PRESYS | Instruments


Advanced Super-Thermometer

# STA-510

## STA-510-RM

## STA-510-DT

TECHNICAL MANUAL

EM0439-01

**IMPORTANT INSTRUCTIONS:**

- Keep the super-thermometer in a dry environment whenever possible.
- In case of failure, contact Presys Technical Assistance.
- When not in daily use, before starting up, let the super-thermometer be turned on for at least one hour.

The warranty conditions are available on our site:
**www.presys.com.br/warranty**

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# 1 - INTRODUCTION

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## 1.1 - General Description

The Super Thermometer STA-510 main purpose is to measure temperature with high accuracy. It uses platinum resistance thermometers sensors, and it also accepts thermocouples signals. The STA-510 has internal algorithms to calculate the temperature value according to Callendar-Van Dusen (CVD), IPTS-68 and ITS-90. For costumers that already have one or several RTD's or PRT's sensors, noble thermocouples with quality enough for being used as standards, it is only necessary to enter its respective coefficients. And for those uncalibrated probes, it is possible to be use the standard linearization curves for RTD's and thermocouples.

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- PRT reference thermometer, resolution of 0.001ºC.
- Replaces precision glass thermometers.
- Fully electronic, without mechanical parts.
- Uses platinum RTD or thermocouple as temperature sensor.
- Support for best bench viewing angle of the display (optional).
- It has internal memory.
- Accepts CVD (Callendar-Van Dusen), IPTS-68 and ITS-90 coefficients.
- Built in Web Server, Ethernet communication and USB serial Communication.
- USB port for software/firmware upgrade.
- 5.7 inches touchscreen display that eases the operation and configuration of the calibrator.

## 1.2 - General Specifications

Five minutes warm-up time.

Operating temperature range: 0 to 50 °C.

Relative Humidity: 0 to 90 % RH.

Built in Web Server, Ethernet communication, USB port or Wi-Fi.

Included accessories: technical manual, power supply cable, USB cable, ETHERNET cable, Wi-Fi adapter, 2 A fuse and set of test leads.

Calibration Certificate (optional).

One-year warranty.

**Dimensions:**

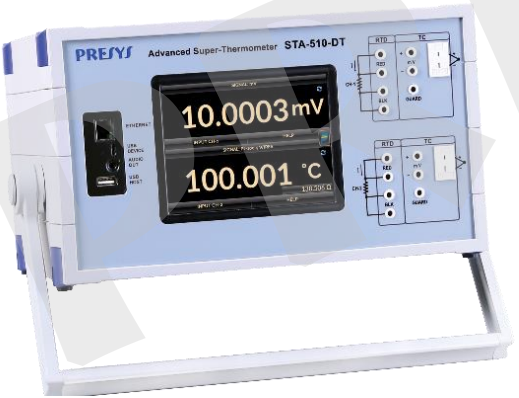
132 mm x 483 mm x 250 mm (HxWxD) for the RM Version (Rack Mounting)
132 mm x 308 mm x 275 mm (HxWxD) for the DT Version (Desktop)

**Weight:**

4.0 kg approx. for the RM Version (Rack Mounting)
3.5 kg approx. for the DT Version (Desktop)

**Rack Mounting Version (STA-510-RM). Designed for mounting on 19” rack or workbench.**

**Powered with** 240 Vac, 50 / 60 Hz.
**Dimensions**: 132 mm x 483 mm x 250 mm (HxWxD)
**Weight**: 4.0 kg approx.


**Desktop Version (STA-510-DT). Designed for use on workbench.**

**Powered with** 240 Vac, 50 / 60 Hz.
**Dimensions**: 132 mm x 308 mm x 275 mm (HxWxD).
**Weight**: 3.5 kg approx.

**Notes:**

* STA-510 is a **PRESYS** trademark.
*Instruments powered with 115 Vac, 50 / 60 Hz must be ordered on request. Please contact a **PRESYS** sales representant.
* Changes can be introduced in the instrument, altering specifications in this manual.

### 1.2.1 - Input Technical Specifications

| Input Ranges | | Resolution | Accuracy | Remarks |
|---|---|---|---|---|
| **Millivolt0** | 0 to 70 mV | 0.0001 mV | ± 0.005 % FS* | $R_{input}$ > 10 MΩ |
| **Resistance** | 0 to 100 Ω | 0.0001 Ω | ± 0.001 Ω | Excitation current 1.0 mA |
| | 100 to 500 Ω | 0.001 Ω | ± 0.004 Ω | |
| **Pt-100** | -200 to 850 °C / -328 to 1562 °F | 0.001 °C / 0.001 °F | ± 0.01 °C / ± 0.02 °F | Excitation current 1.0 mA |
| **Pt-25** | -200 to 850 °C / -328 to 1562 °F | 0.001 °C / 0.001 °F | ± 0.01 °C / ± 0.02 °F | IEC-60584 |
| **TC-J** | -210 to 1200 °C /-346 to 2192 °F | 0.01 °C / 0.01 °F | ± 0.10 °C / ± 0.20 °F | IEC-60584 |
| **TC-K** | -270 to -150 °C / -454 to -238 °F | 0.01 °C / 0.01 °F | ± 0.25 °C / ± 0.50 °F | IEC-60584 |
| | -150 to -1370 °C / -238 to 2498 °F | 0.01 °C / 0.01 °F | ± 0.10 °C / ± 0.20 °F | |
| **TC-T** | -260 to -200 °C / -436 °C to -328 °F | 0.01 °C / 0.01 °F | ± 0.30 °C / ± 0.60 °F | IEC-60584 |
| | -200 to -75 °C / -328 to -103 °F | 0.01 °C / 0.01 °F | ± 0.20 °C / ± 0.40 °F | |
| | -75 to 400 °C / -103 to 752 °F | 0.01 °C / 0.01 °F | ± 0.10 °C / ± 0.20 °F | |
| **TC-B** | 50 to 250 °C / 122 to 482 °F | 0.01 °C / 0.01 °F | ± 1.25 °C / ± 2.50 °F | IEC-60584 |
| | 250 to 500 °C / 482 to 932 °F | 0.01 °C / 0.01 °F | ± 0.75 °C / ± 1.50 °F | |

| | | | | |
|---|---|---|---|---|
| | 500 to 1200 °C / 932 to 2192 °F | 0.01 °C / 0.01 °F | ± 0.50 °C / ± 1.00 °F | |
| | 1200 to 1820 °C / 2192 to 3308 °F | 0.01 °C / 0.01 °F | ± 0.35 °C / ± 0.70 °F | |
| **TC-R** | -50 to 300 ºC / -58 to 572 ºF | 0.01 ºC / 0.01 °F | ± 0.50 ºC / ± 1.00 °F | IEC-60584 |
| | 300 to 1760 ºC / 572 to 3200 ºF | 0.01 ºC / 0.01 °F | ± 0.35 ºC / ± 0.70 °F | |
| **TC-S** | -50 to 300 ºC / -58 to 572 ºF | 0.01 ºC / 0.01 °F | ± 0.50 ºC / ± 1.00 °F | IEC-60584 |
| | 300 to 1760 ºC / 572 to 3200 ºF | 0.01 ºC / 0.01 °F | ± 0.35 ºC / ± 0.70 °F | |
| **TC-E** | -270 to -150 ºC / -454 to -238 ºF | 0.01 ºC / 0.01 °F | ± 0.15 ºC / ± 0.30 °F | IEC-60584 |
| | -150 to 1000 ºC / -238 to 1832 ºF | 0.01 ºC / 0.01 °F | ± 0.05 ºC / ± 0.10 °F | |
| **TC-N** | -260 to -200 ºC / -436 to -328 ºF | 0.01 ºC / 0.01 ºF | ± 0.50 ºC / ± 1.00 ºF | IEC-60584 |
| | -200 to -20 ºC / -328 to -4 ºF | 0.01 ºC / 0.01 ºF | ± 0.20 ºC / ± 0.40 ºF | |
| | -20 to 1300 ºC / -4 to 2372 °F | 0.01 ºC / 0.01 ºF | ± 0.10 ºC / ± 0.20 ºF | |
| **TC-L** | -200 to 900 ºC / -328 to 1652 °F | 0.01 ºC / 0.01 °F | ± 0.10 ºC / ± 0.20 °F | DIN-43710 |
| **TC-C** | 0 to 1500 ºC / 32 to 2732 ºF | 0.01 ºC / 0.01 °F | ± 0.25 ºC / ± 0.50 °F | W5Re / W26Re |
| | 1500 to 2320 ºC / 2732 to 4208 ºF | 0.01 ºC / 0.01 °F | ± 0.35 ºC / ± 0.70 °F | |

(*) FS = Full Scale.

**Note:** Accuracy values are valid within one year and temperature range of 20 to 26 °C. Outside these limits add 0.005 % FS / °C taking 23 °C as the reference temperature. For thermocouples using the internal cold junction compensation add a cold junction compensation error of ± 0.1 °C or ± 0.2 °F max

### 1.3 - Optional Items

- **Temperature Sensor**

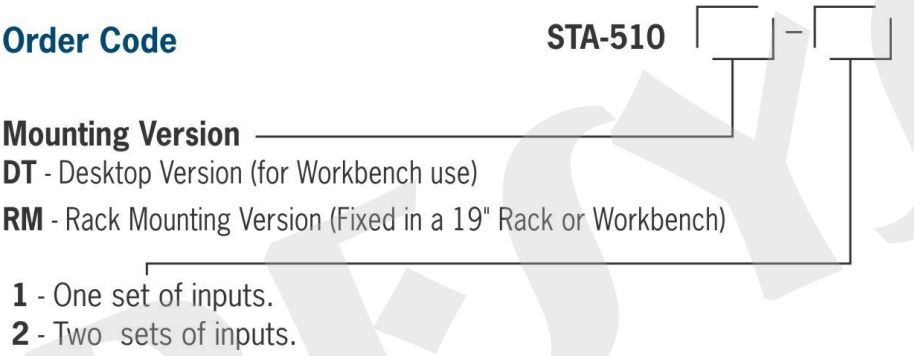
| Description | Order Code | Range | Usage Drift | Accuracy | Dimensions |
|---|---|---|---|---|---|
| Industrial RTD Pt-100 Straight | 04.06.0001-21 | -200 to 420 °C | 0.035 °C | 0.030 °C at 420 °C | 305 mm x Ø 6.35 mm |
| Industrial RTD Pt-100 90 °C bend | 04.06.0007-21 | -200 to 420 °C | 0.035 °C | 0.030 °C at 420 °C | 140 mm x Ø 6.35 mm |
| Industrial RTD Pt-100 90 °C bend | 04.06.0002-21 | -200 to 420 °C | 0.035 °C | 0.030 °C at 420 °C | 170 mm x Ø 6.35 mm |

- **Calibration Certificate**

## 1.4 - Special Software Features

**- Memory Manager:** stores configuration types predefined by the user.
**- Data Logger:** monitoring of input signal, storage and visualization of data in chart or table.
**- Help Desk:** storage and viewing videos and documents on the calibrator screen.

## 1.5 - Order Code



## 2 - OPERATION

### 2.1 - Parts Identification

**STA-510-RM (Rack Mounting Version)**

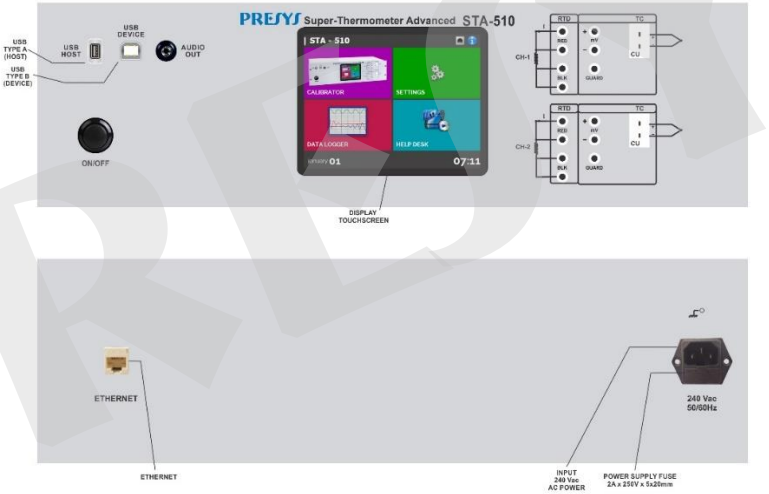



**Fig. 01** - Front and Rear Panels – STA-510-RM

**STA-510-DT (Desktop Version)**

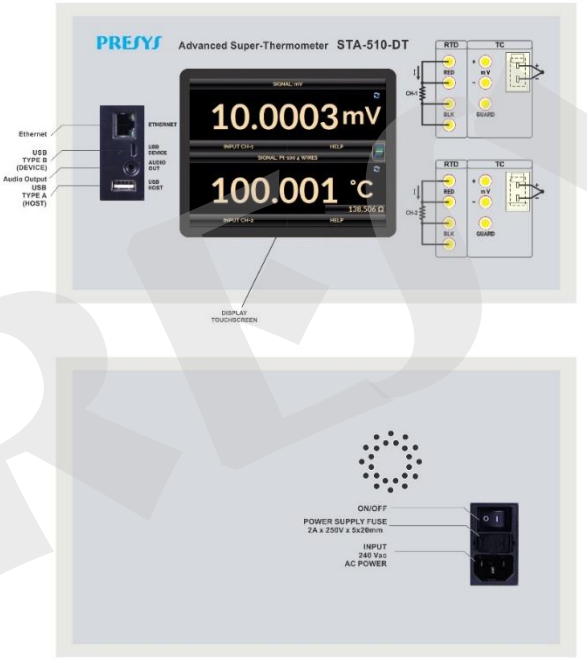



**Fig. 02** - Front and Rear Panels – STA-510-DT

## 2.2 - Using STA-510: Basic Functions

When powered on, the calibrator goes through a self-test routine and shows the last adjustment date. In case of failure, it displays a message to indicate error; if that occurs, **please contact the Presys Technical Assistance Department**. After the self-test is completed, the display shows the main menu, as showed in Fig. 03. The main menu is divided into four functions:

**CALIBRATOR** – selects the input Channel 1 and 2, see section 2.3.
**SETTINGS** – general instrument settings, see section 3.
**DATA LOGGER** – record measurements, enabling visualization in chart or table, see section 2.4.
**HELP DESK** – features videos made by Presys to assist in the use of the calibrator and can also store videos and documents made by the user, see section 2.5.


**Fig. 03** - Main Menu

## 2.3 - Calibrator

To select the input functions, from the main menu, press the **CALIBRATOR** button. The following screen is displayed.

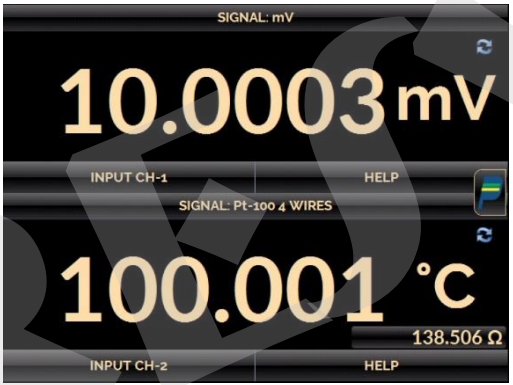



**Fig. 04** - Calibrator Functions

At the top is shown the channel 1 and at the bottom the channel 2.

The icon  shows a **Quick Navigator**, with the options for Main Menu (**HOME**) and **Memory Manager** (see section 2.3.2). Furthermore, it brings information about the input channels configuration, date and time. Press **BACK** to return to Calibrator Mode or **HOME** to go to Main Menu.


**Fig. 05** - Quick Navigator and Secondary Menu

The channel 1 and the channel 2 can be configured only as an input.

### 2.3.1 - Measurement or Input Functions

**a) Input Channel Configuration**

Press **Input CH-1 or Input CH-2**, select through the menu the type of signal to be measured and use the corresponding terminals (see **Fig. 12 - Measurement Connections** or press the **HELP** button).

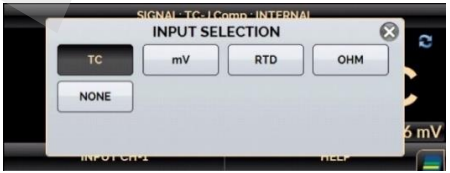



**Fig. 06** - Input Type Selection

### For resistance (OHM)

For **OHM** measurement, you must also select between 3 or 4 wires options.

### For RTD

For **RTD** input, you must choose the standard table type used, the number of lead wires (3 or 4 wires) and the temperature scale (ITS-90 or IPTS-68). You can also set the Callendar-Van Dusen or ITS-90 sensor coefficients by selecting the CVD or ITS-90 option and the desired curve from the ID list. To create CVD or ITS-90 coefficients or edit existing ones, select between the two options and press the edit button → **ADD**. The curves you create appear in the list ordered by the **ID**. Select **CONFIGURATION** to enter an ID or tag for the sensor in **ID** and inform the sensor range in **MIN** and **MAX**. Select **PARAMETERS** to enter the sensor curve, usually informed on the sensor calibration certificate.

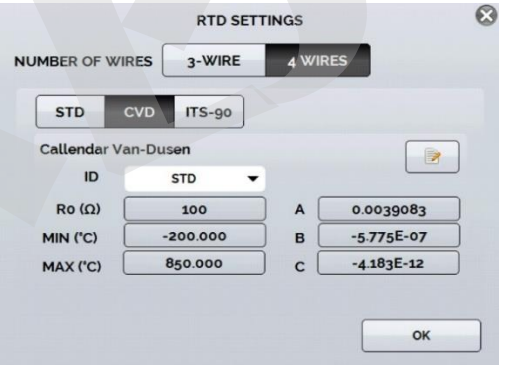



**Fig. 07** - RTD Settings

**For Callendar-Van Dusen:**

Fill in the value of R0 (Resistance at 0 °C) and the parameters A, B and C together with their exponents.

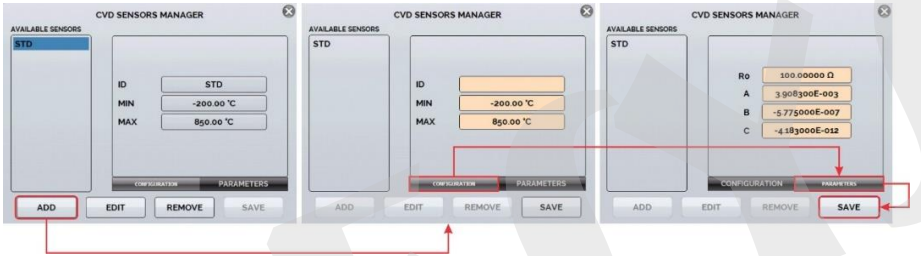



**Fig. 08** - Callendar-Van Dusen Coefficient Configuration

**For ITS-90:**

Fill in the value of RPTW (Resistance at 0.01 °C) and select the range for negative and / or positive curve before entering the parameters together with their exponents.

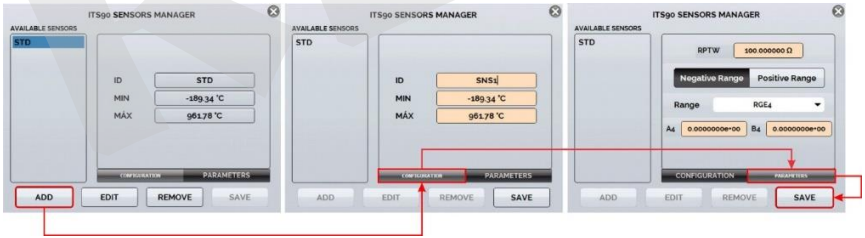



**Fig. 09** - ITS-90 Coefficient Configuration

**Negative Range:** Accesses the coefficients to be used for temperatures below or equal to the triple point of water (0.01 °C).

| Recommended Temperature Range (Negative) | | Coefficients |
|---|---|---|
| Range 4 | -189.3442 °C to 0.01 °C | A4 , B4 |
| Range 5 | -38.8344 °C to 0.01 °C | A5 , B5 |

**Positive Range:** Accesses the coefficients to be used for temperatures above the triple point of water (0.01 °C).

| Recommended Temperature Range (Positive) | | Coefficients |
|---|---|---|
| Range 6 | 0.01 °C to 961.78 °C | A6 , B6 , C6 , D6 |
| Range 7 | 0.01 °C to 660.323 °C | A7 , B7 , C7 |
| Range 8 | 0.01 °C to 419.527 °C | A8 , B8 |
| Range 9 | 0.01 °C to 231.928 °C | A9 , B9 |
| Range 10 | 0.01 °C to 156.5985 °C | A10 |
| Range 11 | 0.01 °C to 29.7646 °C | A11 |
| Range 5 | 0.01 °C to 29.7646 °C | A5 , B5 |

**A, B, C, D:** ITS-90 coefficients

Note that the **POSITIVE** and **NEGATIVE** groups include a common range: **Range 5**. If you need to use their coefficients for the positive and negative ranges, set the coefficients equally for the positive and negative ranges. The coefficient values can be found in the reference sensor certificate.

After filling in the blanks, click the **SAVE** button and confirm. The new sensor is now available to be chosen from the list. To edit data from a sensor, select it and press the **EDIT**  button. To remove a sensor, select it and press **REMOVE**.

## CVD and CCVD Coefficients

The CVD coefficients belong to the Callendar-Van Dusen equation: $\alpha$ (Alpha), $\delta$ (Delta) and $\beta$ (Beta). Configure the coefficients as explained on the previous item.

Callendar-Van Dusen equation:

$$R(t) = R_0 . \left\{ 1 + ALPHA . \left[ t - DELTA . \left( \frac{t}{100} \right) . \left( \frac{t}{100} - 1 \right) - BETA . \left( \frac{t}{100} - 1 \right) . \left( \frac{t}{100} \right)^3 \right] \right\},$$

BETA = 0 for $t \geq 0$.

The CCVD coefficients belong to the Callendar-Van Dusen equation. In fact, this equation is equivalent to the previous one, but it is arranged in a different way. Its coefficients are A, B and C. Configure the coefficients as explained on the previous item.

Callendar and Callendar-Van Dusen equation:

$$R(t) = R_0 . \{ 1 + A . t + B . t^2 + C . t^3 (t - 100°C) \}$$ , C = 0 for $t \geq 0$

This equation is usually used with the IPTS-68 temperature scale, where t is referred to the temperature in this scale and R0, to the resistance at 0°C. Although this equation was not reformulated in the ITS-90 temperature scale, it is also used in this scale

### For thermocouples (TC)

For **TC** (thermocouple) input, you must select the thermocouple type and the type of cold junction compensation (CJC): **Internal** or **Manual**. In **Internal** option, the compensation is done internally; In **Manual** you must set the value of the temperature of the cold junction to the calibrator. You can also enter thermocouple curves as well as RTD curves. Select **CUSTOM** and choose one of the registered thermocouples from the list. To enter or edit data from a sensor, press the edit button  and save or change the parameters of the sensors.

When the input sensor breaking occur (RTD or resistance) the display will show the burn-out warning identified by question marks illustrated below:


**Fig. 10** - Burn-out Warning

Whenever the input signal is above or below the input ranges established in Section 1.2 – General Specifications, the display indicates **OVER** or **UNDER**, respectively.

The units of temperature can be changed by clicking on the engineering unit (°C, °F or K) and selecting the desired option.

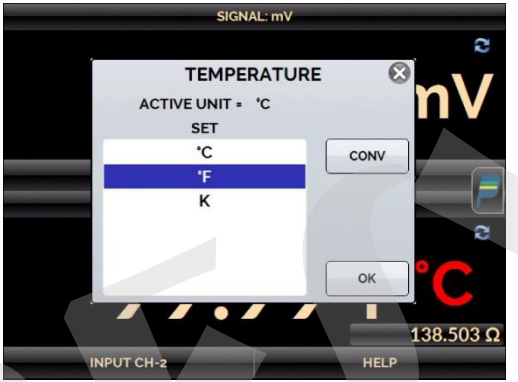
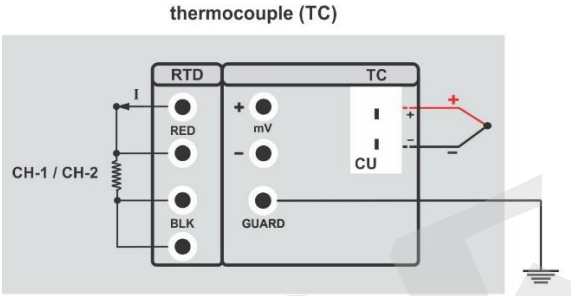
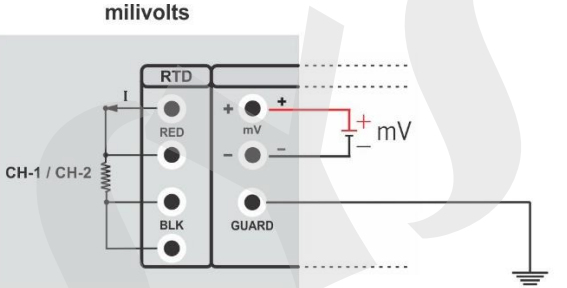


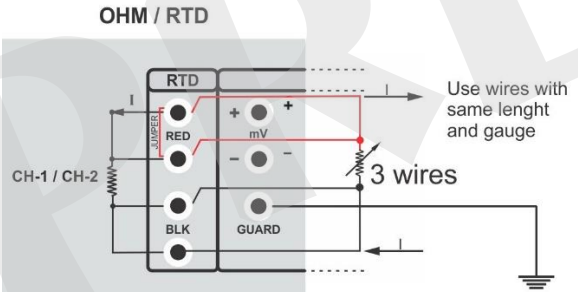

**Fig. 11** - Selecting the Engineering Unit

The **NONE** option turns off the input function.

**b) Measurement Connections**



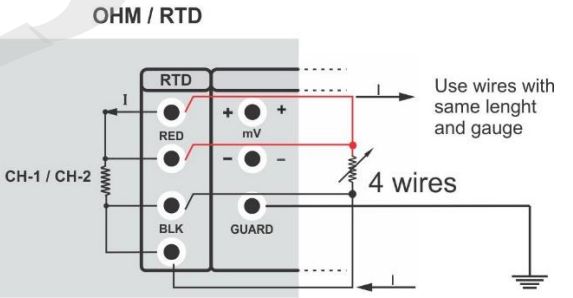



**Fig. 12** - Measurement Connections

### 2.3.2 - Saving Current Configuration (Memory Manager)

The STA-510 admits several special functions that may become of frequent use. In these situations, it is useful to store such settings in the instrument to save time. After setting the desired calibration mode (input type for channel 1 and/or channel 2), press the icon and the button **MEMORY MANAGER**. On the bottom of the screen, type a name for this configuration and a description. Press the **SAVE** button.

The operation that was being performed by the STA-510 shall be stored in memory identified by the name given to it. To use it again, even after the STA-510 is turned off and on, select the name of the desired setting and press the **LOAD** button. The **SAVE AS DEFAULT** button sets the current configuration as the default configuration of the super-thermometer. Thus, every time the STA-510 is turned on, this will be the initial configuration of the calibrator.

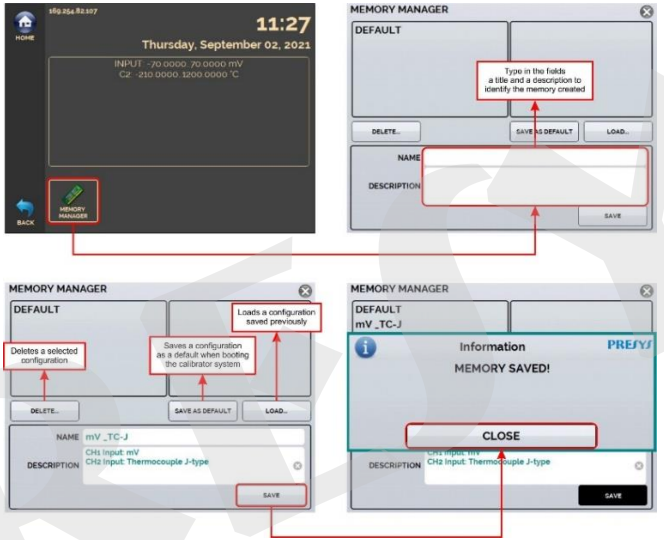



**Fig. 13** - Memory Manager Settings

## 2.4 - Data Logger

The STA-510 allows you to record series of measurements over time to display data in chart or table format. Select **CALIBRATOR** from the main menu and select the desired type of signal on channel 1 and channel 2. Press the icon , come back to the Initial Menu and select **DATA LOGGER.** The calibrator automatically starts the measurements and displays each measured point on the chart.

For measurements to be saved, you must press the **REC** button (see **Fig. 14**). With this option selected, all points (measurement and time) are saved in an internal file in STA-510, which can be used to generate a table or chart.

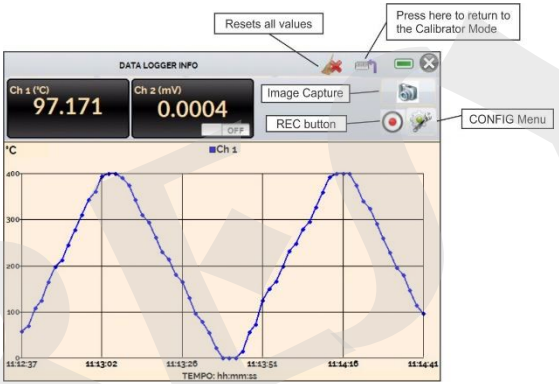



**Fig. 14** - Data Logger

**Fig. 15** - Data-Logger Configuration Menu

Entering in the Configuration Menu, in **CONFIG** option, you can edit the background color of the chart, color and line thickness, sampling rate (in seconds) and set the x (time) and y (measurements) axis of the chart.

Recording can also be programmed to start at a certain date and time in the **LOGGER** option. Just set the start time and end time of recording. During the defined range, the measured points are saved in an internal file in STA-510.

To view a saved file, press the **OPEN** button, select the desired file, and press **LOAD**. The file name contains the date and time of the measurements.

The **SHEET** button allows the visualization of data in table format, with the date and time of the measurement and the measured values.

If the user wants to export the current data to a .csv file that can be opened in spreadsheet software, press the **SAVE** button and indicate the name and where it will be saved. The button saves the current screen image as a .png file. All saved screens can be viewed in the **IMAGE** menu. These files are saved in the internal SD card of the calibrator. If a USB Pen Drive is connected to STA-510, you can choose between saving in the internal SD card or the Pen Drive.

To access the files saved in the internal SD card of the calibrator, connect the USB cable to the computer (type A USB) and to the STA-510 (Type B USB - Device, see **Fig. 01** and **Fig. 02**, RM and DT versions, respectively).

## 2.5 - Help Desk

STA-510 calibrator has a video player and documents viewer. These videos can be viewed while a calibration is performed and are designed to assist in the use of the calibrator. Documents can be, for example, calibration procedures or instructions that can be stored and viewed on the calibrator itself.

From the main menu, selecting **HELP DESK** and the tab **VIDEOS** a list of video categories appears. Select the category and the desired video. Press the button **FULL SCREEN** to view the video in full screen and the button **WINDOW** to reduced screen.

To add new videos on the calibrator, connect the USB cable to the computer (type A USB) and to the STA-510 (Type B USB, see **Fig. 01** and **Fig. 02**, RM and DT versions, respectively). Open **VIDEOS** folder. Copy the new video to any sub-folder (category) of the VIDEOS folder. If you prefer to create a new category, simply create a new folder inside VIDEOS with the name of the desired category and copy the video to this folder.

To insert documents, such as procedures or instructions, files must be converted to PDF and must be saved into the SD-card HELP folder, create a folder with the name of the document and insert it into this folder.

## 3 - SETTINGS

The **SETTINGS** menu has four divisions (tabs at the bottom): **DATE AND TIME**, **NETWORK**, **SERVICES** and **SYSTEM**.


**Fig 16 -** Settings Options

### 3.1 - Date and Time

In **Date and Time** tab is configured the date, time and time zone for the calibrator. You can also set the decimal separator for comma or dot in CSV files.

### 3.2 - Network

In the **NETWORK** tab you can configure the calibrator IP address for communication with the computer and Wi-Fi (wireless) network. The IP address can be dynamically configured (**DHCP**) or can be a fixed address (disable DHCP and change desired addresses).

**Wi-fi** communication is via USB / WIFI adapter. In the **NETWORK** tab you can configure the device name (name which calibrator will be displayed on network). By selecting **CONFIGURE WIRELESS (WIFI)** the user views available networks and configures which network they want to connect to.

By connecting the calibrator to the network, you can view and print Calibration Reports from your computer. Press network icon  to get access to the configured IP address after connecting to the network. When connected to the wireless network, the icon will be Wi-fi network  .

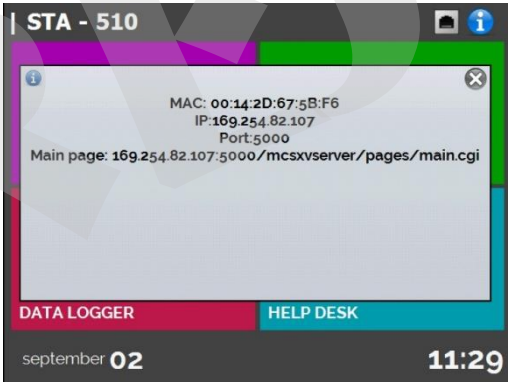



**Fig. 17** - IP Address

### 3.3 - Services

In the SERVICES bar the user can configure the calibrator communication types and other settings. The options are

- **REMOTE ACCESS -** WEBSERVER (Remote Server) and VNC (Virtual Network Computing) access options
- **SERIAL COMM -** Serial Communication Settings
- **FILE SHARING AND USB HOST CONTROL -** Options for allowing / denying file sharing access and setting passwords
- **SERVER ADDRESS -** Remote Server Address Configuration
- **STARTUP MODE -** The user selects whether to prefer the calibrator to start in calibrator mode or the main screen.

  The types of communication are described below.

#### 3.3.1 - *Web Server*

To access the calibrator's integrated web server, enable the option on the **NETWORK** tab. Connect the calibrator to the network via Ethernet cable or Wi-Fi. To access the web server, open the browser on your computer and enter the following address. To verify the IP address, see Fig. 17.

<***calibrator_IP_address>:5000/mcsxvserver/pages/main.cgi***
User: *admin*
Password: *xvmaster*

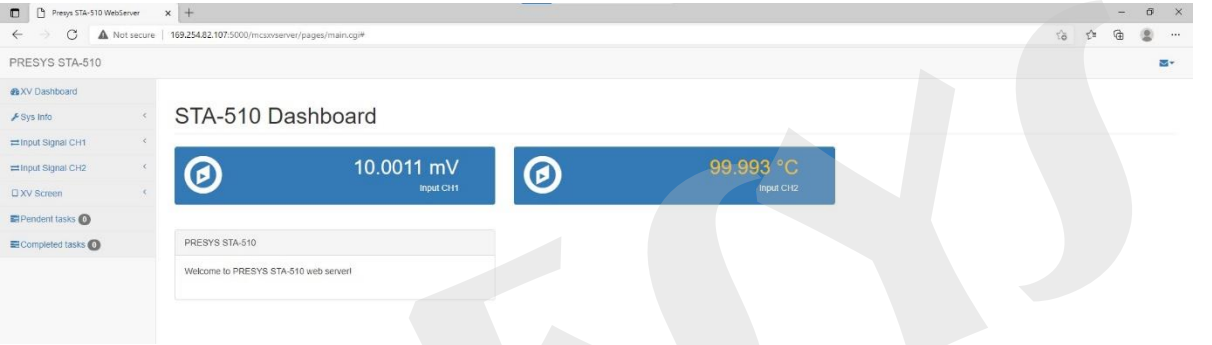



**Fig. 18** - Web Server

In Web Server, you can monitor the calibrator screen and read the input signals.

### 3.3.2 - Remote access - VNC

Virtual Network Computing (or VNC only) is a desktop graphics sharing system that uses the Remote Frame Buffer protocol (RFB) to remotely control another computer or device. By enabling this option, the calibrator screen can be accessed directly from the computer.

For access via VNC you need to download and install a VNC viewer program, some available for free on the internet. Connect the calibrator to the network via Ethernet or Wi-fi cable. Set in the VNC viewer the IP address indicated on the network icon and connect. When prompted, use the password "adm". This password can be changed later in the **SERVICES → FILE SHARING AND USB HOST CONTROL → SECURITY**.

### 3.3.3 - System

In the **SYSTEM** tab can be set the volume of the calibrator, the touch screen calibration, identification of the calibrator, language, printer and security options.

- **Touch Screen Options**

To adjust the touch screen, press the **TOUCHSCREEN OPTIONS** button. Press on the screen the places indicated by + (it is recommended to use the stylus for touch screen). After the calibration, press again on the screen at any point. Confirm the calibration to return to SYSTEM Menu.

- **Language Setting**

Press the desired language for the system and confirm in OK button. The system must be restarted to save the configuration.

- **Calibrator Identification**

  In this option is possible to identify your calibrator, choosing a TAG name, Owner name and Location.

- **Sound Options**

  Press + or - to configure a value for the system audio volume.

- **Screen Brightness**

  Choose display brightness (25 %, 50 %, 75 % or 100 %).

- **Security Options**

  The instrument initially has no access password. This setting can be changed in **SECURITY OPTIONS**.

  To create a new user, press the key icon  and then users' icon  . Fill the blanks and press **CREATE.** To do so, select the user and press **SIGN**.

  Pay attention to the functions that each user level has access in the following table:

| User Level | Function | | |
|---|---|---|---|
| | Calibrator | Data-Logger | Settings |
| Operator | ✓ | ✗ | ✗ |
| Tec | ✓ | ✓ | ✗ |
| Admin | ✓ | ✓ | ✓ |

To lock the system, press the padlock icon  on **Settings → System** menu. The next time the STA-510 Calibrator is turned on, it will request login and password. To unlock the system, login as an Admin Level user and press the padlock icon on system menu again.

***Never delete all Admin level users when using password access!***

- **Printer Config**

  To configure the USB Printer Language (PCL3/PCL5e/PCL3G etc.).

- **Adjust Cal.**

  Adjustment level protected by password. (See section 4 - Adjustment)

## 4 - ADJUSTMENT

**WARNING: Enter the following options only after understanding them completely. Otherwise, it may be necessary to return the instrument to the factory for readjustment**.

Press **ADJUST CAL** option from the **SETTINGS → System** Menu. You should then enter the **PASSWORD** 9875 to access the adjustment menu. The password functions as a protection to adjustment ranges. After the password is entered the menu displays the options **GENERAL** and **INPUTS**. In the option **General** you can Recover the Manufacturer Adjustment backup file and change the last calibration date if a new adjustment is done. For the adjustment, select the **INPUT** tab.

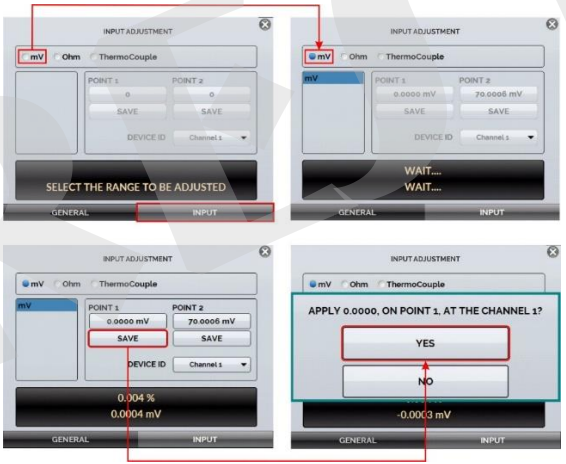



**Fig. 19** - Adjustment Options

Note that the thermocouples will only be adjustment after the **mV** and cold junction **(CJC)** adjustment have been performed. In case of **OHM** or **RTD**, you must perform the **mV** adjustment first.

To perform the inputs adjustment, follow the next steps:

- Select the corresponding input option and wait until the system allows start the adjustment.
- Press the button corresponding to the point value to change its value if needed.
- Apply the signals presented in the tables below for each point and press the button SAVE.

**Notes:**

- You can adjust only one channel, if necessary.
- If both channels require adjustment, be sure to adjust each channel separately.

## 4.1 - Input adjustment

**mV**

Note that the applied signals just need to be close to values shown in the table.

Once the signal has been applied, store the values of the 1st and 2nd calibration points (POINT1 and POINT2).

| mV Input | POINT1 | POINT2 |
|---|---|---|
| Channel 1 | 0.0000 mV | 70.0000 mV |
| Channel 2 | 0.0000 mV | 70.0000 mV |

**OHMS Input**

Input adjustment for Ω is performed in two steps:

**a) Application of mV Signal:**

For the adjustment below, leave terminals RTD3(+) and RTD4(+) short-circuited

| mV Signal | Terminals | POINT1 | POINT2 |
|---|---|---|---|
| G_2 | RTD2 (+) and RTD3 (-) | 0.0000 mV | 600.0000 mV |
| G_3 | RTD2 (+) and RTD 3 (-) | 0.0000 mV | 120.0000 mV |
| G_4 | RTD2 (+) and RTD 2 (-) | 0.0000 mV | 70.0000 mV |
| V_OHM3 | RTD3 (+) and TC (-) | 250.000 mV | 350.000 mV |
| V_OHM4 | RTD4 (+) and TC (-) | 250.000 mV | 350.000 mV |

**b) Application of Resistance:**

Connect a decade-box or standard resistors on terminals RTD1, RTD2, RTD3 and RTD4 (4-wire connection).

| resistors | POINT1 | POINT2 |
|---|---|---|
| OHM1 | 150.000 Ω | 400.000 Ω |
| OHM2 | 80.000 Ω | 150.000 Ω |
| OHM3 | 20.000 Ω | 50.000 Ω |

**CJC Adjustment**

Measure the temperature of thermocouple input terminal and store only one point.

| Cold Junction | POINT1 |
|---|---|

| | |
|---|---|
| CJC | measured temperature in the environment |

**Notes**

- Adjusting procedures for STA-510 must be performed under the reference conditions of temperature and humidity.
- The standards used to adjust STA-510 should have accuracy at least 3 times better than the accuracy values provided in this manual.

# 5 - MAINTENANCE

## 5.1 - Replacing Power Supply Fuse

In case the power fuse (2A / 250V / 5x20mm) burns out, it can be replaced by another fuse that is included with your instrument. The fuse holder is in the power outlet on the rear of the STA-510.

The fuse may burn out due to a mains voltage surge or a component failure in the calibrator. After replacing the fuse, if it burns out again, the failure may have been generated by other, more complex factors. In this case, please contact the Presys technical support.

To replace the power supply fuse of STA-510, proceed as follows:

- Use a screwdriver as a lever to lift the tab that secures the fuse holder to the plug module, perform this operation on both sides until the body of the fuse holder is exposed. For more details, see **Fig. 20** (A).

- Make a tweezer with your thumb and forefinger and remove the fuse holder. For more details, see **Fig. 20** (B).

- Remove the fuse holder by pulling it and then, replace the damaged fuse. For more details, see **Fig. 20** (C).

- Close the fuse holder by pushing it gently until it reaches the end of the compartment. For more details, see **Fig. 20** (D).

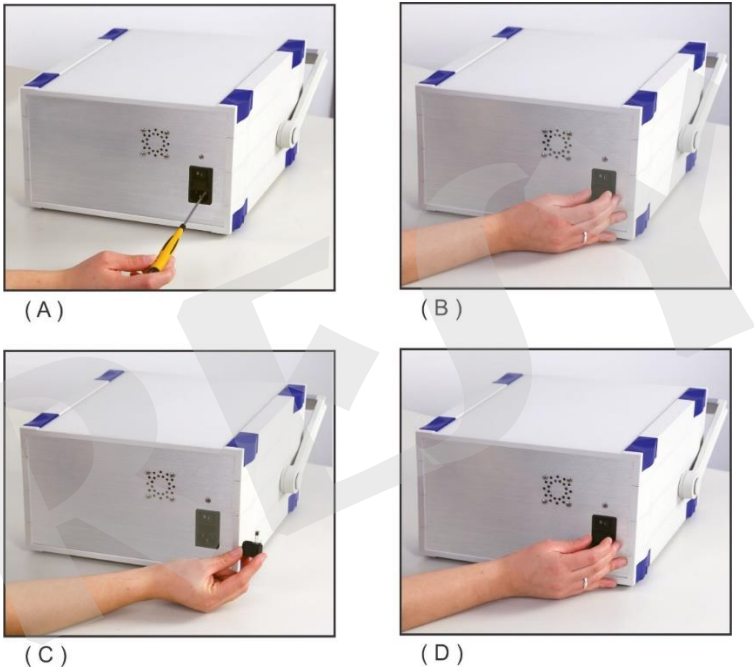



**Fig. 20** - Replacing current input fuse