Model SRH400

Operating Instructions

Setra Systems, Inc.

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800.257.3872 • www.setra.com

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1.0 General

This operation manual is part of the scope of supply and serves for ensuring proper handling and optimal functioning of the device. The operation manual shall be read before commissioning the equipment and it shall be provided to all staff involved in transport, installation, operation, maintenance and repair.

The operation manual may not be used for the purposes of competition without the written consent of Setra Systems, Inc. and may not be forwarded to third parties. Copies may be made for internal purposes. All information, technical data and diagrams included in these instructions are based on the information available at the time of writing.

1.1 Explanation of symbols

This symbol indicates safety information.
It is essential that all safety information is strictly observed. Failure to comply with this information can lead to personal injuries or damage to property. Setra Systems, Inc. assumes no liability if this happens.

This symbol indicates instructions.
The instructions shall be observed in order to reach optimal performance of the device.

1.2 Safety instructions

1.2.1 General safety instructions

- Avoid any unnecessary mechanical stress and inappropriate use.
- When replacing the filter cap make sure not to touch the sensing elements.
- For sensor cleaning please see "Cleaning instructions" at www.setra.com.
- Installation, electrical connection, maintenance and commissioning shall be performed by qualified personnel only.

1.2.2 Mounting, start-up and operation

The humidity / temperature transmitter has been produced under state of the art manufacturing conditions, has been thoroughly tested and has left the factory fulfilling all safety criteria. The manufacturer has taken all precautions to ensure safe operation of the device. The user must ensure that the device is set up and installed in a manner that does not have a negative effect on its safe use.

The user is responsible for observing all applicable safety guidelines, local and international, with respect to safe installation and operation on the device. This operating manual contains information and warnings that must be observed by the user in order to ensure safe operation.

- Mounting, start-up, operation and maintenance of the device may be performed by qualified staff only. Such staff must be authorized by the plant operator to carry out the mentioned activities.
- The qualified staff must have read and understood this operating manual and must follow the instructions contained within.
- All process and electrical connections shall be thoroughly checked by authorized staff before putting the system into operation.
- Do not install or start start-up a device supposed to be faulty. Make sure that such devices are not accidentally used by marking them clearly as faulty.
- A faulty device may only be investigated and possibly repaired by qualified, trained and authorized staff. If the fault cannot be fixed, the device shall be removed from the system.
- Service operations other than described in this operating manual may only be performed by the manufacturer.

DISCLAIMER:

The manufacturer or his authorized agent can be only be held liable in case of wilful or gross negligence. In any case, the scope of liability is limited to the corresponding amount of the order issued to the manufacturer. The manufacturer assumes no liability for damages incurred due to failure to comply with the applicable regulations, operating instructions or the operating conditions. Consequential damages are excluded from the liability.

1.3 Environmental aspects

Products from Setra System, Inc. are developed and manufactured observing of all relevant requirements with respect to environment protection. Please observe local regulations for the device disposal.

For disposal, the individual components of the device must be separated according to local recycling regulations. The electronics shall be disposed of correctly as electronics waste.

2.0 Product description

The innovative, modular SRH400 humidity (RH) and temperature (T) transmitter consists of a basic unit and various pluggable, interchangeable probes.

The basic unit can accommodate one combined RH and T probe or two separate probes, one for RH and one for T. The probes are available in stainless steel enclosure, and can be plugged onto the basic unit either directly or with extension cables up to 10 m (32.8 ft) long. An optional kit facilitates the mounting of the probes into duct.

The SRH400 basic unit is available a with metal enclosure, suitable for wall mount.
The measured values are available on two analogue voltage or current (2 wire, 4 – 20 mA) outputs, as well as on the optional display.

One or two point adjustment for RH and T of the transmitter can be easily performed with push buttons on the electronics board of the SRH400 basic unit. Alternatively, the probes can be adjusted individually with the PCA Product Configuration Adapter.

3.0 Scope of supply

SRH400 Basic Unit (does not include probes or probe cables; these are to be ordered separately)

- SRH400 according to ordering guide
- Gland fitting PG9
- Calibration certificate
- Operating instructions

Probe
- RH/T probe or RH and Temp probes separately, depending on order
- Calibration certificate

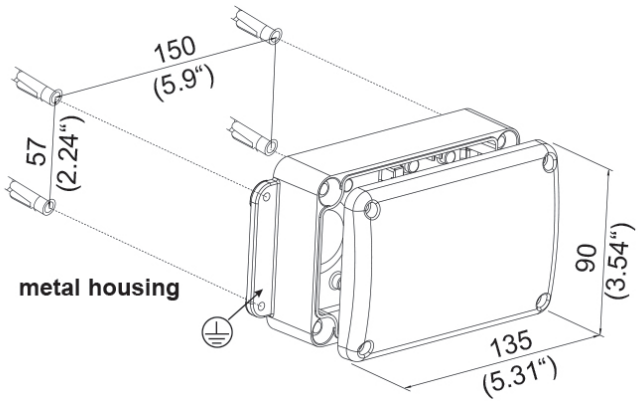
Probe cable
- Probe cable depending on order

4.0 Installation

4.1 Mounting of the enclosure

Drill the mounting holes according to the mounting template. Fix the back cover of the enclosure with 4 screws, max. diameter 4.2 mm (0.2"), not included in the scope of supply. Perform the electrical connection according chapter "6. Electrical connections".

Fix the front cover onto the back cover with the four screws included in the scope of supply.

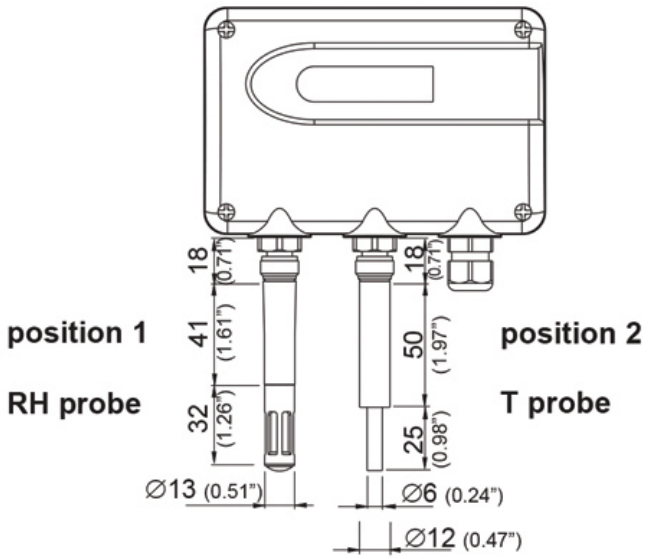


4.2 Connecting the sensing probes

The humidity (RH) probe or the combined humidity and temperature (RH&T) probe must be connected at position 1. The T probe must be connected at position 2.

4.3 S07 probes connected directly to SRH400

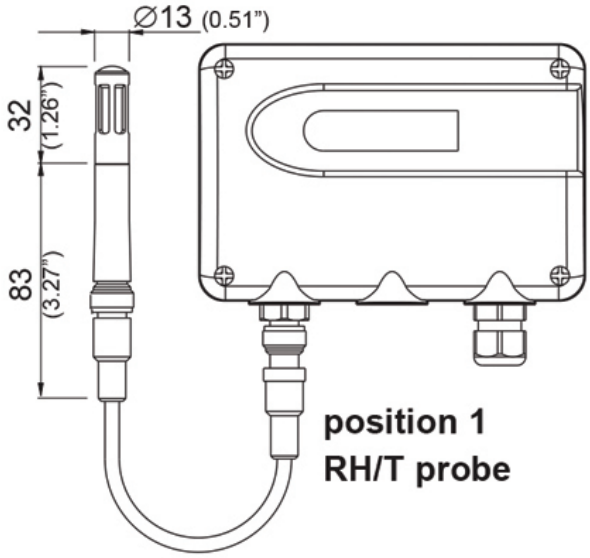
SRH400 with fixed probe:



In order to avoid misreading caused by self-heating, the device shall be installed with the probes pointing downwards. In very humid, condensing environment it is recommended to use the SRH400 version with remote probe, please see below.

4.4 probes connected to SRH400 with extension cables

SRH400 with remote sensing probe:



The probes can be also connected to the SRH400 housing with extension cables, see chapter "11. Accessories". The probe may be mounted pointing upwards or downwards. The probe can be fixed onto a wall with the wall mounting clip SRHWMC.

5.0 Probe protection during cleaning and sterilizing operations

Periodical cleaning and sterilizing operations are common in pharma and food industries, as well as in incubators or hatchers. Cleaning and sterilizing agents may affect the sensors and lead to drift and corrosion. It is highly recommended to or remove the probes during cleaning and sterilizing.

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6.0 Electrical connections

see figure Fig. 5 Voltage output and Fig. 6 Current ouput

EMC recommendations for wiring
The requirements of EMC standards as specified in the technical data are only fulfilled with the probes connected either directly or with Setra original extension cables to SRH400.

- SRH400 with metal enclosure must be grounded either at the designated points on the inside, or outside at the mounting plate. The probe must not be grounded; it must be electrically isolated from the GND.
- Locate the SRH400, the probe cable and the output cables as far as possible from sources of electromagnetic disturbances.
- For the analogue outputs use either shielded or twisted cable pairs. The shield shall be grounded at one end only, preferably at the controller side.
- Cable loops may impact on the EMC behavior of SRH400. Keep all cables as short as possible. Unused wires shall be grounded at both ends. Run all cables as close as possible to the ground potential, for instance close to the walls or steel structure elements.

6.1 Connection diagram

SRH400 - Analog volts

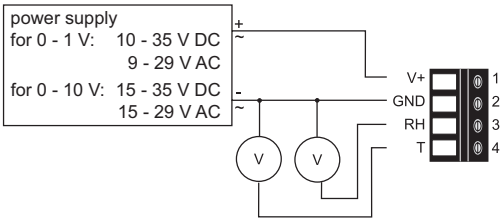


Figure 5.

SRH400 - Analog millamps

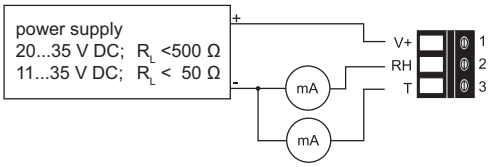
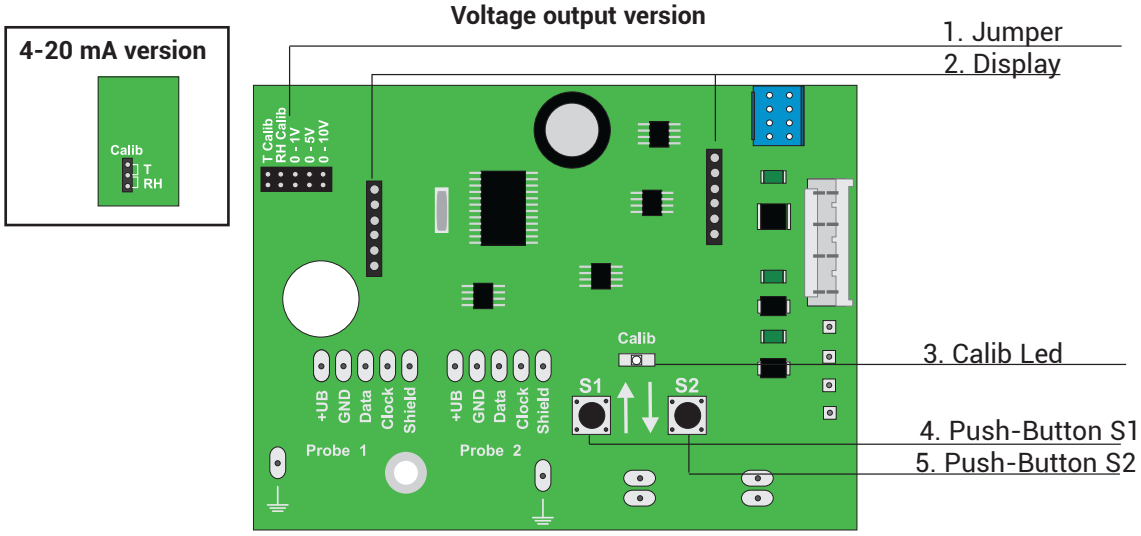


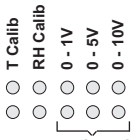
Figure 6.

7.0 User interface



1. JUMPER:
- Selection of output signals and of calibration mode

Voltage output



4-20 mA output

2. DISPLAY:
- Socket for optional display

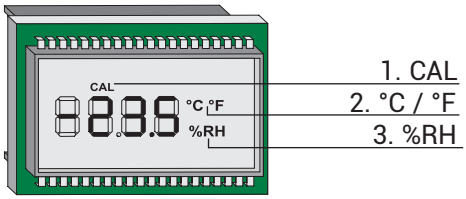
3. CALIB LED:
- Continuously on indicates adjustment mode
- 1 flash confirms reset to factory calibration

4. S1 Functions
- 1-point RH or T adjustment (RH > 50%RH; T within the upper half of the T scale)
- 2-point RH or T adjustment (high calibration point)
- Save adjustment data

5. S2 Functions
- 1-point RH or T adjustment (RH < 50%RH; T within the lower half of the T scale)
- 2-point RH or T adjustment (low calibration point)
- Exit the adjustment mode without saving the data

S1+S2 Function:
- Reset to factory calibration

7.1 Display



1. CAL:
- Indicates adjustment mode

2. °C / °F:
- T measuring unit

3. % RH:
- RH measuring unit

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8.0 RH and T adjustment of the probes

8.1 Definitions

Calibration
The calibration documents the accuracy of a measurement device. The device under test (specimen) is compared with the reference and the deviations are documented in a calibration certificate. During the calibration, the specimen is not changed or improved in any way.

Adjustment
The adjustment improves the measurement accuracy of a device. The specimen is compared with the reference and brought in line with it. An adjustment can be followed by a calibration which documents the accuracy of the adjusted specimen.

8.2 Sensing adjustment with SRH400 basic device

- 1-point RH or T adjustment for optimal performance over a narrow RH or T range.

  Example: climate monitoring in a pharma manufacturing site. RH range: 40…60 % RH, RH adjustment point: 50 % RH T range: 15…25 °C (59…77 °F) T adjustment point: 20 °C (68 °F)

- 2-point RH or T adjustment for accurate measurement over a wide RH or T range.

  Example: outdoor measurement
  RH range: 10 … 100 % RH, RH adjustment points: 40 % RH, 70 % RH T range: -30 … 35 °C (-22…95 °F), T adjustment points: -10 °C (14 °F), 15 °C (59 °F)

- The adjustment data is saved into the probes. The SRH400 basic unit is not affected by the adjustment procedure. Consequently, it is possible to replace the probes at any moment.
- Start the adjustment procedure with the low point (e.g. 30 % RH) and continue with the high point (e.g. 80 % RH)
- For accurate calibration or adjustment, the specimen and the reference must have same T.
- During calibration or adjustment the T shall remain constant.
- Allow min. 30 min, stabilization time for RH calibration or adjustment.
- If needed, clean the sensors and replace the filter cap by a new one.

8.2.1 2-point RH and T adjustment

1. Set the jumper to RH calib or to T Calib.

2. Place the probe into the corresponding calibrator and let it stabilize at the first point (low) for at least 30 minutes.

3. Press and hold S2 for 3 seconds. The LED “Calib” will light and the symbol “CAL<” will appear on the SRH400 display.

4. Push S1 (up) or S2 (down) to bring the measured value in line with the reference in steps of 0.1. The actual corrected value is indicated on the display and can be measured at the analogue output.

5. Press and hold S1 for 3 seconds to store the value into the probe and end the first (low) point adjustment. The LED “Calib” will be deactivated and the display will show “CAL”

6. Alternative: Press and hold S2 for 3 seconds to exit the adjustment mode without storing the adjustment data. The LED “Calib” will be deactivated and the symbol “CAL” disappears from the LC display.

7. Set the calibrator for the second (high) adjustment point and let the probe stabilize for at least 30 min.

8. Press and hold S1 for 3 seconds. The LED “Calib” will light and the symbol “CAL>” will appear on the SRH400 display.

9. Push S1 (up) or S2 (down) to bring the measured value in line with the reference in steps of 0.1. The actual corrected value is indicated on the display and can be measured at the analogue output. Press and hold S1 for 3 seconds to store adjusted value in the probe and end the second (high) point adjustment. The LED “Calib” will be deactivated and the display will show “CAL”.

   Alternative: Press and hold S2 for 3 seconds to exit the adjustment mode without storing the adjustment data. The LED “Calib” will be deactivate and the symbol “CAL” disappears from the LC display.

8.3 1-point RH and T adjustment

For best performance, the RH and the T adjustment point shall be selected at the middle of the RH and T measurement range of main interest.

1. Set the jumper to RH calib or to T Calib.

2. Place the probe into the corresponding calibrator and let it stabilize at the selected RH or T value for at least 30 minutes.

3. For adjustment point in the lower half of the output scale, press and hold S2 for 3 seconds. The LED "Calib" will light and the symbol "CAL<" will appear on the SRH400 display. For adjustment point in the upper half of the output scale, press and hold S1 for 3 seconds. The LED "Calib" will light and the symbol "CAL>" will appear on the SRH400 display.

4. Push S1 (up) or S2 (down) to bring the measured value in line with the reference in steps of 0.1. The actual corrected value is indicated on the display and can be measured at the analogue output.

5. Press and hold S1 for 3 seconds to store adjusted value in the S07 probe and end the first (low) point adjustment. The LED "Calib" will be deactivated and the display will show "CAL".

   Alternative: Press and hold S2 for 3 seconds to exit the adjustment mode without storing the adjustment data. The LED "Calib" will deactivate and the symbol "CAL" disappears from the LC display.

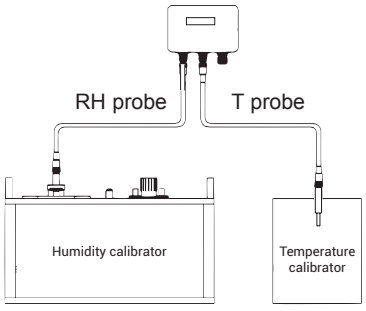

Figure 3.
Loop calibration

8.4 Return to factory calibration

During normal measurement mode of SRH400 (NOT during adjustment mode!) press and hold together S1 and S2 for 5 seconds. The return to factory calibration is indicated by one flash of the LED "Calib".

8.5 Loop adjustment and calibration in the field

Loop calibration or adjustment in the field, as required by the FDA (Food and Drugs Administration) regulated industries, is easily possible for the SRH400 with two separate probes. Use extension cables to drop the probes into calibrators without dismounting or disconnecting the SRH400 basic unit. The illustration shows the RH probe placed into the Humor 20 high end portable humidity calibrator, and the T probe in a dry block calibrator.

8.6 Probe individual adjustment

The probes can be adjusted individually with the optional Product Configuration Adapter and the optional Product Configuration Software.

9.0 Functional and accuracy check of SRH400 basic unit

The SRH400 basic unit can be checked with respect to functionality and accuracy by using the SRH400 Reference Probes Set, order number SRH400XXX (Fig. 4).

The set consists of two reference probes, which supply each a pair of fix humidity and temperature values as follows:

RH = 10 % , T = 45 °C (113 °F)
RH = 90 % , T = 5 °C (41 °F)

The set includes a test report for each reference probe.

For SRH400 basic unit dedicated for only one combined RH & T probe, both RH and T check shall be performed with each reference probe connected at the single probe connection socket.

For SRH400 basic unit ordered with for two separate RH and T probes, the RH check shall be done with each reference probe connected to the first (left) socket, and then the T check with the same probe connected to the second (right) socket.

9.1 SRH400 check using the display

If the SRH400 basic unit features a display, as soon as the reference probe is connected the display shall show the corresponding RH and T reference values.

9.2 Check of the SRH400 outputs

For the SRH400 with voltage output, a voltmeter shall be connected as in Fig. 5.

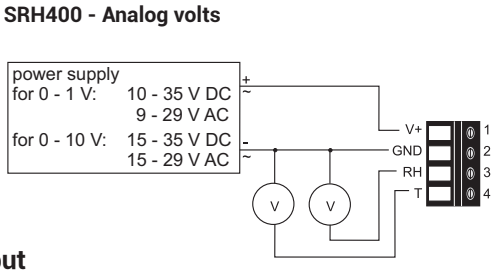

Figure 5.
Voltage output

For the SRH400 with current output, an ammeter shall be connected as in Fig. 6.

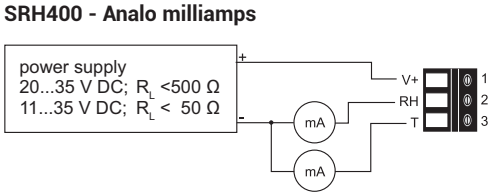

Figure 6.
Current output

Make sure that the supply is appropriate for the output signal.

9.3 Humidity check

The table below shows the output signal for each reference probe.

	Output			
Humidity reference	**4 to 20 mA**	**0 to 1 V**	**0 to 5 V**	**0 to 10 V**
Reference probe 1 10 % RH	5.6 mA	0.1 V	0.5 V	1.0 V
Reference probe 2 90 % RH	18.4 mA	0.9 V	4.5 V	9.0 V

9.4 Temperature check

The output signal depends on the scaling of the temperature output.

For current output: Iout [mA] = (16*(Ref/Tmax)) + 4 mA
For voltage output: Uout [V] = (Abb*(Ref/Tmax))

Where:
Abb ..... voltage scaling (1 V, 5 V, 10 V)
Ref ..... reference value of temperature (45 °C (113 °F) resp. 5 °C (41 °F))
Tmax ..... max. temperature scaling (e.g. 50 °C (122 °F))

	Output			
Temperature reference	**4 to 20 mA**	**0 to 1 V**	**0 to 5 V**	**0 to 10 V**
Reference probe 1 45 °C (113 °F)	18.4 mA	0.1 V	4.5 V	9.0 V
Reference probe 2 5 °C (41 °F)	5.6 mA	0.9 V	0.5 V	1.0 V

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10.0 Technical data

General

Supply voltage (Class III)	
for 0-10 V output:	15-35 VDC or 15-29 VAC
for 4-20 mA output:	10 -35 VDC
Current consumption	
DC supply:	typ. 10 mA
AC supply:	typ. 20 mA
Load resistor (for 4-20 mA output)	$R_L < (U_V\text{-}10\ V/0.02\ A)[\Omega]$
Connection	Screw terminals, max. 2.5 mm^2
Housing material	Cast away - $AlSi_9Cu_3$
Protection class	IP65/ NEMA 4

Specifications subject to change without notice.

General (cont.)

Cable fitting	PG9 cable Ø 4.5-100 mm (0.18-0.39")
Sensor protection	Membrane filter
Electromagnetic compatibility	EN61326-1, EN61326-2-3, Industrial environment
Temperature ranges	Operating: -40 to 60°C (-40 to 140°F) Storage: -40 to 60°C (-40 to 140°F)

Outputs

0-100% RH	
0-10 V:	$-1\ mA < I_L < 1\ mA$
4-20 mA (2-wire):	$R_L < 500\ \Omega$
T dependence of analog outputs	Max. 0.2 mV/°C Resp. 1 µA/°C

11.0 Spare parts and accessories

Category	EE Accessory P/N	Setra Accessory P/N	Description
Filters	HA010101	SRHMF	Membrane filter
Filters	HA010103	SRHSS	Stainless steel sintered filter
Filters	HA010104	SRHPG	Plastic grid filter
Filters	HA010105	SRHPF	PTFE - filter Ø12mm
Filters	HA010106	SRHMG	Metal grid filter
Filters	HA010115	SRHHP	H2O2 - filter
Flanges	HA010201	SRHSMF	Stainless steel mounting flange 12mm
Flanges	HA010209	SRHDMK	Duct mounting kit (for SRH400)
Flanges	HA010211	SRHWMC	Wall mounting clip for probe Ø12mm
Flanges	HA010214	SRHPMFB	Plastic mounting flange 12mm; black
Flanges	HA010202	SRHPMFG	Plastic mounting flange 12mm; grey (RAL7035)
Part configuration adapter	EE-PCA	SETRAPCA1	Configuration adapter transmitter to RS232 and USB
Part configuration adapter	HA011057	SETRAPCA4	Configuration cable for humidity & temp probe SRP4xxx
Cable for SRH400	HA010801	SRC400W	Remote probe extension cable - 2 meter
Cable for SRH400	HA010802	SRC400F	Remote probe extension cable - 5 meter
Cable for SRH400	HA010803	SRC400X	Remote probe extension cable - 10 meter
RH & temp sensor probe SRH400	EE07-MFT6HC01	SRP400HTMGM	SRH400 humidity/ temperature sensor with coating
Temp sensor probe SRH400	EE07-MT	SRP400TPNNM	SRH400 temperature sensor
Calibration	ISO-AH3ASD	SRH400SCAL	SRH400 calibration (ISO)
Calibration	OEKD-AH3A1SD	SRH400NCAL	SRH400 calibration (NIST)

12.0 Returning products for repair

Please contact a Setra application engineer (800-257-3872, 978-263-1400) before returning unit for repair to review information relative to your application. Many times only minor field adjustments may be necessary. If a return is required please call 1-800-257-3872 or email orders@setra.com to obtain an RMA number before sending unit(s) back to us. Once an RMA number has been assigned to you, please send the package back to the below address.

Setra Systems, Inc.
159 Swanson Road
Boxborough, MA 01719-1304
Attn: Repair Department

To download return form, please visit Setra's service page.

To assure prompt handling, please make sure the RMA number is on the outside of the box and a copy of the service request from is included in the shipment. If applicable, include a copy of the PO for return in the shipment.

NOTES:

Please remove any pressure fittings and plumbing that you have installed and enclose any required mating electrical connectors and wiring diagrams.

Allow approximately 3 weeks after receipt at Setra for the repair and return of the unit. Non-warranty repairs will not be made without customer approval and a purchase order to cover repair chargers.

12.1 Calibration services

Setra maintains a complete calibrations facility that is traceable to the National Institute of Standards and Technology (NIST). If you would like to recalibrate or recertify your Setra pressure transducers or transmitters, please call our Repair Department at 800-257-3872 (978-263-1400) for scheduling.

13.0 Warranty and limitation of liability

SETRA warrants its products to be free from defects in materials and workmanship, subject to the following terms and conditions: Without charge, SETRA will repair or replace products found to be defective in materials or workmanship within the warranty period; provided that:

a) the product has not been subjected to abuse, neglect, accident, incorrect wiring not our own, improper installation or servicing, or use in violation of instructions furnished by SETRA;

b) the product has not been repaired or altered by anyone except SETRA or its authorized service agencies;

c) the serial number or date code has not been removed, defaced, or otherwise changed; and

d) examination discloses, in the judgment of SETRA, the defect in materials or workmanship developed under normal installation, use and service;

e) SETRA is notified in advance of and the product is returned to SETRA transportation prepaid.

Unless otherwise specified in a manual or warranty card, or agreed to in writing and signed by a SETRA officer, SETRA pressure, humidity, and acceleration products shall be warranted for one year from date of sale.

The foregoing warranty is in lieu of all warranties, express, implied or statutory, including but not limited to, any implied warranty of merchantability for a particular purpose.

SETRA's liability for breach of warranty is limited to repair or replacement, or if the goods cannot be repaired or replaced, to a refund of the purchase price. In no instance shall SETRA be liable for incidental or consequential damages arising from a breach of warranty, or from the use or installation of its products. No representative or person is authorized to give any warranty other than as set out above or to assume for SETRA any other liability in connection with the sale of its products.

For all CE technical questions, contact Setra Systems, USA. EU customers may contact our EU representative Hengstler GmbH, Uhlandstr 49, 78554 Aldingen, Germany (Tel: +49-7424-890; Fax: +49-7424-89500).

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