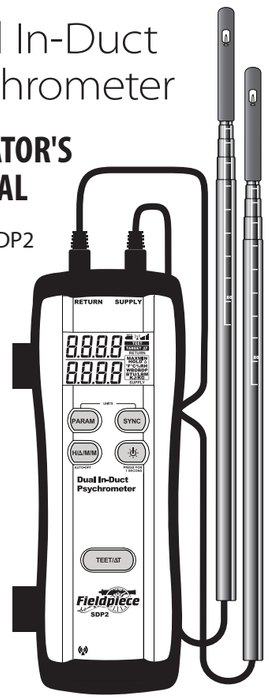
Fieldpiece

Dual In-Duct Psychrometer

OPERATOR'S MANUAL

Model SDP2



Quick Start

1. Power on your SDP2 by holding the ☼ button for 1 second.
2. Select mode with the TEET/ΔT button: Target Evaporator Exit Temperature, Target Temp Split, or Normal (real-time return and supply.)
3. Press the PARAM button to cycle between dry bulb, relative humidity, wet bulb, dew point, and enthalpy.
4. Insert sensing probes into duct or plenum for in-duct measurements.
5. Hold SYNC to pair and send all measurements to Fieldpiece model HG3 or SMAN4 Analyzers.

Certifications

- C-Tick (N22675)
- CE
- WEEE
- FCC
- RoHS Compliant

Description

The two probes each simultaneously measure temperature and RH%. One goes before the evaporator (RETURN) and one goes after the evaporator (SUPPLY). These four measurements can be displayed or used in calculations to display the actual temperature split (delta T), the target temperature split, the actual exit evaporator temperature, or the target exit evaporator temperature (TEET), plus the difference between the actual and target. Enthalpy (BTU/LBM) and Dew Point can also be displayed.

The TEET takes into consideration the latent heat used to condense water from the air, while a simple 20° temperature split ignores latent heat. TEET, developed by Fieldpiece, is an intuitive test allowing you to aim for a target value rather than a target difference between two values.

The 38"(96cm) telescoping probe with laser etched ruling and flattened edges allows you to locate proper measurement points within a duct and ensures that your probe is properly aligned. The dual display, bright backlight, and rugged rubber boot with probe clips make sure the SDP2 is ready for any job.

⚠ WARNING

Do not retract the sensor probe by pulling on the cord. Doing so may sever the cord from the sensors.

Do not punch or drill holes into an evaporator without making sure there is not critical system parts behind the hole location.

Maintenance

Clean the exterior with a dry cloth. Do not use liquid.

Battery Replacement

Turn your SDP2 off, remove rubber boot, unscrew battery cover, and replace 9V battery.

Display

APO	Auto Power Off Enabled
	Battery Life
	Wireless Signal Strength
%RH	Relative Humidity
DP	Dew Point
WB	Wet Bulb
DB	Dry Bulb
BTU/LBM KJ/KG	Enthalpy
TEET	Target Evaporator Exit Temperature
TARGET ΔT	Target Dry Bulb Temp Split
°F °C	Temperature
MAX	Maximum Display
MIN	Minimum Display
HOLD	Hold Display
Δ	Δ Display (Return-Supply)
RETURN	Top Display Shows Return Bottom Display Shows Supply or the difference between actual and target values for TEET and ΔT.

Controls

☼	Hold 1 second to toggle power on/off. Press to toggle backlight.
PARAM	Cycle through dry bulb, wet bulb, dew point, relative humidity, and Enthalpy.
SYNC	Hold for 1 second to search for a model HG3 or SMAN4 and send real-time measurements.
H/Δ/M/M AUTO-OFF	Cycles through Hold, Difference (Δ), Maximum, Minimum, and Real-time. Hold for 1 second to exit and clear stored values. Hold while turning ON to toggle Auto-Off (APO).
TEET/ΔT	Press to cycle between Target Evaporator Exit Temp, Target Delta T and Normal modes.
PARAM + SYNC	Press both to toggle between Fahrenheit or Celsius and BTU/LBM or KJ/KG.

BACKLIGHT NOTE: The timer is automatically reset for 3 min when any button is pressed. A quick press of ☼ toggles backlight.

How to Use

Normal Mode

Measure real-time dry bulb, relative humidity, wet bulb, dew point, or BTU/LBM for each probe.

1. Remove vinyl protective sleeves if covering sensors.
2. Press the PARAM button to cycle dry bulb temperature, relative humidity, wet bulb, dew point, or BTU/LBM.
3. The top display shows Return probe and the bottom display shows Supply probe. The probes are interchangeable.

TEET (Target Evaporator Exit Temperature) Mode

Target Evaporator Exit Temperature, is similar to temperature drop or ΔT. TEET is better than a simple temp-split because it uses a wet and dry bulb temperature on the evaporator coil to determine the coil load and then calculates a corresponding correct exit dry bulb temperature.

Insert the Return probe to find the TEET. Insert the Supply probe to monitor how close the target temperature is to the actual temperature.

1. Insert the RETURN probe into the return plenum. See Figure 1 for recommended return plenum placement of probe. Drill or punch a 3/8" hole into the return plenum if needed.
2. Press the TEET/ΔT button until TEET is displayed on the top line.
3. Insert the SUPPLY probe into the supply plenum to see how close the target temperature is to the actual temperature. See Figure 1 for recommended supply plenum placement of probe. Drill or punch a 3/8" hole into the supply plenum if needed.
4. (Actual evaporator temp - target evaporator temp) will be shown on the bottom "SUPPLY" line. A negative number means the actual exit temperature and airflow are both too low. You want to be within ± 3°F (± 1.7°C) of the target for good evaporator performance.
5. Seal any holes before leaving the jobsite.

Target ΔT (Target Temp-Split) Mode

Temperature split is simple. It is the return temperature minus the supply temperature. Target ΔT uses RETURN wet bulb and dry bulb to measure heat load and automatically calculate what the ΔT should be.

Insert the RETURN probe to find the Target ΔT. Switch over to Normal mode, and use both probes to then see what your dry bulb Δ actually is.

1. Insert the RETURN probe into the return plenum. See Figure 1 for recommended return plenum placement of probe. Drill or punch ⚠ a 3/8" hole into the return plenum if needed.
2. Press the TEET/ΔT button until TARGET ΔT is displayed on the top line.
3. Switch to Normal Mode to find the actual ΔT so you can compare the two values.
4. Insert the SUPPLY probe into the supply plenum. See Figure 1 for recommended supply plenum placement of probe. Drill or punch ⚠ a 3/8" hole into the supply plenum if needed.
5. Press PARAM until DB is shown. Press H/Δ/M/M until Δ is shown.
6. Seal any holes before leaving the jobsite.

RCONE1 Probe Lock

Figure 2. Screw a threaded RCONE1 into the duct or plenum wall to secure a sensing probe. Use the RCONE1s and the magnet on the SDP2 for hands-free in-duct testing.

Figure 1

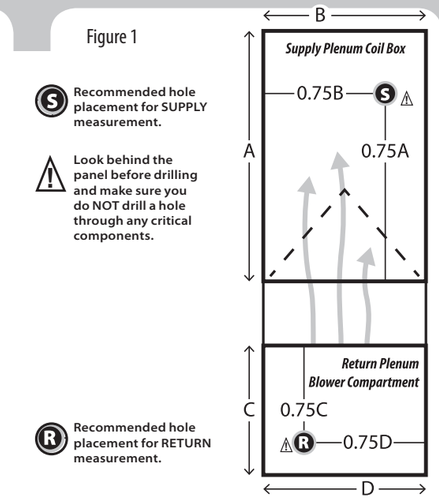
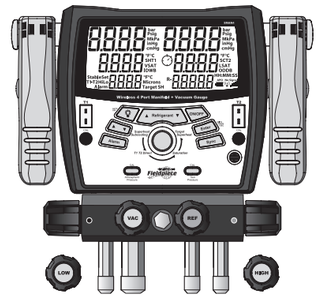


Figure 2

Use the RCONE1 for hands-free in-duct measuremesnts.

Wireless Sync

The SDP2 can wirelessly send all of its measurements to a wireless Fieldpiece model that accepts them. As of this printing, models HG3 and SMAN4 both can receive measurements.



4-Port Wireless Manifold
Model SMAN4

1. Enter Target Superheat mode.
2. Use arrow keys to select IDWB. (IDWB will blink)
3. Press SYNC on SMAN4 for 1 second.
4. Press SYNC on SDP2 for 1 second to connect and sync real-time indoor wet bulb.
5. Use a temperature accessory head and ET2W wireless transmitter to sync ODDB and view real-time target superheat while you charge outside.

HVAC Guide® System Analyzer
Model HG3

1. Select test.
2. Use arrow keys to select a measurement line.
3. Press SYNC on HG3 for 1 second.
4. Press SYNC on SDP2 for 1 second to connect and sync ALL lines of the test that it can fill.
5. Values will be held if OUTPUT is pressed. Going back to INPUT will show the held values. Press SYNC on the HG3 to return to real-time values.

Specifications

Telescoping probe length: Up to 38 inches (97cm)
Probe tip diameter: 0.35 inch (9mm)
Storage temperature: -4°F to 140°F (-20°C to 60°C), 0 to 80% RH (with battery removed)
Temperature coefficient: 0.1 x (specified accuracy)/°C (<18°C or >28°C)
Over range: "OL" or "-OL" is displayed
Power: Single standard 9-volt battery, NEDA 1604, JIS 006P, IEC 6F22
Auto power off: after 30 minutes of inactivity if APO is active.
Battery life: Approx. 120 hours standard use (alkaline)
Low battery indication: is displayed when the battery voltage drops below the operating level.
Dimensions: 7.9 in (H) x 2.6 in (W) x 1.4 in (D), [200mm (H) x 66mm (W) x 36mm (D)]
Weight: Approx. 570g, including battery

Temperature:
Sensor type: Precision thermistor
Operating environment: -4°F to 140°F (-20°C to 60°C)
Range: -4°F to 140°F (-20°C to 60°C)
Resolution: 0.1°F / 0.1°C
Accuracy: ±(1°F) 32°F to 113°F
±(2°F) -4°F to 32°F, 113°F to 140°F
±(0.5°C) 0°C to 45°C
±(1°C) -20°C to 0°C, 45°C to 60°C

Relative Humidity:
Sensor type: Capacitance polymer film
Operating environment: 32°F to 131°F (0°C to 55°C)
Range: 0% to 100%RH
Accuracy: ±(2.5%) 10% to 90%RH
±(5%) <10%RH and >90%RH
Note: Above accuracies stated at 73.4°F (23°C).
Sensor response time: 60 seconds typical for 90% of total range.
Sensor hysteresis: ±1%RH typical (Excursion of 10% to 90% to 10%RH)

Wireless:
Frequency range: 910MHz ~ 920MHz
FCC ID: VEARF915
Range: 100 feet
Minimum Wireless Range: 1 foot (30cm)

Error Codes

You may see an error code in TEET or Target Delta T mode. Usually it means probes are swapped or a bad sensor (model RSDP2).

Err 01: Return wet bulb is higher than dry bulb.
Err 02: Return wet bulb is extremely low.
Err 03: Supply dry bulb is higher than return dry bulb.
Err 04: Return values are outside calculating range.
Err 05: Supply values are outside calculating range.
Err 06: Both the return and supply values are outside calculating range.
(Err 04, 05, 06 supersedes Err 01, 02, 03)

Sensor Care

When not in use, protect the sensors with the black vinyl slip covers.

Extreme conditions or exposure to solvent vapors may offset the relative humidity sensor. If this happens, place the exposed sensor in a controlled environment of 75%RH and between 68°F - 86°F for a period of 24 hours.

To create a 75%RH environment moisten a small amount of table salt, in an open container such as a clean 2 liter bottle cap.

Place the container with the salt solution and the SDP2 probe in a sealable plastic bag, and leave the bag in a room temperature location where it will not be disturbed for 24 hours.

Note: It is important that the salt solution does not come in direct contact with the sensor, as this may permanently damage the sensor.

A/C Basics

The Evaporator, Condenser, Restrictor (Throttling valve) and Compressor are the four basic components of an air conditioner. Following one pound of refrigerant through the system shows the function of each component.

Subcooled liquid refrigerant at high pressure enters the restrictor and is throttled to saturated refrigerant at a lower pressure. The restrictor can be of either a fixed or TXV/EXV type. The fixed type must be charged to a target superheat that varies with indoor and outdoor conditions. TXV/EXV systems must be charged to subcooling.

The evaporator capacity varies with the indoor heat load on a fixed restrictor. The TXV/EXV regulates the size of the restriction to maintain a constant superheat. This essentially adjusts the capacity of the evaporator responding to the indoor heat load.

After the restrictor, refrigerant enters the evaporator at a low temperature and pressure, and boils (evaporates) into a gas by absorbing heat from the

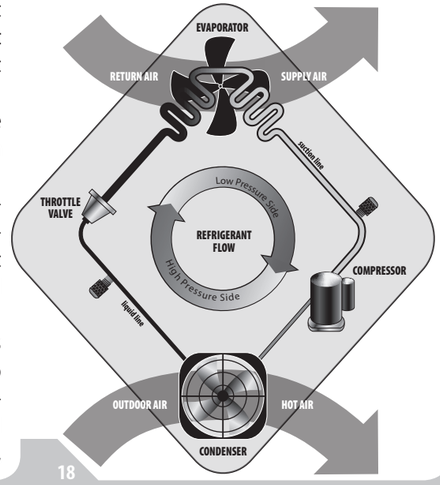
indoor air. The refrigerant stays at the same temperature and pressure until all the refrigerant evaporates into a gas. After the refrigerant becomes a gas, it will continue to absorb heat and become superheated at which point its temperature will change. The Superheat measurement is the best indication of refrigerant charge level in a fixed restrictor system. A TXV/EXV system will keep the superheat constant. There must be superheat present to ensure liquid does not flood the compressor.

Superheat measurements are taken on the suction line between the evaporator and compressor.

The compressor takes this low temperature, low pressure, slightly superheated refrigerant and compresses it to a much higher temperature and pressure.

The highly superheated gas enters the condenser and rejects heat into the outside air. The refrigerant condenses back into a liquid. Once all of the gas is condensed into a liquid,

additional removal of heat causes a temperature drop that is known as subcooling. TXV/EXV systems are charged to subcooling since superheat is controlled by the throttle valve. Subcooling measurements are taken on the liquid line between the condenser and TXV/EXV. Finally, the subcooled liquid enters the restrictor and the cycle starts again.



Limited Warranty

This meter is warranted against defects in material or workmanship for one year from date of purchase. Fieldpiece will replace or repair the defective unit, at its option, subject to verification of the defect.

This warranty does not apply to defects resulting from abuse, neglect, accident, unauthorized repair, alteration, or unreasonable use of the instrument.

Any implied warranties arising from the sale of a Fieldpiece product, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the above. Fieldpiece shall not be liable for loss of use of the instrument or other incidental or consequential damages, expenses, or economic loss, or for any claim of such damage, expenses, or economic loss.

State laws vary. The above limitations or exclusions may not apply to you.

For Service

In the USA, call Fieldpiece Instruments for one-price-fix-all out of warranty service pricing. Send check or money order for the amount quoted. Send the meter freight prepaid to Fieldpiece Instruments. Send proof of date and location of purchase for in-warranty service. The meter will be repaired or replaced, at the option of Fieldpiece, and returned via least cost transportation. Outside of the USA, please visit www.fieldpiece.com for service contact information.

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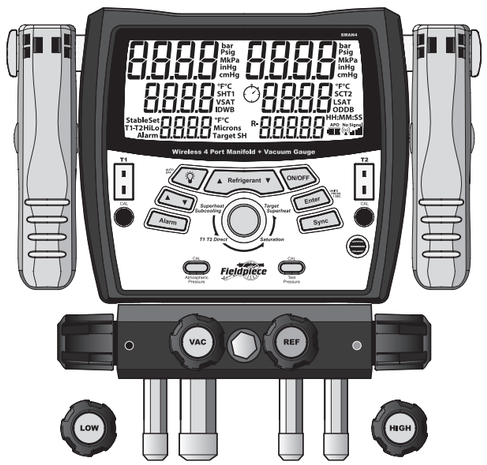
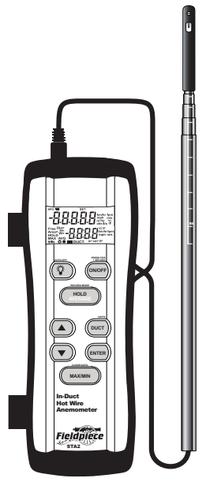
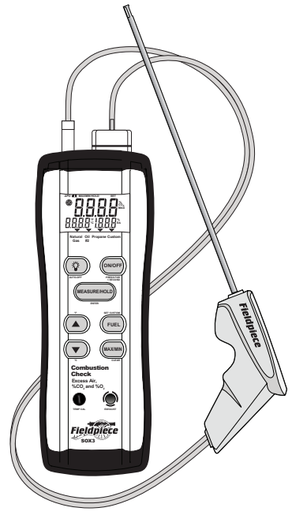


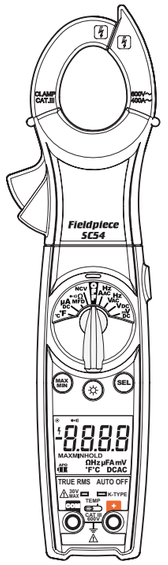
Wireless 4-Port Manifold
Model SMAN4



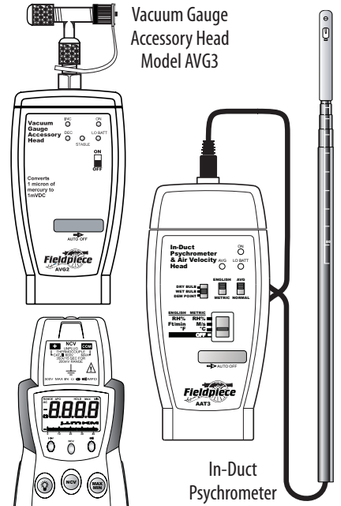
In-Duct Hot-Wire Anemometer
Model STA2



Combustion Check with AutoPump
Model SOX3



Swivel Clamp Meter
Model SC54



Vacuum Gauge
Accessory Head
Model AVG3

In-Duct
Psychrometer
and Air Velocity
Accessory Head
Model AAT3

True RMS Stick Meter
Model HS36