# Tisch Environmental
# X-Calibrator
# High Volume Calibrator

# TE-HVC X-Calibrator Operations Manual Table of Contents

# 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



## 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<br>Micro USB (+5V @ 500 mA)<br>Battery life is 20+ hours |
| **Display** | 2.8” Diagonal 240x320 Color |
| **Data Interface** | Micro USB |
| **Operating Temperature** | -20ºC to 65ºC |
| **Weight** | 1.0 lbs with batteries |
| **Flow System** | Range 25 to 50 CFM with an accuracy of ±0.75% of reading (25ºC and 760 mmHg) – TE-HVC-V – High Volume Air Calibrator<br><br>Range 5 to 15 CFM with an accuracy of ±0.75% of reading (25ºC and 760 mmHg) – TE-HVC-H and TE-HVC-P Mid-Volume Air Calibrator |
| **Ambient Temperature** | Range -35ºC to 65ºC with an accuracy of ± 2.0ºC |
| **Barometric Pressure** | Range 650 to 825 mmHg with an accuracy of ±10mmHg |

## 1.7 XCalibrator Ordering Information

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

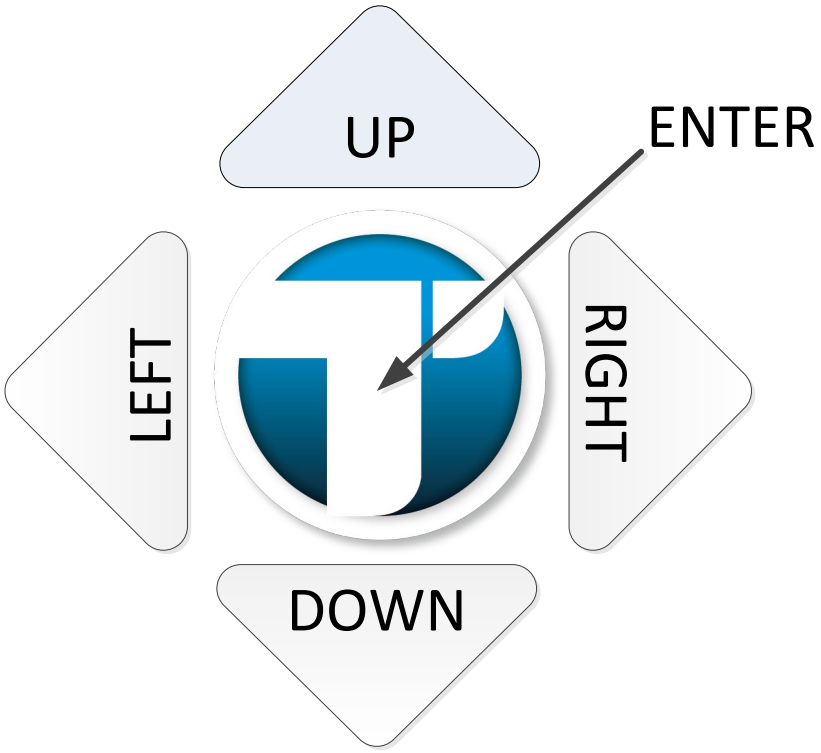
### XCalibrator accessories

| | |
|---|---|
| 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 25°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)<br>Fahrenheit (°F)<br>Kelvin (°K)<br>Rankine (°R) |
| Flow | Cubic feet per minute (CFM)<br>Liters per minute (LPM)<br>Cubic meters per minute (M3M) |
| Pressure | Millimeters of Mercury (mmHg)<br>Inches of Mercury (InHg)<br>Millimeters of Water ($mmH_20$)<br>Inches of Water ($InH_20$)<br>Millibars<br>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)

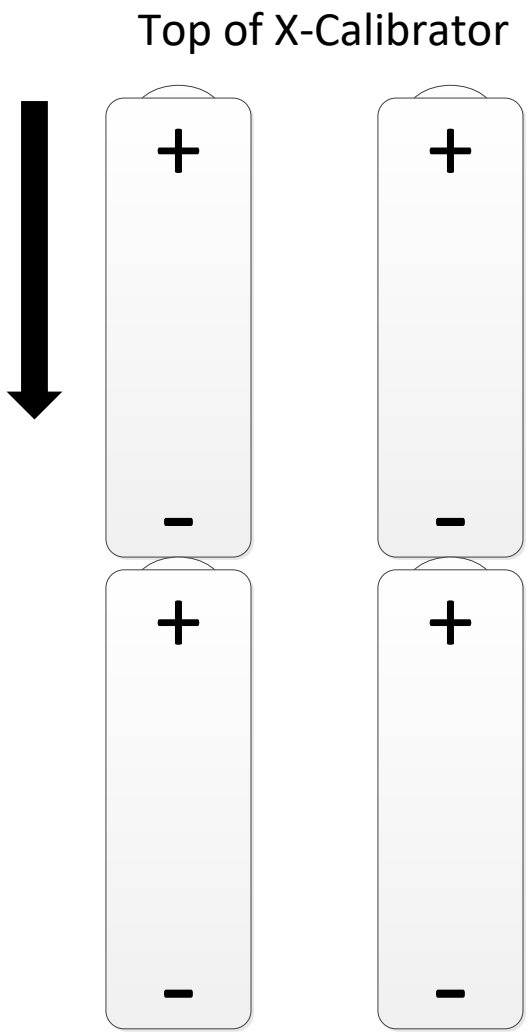
## 3.7 Changing the batteries

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.



# Appendix A: Revision History

| Revision No. | Date | Description |
|---|---|---|
| REV001 | 2-13-15 | Manual created |
| REV002 | 1-26-18 | Changed Qstd temperature from 21 to 25°C which was a typo |