

***Model 8732
IAQ-CALC[®]
Indoor Air Quality
Meter***

***Operation and Service
Manual***

*August 2000
P/N 1980393 A*

***Model 8732
IAQ-CALC[®]
Indoor Air Quality
Meter***

***Operation and Service
Manual***

*August 2000
P/N 1980393 A*

SHIP TO:

TSI Incorporated
500 Cardigan Road
Shoreview, MN 55126-3996
USA

MAIL TO:

TSI Incorporated
P.O. Box 64394
St. Paul, MN 55164-0394
USA

E-MAIL:

emco@tsi.com

U.S.

Sales and Customer Service:

(800) 777-8356 / (651) 490-2711

Fax: (651) 490-2874

INTERNATIONAL

Sales and Customer Service:

(1) 651-490-2711

Fax: (1) 651-490-2874

Copyright©

TSI Incorporated/August 2000/All rights reserved.

Address

TSI Incorporated/P.O. Box 64394/St. Paul, MN
55164/USA

Fax No.

(651) 490-2874

LIMITATION OF WARRANTY AND LIABILITY. Seller warrants the goods sold hereunder, under normal use and service as described in the operator's manual, shall be free from defects in workmanship and material for (24) months, or 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:

- a. 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.
- b. 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.
- c. 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.

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 NO EVENT SHALL SELLER BE LIABLE FOR ANY SPECIAL, 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 (800) 777-8356 (USA) and (1) 651-490-2711 (International).

CONTENTS

Chapters

1. Unpacking and Parts Identification	1
2. Setting-Up	3
Supplying Power to the IAQ-CALC	3
<i>Installing the Batteries</i>	3
<i>Using the Optional AC Adapter</i>	3
Connecting to the Optional Model 8925 Portable Printer	4
3. Operation	5
Keypad Functions.....	5
ON/OFF Key	5
SAMPLE Key	5
Calibration Mode	6
PRINT (▲) Key	8
STATISTICS (▼) Key	8
4. Maintenance	9
Cases	9
Storage	9
Service.....	9
5. Troubleshooting	11

Appendices

A. Specifications	13
B. Internal Dip Switch Settings	157

To obtain Application Notes or technical support contact TSI at the following:

U.S. (800) 777-8356/(651) 490-2711

Fax: (651) 490-2874
International: (1) 651-490-2711
Fax: (1) 651-490-2874

Chapter 1

Unpacking and Parts Identification

Carefully unpack the instrument and accessories from the shipping container. Check the individual parts against the list of components in Table 1-1. If any are missing or damaged, notify TSI or your local distributor immediately.

Table 1-1: List of components

Qty	Item	Part #
1	IAQ-CALC Model 8732	8732
1	Carrying case	1319251
4	AA alkaline batteries	1208013
1	Operation and service manual	1980393
1	AC Adapter (optional)	
	115 V, NEMA-5	2613033
	230 V, European CEE 7/16	2613078
	230 V, Great Britain	800169
	240 V, Australian	2613105

Chapter 2

Setting-Up

Supplying Power to the IAQ-CALC

The IAQ-CALC can be powered in one of two ways: four size AA batteries or the optional AC adapter.

Installing the Batteries

Insert four AA batteries as indicated by the diagram located on the inside of the battery compartment. TSI ships the unit with alkaline batteries. The IAQ-CALC is designed to operate with alkaline batteries. Other battery types are not recommended. At 15% battery life remaining, the battery indicator will blink, indicating the batteries need to be changed. At 0% “LO” will display, and the instrument will shut off within 10 seconds.

Using the Optional AC Adapter

The optional AC adapter allows you to power the IAQ-CALC from a wall outlet. When using the AC adapter, the batteries (if installed) will be bypassed. The AC adapter is not a battery charger.

Connecting to the Optional Model 8925 Portable Printer

To connect the Model 8925 printer to the IAQ-CALC, locate the Printer Interface cable (supplied with optional printer) and connect the 9-pin end labeled 'PRINTER' to the printer and the other end to the data port on the IAQ-CALC. If the printer prints question marks (?????), asterisks (*****), or random characters, reset it by turning it off and then on again. If necessary, refer to the *Model 8925 Portable Printer Operation and Service Manual*.

Chapter 3

Operation

Keypad Functions

When pressing the keys on the front panel, the IAQ-CALC will beep to confirm the function. If you press a key and the IAQ-CALC does not beep, then the IAQ-CALC does not allow that function during the selected mode.

ON/OFF Key

Press the ON/OFF key to turn the IAQ-CALC on and off. When the instrument is first turned on, it goes through a preprogrammed power-up sequence that includes an internal self-check (when all displayable items are shown). The IAQ-CALC also displays percentage of battery life and then, after a brief warm up period, starts measuring CO₂ in real-time.

SAMPLE Key

Press and release the SAMPLE key to start the sample. Press the SAMPLE key again to stop taking a sample. The number of seconds sampled will be displayed followed by the average ('AVG') and then the IAQ-CALC will

return to measuring in real-time. The minimum sample time is 5 seconds.

If the instrument is hooked up to a printer, then the average and 'Number of Data' (Number of Seconds) will print.

Calibration Mode

1. Turn the IAQ-CALC off and flip DIP switch #7 to ON.
2. Turn the IAQ-CALC on. It will flash "CAL" on the top row and beep intermittently until you are done with the procedure and back in "Normal" mode.
3. Press and hold the SAMPLE key to begin the calibration procedure. The display will begin a countdown from 5 to 0. Release the key when the display reads 0. If the key is released too soon or too late, the instrument will go back to beeping and flashing "CAL". If you've done this step correctly, 'ZEro' will appear on the display and the beeping will have stopped.
4. Install the regulator on the zero calibration gas tank and connect tubing from the regulator to the inlet fitting on the back of the IAQ-CALC.
5. Turn on gas flow.

6. Press and release the **SAMPLE** key to begin a zero reading. The IAQ-CALC begins a 60 second countdown during the zero reading. The actual zero reading is taken in the last 10 seconds. When the countdown is completed, the display indicates 'SPAN' and the span concentration.
7. Install the regulator on the span calibration cylinder and connect tubing from the regulator to the inlet fitting on the back of the IAQ-CALC.
8. Use ▲ and ▼ to adjust the concentration displayed on the IAQ-CALC to match the concentration on the span gas cylinder.
9. Press and release the **SAMPLE** key to take a span gas reading. The IAQ-CALC starts a 60 second countdown. When the countdown reaches zero, the instrument returns to the normal measurement mode.
10. With the gas still connected, observe the reading on the display. It should indicate the span gas concentration. If not, repeat the calibration.
11. If the displayed reading is accurate, remove the regulator and tubing.
12. Turn the IAQ-CALC off and flip DIP switch #7 to OFF (normal mode). The calibration is now complete.

Operation

PRINT (▲) Key

Press the PRINT key at any time to print out the values shown on the display. Pressing and holding the PRINT key will print CO₂ concentrations every second.

The ▲ key is also used in calibration mode for adjusting the span value. See “Calibration Mode” under the *SAMPLE* key section for more detail.

STATISTICS (▼) Key

Press the STATISTICS key to view seconds sampled and average (‘AVG’).

Press the STATISTICS key repeatedly to toggle through the minimum, maximum and average values for the most recently taken sample. If a printer is attached, the average, maximum and minimum will print out as they are displayed.

The ▼ key is also used in calibration mode for adjusting the span value. See “Calibration Mode” in the *SAMPLE* key section for more detail.

Chapter 4

Maintenance

The IAQ-CALC requires very little maintenance to keep it performing well.

Case

If the instrument case needs cleaning, wipe it off with a soft cloth and isopropyl alcohol or a mild detergent. Never submerge the IAQ-CALC.

Storage

When storing the IAQ-CALC for more than a month, remove the batteries to prevent damage due to potential battery leakage.

Service

To maintain a high degree of accuracy in your measurements, return your instrument to TSI for annual calibration. For a nominal fee, we will recalibrate the unit and return it to you with a NIST traceable certificate of calibration. This ‘annual checkup’ assures you of consistently accurate readings; it is especially important in applications where strict calibration records must be maintained.

Chapter 5

Troubleshooting

Table 5-1 lists symptoms, possible causes, and recommended solutions for common problems encountered with the IAQ-CALC. If your symptom is not listed, or none of the solutions solves your problem, please contact TSI.

Table 5-1: Troubleshooting the IAQ-CALC

Symptom	Possible Causes	Corrective Actions
No display	Instrument not on	Switch on the instrument
	Low batteries	Replace the batteries
	Dirty battery contacts	Clean the battery contacts
	Batteries installed incorrectly	Refer to battery illustration inside battery cover
BAT is blinking	Dirty battery contacts	Clean contacts and batteries
	Low battery	Replace the batteries
SPAn err or ZERO err	Error in field calibration	Perform calibration again
Display reads “LO”	Batteries are low	Replace the batteries

Appendix A

Specifications

Specifications are subject to change without notice. Specifications in parentheses () indicate metric equivalents.

CO₂:

Sensor type: Dual wavelength detector with
Non-dispersive infrared
(NDIR)
Range: 0 to 5000 ppm
Accuracy¹: $\pm 3\%$ of reading or ± 50 ppm
whichever is greater at 25°C
(add $\pm 0.36\%$ of reading per °C
away from calibration
temperature, $\pm 0.2\%$ of reading
per °F)
Resolution: 1 ppm
Response time: <10 minutes in still air

TEMPERATURE RANGE:

Operating: 41 to 158°F (5 to 70°C)
Storage: -4 to 158°F (-20 to 70°C)

EXTERNAL METER DIMENSIONS:

Size Measurements:
4.2 in. x 7.2 in. x 1.5 in.
(107 mm x 183 mm x 38 mm)

DISPLAY:

Type: Digital
Description: 2 lines with 4 digits, 0.4 inches
(10 mm) high

POWER REQUIREMENTS:

Four (4) AA-size, alkaline batteries (provided)

BATTERY LIFE:

Minimum 10 hours using alkaline batteries

STANDARD EQUIPMENT:

Free NIST* traceable certificate, operation and service manual, four AA-size alkaline batteries and a soft carrying case.

* U.S. National Institute of Standards and Technology

¹ Accuracy is based on barometric pressure of 406.8 inches H₂O (101.4 kPa). To correct for conditions, refer to Application Note TI-133.

Appendix B

Internal Dip Switch Settings

To access the DIP switches, remove the batteries from the battery compartment. On the inside of the battery compartment, there is a window with eight DIP switches. The table below shows the functions for each switch.

CAUTION: Make certain that power is turned off before changing DIP switch settings.

Switch	OFF	ON
1-3	Must be OFF	-----
4-5	N/A	N/A
6	Beep OFF	Beep ON
7	Normal mode	Field Calibration mode
8	N/A	N/A

- The ON position is away from the batteries and OFF is towards the batteries.
- Switch 1 is towards the display and switch 8 is nearest to the data port.