TiTEC
SENSORIK NACH MAß

⚠ WARNING

- **READ THESE INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THIS DEVICE**.
- Failure to observe safety information and comply with instructions could result in **PERSONAL INJURY, DEATH AND/OR PROPERTY DAMAGE**.
- To avoid electrical shock or damage to equipment, disconnect power before installing or servicing and use only wiring with insulation rated for full device operating voltage.
- To avoid potential fire and/or explosion do not use in potentially flammable or explosive atmospheres.
- Retain these instructions for future reference.
- This product, when installed, will be part of an engineered system whose specifications and performance characteristics are not designed or controlled by TiTEC, Review applications and national an local codes to assure that the installation will be functional and safe. Use only experienced, knowledgeable, technicians to install this device.

APPLICATIONS

STF series devices are commonly used in HVAC/R systems for:

- In-duct airflow and velocity monitoring
- In-duct temperature monitoring
- VAV applications

SPECIFICATIONS

Performance

Measurement Ranges
Velocity: Range   2: 0 - 400 FPM (0-2 m/s)
        Range 10: 0 - 2,000 FPM (0-10 m/s)
        Range 20: 0 - 4,000 FPM (0-20 m/s)
Temperature: 32 –122°F (0 – 50°C)

Accuracy
Velocity: Range   2: 0 - 400 FPM
        <20 FPM +5% from reading
        Range 10: 0 - 2,000 FPM
        <100 FPM +5% from reading
        Range 20: 0 - 4,000 FPM
        <200 FPM +5% from reading
Temperature: <33°F for v > 100 FPM
Accuracy specifications include: general accuracy, temperature drift, linearity, hysteresis, long term stability, and repetition error.

Technical Specifications

Media Compatibility
Dry air or non-aggressive gases

Measuring units
FPM and °F

Measuring element
Temperature: ntc10k
Velocity: Pt1000

Environment
Operating Temperature:
32 –122°F (0 – 50°C)
Storage Temperature: -4 –158°F (-20 – 70°C)
Humidity: 0 to 95% RH, non condensing

Physical

Case
Dimensions: 3.54" x 3.74" x 1.4"
        (90.0 x 95.0 x 36.0 mm)
Dimensions - Probe:
    OD: 0.394" (10mm)
    Length: 8.26" (210mm) from cover bottom
    Immersion Length with Flange:
    Adjustable 2"–7.08" (50 – 180 mm)
Weight (Case + Probe): 7.76 oz (220 g)
Mounting: 2 screw holes, 11/64" (4.0mm)
Materials:
    Case: ABS (UL 94 V-0 Approved)
    Lid: PC (UL 94 V-0 Approved)
    Probe: Stainless Steel
Protection standard: IP54 / NEMA3

Display

3 1/2 Digit LCD display
Size: 1.8" x 0.5" (45.7 x 12.7 mm)

Electrical Connections (2 each)
Power Supply & Signal Out: 4 screw terminal
        block 12-24AWG (0.2 – 1.5 mm^2)
Relay Out: 3 screw terminal block
        12-24AWG (0.2 – 1.5 mm^2)

Cable Entry (2 each)
Strain Relief: M16
Knockout $\varnothing$: 0.625" (16 mm)

Electrical

Input: 24VDC/24VAC ± 10%
Current consumption 35mA (50mA with relay)
    + 40mA with mA-outs

Output signal 1: (Tout)
    0 - 10V (linear to temperature) 32-122°F (0 - 50°C)
    L min 1kΩ
    V Output = 32F + (9 degrees F * volts)
    4 - 20mA (linear to temperature) 32-122°F (0 - 50°C)
    L max 400Ω
    mA Output = 32F + [5.625 degrees F * (mA – 4)]

Output signal 2: (vout)
    0 - 10V (linear to FPM), L min 1kΩ
    4 - 20mA (linear to FPM), L max 400Ω

Relay Out: 3 screw terminal block
(NC, COM, NO) 12-24AWG (0.2 – 1.5 mm^2)

Potential free SPDT, 250VAC, 6A / 30VDC, 6A adjustable switching point and hysteresis.

Conformance

Meets requirements for CE marking:
EMC Directive   2004/108/EY
RoHS Directive   2002/95/EY

Meets safety requirements for electrical equipment for measurement, control, and laboratory use:
ETL marking, standard IEC61010-1.

Product is tested and meets the NRTL product-approval requirements.

ETL Intertek
4002576
Conforms to ANSI/UL Std 61010
Certified to CAN/CSA Std C22.2 No 61010

CE

RoHS 2002/95/EC

QUALITY SYSTEM CERTIFICATION ISO 9001 DNV

SCHEMATICS

Display
Joy stick
Terminal Block
Terminal Block for Relay
T v
V mA
J1
J2
sw.p.
hyst.
Tout
vout
24V
GND
Jumpers

DIMENSIONAL DRAWINGS

3.54
(90.0)

2.815
(71.5)

Velocity Sensor

Temperature Sensor

0.59
(15.0)

0.59
(15.0)

1.41
(36.0)

2.756
(70.0)

3.74
(95.0)

8.267
(210.0)
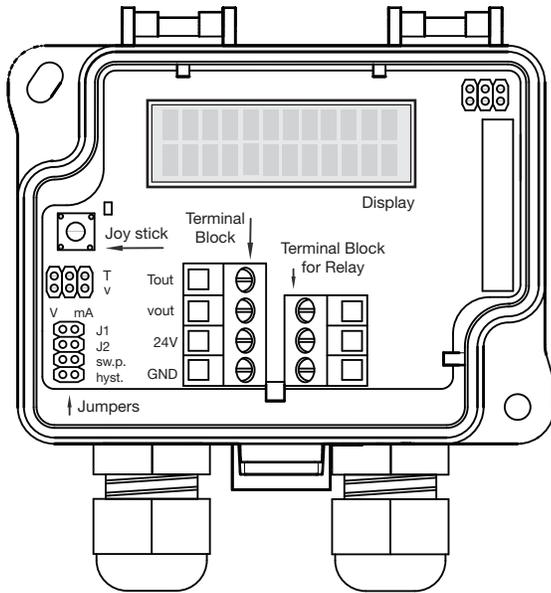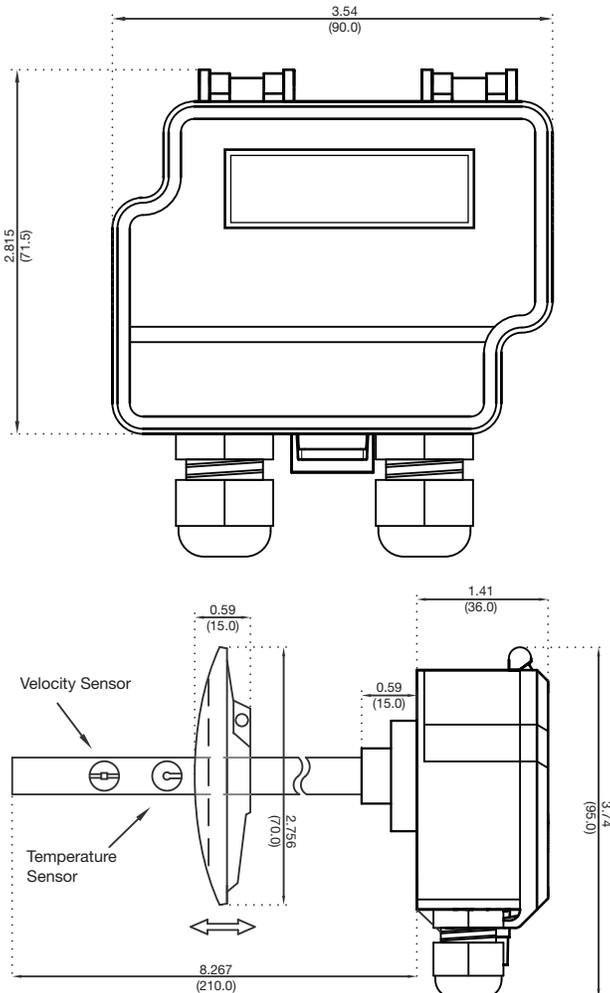
INSTALLATION

1) Mount the device in desired location, see Step 1.

2) Open the lid and route cable through strain relief and connect the wires to terminal block, see Step 2. Use separate strain relief for each cable.

3) The device is now ready for configuration.

⚠ **WARNING! Apply power after the device is properly wired.**

STEP 1   MOUNTING DEVICE

1) Select mounting location (in a duct).

2) Use the mounting flange of the device as a template and mark the screw holes.

3) Mount the flange on the duct with screws (not included), Figure 1a.

4) Adjust the probe to desired depth. Ensuring the end of the probe reaches the middle of the duct, Figure 1b.

5) Tighten the screw on the flange, to hold the probe in position.

Mounting a Flange
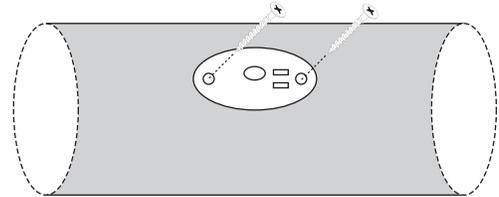
Figure 1a

Mounting Probe In Flange

Tighten Screw
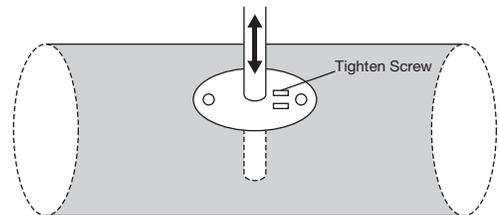
Figure 1b

Mounting Orientation

Air Flow Direction

Air Flow Direction

Strain Relief Facing Down

Air Flow Direction

Air Flow Direction

Air Flow Direction
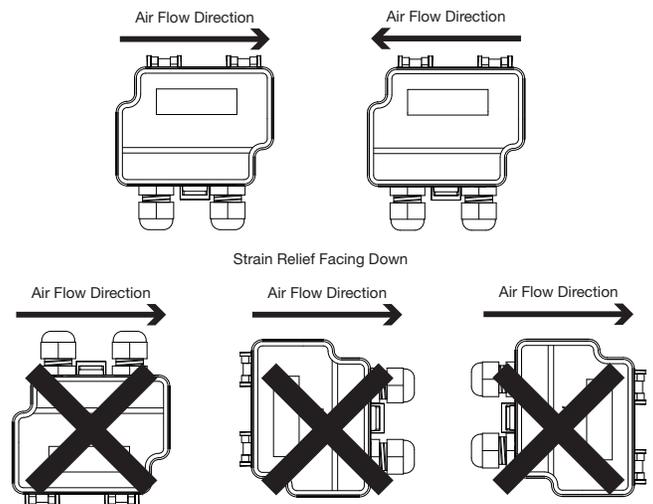
Figure 1c

STEP 2   WIRING DIAGRAMS

For CE compliance, a properly grounded shielding cable is required.

1) Unscrew strain relief and route cable(s). Use the strain relief on left for power in and signal out (Tout/vout) and the strain relief on right for relay.
2) Connect the wires as shown in Figures 2a and 2b.
3) Tighten the strain relief.

Wiring: Tout & Vout

Output 0 - 10V / 4 - 20mA (temperature)
Output 0 - 10V / 4 - 0mA (velocity)

Tout
vout
24V
GND

Power Supply 24VDC / 24VAC

Figure 2a

Wiring: Relay Output

NC
COM
NO
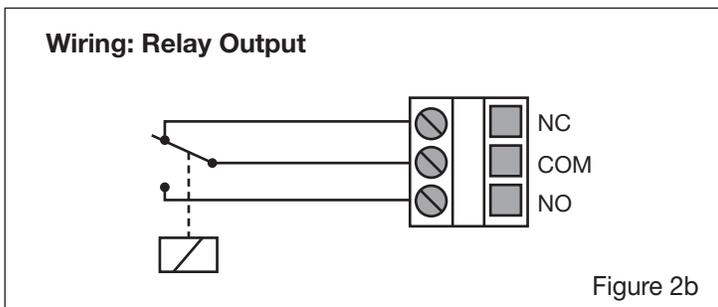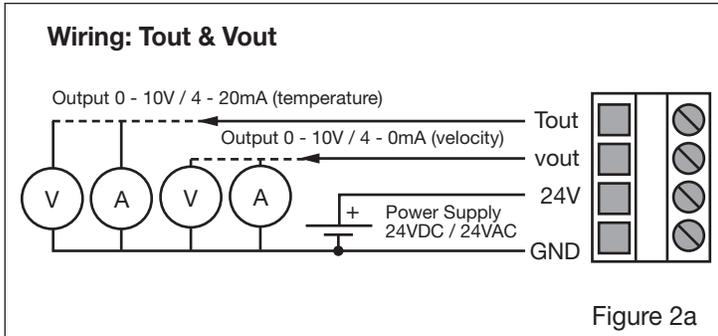
Figure 2b

CONFIGURATION

Configuration requires:

1) Select the desired measurement mode, Step 3.
2) Select the desired measurement range, Step 4.
3) Configure the relay (optional), Steps 5 and 6.

Selection convention used to input configuration information into STF Transducer

Entering configuration information into the STF Air Velocity and Temperature transducer is accomplished with the Joystick, see Figure 5, the Display, and Jumpers installed and removed from the set of three (3) or four (4) jumper pins, see Figure 5.

Joystick   Pressing down or tilting (Tilt Up/Down or Side-to-Side) will cycle the display though the available menu choices. The Joystick will only cycle the choices up, if you accidently pass your preferred selection continue to activate the Joystick until your selection reappears.

Jumpers   Jumpers are used in two (2) different ways:
1. Jumpers are installed, and remain installed, to select the required choice, see Steps 3 and 4.
2. Jumpers are installed, a choice is made, and the jumper is removed, see Steps 5 and 6.

Jumper Installation

No Jumper Circuit Open

Jumper Installed Circuit Closed

Jumper Stored
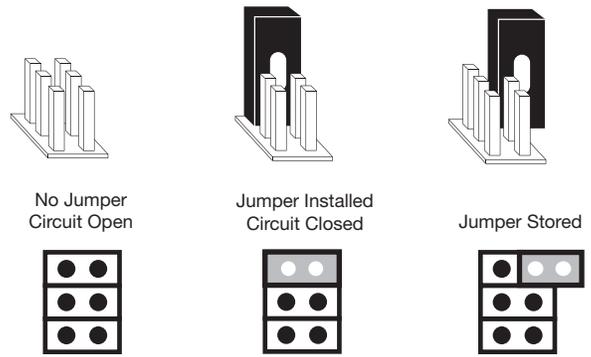
Grey color indicates that a jumper is installed.

Figure 3

STEP 3   SELECT MEASUREMENT MODE

Configure the outputs:

- Temperature output (Tout)
- Velocity output (vout)

1) Select the output mode, Current (4-20mA) or Voltage (0-10V), by installing jumpers as shown in Figure 3b. Both outputs, Temperature (T) and Velocity (v), are configured separately.

T v V mA	Temperature Output (Tout): T=Voltage (V) Velocity Output (vout): v=Voltage (V)
T v V mA	Temperature Output (Tout): T=Current (mA) Velocity Output (vout): v=Current (mA)
T v V mA	Temperature Output (Tout): T=Voltage (V) Velocity Output (vout): v=Current (mA)
T v V mA	Temperature Output (Tout): T=Current (mA) Velocity Output (vout): v=Voltage (V)
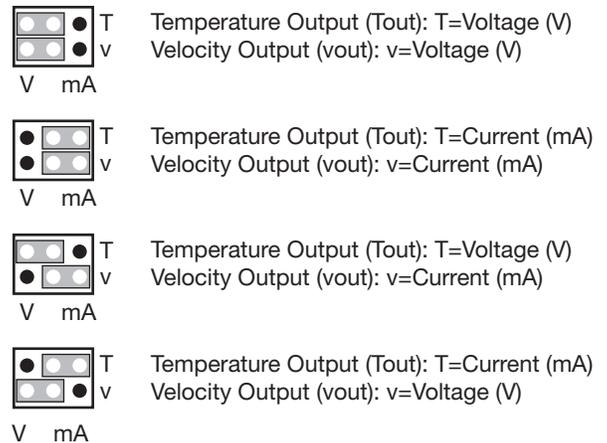
Figure 3b

STEP 4   SELECT MEASUREMENT RANGE

Select the measurement range by installing jumpers as shown in Figure 4. Note: Figure 3, Jumper Installation.

Range 2   **(0-400 FPM) (0-2 m/s)**

J1   Jumper (J1): Installed
J2   Jumper (J2): Not Installed

Range 10   **(0-2000 FPM) (0-10 m/s)**

J1   Jumper (J1): Not Installed
J2   Jumper (J2): Installed

Range 20   **(0-4000 FPM) (0-20 m/s)**

J1   Jumper (J1): Installed
J2   Jumper (J2): Installed
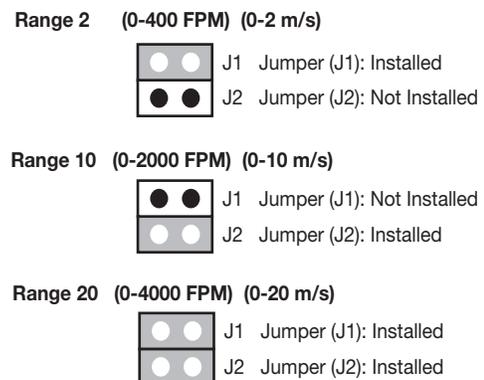
Figure 4

Note: display is required.

1) Install jumper to pins labeled sw.p. (Switching Point), see Figure 5.

2) Press down/tilt the push-button (joystick). The values (FPM) for the Switching Point (relay on/off) will cycle up. Continue until the required value (FPM) is shown on the display.

3) Remove and store jumper after configuration is completed.

1) Install jumper to pins labeled hyst. (hysteresis), see Figure 5.

2) Press down/tilt the push-button (joystick). The values (FPM) for the hysteresis of the relay switching point will cycle up to the maximum value. Continue until the required value (FPM) is shown on the display.

3) Remove and store jumper after configuration is completed.

About hysteresis
Hysteresis represents a dead-zone less than or equal to 20% of the Range Selected. The hysteresis is anchored at the Switching Point (sw p.), extending to the hysteresis range selected.
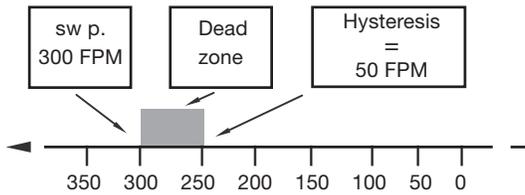
In above example Switch Point is set at 300 FPM, and hysteresis is set at 50 FPM. As the velocity increases over 300 FPM, the relay will open/close. As velocity reduces, the relay will not close/open until the velocity passes 250 FPM, thus preventing rapid cycling.

Range		Maximum	Hysteresis
m/s	FPM	m/s	FPM
0-2	0-400	0.4	80
0-10	0-2,000	2	400
0-20	0-4,000	4	800

The Hysteresis Maximum setting is based on the Range Selected.

Schematic

Figure 5