




SOUNDPRO® SOUND LEVEL METER OUTDOOR MEASURING SYSTEM (SP-OMS)

INSTRUCTION MANUAL



SOUNDPRO® SOUND LEVEL METER OUTDOOR MEASURING SYSTEM (SP-OMS)

Dangers, Warnings, Cautions & Battery

	DANGER!
	<p><i>Failure to observe the following procedures may result in serious personal injury:</i></p> <ul style="list-style-type: none"> • Risk of Electrical Shock. Avoid nearby overhead wires and electrical fixtures. The conductive electrical mast will tend to attract stray voltages and currents, including the possibility of Lightning. • Risk of Fire or Explosion. DO NOT connect to AC power while the lid is sealed or closed. DO NOT connect to AC power while the lid is sealed or closed. DO NOT modify the enclosure to provide AC power from external sources while the lid is closed. Hydrogen gas may be released from the lead-acid batteries during charging leading to a risk of explosion. The cover must be left open during the re-charge process. • Risk of Chemical Burn. Although the batteries provided are Absorbent Glass Mat (AGM) Sealed Lead-Acid (SLA) batteries that can be stored, transported, operated, and re-charged in any orientation, there is still a slight risk of exposure to sulfuric acid if the case is cracked or punctured. These batteries can be shipped as “dry cargo” and do not require special hazardous material shipping. • Not for use in explosive or hazardous locations. This product is not intrinsically safe.
	WARNING!
	<p><i>Failure to observe the following procedures could damage the instrument:</i></p> <ul style="list-style-type: none"> • Read the manual before operation. • DO NOT operate in temperatures exceeding 50°C (122°F). Excessively hot and extreme sun exposure may lead to over-heating. Use additional sun shields to reduce running temperature, if necessary. Repeated or extended time in extreme environments will lead to premature battery failure. • Substitution of components may impair the accuracy of the instrument. Repair should only be performed by authorized service personnel.
	Caution!
	<p>General</p> <ul style="list-style-type: none"> • Before first use, insure that the voltage select switch on the charger is set to the line voltage in your location. It may be set to either nominal 115V or 230VAC. To preserve battery cycle life, store the batteries fully charged. Turn OFF the power at the power distribution panel when not in use. Charge batteries as soon as possible after any use and before storing them for long periods.

Intended Use:

The SoundPro Outdoor measurement system provides protection to re-chargeable batteries for extended outdoor operation of the SoundPro Sound Level Meter. Consult your company’s safety professional for local standards, or call TSI at 1-800-680-1220 (USA) or (651) 490-2860.

TABLE OF CONTENTS

Dangers, Warnings, Cautions & Battery	i
Intended Use:	i
Introduction	1
SoundPro Outdoor Measuring System (SP-OMS)	1
Assemble the Outdoor Kit: Field Instructions	2
Mounting the outdoor microphone and mast to the weatherproof case.	2
Assemble the Outdoor Kit: Internal Connections	3
Making the internal connections	3
Make the measurements	4
Turn-off and disassemble	4

Battery: First Assembly and Replacement	4
Maintenance and Care Instructions	5
Recharging the internal batteries	5
Reactivating the desiccant	6
Storage Recommendations.....	6
SoundPro Outdoor Kit Specifications	7
Customer Service	8
Technical Support Contacts	8
Service Contact Information.....	8
Returning for Service.....	8
Warranty	9

FIGURES

Figure 1: Assembly for outdoor kit	2
Figure 2: Connecting the battery power	3
Figure 3: On/Off switch for the SoundPro Outdoor Kit.....	3

Figure 4: Connecting two SoundPro outdoor battery assemblies.....	5
Figure 5: Sample SoundPro outdoor kit assembly parts	7

TABLES

Table 1: SoundPro Outdoor kit parts	3
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Introduction

The SoundPro® Outdoor Measuring System helps protect the SoundPro Sound Level Meter from environmental exposure, such as wind, rain, snow, chemicals, particulates, animals, vandalism and theft. It is also used for extended battery life with up to one week of continuous monitoring (two weeks with optional second battery).

The weatherproof case holds the SoundPro instrument and battery pack with room for accessories and storage of the system components while not in use. The exposed components are made of stainless steel or plastic to resist corrosion.

SoundPro Outdoor Measuring System (SP-OMS)

How it works? The weatherproof case provides a stable base for mounting the microphone mast. There is an internal battery monitor circuit to reduce the risk of damaging the batteries by over-discharge. The circuit also protects against over-voltage, over-temperature (70°C or 158°F), and over-current (2 Amps, each output). The on-board universal input battery charger fully re-charges empty batteries in about 16 hours or less.

Provisions in the case design allow customer-supplied padlocks and cables to be used to lock the case and secure it to a stationary object.



Assemble the Outdoor Kit: Field Instructions

To assemble the outdoor kit refer to Figure 1 and Table 1.

Mounting the outdoor microphone and mast to the weatherproof case

- Assemble the mast pieces by screwing the threaded coupler of the shaft segment with coupler of item 3 (see Figure 1/Table 1), to the threaded base shaft (see 2). You may use multiple extensions (see 3) to increase the height of the microphone.
- From inside the case (see 1), feed the smaller female end of the cable assembly (9) through the hole in the case cover.
- For easier insertion, you may lubricate the connector boot with a bit of petroleum jelly. Feed the female end of the cable through the mast, and then completely through the preamp adapter (see 4). The insertion tool (see 11) will be necessary to push the connector through the preamp adapter (see 4).
- Assemble the preamp adapter (see 4) to the mast. Then assemble the mast to the case by screwing the threaded portions together.

Caution: | DO NOT over tighten.

- Screw the microphone (see 6) onto the preamp (see 5). Connect the preamp to the female end of the cable by properly orienting and inserting the connector into the preamp. Hold the cable connector while turning the knurled knob on the preamp to tighten the connectors.
- Grasp the preamp and push the connector's rubber boot into the preamp adapter until the preamp is completely seated.
- Insert the windscreen (see 7) inside of the bird spikes (see 8). Place this assembly over the microphone preamp. Gently spread the bird spike wires and insert them into the holes on the preamp adapter.

NOTE: Be cautious when bending the wires to prevent them from deforming.

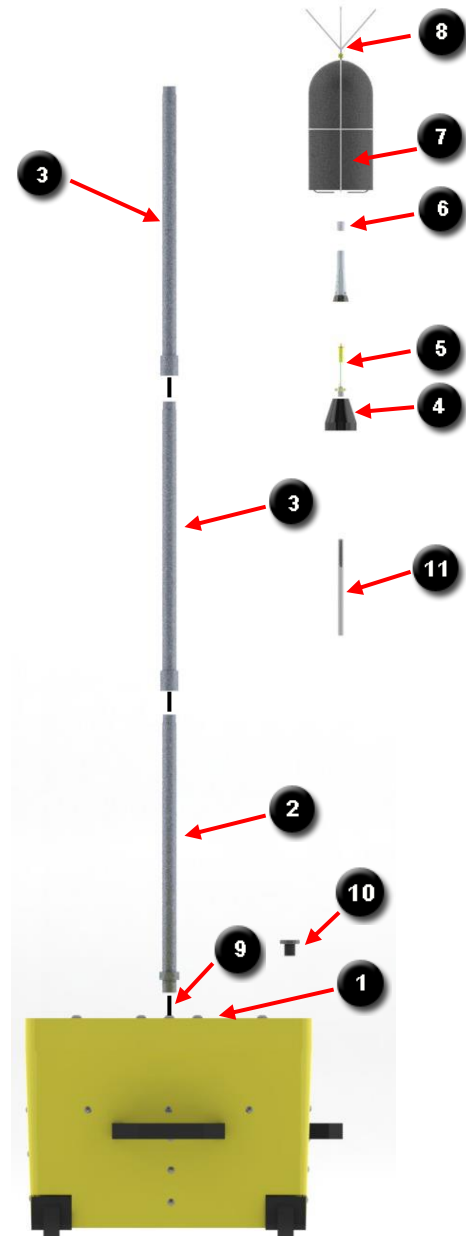


Figure 1: Assembly for outdoor kit

Table 1: SoundPro Outdoor kit parts

Description	Part Number	Description	Part Number
1. Weatherproof case assembly.	057-832	10. Case plug w/ 059-330 O-ring (both parts required)	056-467
2. Base Shaft with sealed nut. (1.0 m; 39")	056-472	11. Cable insertion tool.	056-475
3. Shaft segment with coupler. (1.4 m, 56"). Two provided for optional extra height. (1.9 m; 73")	056-473	12. SoundPro outdoor 12V power cable assembly.	057-241
4. Preamp adapter 2 in./5 cm tall.	056-462	13. SoundPro outdoor battery assembly (1 or 2) provided.	057-242
5. SoundPro Preamp assembly (included with SoundPro Sound Level Meter).	053-809	14. SoundPro outdoor power distribution panel.	057-826
6. Microphone (various models included with SoundPro Sound Level Meter and identified in Appendix A of user manual)	(See Part # on delivery note.)	15. Universal Input (Switch-able) 12V/5A Battery Charger.	053-562
7. Windscreen/weather shield.	056-463	16. USA 115V IEC320 Line cord #18AWG.	068-028
8. Bird Spikes.	056-464	17. European 230V IEC320 Line cord #18AWG (Optional).	054-462
9. SoundPro outdoor extension cable assembly.	057-240	18. Desiccant SG-40 Rechargeable canister.	057-235

Assemble the Outdoor Kit: Internal Connections

Making the internal connections

- 1 Connect the other end of the cable (see 9 in Figure 1/Table 1) to the meter inside the case.
- 2 For brief runtimes (4 hours or less), you may use the internal battery power of the SoundPro Sound Level Meter. For extended runtime, connect the internal 12-Volt power cable (see Figure 2) to the meter at its bottom inlet. Then turn On the power switch at the power distribution panel (see Figure 3).



Figure 2: Connecting the battery power

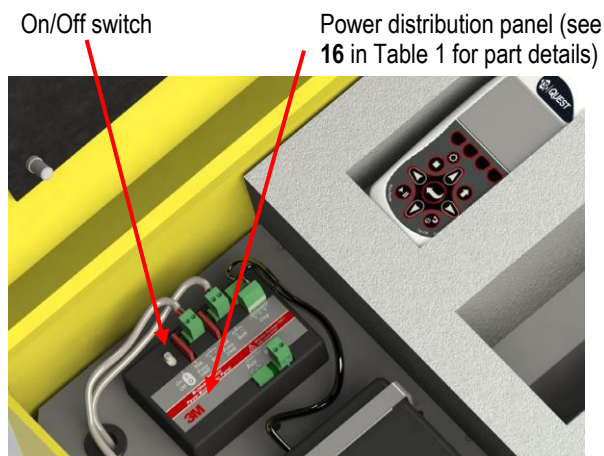



Figure 3: On/Off switch for the SoundPro Outdoor Kit

- 3 When you have turned **On** the power switch and the SoundPro Sound Level Meter, verify that the power cord is connected for external power. (**NOTE:** The battery icon , will appear on the display of the SoundPro Sound Level Meter as a fully charged icon when connected with AC power cord.)

Make the measurements

- 1 Follow the SoundPro Sound Level Meter user manual to prepare and run your measurements. (**Note:** This may require a pre-calibration, setup changes, and pressing the run key or programming an auto-run.)
- 2 When you are ready, place the SoundPro Sound Level Meter in the pocket of the case, verify that the SoundPro Sound Level Meter is running on external power, and close up the case.

Turn-off and disassemble

- 1 When you are finished, turn **Off** the SoundPro Sound Level Meter and then turn **Off** the power switch at the power distribution panel.
- 2 Remove and disassemble the mast, microphone, and windscreen and place the parts back into the case.
- 3 Remove and store the case plug with O-ring (see **10** in Figure 1/Table 1).

Battery: First Assembly and Replacement

1. Open and unpack the batteries.
 - **NOTE:** The battery is packaged separately from the outdoor kit to ensure the shipping weight of each carton is under the 70-pound limit that is imposed by common freight carriers such as Federal Express (FEDEX) and United Parcel Service (UPS).
2. (*Please skip step 2 for first assembly.*)
 - a. If replacing the batteries, disconnect and remove the old batteries.
 - b. Disconnect the battery's connectors from the power distribution panel (see Figure 3).
 - c. Remove the battery cover as discussed in Step 3.
 - d. While holding the case open, stand the case on its right side (away from the wheel end).
 - e. Gently slide the battery out of the compartment (one at a time if more than one battery).
3. Open the enclosure and remove the battery cover.
 - Unlatch and open the outdoor system enclosure.
 - **NOTE:** The cover is held in place with six Phillips-Head screws. The power distribution panel and the charger are also mounted on the battery cover. It is optional to remove the shaft segments, the accessory parts, and some of the foam layers.
 - Carefully remove the six larger screws around the perimeter and remove the cover.
4. Install batteries into enclosure.
 - While holding the outer enclosure lid open, tip the entire case on its side, so that the wheel-side is up, the battery enclosure is near the top, and the right handle is on the floor. This will make it much easier to slide the batteries down into their compartments. Position each battery so that the wires and posts can still be seen as you slide it into position. Lay the enclosure back down in its normal orientation.
 - As displayed in Figure 4 below, it is optional to connect two SoundPro outdoor battery assemblies (see **13** in Table 1) inside the case for additional battery power.



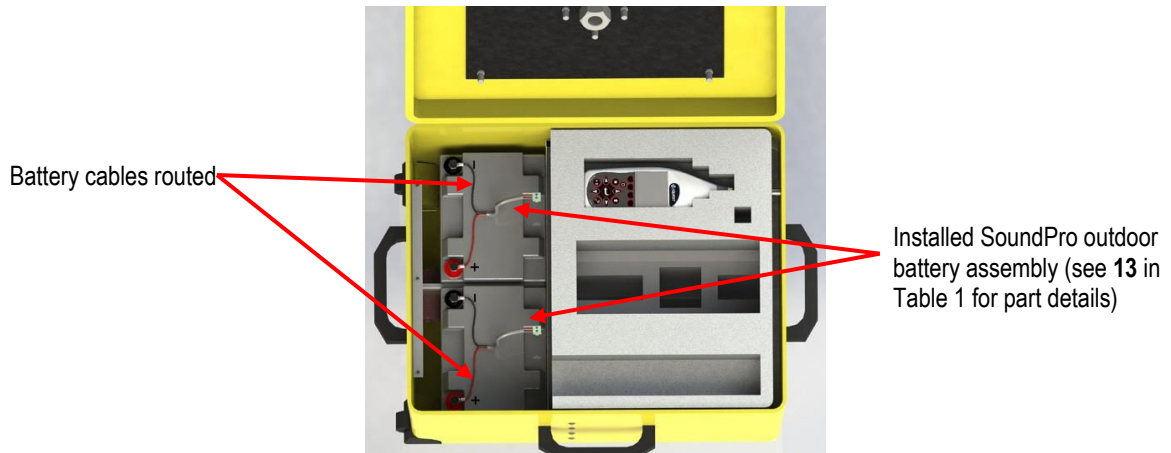


Figure 4: Connecting two SoundPro outdoor battery assemblies

5. Route the battery cables.
 - While positioning the battery cover over the batteries in the correct orientation, take one of the battery wires and its green connector, and feed it through one of the rubber grommets. Take the other connector and feed it through the other grommet. Carefully route the wires under the cover so that they will not be pinched (see Figure 4)
6. Replace cover and screws.
 - Position and secure the cover in place with the six (6) screws you removed in Step (3).
7. Connect the Batteries.
 - Connect the two battery cables into the Power Distribution Panel (see Figure 4) at the two connectors near the RED fuses. These two connectors are the only connectors that may be used for the batteries.

Maintenance and Care Instructions

Recharging the internal batteries

1. Open the case and leave it open for the duration of the charging. See the **WARNING: “Risk of FIRE or EXPLOSION”** at beginning of this manual. Keeping the case open also allows the charger to stay cool.
2. You may leave the master **On/Off** switch in either position. If you leave the master **On**, you may also leave the meter connected, but doing that will increase the charging time by about 10%.
3. Before the first use of the charger, verify that the input voltage selector on the charger module is set to the appropriate line voltage. The selector is a small red slide switch near the power inlet that is moved into the correct position using a small screwdriver. In the USA, it is 115 Volts (the UP position). With the European cord you will use 230 Volts (the Down position). When it is in its proper location, you will see your line voltage displayed.
4. Connect your line cord to the charger power inlet.
5. Connect the cord to a power outlet.
6. There is a status lamp on the charger that is located on the opposite end from the power inlet. The lamp has three states.
 - **Yellow:** Indicates Charging.
 - **Green:** Indicates Finished Charging.
 - **Blinking:** Indicates Charging Problem.

7. Leave the power cord connected until you see the GREEN (FINISHED) indicator. The charging rate is 5 Amps. In the unlikely event that the batteries (84 Amp-Hours) are completely emptied (more than eight days of discharge), it will take at least $84\text{AH} / 5\text{ A} = 16.8$ Hours (overnight), to completely re-charge them. For each hour of charging, you should be able to get about 10 hours of runtime.
8. At 80% depth of discharge, the batteries should be good for at least 200 cycles. The batteries will age and lose capacity over time, and will likely need to be replaced about three to five years from purchase.
9. When charging has completed you may unplug the charger and store the cable away. The enclosure lid can safely be closed as soon as the charger is unplugged.

Reactivating the desiccant

When you first use the silica gel canister in the area to be protected, it may become saturated rather quickly as it "drinks up" residual moisture. Once the residual dampness is removed, you can maintain a dry condition with less frequent need to reactivate the silica gel. Reactivation times below are minimums. Sometimes, when the silica gel becomes overly saturated, it is good practice to extend the reactivation period. However, do not vary from the recommended temperatures.

When the blue silica gel beneath the inspection window turns pink, reactivate as follows:

- Place the unit in a vented 150°C (300°F) oven for at least 3 hours. (Or until the silica gel turns blue again).

Note: The desiccant can be reactivated as many times as you want to.

Storage Recommendations

The batteries have an extremely low self-discharge rate, thus providing extended storage capability while maintaining high state-of-charge levels for dependable operation. These batteries have a shelf life more than two times that of conventional lead batteries. To assure maximum reliability, TSI recommends that all stored batteries be recharged (boost charged) at least every 12 months or when the open circuit voltage drops to 12.00 volts per battery, whichever occurs earlier. Check the batteries more frequently if storage temperature regularly exceeds 25°C (77°F).

The outdoor measurement system should be stored in a cool dry location with the lid closed whenever possible. High battery storage temperatures will lead to excessive self-discharge and premature battery failure.

SoundPro Outdoor Kit Specifications

Windscreen Attenuation	0.5 dB @ 2 kHz, 1 dB @ 6 kHz, 1.4 dB @ 10 kHz, 2 dB @ 20 kHz
Battery type	(1) 12 Volt, 42 Amp-Hour battery
Battery runtime	Total capacity : 34 Amp-Hours of 12 Volt power <ul style="list-style-type: none"> Approximately 5.5 days, with nominal 3400 mAH load and de-rated to 80% depth of discharge (3400 mAH / 250 mA / 24 (H/day) = approximately 5.5 days When other additional accessories are used, reduced runtimes are calculated from the 80% de-rated 34 Amp-Hour Capacity. With the optional second battery installed, runtime will increase up to 7 days (doubling the runtime).
Operating Temperature	0°C to 50°C (32°F to 122°F) <ul style="list-style-type: none"> Excessively hot and extreme sun exposure may lead to over-heating. Use additional sun shields to reduce running temperature, if necessary. Repeated or extended time in extreme environments will lead to premature battery failure.
Overall Dimensions	
In Transit (W x D x maximum H)	64 cm x 51 cm x 38 cm (25 in. x 20 in. x 15 in.)
Ready to Use (W x D x maximum H)	64 cm x 51 cm x 200 cm; (25 in. x 20 in. x 78 in.)
Overall Weight	30 kg; 67 lbs (with one battery) 45 kg; 100 lbs (with two batteries)



Figure 5: Sample SoundPro outdoor kit assembly parts

Customer Service

This section gives directions for contacting TSI Incorporated for technical information and directions for returning the SoundPro Outdoor Measuring System.

Technical Support Contacts

If you have any difficulty setting or operating the instrument, or if you have technical or application questions about this system, contact TSI's Technical Support.

North America and Asia Pacific	Europe, Middle East, and Africa
Telephone: 1-800-680-1220 (USA); +1 651-490-2860 (Outside USA)	Telephone: +49 241-52303-0
Fax: +1 651-490-3824	Fax: +49 241 52303-49
E-mail: technical.services@tsi.com	E-mail: tsigmbh@tsi.com

Service Contact Information

If your instrument does not operate properly, or if you are returning the instrument for service, visit our website at <http://rma.tsi.com> for a Return Material Authorization, or contact Customer Service.

North America and Asia Pacific	Europe, Middle East, and Africa
TSI Incorporated 1060 Corporate Center Drive Oconomowoc, WI 53006-4828	TSI Instruments Ltd. Stirling Road Cressex Business Park High Wycombe, Bucks HP12 3ST United Kingdom
Telephone: 1-800-680-1220 (USA); +1 651-490-2860 (Outside USA)	Telephone: +44 (0) 149 4 459200
E-mail: technical.services@tsi.com	E-mail: tsiuk@tsi.com

Returning for Service

Visit our website at <http://rma.tsi.com> and complete the on-line "Return Merchandise Authorization" form or call TSI at 1-800-680-1220 (USA) or (651) 490-2860, or 001 651 490 2860 (International) for specific return instructions.

Customer Service will need the following information:

- The instrument model number
- The instrument serial number
- A purchase order number (unless under warranty)
- A billing address
- A shipping address

Use the original packing material to return the instrument to TSI. If you no longer have the original packing material, seal off any ports to prevent debris from entering the instrument and ensure that the display and the connectors on the instrument front and back panels are protected. This instrument is very fragile and must be packed in a manner appropriate for a precision instrument.

Warranty

(For country-specific terms and conditions outside of the USA, please visit www.tsi.com.)

Seller warrants the goods, excluding software, sold hereunder, under normal use and service as described in the operator's manual, to be free from defects in workmanship and material for **12 months**, or if less, the length of time specified in the operator's manual, from the date of shipment to the customer. This warranty period is inclusive of any statutory warranty. This limited warranty is subject to the following exclusions and exceptions:

- a. Hot-wire or hot-film sensors used with research anemometers, and certain other components when indicated in specifications, are warranted for 90 days from the date of shipment;
- b. Pumps are warranted for hours of operation as set forth in product or operator's manuals;
- c. Parts repaired or replaced as a result of repair services are warranted to be free from defects in workmanship and material, under normal use, for 90 days from the date of shipment;
- d. Seller does not provide any warranty on finished goods manufactured by others or on any fuses, batteries or other consumable materials. Only the original manufacturer's warranty applies;
- e. This warranty does not cover calibration requirements, and seller warrants only that the instrument or product is properly calibrated at the time of its manufacture. Instruments returned for calibration are not covered by this warranty;
- f. This warranty is **VOID** if the instrument is opened by anyone other than a factory authorized service center with the one exception where requirements set forth in the manual allow an operator to replace consumables or perform recommended cleaning;
- g. This warranty is **VOID** if the product has been misused, neglected, subjected to accidental or intentional damage, or is not properly installed, maintained, or cleaned according to the requirements of the manual. Unless specifically authorized in a separate writing by Seller, Seller makes no warranty with respect to, and shall have no liability in connection with, goods which are incorporated into other products or equipment, or which are modified by any person other than Seller.

The foregoing is **IN LIEU OF** all other warranties and is subject to the LIMITATIONS stated herein. **NO OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE OR MERCHANTABILITY IS MADE. WITH RESPECT TO SELLER'S BREACH OF THE IMPLIED WARRANTY AGAINST INFRINGEMENT, SAID WARRANTY IS LIMITED TO CLAIMS OF DIRECT INFRINGEMENT AND EXCLUDES CLAIMS OF CONTRIBUTORY OR INDUCED INFRINGEMENTS. BUYER'S EXCLUSIVE REMEDY SHALL BE THE RETURN OF THE PURCHASE PRICE DISCOUNTED FOR REASONABLE WEAR AND TEAR OR AT SELLER'S OPTION REPLACEMENT OF THE GOODS WITH NON-INFRINGEMENTS.**

TO THE EXTENT PERMITTED BY LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE LIMIT OF SELLER'S LIABILITY FOR ANY AND ALL LOSSES, INJURIES, OR DAMAGES CONCERNING THE GOODS (INCLUDING CLAIMS BASED ON CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) SHALL BE THE RETURN OF GOODS TO SELLER AND THE REFUND OF THE PURCHASE PRICE, OR, AT THE OPTION OF SELLER, THE REPAIR OR REPLACEMENT OF THE GOODS. IN THE CASE OF SOFTWARE, SELLER WILL REPAIR OR REPLACE DEFECTIVE SOFTWARE OR IF UNABLE TO DO SO, WILL REFUND THE PURCHASE PRICE OF THE SOFTWARE. IN NO EVENT SHALL SELLER BE LIABLE FOR LOST PROFITS, BUSINESS INTERRUPTION, OR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR INCIDENTAL DAMAGES. SELLER SHALL NOT BE RESPONSIBLE FOR INSTALLATION, DISMANTLING OR REINSTALLATION COSTS OR CHARGES. No Action, regardless of form, may be brought against Seller more than 12 months after a cause of action has accrued. The goods returned under warranty to Seller's factory shall be at Buyer's risk of loss, and will be returned, if at all, at Seller's risk of loss.

Buyer and all users are deemed to have accepted this LIMITATION OF WARRANTY AND LIABILITY, which contains the complete and exclusive limited warranty of Seller. This LIMITATION OF WARRANTY AND LIABILITY may not be amended, modified or its terms waived, except by writing signed by an Officer of Seller.

Service Policy

Knowing that inoperative or defective instruments are as detrimental to TSI as they are to our customers, our service policy is designed to give prompt attention to any problems. If any malfunction is discovered, please contact your nearest sales office or representative, or call TSI's Customer Service department at 1-800-874-2811 (USA) or +001 (651) 490-2811 (International).

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TSI Incorporated – Visit our website www.tsi.com for more information.

USA	Tel: +1 800 874 2811	India	Tel: +91 80 67877200
UK	Tel: +44 149 4 459200	China	Tel: +86 10 8219 7688
France	Tel: +33 1 41 19 21 99	Singapore	Tel: +65 6595 6388
Germany	Tel: +49 241 523030		

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