

Tisch Environmental X-Calibrator High Volume Calibrator





TE-HVC X-Calibrator Operations Manual Table of Contents

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1.0 Introduction

1.1 X-Calibrator Overview

The X-Calibrator is an advanced high volume calibrator that can be used to calibrate high-volume air sampling equipment such as TSP, PM10 and PUF samplers. The system utilizes a 32-bit microprocessor and a precise pressure sensor to monitor pressure within the calibration orifice. By measuring the exact temperature within the orifice and the barometric pressure, the volumetric flow rate can be calculated. The calibrator is mounted directly to the calibration orifice which allows for easy use and quick calibration of field instrumentation. The system can be powered via a USB port and takes 4 AA batteries. Typical battery life is over 20 hours of continuous operation. The system is shipped with the calibrator, NIST traceable calibration certificate, 4 batteries, USB cable, USB wall adapter and rugged carrying case. With four generations of experience, leadership and know-how, the Tisch family would like to welcome you to our company and thank you for choosing Tisch Environmental.

1.2 Copyrights and Trademarks

The 'X-Calibrator' trade name and Tisch logos are copyrights of Tisch Environmental, Inc. The software used in this instrument is proprietary intellectual property of Tisch Environmental and is not to be reproduced or replicated in any way.

1.3 Warranty

Instruments manufactured by Tisch Environmental, Inc. are guaranteed by warranty to be free of defects in materials and workmanship for one year after shipment from Tisch Environmental factories. The liability of Tisch Environmental, Inc. is limited to servicing or replacing any defective part of any instrument returned to the factory by the original purchaser. All service traceable to defects in original material or workmanship is considered warranty service and is performed free of charge. The expense of warranty shipping charges to and from our factory will be borne by Tisch Environmental. Service performed to rectify an instrument malfunction caused by abuse, acts of god or neglect, and service performed after the one-year warranty period will be charged to the customer at the current prices for labor, parts, and transportation. The right is reserved to make changes in construction, design specifications, and prices without prior notice.



1.4 Symbols Used in This Document

The following symbols are used in this document



General Attention – this symbol is used to make the operator aware of an important directive

1.5 Recertification

Per USEPA requirements, this instrument should be recertified on an annual basis. Recertification can be performed at our laboratory in Cleves, OH. Simply send the unit to us at:

Tisch Environmental
Attn: Recertification
145 South Miami Ave.
Cleves, OH 45002

Or call us at 1-877-TSP-PM10, email at sales@tischenv.com to setup a recertification of your calibrator. Once received, our highly trained technicians will evaluate your unit, perform a multi-stage calibration and issue a re-certification letter for the calibrator.

Part Numbers for Recertification

TE-HVC-100	XCalibrator with horizontal display alignment for the personal hygiene sampler TE-3000P
TE-HVC-101	XCalibrator with vertical display alignment for high volume air samplers with threaded ring
TE-HVC-102	XCalibrator with vertical display alignment for mid-volume air samplers (PUF) with 3-bolt adapter plate



1.6 Ratings

Power	4AA Batteries Micro USB (+5V @ 500 mA) Battery life is 20+ hours
Display	2.8" Diagonal 240x320 Color
Data Interface	Micro USB
Operating Temperature	-20°C to 65°C
Weight	1.0 lbs with batteries
Flow System	Range 25 to 50 CFM with an accuracy of $\pm 0.75\%$ of reading (25°C and 760 mmHg) – TE-HVC-V – High Volume Air Calibrator Range 5 to 15 CFM with an accuracy of $\pm 0.75\%$ of reading (25°C and 760 mmHg) – TE-HVC-H and TE-HVC-P Mid-volume Air Calibrator
Ambient Temperature	Range -35°C to 65°C with an accuracy of $\pm 2.0^\circ\text{C}$
Barometric Pressure	Range 650 to 825 mmHg with an accuracy of $\pm 10\text{mmHg}$



1.7 XCalibrator Ordering Information

TE-HVC-H	<p>XCalibrator Mid-volume ranged 5-15CFM with horizontal screen configuration with integrated orifice and 3-bolt ring</p> <p>Rugged carrying case</p> <p>USB cable</p> <p>USB wall adapter</p> <p>4AA Batteries included</p> <p>3-bolt stainless steel plate for TE-2000P interface</p>
TE-HVC-V	<p>XCalibrator High-volume ranged 25 to 50CFM with vertical screen configuration with integrated orifice and threaded ring</p> <p>Rugged carrying case</p> <p>USB cable</p> <p>USB wall adapter</p> <p>4AA Batteries included</p> <p>TE-5035 adapter plate</p>
TE-HVC-P	<p>XCalibrator Mid-volume ranged 5-15CFM with vertical screen configuration with integrated orifice and 3-bolt ring for PUF systems</p> <p>Rugged carrying case</p> <p>USB cable</p> <p>USB wall adapter</p> <p>4AA Batteries included</p>

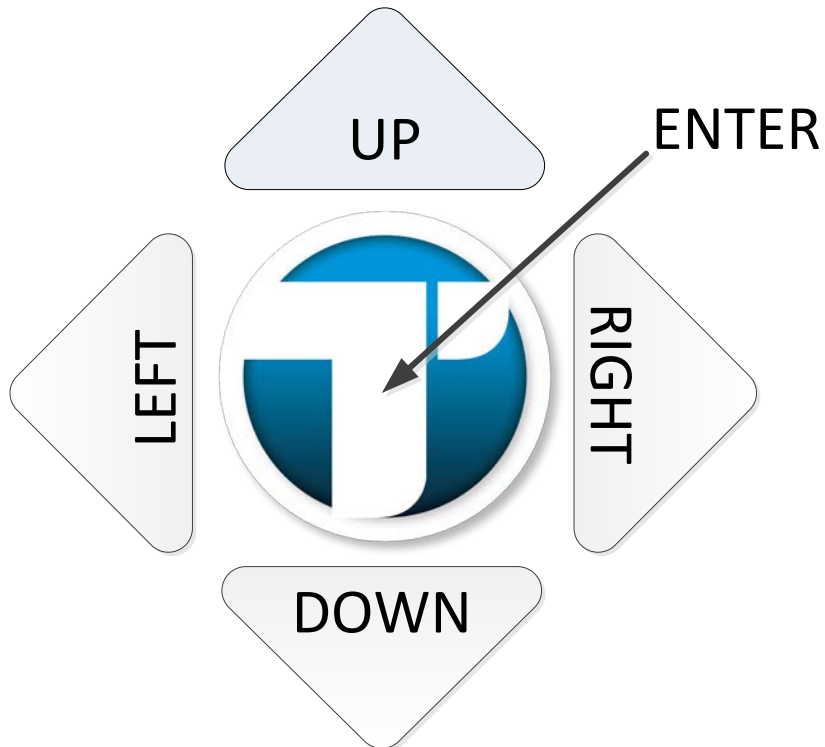
XCalibrator accessories

TE-HVC-40	Rugged carrying case with foam insert
TE-HVC-030	USB wall adapter
TE-HVC-031	USB cable
TE-HVC-014	Black thumb screws, knurled – package of (4)
TE-5018	8” x 10” replacement gasket for TE-5035 adapter plate
TE-5028-13	Gasket with pressure sensitive adhesive for all orifices
TE-5035	Adapter plate for PM10 and TSP
TE-HVC-003	Battery cover

2.0 Menu Navigation

2.1 Button Configuration

The XCalibrator has (4) arrows for navigating up, down, left and right along with a center button which is used for the 'enter' button.



2.2 Powering ON/OFF the Unit

Powering ON the unit

Press and hold the ENTER button for longer than 2 seconds

Powering OFF the unit

Press and hold the ENTER button for longer than 10 seconds, or

Press the RIGHT arrow to get to the main menu

Press the DOWN arrow until POWER OFF is shown

Press the ENTER button or the RIGHT arrow button



2.3 Menu Structure

Navigation between menus is performed using the arrow keys and the center enter key.

Measurement Menu	Description
Qstd	Standardized volumetric flow at 760 mmHg and 21°C
Qamb	Volumetric flow at ambient conditions
Tamb	Ambient temperature
Pamb	Ambient barometric pressure

Main Menu	Description
About	Provides software revisions and serial number information
Date	Allows user to adjust the date
Time	Allows user to adjust the time
Sensors	Proceeds to Sensors menu
LCD	Proceeds to the LCD menu
Power	Indicates the power level and power source
Power Off	Powers off the X-Calibrator
Exit	Exits to Measurements menu

Sensors Menu	Description
Qstd	Shows the current value and proceeds to Qstd setup menu
Qamb	Shows the current value and proceeds to Qamb setup menu
Pamb	Shows the current value and proceeds to Pamb setup menu
Porf	Shows the current value and proceeds to Porf setup menu
Tamb	Shows the current value and proceeds to Tamb setup menu
Exit	Exits to the main menu

Each sensor has a sensor sub-menu. They are all identical with the exception of the units for each sensor.

Sensors Menu	Description
Value	Shows the current value of the sensor
Average	Shows the average of the sensor
Minimum	Shows the minimum of the sensor
Maximum	Shows the maximum of the sensor
Reset Statistics	Resets the average, minimum and maximum values
Configure	Allows the sensor's units to be changed
Exit	Exits to the sensor menu



2.4 Available Sensor Units

Unit	Available Units
Temperature	Celsius (°C) Fahrenheit (°F) Kelvin (°K) Rankine (°R)
Flow	Cubic feet per minute (CFM) Liters per minute (LPM) Cubic meters per minute (M3M)
Pressure	Millimeters of Mercury (mmHg) Inches of Mercury (InHg) Millimeters of Water (mmH ₂ O) Inches of Water (InH ₂ O) Millibars Bar



3.0 Operation

3.1 Zeroing unit on Power Up

When the X-Calibrator is powered on, it will zero all of it's sensors.....

3.2 Setting the date and time

To set the date and time perform the following from the measurement menu:

Changing the time

Press the LEFT or RIGHT arrow keys

Scroll down to TIME

Press the ENTER key

Use the arrow keys to change the time

Press ENTER when complete

Press the LEFT arrow to return to the previous menu(s)

Changing the date

Press the LEFT or RIGHT arrow keys

Scroll down to DATE

Press the ENTER key

Use the arrow keys to change the date

Press ENTER when complete

Press the LEFT arrow to return to the previous menu(s)

3.3 Setting the backlight brightness

To change the brightness or backlight power

Press the LEFT or RIGHT arrow keys

Scroll down to LCD

Press the ENTER key

Press enter on BLIGHT POWER

Use the arrow keys to change the brightness level – 100 is maximum.

Press ENTER when complete

Press the LEFT arrow to return to the previous menu(s)



3.4 Setting the backlight timer

The backlight timer will cut the backlight in half after the time expires to save battery life.

To change the backlight timer

Press the LEFT or RIGHT arrow keys

Scroll down to LCD

Press the ENTER key

Scroll down to BLIGHT TIMER

Press the ENTER key

Use the arrow keys to change the timer value in minutes and seconds

Press ENTER when complete

Press the LEFT arrow to return to the previous menu(s)

3.5 Changing sensor units

To change the sensor units

Press the LEFT or RIGHT arrow keys

Press ENTER at SENSORS

Scroll to the sensor you would like to change and press ENTER

Scroll down to CONFIGURE and press ENTER

Press ENTER at UNITS

Use the UP/DOWN arrow keys to select the units and press ENTER

Use the LEFT arrow to return to the previous menu(s)



3.6 Changing sensor precision

The precision of the sensor is how many decimal places are shown for the sensor.

To change the precision of the sensor

Press the LEFT or RIGHT arrow keys

Press ENTER at SENSORS

Scroll to the sensor you would like to change and press ENTER

Scroll down to CONFIGURE and press ENTER

Scroll down to PRECISION and press ENTER

Use the UP/DOWN arrow keys to select the precision value and press ENTER

Use the LEFT arrow to return to the previous menu(s)

3.7 Changing the batteries

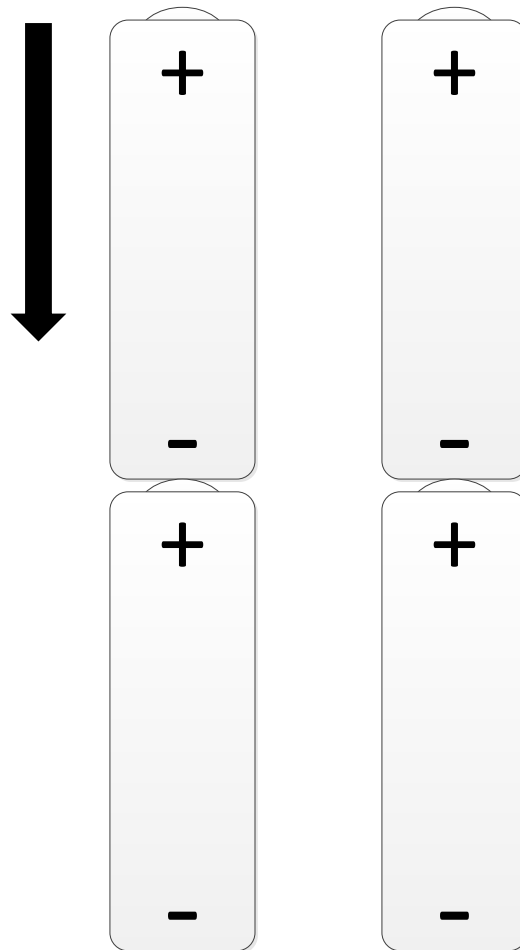
The X-Calibrator requires power from (4) AA batteries or can be powered from a PC or the included AC to USB adapter.

To replace the batteries

Remove the (2) black knurled screws on top of the unit and remove the battery compartment cover. Remove the (4) AA batteries, 2 on each side.

Replace the batteries with fresh batteries. The negative sides go in first. Replace the battery cover and secure with the (2) black knurled screws.

Top of X-Calibrator





Appendix A: Revision History

Revision No.	Date	Description
REV001.0	2-13-15	Manual created