

# INSTALLING THE BATTERY KIT (854037) INTO ENVIRONMENTAL ENCLOSURE MODEL 854030

QUICK START GUIDE

## Safety Information



### WARNING

The 8540 Environmental DustTrak™ / 8543 Environmental DustTrak™ DRX aerosol monitor is not rated for intrinsic safety. The DustTrak monitor, with the Environmental Enclosure, must **NEVER** be operated under conditions where there is a risk of fire or explosion.



### WARNING

Use of components other than those specified by TSI may impair the safety features provided by the equipment.



### WARNING

The instrument has been design to be used with batteries supplied by TSI. **DO NOT** use a substitute.

The TSI charger (P/N 801809) has been designed to be used with the battery packs supplied by TSI. **DO NOT** use a substitute charger to charge TSI battery packs.

Old batteries must be properly recycled in accordance with the local environmental regulations.



### WARNING

**DO NOT** use non-rechargeable batteries in this instrument. Fire, explosions, or other hazards may result.



### Note

Prior to using the Battery Pack for the first time, a full recharge is recommended. **Recharging Battery Pack(s) immediately after use (within one hour maximum) is critical to obtaining optimal recharge time, battery health, and battery life.**

## Reusing and Recycling



As part of TSI Incorporated's effort to have a minimal negative impact on the communities in which its products are manufactured and used:





-  **DO NOT** dispose of used batteries in the trash. Follow local environmental requirements for battery recycling.
-  If instrument becomes obsolete, return to TSI for disassembly and recycling.

This guide will help you quickly install the Batteries for Environmental Enclosure Model 854030.

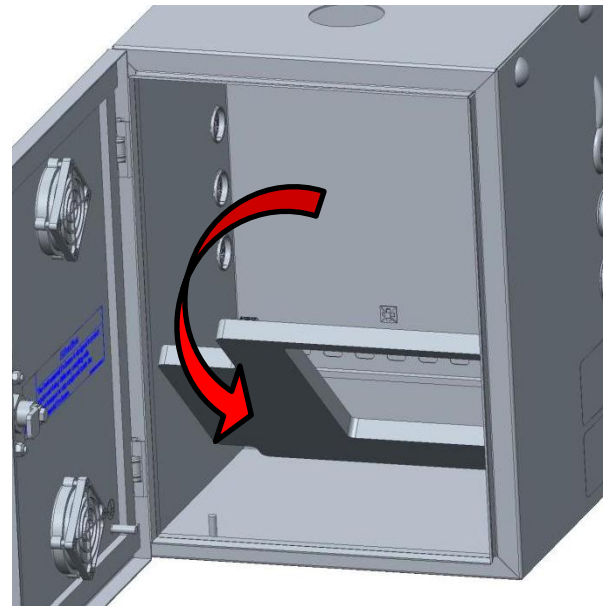
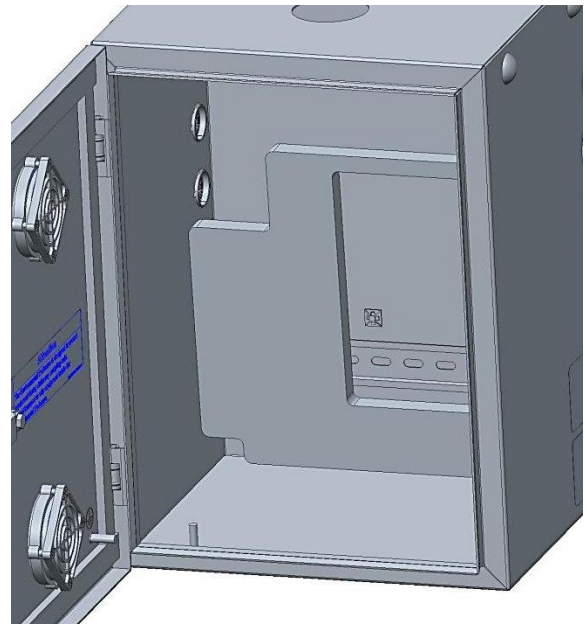


## Unpacking the Batteries (8018807) for the Environmental Enclosure (854030)

1. Unpack the Batteries (8018807) for Environmental Enclosure (854030) and verify that all the items listed in the following table are present.
2. Contact [TSI](#) immediately if items are missing or broken.

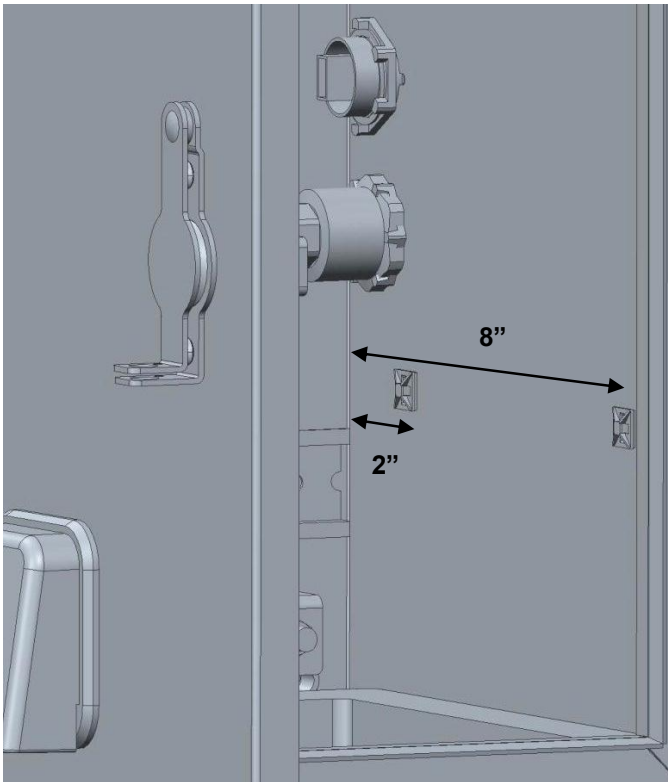
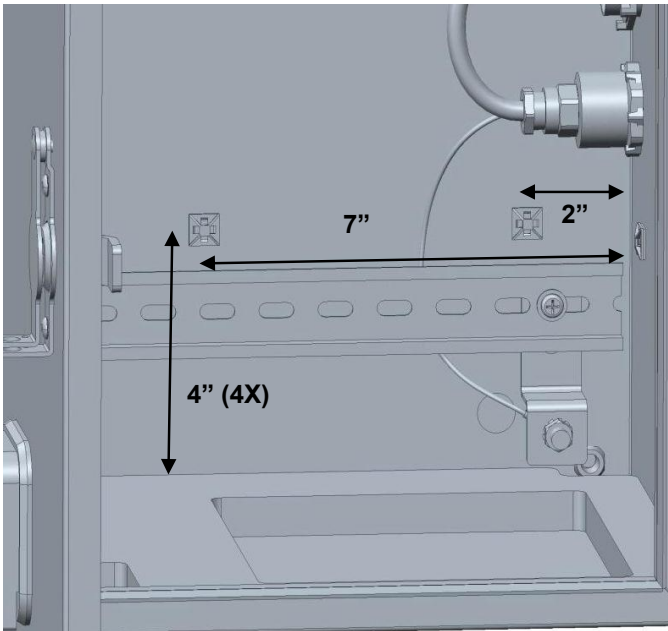
Qty.	Item Description	Reference Picture
1	Charger (P/N 801809)	
2	Battery (P/N 801808)	
1	Battery Connection Harness (Fuse: 5AT 250V 20 x 5 mm)	
1	Battery Tray	
4	Zip Tie Mounts	
4	Zip Ties	

## Install the Battery Tray



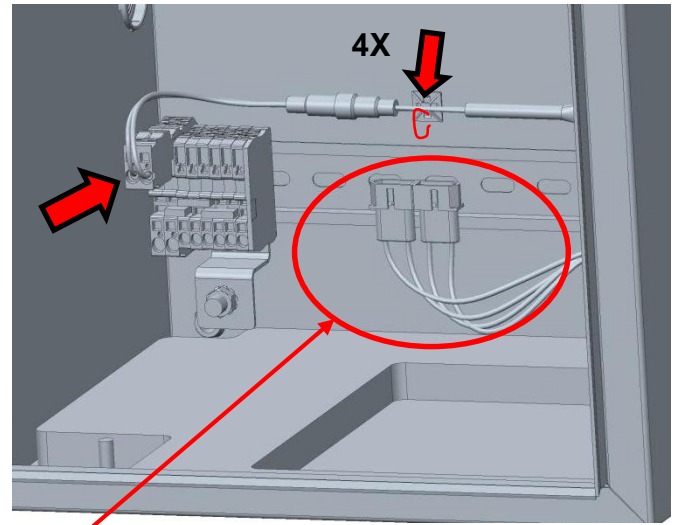
## Install Zip Tie Mounts

Install Zip Tie Mounts in approximate locations shown. Prior to installing mounts make sure surface is clean and free of dirt, debris, grease, etc.



## Install Battery Connection Harness

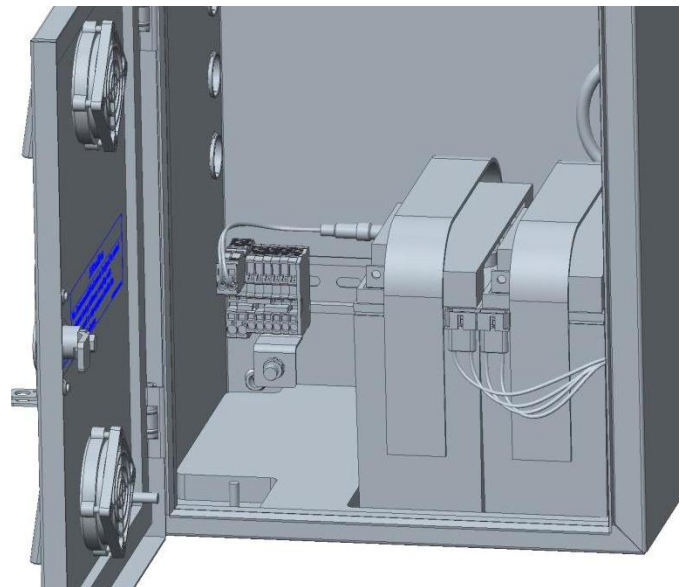
Install battery connection harness and connect to DIN Rail.



Battery connection harness shown where connection to batteries will be made in next step below.

## Install Batteries

Install Batteries and connect to harness.



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## Safe Handling and Usage Guide

- **Read** the “Battery Charger User’s Manual” before using the battery charger.
- **DO NOT** modify the battery packs (P/N 801808) or battery charger (P/N 801809) in any way from the original state received from TSI.
- The warranty period on the replacement battery packs (P/N 801808) or the replacement battery charger (P/N 801809) are valid for one year from date of shipment from TSI Incorporated.
- **NEVER** use a substitute charger to charge battery packs. **Only use TSI P/N 801809 chargers to charge battery packs (P/N 801808).**
- **ALWAYS disconnect (un-plug) power from charger before removing battery packs from the charger.**
- **ALWAYS** completely, charge battery packs before use.
- **ALWAYS** inspect battery packs and cables prior to charging or use.
- **PLACE BATTERY PACKS ON CHARGE IMMEDIATELY AFTER USE.** Waiting to charge batteries after use will result in poor battery health, longer charge times and decreased battery life.
- Keep battery packs on charge when **NOT** in use.
- It is important to check the health of battery packs at least once every three (3) months. To check the current health status of a battery pack, perform the “Battery Pack Health Procedure” provided in the Maintenance section below for details.
- **REMOVE from service and appropriately recycle any battery pack that provides less than 17 hours of run-time for either an Environmental DustTrak Photometer 8540 or Environmental DustTrak DRX Photometer 8543.**
- **REMOVE from service and appropriately recycle any battery pack that has triggered a charger time-out while charging as this is an indication of a battery that will not take a charge any longer.** Read the “Charging Battery Packs” section of the TSI Environmental Enclosure Model 854030 Operation and Maintenance Manual for details.
- **Contact TSI Incorporated if a charger should trigger a “time-out” on multiple occasions while charging different battery packs, as this may be an indication of a faulty battery charger.**
- **Keep battery packs AWAY from the presence of flammable materials at all times, as the battery pack can be a source of ignition.**
- **DO NOT** expose a battery pack to temperatures less than 5°F/-15°C or greater than 122°F/50° C at any time.
- Charge and store battery packs in a cool, clean, dry, and well-ventilated environment.
- **DO NOT** leave a battery pack inverted for long periods of time.
- Battery packs should only be handled using the battery straps mounted on the top of the battery case from TSI factory.
- **DO NOT handle or carry the battery pack using the power cable connector.**
- **REMOVE** (disconnect) any wire connections from power cable connector before attempting to remove batteries from Environmental Enclosure or prior to charging.
- **ONLY** connect battery packs together using the Battery Wiring Harness provided with the Battery Kit.
- **DO NOT** attempt to charge battery packs using the Battery Wiring Harness or Dual Battery Wiring Harness (P/N 801817); it will not work and could cause serious damage to either the battery packs or the battery charger. The Dual Battery Wiring Harnesses are designed to be used to supply power to various models of DustTrak monitors and TSI accessories only.
- If strain is applied to battery pack power cables, evaluate the cable for damage before using.
- If any damage is observed to any battery pack power cable at any time, **DO NOT** attempt to use or charge the battery pack. **REMOVE and dispose of the damaged cable.**

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## Operation

### Changing and Re-charging the Batteries

If using an Environmental DustTrak aerosol monitor, change battery pack at least every 24 hours of use or every 48 hours if using two batteries. If using the Heated Inlet accessory with the Environmental Enclosure, change the battery at least every 15 hours of use or 30 hours if using two batteries.

A voltage cutoff switch will cut the power to the DustTrak II/DRX aerosol monitor when the battery voltage reaches 10.5 V. This ensures that the battery does not become too deeply discharged to recover, and also prevents the DustTrak monitor from operating below its rated voltage input. Preventing this condition will prolong the life of the battery.

If storage is required, battery packs should be fully charged prior to storage to prolong the life of the battery and be left off of charge for no longer than three months maximum. However, it is **NOT** recommended to store battery packs off of charge. Battery packs stored off charge may result in shorter than average life.



Battery packs will age over time per usage and care. The battery packs will last 180 to 200 cycles on average. One cycle being defined as one battery pack discharge and one recharge process. With optimal use and care, the life of a battery pack may possibly increase beyond 200 cycles. For optimal battery health, keep battery packs on charge in a cool, dry, and well-ventilated area while **NOT** in use, and recharge battery packs immediately after use.

If battery packs are stored off of charge for durations longer than 30 days then longer charge times and shorter run-times may result due to degraded battery health. Battery pack health will diminish at a much more rapid pace if **NOT** recharged immediately (within one hour maximum) after use.

It is important to remove a battery pack from service if signs of diminished run-time or longer charge time are observed. These are signs of battery pack aging and poor general battery health. **To identify unhealthy battery packs, it is important to review and adhere to the Battery Health Check procedures in the Maintenance section below.**

A battery pack in good health will take near 8 to 9 hours to fully charge.

A battery pack that provides 30% less product run-time than expected is ready to be removed from service. If a given battery pack provides a run-time of 17 hours or less for the Environmental DustTrak or a run-time of 10 hours or less for the Environmental DustTrak and Heated Inlet, the battery pack should be removed from service and properly recycled in accordance with local environmental regulations.

#### Note

Prior to using the Battery Pack for the first time, a full recharge is recommended. **Recharging Battery Pack(s) immediately after use (within one hour maximum) is critical to obtaining optimal recharge time, battery health, and battery life.**



#### WARNING

The instrument has been designed to be used with batteries supplied by TSI. Do **not** use a substitute.

The TSI charger (P/N 801809) has been designed to be used with the battery packs supplied by TSI. Do **not** use a substitute charger to charge TSI battery packs.

Old batteries must be properly recycled in accordance with the local environmental regulations.



#### WARNING

Do **not** use non-rechargeable batteries in this instrument. Fire, explosions, or other hazards may result.

## Charging Battery Pack

1. Disconnect the battery pack from the Environmental DustTrak II/DRX aerosol monitor and remove it from the Environmental Enclosure. Take it to a protected area where it can be charged undisturbed for 8 to 9 hours. Before charging any battery pack, please completely read the "Battery Charger Owner's Manual" that was provided along with your charger. Do **NOT** attempt to charge Battery Packs using the Dual Battery Wiring Harness (P/N 801817). The Dual Battery Wiring Harness is designed to be used to power the 854030 during instrument operation only.

The information below is **NOT** intended as a substitute to the charger manual. The charger manual will cover all important warnings and operating instructions for using the charger. The steps below will guide you through the battery pack charging process steps.

2. Select the manual switch setting on the back of the charger to the setting that matches the correct power distribution present in your local area (i.e., 115 VAC or 240 VAC).
3. Connect the charger to the battery pack by connecting the battery pack output connector to the mating charger connector.
4. Plug the battery charger's power AC plug (Red colored) into an AC outlet. The "ON" LED will light red momentarily then the "ON" LED will turn off and the "CHARGE" LED will light solid yellow. This indicates that the charging process has started.
5. The "CHARGE" LED will remain lit solid yellow until the battery pack is charged to a state of charge of 80% then the "CHARGE" LED will start to flash yellow for the remainder of the charging process until the battery pack reaches a fully charged state. The duration of time the charger will remain in charging mode depends upon state of discharge of the battery. It is important to allow the charger to go through a complete charging routine in order to charge each battery pack to an optimum level. Even if a battery pack is already charged, the charging process will take a minimum of one hour.

#### Note

Do **NOT** stop charging a battery before it is completely charged.

Battery packs should be completely charged before using. Once the battery pack is completely charged, the yellow "CHARGE" LED light will turn off and the green "READY" LED will light to indicate that the battery pack is ready for use. The battery is fully charged at this point. The charger can remain

connected in this state indefinitely—it will continue to float charge the battery at a very low level with no risk of overcharging the battery.

**Leaving the battery pack connected to the charger while not in use is highly recommended, and doing so will maintain the battery at a fully charged state and support optimum battery pack health while it is not in use.**

6. **ALWAYS DISCONNECT THE CHARGER FROM THE AC POWER SUPPLY (REMOVE AC PLUG FROM WALL SOCKET) BEFORE REMOVING THE BATTERY PACK FROM THE CHARGER AFTER CHARGING HAS COMPLETED.** This will prevent the possibility of arcing during the battery disconnect process.
7. The charger is equipped with a time-out feature. The time-out feature is designed to prevent overcharging aging battery packs or battery packs having poor health due to abuse. The time-out feature may also protect against charger faults. The time-out feature does **NOT** trigger during normal operation of charging healthy battery packs. This feature is triggered if a battery pack does not reach the correct state of charge within a defined time period. When the time-out feature is triggered, the charger will simply shut-down charging the battery and is indicated by a continuous flashing of the green “READY” LED.

In the event that the time out feature is triggered, remove the battery pack from service immediately and recycle the battery pack appropriately. When a time-out event occurs, the charger must be reset before being used again. To reset the charger simply disconnect the battery from the charger, or disconnect the AC plug from the charger momentarily then reconnect the charger to AC power. If the time-out feature should trigger multiple times on different battery packs, contact TSI Incorporated for assistance.

## Using the Dual Battery Wiring Harness

The Dual Battery Wiring Harness (P/N 801817) is a product option used to connect two battery packs together to provide roughly twice the run-time provided with a single battery pack. To use the Dual Battery Wiring Harness, simply connect two battery packs to the Dual Battery Wiring Harness at the male connectors and then connect the female connector to the Internal DC Power Cable connector. Once the cable is connected, power will be delivered to the DustTrak Aerosol Monitor and optional radio modem in manner which supports even power distribution.

The Dual Battery Wiring Harness is **NOT** intended for use to charge battery packs. The cable is designed specifically to prevent the use of the cable to charge battery packs through the cable interface. Be careful to **NOT** put unnecessary strain on the cable or connectors.

Only connect the Dual Battery Wiring Harness after installing battery packs into the environmental enclosure case. Moreover, be sure to disconnect the Dual Battery Wiring Harness prior to removing battery packs from the environmental enclosure case. Only use the cable internal to the environmental enclosure case.

The Dual Battery Wiring Harness is water-resistant, but **NOT** waterproof, the cable may fail if subjected to abundant water exposure including submersion in water.

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## Maintenance

### When to Change the Battery

Single battery packs are designed to provide power to Environmental DustTrak aerosol monitor for a minimum of 24 hours, even under cold ambient conditions. Adding the optional heated inlet accessory will result in 15 hours minimum battery life.

If using the Dual Battery Wiring Harness, two battery packs will provide power to the Environmental DustTrak monitor for roughly 48 hours or 30 hours with the heated inlet accessory. To ensure uninterrupted operation, the packs should be replaced daily or within the time period listed above.

If a battery pack has been forgotten and is left connected to a running Environmental DustTrak monitor, the extended-life battery will automatically quit delivering power to the Environmental DustTrak monitor after its voltage drops below 10.5 V. This cutoff provides protection to the battery pack, which will extend the lifetime of the pack.

#### Note

The logged data will **not** be lost even if **both** battery packs lose power.

### Battery Pack Life

Battery packs will age over time per usage and care. The battery packs will last 180 to 200 cycles on average. One cycle being defined as one battery pack discharge and one recharge process. With optimal use and care the life of a battery pack may possibly be increased beyond 200 cycles. To obtain optimal battery health, keep battery packs on charge in a cool, dry, and well-ventilated area while **NOT** in use, and recharge battery packs immediately after use. This assumes that the batteries are being used to run an Environmental DustTrak aerosol monitor every day and that they are properly cared for and rotated daily. Replacement battery packs may be ordered from TSI.

If battery packs are stored off of charge for durations longer than 30 days then longer charge times and shorter run-times may result due to degraded battery health. Battery pack health will diminish at a much more rapid pace if **NOT** recharged immediately (within one hour maximum) after use.

It is important to remove a battery pack from service if signs of diminished run-time or longer charge time are observed. These are signs of battery pack aging and poor general battery health. A battery pack in good health will take near 8 to 9 hours to fully charge. A battery pack that provides 30% less product run-time than expected is ready to be removed from service. If a given battery pack provides a run-time of 17 hours or less for the DustTrak, or a run-time of 10 hours or less with the heated inlet accessory, the battery pack should be removed from service and properly recycled in accordance with local environmental regulations.

### Battery Pack Health Status Check

TSI highly recommends consistently monitoring the health of all battery packs in possession. This status check is intended to help with that process and should be performed in addition to the use and handling instructions listed within this manual. This status check is not intended as a replacement for any other use and handling instructions as all instructions are important to follow to maintain battery health and to get the maximum life from battery packs. It is important to follow the following process to help to identify a battery pack that is no longer in good health and needs to be recycled.

### Battery Pack Health Check Procedure

1. Check the battery pack visually for any signs of bulging or abnormal appearance.
2. Connect the battery to the TSI Battery Charger Part #801809.
3. Plug in power to the charger.
4. Keep the battery pack on charge until the charger's "Ready" LED light is lit green indicating that the battery is now completely charged.
5. Disconnect power from the charger.
6. Disconnect the battery pack from the charger.
7. Let the battery pack rest (off the charger) for at least one hour.

8. Using a DC Volt Meter, connect the "red" (positive) test lead of the meter to the battery pack output connector at the conductor located closest to the triangle-shaped side of the connector. Please see the illustration.



9. Connect the "black" (negative) test lead of the DC Volt Meter to the battery pack output connector at the bottom conductor as illustrated in the picture above.
10. Record the voltage measured by the DC Volt Meter.
11. If the measured voltage is  $\leq 12.9$  volts, this battery pack is no longer in good condition and should **NOT** be charged. Remove this battery from service and recycle the battery according to local, state, or federal regulations.
12. However, if the measured voltage is  $\geq 13$  volts, this battery is in good operating condition and is able to be charged unattended, using the TSI Battery Charger Part #801809.

### Battery Specifications

Power output	12 VDC, 22Ah
Battery run time	Configuration: DustTrak II/DRX Single battery: 21-24 hrs Two batteries: 42-48 hrs  Configuration: DustTrak II/DRX and Heated Inlet: Single battery: 12-15 hrs Two batteries: 24-30 hrs
Battery charge time	8-9 hours at 72°F (22°C)
Operating temp	5° to 130°F (-15° to 54°C)
Dimensions (single battery)	7 x 6.5 x 3 in. (18.2 x 16.6 x 7.6 cm)
Weight	Single battery: 13.4 lbs (6.1 kg) Kit w/2 batteries and tray: 30 lbs (13.6 kg)



UNDERSTANDING, ACCELERATED

**TSI Incorporated** – Visit our website [www.tsi.com](http://www.tsi.com) for more information.

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