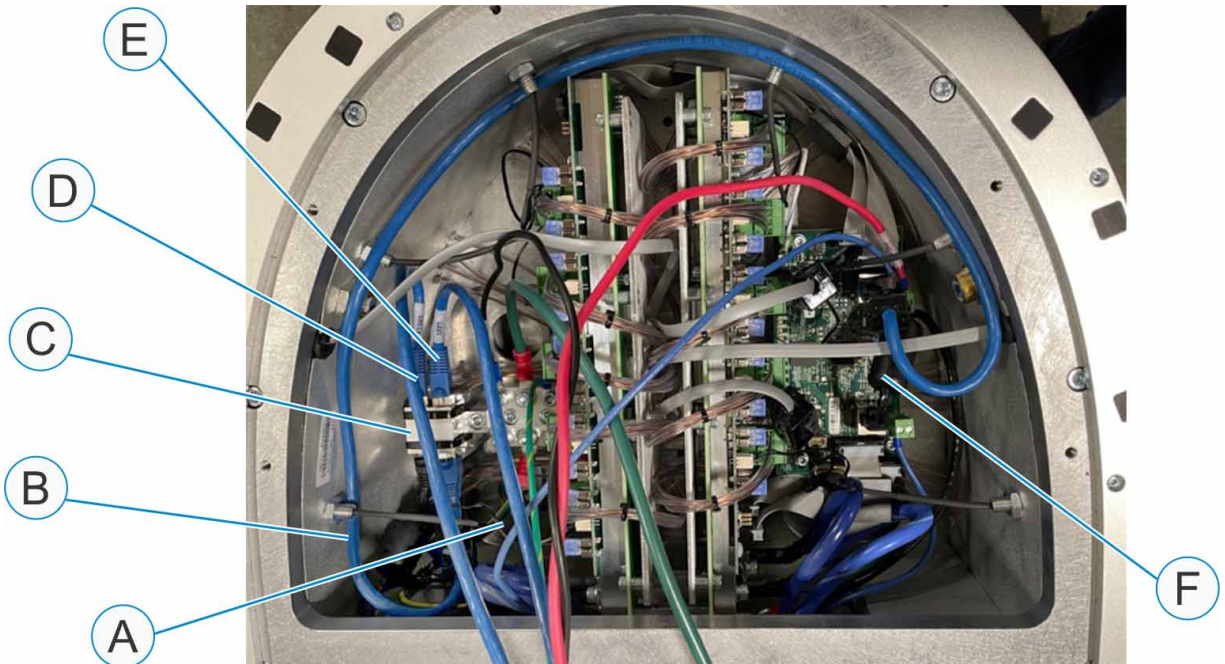
*Straight Sections with 180 Deg (500 mm) Sections*



ID	Connection Type	Description
A	N/A	Ethernet cable - not connected
B	RJ45	Right network port (not connected)
C	RJ45	Left network port (connected)
D	RJ45	Left network port (not connected)
E	RJ45	Right network port (connected)
F	N/A	Right head section
G	N/A	Ferrite (1 of 6)
H	RJ45	F-F coupler
I	RJ45	Ethernet cable - right network cable from controller (connected)
J	RJ45	Ethernet cable - left network cable from controller (connected)
K	N/A	Right tail section
L	N/A	Left tail section
M	N/A	Left head section
N	N/A	Control panel electrical interconnect
O	N/A	Left network patch cable
P	N/A	Control panel

Sample Gateway Network Connections in a 180 Deg (500 mm) Section

The following image illustrates some of the Gateway network connections.



A	Control panel electrical interconnect	D	Ethernet cable - right network cable from controller (connected)
B	Left network patch cable	E	Ethernet cable - left network cable from controller (connected)
C	F-F coupler	F	Ferrite (1 of 3 shown)





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# Operating Procedures

This section provides the following SuperTrak PHARMA8™ conveyance platform operating procedures:

- [Pre-Start Inspection](#) on page 66
- [SuperTrak PHARMA8™ Conveyance Platform Power ON Behavior](#) on page 68
- [SuperTrak PHARMA8™ Conveyance Platform Power OFF Behavior](#) on page 69
- [TrakMaster Procedures](#) on page 71
- [Monitor the SuperTrak PHARMA8™ Conveyance Platform](#) on page 73

# Pre-Start Inspection



During startup, the SuperTrak conveyance platform uses an identification process to locate unrecognized shuttles. There could be uncontrolled shuttle movement during this process. When all shuttles are located, the SuperTrak conveyance platform switches to normal shuttle control.

For systems where minor shuttle collisions are acceptable, no action is required. Be aware that straight sections have minimal or no movement during startup, whereas curved sections may have significant movement.

For systems where shuttle collisions are not acceptable, use the PLC code (or TrakMaster) before startup to determine which sections contain unrecognized shuttles, and then manually move those shuttles so the software can identify the shuttle position.

Task	Complete
1.	Verify that all users have been properly trained and instructed in safety procedures and SuperTrak PHARMA8™ conveyance platform operation.
2.	Verify that upper and lower rails are clean and that the shuttles have had the proper preventive maintenance.
3.	Inspect around the SuperTrak PHARMA8™ conveyance platform, to make sure there are no abnormal obstructions along the path that the shuttles travel.
4.	Verify that all energy sources have locks and tags removed.
5.	Verify that no one is working inside the guarding.
6.	Verify that all guarding is correctly installed and operational.
7.	Confirm that the sections are correctly aligned. Section joints and heights should not exceed ±0.07 mm (0.003 in.).
8.	Confirm that the ETH1 port is used for TrakMaster to communicate with SuperTrak. See <a href="#">Ethernet Port Connection</a> on page 54.
9.	<p>Open TrakMaster. The default IP address for the SuperTrak is 192.168.13.2. The computer must be connected to the ETH1 port on the controller computer.</p> <ul style="list-style-type: none"> <li>• Confirm the communication.</li> <li>• Confirm that faults and warnings do not exist.</li> <li>• Confirm that the latest controller software is installed (Advanced &gt; Firmware)</li> </ul>
10.	<p>Verify stable motion of a single SuperTrak shuttle:</p> <ol style="list-style-type: none"> <li>1. Install a <u>single</u> SuperTrak shuttle on the SuperTrak PHARMA8™ conveyance platform.</li> <li>2. Confirm that the motor power supply is ON. On TrakMaster, check the <b>Motor Power</b> column on the System Status/Control screen.</li> <li>3. Move the shuttle around the system at a high speed (2500 mm/sec).</li> <li>4. Verify that no abnormal sounds or shuttle instability is detected.</li> </ol>

	Task	Complete
11.	<p>Verify stable motion of all SuperTrak shuttles:</p> <ol style="list-style-type: none"><li>1. Turn the motor power OFF. On TrakMaster, check the <b>Motor Power</b> column on the System Status/Control screen.</li><li>2. Install all required SuperTrak shuttles on the SuperTrak PHARMA8™ conveyance platform.</li><li>3. Verify that the number of shuttles on TrakMaster match the physical number of shuttles on the SuperTrak PHARMA8™ conveyance platform.</li><li>4. Turn the motor power ON.</li><li>5. Move the shuttles around the system at high speed (2500 mm/sec).</li><li>6. Verify that no abnormal sounds or shuttle instability is detected.</li></ol>	

## SuperTrak Behavior



The SuperTrak PHARMA8™ conveyance platform is typically integrated with a larger automation system. This section describes the SuperTrak PHARMA8™ conveyance platform power ON procedure and does not include any steps for the larger system.

Each section has two (2) power connections:

- Motor power (28VDC for high power sections, 15VDC for low power sections,)
- Digital power (24V)

Motor power turns OFF with the safety circuit, but digital power remains ON. The digital power maintains feedback from the encoders, so that the SuperTrak PHARMA8™ conveyance platform continues to monitor the shuttle positions.

The SuperTrak PHARMA8™ conveyance platform digital power turns ON when the main power disconnect switch is placed in the ON position (if the SuperTrak PHARMA8™ conveyance platform power disconnect switch is in the ON position). This provides power to the SuperTrak PHARMA8™ conveyance platform controller, encoders, and other digital electronics in the motors. The SuperTrak PHARMA8™ conveyance platform digital power can be ON prior to the main disconnect turning ON if the UPS has battery power remaining.

## SuperTrak PHARMA8™ Conveyance Platform Power ON Behavior

When the system is in a safe state and cell power is ON, the system safety circuit turns the fail safe output ON to the SuperTrak PHARMA8™ conveyance platform control panel, which turns the SuperTrak PHARMA8™ conveyance platform motor power supplies ON. This must only occur when the guard doors are closed and the system is in a safe state to start operation. To avoid rapid switching of the SuperTrak PHARMA8™ conveyance platform power supplies, the system safety circuit must be configured with a minimum 2 second delay after the fail safe output turns OFF before it turns back ON.

When the PLC is ready to allow shuttle motion, the PLC enables the SuperTrak PHARMA8™ conveyance platform by turning ON defined bits on the PLC network. Shuttle movement does not occur until the PLC enables shuttle motion. The PLC can enable shuttle motion at the system level or for individual sections. The PLC must verify that all robots and tooling are clear before it enables shuttle motion.

When the PLC enables shuttle movement, the SuperTrak PHARMA8™ conveyance platform initializes the shuttles, returns them to their proper starting location, and then moves shuttles as required.

The system startup procedure varies, depending on whether the UPS has timed out or not and digital power was lost:

- If digital power is not lost, all shuttle locations and data are maintained. The system continues to work from where it left off.

- If digital (UPS) power is lost and a cold start occurs, the shuttles travel to the default target locations and the PLC decides what to do next for startup. Multiple options are available to manage system startup after a cold start, for example:
  - The PLC can cycle all shuttles around the SuperTrak PHARMA8™ conveyance platform, determine the shuttle ID, return the shuttles to the stations they left off, and continue running.
  - If the PLC knows that the line was purged, the shuttles can all go to the first processing station by default and the system can start running.
  - The PLC can send all shuttles to a reject station where any parts partially processed are removed and the system starts over after a cold start.
  - The SuperTrak PHARMA8™ conveyance platform digital electronics can be wired to the equivalent of a panel lighting circuit that does not lose power when the main disconnect is switched OFF. In this case, the SuperTrak PHARMA8™ conveyance platform shuttle positions and data are always maintained unless the entire plant loses power and the battery backed UPS times out.

## SuperTrak PHARMA8™ Conveyance Platform Power OFF Behavior

When the SuperTrak conveyance platform powers off, the process to power off depends on what caused the power interruption. A planned or intentional power off results in a controlled stop, whereas an unplanned or unexpected power off results in an uncontrolled stop.

### Controlled Stops

Control stops are initiated by a mechanism such as an e-stop button, a guard door switch, or a safety controller. These mechanisms will vary from system to system and are designed and built by the system integrator.

In a controlled stop:

- A signal is triggered by the stopping mechanism, sending an immediate-off digital signal. This signal prompts an enable signal to the controller which begins decelerating shuttles to a controlled stop. This SuperTrak controller is not a safety-rated device and is not a safety feature.
- A separate delayed off digital signal (300ms delay) connects to the motor power contactors (which are safety rated). This delay allows the SuperTrak controller time to complete shuttle deceleration. (NOTE: this operation switches the AC input to the motor power supplies which prevents any further power supply but does not discharge any residual power (capacitance)).

The disable delay time is set in both the system safety circuit and in the TrakMaster software (see **Section Parameters > Section Disable Delay Time**). When the disable delay time is correctly configured, shuttles come to a controlled stop and avoid bumping on an abrupt cell

power OFF. If a disable delay time is not configured (**Section Disable Delay Time** is set to zero [0]), the SuperTrak conveyance platform shorts the coils to help decelerate the shuttles on cell power OFF, which minimizes how far the shuttles coast.

### Uncontrolled Stops

Uncontrolled stops are initiated when there is a total loss of power from an unplanned event such as a power grid system failure or the opening of the SuperTrak main circuit breaker.

In an uncontrolled stop:

- Because the SuperTrak controller and other system electronics typically share a power supply, the controller is not available to regulate the shuttle deceleration. Shuttles will coast to a stop in a time frame determined by their speed and weight.
- If only the controller is powered off (but the motor power remains on), the sections of the track will respond after about 10ms by shorting coils. Shuttles will stop reasonably quickly, but this feature is not safety rated.
- If only the motor power supply is powered off (but the controller remains on), the shuttles will continue moving until the motor bus capacitance is discharged. At that point, the shuttles will coast freely. This scenario should not arise on a correctly configured system.
- No special restart sequence is required.

See [Safety Circuit Connection](#) on page 52 for more information.

# TrakMaster Procedures



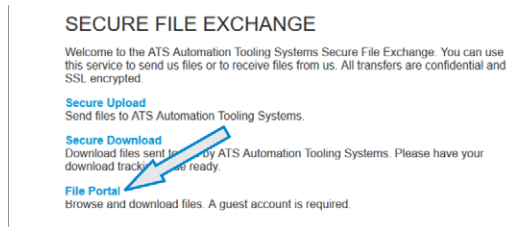
TrakMaster is not required to operate the SuperTrak PHARMA8™ conveyance platform; however, it is useful for troubleshooting and configuring the SuperTrak PHARMA8™ conveyance platform.

TrakMaster is a Windows-based application that monitors, configures, and is used to troubleshoot the SuperTrak PHARMA8™ conveyance platform.

*Note: TrakMaster software is periodically updated with new releases, and screen shots shown here may not reflect the current version--however, the sequence of operation is the same.*

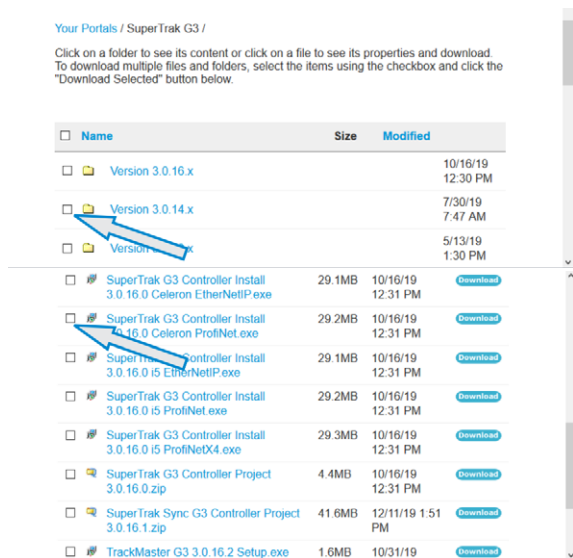
## Download TrakMaster

1. Email [supertrak\\_support@supertrakconveyance.com](mailto:supertrak_support@supertrakconveyance.com) to obtain a login account.
2. Navigate to <http://atsautomation.leapfile.com/>.
3. Click File Portal.



4. Enter your Login ID and Password, and then click Login.
5. Click SuperTrak G3.
6. Complete one (1) of the following:
  - Select the checkbox(es) of the required software version, and then click Download Selected.

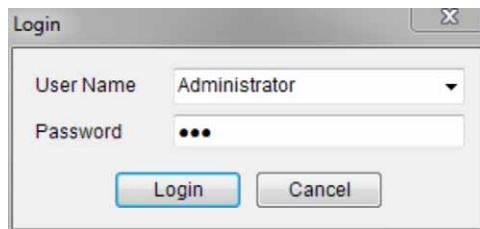
- Click a folder to view the folder contents, select the checkbox(es) of the required files, and then click Download.



## Login to TrakMaster

1. Open TrakMaster.
2. Click File > Login.
3. Enter your User Name and Password.

User accounts and the associated permissions are configurable. The software includes the following initial accounts: Administrator, Programmer, Maintenance, and Operator. All passwords are initially password.



4. Click Login.

If login is successful, TrakMaster displays the SuperTrak Connections dialog; otherwise, TrakMaster displays an error message and the Login dialog.

See [Access the TrakMaster Built-in Help](#) on page 72.

## Access the TrakMaster Built-in Help



See the Quick Start section for initial SuperTrak conveyance platform connection and configuration instructions.

1. Open TrakMaster.
2. Click Help > Contents.



## Monitor the SuperTrak PHARMA8™ Conveyance Platform

It is important to be aware of the state of SuperTrak PHARMA8™ conveyance platform during operation. When you are aware of how the SuperTrak PHARMA8™ conveyance platform correctly works, it is easier to notice when a change occurs. Some things to notice include:

- Watch all devices for smooth operation. If a device does not seem to be operating correctly, stop the SuperTrak PHARMA8™ conveyance platform and notify a service technician.
- Be aware of the speed at which the components function. If they appear to move slower than usual or are progressively getting slower, maintenance may be required.
- Watch for debris accumulation on the V-rail. This is an indication that the shuttles require immediate lubrication.
- Watch for debris accumulation on the lower rails. Wipe down the lower rails with a clean cloth dampened with isopropyl alcohol or equivalent.
- Watch for repeated faults and listen for shuttle noise. Inspect and repair the shuttle as required.

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# Maintenance

Maintenance is an important part of the continued and proper operation of the SuperTrak PHARMA8™ conveyance platform. Failure to perform maintenance as required, and in accordance with your ATS contract, voids the warranty. Maintain accurate and complete records regarding SuperTrak PHARMA8™ conveyance platform maintenance and any completed service procedures.

Some equipment requires periodic adjustment to re-establish the accuracy and desired output of the SuperTrak PHARMA8™ conveyance platform. SuperTrak CONVEYANCE™ recommends replacing defective devices rather than repairing them. Only qualified technicians should perform maintenance tasks.

Warranty excludes consumable items and wear parts, such as but not limited to fuses, filters, or lubricants, which by their nature require periodic replacement.

All technicians involved with maintaining the SuperTrak PHARMA8™ conveyance platform must be qualified and must read and understand the SuperTrak PHARMA8™ conveyance platform process and safety guidelines.

See [Safety Information](#) on page 13.

This section provides the following SuperTrak PHARMA8™ conveyance platform maintenance information:

- [Scheduled Maintenance](#) on page 76
- [Cleaning Procedures](#) on page 80
- [Shuttle Maintenance](#) on page 82
- [Replace Electrical Components](#) on page 103

## Scheduled Maintenance

### NOTICE

The scheduled maintenance tables in this section provide a recommended frequency for each maintenance task. Adjust the frequency according to your installation environment. For example; cleaning may need to be more or less frequent, depending on the environment.

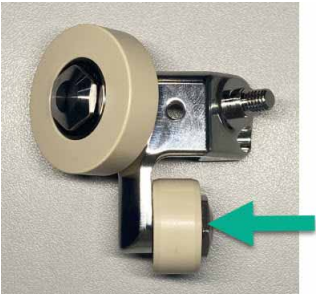
This section provides SuperTrak PHARMA8™ conveyance platform preventive maintenance tables. See [SuperTrak PHARMA8™ Conveyance Platform Overview](#) on page 27 for diagrams and component names.

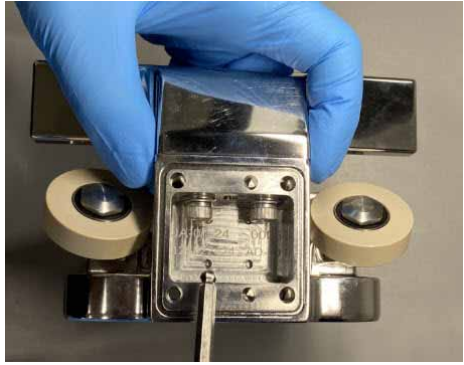
## SuperTrak PHARMA8™ Conveyance Platform Components


Component	Frequency	Task	Description
Power supply	Monthly	Inspect	Inspect the air filter for dirt and debris. If required, replace the filter. See <a href="#">Replace a Power Supply Filter</a> on page 118.
Table and supporting structure	Weekly	Clean	Clean off debris, using a clean, soft cloth.

## SuperTrak PHARMA8™ Conveyance Platform Shuttles

Component	Frequency	Task(s)	Description
Shuttle Body	Monthly	Clean	Wipe off debris using a clean, soft, non-marking cloth.
Lubricant Block	Weekly	Inspect and lubricate	Check lubrication shuttle for lubricant status. Ensure the lubrication block is making contact with the track's V-rail.  If required, adjust or replace lubrication block. See <a href="#">On-Shuttle Track Lubrication</a> on page 99.

Component	Frequency	Task(s)	Description
Flat Wheels <ul style="list-style-type: none"> <li>• Upper Flat Wheels</li> <li>• Lower Flat Wheels</li> </ul>	Monthly	Inspect	<p>Turn each wheel to make sure it moves freely. Check each flat wheel for vertical and horizontal movement. A small amount of vertical play (<math>\leq 0.5</math> mm [<math>\leq 0.02</math> in.]) in the flat wheels is normal and acceptable. Tighten the flat wheel pins, if necessary, to a torque of 7.0 Nm.</p> <p>If a flat wheel does not sit firmly in position and still turn freely after tightening, replace the flat wheel.</p> <p>Visually inspect each flat wheel for wear or damage. Replace any badly damaged wheels. See <a href="#">Replace Shuttle Wheels</a> on page 90.</p>
Bogie Wheels	Monthly	Inspect	<p>Check each bogie wheel for vertical movement. If the bogie wheel does not sit firmly in position, tighten the bogie wheel pin screw to a torque of 2.1Nm</p>  <p>Turn each wheel to make sure it moves freely. Replace any wheels that do not move freely. Visually inspect bogie wheels. If a wheel is damaged, make sure the V-rail is not damaged and that it is correctly aligned. See <a href="#">Replace Shuttle Wheels</a> on page 90.</p>
Anti-Static Brush	Monthly	Inspect	<p>Verify that the two screws that hold the anti-static brush are tightly secured. Visually inspect the anti-static brush. Make sure that at least 90% of the bristles remain. If more than 20% of the bristles are worn away, replace the anti-static brush. The nominal length of a new anti-static brush is 4.05 mm (0.159 in.). When 0.5 mm (0.02 in.) of the anti-static brush is worn away, it will not make contact with the V-rail. See <a href="#">Replace a Shuttle's Anti-Static Brush</a> on page 85.</p>

Component	Frequency	Task(s)	Description
Bumpers	Monthly	Inspect	<p>Inspect bumpers for physical damage. The surface should be smooth. If not, replace as necessary depending on the application requirements</p> <p>See <a href="#">Replace Shuttle Bumpers</a> on page 86.</p>
Encoder	Monthly	Clean and inspect	<p>To clean, wipe with a soft, damp cloth using water or a non-chlorine cleaning solution.</p> <p>Ensure the Encoder is securely attached to shuttle body. The torque specification is 4.1Nm</p> 
Encoder Strip Assembly	Monthly	Inspect	<p>Visually inspect the encoder strip assembly and the encoder assembly for damage. The encoder bracket can be checked while on the shuttle. Use a magnetic viewing film to verify the magnetic poles.</p> <p>See <a href="#">Replace a Shuttle Encoder Strip Assembly</a> on page 87.</p> <p>If the encoder strip is damaged, contact SuperTrak CONVEYANCE™. The encoder strip will have to be replaced as it is not repairable.</p>

Component	Frequency	Task(s)	Description
Magnet Assembly	Monthly	Inspect	Visually check magnet assembly surface is not damaged and there are no weld gaps. 

## Electrical Enclosure

Component	Frequency	Task	Description
Fan	Monthly	Inspect	Inspect for damage and loose connections. If required, repair or replace.
	As Required	Clean	Clean off debris, using a clean, soft cloth.
Filter	Monthly	Inspect	Inspect the condition of the filter. If required, vacuum, wash or replace. See <a href="#">Clean a Control Panel Air Filter</a> on page 81.

## Cleaning Procedures

This section describes SuperTrak PHARMA8™ conveyance platform cleaning procedures.

### Clean the SuperTrak PHARMA8™ Conveyance Platform

#### CAUTION

After cleaning the SuperTrak PHARMA8™ conveyance platform frame, clean up all spills and excess water immediately. Liquid on floors causes a slip hazard.

#### NOTICE

Never use razor blades, scrapers, squeegees, brushes or any other abrasive tools to clean the SuperTrak PHARMA8™ conveyance platform frame. Use of these tools may cause damage.

Do not use chlorine or products containing chlorine when cleaning any part of the SuperTrak PHARMA8™ system, including shuttles. Chlorine may damage components of the system.

The end user/customer is responsible for determining aseptic requirements and contamination or reaction prevention for the products and processes conducted on the track; therefore, the customer must also determine what, if any, cleaning solutions or agents are appropriate for use.

SuperTrak CONVEYANCE™ does not recommend any specific brands of cleaners. Your system's processes and product requirements determine the type of cleaners you will use. However, **cleaning solutions containing chlorine should never be used** on the PHARMA8™ system as such cleaners can damage its components.

#### Remove Dust and Dirt

1. Wipe with a soft damp cloth to remove dust and dirt.
2. Dry with a clean soft cloth or chamois.

#### Remove Wet Paint, or Grease

1. Wipe with a clean soft cloth dampened with isopropyl alcohol or equivalent. (Do not use chlorine-based cleaners.)
2. Dry with a clean soft cloth or chamois.



## Clean a Control Panel Air Filter

Air filters are located on the side of the control panel.

1. Carefully remove the front plastic filter support.
2. Gently peel back the sponge filter.
3. Use a vacuum to carefully remove any particulate from the filter unit.
4. Replace the filter.
5. Snap the filter cover back into position over the filter.

## Clean the V-Rail

V-rails can be cleaned when needed, but be aware that cleaning will remove necessary lubrication on the rail.

1. Wipe with a clean soft cloth dampened with isopropyl alcohol or equivalent.
2. Dry with a clean soft cloth or chamois.

**After cleaning, the V-rail must be re-lubricated, which is done via the lubrication shuttle.**

See [On-Shuttle Track Lubrication](#) on page 99.

# Shuttle Maintenance

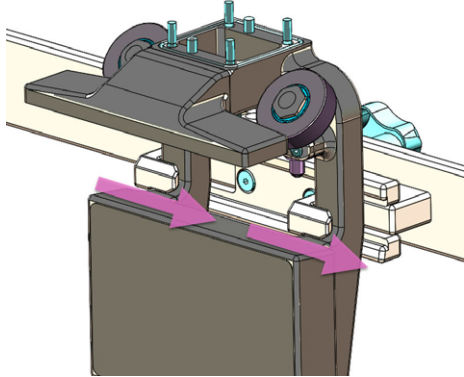
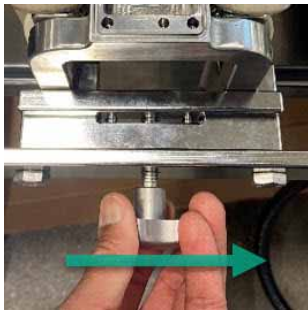
This section describes shuttle maintenance.


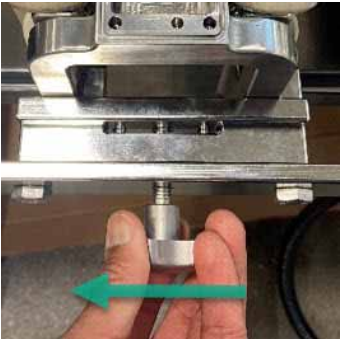
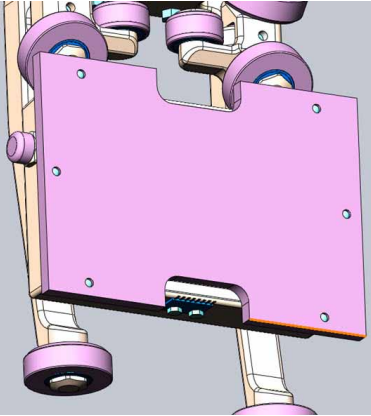
- [Remove a Shuttle](#) on page 82
- [Replace Shuttle Components](#) on page 84
- [On-Shuttle Track Lubrication](#) on page 99

## Remove a Shuttle

Before performing any maintenance on a shuttle, you should remove it from the track. SuperTrak CONVEYANCE™ recommends using the optionally purchased shuttle removal tool to remove and install shuttles.

**NOTICE** Handle shuttles carefully to avoid damage to the shuttle components.

Step	Illustration
<ol style="list-style-type: none"> <li>1. Open the safety circuit.</li> <li>2. Attach the shuttle removal tool to the shuttle.                             <ol style="list-style-type: none"> <li>a. Using both handles, carefully slide the shuttle removal tool onto the front of the shuttle from right to left, securing the hooks of the tool behind the shuttle legs and just above the magnet enclosure but below the flat wheels.</li> </ol> </li> </ol>	
<ol style="list-style-type: none"> <li> <ol style="list-style-type: none"> <li>b. Turn the center knob clockwise to tighten the removal tool against the shuttle until firmly secure without over-tightening.</li> </ol> </li> </ol>	

Step	Illustration
<p>3. Pull the right handle of the shuttle removal tool out and away from the track. Then using both handles, pull the shuttle out until it is no longer on the V-rail and is completely clear of the track.</p>	
<p>4. Remove the shuttle removal tool from the shuttle by turning the center knob counterclockwise until the tool is loose.</p> <p>Then, holding both handles, slide the tool from left to right to detach its hooks from behind the shuttle body.</p>	
<p>5. Carefully place the keeper plate on the magnet enclosure to shield the magnetic field.</p>	

**When a shuttle is not on the track, always install its magnetic keeper plate and place it where it will be protected from damage.**

For detailed instructions on how to place a shuttle on the track, see [Install a Shuttle](#) on page 38.

## Replace Shuttle Components

### CAUTION

- The magnetic field generated by the shuttle magnets can be harmful to pacemaker wearers. Maintain a minimum distance of 31 cm (12 in.) between the shuttle and the implant location. The magnetic field may also induce magnetic materials into motion, creating potential projectiles or pinch points. Various electronic equipment and magnetic data carriers can also be affected by magnetic fields.
- Make sure the motor power is OFF when a shuttle is installed on the SuperTrak PHARMA8™ conveyance platform. The external safety circuit must turn the failsafe output to the control panel OFF when the guard doors are open, to disable the motor power.

### NOTICE

The magnetic attraction between the permanent magnets of the shuttle and the motor increases as the distance decreases. Prevent strong impact of the shuttle with the motor or damage can occur.

### NOTICE

Handle shuttles carefully to avoid damage to the shuttle components.

**Important:** Anti-seize lubricant, such as Loctite Food Grade Anti-Seize, is required for stainless steel fasteners that go into stainless steel materials as galling can cause significant problems. All fasteners on the shuttles and most fasteners on the track have small amounts of anti-seize applied to their threads when first assembled by SuperTrak Conveyance. However, when maintaining the shuttle or track, if no residual anti-seize is apparent on the removed fasteners, re-apply by adding a very small amount to the threads. If using new fasteners, ensure they are stainless steel and add a small amount of anti-seize to the threads. While anti-seize is necessary for the fasteners, adding too much can compromise the aseptic nature of the overall system.





This section explains the process for replacing components of shuttles:

- [Replace a Shuttle's Anti-Static Brush](#) on page 85
- [Replace Shuttle Bumpers](#) on page 86
- [Replace a Shuttle Encoder Strip Assembly](#) on page 87
- [Replace Shuttle Wheels](#) on page 90

## Replace a Shuttle's Anti-Static Brush


When the length of a shuttle's anti-static brush bristles are less than 3.6mm (0.14 in) and/or the brush is not making contact with the track, replace the anti-static brush.

Step	Illustration
1. Open the safety circuit.	
2. Prepare the shuttle for maintenance: <ul style="list-style-type: none"> <li>• Using the shuttle removal tool, take the shuttle off the track.</li> <li>• Place the keeper plate on the shuttle's magnet enclosure to shield the magnetic field</li> </ul>	
3. Use a wrench to remove both bolts holding the anti-static brush to the bottom of the shuttle's magnet assembly.	
4. Attach the new anti-static brush using the same fasteners and tighten with a wrench.	
5. Carefully pull the protective keeper plate off the shuttle magnet assembly, and use the shuttle removal tool to place the shuttle back on the track.	

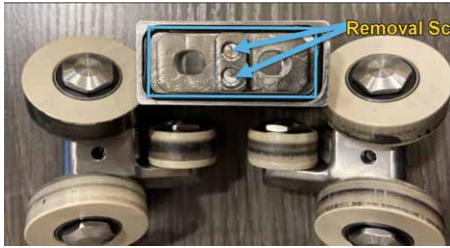
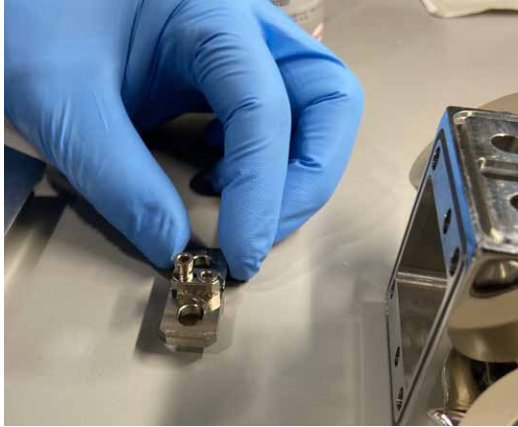
### Replace Shuttle Bumpers

If a shuttle's bumper is loose, tighten it with a non-marring wrench. If any part of a bumper is damaged, it should be replaced



Step	Illustration
1. Open the safety circuit.	
2. Prepare the shuttle for maintenance: <ul style="list-style-type: none"> <li>• Using the shuttle removal tool, take the shuttle off the track.</li> <li>• Place the keeper plate on the shuttle's magnet enclosure to shield the magnetic field</li> </ul>	
3. Unscrew the damaged bumper, using a non-marring wrench if necessary.	
4. Apply a small amount of anti-seize, such as Loctite Food Grade Anti-seize, to the threads of the new bumper before inserting it into the shuttle body. See note on page 84 for more information.	
5. After inserting the new bumper into the side of the shuttle, use a non-marring wrench to tighten it into place	
6. Carefully pull the protective keeper plate off the shuttle magnet assembly, and use the shuttle removal tool to place the shuttle back on the track.	



Step	Illustration
<p>4. After detaching the encoder strip assembly, remove its bi-directional key as you will need to install it on the replacement assembly. Use an M3 Allen wrench to loosen the screws that attach the bi-directional key to the assembly.</p> <p><i>Note: If necessary, the bi-directional key can be used to align the encoder strip assembly to the center of the shuttle.</i></p>	 
<p>5. Attach the new encoder strip assembly by reversing these instructions, using the same fastener hardware.</p> <p>6. It is recommended to vertically and horizontally align the encoder assembly before placing the shuttle back on the track. See <a href="#">Align a Shuttle Encoder Strip Assembly</a> on page 89.</p> <p>7. Then carefully pull the protective keeper plate off the shuttle magnet assembly and use the shuttle removal tool to place the shuttle back on the track.</p>	



## Align a Shuttle Encoder Strip Assembly

The shuttle's encoder strip assembly may need to be aligned when it has been replaced or if there is an issue with TrakMaster accurately reading the shuttle's position.

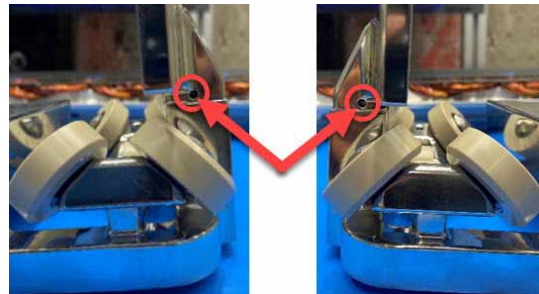
Encoder strip assemblies should be aligned to the shuttle both vertically and horizontally.

- **Vertical alignment** ensures the shuttle encoder has the proper spacing with the track encoder for performance and prevents damage to both track and shuttle encoders.
- **Horizontal alignment** aligns the encoder to the shuttle body and is important for accurate position readings in TrakMaster.

To align vertically: The two screws in the compartment at the top of the shuttle are used to adjust the vertical height of the encoder strip assembly. A .5mm shim may be used to verify the correct distance between the shuttle encoder and track encoder.



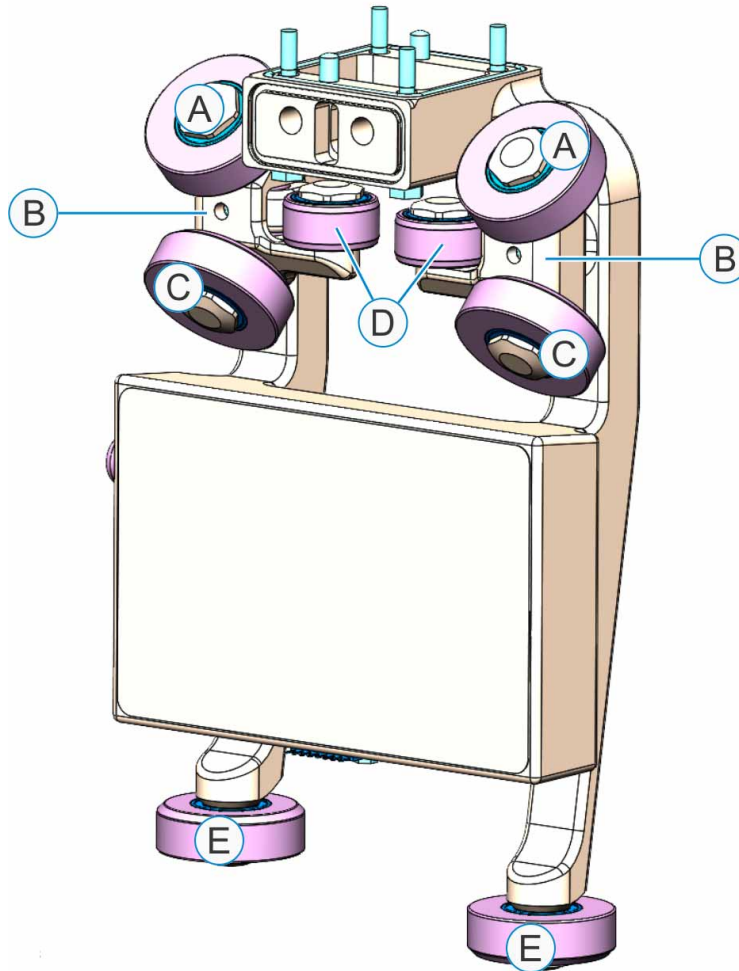
To align horizontally: The shuttle encoder bracket has two screw slots, one on each side, that are used to adjust the horizontal alignment to the shuttle. Insert a hex-head screw into the hole to make the adjustment. Adjustments must be made symmetrically on both sides of the shuttle.



### Replace Shuttle Wheels

This section describes removing and installing all wheels and wheel components of a shuttle. The reference diagram below indicates which wheels and wheel components are referenced.

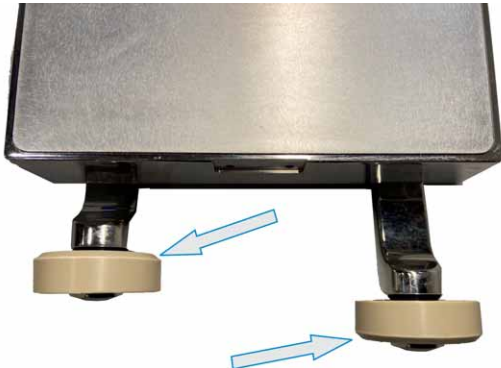
**Note:** For optimum performance of a shuttle, replace all its wheels and bushings at the same time.




<b>A</b>	Top upper flat wheels
<b>B</b>	Wheel brackets
<b>C</b>	Bottom upper flat wheels
<b>D</b>	Bogey wheels
<b>E</b>	Lower flat wheels



When replacing any components on the shuttle, be sure to note the status of anti-seize lubricant on fastener threads. See note on page 84 for more information.

Replace Lower Flat Wheels

Step	Illustration
1. Open the safety circuit.	
2. Prepare the shuttle for maintenance: <ul style="list-style-type: none"> <li>• Using the shuttle removal tool, take the shuttle off the track.</li> <li>• Place the keeper plate on the shuttle's magnet enclosure to shield the magnetic field</li> </ul>	
3. Using an M16 wrench, remove the hex wheel hub and the wheels from the bottom of the shuttle frame. Set aside the hex bolts as you will use them to install the new wheels.	
4. Install the new wheels on the shuttle making sure that the wheels' bevels are facing opposite directions, as pictured at right.	
5. Using the M16 wrench, tighten the hex wheel hub.	
6. Carefully pull the protective keeper plate off the shuttle magnet assembly and use the shuttle removal tool to place the shuttle back on the track.	

*Remove Upper Wheels (Flat Wheels, Bogey Wheels, and Bushings)*


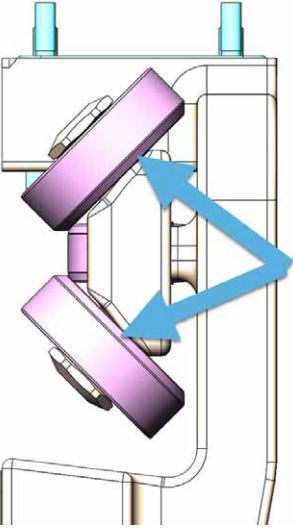
Step	Illustration
<p>1. Open the safety circuit.</p>	
<p>2. Prepare the shuttle for maintenance:</p> <ul style="list-style-type: none"> <li>• Using the shuttle removal tool, take the shuttle off the track.</li> <li>• Place the keeper plate on the shuttle’s magnet enclosure to shield the magnetic field</li> </ul>	
<p>3. Remove the shuttle’s encoder bracket assembly. See <a href="#">Replace a Shuttle Encoder Strip Assembly</a> on page 87 for instructions.</p>	
<p>4. After detaching the encoder strip assembly, use a non-marring M16 wrench to loosen the hex wheel hub and remove the top upper flat wheels from the shuttle</p>	

Step	Illustration
<p>5. Remove both the right and left wheel brackets.</p> <p>To remove a bracket:</p> <ol style="list-style-type: none"><li>a. Thread an M3 bolt screw into the top of the pivot pin and then pull upwards to remove the pivot pin.</li> <li>b. Use a 3mm stainless steel Allen wrench to remove the screw that attaches the wheel bracket to the shuttle body.</li></ol> <p>Set aside the fastener hardware as you will need it when attaching the new wheels.</p>	 

Step	Illustration
<p>6. Using needle-nose pliers, carefully remove both bushings from each bracket.</p>	
<p>7. Using a non-marring M16 wrench, loosen the hex nut to remove the bogey wheel from each bracket.</p>	
<p>8. Using the same M16 wrench, loosen the hex wheel hub for the remaining flat wheel on each bracket and remove the wheels.</p>	



*Install Upper Wheels (Flat Wheels, Bogey Wheels, and Bushings)*


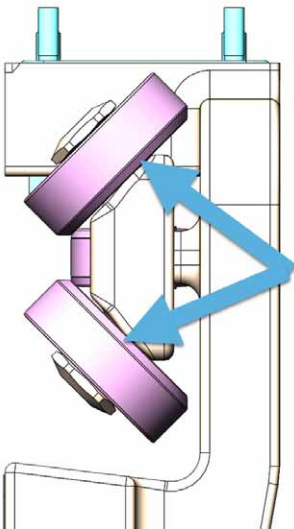
Install new wheels and bushings in essentially the reverse order they were removed.

Step	Illustration
<p>1. Install a bottom upper flat wheel onto each bracket. Tighten using a non-marring M16 wrench.</p>  <p>Important: When installing the flat wheels on the bracket, the beveled edges on these wheels should be opposite of each other (facing towards each other).</p>	  <p>Side view: BEVELED EDGES FACING</p>

Step	Illustration
<p>2. Using needle-nose pliers, insert two new bushings into each wheel bracket.</p>	
<p>3. Install the new bogey wheel onto its threaded post and tighten the hex wheel hub with a non-marring M16 wrench.</p>	



Step	Illustration
<p>4. Use a 3mm stainless steel Allen wrench to reattach the wheel brackets to the shuttle body.</p>	
<p>5. Re-insert the bogey wheel pivot pin assembly into the hole at the top of the bracket. Once the pin is fully inserted, remove the bolt screw.</p> <p><i>Note: Do not apply anti-seize to the pivot pin assembly.</i></p>	

Step	Illustration
<p>6. Install the top upper flat wheel onto its threaded post on each bracket. Tighten the hex wheel hub using a non-marring M16 wrench.</p> <p>Important-when installing the flat wheels on the bracket, the beveled edges on these wheels should be opposite of each other (facing towards each other).</p>	  <p>Side view: <b>BEVELED EDGES FACING</b></p>
<p>7. Carefully pull the protective keeper plate off the shuttle magnet assembly and use the shuttle removal tool to place the shuttle back on the track.</p>	

## On-Shuttle Track Lubrication

The Pharma8™ track V-rail is lubricated by a Teflon lubrication block mounted on specially fitted shuttles on the track. Lubrication shuttles are those that have an extra bracket between the bogey wheels. A leaf spring bar on the shuttle presses on the metal dowel pin\* on the lubrication block to hold it against the V-rail.

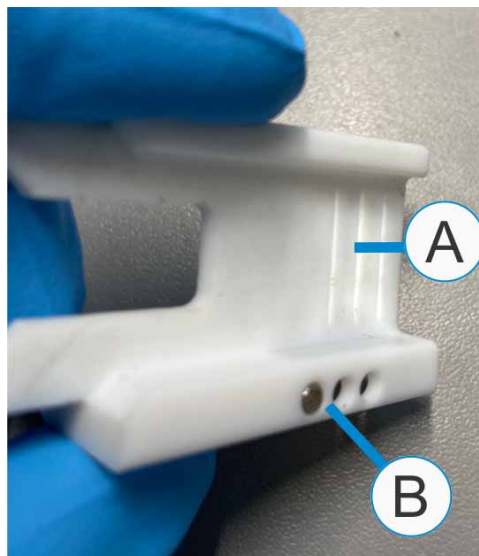


*New lubrication block\**



*Lubrication block mounted on lubrication shuttle*

The lubrication block has three lines on it to indicate how worn down it is and also three corresponding holes. The metal dowel pin\* is moved to the corresponding hole in the block to adjust its distance to the rail as the block becomes worn.



**A. Wear indicator lines**



**B. Metal dowel pin and adjustment holes\***


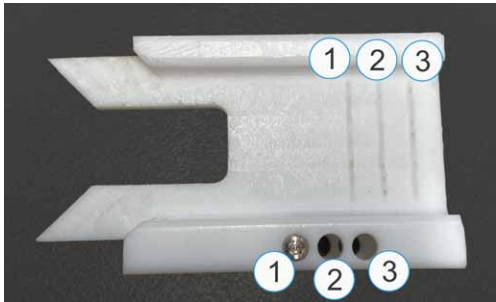
*\* Some versions of the lubrication block may have built-in adjustment points rather than removable metal dowels.*

### Adjust the Shuttle Lubricator

As the lubrication block becomes worn, it is necessary to adjust it so that it continues to make contact with the V-rail of the track.


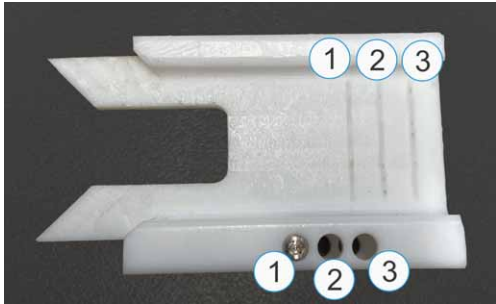
The lubrication block will shift towards the track as it wears, and the indicator lines at the back of the block will determine into which hole the dowel pin should be moved. For example, if only two indicator lines are visible at the back of the block when it is in the bracket, the dowel pin should be moved to the second hole from the back of the block. Likewise, when only one indicator line is visible at the back of the block while it is in the bracket, the dowel pin should be moved to the hole closest to the back of the block.

Step	Illustration
1. Open the safety circuit.	
2. Locate the track's lubrication shuttle. Prepare the shuttle for maintenance: <ul style="list-style-type: none"> <li>• Using the shuttle removal tool, take the shuttle off the track.</li> <li>• Place the keeper plate on the shuttle's magnet enclosure to shield the magnetic field</li> </ul>	
3. The indicator lines on the lubrication block correspond to the holes where the dowel pin should be moved. <p><i>Note: Updated versions of the lubrication block may have built-in adjustment points rather than a removable metal dowel.</i></p>	
<p>If the back of the lubrication block is flush with the bracket and no lines are visible, as pictured at right, you will need to replace the lubrication block. See <a href="#">Install or Replace a Shuttle Lubrication Block</a> on page 102.</p>	

Step	Illustration
<p>4. Press on the leaf spring and slide the lubrication block out from its bracket on the front side of the shuttle.</p>	
<p>5. Remove the dowel pin and place it in the hole that corresponds with the visible wear indicator line (as depicted at right).</p>	
<p>6. Press the leaf spring and re-insert the lubrication block through the front of the shuttle and into its bracket.</p>	
<p>7. Release the leaf spring.</p>	
<p>8. Carefully pull the protective keeper plate off the shuttle magnet assembly, and use the shuttle removal tool to place the shuttle back on the track.</p>	
<p>9. Ensure the lubrication block is making contact with the surfaces of the track's V-rail.</p>	

### Install or Replace a Shuttle Lubrication Block

When the lubrication block is worn to the point where it is not making contact with the V-rail of the track, replace the worn block with a new block.

Step	Illustration
1. Open the safety circuit.	
2. Locate the track's lubrication shuttle. Prepare the shuttle for maintenance: <ul style="list-style-type: none"> <li>• Using the shuttle removal tool, take the shuttle off the track.</li> <li>• Place the keeper plate on the shuttle's magnet enclosure to shield the magnetic field</li> </ul>	
3. If a lubrication block is already on the shuttle, press down the leaf spring and slide the block out through the front of the shuttle.	
4. On the new lubrication block, ensure the metal dowel pin is installed in the hole (1) as indicated at right.	
5. Press the leaf spring and re-insert the lubrication block through the front of the shuttle and into its bracket.	
6. Release the leaf spring.	
7. Carefully pull the protective keeper plate off the shuttle magnet assembly, and use the shuttle removal tool to place the shuttle back on the track.	
8. Ensure the lubrication block is making contact with the surfaces of the track's V-rail.	

## Replace Electrical Components

**⚠ DANGER**

Completing any maintenance procedures with the SuperTrak PHARMA8™ conveyance platform electrically powered may result in serious injury or death. Lock out and tag out all electrical energy sources before part service or replacement. See [Hazardous Energy](#) on page 16, and [Lockout and Tagout](#) on page 19.

**NOTICE**

To prevent damage to electrical components from electrostatic discharge (ESD), always use an ESD wrist strap when working with electrical components. An ESD wrist strap prevents the buildup of static electricity.

This section describes electrical component maintenance.

- [Remove and Reinstall Hatch Covers](#) on page 103
- [Replace the Track Encoders](#) on page 107
- [Replace a Motor Thermistor](#) on page 110
- [Replace the Main Motor Fuse](#) on page 115
- [Replace a Coil Fuse](#) on page 116
- [Replace a Power Supply Filter](#) on page 118

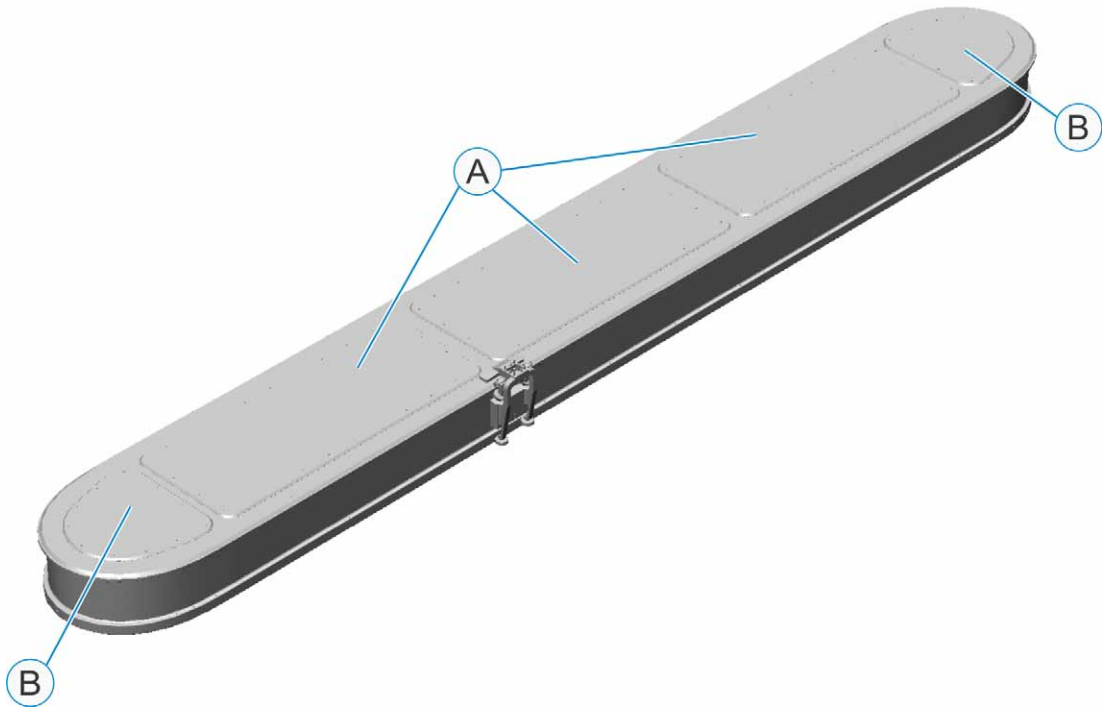
## Remove and Reinstall Hatch Covers

To access the electronics inside the track, you must remove the top hatch cover(s) for the corresponding section of the track. The end turn sections at the ends of the track have separate hatch covers from the interior straight section(s) of the track.

A track will always have two end turn section hatches, and the number of straight section hatch covers will vary depending on the length of the track.



**Important:** Anti-seize lubricant, such as Loctite Food Grade Anti-Seize, is required for stainless steel fasteners that go into stainless steel materials as galling can cause significant problems. All fasteners on the shuttles and most fasteners on the track have small amounts of anti-seize applied to their threads when first assembled by SuperTrak Conveyance. However, when maintaining the shuttle or track, if no residual anti-seize is apparent on the removed fasteners, re-apply by adding a very small amount to the threads. If using new fasteners, ensure they are stainless steel and add a small amount of anti-seize to the threads. While anti-seize is necessary for the fasteners, adding too much can compromise the aseptic nature of the overall system.


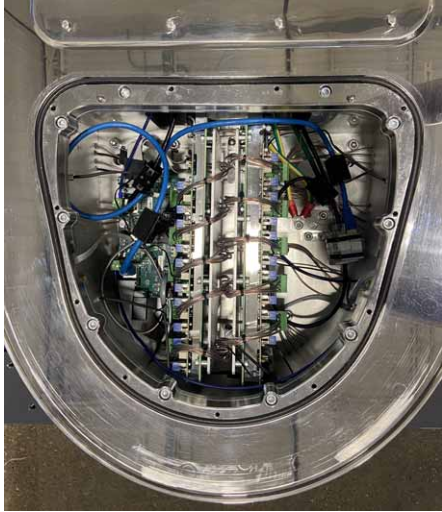


- A. Straight section hatch covers**
- B. End-turn (curved) section hatch covers**




### Removing and Reinstalling an End-Turn (Curved) Section Hatch Cover

Step	Illustration
<ol style="list-style-type: none"> <li>1. Turn the SuperTrak PHARMA8™ conveyance platform power disconnect switch to the OFF position.</li> <li>2. Lock out and tag hazardous energy. See <a href="#">Lockout and Tagout Locations</a> on page 20.</li> </ol>	
<ol style="list-style-type: none"> <li>3. Using a non-marring M7 wrench, remove the eleven screws that attach the hatch cover.</li> </ol> <p><i>Note: Set aside the screws in a secure location as you will need them later to re-attach the hatch.</i></p>	



Step	Illustration
4. Attach a suction handle with a capacity to lift at least 60 kg (132 lbs).	
5. Carefully set aside the hatch cover where it cannot be damaged.	
6. To reinstall the hatch: <ol style="list-style-type: none"><li>If required, lubricate the cover's O-ring with a food-safe lubricant.</li><li>Check fastener threads for anti-seize lubricant. See note on page 84 for more information.</li><li>Follow these instructions in reverse order using the original fasteners torqued to 2.3 Nm.</li></ol>	

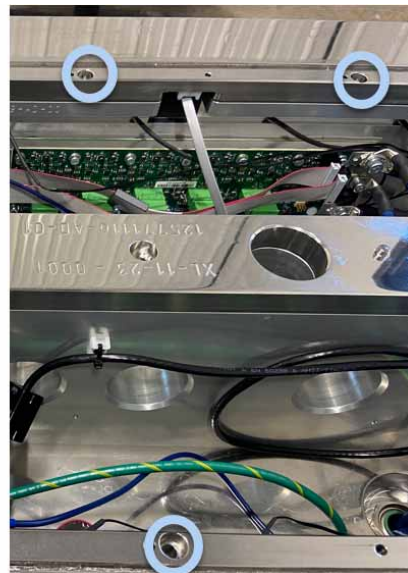
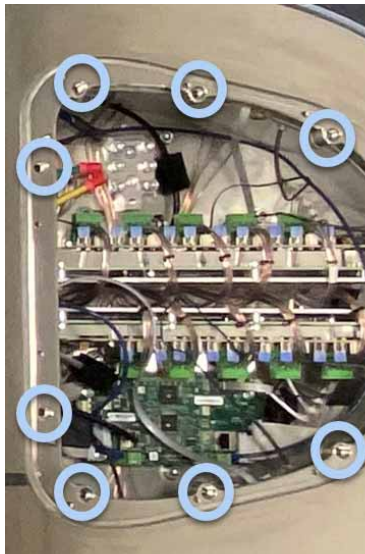
## Removing and Reinstalling a Straight Section Hatch Cover

Step	Illustration
<ol style="list-style-type: none"> <li>1. Turn the SuperTrak PHARMA8™ conveyance platform power disconnect switch to the OFF position.</li> <li>2. Lock out and tag hazardous energy. See <a href="#">Lockout and Tagout Locations</a> on page 20.</li> <li>3. Using a non-marring M7 wrench, remove the 26 screws that attach the hatch cover.           <p><i>Note: Set aside the screws in a secure location as you will need them later to re-attach the hatch.</i></p> </li> </ol>	
<ol style="list-style-type: none"> <li>4. Attach two suction/magnetic handles with a combined capacity to lift at least 80 kg (176 lbs), one at each end of the cover.</li> </ol>	
<ol style="list-style-type: none"> <li>5. Carefully set aside the hatch cover where it cannot be damaged.</li> </ol>	
<ol style="list-style-type: none"> <li>6. To reinstall the hatch:           <ol style="list-style-type: none"> <li>a. If required, lubricate the cover's O-ring with a food-safe lubricant.</li> <li>b. Check fastener threads for anti-seize lubricant. See note on page 84 for more information.</li> <li>c. Follow these instructions in reverse order using the original fasteners torqued to 2.3 Nm.</li> </ol> </li> </ol>	

## Replace the Track Encoders

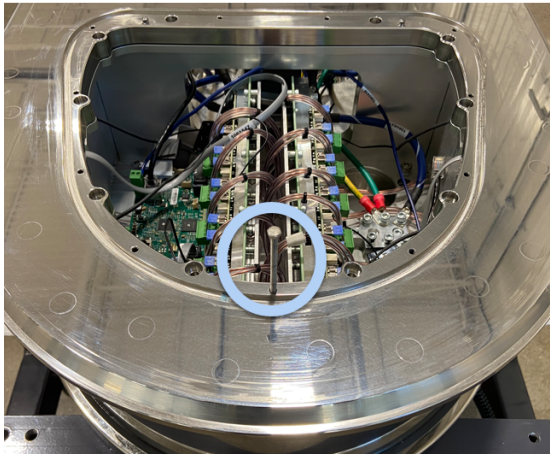
All curved and straight sections have two (2) encoder assemblies each. Replace the encoder assembly if a SuperTrak PHARMA8™ conveyance platform fault indicates that replacement is required.

1. Turn the SuperTrak PHARMA8™ conveyance platform power disconnect switch to the OFF position.
2. Lock out and tag hazardous energy.  
See [Lockout and Tagout Locations](#) on page 20.
3. Remove all hatch covers from the track. See [Remove and Reinstall Hatch Covers](#) on page 103.
4. Remove the screws holding the track's top plate to the chassis. The screws are in the counter-bored holes and can be removed with an Allen wrench.



5. Next, locate the lifting screw holes, one at each end of the track, and one on each side of every straight section. Inset a hex bolt into each of the screw lifting holes. As much as possible, alternate turning the screws to lift the top plate evenly. Turn the screws until the plate is lifted to a maximum height of 38mm (1.5 in). The top plate only needs to be lifted to a height that allows insertion of an Allen wrench to access the encoder strips.

*Note: The holes in the side of the straight sections that are used for lifting will be located at the center of the side of the section*



6. Unplug each encoder strip's Ethernet cable.

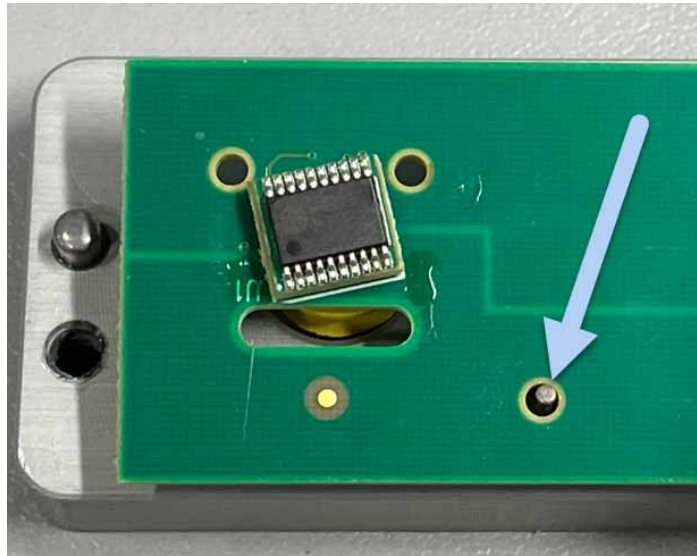


7. Locate the screws holding the encoder strip to the bottom of the top plate. There will be eight screws holding the two encoder strips to the curved section (four screws per encoder) and five each for the right and left encoder strips on the straight sections. Use an Allen wrench to remove the screws to release the encoder strips.

*Note: The encoders are not fixed to the bracket, so use caution when removing the screws to prevent the encoder from falling out of position.*



8. Remove the old encoder strip and install the new one by following these steps in reverse order. However, note the following:
  - When mounting the new encoder to its bracket, be sure the dowel pins on the bracket line up with the corresponding holes on the strip. Use care to ensure that the dowel remains in the hole in the encoder strip while remounting the bracket..
  - Apply a small of anti-seize lubricant to threaded fasteners if necessary. For more information, see note on page 103.



## Replace a Motor Thermistor



A thermistor replacement fault can be set to be ignored in the TrakMaster software. This allows the SuperTrak PHARMA8™ conveyance platform to continue to run until the thermistor can be replaced at a convenient time.

See the TrakMaster built-in help for additional information.

Motor thermistor connections are made with the coil driver boards. Replace a motor thermistor if a SuperTrak PHARMA8™ conveyance platform fault indicates that replacement is required.

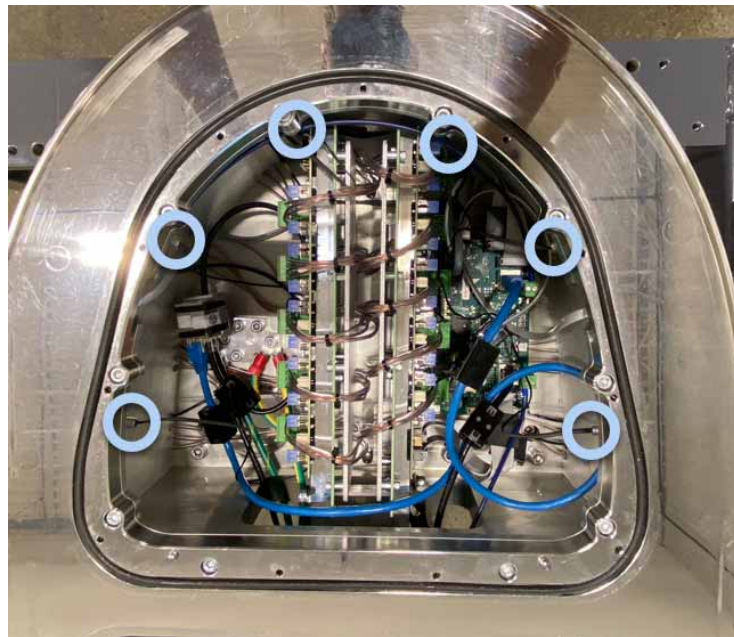
A thermistor replacement fault in TrakMaster will reference the thermistor number in the related section. Each coil driver board has five (5) thermistors with the exception of the coil driver boards in the curved sections which have three (3) per board. Therefore, a curved section has a total of six (6) thermistors while a straight section has ten (10) total thermistors.

## Thermistor Locations

**Straight Section:** Ten thermistors numbered 1-10 from left to right as pictured.



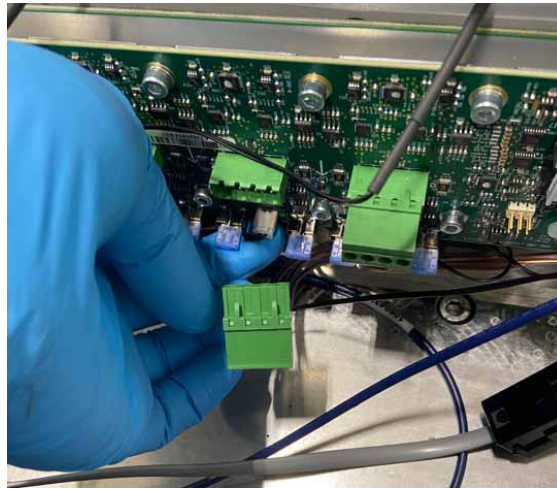
**180 Deg (500 mm) Section:** Six thermistors numbered 1-6 from left to right as pictured.



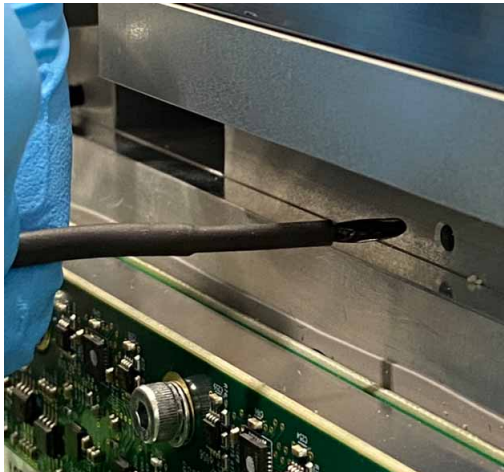
## Replace a Straight Section Thermistor

This section describes replacing the thermistors in straight sections. Thermistors may need to be replaced if a thermal sensor malfunction warning is generated.

1. Turn the SuperTrak PHARMA8™ conveyance platform power disconnect switch to the OFF position.
2. Lock out and tag hazardous energy.  
See [Lockout and Tagout Locations](#) on page 20.
3. Remove section's hatch cover.
4. If access to the motor thermistor is blocked, disconnect the applicable coil connection.
5. Unplug the thermistor connector from the coil driver board. The thermistor is held in place with a clip. Do not pull on the thermistor to remove it; pinch the clip to release it.



6. Pull the old thermistor wire straight out from the thermistor hole.





7. Slide the end of the new thermistor wire into the thermistor hole until you feel resistance.  
The thermistor tapers. During installation, the thick ridge creates a friction fit against the sides of the thermistor hole.
8. Plug the new thermistor connector into the electrical board.
9. Route the thermistor wire under the electrical board.
10. If required, re-connect any coil connections that were disconnected in the process.
11. Reinstall the hatch cover.

## Replace a Thermistor - Curved Section

There are six (6) thermistors in each 180 deg. (500 mm) section.

1. Turn the SuperTrak PHARMA8™ conveyance platform power disconnect switch to the OFF position.

2. Lock out and tag hazardous energy.

See [Lockout and Tagout Locations](#) on page 20.

3. Remove the 180 deg. section hatch cover.
4. Unplug the thermistor connector from the coil driver board.
5. Pull the old thermistor wire straight out from the thermistor hole.

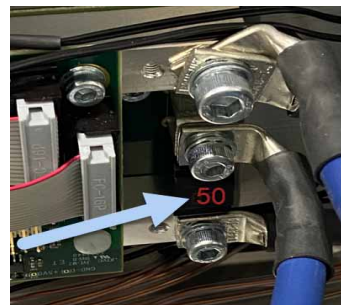


6. Slide the end of the new thermistor wire into the thermistor hole until you feel resistance. The thermistor tapers. During installation, the thick ridge creates a friction fit against the sides of the thermistor hole
7. Plug the new thermistor connector into the electrical board.
8. Route the thermistor wire under the electrical board.
9. Reinstall the hatch cover.

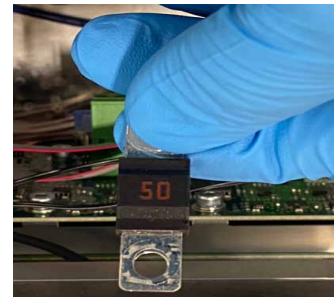
## Replace the Main Motor Fuse

A 50A fuse is installed on the left coil driver board when a power supply is installed for the motor. The 50A fuse bridges the two (2) 28VDC motor power connections. Fuse replacement may be required if a low motor voltage fault displays.

1. Turn the SuperTrak PHARMA8™ conveyance platform power disconnect switch to the OFF position.
2. Lock out and tag hazardous energy.  
See [Lockout and Tagout Locations](#) on page 20.
3. Remove the hatch cover from the section requiring the new fuse.
4. Remove a screw from each of the two (2) 28VDC motor power connections.



5. Remove the 50A fuse.
6. Align a new 50A fuse with the two (2) 28VDC motor power connections.



7. Install a screw through each of the two (2) 28VDC motor power connections and into the 50A fuse.

Make sure each screw has a washer and lock nut as illustrated.



8. Reinstall the hatch cover.

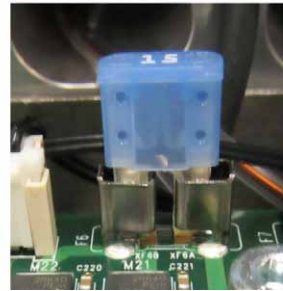
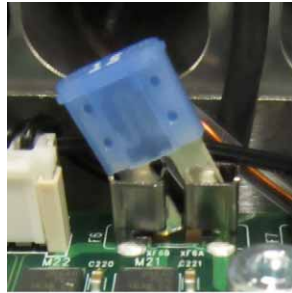
## Replace a Coil Fuse



It is possible for the SuperTrak PHARMA8™ conveyance platform to operate when a coil fuse is blown; however, the shuttle stop control is affected.

Each coil driver board has ten (10) 15A fuses; there is a dedicated fuse for each coil. If a SuperTrak PHARMA8™ conveyance platform fault indicates that fuse replacement is required, remove the fuse and test it. If the fuse is blown, replace it. If the fuse is not blown, verify that the fuse is seated correctly.

The images below indicate correct and incorrect fuse installation.



### Replace a Coil Fuse - Straight Section

Turn the SuperTrak PHARMA8™ conveyance platform power disconnect switch to the OFF position.

1. Lock out and tag hazardous energy.  
See [Lockout and Tagout Locations](#) on page 20.
2. Remove the section's hatch cover.
3. Disconnect both ribbon cables.
4. If access to the fuse is blocked, disconnect the applicable coil connection.



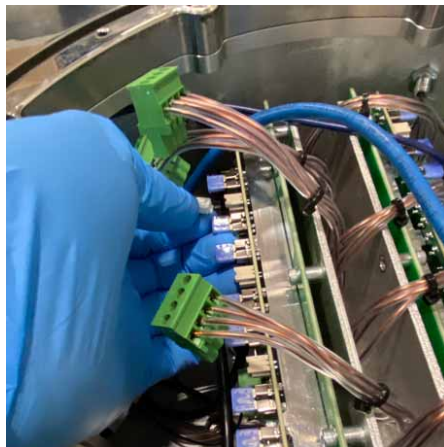
5. Pull the 15A fuse straight out from the slot.



6. Install a new 15A fuse straight into the fuse slot.  
Make sure the fuse is centered and seated correctly during installation.
7. If required, connect any coil connections that were disconnected in step 4.
8. Reconnect both ribbon cables.

### Replace a Coil Fuse - Curved Section

1. Turn the SuperTrak PHARMA8™ conveyance platform power disconnect switch to the OFF position.
2. Lock out and tag hazardous energy.  
See [Lockout and Tagout Locations](#) on page 20.
3. Remove the hatch cover from the curved section.
4. Pull the 15A fuse straight out from the slot.



5. Install a new 15A fuse straight into the fuse slot.  
Make sure the fuse is centered and seated correctly during installation.
6. Reinstall the hatch cover.

## Replace a Power Supply Filter

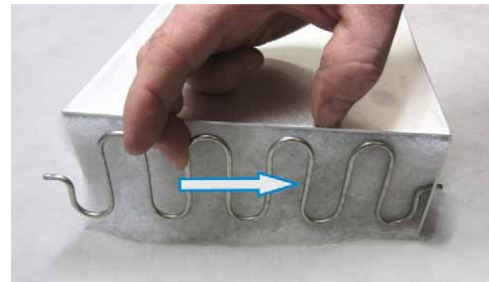
**NOTICE**

Be careful not to bend the power supply filter retention clip out of shape when removing it.

The power supply filter prevents particles from entering the power supply through the cooling fans. Particulate build-up on the power supply filter impedes air flow and may cause the power supply to overheat.

Power supply filter replacement frequency depends on the SuperTrak PHARMA8™ conveyance platform environment. Regularly inspect the power supply filter and replace it when it is dirty.

1. Carefully compress one end of the filter retention clip until one end releases from the power supply cabinet tab.



2. Remove the filter retention clip.
3. Remove the old filter.
4. Clean away any excess grit or dirt in and around the power supply fans.



5. Position a new filter into the base of the power supply.  
The filter is not directional, so it can be positioned with either side facing either direction.
6. Place one end of the filter retention clip into the power supply cabinet tab, and then carefully compress the filter retention clip to secure the opposite end into the cabinet tab on the opposite side.

# Troubleshooting

This section provides the following SuperTrak PHARMA8™ conveyance platform troubleshooting procedures for qualified technicians:

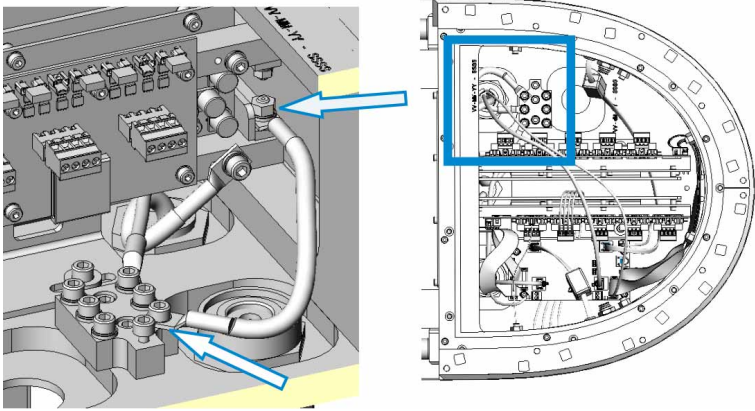
- [Communication Faults](#) on page 119
- [Pre-Power ON Faults](#) on page 120
- [Shuttle Faults](#) on page 124
- [Test Section Hardware](#) on page 125
- [Diagnostic Lights](#) on page 133
- [Gateway Network Error](#) on page 138

Read and understand the SuperTrak PHARMA8™ conveyance platform process and safety guidelines before starting any troubleshooting procedures. See [Safety Information](#) on page 13.

## Communication Faults

Fault	Resolution
The configuration software is unable to connect to the controller.	<ul style="list-style-type: none"> <li>• Attempt to retrieve diagnostic information using the following website: <a href="http://controller_IP_address/sdm">http://controller_IP_address/sdm</a> The IP address of the controller is required for this procedure.</li> <li>• Check the controller LEDs. See <a href="#">Controller Indicator Lights</a> on page 133.</li> </ul>
A fault message indicates that a communication problem exists.	<ol style="list-style-type: none"> <li>1. Read the fault message, and reference the TrakMaster built-in help for a resolution. See <a href="#">Access the TrakMaster Built-in Help</a> on page 72.</li> <li>2. Verify that all associated electronic components have power (for example; confirm power by looking at the component indicator lights).</li> <li>3. Turn the power OFF to the controller and Gateway boards (24V digital power).</li> <li>4. Verify that all associated cables are correctly connected. Make sure the cable connections are correct to the components, and that the connectors are seated correctly at both ends. See <a href="#">Controls and Connections Setup</a> on page 42.</li> <li>5. Turn the power ON.</li> </ol>
Gateway Network error - fault ID 7	See <a href="#">Gateway Network Error</a> on page 138.

## Pre-Power ON Faults

Failure	Resolution
<p>A short exists between the motor power connection and the common connection or ground (frame).</p>	<p>Determine if the short exists between a motor power connection and a common connection or between a motor power connection and ground (frame):</p> <ol style="list-style-type: none"> <li>1. Disconnect and isolate one (1) end of the common bonding jumper located in the 180 deg. section that contains the control panel electrical interconnect.</li> </ol>  <ol style="list-style-type: none"> <li>2. Use a multimeter to measure the resistance between the motor power connection and the common connection. If the value displayed on the multimeter screen is OL, the short exists between the motor power connection and ground (frame). If the value displayed on the multimeter screen is <math>&lt;5\Omega</math>, the short exists between the motor power connection and the common connection.</li> </ol> <p>Isolate the short:</p> <ol style="list-style-type: none"> <li>1. Disconnect a motor power connection at each end of the system. This divides the system in half electrically.</li> <li>2. Use a multimeter to measure the resistance of each half of the system. The half of the system with a measurement of <math>&lt;5\Omega</math> is the half containing the short.</li> <li>3. Disconnect a motor power connection in the middle of the isolated half of the system.</li> <li>4. Repeat step 2.</li> <li>5. Locate the connection between the motor power connection and the common connection or ground (frame).</li> </ol>

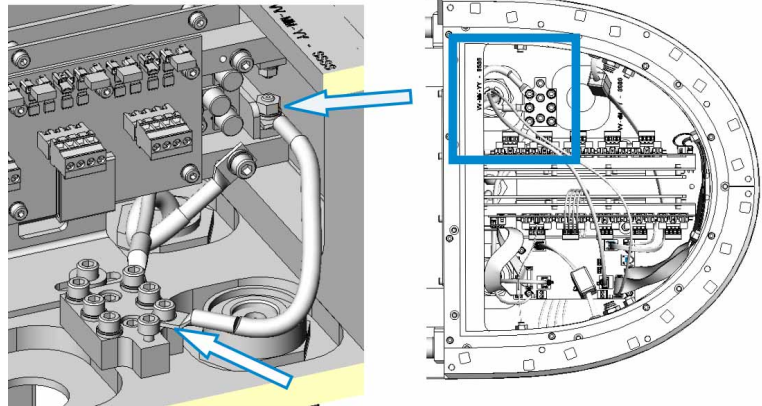


Failure	Resolution
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A short exists between the 24V digital power connection and the common connection or ground (frame).

Determine if the short exists between a 24V digital power connection and a common connection or between a 24V digital power connection and ground (frame):

1. Disconnect and isolate one (1) end of the common bonding jumper located in the 180 deg. section that contains the control panel electrical interconnect.



2. Use a multimeter to measure the resistance between the 24V digital power connection and the common connection. If the value displayed on the multimeter screen is OL, a short exists between the 24V digital power connection and the ground (frame). If the value displayed on the multimeter screen is  $<1000\Omega$ , the short exists between the 24V digital power connection and the common connection.

Isolate the short:

1. Disconnect a 24V digital power connection at each end of the system. This divides the system in half electrically.
2. Use a multimeter to measure the resistance of each half of the system. The half of the system with a measurement of  $<1000\Omega$  is the half containing the short.
3. Disconnect a 24V digital power connection in the middle of the isolated half of the system.
4. Repeat step 2.
5. Locate the connection between the 24V digital power connection and common connection or ground (frame).

Failure	Resolution
<p>A short exists between the motor power connection and the 24V digital power connection.</p>	<p>Isolate the short:</p> <ol style="list-style-type: none"> <li>1. Disconnect a 24V digital power connection at each end of the system. This divides the system in half electrically.</li> <li>2. Use a multimeter to measure the resistance of each half of the system. The half of the system with a measurement of <math>&lt;10\Omega</math> is the half containing the short.</li> <li>3. Disconnect a 24V digital power connection in the middle of the isolated half of the system.</li> <li>4. Repeat step 2.</li> <li>5. Locate the connection between the motor power connection and the 24V digital power connection.</li> </ol>

## Power Faults

Fault	Resolution
<p>Motor supply voltage</p>	<ul style="list-style-type: none"> <li>• Make sure the motor power is ON before attempting to enable the SuperTrak PHARMA8™ conveyance platform. This is typically a PLC programming error.</li> <li>• Verify that the breakers in the SuperTrak PHARMA8™ conveyance platform control panel are ON.</li> <li>• Verify that all power supplies are functioning correctly, and that all power wiring is installed correctly and securely.</li> <li>• Check the 50A main motor fuse(s) and replace if necessary. See <a href="#">Energy Controls</a> on page 44 and <a href="#">Replace the Main Motor Fuse</a> on page 115.</li> </ul>
<p>Motor I2T</p>	<ul style="list-style-type: none"> <li>• Check for a mechanical interference with the shuttle. The fault indicates the location.</li> <li>• Verify that shuttle performance limits (such as shuttle acceleration, duty cycle, or payload) are not exceeded. Reduce if required. The fault indicates the location.</li> <li>• Check the shuttle stability. Watch the shuttle during operation for abnormal oscillation. Contact maintenance to verify shuttle tuning.</li> <li>• Replace the coil driver board, if no other solution resolves the issue.</li> </ul>

Fault	Resolution
Excessive current loop error	<ul style="list-style-type: none"> <li>Verify that the coil is correctly connected to the coil driver board (green connectors).</li> <li>Test the coil resistance. It should be low (less than 1 ohm) but not a short-circuit (less than 0.3 ohm). If the resistance test fails, a problem may exist with the coil. Replace the coil. If the resistance test passes, a problem may exist with the coil driver board. Replace the coil driver board.</li> </ul>
Coil driver(s) shut down error	<ul style="list-style-type: none"> <li>Verify that the power supplies are functioning correctly.</li> <li>A problem may exist with the coil driver board. Replace the coil driver board.</li> <li>Coil driver boards (revision E01) require Gateway FPGA ver. 3.0.92.281 or later to be installed, otherwise a Coil driver(s) shutdown fault will occur. TrakMaster Help provides more information on this issue.</li> </ul>

## Power Supply Behavior and Troubleshooting

The power supply has three built-in protections which can interrupt the power output in specific situations. The table below outlines these protections and how to restore power flow.

Protection	Output Shutdown Condition(s)	Restart Procedure
Overcurrent/Short-Circuit Protection	105% of rated current, or 101% of peak current  If the overcurrent protection circuit operates continuously for 5 seconds, the output voltage will shut down.	The power supply will automatically recover when the fault condition is removed.  To manually recover the output voltage, remove the condition that is causing the overcurrent, shut down the AC input voltage, wait more than 3 minutes and turn on the AC input again.
Overvoltage Protection	Vo+5.6 – 11.2	If the overvoltage protection circuit is activated, shut down the input voltage, wait more than 3minutes and turn on the AC input again to recover the output voltage.
Thermal Protection	<ul style="list-style-type: none"> <li>The temperature continues to exceed the values determined by the derating curve. (50°C @ 100% Loading, 71°C @ 50% Loading)</li> <li>The fan stops, or air flow is blocked from the fan.</li> </ul>	<ul style="list-style-type: none"> <li>Shut off the input voltage and eliminate the overheating conditions.</li> <li>To recover the output voltage, allow the unit to fully cool down (~10min) before reapplying the input voltage.</li> </ul>

## Shuttle Faults

Fault	Resolution
Shuttle following error	<ul style="list-style-type: none"> <li>• Check for mechanical or other interference with the shuttle (for example, a jammed part). The fault indicates the location.</li> <li>• Inspect the shuttle. See <a href="#">SuperTrak PHARMA8™ Conveyance Platform Shuttles</a> on page 76 for shuttle inspection guidelines.</li> <li>• Verify that a coil fuse is not blown. If a shuttle travels across a coil with a blown fuse, shuttle momentum is usually adequate to allow acceptable control. However, if the shuttle attempts to stop in the vicinity of this coil, it will have poor control, which will trigger a following error.</li> <li>• Check for a damaged V-rail.</li> </ul>
Shuttle lost position	<ul style="list-style-type: none"> <li>• Check the encoder assembly to make sure that it is not damaged.</li> <li>• Check encoder calibration. See the TrakMaster built-in help for the calibration procedure.</li> <li>• Verify the encoder functionality. View the TrakMaster Encoder screen, to make sure the encoders are functioning.</li> </ul>

## Test Section Hardware



TrakMaster software is required for most of the straight section or curved section hardware testing procedures. TrakMaster software is periodically updated with new releases, and screen shots shown here may not reflect the current version—however, the sequence of operation is the same.

This section describes how to test the functionality of straight section or curved section hardware components.

## Test Encoder Functionality

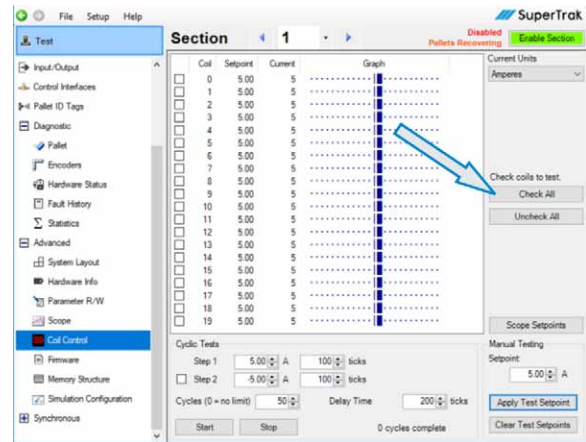
1. Open TrakMaster.
2. In the left pane, click Diagnostic > Encoders.
3. If required, click the Status tab.
4. At the top of the screen, click ◀ or ▶ to select the required **Section** to test.
5. By hand, slowly move a shuttle across the section you selected in step 4. As you move the shuttle, watch the grey Xs on the left side of the screen. The Xs, beginning with **Encoder 0** or **15** depending on the direction the shuttle is moving, should change to a yellow star and then to a green checkmark. As the shuttle continues to travel across the section the green checkmark may or may not change back to a yellow star and then back to a grey X.

The encoders pass if all the grey Xs sequentially change to a green checkmark.

Status	Verification	Encoder Strip Setup	Reference
X	0	62.245 0.000	3920
X	1	63.380 0.029	1306
X	2	62.393 0.024	672
X	3	62.181 0.070	882
X	4	62.181 0.092	3122
✓	5	55.434 0.104	3409
✓	6	-7.082 0.049	702
★	7	63.641 0.132	2642
✓	8	38.051 0.437	2640
✓	9	-24.450 0.457	3168
X	10	62.626 0.377	1292
✓	11	21.088 0.431	673
✓	12	-41.419 0.396	1139
★	13	64.407 0.411	2149
✓	14	4.025 0.328	3882
✓	15	-58.489 0.392	1145

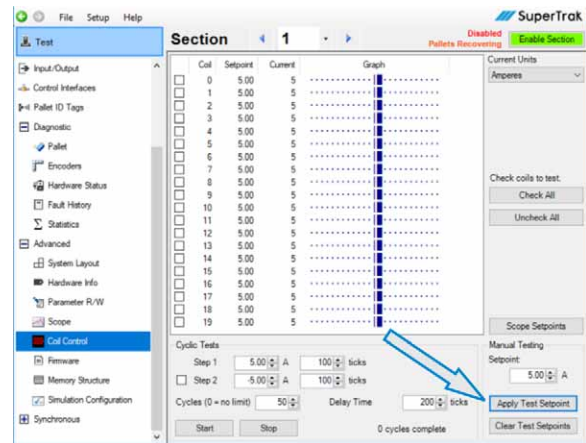
## Test the Coil Functionality

1. Remove all shuttles from the straight section or 180 deg. section to be tested.
2. Turn the SuperTrak power supply power ON.  
This is generally done by turning the system power ON when the safety circuit is closed.
3. Open TrakMaster.
4. In the left pane, click Advanced > Coil Control.
5. Click Check All.



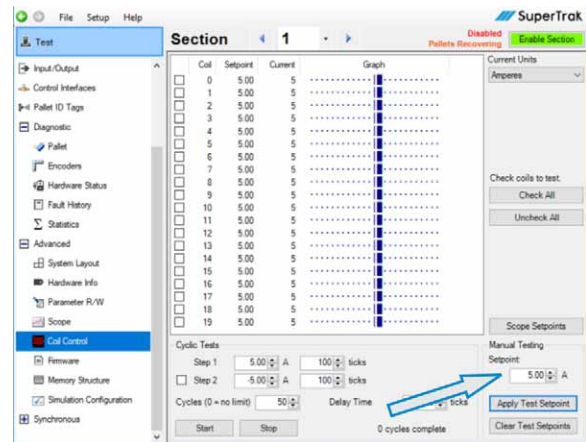
6. Verify that the section is disabled and that there are no active faults or warnings.  
The top right of the screen displays **Disabled** when faults or warnings exist. If required, open the Section Status/Control screen to clear any faults or warnings.
7. Verify that the **Setpoint** is set to 5.00 A.

8. Click Apply Test Setpoint.  
To pass, each **Coil** should display a **Current** of 5.00 ±0.5



9. Click Clear Test Setpoints.

- Enter a value of -5.00 into the **Setpoint** field.



- Click **Apply Test Setpoint**.

To pass, each **Coil** should display a **Current** of  $-5.00 \pm 0.5$  for standard sections or  $1.00 \pm 0.5$  for collaborative sections. This verifies that the current control works in both directions.

- Click **Clear Test Setpoints**.

## Test for a Reversed Polarity Coil

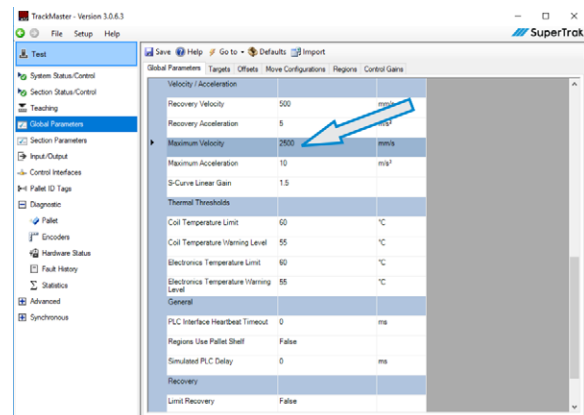
If a coil is connected backward it will have reversed polarity. There are two (2) methods to test for reversed polarity in a coil:

- [Test with the PLC in MANUAL Mode](#) on page 128  
If this option is available, it is easier and quicker to use this test.
- [Test Manually with TrakMaster](#) on page 129

### Test with the PLC in MANUAL Mode

Use this test if you can place the PLC in MANUAL mode and step the system through process steps; otherwise, see [Test Manually with TrakMaster](#) on page 129.

1. Open the Global Parameters window in TrakMaster
2. Note the value of the **Maximum Velocity** parameter, so that you can change the value back to this after the test.



3. Set the **Maximum Velocity** parameter to 50 mm/s.
4. Manually step the PLC until a shuttle fully-travels the length of the straight section or 180 deg. section to be tested.

The hardware passes if the shuttle fully-travels the section without producing an **Excessive pallet following error** fault.

5. Set the **Maximum Velocity** parameter back to the value that was noted in step 2.



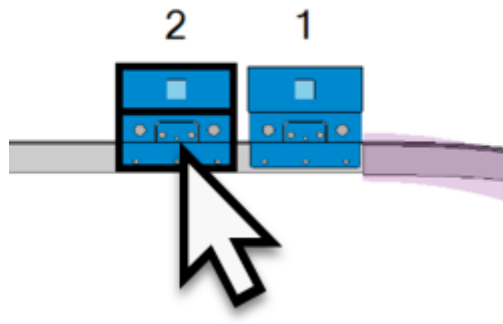
## Test Manually with TrakMaster

**NOTICE**

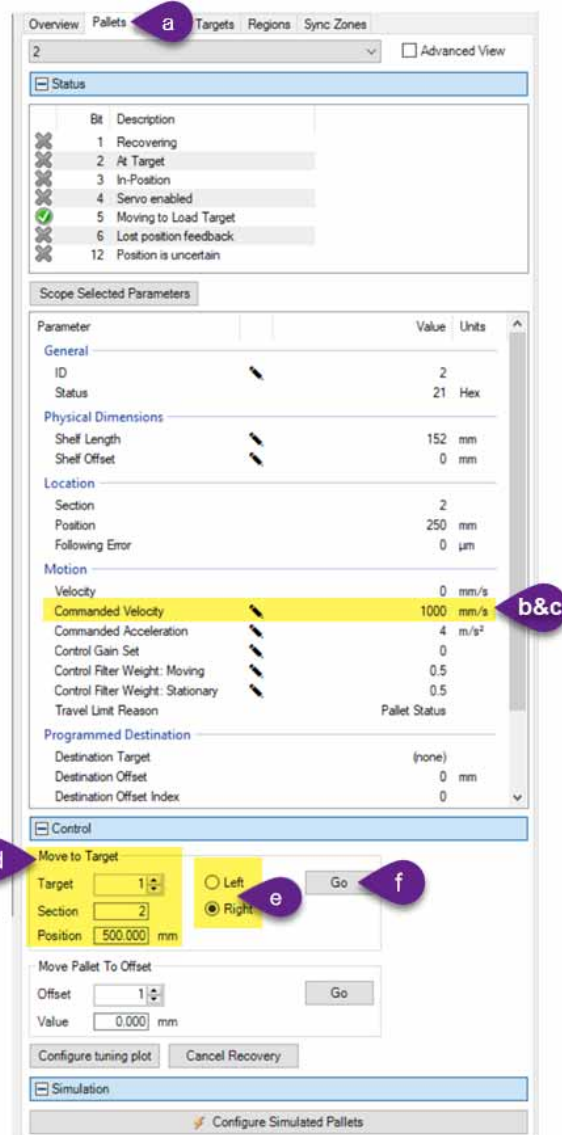
Before starting this test, manually block any system tooling that could interfere with shuttle motion. Failure to do so, could result in system damage.

During this test, a shuttle is manually commanded across the straight section or 180 deg. section being tested and across the sections on either side of the straight section or 180 deg. section being tested.

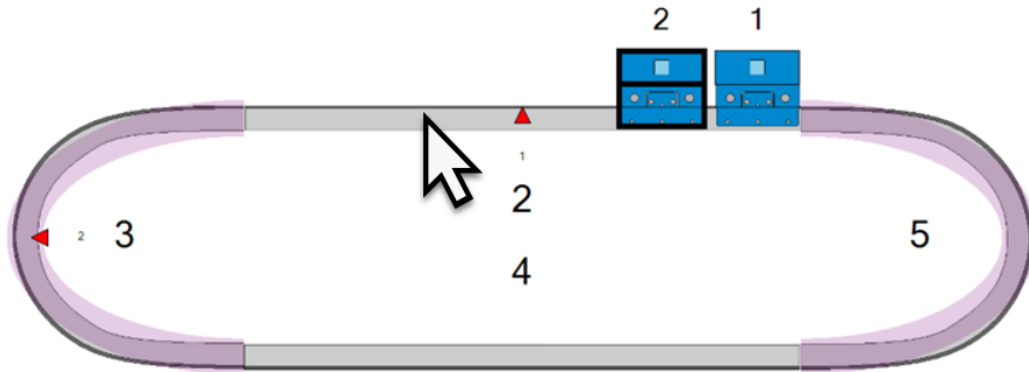
1. Prepare the system and SuperTrak shuttles:
  - a. Verify that no system tooling can interfere with shuttle motion. If required, block the system tooling out of the way.
  - b. Remove all shuttles from the straight section or 180 deg. section to be tested and the sections on each side of it.
  - c. Position a shuttle directly on the right or left side of the section to be tested.
2. Open TrakMaster.
3. On the System Dashboard, select the shuttle to use for the test. The selected shuttle is indicated by a black outline.



4. In TrakMaster's right pane:
  - a. Select the Pallets tab.
  - b. Note the current value of the **Commanded Velocity** parameter so that you can change the value back to this after the test.
  - c. Set the **Commanded Velocity** parameter to 50 mm/s.
  - d. Under **Move to Target**, select a **Target** that is past the section to be tested and in the direction that will cause the shuttle to travel over the section to be tested.
  - e. Select the correct shuttle direction (**Left** or **Right**)
  - f. Click **Go**.



- Click to select the track section that is being tested.



Overview Pallets Stations Targets Regions Sync Zones

Section	Fault Codes	Warning Codes	Motor Power	Enabled	Pallet Count	Status
c>	0	0			2	
2	0	0	✓	✗	2	Disabled
3	0	0	✓	✗	0	Disabled
4	0	0	✓	✗	0	Disabled
5	0	0	✓	✗	0	Disabled

Clear All Faults

Parameter	Value	Units
General		
Run Time	00:00:00	dd:hh:mm:ss
Pallet Flow Direction	Right	

Section 2 Straight, 1-metre Enable Section

- ✗ Section Enabled
- ✗ Enable Requested
- ✗ Externally Disabled
- ✗ Disabled Pallet Present
- ✗ Pallets Recovering
- 🚚 Pallets Moving to Load Target

- In the right pane, select the Overview tab and click on Enable Section. This will auto enable the sections on either side of the track section.

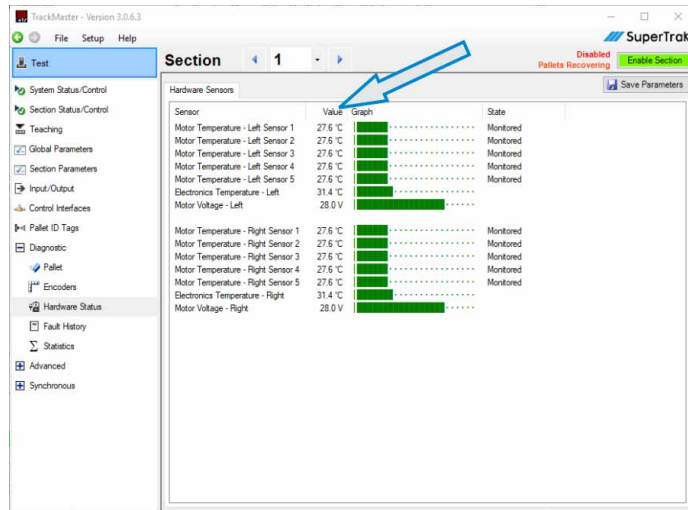
Do not enable power to any other sections because this may cause all the SuperTrak shuttles to move around the system.

- The section passes if the shuttle fully travels over the section without producing an **Excessive Follow Error** fault.
- Select the Pallets tab and reset the Commanded Velocity Parameter value to the value you noted prior to changing it for the test.

## Test the Status of the Hardware

1. Open TrakMaster.
2. In the left pane, click Diagnostic > Hardware Status.
3. Verify that the **State** of all motor temperature sensors is set to **Monitored**.
4. Verify that the **Value** for:

- Motor temperature sensors are reasonable. This value varies depending on the state of the system.



*NOTE: All sections have two (2) coil driver boards with the exception of the 180 deg. (800 mm) section which has three (3). Each coil driver board has five (5) thermistor connections; straight sections have ten (10) thermistors.*

*A 180 deg. (500mm) section has only six (6) thermistor locations, and thus only uses three (3) connections per coil driver board. As a result thermistors 2 and 4 (Left and Right) are set to "Ignored" by default in TrakMaster.*

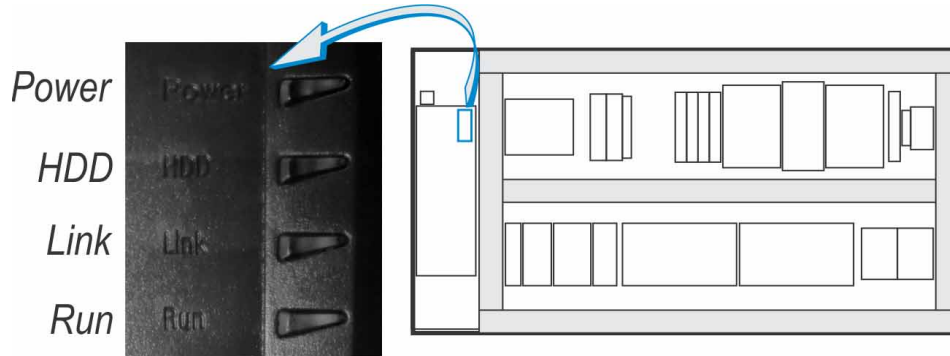
- Electronics temperatures are within a reasonable range (25-50°C [77-122°F]).
- Motor voltages are representative of the current SuperTrak power supply power state (ON or OFF), and are within a reasonable range (27-29V).

## Diagnostic Lights

This section provides information about the indicator lights on the SuperTrak PHARMA8™ conveyance platform hardware.

### Controller Indicator Lights

The controller has four (4) indicator lights: Power, HDD, Link, and Run.



The Power light should be observed first:

- Solid green: The system is powered-on.
- Solid red: The system is powered-off. If the system remains in this state when power is applied, or the power button is pressed, then it requires service.
- Flashing: The system may require service. Please contact your vendor for further advice.

The Run light should be observed next:

- Solid green: The system is running normally.
- Flashing green: The system is starting up, or applying a firmware update. Firmware updates are often included in controller software updates, and should not be interrupted.
- Off: The system is powered off, or starting up.
- Flashing orange: The system is running, but a required software license was not found.
- Solid red: The controller is in diagnostic or service mode.

The conveyor configuration software can only connect when the system is running. The SDM service is available when the system is running or in diagnostic/service modes.

If the Run light remains in an abnormal state, please contact your vendor for assistance. It may be possible to obtain more information by connecting a monitor to the DVI port.

For additional information, consult the "LED status indicators" topic in the APC910 User Manual.

The following table summarizes the indicator light behavior.

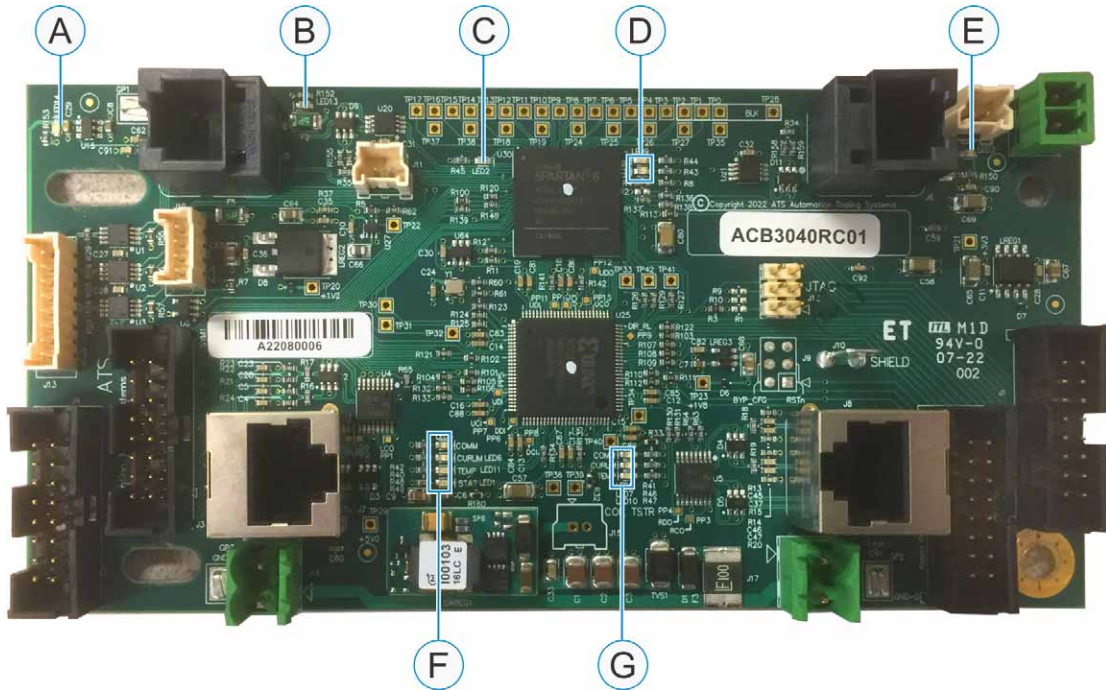
Indicator	Color	Light State	Normal	A Problem May Exist
Power	Green	Solid	✓	
		Blinking		A controller hardware problem exists. Contact your vendor for assistance.
	Red	Solid		The controller power is OFF. Press the power button to turn it ON.
		Blinking		A controller hardware problem exists. Contact your vendor for assistance.
	Red/ Green	Blinking		
HDD	Yellow	Occasional Blink	✓	
Link	Yellow	Solid	Normal when an SDL display is connected.	
		Blinking		SDL display power was interrupted. Check the cables.
		Off	Normal when an SDL display is not connected.	
Run	Green	Solid	✓	
		Blinking	✓	The controller startup sequence is not yet complete. Wait several minutes.
	Red	Solid		A controller software problem exists. Contact your vendor for assistance.
		Blinking		

## Gateway Board (ACB3040) Indicator Lights



The Gateway board image may not reflect the latest version of the Gateway board.

The Gateway board has thirteen (13) indicator lights.



ID	LED #	Color	Light State	Normal	A Problem May Exist
A	14	Red	ON		Power to the IR reader is disabled because of excessive current draw. A short-circuit may exist in the IR reader or in the IR reader cable.
			OFF	✓	
B	13	Red	ON		Power is disabled due to excessive current draw, A short-circuit exists in the encoder board or in the encoder board cable.
			OFF	✓	
C	2	Green	Any	N/A	A software diagnostic LED. This indicator is for development purposes only.
D	8	Red	Any	N/A	Software diagnostic LEDs. These indicators are for development purposes only.
D	9	Yellow			

ID	LED #	Color	Light State	Normal	A Problem May Exist
E	3	Red	ON		Power is disabled due to excessive current draw, A short-circuit exists in the encoder board or in the encoder board cable.
			OFF	✓	
F	1 (STAT) <sup>a</sup>	Green	ON	✓	
			Blinking very slow		The network is not configured.
			Blinking slow		The FPGA is not configured.
			Blinking fast		The FPGA is ready but inactive.
			OFF		Power is OFF.
F and G	4 (COMM) <sup>b</sup> and 5 (COMM) <sup>b</sup>	Orange or Blue	ON		Gateway board communication does not exist with the controller.
			Blinking fast		The coil current set points are not received.
			OFF	✓	
F and G	6 (CURLIM) <sup>c</sup> and 7 (CURLIM) <sup>c</sup>	Red	Blinking fast	✓ (normal if the motor power is OFF)	The coil driver board is deactivated.
			OFF	✓	
F	11 (TEMP) <sup>d</sup>	Yellow	ON	✓	The Gateway board is configured on the left network.
			OFF	✓	The Gateway board is configured on the right network.
G	10 (TEMP) <sup>d</sup>	Yellow	ON	✓	The Gateway board is the last in the network.
			OFF	✓	The Gateway board is not the last in the network.

a. STAT stands for status.

b. COMM stands for communication.

c. CURLIM stands for current limit. Note that the text does not correlate to the LED function.

d. TEMP stands for temperature. Note that the text may not correlate to the LED function. Gateway boards that were manufactured before mid-2016 and have not received a CPLD firmware update use the yellow LEDs as follows: ON=defective thermistor detected, blinking fast=the operating temperature limit is exceeded, OFF=the motor temperature is within operating range.



## Coil Driver Board (ACB3000) Indicator Lights

The coil driver board has two (2) indicator lights: one green, and one red.

Indicator Light	Light State	Normal	A Problem May Exist
Green	ON	✓ (power is ON)	
	OFF		The power is OFF.
Red	ON		The A/D CPLD is not programmed. Contact your vendor for assistance.
	OFF	✓	

## Gateway Network Error

This fault occurs when the controller doesn't receive updates from a section in a required time, and results in the system being unable to continue operation to product specifications. There are various reasons this can be the case listed in the root causes tables at the end of this section.

### Identifying the Fault

There are two locations the fault will display.

1. Gateway network error as seen from the Overview tab of the right panel in the System Dashboard view.

Overview						
Section	Fault Codes	Warning Codes	Motor Power	Enabled	Pallet Count	Status
<>	0	800000			14	Warning Present
1	0	0	✓	✓	0	Enabled
2	0	0	✓	✓	4	Enabled
3	8000	0	✓	✗	5	Fault Present
4	80	0	✓	✗	0	Fault Present
5	0	0	✓	✓	5	Enabled
6	0	0	✓	✓	0	Enabled

2. Gateway network error as seen from the Fault/Warning Message List of the Overview tab of the right panel in the System Dashboard view.

Timestamp	Message	ID
✗ 12/15/...	Gateway Network error: Feedback not received	7
✗ 12/15/...	Gateway Network error: Hardware sensor values not received	7

### Using TrakMaster to Identify Sections Causing Gateway Network Errors

Starting with version 3.0.32.0, TrakMaster can be used to find where in the network Gateway network errors originate which is often different than the location as reported in TrakMaster (due to Feedback losses cascading towards the tail of a network). Below is a mapped diagram of the TrakMaster screen showing how to identify the location of the Gateway network error.

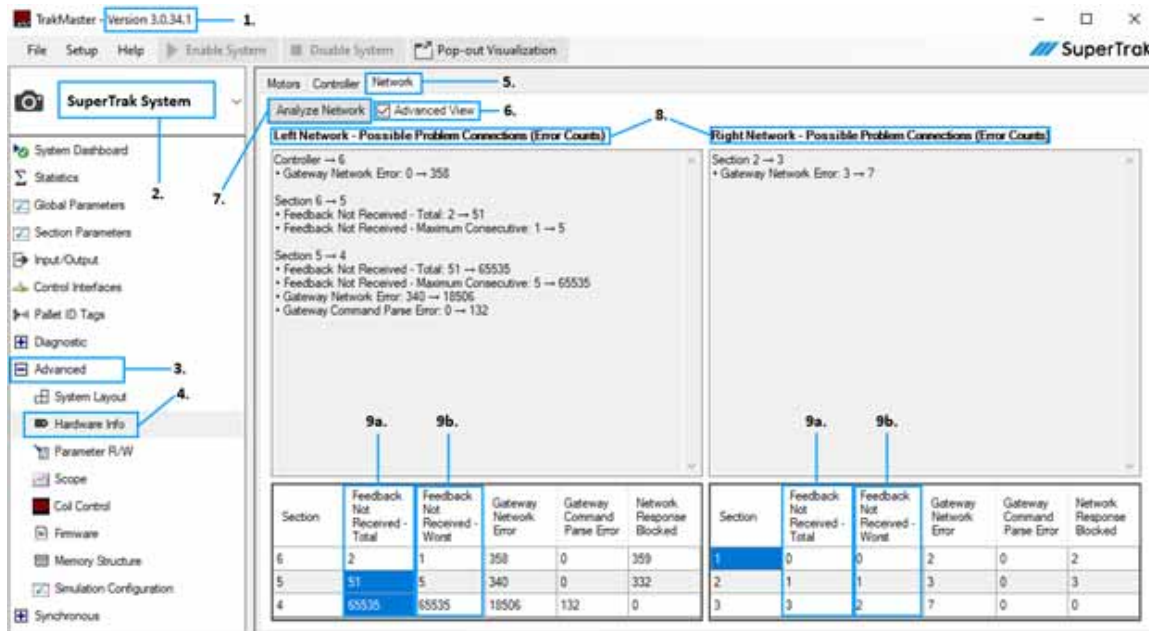


Diagram #	Step
1	Verify that you are using TrakMaster version 3.0.32.0 or higher
2	Open the system snapshot to be analyzed.
3	Expand the “Advanced” view category.
4	Select the “Hardware Info” Menu
5	Select the “Network” tab
6	Check the “Advanced View” check box
7	Press “Analyze Network”
8	Observe the Left and Right network views
9a	Observe the “Feedback Not Received – Total” count pattern and take note of sections where this number jumps the most between. These are locations that should be investigated. In this example, the interconnect between section 5 and 4 should be investigated. Refer to root causes chart.
9b	Observe the “Feedback Not Received – Worst” count. This count increases disproportionately at sections that experience large differences in “Feedback Not Received – Total” counts and is the reason systems experience Gateway network error faults

*Note: All networks experience Gateway losses. SuperTrak performs to specifications, even considering these losses.*

### Root Causes of Gateway Network Errors

The following are common causes for Gateway network errors. Please contact customer support if issues persist.

GATEWAY NETWORK ERRORS - POWER ISSUES	
Root Cause	Solution(s)
Required EMC filter on AC lines not present in panel	<ul style="list-style-type: none"> <li>• Install filter.</li> </ul>
Loose +28VDC, COM interconnect cables, and/or COM bus jumper connections; could cause ground bounce on the Gateway network	<ul style="list-style-type: none"> <li>• Tighten to torque specs indicated on the e-box cover diagrams.</li> <li>• For sections built pre-2020, check the split bus bar connections behind the Gateway board.</li> </ul>
+24VDC and/or COM digital connections loose/improperly seated at Gateway	<ul style="list-style-type: none"> <li>• Ensure ferrules are held tightly in green terminal block connectors.</li> <li>• Ensure all green terminal block connectors are properly seated in the Gateway board.</li> <li>• If installed in a curved section: Ensure that Gateway board is screwed in place at all four corners</li> </ul>
+24VDC digital supply too low	<ul style="list-style-type: none"> <li>• Measure voltage across the +24VDC at furthest end of track from the supply. Adjust supply if needed</li> </ul>
+28VDC power supplies poorly distributed around the track, causing high bus fluctuations	<ul style="list-style-type: none"> <li>• Spread +28VDC supplies evenly around the system, avoiding clustering.</li> </ul>
Additional devices sharing +24VDC digital power are introducing voltage transients	<ul style="list-style-type: none"> <li>• Consider electrical solution to eliminate transients.</li> <li>• Otherwise move devices to separate 24V supply.</li> </ul>
+24VDC and COM digital cables from panel to e-turn not a twisted pair	<ul style="list-style-type: none"> <li>• Install proper cable.</li> </ul>
Motor power supply delay timer not functioning as specified	<ul style="list-style-type: none"> <li>• Verify the power supply delay timer is functioning properly and set to a minimum of 2 seconds delay.</li> </ul>

*Note: If the affected Gateway board(s) display a blinking green "STAT" light, then the board has likely experienced a temporary loss of power. Check for power supply and power wiring issues.*

<b>GATEWAY NETWORK ERRORS - NETWORK ISSUES</b>	
<b>Root Cause</b>	<b>Solution(s)</b>
Network cable ferrites missing or in wrong locations	<ul style="list-style-type: none"> <li>• Install ferrites in the correct locations. See the diagrams in <a href="#">Gateway Network Connections</a> on page 56.</li> </ul>
Network cables pinched at motor bus jumper connection	<ul style="list-style-type: none"> <li>• Visually inspect and re-route cable.</li> <li>• Replace if damaged.</li> </ul>
Faulty black network cable	<ul style="list-style-type: none"> <li>• Problem area can be located using TrakMaster, See procedure below. Technical support may still be required</li> <li>• Faulty cable can then be identified and replaced.</li> </ul>
Black network cables routed behind coil wires; picking up noise when coils are driving	<ul style="list-style-type: none"> <li>• Re-route cables in front of coil wires.</li> </ul>
Faulty/damaged, or improperly grounded F-F coupler in e-turn	<ul style="list-style-type: none"> <li>• Inspect and replace if needed.</li> <li>• Ensure F-F coupler not bypassed.</li> </ul>

<b>GATEWAY NETWORK ERRORS - OTHER ISSUES</b>	
<b>Root Cause</b>	<b>Solution(s)</b>
Unapproved Controller configuration	<ul style="list-style-type: none"> <li>• Use approved configurations for SuperTrak.</li> </ul>
Anti-static brushes worn out, causing static buildup on shuttles	<ul style="list-style-type: none"> <li>• Ensure anti-static brushes are clean and bristles are an acceptable length.</li> </ul>
Improper controller grounding	<ul style="list-style-type: none"> <li>• Ensure APC is properly grounded in the SuperTrak panel.</li> </ul>
Excessive electrical noise emitted by other devices located near the conveyor	<ul style="list-style-type: none"> <li>• Identify and reduce external noise.</li> </ul>
Faulty/damaged Gateway board	<ul style="list-style-type: none"> <li>• Rare occurrence. Consider replacing as a last resort solution.</li> </ul>
Improperly routed network cable	<ul style="list-style-type: none"> <li>• Contact SuperTrak Support and see <a href="#">Gateway Network Connections</a> on page 56.</li> </ul>

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# System Specifications

This section provides SuperTrak PHARMA8™ conveyance platform system specifications. Information in this section is for general reference and may be updated without notice. Be sure you are using the most current version of this user manual, which can be found at <https://supertrakconveyance.com/technical-documentation/>.

## Installation Requirements

Service	Specification	Value
Power supply	Input rating	1 phase x 200-240VAC 50/60 Hz
	Output rating	28VDC 1500W
	Fuses/circuit breaker	10 A UL489 breaker Type CC fuses, or type J fuses
	Terminal connection cross-section	Connect as per local requirements for 10A
Track	Input rating	28VDC 100A peak
	Output rating	Force of up to 150N/shuttle
	Fuses/circuit breaker	50A fuses
	Terminal connection cross-section	16 mm <sup>2</sup> cables terminated with a wire lug
	Permitted mounting orientations	Horizontal upright

## Performance

The SuperTrak PHARMA8™ conveyance platform is designed to meet the following optimal performance<sup>1</sup>:

Performance Description	Value
Maximum speed	2.5 m/s (8.2 ft./s)
Acceleration	30m/s <sup>2</sup> with 0.5 kg (1.1 lb) payload
Payload	8.5 kg (18.7 lb) per shuttle
Stop repeatability - straight section	± 0.01 mm (0.00039 in.)
Stop repeatability - curved section	± 0.025 mm (0.001 in.)
Communication	EtherNet/IP, PROFINET, POWERLINK, and EtherCAT <sup>a</sup>
Number of supported shuttles	As many as can physically fit on the track length
Process on curve	Yes, full control
Shuttle options	Standard configuration with 2 or 3 magnet array options
Collision avoidance	Built in
Power consumption	10W/section, 150-275W/shuttle <sup>b</sup>
Servo update rate	800 μs typical
Lubricants	No wet lubricant required
Loop size	<ul style="list-style-type: none"> <li>• 1m and 2m plus turns in a single piece</li> <li>• 3m plus turns and more in module buildup</li> </ul>
Surface and roughness	Stainless steel 316L, Ra < 0.8μm on visible area surfaces
Design ratings	Design conforms to EEC-cGMP, ISO 9001 & ISO 13485
Washing and decontamination	<ul style="list-style-type: none"> <li>• Vaporized hydrogen peroxide (VHP), quats, ethanol, IPA and traditional sporicidals</li> <li>• Wash In Place (WIP) with spray gun and spray ball</li> </ul>

a. Other protocols are possible. Contact ATS if other protocols are required.

b. Power consumption varies depending on the aggressiveness of the application: it may be less with less demanding requirements or more with more demanding requirements.

<sup>1</sup>Performance does not include supplied product defects, operator error, operator training, or failure of services.



## Environment Conditions

State	Specification	Track	Power Supply Value
Operation	Temperature (ambient)	5°C (41°F) to 55°C (131°F)	-20°C (-4°F) to 71°C (159.8°F)
	Humidity (relative)	5% to 85% non-condensing	20% to 90%
Storage	Temperature (ambient)	-25°C (-13°F) to 55°C (131°F)	-20°C (-4°F) to 75°C (167°F)
	Humidity (relative)	5% to 95% non-condensing	20% to 90%
Transport	Temperature (ambient)	-25°C (-13°F) to 70°C (158°F)	-20°C (-4°F) to 75°C (167°F)
	Humidity (relative)	Max.95% at 40°C (104°F)	20% to 90%

## Environmental Limits

### Power Supply: Environmental Limits

Specification	Power Supply Value
Mains configuration	1 phase x 200-240VAC 50/60 Hz Grounding: TN
Degree of contamination	Pollution degree 2 environments
Over-voltage capacity	II
IP protection	IP20
NEMA protection	NEMA type 1
Maximum installation altitude	2000 m (6561.6 ft.)

### Track: Environmental Limits

Specification	Track Value
Particulate Levels Rating	<ul style="list-style-type: none"> <li>ISO 5, ISO 14644.1</li> <li>EU GMP Annex 1 Grade A</li> </ul>
Leak Rate Classification	ISO 10648 Class 3

## Electrical Services

Service	Specification	Value
Control panel	Line voltage	208Y120VAC+PE Or 400Y230VAC+PE
	Frequency	50/60 Hz
	Phases	3 ph, 5-wire
	Short circuit current rating	5kA
	Largest load	20A
	Control voltage	24VDC (digital power supplied from the control panel) 28VDC (motor power supplied from the power supplies)
	Full load amps	36A
UPS (located inside the control panel)	Line voltage	24VDC
	Frequency	50/60 Hz
	Current rating	15A

## Electromagnetic Compatibility (EMC) Requirements for High-Frequency Emissions

The following table provides the high-frequency emissions in accordance with EN 61000-6-4:

Emission	Test Accordance	Class	Emission
Conducted emissions	IEC 55011	Class A Group 2	150 kHz - 30 MHz
Radiated emissions	IEC 55011	Class A Group 2	150 kHz - 1000 MHz

## Electromagnetic Compatibility (EMC) Requirements for Immunity to Disturbances

The following table provides high-frequency disturbance limits in accordance with EN 61000-6-2:

Disturbance Type	Test Accordance	Description	Limit Requirement	PC <sup>a</sup>
Electrostatic discharge	EN 61000-4-2	Contact discharge to powder-coated and bare metal housing parts.	4kV	B
		Discharge through the air to plastic housing parts.	8kV	B
Electrostatic fields	EN 61000-4-3	Housing, completely wired.	10V/m, 51 MHz, 144 MHz, 222 MHz, 431 MHz, 2.4 GHz Radiated field as produced by portable radios modulation.	A
Burst	EN 61000-4-4	AC mains	±2kV, 1 min, direct coupling.	B
		I/O ports	N/A	B
Surge	EN 61000-4-5	Power connection	±2kV, CM (L-Gnd), ±1kV, DM (L-L), N/A on I/O Ports	B
High-frequency conducted disturbances	EN 61000-4-6	Power connection	0.15 - 250 MHz, 10 Vrms, 80% amplitude modulation at 1 kHz	A
		I/O ports	N/A	-

a. Performance criteria (PC) descriptions are as follows:

A - The system will continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by SuperTrak CONVEYANCE when the system is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by SuperTrak CONVEYANCE, then either of these may be derived from the product description and documentation and by what the user may reasonably expect from the system if used as intended. Preprogrammed move of shuttles showing speeding up, sudden stop in predetermined position, short moves back-and-forth and speeding up again, are simulated to show all possible scenarios of the shuttle moves. No stopping of shuttles, no errors on the control screen, and no alarms are allowed during the application of the test voltage.

B - After the test, the system will continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by SuperTrak CONVEYANCE™, when the system is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (of the permissible performance loss) is not specified by SuperTrak CONVEYANCE™, then either of these may be derived from the product description and documentation and by what the user may reasonably expect from the system if used as intended.

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# Glossary

This section contains an alphabetized list of terms and acronyms that may be used in this document.

Term	Definition
ATS	ATS Corporation, the parent company of SuperTrak CONVEYANCE™.
Bus board	A capacitor bank that filters out spikes or ripples in the electrical supply to provide smooth DC voltage. A bus board is mounted behind each linear motor.
Cell	Two (2) or more stations that are grouped together. Typically, a cell can function independently of other cells. In some cases, cells are connected by a global emergency stop.
Component	Typically, the smallest and most detailed level of the SuperTrak PHARMA8™ conveyance platform. For example; a single piece of tooling, a sensor, or a cylinder.
Control interface	A protocol that provides isolated bi-directional communication from the SuperTrak PHARMA8™ conveyance platform controller to local cell controllers. This protocol is executed over one of the supported fieldbus network.
Curved section	A portion of the track where shuttles move on an arc between straight sections. May also be referred to as an e-turn or a 180 deg. (500mm) section.
Cycle	The complete sequence of steps that a device performs to complete a task.
Cycle time	The time a device takes to complete a sequence of operations once.
Device	Two (2) or more components that are grouped together to complete a single function. A device can be controlled by software to move through a sequence of steps. For example; a conveyor or lift tooling.
Disable	Prevent a device from operating through software or by removing power.
Disconnect	To interrupt or terminate a connection.
Enable	Allow a device to operate through software or by connecting power.
Encoder	A position sensor that continuously monitors shuttle positions.
Gateway network	An ATS proprietary network, implemented using standard Ethernet cables; however, it is not Ethernet and should not be connected to Ethernet devices. It connects an array of Gateway boards to the controller.
Guarding	A protective barrier surrounding automated equipment to prevent access to moving devices and to guard users from potentially hazardous conditions.
ISO	International Organization for Standardization (an international organization composed of national standards bodies from over 75 countries)

Term	Definition
Lockout	The placement of a locking device (such as a padlock) on an energy isolating device, in accordance with an established procedure, to make sure that the energy isolating device and the equipment being controlled cannot be operated until the locking device is removed. Used in combination with tagout.
Pallet	A shuttle may also be referred to as a pallet. See definition of “shuttle” below.
Payload	The total mass of the parts and tooling added to the base shuttle. (The mass of the base shuttle is not included in the payload.)
PLC	Programmable Logic Controller An electronic processor that contains the programmable code for controlling system operation, device operating sequences, fault recovery, and data processing.
Shuttle	A movable base on which parts can be placed. A shuttle can be partitioned to hold more than one part. A shuttle may also be referred to as a pallet.
Skirt	An oval metal structure that supports the track from the bottom.
Station	Two (2) or more devices that work together to complete a task. For example; a shuttle stop on a conveyor and all the devices responsible for working on the contents of the shuttle.
Straight section	A portion of the track where shuttles move in a linear direction.
System	References the automation machine that the SuperTrak PHARMA8 <sup>™</sup> conveyance platform is integrated with.
Tagout	The placement of a durable tag on an energy isolating device, in accordance with established procedure, to identify the person who placed a lock on the device. Equipment being controlled by the energy isolating device must not be operated until the lock and tag have been removed. Used in combination with lockout.
Target	A location on the SuperTrak PHARMA8 <sup>™</sup> conveyance platform that can be set as a shuttle destination. A SuperTrak PHARMA8 <sup>™</sup> conveyance platform can have up to 255 configured targets, each located anywhere on the system.
Thermistor (motor thermistor)	A motor thermistor is a temperature sensor that is used to monitor the temperature of the linear motor.
Track	When used in the context of specifications, the term “track” refers to the basis of the conveyor itself, including the motors and the rails (and not including the shuttles, power supply, control panel, or skirting).
TrakMaster	Software that provides configuration, programming, diagnostics and control over a supervisory data network. TrakMaster communicates over Ethernet. TrakMaster is not required to operate SuperTrak PHARMA8 <sup>™</sup> conveyance platform; however, it is useful for troubleshooting and configuring the device.
UPS	Uninterruptible power supply or uninterruptible power source An electrical device that provides electrical power to a device when the main source of electrical power is turned OFF.

# SuperTrak PHARMA8™ Conveyance Platform Service

This section describes how to contact SuperTrak CONVEYANCE™ Product Support for customer assistance.

## Contact SuperTrak CONVEYANCE™

Please contact SuperTrak CONVEYANCE™ for assistance, questions or comments regarding the operation or maintenance of your equipment.

SuperTrak CONVEYANCE™

1 Natura Way

Cambridge, ON, N3C 0A4, Canada

Tel: 519-653-6500

Fax: 519-650-6538

Email: [supertrak\\_support@supertrakconveyance.com](mailto:supertrak_support@supertrakconveyance.com)

Website: [www.supertrakconveyance.com](http://www.supertrakconveyance.com)

Regular business hours are 8:30 am to 5:00 pm EST, Monday through Friday. Emergency support hours are weekends, holidays, and 5:30 pm to 8:00 am EST weekdays.

Emergency Support Tel: 519-653-3060

## Return a Part to SuperTrak CONVEYANCE™ for Warranty

If your spare parts inventory does not contain a replacement part for a failed SuperTrak PHARMA8™ conveyance platform part, you can purchase a replacement part from SuperTrak CONVEYANCE Product Support.

1. Contact SuperTrak CONVEYANCE Product Support with the following information:
  - Part number
  - Part description
  - A brief description of the failure.
2. SuperTrak CONVEYANCE Product Support will send you a RMA request form which you complete and return to product support.
3. SuperTrak CONVEYANCE Product Support reviews the form and determines if the part is in warranty.

4. SuperTrak CONVEYANCE Product Support provides you with a return material authorization (RMA) number.
5. Courier your defective part to SuperTrak CONVEYANCE Product Support. A tracking number is recommended. Make sure the RMA number is on the outside of the package.
6. When SuperTrak CONVEYANCE Product Support receives the defective part, one (1) of the following is done:
  - For parts manufactured by SuperTrak CONVEYANCE™, SuperTrak CONVEYANCE Product Support directly validates the warranty by repairing or replacing the part. Proceed to step 7.
  - For purchased parts (for example; motors, or amplifiers), SuperTrak CONVEYANCE Product Support sends the defective part to the original manufacturer. The original manufacturer validates the warranty and repairs or replaces the part at their discretion.

Be aware that some manufacturers require a purchase order (PO) to test returned parts. If a PO is required, SuperTrak CONVEYANCE Product Support will contact you for a PO before additional action is taken.

7. Depending on the original manufacturer response, SuperTrak CONVEYANCE Product Support contacts you with a list of options:
  - The defective part is repaired or replaced under warranty. Freight is the responsibility of the customer.
  - The defective part is not covered under warranty, but it can be repaired with a PO. SuperTrak CONVEYANCE Product Support provides a quote for part repair.
  - The defective part is not covered under warranty, and it can not be repaired. SuperTrak CONVEYANCE Product Support provides a quote for part replacement and discards the defective part unless otherwise directed.
8. When SuperTrak CONVEYANCE Product Support receives the replacement part from the manufacturer, SuperTrak CONVEYANCE Product Support sends the replacement part back to the original sender unless otherwise directed.
9. SuperTrak CONVEYANCE Product Support closes the RMA.



## Request Service from SuperTrak CONVEYANCE™

Contact SuperTrak CONVEYANCE™ Product Support if service is required on your SuperTrak PHARMA8™ conveyance platform. Please have the following information available when you call:

- Company name
- Contact name
- Contact number
- Project number (if applicable): See the electrical panel, or front cover of this manual for the project number.
- Technical description of the problem
- Purchase order number

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# Appendix A: Spare Parts






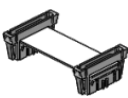



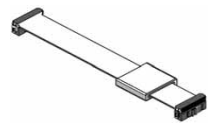
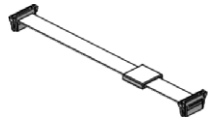
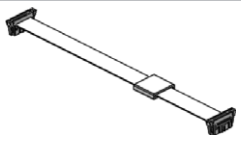
Be aware that graphics in this section are not to scale.

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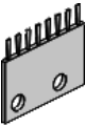



This section provides the recommended spare parts information for the SuperTrak PHARMA8™ conveyance platform.

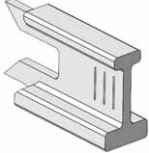


## Cables and Wires


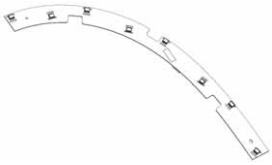
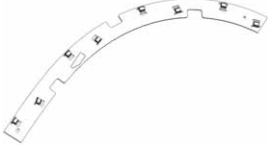
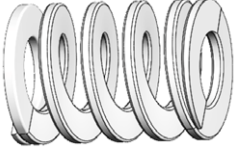
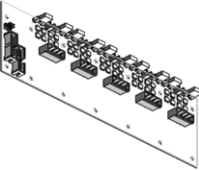
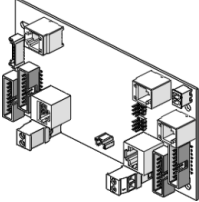
Description	Graphic	Part Number	Where Used	Rec. Qty <sup>a</sup>	Replacement Frequency <sup>b</sup>	Critical <sup>c</sup>
Encoder cable - 548mm		SP-1061547	<ul style="list-style-type: none"> <li>•Straight Section</li> <li>•180 Degree Section 500mm</li> </ul>	1	Very Low	Yes
Thermistor - 300mm		SP-1061479	<ul style="list-style-type: none"> <li>•Straight Section</li> <li>•180 Degree Section 500mm</li> </ul>	5	Very Low	Yes
Thermistor - 1000mm		SP-125444151	<ul style="list-style-type: none"> <li>•Straight Section</li> <li>•180 Degree Section 500mm</li> </ul>	5	Very Low	Yes
Ethernet network cable		SP-3708400	•All Sections	3	Very Low	Yes
Ribbon cable - 298mm		SP-1060325	•Straight Section LH top	1	Very Low	Yes
Ribbon cable - 57mm, straight RH bottom		SP-1060322	•Straight Section RH bottom	1	Very Low	Yes
Ribbon cable - 32mm		SP-1060323	•Straight Section RH top	1	Very Low	Yes

Description	Graphic	Part Number	Where Used	Rec. Qty <sup>a</sup>	Replacement Frequency <sup>b</sup>	Critical <sup>c</sup>
Ribbon cable - 152mm		SP-1060484	180 Degree Section 500mm LH top and bottom	1	Very Low	Yes
Ribbon cable - 241mm		SP-1060483	180 Degree Section 500mm RH top	1	Very Low	Yes
Ribbon cable - 273mm		SP-1060324	<ul style="list-style-type: none"> <li>•Straight Section LH</li> <li>•180 Degree Section 500mm RH bottom</li> </ul>	1	Very Low	Yes

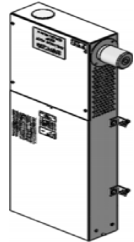

## Other Spare Parts

Component	Description	Graphic	Part Number	Rec. Qty <sup>a</sup>	Replacement Frequency <sup>b</sup>	Critical <sup>c</sup>
Shuttle	Flat wheel assembly		SP-125728057	30	Medium	No
	Bogie wheel assembly		SP-125728564	30	Medium	No
	Anti-static brush		SP-125788699	10	Medium	Yes
	Shuttle bumper		SP-125779750	2	Low	No
	Shoulder bushing		SP-125732613	30	Medium	No
	Tooling plate O-ring		SP-125778190	5	Low	No

Component	Description	Graphic	Part Number	Rec. Qty <sup>a</sup>	Replacement Frequency <sup>b</sup>	Critical <sup>c</sup>
Shuttle Lubrication	Shuttle lubrication kit	N/A	SP-125905812	5	Medium	No
	Shuttle lubrication block		SP-125916981	2	High	No
	Shuttle lubrication leaf spring		SP-125917055	2	Medium	No
	Shuttle lubrication washer plate		SP-125917222	4	Medium	No

Component	Description	Graphic	Part Number	Rec. Qty <sup>a</sup>	Replacement Frequency <sup>b</sup>	Critical <sup>c</sup>
Encoder	Encoder PCB - Straight		SP-125957362	1	Low	Yes
	Encoder PCB - Curved LH		SP-125957363	1	Low	Yes
	Encoder PCB - Curved RH		SP-125957364	1	Low	Yes
	Compression spring		SP-125803985	10	Low	Yes
Circuit boards	Coil driver board		SP-25211311	4	Low	Yes
	Gateway board		SP-25211309	1+	Low	Yes



Component	Description	Graphic	Part Number	Rec. Qty <sup>a</sup>	Replacement Frequency <sup>b</sup>	Critical <sup>c</sup>
Miscellaneous	Motor power supply 1.5M DC cable		25270337	1	Low	Yes
	Power supply 50a fuse (pack of 5)		SP-3708611-PK	1+ (5-pk)	Very Low	Yes
	Coil driver fuse (pack of 10)	N/A	SP-4234040-PK	1	Very Low	Yes
	Power supply exhaust filter (pack of 10)	N/A	SP-0405-0144-101-PK	1+ (10-pk)	High	Yes
	High i3 performance SuperTrak conveyance platform controller	N/A	SP-4598804 (Obsolete—use SP-7325131)	1 (if using standard controller)	Low	Yes
	Integrated i3 SuperTrak conveyance controller and PROFINET slave	N/A	7582584	1 (if using integrated controller)	Low	Yes
	Hatch O-ring - curved section	NA	SP-125958638	1	Low	Yes
	Hatch O-ring - straight section	NA	SP-125958667	1	Low	Yes

- a. This is the recommended on-hand quantity for a base assembly. Increase quantities, as required, for larger SuperTrak PHARMA8™ conveyance platforms.
- b. Replacement frequency definitions:  
 High - Replace at regular intervals.  
 Medium - Replace occasionally.  
 Low - Replace rarely.  
 Very Low - Replacement is not generally required.
- c. Critical to the SuperTrak PHARMA8™ conveyance platform function definitions:  
 Yes - The SuperTrak PHARMA8™ conveyance platform will not run without this component.  
 No - The SuperTrak PHARMA8™ conveyance platform will run without this component.

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# Appendix B: Unit Conversions

To Convert	Into	Multiply By
bar	psi	14.503773773
bar	KPa	100.0
bar	inHg	29.5301
cm	in.	0.3937
ft	m	0.3048
ft.-lbf	N-m	1.3558179483314
Gs	mT	0.1
in.	cm	2.54
inHg	psi	0.491154
inHg	kPa	3.38638816
inHg	bar	0.03386388158
kPa	psi	0.145038
kPa	bar	0.01
kPa	inHg	0.295301
lbf	N	4.4482216
m	ft	3.2808
N	lbf	0.22480894387096
N-m	ft.-lbf	0.73756214927727
psi	kPa	6.8948
psi	bar	0.068947
psi	inHg	2.03602

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