## SMART AIR HOOD® BALANCING INSTRUMENTS

### PRODUCT OVERVIEW

#### Humidity Accuracy

<table>
<thead>
<tr>
<th>Material</th>
<th>Humidity Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>304 SS</td>
<td>±2% FS</td>
</tr>
<tr>
<td>Black polycarbonate</td>
<td>±0.03 m/s</td>
</tr>
<tr>
<td>ABS</td>
<td>±2% FS</td>
</tr>
</tbody>
</table>

#### Temperature Accuracy

<table>
<thead>
<tr>
<th>Material</th>
<th>Temperature Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>304 SS</td>
<td>±0.5°F (±0.28°C)</td>
</tr>
<tr>
<td>Black polycarbonate</td>
<td>±0.54°F (±0.3°C)</td>
</tr>
<tr>
<td>ABS</td>
<td>±1°F (±0.6°C)</td>
</tr>
</tbody>
</table>

#### Material

- 304 SS: Stainless Steel
- Black polycarbonate
- ABS: Acrylonitrile Butadiene Styrene

#### Diameter

<table>
<thead>
<tr>
<th>Material</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>304 SS</td>
<td>±3% FS</td>
</tr>
<tr>
<td>Black polycarbonate</td>
<td>±1.5% of reading</td>
</tr>
<tr>
<td>ABS</td>
<td>±20 FPM</td>
</tr>
</tbody>
</table>

#### Air Velocity Accuracy

<table>
<thead>
<tr>
<th>Material</th>
<th>Air Velocity Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>304 SS</td>
<td>±3% FS</td>
</tr>
<tr>
<td>Black polycarbonate</td>
<td>±1.5% of reading</td>
</tr>
<tr>
<td>ABS</td>
<td>±3% of reading</td>
</tr>
</tbody>
</table>

#### Available Lengths

- 8 to 216˝

#### Series

- SAH
- PUB
- AQTIA-WDPM
- AQTIA-AP2
- AQTIA-VP2
- VT-300
- 473B
- 471B

#### Volume Flow

- Supply: 40 to 2000 CFM (68 to 3398 units)
- Exhaust: 80 to 2000 CFM (136 to 3398 m³/h)

#### Compatibility

- Compatible with gases and liquids
- Measuring Range: 0.5 to 19,999 RPM; Contact: ±0.05%
- Surface speed: 0.05 to 0.5 to 19,999 RPM; Contact: ±0.05%
- Measuring Distance: ±0.01% of reading; Timer: ±0.2 s
- Measuring Distance: ±(0.05% + 1 digit)
- Measuring Distance: ±0.01% of reading; Timer: ±0.2 s
- Measuring Distance: ±0.01% of reading; Timer: ±0.2 s

#### Pressure Limits

- ±0.5% FS
- ±0.5% FS
- ±0.1% FS
- ±0.5% FS
- ±0.5% FS

#### Service

- SERIES AQTIA-WDPM
- 477AV
- 477B
- 475
- 490A

#### Approvals

- RAM 1 GB & ROM 4 GB
- 40 readings
- 40 readings
- N/A
- Up to 40 readings

#### Protection

- 600 Vrms
- 1000 Vrms
- N/A
- N/A
- N/A

#### Measuring Distance

- 0.33 to 65.62 ft/s (0.1 to 20 m/s)
- 40 to 5000 FPM
- 0 to 6000 FPM
- 2 to 40˝ (50.7 to 1016 mm)
- 0.512 to 2.95˝ (13 to 75 mm)
- ±6% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm); ±3% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm); ±5% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm); ±2% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm); ±1% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm); ±0.5% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm); ±0.13% reading + 1.4°F + .006°/°F below 1000°F

#### Range

- 0.5 to 4.5˝ (13 to 115 mm) or 2 to 40˝ (50.7 to 1016 mm)
- 0.33 to 65.62 ft/s (0.1 to 20 m/s)
- 0.5 to 4.5˝ (13 to 115 mm) or 2 to 40˝ (50.7 to 1016 mm)
- ±0.5% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm); ±3% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm); ±5% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm); ±2% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm); ±1% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm); ±0.5% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm); ±0.13% reading + 1.4°F + .006°/°F below 1000°F

#### Input

- Type J, K, T thermocouples
- 4-20 mA
- 0-10 V
- 120/240 VAC
- 120/240 VDC
- 100 to 1200 vac
- 150 to 200 vac
- 200 to 240 vac
- 200 to 400 vac
- 100 to 400 vac
- 400 to 600 vac
- 60 to 200 vac
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- 400 to 600 vac
- 60 to 200 vac
### Overview

**SMART AIR HOOD® BALANCING INSTRUMENT PRESSURE MANOMETERS**

**Pitot Tubes**
- Air Volume Range: 999,999 units
- Humidity Accuracy: 0 to 100% RH
- K-Factor: 1.0
- N/A
- ±2% FS
- ±0.5°F (±0.28°C)
- Material: 304 SS
- 5/16˝ (8 mm) [standard]

**Therm-anemometers**
- Air Volume Range: 999,999 units
- Humidity Accuracy: 0 to 100% RH
- K-Factor: 0.81
- N/A
- ±2% FS
- ±0.5°F (±0.28°C)
- Material: 304 SS
- 7/16˝ (11 mm)

**Series AQTIA-AP2**
- Volume flow: Supply: 40 to 2000 CFM (68 to 3398 units)
- Exhaust: 80 to 2000 CFM (136 to 3398 units)

**Series AQTIA-VP2**
- Volume flow: Supply: 40 to 2000 CFM (68 to 3398 units)
- Exhaust: 80 to 2000 CFM (136 to 3398 units)

**Series VT-300**
- Volume flow: Supply: 40 to 2000 CFM (68 to 3398 units)
- Exhaust: 80 to 2000 CFM (136 to 3398 units)

**Series 473B**
- Volume flow: Supply: 40 to 2000 CFM (68 to 3398 units)
- Exhaust: 80 to 2000 CFM (136 to 3398 units)

**Series 471B**
- Volume flow: Supply: 40 to 2000 CFM (68 to 3398 units)
- Exhaust: 80 to 2000 CFM (136 to 3398 units)

**Series TAC3-K**
- Volume flow: Supply: 40 to 2000 CFM (68 to 3398 units)
- Exhaust: 80 to 2000 CFM (136 to 3398 units)

**Series TAC-L**
- Volume flow: Supply: 40 to 2000 CFM (68 to 3398 units)
- Exhaust: 80 to 2000 CFM (136 to 3398 units)

**Series PUB**
- Volume flow: Supply: 40 to 2000 CFM (68 to 3398 units)
- Exhaust: 80 to 2000 CFM (136 to 3398 units)

### Performance Specifications

- **Air Volume Range**
  - 0 to 6000 FPM
- **Humidity Accuracy**
  - ±2% FS
  - ±0.5°F (±0.28°C)
- **K-Factor**
  - 1.0
  - 0.81
- **Temperature Accuracy**
  - ±2% FS
  - ±0.5°F (±0.28°C)
- **Material**
  - 304 SS
  - Black polycarbonate
  - ABS
- **Air Velocity Range**
  - 0 to 30 m/s
  - ±3% FS
- **Air Velocity Accuracy**
  - ±1.5% of reading
  - ±20 FPM
- **Wet Bulb Range**
  - N/A
  - -7.6 to 158°F (-22 to 70°C)
- **Surface speed**
  - 0.05 to 0.5 to 25 m/s
  - 0.5 to 20 m/s
- **Pipe Size**
  - 5/16˝ (8 mm) [standard]
  - 7/16˝ (11 mm)
- **Available Lengths**
  - 18 to 60˝
  - 11.5 to 20˝ (5 to 50 cm)
- **Accuracy**
  - Non-contact: ±0.01% of reading
  - Timer: ±0.2 s
  - Contact: ±0.05%
- **Measuring Distance**
  - 2 to 20˝ (5 to 50 cm)
  - 2 to 20˝ (5 to 50 cm)
  - ±6% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm); ±3% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm)
- **Pressure Limits**
  - 10 psi (2 to 10 in w.c.); 20 ±0.5% FS
  - ±0.5% FS
  - ±0.1% FS
  - ±0.5% FS
  - ±0.5% FS
- **Service**
  - Non-corrosive dry gases
  - Air and compatible gases
  - Air and compatible gases
  - Air and compatible gases
  - Air and compatible gases
- **Protection**
  - CE, FCC
  - CE
  - CE
  - CE, FM
  - CE
- **RAM & ROM**
  - 1 GB & 4 GB
  - 40 readings
  - 40 readings
  - N/A
  - Up to 40 readings
- **Ranges**
  - DC Voltage: 0.1 mV to 600 V (0.8% + 2 digits)
  - AC Voltage: 0.1 mV to 600 V (0.8% + 2 digits)
  - DC Current: 0.01 A to 10 A (1.2% + 3 digits)
  - AC Current: 0.1 uA to 10 A (1.2% + 5 digits)
  - DC Voltage: 0.1 mV to 600 V ± (1.0% + 3 digits)
  - AC Voltage: 0.1 mV to 600 V ± (1.0% + 5 digits)
  - DC Current: 0.01 A to 10 A ± (2.0% + 5 digits)
  - AC Current: 0.1 uA to 10 A ± (2.0% + 5 digits)
  - DC Voltage: 0.1 mV to 600 V ± (1.0% + 3 digits)
  - AC Voltage: 0.1 mV to 600 V ± (1.0% + 3 digits)
  - DC Current: 0.01 A to 10 A ± (2.0% + 5 digits)
  - AC Current: 0.1 uA to 10 A ± (2.0% + 5 digits)
  - DC Voltage: 0.1 mV to 600 V ± (1.0% + 3 digits)
  - AC Voltage: 0.1 mV to 600 V ± (1.0% + 3 digits)
  - DC Current: 0.01 A to 10 A ± (2.0% + 5 digits)
  - AC Current: 0.1 uA to 10 A ± (2.0% + 5 digits)
- **Input Type**
  - J-type: -328 to 1400°F (-200 to 760°C)
  - K-type: -328 to 2498°F (-200 to 1370°C)
  - T-type: -328 to 734°F (-200 to 390°C)
  - U-type: -328 to 220°F (-200 to 109°C)
  - R-type: 2000°F (1093°C)
- **Combustion**
  - ± (1.0% + 3 digits)
  - ± (1.0% + 3 digits)
**PRODUCT OVERVIEW**

**SMART AIR HOOD® BALANCING INSTRUMENTS**

**PITOT TUBES**

<table>
<thead>
<tr>
<th>Air Volume Range</th>
<th>K-Factor</th>
<th>Humidity Range</th>
<th>Humidity Accuracy</th>
<th>Temperature Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>999,999 in selected flow</td>
<td>1.0</td>
<td>0 to 100% RH</td>
<td>±2% RH</td>
<td>±0.5°F (±0.28°C)</td>
</tr>
<tr>
<td>N/A</td>
<td>0.81</td>
<td>0.1 to 99.9% RH</td>
<td>±3% RH</td>
<td>±0.54°F (±0.3°C)</td>
</tr>
<tr>
<td>±2% RH</td>
<td>1.0</td>
<td>0 to 100% RH</td>
<td>±2% RH</td>
<td>±1°F (±0.6°C)</td>
</tr>
<tr>
<td>N/A</td>
<td>0.84</td>
<td>N/A</td>
<td>±1% of reading</td>
<td>±0.5°F (±0.28°C)</td>
</tr>
<tr>
<td>±2% FS</td>
<td>0.843</td>
<td>N/A</td>
<td>±0.03 m/s</td>
<td>±0.5°F (±0.28°C)</td>
</tr>
</tbody>
</table>

**THERMO-ANEMOMETERS**

<table>
<thead>
<tr>
<th>Temperature Range</th>
<th>K-Factor</th>
<th>Wet Bulb Range</th>
<th>Wet Bulb Accuracy</th>
<th>Surface speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>-40 to 212°F (-40 to 100°C)</td>
<td>1.0</td>
<td>N/A</td>
<td>±0.01% of reading</td>
<td>0.25 to 25 m/s</td>
</tr>
<tr>
<td>-22 to 140°F (-30 to 60°C)</td>
<td>0.81</td>
<td>-7.6 to 158°F (-22 to 70°C)</td>
<td>±0.01% of reading</td>
<td>0.5 to 20 m/s</td>
</tr>
<tr>
<td>-4 to 140°F (-20 to 60°C)</td>
<td>1.0</td>
<td>N/A</td>
<td>±0.01% of reading</td>
<td>0.5 to 20 m/s</td>
</tr>
<tr>
<td>-20 to 212°F (-29 to 100°C)</td>
<td>0.84</td>
<td>N/A</td>
<td>±0.01% of reading</td>
<td>0.5 to 20 m/s</td>
</tr>
<tr>
<td>-40 to 212°F (-40 to 100°C)</td>
<td>0.843</td>
<td>N/A</td>
<td>±0.01% of reading</td>
<td>0.5 to 20 m/s</td>
</tr>
</tbody>
</table>

**Material**

- 304 SS
- 304 SS
- Black polycarbonate
- ABS

**Diameter**

- 5/16˝ (8 mm) [standard]
- 7/16˝ (11 mm)
- Available Lengths: 8 to 216˝

**Volume flow: Supply:**

- 40 to 2000 CFM (68 to 3398 m³/h)
- 99,999 units

**Volume flow: Exhaust:**

- 80 to 2000 CFM (136 to 3398 m³/h)
- 19,999 units

**Accuracy**

- ±3% of reading ±7 CFM.
- ±0.01% of reading

**Hood Sizes**

- 2´ x 2´ (standard); 1´ x 4´, 2´ x 4´ (optional accessories)

**Series**

- 160
- 160F
- 166T
- 160G
- ANE-1
- AQTIA-AP2
- AQTIA-VP2
- VT-300
- 473B
- 471B
- SAH
- TAC3-K
- TAC-L

**Series**

- MM-1
- MM-2
- CM-1

**INPUT TYPE**

- J, K, T thermocouples

**Pressure Limits**

- 10 psi (2 to 10 in w.c.); 20 psig (1.0% + 3 digits)
- 40 psig (20 to 40 in w.c.); 30 psig (15 psi); 60 psig (30 psi); 100 psig (50 psi); 200 psig (100 psi); 400 psig (200 psi); 1000 psig (100 psi); 2000 psig (200 psi)
- 600 Vrms

**Protection**

- 600 Vrms

**Memory**

- RAM 1 GB & ROM 4 GB
- 40 readings

**AC Voltage:**

- 0.001 V to 600 V (0.8% + 3 digits);
- DC Voltage: 0.1 mV to 600 V (0.8% + 2 digits);
- AC Current: 0.01 A to 10 A (1.2% + 3 digits);
- DC Current: 10 mA to 400 A

**Ranges**

- 0.33 to 65.62 ft/s (0.1 to 20 m/s)
- ±0.5 to 2% of flow reading for flow rate > 0.66 ft/s
- ±3% of flow reading for flow rate < 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm)
- 2 to 20˝ (5 to 50 cm)
- 18 to 60˝
- 4-23/64˝ (111 mm) diameter
- DC Voltage: 0.1 mV to 1000 V (0.5% + 2 digits);
- AC Voltage: 0.1 mV to 750 V (1.0% + 3 digits)
- AC Current: 0.1 uA to 10 A ± (1.0% + 3 digits)
- DC Current: 10 mA to 400 A ± (2.0% + 10 digits)
- Resistance: 0.1 to 40 MΩ ± (1.0% + 3 digits)
- AC Current: 10 mA to 400 A ± (2.0% + 10 digits)
- AC Voltage: 0.001 V to 600 V (0.8% + 3 digits);
- DC Voltage: 0.1 mV to 600 V ± (1.0% + 3 digits)
- AC Current: 0.01 A to 10 A (1.2% + 3 digits)
- DC Current: 10 mA to 400 A ± (1.0% + 3 digits)
- Resistance: 0.1 to 40 MΩ ± (1.0% + 3 digits)

**Approvals**

- CE, FCC
- CE, FM

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- dwyer-inst.com

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Michigan City, IN 46360

P.O. Box 373

DWYER INSTRUMENTS, INC.
AIR BALANCING TEST INSTRUMENT KITS

Variety Kits

- AQTIA-CK
- AQTIA-AP2
- AQTIA-VP2
- AQTIA-WP2
- AQTIA-RP2
- AQTIA-WDPM
- AQTIA-WDPM

The 477AV line of digital manometers can be combined with a traditional or duct measurements. Humidity, dew point, and wet bulb temperatures can VP1 vane thermo-anemometer probes can be interchanged for register or UHH2 to a spreadsheet program for report generation.

PROFESSIONAL KITS are available that include the components of our time proven Air quality test instrument kit with UHH2 base unit, AP2, RP2, VP2, WDPM, and modules. Professional kits are available that include the components and differential pressure measurements.

FEATURES/BENEFITS

• Rugged, extruded aluminum housing protects the device from damage and physical stress. The rugged polypropylene base hood features a single operator can balance a branch in less time than traditional
• Rugged IP68 housing withstands 1.5 meter drop test

• Lightweight wireless sensors and easy to carry up and down a ladder

• Wi-Fi direct wireless communication provides a range up to 200 yards (183 m) between the hood and the handheld test instrument.

• ASME design meets AMCA and ASHRAE codes

• Quad Flow Design Technology for controlling air flow and minimizing back pressurization

• Etched ruler markings simplify duct traverse measurements

• Automatic resolution adjustment for finer control

• Rubber boot for easy handling and all day comfort

• Backlight for use in dim areas

• Handheld device with protective OtterBox

• Includes hood stand and wireless communications to the handheld, SMART Air Hood ® Balancing Instrument with 2´ x 2´ (0.6 m x 0.6 m) opening

• SAH adapter base kit for canvas hood

• Canvas hood 1´ x 4´ (0.3 m x 1.2 m)

• SMART Air Hood® Application Software is factory installed into the SMART Air Hood® Balancing Instrument. With PREDICTAIR™ Application Software, the technician balances a system, one requirement is that the system has an 80% to 120% rate to flow capacity, the other is that the system is able to deliver 100% of the design flow. Systems that are higher or lower than this range will require more time and effort to balance. Systems that are higher than the design flow will require less time to balance as they are already balanced. Systems that are lower than the design flow will require more time to balance as they are already unbalanced.

PREDICTAIR™ Application Software

PREDICTAIR™ Application Software is available in three versions: Express, Premium, and Ultimate. Express is designed for traditional accessibility and provides basic balancing functions. Premium and Ultimate are designed for hydronic accessibility and provide additional functions such as pressure and flow monitoring and control. PREDICTAIR™ Application Software allows the technician to set the target flow and pressure for each register in order to balance the HVAC system accurately and quickly. With proportional balancing (reference Figure 2), the technician balances a system, one requirement is that the system has an 80% to 120% rate to flow capacity, the other is that the system is able to deliver 100% of the design flow. Systems that are higher or lower than this range will require more time and effort to balance. Systems that are higher than the design flow will require less time to balance as they are already balanced. Systems that are lower than the design flow will require more time to balance as they are already unbalanced.

For traditional proportional balancing, an air flow hood, or capture hood, is used to capture the air flow at a terminal. The technician then uses a manometer to measure the pressure drop across the terminal. The terminal will remain the same ratio to other terminals.

With Terminal 1 as the key, delivering 100% of design flow, then Terminal 2 will be delivering 95% of the design flow. This will meet the design accuracy of the balancing. The illustration in Figure 2 shows the potential flows. Finally, Predictive Balancing calculates the ideal flow for Terminal 4 so the system is balanced. With Terminal 1 as the key, delivering 100% of design flow, then Terminal 2 will be delivering 95% of the design flow. This will meet the design accuracy of the balancing. The illustration in Figure 2 shows the potential flows.

With Proportional Balancing, the technician balances a system, one requirement is that the system has an 80% to 120% rate to flow capacity, the other is that the system is able to deliver 100% of the design flow. Systems that are higher or lower than this range will require more time and effort to balance. Systems that are higher than the design flow will require less time to balance as they are already balanced. Systems that are lower than the design flow will require more time to balance as they are already unbalanced.

For traditional proportional balancing, an air flow hood, or capture hood, is used to capture the air flow at a terminal. The technician then uses a manometer to measure the pressure drop across the terminal. The terminal will remain the same ratio to other terminals.

With Terminal 1 as the key, delivering 100% of design flow, then Terminal 2 will be delivering 95% of the design flow. This will meet the design accuracy of the balancing. The illustration in Figure 2 shows the potential flows. Finally, Predictive Balancing calculates the ideal flow for Terminal 4 so the system is balanced. With Terminal 1 as the key, delivering 100% of design flow, then Terminal 2 will be delivering 95% of the design flow. This will meet the design accuracy of the balancing. The illustration in Figure 2 shows the potential flows.
AIR BALANCING

Air balancing a distribution system is needed to properly direct the air flow through the system and balanced as cubic feet per minute (CFM) or cubic meters per hour (m³/h). Methods of air balancing may include sequential, proportional, predictive, or hydronic balancing. A predictive balancing system can monitor and balance a hydronic system in less time than traditional methods using wireless transducers and a versatile, handheld, battery operated manometer available in several ranges for positive or positive differential pressure measurement and can monitor and balance a hydronic system in less time than traditional methods.

PROPORTIONAL BALANCING

This process requires the balancing technician to adjust the flow from each terminal to a certain percentage of the design flow for each terminal. Terminal 3 in the illustration in Figure 2 is the key terminal. Predictive Balancing calculates the ideal flow set point for Terminal 2 and predicts the new flows for Terminals 1, 3, and 4. The Predictive Balancing process begins by opening Terminal 2. A designer then chooses a percentage of the total design flow from Terminal 2 for multiple terminal systems. This percentage is used for all key terminal systems. If the system was balanced at the original percentage used in the calculation, all key terminal systems will remain the same ratio to other terminals. This process requires the balancing technician to adjust the flow from each terminal to a certain percentage of the design flow for each terminal.

SMART AIR HOOD® BALANCING INSTRUMENT

The SMART Air Hood® Balancing Instrument with 2´ x 2´ (0.6 m x 0.6 m) adapters and 48˝ Pitot tube. These adapters are designed to be used in commercial, industrial, and office buildings. The SMART Air Hood® is the most accurate and easy to operate air flow hood on the market. By using the SMART Air Hood®, you can monitor and balance a hydronic system in less time than traditional methods using wireless transducers and a versatile, handheld, battery operated manometer available in several ranges for positive or positive differential pressure measurement and can monitor and balance a hydronic system in less time than traditional methods.

FEATURING PREDICTAIR™

One form of Predictive Balancing calculates the ideal set point for Terminal 2 and predicts the new flows for Terminals 1, 3, and 4. The Predictive Balancing process begins by opening Terminal 2. A designer then chooses a percentage of the total design flow from Terminal 2 for multiple terminal systems. This percentage is used for all key terminal systems. If the system was balanced at the original percentage used in the calculation, all key terminal systems will remain the same ratio to other terminals. The Predictive Balancing system has the potential to save the designer significant time and effort by replacing the manual process with a process that takes advantage of wireless communication and computer technology.

PREDICTAIR™ Application Software

The PredictAir™ Application Software is a device that can be used to monitor and balance a hydronic system. The PredictAir™ Application Software is a device that can be used to monitor and balance a hydronic system. The PredictAir™ Application Software is a device that can be used to monitor and balance a hydronic system. The PredictAir™ Application Software is a device that can be used to monitor and balance a hydronic system. The PredictAir™ Application Software is a device that can be used to monitor and balance a hydronic system. The PredictAir™ Application Software is a device that can be used to monitor and balance a hydronic system.

FEATURING CALIBRATION BASE KIT

The Calibration Base Kit (sensing arrays and calibrated test instruments) provides an accurate and easy to operate air flow hood on the market. By using the SMART Air Hood®, you can monitor and balance a hydronic system in less time than traditional methods using wireless transducers and a versatile, handheld, battery operated manometer available in several ranges for positive or positive differential pressure measurement and can monitor and balance a hydronic system in less time than traditional methods.

FEATURING ADAPTER HOOD ACCESSORIES

The SMART Air Hood® Balancing Instrument with 2´ x 2´ (0.6 m x 0.6 m) adapters and 48˝ Pitot tube. These adapters are designed to be used in commercial, industrial, and office buildings. The SMART Air Hood® is the most accurate and easy to operate air flow hood on the market. By using the SMART Air Hood®, you can monitor and balance a hydronic system in less time than traditional methods using wireless transducers and a versatile, handheld, battery operated manometer available in several ranges for positive or positive differential pressure measurement and can monitor and balance a hydronic system in less time than traditional methods.

FEATURING HARD CARRYING CASE

The SMART Air Hood® Balancing Instrument with 2´ x 2´ (0.6 m x 0.6 m) adapters and 48˝ Pitot tube. These adapters are designed to be used in commercial, industrial, and office buildings. The SMART Air Hood® is the most accurate and easy to operate air flow hood on the market. By using the SMART Air Hood®, you can monitor and balance a hydronic system in less time than traditional methods using wireless transducers and a versatile, handheld, battery operated manometer available in several ranges for positive or positive differential pressure measurement and can monitor and balance a hydronic system in less time than traditional methods.

FEATURING WHEEL KITS

The SMART Air Hood® Balancing Instrument with 2´ x 2´ (0.6 m x 0.6 m) adapters and 48˝ Pitot tube. These adapters are designed to be used in commercial, industrial, and office buildings. The SMART Air Hood® is the most accurate and easy to operate air flow hood on the market. By using the SMART Air Hood®, you can monitor and balance a hydronic system in less time than traditional methods using wireless transducers and a versatile, handheld, battery operated manometer available in several ranges for positive or positive differential pressure measurement and can monitor and balance a hydronic system in less time than traditional methods.

FEATURING DRYER KITS

The SMART Air Hood® Balancing Instrument with 2´ x 2´ (0.6 m x 0.6 m) adapters and 48˝ Pitot tube. These adapters are designed to be used in commercial, industrial, and office buildings. The SMART Air Hood® is the most accurate and easy to operate air flow hood on the market. By using the SMART Air Hood®, you can monitor and balance a hydronic system in less time than traditional methods using wireless transducers and a versatile, handheld, battery operated manometer available in several ranges for positive or positive differential pressure measurement and can monitor and balance a hydronic system in less time than traditional methods.

FEATURING SMART KITS

The SMART Air Hood® Balancing Instrument with 2´ x 2´ (0.6 m x 0.6 m) adapters and 48˝ Pitot tube. These adapters are designed to be used in commercial, industrial, and office buildings. The SMART Air Hood® is the most accurate and easy to operate air flow hood on the market. By using the SMART Air Hood®, you can monitor and balance a hydronic system in less time than traditional methods using wireless transducers and a versatile, handheld, battery operated manometer available in several ranges for positive or positive differential pressure measurement and can monitor and balance a hydronic system in less time than traditional methods.

FEATURING AIR QUALITY TEST INSTRUMENT KITS

The SMART Air Hood® Balancing Instrument with 2´ x 2´ (0.6 m x 0.6 m) adapters and 48˝ Pitot tube. These adapters are designed to be used in commercial, industrial, and office buildings. The SMART Air Hood® is the most accurate and easy to operate air flow hood on the market. By using the SMART Air Hood®, you can monitor and balance a hydronic system in less time than traditional methods using wireless transducers and a versatile, handheld, battery operated manometer available in several ranges for positive or positive differential pressure measurement and can monitor and balance a hydronic system in less time than traditional methods.
AIR BALANCING

**AIR BALANCING TEST INSTRUMENT KITS**

- **SAH-22HC**
  - 4.5’ to 12’ (1.4 m x 3.7 m) extendable pole
  - Application Software is factory installed into the Balancing Instrument.

**AIR BALANCING HVAC SYSTEMS**

**PROPORTIONAL BALANCING**

- Terminal 2 is the first damper adjusted in the system, and Terminal 1 is the damper loads and the pressure drop in the system.

**PREDICTIVE BALANCING**

- The Predictive Balancing (reference Figure 3) process begins by opening the damper loads and the pressure drop in the system.

**SMART AIR HOOD® BALANCING INSTRUMENT**

- A single technician can complete the air balancing within 200 yards (200 ft).

- Predictive Balancing is a process that guides the balancing technician on time than traditional air balancing methods.

**POST TUBE KITS**

- The post tube kits are used to monitor and balance a hydronic system in less time than traditional air balancing methods.

**AIR QUALITY TEST INSTRUMENT KITS**

- The air quality test instrument kits are used to monitor and balance a hydronic system in less time than traditional air balancing methods.

**FEATURES/BENEFITS**

- Patent pending Quad Flow Design Technology directs the circulating air that contains valve charts for numerous manufacturers, which converts drained. The 490W includes the Dwyer Hydronic Application Software.
Air balancing a distribution system is needed to properly direct the air flow. The illustration in Figure 2 shows the potential for inaccuracies in the balancing. Since the technician is estimating where to set the flow rate of the TUA, 550 CFM, the flow from Terminal 1 may increase to 550 CFM. In this case, Terminal 2 is within the design range; 550 * 0.95 = 523 CFM. With Terminal 1 as the key, delivering 100% of design flow, then Terminal 2 should be adjusted to get within range. Once set, the air flow from each terminal can be measured and compared to the design flow. If the flow is not within the design range, the dampers to capture the total flow. The total flow is distributed into the terminals, number 4, and flows for Terminals 1, 2, and 3 are correctly balanced.

Predictive Balancing is a method of predicting the optimal flow setting for each terminal. The Predictive Balancing (reference Figure 3) process begins by opening the terminal, with the rest of the system closed, and determining the flow rate from the terminal. This process repeats for each terminal, with the rest of the system closed, until all terminals have been balanced. The Predictive Balancing process is faster than traditional air balancing methods. For example, a single operator can balance a branch in less time than traditional air balancing methods.
## SMART AIR HOOD® BALANCING INSTRUMENT PRESSURE MANOMETERS

### OVERVIEW

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>PITOT TUBES</th>
<th>THERMO-ANEMOMETERS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Air Volume Range</strong></td>
<td>999,999 units</td>
<td>999,999 units</td>
</tr>
<tr>
<td><strong>K-Factor</strong></td>
<td>1.0 0.81 1.0 0.84 0.843</td>
<td></td>
</tr>
<tr>
<td><strong>Humidity Range</strong></td>
<td>±0.5°F (±0.28°C)</td>
<td>±0.5°F (±0.28°C)</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>±2% FS</td>
<td>±1% of reading</td>
</tr>
<tr>
<td><strong>Temperature Range</strong></td>
<td>-40 to 212°F (-40 to 100°C)</td>
<td>-40 to 212°F (-40 to 100°C)</td>
</tr>
<tr>
<td><strong>Air Velocity Accuracy</strong></td>
<td>±3% FS</td>
<td>±20 FPM</td>
</tr>
<tr>
<td><strong>Volume Flow</strong></td>
<td>40 to 2000 CFM (68 to 3398 m³/h)</td>
<td>Non-contact: 2.5 to 999,999 CFM or m³/s</td>
</tr>
<tr>
<td><strong>2´ x 2´ (standard)</strong></td>
<td>7/16˝ (11 mm)</td>
<td>36˝ (29 to 91 mm)</td>
</tr>
<tr>
<td><strong>1´ x 4´, 2´ x 4´ (optional accessories)</strong></td>
<td>1/8˝ (3 mm)</td>
<td>36˝ (29 to 91 mm)</td>
</tr>
</tbody>
</table>

## ULTRASONIC FLOWMETER THERMOMETER

### PRODUCT OVERVIEW

<table>
<thead>
<tr>
<th>APPROVALS</th>
<th>CE, FCC</th>
<th>CE, FM</th>
<th>CE, FM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Memory</strong></td>
<td>RAM 1 GB &amp; ROM 4 GB</td>
<td>40 readings</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Pressure Limits</strong></td>
<td>±0.5% FS</td>
<td>±0.5% FS</td>
<td>±0.1% FS</td>
</tr>
<tr>
<td><strong>Service</strong></td>
<td>Non-corrosive dry gases</td>
<td>Air and compatible gases</td>
<td>Air and compatible gases</td>
</tr>
<tr>
<td><strong>Protection</strong></td>
<td>600 Vrms</td>
<td>1000 Vrms</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### RANGES

- **DC Voltage**: 0.1 mV to 600 V (0.8% + 2 digits); 0.001 V to 600 V (0.8% + 3 digits)
- **AC Voltage**: 0.001 V to 600 V (0.8% + 3 digits)
- **AC Current**: 0.01 A to 10 A (1.2% + 3 digits)
- **DC Current**: 0.01 A to 10 A (1.2% + 3 digits)
- **Resistance**: 0.1 to 40 MΩ
- **Input Type**: J, K, T thermocouples

### ACCURACY

<table>
<thead>
<tr>
<th>Type</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>J-type</td>
<td>±0.13% reading + 1.4°F + .006°/°F below 1000°F</td>
</tr>
<tr>
<td>K-type</td>
<td>±0.13% reading + 1.4°F + .006°/°F below 1000°F</td>
</tr>
<tr>
<td>T-type</td>
<td>±0.13% reading + 1.4°F + .006°/°F below 1000°F</td>
</tr>
</tbody>
</table>

### RANGES (Accuracy)

- **AC Voltage**: ±0.13% reading + 1.4°F + .006°/°F below 1000°F
- **DC Voltage**: ±0.13% reading + 1.4°F + .006°/°F below 1000°F
- **AC Current**: ±0.13% reading + 1.4°F + .006°/°F below 1000°F
- **DC Current**: ±0.13% reading + 1.4°F + .006°/°F below 1000°F
- **Resistance**: ±0.13% reading + 1.4°F + .006°/°F below 1000°F