



BUILDING Automation

We have all your field instrument needs

Pressure
Flow
Air Velocity
Temperature
Humidity/Air Quality
Level/Water Detection
Output Transducers
Test Equipment
Power Monitoring
Indicators/Data Loggers
Valves/Actuators
Accessories/Books



Total Instrument Solution Worldwide



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Many of these instruments are widely known by their individual brand names, such as Magnehelic® and Spirahelic® pressure gages, Photohelic® switch/gages, Rate-Master®, Mini-Master® and Visi-Float® flowmeters, Slack Tube® and Flex-Tube® manometers, and Dwyer® pressure switches.

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Founded in 1931, Dwyer Instruments, Inc. moved its manufacturing and headquarters from Chicago, Illinois, in 1955, to newly constructed, greatly-expanded facilities in Michigan City, Indiana. The company has since added three more Indiana facilities—in Wakarusa, Kingsbury and Wolcott—as well as manufacturing facilities in Anaheim, California; Fergus Falls, Minnesota; Kansas City, Missouri; and Naguabo, Puerto Rico.

In addition to making and selling quality precision instruments, Dwyer Instruments, Inc. is committed to a standard of customer service—including competitive prices and knowledgeable, courteous technical support—that generates and sustains long-term relationships.

Dwyer Instruments, Inc.



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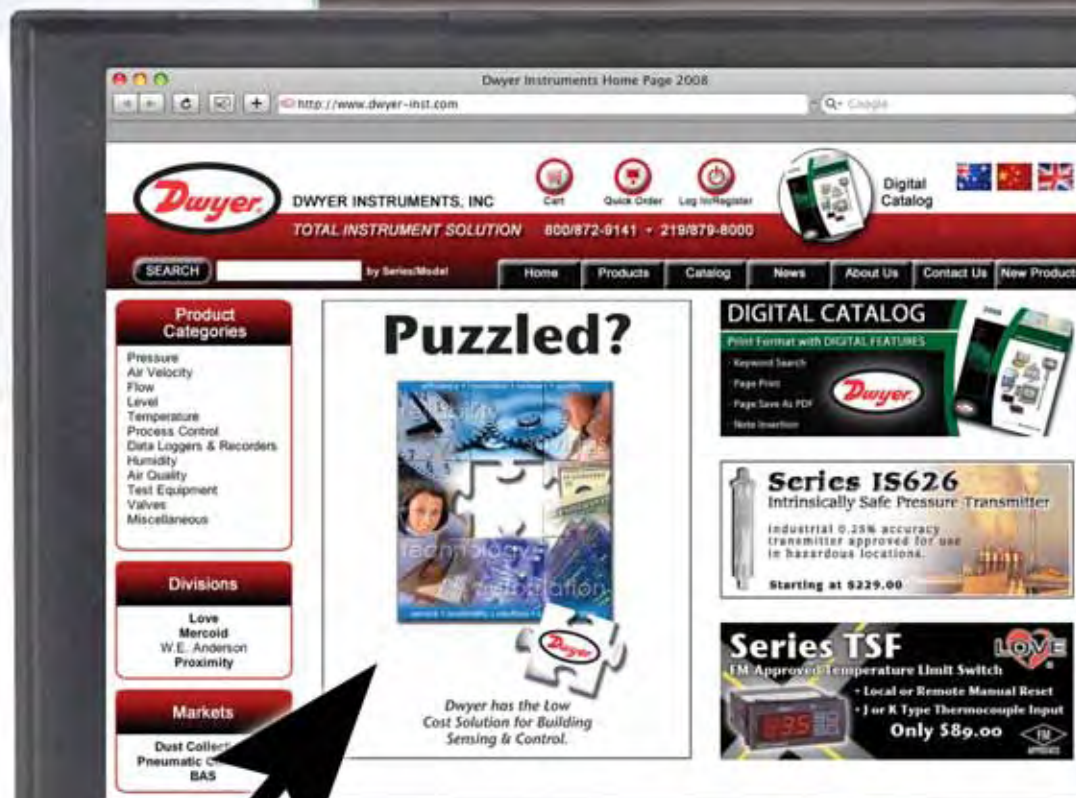
- Model numbers and pricing are easy to find
- Normal inventory availability displayed

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- Catalog pages in PDF format – view, print or save to your computer
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- Application guides
- Frequently asked questions

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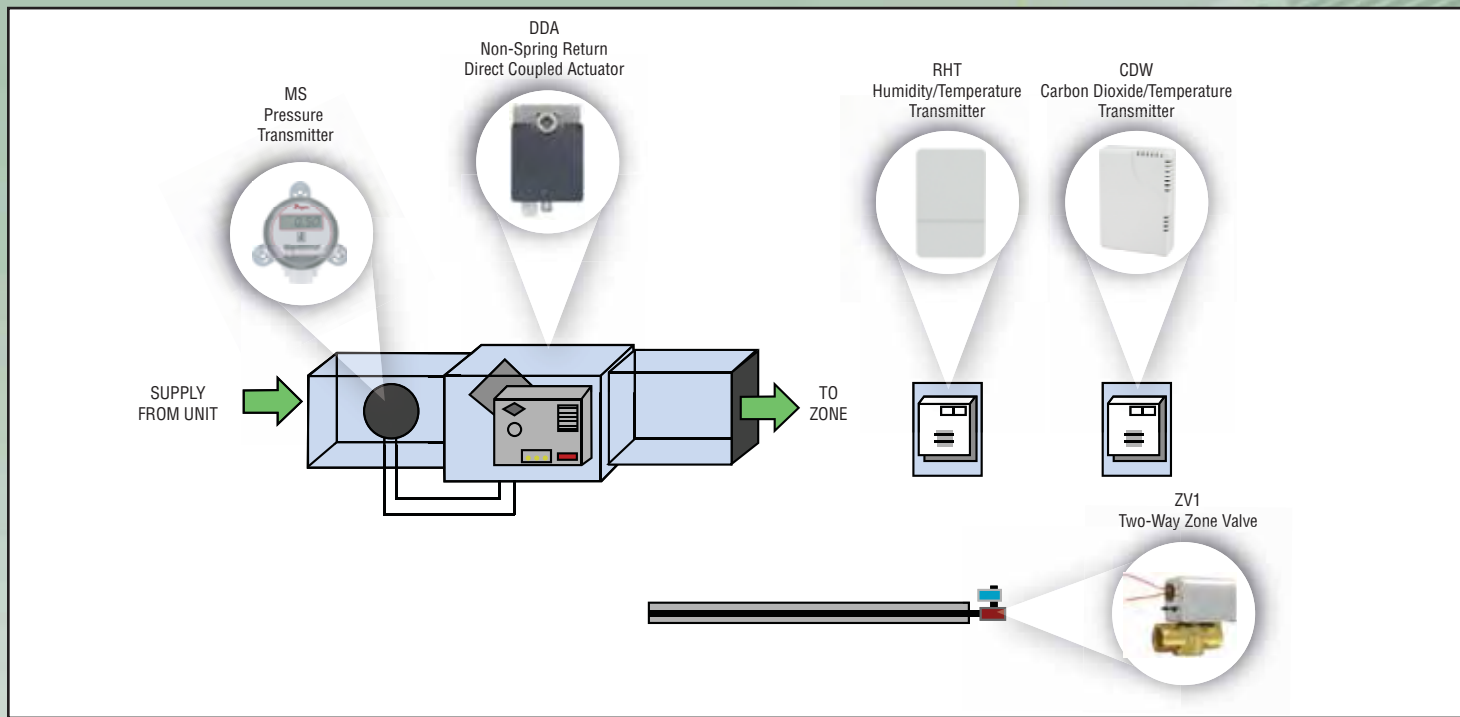
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Building Automation

Room Control Example

Buildings are often broken down into zones for better control of the HVAC system. These zones can have Variable Air Volume (VAV) systems with a VAV terminal unit or VAV “box”. A VAV box controls the air flow into the zone thereby controlling the environment of the zone.



AIR VOLUME CONTROL

The amount of air added to the zone is controlled by opening and closing the air duct via a damper with a damper actuator.

- Product used: DD Damper Actuator.



DUCT AIR FLOW

The amount of air flow to the zone is changed according to the demand. An air velocity transmitter is used to monitor the duct air flow.

- Product used: MS Pressure Transmitter that has square root extraction for air velocity.



ROOM TEMPERATURE AND CARBON DIOXIDE

The amount of air flow to a zone is varied based on occupancy in a zone. The occupancy is determined by the concentration of carbon dioxide in the zone.

- Product used: CDW Carbon Dioxide and Temperature Transmitter



ROOM TEMPERATURE AND HUMIDITY

A wall mounted temperature and humidity transmitter is placed in the zone to monitor the zone conditions and determine demand.

- Product used: RHT-W Humidity and Temperature Transmitter.



WATER FLOW CONTROL

VAV systems can include heating coils of hot water that the air flows past. A zone valve is used to change the amount of hot water added to the heating coil. Zone systems can include radiant heating systems. A zone valve is used to change the amount of hot water added to the radiator in the zone.

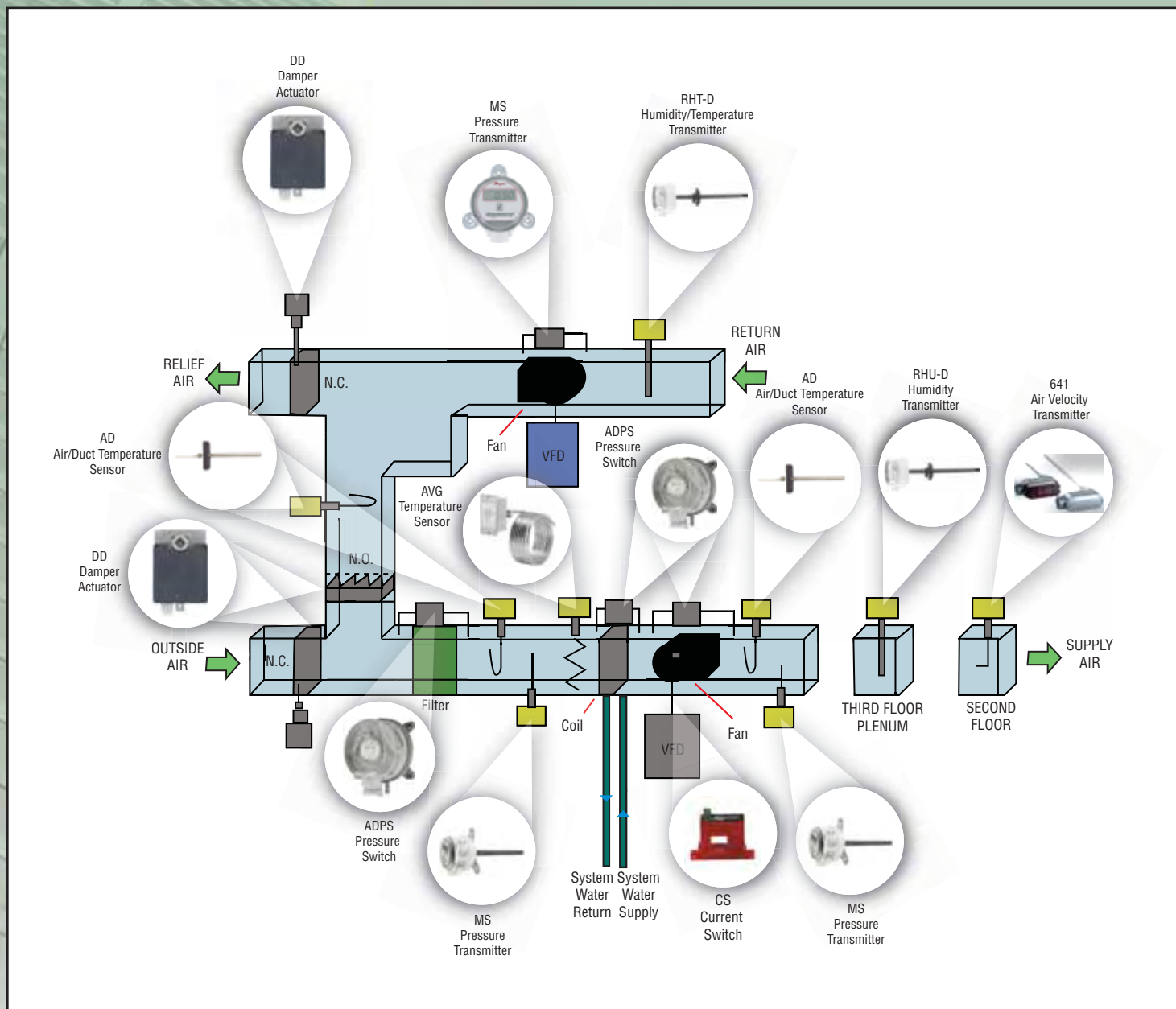
- Products used: ZV1 Zone Valves.



Building Automation

Air Handler Example

Building automation systems provide the method to give a building a comfortable environment. An air handler is an integral part of the building automation system and provides control of temperature, humidity, pressure, and air exchange. Shown below is an example of a type of air handler using a water based temperature system. On the opposite page is a description of the products that Dwyer provides to use in the system.



Building Automation

Air Handler Example



DIRTY FILTER ALARM

A differential pressure monitor of the pressure loss across the filter.

- Products used: 1900 or ADPS Pressure Switch

FAN VALIDATION

Proving a fan is operating can be done in several ways:

1. Monitor the differential pressure between upstream and downstream of the fan.
 - Products used: 1900 or ADPS Pressure Switch.
2. Monitor the air flow or velocity exiting the fan.
 - Products used: DH, DHII, DH3, MS or 641 transmitter.
3. Monitor the current usage of the fan.
 - Products used: CS Current Switch.

DUCT STATIC PRESSURE

A pressure transmitter is used with a static pressure tip to monitor discharge air and mixing air duct static pressure.

- Products used: MS Pressure Transmitter with A-302 Static Pressure Tip.

DUCT HUMIDITY SENSOR

A humidity transmitter is inserted into the duct to monitor the zone discharge humidity.

- Products used: RHU-D Humidity Transmitter.

DUCT HUMIDITY/TEMPERATURE SENSOR

A dual humidity and temperature transmitter is inserted into the duct to monitor the exhaust air humidity and temperature.

- Products used: RHT-D Humidity/Temperature Transmitter.

DUCT TEMPERATURE SENSOR

A temperature sensor is inserted into the duct to monitor the supply air, mix air, and exhaust air temperature.

- Products used: AD Air/Duct Temperature Sensor, AVG Averaging Temperature Sensor.

FROZEN COIL ALARM

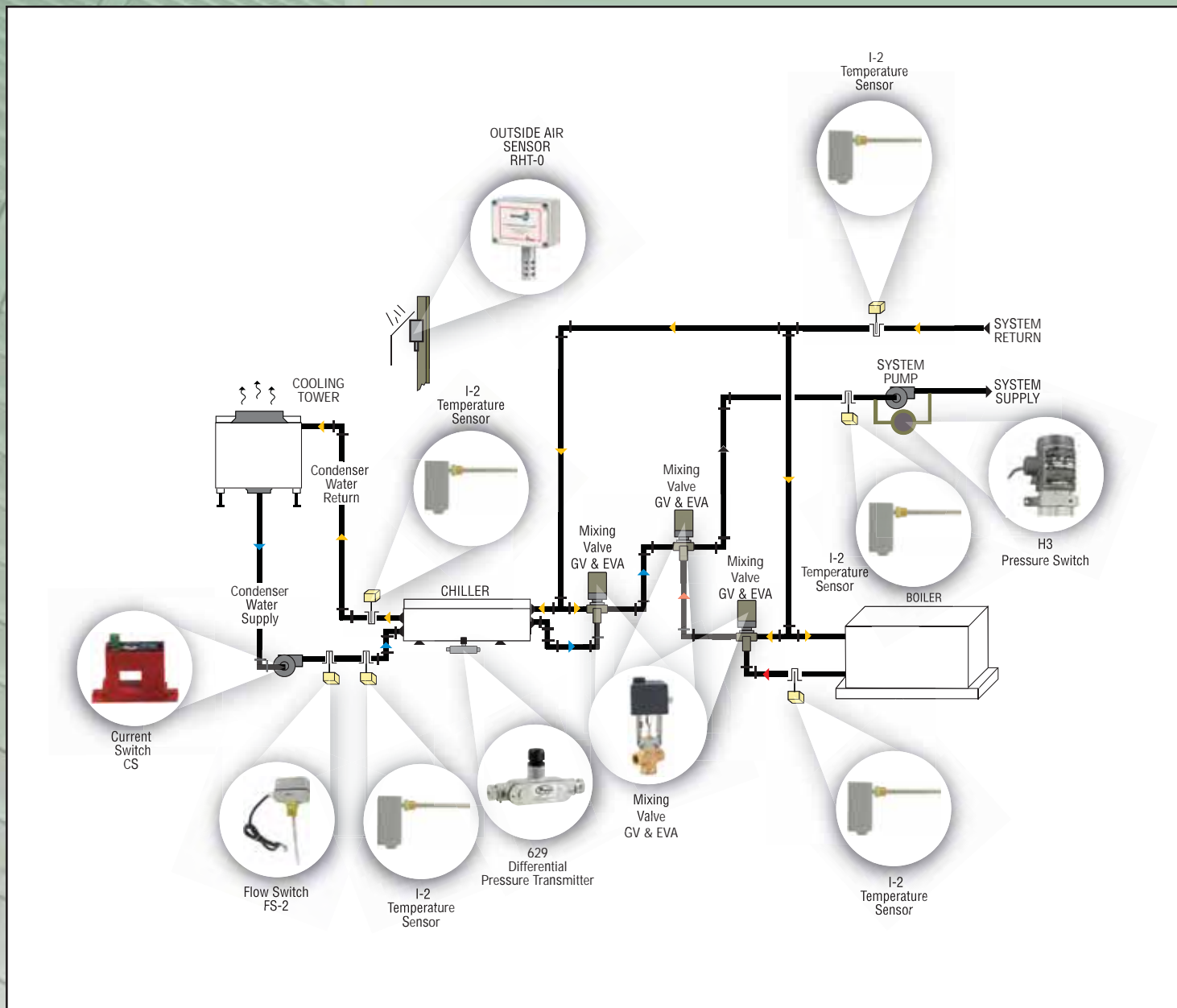
A differential pressure monitor of the pressure loss across the coils in the duct can indicate frozen coils.

- Products used: 1900 or ADPS Pressure Switch.

Building Automation

Heating and Cooling System Example

There are several ways to heat and cool the air in an air handler. In the example shown below this is accomplished through a hot/chilled water system. The system provides water to an air handler to heat or cool the air temperature as needed. On the opposite page is a description of the products that Dwyer provides to use in the system.



Building Automation

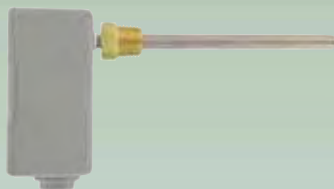
Heating and Cooling System Example



WATER MIXING VALVE

Three-way valves are used to mix return and supply water and chilled and hot together.

- Products used: GV Globe Valve with EVA Electric Actuator, or 3ABV Ball Valve with Electric Actuator.



WATER TEMPERATURE MONITOR

A temperature sensor is inserted into the water pipeline to monitor the system supply, system return, condenser return, condenser supply, and boiler supply water temperature.

- Products used: I-2 or I-4 RTD Temperature Sensor with thermowell.



OUTSIDE AIR SENSOR

A dual humidity and temperature transmitter is outside the building to monitor the outdoor air humidity and temperature.

- Products used: RHT-O Humidity/Temperature Transmitter.



PUMP VALIDATION/FLOW PROVING

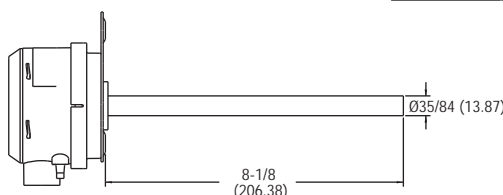
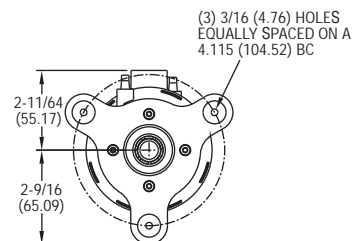
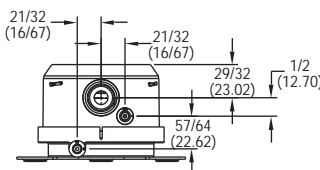
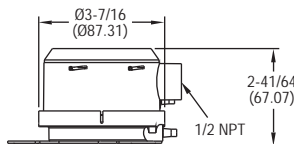
Proving a pump is operating can be done in several ways:

1. Monitor the differential pressure between upstream and downstream of the pump.
 - Products used: H3 Pressure Switch.
2. Monitor the water flow exiting the pump.
 - Products used: FS-2, V8, or V10 Flow Switch.
3. Monitor the current usage of the pump.
 - Products used: CS Current Switch.
4. Ensure proper differential pressure is created from sufficient flow through chiller
 - Products used: 629 Differential Pressure Transmitter

Series
MS

Magnesense® Differential Pressure Transmitter

Monitors Pressure & Air Velocity



The Series MS Magnesense® Differential Pressure Transmitter is an extremely versatile transmitter for monitoring pressure and air velocity. This compact package is loaded with features such as:

- Field Selectable English or Metric Ranges
- Field Upgradeable LCD Display
- Adjustable Dampening of Output Signal (with Optional Display)
- Ability to Select a Square Root Output for Use with Pitot Tubes and Other Similar Flow Sensors

Along with these features, the patented magnetic sensing technology provides exceptional long term performance and enables the Magnesense® Differential Pressure Transmitter to be the single solution for your pressure and flow applications.

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.

Wetted Materials: Consult factory.

Accuracy: ±1% for 0.25" (50 Pa), 0.5" (100 Pa), 2" (500 Pa), 5" (1250 Pa), 10" (2 kPa), 15" (3 kPa), 25" (5 kPa) ±2% for 0.1" (25 Pa), 1" (250 Pa) and all bi-directional ranges.

Stability: ±1% / year F.S.O.

Temperature Limits: 0 to 150°F (-18 to 66°C).

Pressure Limits: 1 psi maximum, operation; 10 psi, burst.

Power Requirements: 10 to 35 VDC (2-wire); 17 to 36 VDC or isolated 21.6 to 33 VAC (3-wire).

Output Signals: 4 to 20 mA (2-wire); 0 to 5 V, 0 to 10 V (3-wire).

Response Time: Adjustable 0.5 to 15 sec. time constant. Provides a 95% response time of 1.5 to 45 seconds.

Zero & Span Adjustments: Digital push button.

Loop Resistance: Current Output: 0-1250 Ω max; Voltage Output: min. load resistance 1 kΩ.

Current Consumption: 40 mA max.

Display (optional): 4 digit LCD.

Electrical Connections:

4-20 mA, 2-Wire: European Style

Terminal Block for 16 to 26 AWG.

0-10 V, 3-Wire: European Style

Terminal Block for 16 to 22 AWG.

Electrical Entry: 1/2" NPS Thread

Accessory (A-151): Cable Gland for 5 to 10 mm diameter cable.

Process Connections: 3/16" ID tubing (5 mm ID). Maximum OD 9 mm.

Enclosure Rating: NEMA 4X (IP65).

Mounting Orientation: Diaphragm in vertical position.

Weight: 8.0 oz (230 g).

Agency Approvals: CE.

ACCESSORY

A-435, Field Upgradeable LCD

Model Number	Output	Selectable Ranges
MS-121*	4-20 mA	0.1", 0.25", 0.5" (25, 50, 100 Pa)
MS-321*	0-10 V	0.1", 0.25", 0.5" (25, 50, 100 Pa)
MS-111*	4-20 mA	1", 2", 5" (250, 500, 1250 Pa)
MS-311*	0-10 V	1", 2", 5" (250, 500, 1250 Pa)
MS-131	4-20 mA	10" w.c. (2 KPa)
MS-141	4-20 mA	15" w.c. (3 KPa)
MS-151	4-20 mA	25" w.c. (5 KPa)
MS-331	0-10 V	10" w.c. (2 KPa)
MS-341	0-10 V	15" w.c. (3 KPa)
MS-351	0-10 V	25" w.c. (5 KPa)
MS-021	4-20 mA	±0.1", 0.25", 0.5" w.c. (±25, 50, 100 Pa)
MS-221	0-10 V	±0.1", 0.25", 0.5" w.c. (±25, 50, 100 Pa)

NOTE: Add -LCD to end of model for units with display.

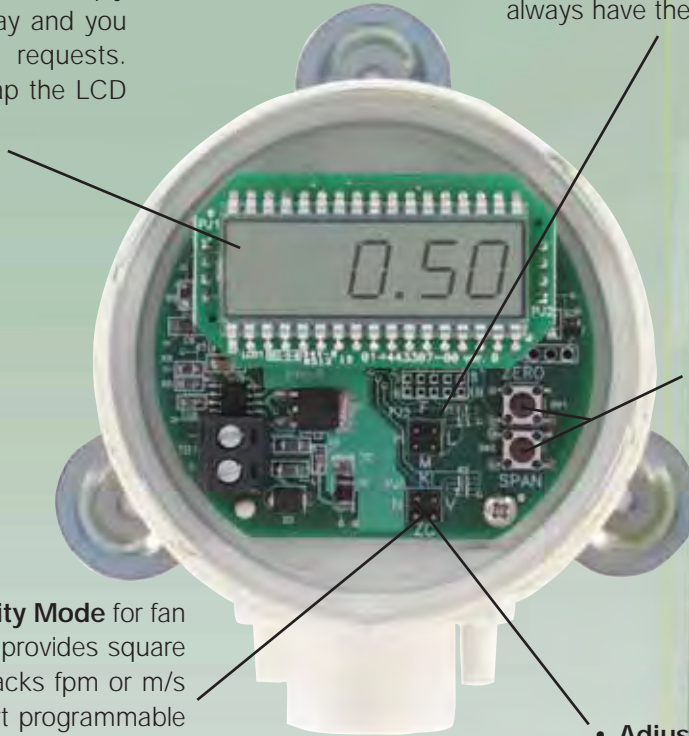
*Models available with duct mount static pressure probe. Change last digit from 1 to 2. Ex. MS-122

One Unit for all your Building Pressure Applications

The Industry Standard for Building Automation

- **Field Upgradable LCD.** No need to order two separate transmitters. Simply stock a transmitter and display and you can satisfy any customer's requests. Simply remove cover and snap the LCD onto the board.

- **Field Selectable Ranges** in metric or English. Lowers stock and inventory requirements. You'll always have the right transmitter for every job.



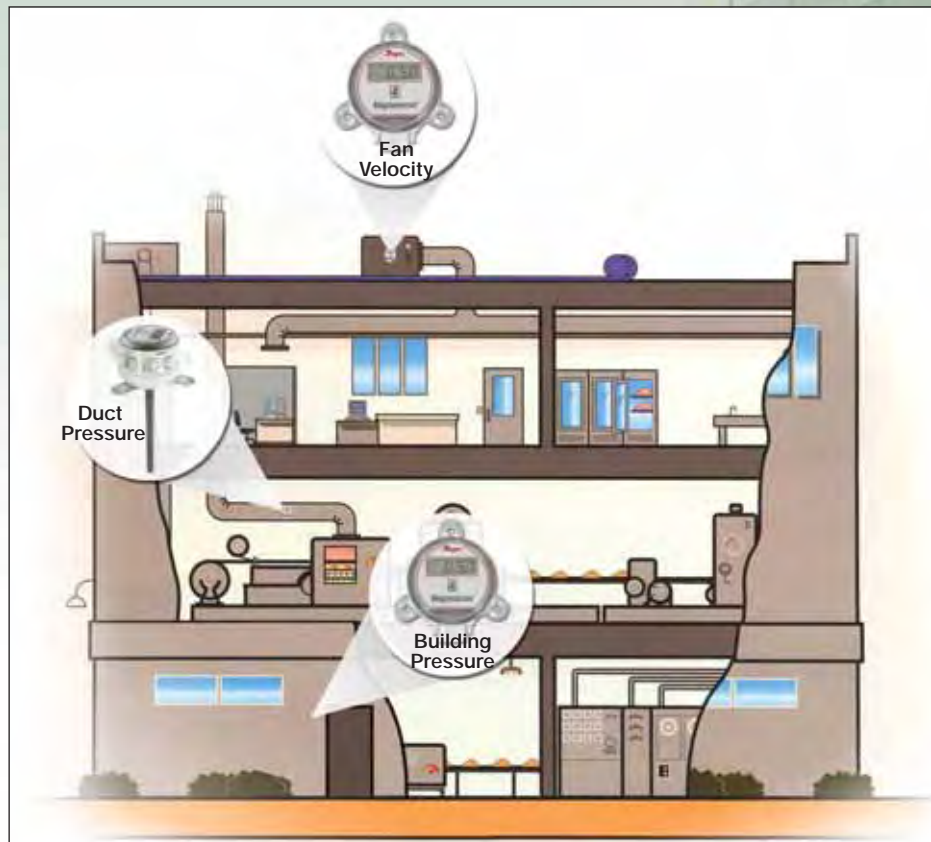
- **Digital Push Button Zero and Span.** Reduces calibration time significantly over other transmitters that utilize potentiometers. Lowers maintenance time and costs.

- **Field Selectable Air Velocity Mode** for fan and blower applications. Unit provides square root output that accurately tracks fpm or m/s flow rate. No need for a smart programmable indicator or PLC to convert pressure to air flow. Reduces components and installation time lowering overall costs.

- **Adjustable Digital Dampening** smooths out unstable pressure fluctuations common in air flow applications.

APPLICATIONS

- Duct pressures
- Building pressures
- Room-to-room differential pressures
- Air velocity pressures from fans and air handlers



Series
605

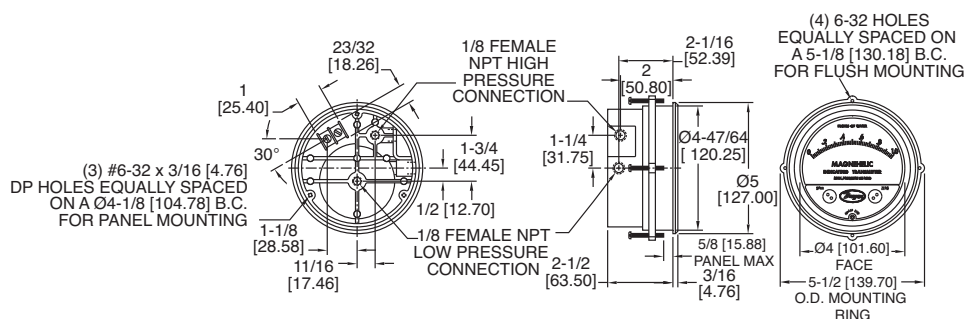
Magnehelic® Differential Pressure Gage with Transmitter

HVAC Static Pressure & Building Pressure

CE



Patent No. 4,890,497



The Series 605 Magnehelic® Indicating Transmitter provides for both visual monitoring and electronic control of very low differential pressure. The Series 605 is ideal for control applications in building HVAC systems where local indication is desired during routine maintenance checks or necessary when trouble shooting the system. The easily read dial gage is complimented by the two-wire, 4-20 mA control signal utilizing the time-proven Dwyer® Magnehelic® gage mechanical design and Series 600 transmitter technology. The 2-wire design with terminal strip on the rear simplifies connection in any 4-20 mA control loop powered by a 10-35 VDC supply.

APPLICATIONS

- Monitor pressures in ducts, rooms, or total building pressures
- Filter monitoring
- Local indication of clean room pressures with process signal sent to control room

ACCESSORIES

A-298 Flat Aluminum Bracket, for flush mounting

A-370 Mounting Bracket, flush mount Series 605 Transmitter in bracket. Bracket is then surface mounted. Steel with gray hammertone epoxy finish

SPECIFICATIONS

GAGE SPECIFICATIONS

Service: Air and non-combustible, compatible gases.

Wetted Materials: Consult factory.

Accuracy: See chart.

Stability: ±1% F.S./yr.

Pressure Limits: See chart.

Temperature Limits: 20 to 120°F
(-6.67 to 48.9°C).

Process Connections: 1/8" female NPT.

Size: 4" (101.6 mm) dial face, 5" (127 mm) O.D. x 2-11/16" (68.3 mm).

Weight: 1 lb, 12.6 oz (811 g).

Agency Approvals: CE.

TRANSMITTER SPECIFICATIONS

Accuracy: See chart (includes linearity, hysteresis, repeatability).

Temperature Limits: 20 to 120°F
(-6.67 to 48.9°C).

Compensated Temperature Range: 32 to 120°F (0 to 48.9°C).

Thermal Effect: ±0.025% F.S./°F
(0.045% F.S./°C).

Power Requirements: 10-35 VDC (2-wire).

Output Signal: 4 to 20 mA.

Zero and Span Adjustments: Protected potentiometers.

Loop Resistance: DC; 0-1250 ohms maximum.

Current Consumption: DC; 38 mA maximum.

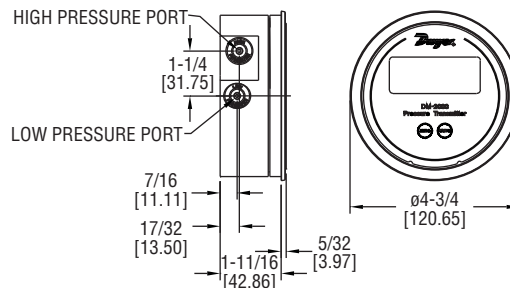
Electrical Connections: Screw terminal block.

Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.

Model Number	Range in w.c.	Maximum Pressure	Electrical Accuracy +/- %	Mechanical Accuracy +/- %	Model Number	Range in w.c.	Maximum Pressure	Electrical Accuracy +/- %	Mechanical Accuracy +/- %
605-00N	.05-0-.20	25 psi (1.7 bar)	2	4	605-20	0-20.0	20 psi (1.4 bar)	0.5	2
605-11	.25-0-.25	25 psi (1.7 bar)	2	3	605-30	0-30	20 psi (1.4 bar)	0.5	2
605-0	0-.50	25 psi (1.7 bar)	2	3	605-50	0-50	20 psi (1.4 bar)	0.5	2
605-1	0-1.0	25 psi (1.7 bar)	2	2		Range in Pa			
605-2	0-2.0	5 psi (34.5 kPa)	0.5	2	605-60PA	0-60	25 psi (1.7 bar)	2	4
605-3	0-3.0	5 psi (34.5 kPa)	0.5	2	605-125PA	0-125	25 psi (1.7 bar)	2	3
605-6	0-6.0	5 psi (34.5 kPa)	0.5	2	605-250PA	0-250	25 psi (1.7 bar)	2	2
605-10	0-10	5 psi (34.5 kPa)	0.5	2	605-500PA	0-500	5 psi (34.5 kPa)	0.5	2

Differential Pressure Transmitter

Same Size as Standard Magnehelic® Differential Pressure Gage



The Dwyer Series DM-2000 Differential Pressure Transmitter senses the pressure of air and compatible gases and sends a standard 4-20 mA output signal. The DM-2000 housing is specifically designed to mount in the same diameter cutout as a standard Magnehelic® gage. A wide range of models are available factory calibrated to specific ranges. Pressure connections are inherent to the glass filled plastic molded housing making installation quick and easy. Digital push-button zero simplifies calibration over typical turn-potentiometers. An optional 3.5 digit LCD shows process and engineering units. A single push button allows field selection of 4 to 6 engineering units depending on range LCD models.

APPLICATIONS

- Filter monitoring
- Fan pressure indication
- Duct static pressures
- Bi-directional ranges ideal for sensing fluctuating building pressure

ACCESSORIES

A-299, Surface Mounting Bracket

A-300, Flat Flush Mounting Bracket

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.

Wetted Materials: Consult Factory.

Accuracy: ±1% F.S. at 70°F.

Stability: ±1% F.S./yr.

Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).

Pressure Limits: 10 psig (0.69 bar).

Thermal Effect: ±0.055% F.S./°F (0.099% F.S./°C).

Power Requirements: 10-35 VDC (2 wire).

Output Signal: 4 to 20 mA.

Zero and Span Adjustments: Digital push-button zero and span.

Loop Resistance: DC: 0-1250 ohms maximum.

Current Consumption: DC: 38 mA maximum.

Electrical Connections: Screw-type terminal block.

Display: 3.5 digit LCD, 0.7" height.

Process Connections: 1/8" I.D. tubing.

Mounting Orientation: Vertical.

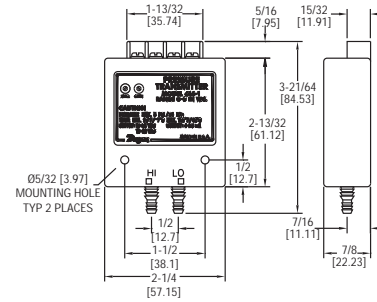
Weight: 4.8 oz (136 g).

Model Number	Range	Pa	mm wc	mBar	kPa	psi
DM-2001-LCD	.100 in wc	24.9	2.54	.249		
DM-2002-LCD	.250 in wc	62.2	6.35	.622		
DM-2003-LCD	.500 in wc	124.3	12.70	1.243	.124	
DM-2004-LCD	1.000 in wc	249	25.4	2.49	.249	
DM-2005-LCD	2.00 in wc	497	50.8	4.97	.497	
DM-2006-LCD	3.00 in wc	746	76.2	7.46	.746	.108
DM-2007-LCD	5.00 in wc	1243	127.0	12.43	1.243	.180
DM-2012-LCD	.250-0-.250 in wc	62.2-0-62.2	3.65-0-6.35	.622-0-.622		
DM-2013-LCD	.500-0-.500 in wc	124.3-0-124.3	12.70-0-12.70	1.243-0-1.243		

Note: Remove '-LCD' from the end of the model number if not needing the display.

Differential Pressure Transmitter

Ranges from 0-3 in. w.c. to 0-100 psid



Series 616 & 616C Transmitters feature exceptional $\pm 0.25\%$ and 1% accuracies in several factory calibrated ranges. Choose the one just right for your application. Span and Zero controls included for fine tuning and minor re-calibration in the field.

APPLICATIONS

- Compact housing makes unit ideal for variable air volume systems

Model No.	Range	Max. Press.	Model No.	Range	Max. Press.
616-00	0-1 in. w.c.	5 psig	616-8	0-10 psid	58 psig
616-0	0-2 in. w.c.	5 psig	616-9	0-20 psid	58 psig
616-1	0-3 in. w.c.	5 psig	616-10	0-30 psid	58 psig
616-2	0-6 in. w.c.	5 psig	616-11	0-50 psid	150 psig
616-3	0-10 in. w.c.	5 psig	616-12	0-100 psid	150 psig
616-4	0-20 in. w.c.	11 psig	616-3B	1.5-0-1.5 in. w.c.	5 psig
616-5	0-40 in. w.c.	11 psig	616-6B	3-0-3 in. w.c.	5 psig
616-6	0-100 in. w.c.	29 psig	616-10B	5-0-5 in. w.c.	5 psig
616-7	0-200 in. w.c.	29 psig	616-20B	10-0-10 in. w.c.	11 psig

Note: For 1% models add "C" after 616. 616C not available with 1" or 2" w.c. ranges.

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.

Wetted Materials: Consult factory.

Accuracy: 616: $\pm 0.25\%$ F.S.;

616C $\pm 1\%$ F.S.

Stability: $\pm 1\%$ F.S./yr.

Temperature Limits: 0 to 140°F (-17.8 to 60°C).

Compensated Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).

Pressure Limits: See Chart.

Thermal Effect: $\pm 0.02\%$ F.S./°F ($\pm 0.0012\%$ F.S./°C).

Power Requirements: 10-35 VDC (2-wire).

Output Signal: 4 to 20 mA.

Zero and Span Adjustments:

Potentiometers for zero and span.

Loop Resistance: DC; 0-1250 ohms maximum.

Current Consumption: DC; 38 mA maximum.

Electrical Connections: Screw-type terminal block.

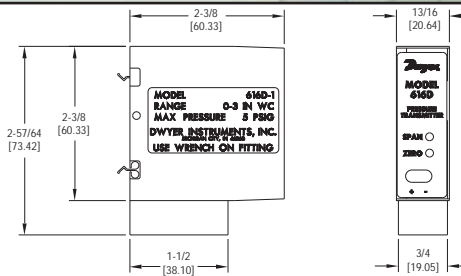
Process Connections: Barbed, dual size to fit 1/8" and 3/16" (3.12 mm and 4.76 mm) I.D. rubber or vinyl tubing.

Weight: 1.8 oz (51 g).

Agency Approvals: CE on 616 only.

DIN Rail Differential Pressure Transmitter

Mounts on 35 mm DIN Rail



The Series 616D Differential Pressure Transmitter senses the pressure of air and compatible gases and sends a standard 4-20 mA output signal. The 616D housing is specifically designed to mount on a 35 mm DIN rail in a panel. This mounting style allows for several units to be mounted closely together reducing required space. A wide range of models are available factory calibrated to specific ranges as listed in the chart below. The span and zero controls are for use when checking calibration. They are not intended for re-ranging to a significantly different span. Versatile circuit design enables operation in 2-wire current loops.

APPLICATIONS

- Compact, DIN rail housing allows unit to be easily mounted in HVAC control panel

Model No.	Range	Max. Press.	Model No.	Range	Max. Press.
616D-1	0-3 in. w.c.	5 psig	616D-10	0-30 psid	58 psig
616D-2	0-6 in. w.c.	5 psig	616D-11	0-50 psid	150 psig
616D-3	0-10 in. w.c.	5 psig	616D-12	0-100 psid	150 psig
616D-4	0-20 in. w.c.	11 psig	616D-13	0-12 ft w.c.	29 psig
616D-5	0-40 in. w.c.	11 psig	616D-14	0-20 ft w.c.	58 psig
616D-6	0-100 in. w.c.	29 psig	616D-3B	1.5-0-1.5 in. w.c.	5 psig
616D-7	0-200 in. w.c.	29 psig	616D-6B	3-0-3 in. w.c.	5 psig
616D-8	0-10 psid	58 psig	616D-10B	5-0-5 in. w.c.	5 psig
616D-9	0-20 psid	58 psig	616D-20B	10-0-10 in. w.c.	11 psig

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.

Wetted Materials: Consult Factory.

Accuracy: $\pm 0.25\%$ F.S. at 70°F.

Stability: $\pm 1\%$ F.S./yr.

Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).

Pressure Limits: See chart.

Thermal Effect: $\pm 0.02\%$ F.S./°F (0.0012% F.S./°C).

Power Requirements: 10-35 VDC (2-wire).

Output Signal: 4 to 20 mA.

Zero and Span Adjustments:

Potentiometers for zero and span.

Loop Resistance: DC; 0-1250 ohms max.

Current Consumption: DC; 38 mA max.

Electrical Connections: Screw-type terminal block.

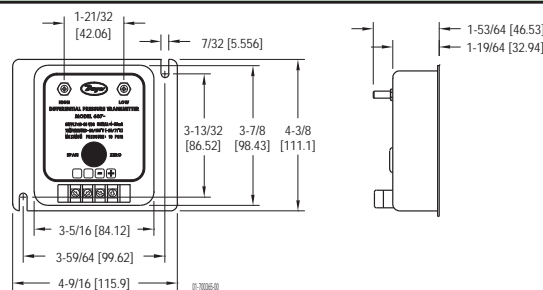
Process Connections: 1/8" female NPT. Accessories included are 2 barbed fittings for 1/8" (3.12 mm) and 3/16" (4.77 mm) I.D. rubber or vinyl tubing.

Mounting Orientation: Vertical, on a 1.378" (35 mm) DIN rail.

Weight: 4.8 oz (136 g).

Series
607

Low Range Differential Pressure Transmitter

 $\pm 0.25\%$ or $\pm 0.5\%$ F.S. Accuracy, Ranges from 0-0.1" w.c.

Series 607 Differential Pressure Transmitter combines very low ranges with exceptional stability, reliability and either $\pm 0.25\%$ or $\pm 0.5\%$ accuracy for the most demanding applications. Ranges from 0-0.1 to 0-25" w.c. Ultra thin glass clad silicon diaphragm design resists shock and vibration, practically eliminates drift. Certification to NIST standards is included with each unit. Tough stainless steel housing is NEMA-2 rated to protect against moisture and dirt. Use with air and other compatible gases.

APPLICATIONS

- Leak Detection
- Clean Room Control
- Lab and fume hood pressure control

Model No.	Range (in w.c.)	Model No.	Range (in w.c.)
607-0	0-.10	607-71*	0-5.0
607-01*	0-.10	607-8	0-10
607-1	0-.25	607-0B	.10-0-.10
607-11*	0-.25	607-1B	.25-0-.25
607-2	0-.50	607-2B	.50-0-.50
607-21*	0-.50	607-9	0-25
607-3	0-1.0	607-3B	1.0-0-1.0
607-4	0-2.0	607-4B	2.0-0-2.0
607-7	0-5.0	607-7B	5.0-0-5.0

* Models have a $\pm 0.25\%$ F.S. accuracy.

SPECIFICATIONS

Service: Air and nonconductive, noncorrosive gases.

Wetted Materials: Contact factory.

Accuracy: $\pm 0.5\%$ or $\pm 0.25\%$ F.S.

Stability: $\pm 0.5\%$ F.S.O./yr.

Temperature Limits: -20 to 160°F (-29 to 71°C), 10 to 95% RH.

Pressure Limits: 10 psig (0.69 bar).

Compensated Temp. Range: 35 to 135°F (2 to 57°C).

Thermal Effects: $\pm 0.015\%$ FS/°F (zero and span).

Power Requirements: 12-36 VDC.

Output Signal: 4 to 20 mA DC, 2-wire.

Zero & Span Adjustments: Externally accessible potentiometers, non-interactive, $\pm 10\%$ F.S. adjustment.

Response Time: 250 msec max.

Loop Resistance: 0 to 1045 ohms

$V_{min} = 12V + [(22A)(R_L)]$

Current Consumption: 3.6 mA (min).

Electrical Connection: Screw terminals.

Process Connection: Barbed stainless steel for 3/16" I.D. tubing.

Housing: 300 Series SS (NEMA 2).

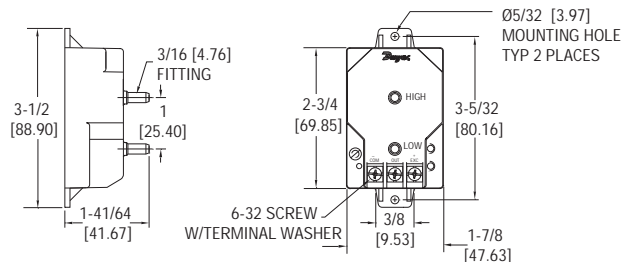
Weight: 1.04 lb (472 g).

Agency Approvals: CE.

Series
668

Compact Differential Pressure Transmitter

Ranges from 0 to 0.25 in. w.c., Overpressure Protection to 10 psig



Our low cost Series 668 Differential Pressure Transmitter is capable of measuring low pressures with a $\pm 1\%$ accuracy — ideally suited for proper building pressurization and air flow control. Transmitters can withstand up to 10 psig overpressure with no damage to the unit. Variable capacitance sensor design provides excellent sensitivity and long-term stability. Compact, lightweight design makes installation simple and easy. Units also feature reverse-polarity protection.

APPLICATIONS

- Compact housing ideal for variable air volume systems
- Bi-directional ranges suited to measure building pressures

SPECIFICATIONS

Service: Air and non-conductive gases.

Accuracy: $\pm 1\%$ of full scale (RSS) (includes non-linearity, hysteresis, and non-repeatability).

Temperature Limits:

Operating: 0 to 150°F (-18 to 65°C),

Storage: -40 to 185°F (-40 to 85°C).

Pressure Limits: 10 psig (0.69 bar).

Compensated Temperature Range: 0 to 150°F (-18 to 65°C).

Thermal Effects: 0.033% FS/°F (0.018% FS/°C).

Supply Voltage: 12-30 VDC.

Output: 4 to 20 mA, 2-wire.

Zero and Span Adjust: ± 1 mA,

non-interactive.

Response Time: <60 msec.

Loop Resistance: 0-800 ohms.

Electrical Connection: Terminal strip.

Pressure Connection: 3/16" O.D. fitting for 1/4" I.D. tubing.

Housing: Fire retardant glass filled polyester.

Weight: 3 oz (85 g).

Agency Approvals: CE.

Bi-Directional

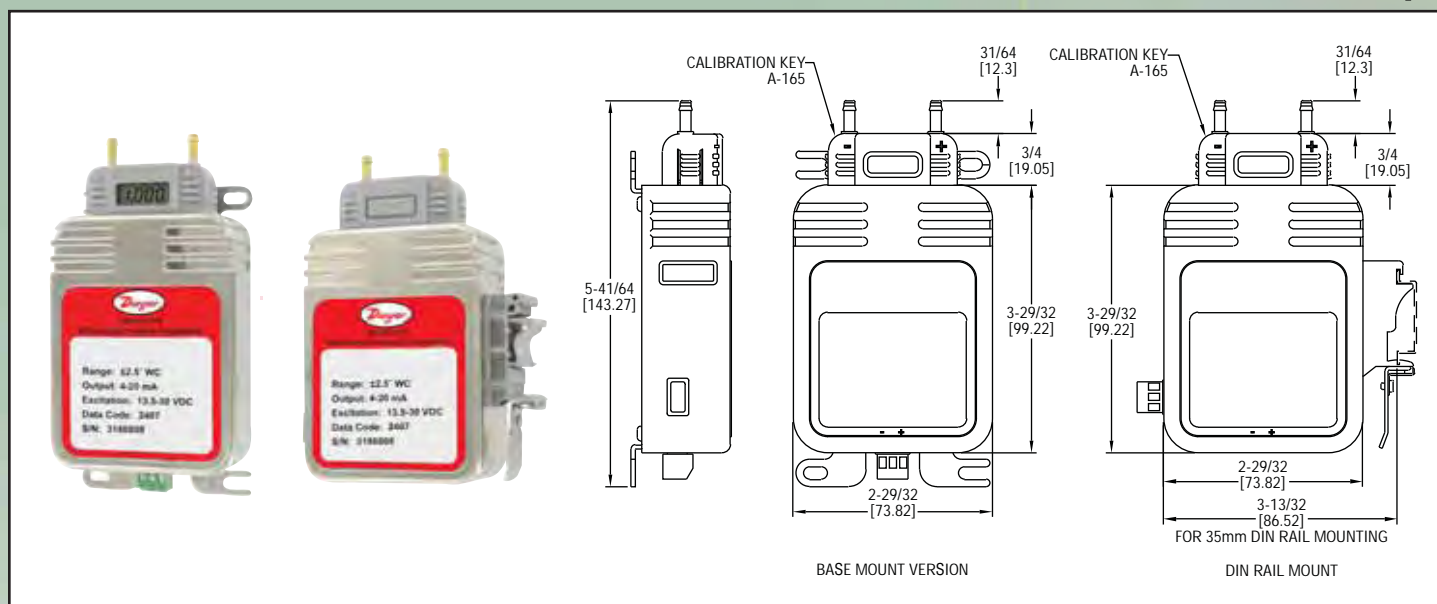
Model Number*	Range	Model Number*	Range
668-10	0 to ± 0.1 in. w.c.	668-14	0 to ± 2.5 in. w.c.
668-11	0 to ± 0.25 in. w.c.	668-15	0 to ± 5 in. w.c.
668-12	0 to ± 0.5 in. w.c.	668-16	0 to ± 10 in. w.c.
668-13	0 to ± 1 in. w.c.	668-17	0 to ± 25 in. w.c.
		668-18	0 to ± 50 in. w.c.

Model Number*	Range	Model Number*	Range
668-1	0 to 0.25 in. w.c.	668-5	0 to 5.0 in. w.c.
668-2	0 to 0.5 in. w.c.	668-6	0 to 10 in. w.c.
668-3	0 to 1 in. w.c.	668-7	0 to 25 in. w.c.
668-4	0 to 2.5 in. w.c.	668-8	0 to 50 in. w.c.
		668-9	0 to 100 in. w.c.

*Also available with optional conduit cover. To order add "C" to part number, i.e. 668C-1. Consult factory for additional information.

Precision Low Differential Pressure Transmitter

Ideal for Clean Rooms, Easy to Field Calibrate with Security Key



The Series 610 Low Differential Pressure Transmitters are capable of measuring the pressures and flow of air or non-conducting gases at high resolutions. Designed specifically for clean rooms, isolation rooms, and other critical environments, the Series 610 uses an improved all stainless steel micro-tig welded sensor to detect differential pressure and convert this pressure into a linear DC electrical signal by a unique electrical circuit. This unit is ideal for situations when accurate and reliable pressure monitoring is essential. Easy access pressure ports and electrical connections, removable process heads, and detachable terminal blocks make for fast and easy installation. The Series 610 transmitters are available for air pressure ranges as low as 0.1" W.C. full scale. Standard accuracy is $\pm 0.25\%$ full scale (terminal-based) in normal ambient temperature environments. The tensioned sensor allows up to 2 psi overpressure in either direction with absolutely no damage to the unit. The Series 610 transmitters can be ordered as either a base mount or a din rail mount and the option of a digital read out display. In addition, a calibration key can be ordered that allows the user to set zero and span. One key will work on multiple transmitters.

FEATURES

- Ranges down to 0.1" w.c. with 0.25% or 0.5% F.S. accuracy
- Removeable process head for simplified installation
- Secure operation ensured with calibration only possible via separate calibration key

SPECIFICATIONS

Service: Air or similar non-conducting gases.

Accuracy: $\pm 0.25\%$ or $\pm 0.5\%$ F.S.

Stability: $\pm 0.5\%$ /yr.

Temperature Limits: -20 to 160°F (-29 to 71°C).

Pressure Limits: 100 psi (6.8 bar).

Thermal Effect: 0.5% FS.

Power Requirements: 13.5 to 30 VDC.

Output: 4 to 20 mA.

Loop Resistance: 800 ohms max.

Current Consumption: 25 mA.

Zero and Span Adjustments: External security key pendant.

Response Time: 0.02 to 0.04 seconds.

Electrical Connections: Detachable screw terminal connector.

Process Connections: 3/16" O.D. barbed brass fittings on removeable process head.

Enclosure Rating: Fire retardant ABS.

Mounting Orientation: Vertical.

Weight: 9 oz (255 g).

Agency Approvals: CE.

ACCESSORIES

A-165, Security Key

A-616, Process Head without display

A-617, Process Head with LCD display

0.25% Accuracy				0.5% Accuracy			
With Display		Without Display		With Display		Without Display	
Model	Range	Model	Range	Model	Range	Model	Range
610-01D-BDV	0-1"	610-01D-BNV	0-1"	610-01D-BDE	0-1"	610-01D-BNE	0-1"
610-25D-BDV	0-.25"	610-25D-BNV	0-.25"	610-25D-BDE	0-.25"	610-25D-BNE	0-.25"
610-05D-BDV	0-.5"	610-05D-BNV	0-.5"	610-05D-BDE	0-.5"	610-05D-BNE	0-.5"
610-01A-BDV	0-1"	610-01A-BNV	0-1"	610-01A-BDE	0-1"	610-01A-BNE	0-1"
610-25A-BDV	0-2.5"	610-25A-BNV	0-2.5"	610-25A-BDE	0-2.5"	610-25A-BNE	0-2.5"
610-05A-BDV	0-5"	610-05A-BNV	0-5"	610-05A-BDE	0-5"	610-05A-BNE	0-5"
610-10A-BDV	0-10"	610-10A-BNV	0-10"	610-10A-BDE	0-10"	610-10A-BNE	0-10"
610-01C-BDV	0 \pm 1"	610-01C-BNV	0 \pm 1"	610-01C-BDE	0 \pm 1"	610-01C-BNE	0 \pm 1"
610-25C-BDV	0 \pm .25"	610-25C-BNV	0 \pm .25"	610-25C-BDE	0 \pm .25"	610-25C-BNE	0 \pm .25"

Series
626
&
628

Industrial Pressure Transmitter

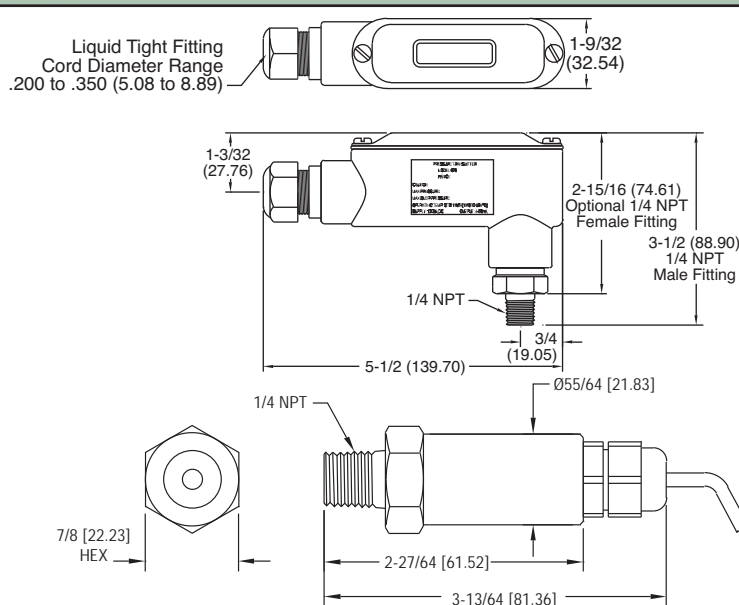
Complete Offering of Ranges, Connections and Outputs



Conduit Housing (-CH)



General Purpose Housing (-GH)



The Series 626 Pressure Transmitters possess a highly precise 0.25% piezo-resistive sensor contained in a compact, rugged, NEMA 4X stainless steel general purpose housing or cast aluminum conduit housing.

The Series 628 Pressure Transmitters are ideal for OEMs with 1% full scale accuracy sensors. The transmitter is also available in the general purpose stainless steel housing and the cast aluminum conduit housing.

The highly corrosive resistant 316L stainless steel wetted parts allow the Series 626 and 628 transmitters to measure the pressure in a multitude of processes from hydraulic oils to chemicals. The Series 626 and 628 are available in ranges of vacuum, compound to 5000 psi with a variety of optional outputs, process connections and electrical terminations to allow you to select the right transmitter for your application.

APPLICATIONS

- Compressors
- Pumping systems
- Irrigation system pressure
- Fire pump control pressures
- Refrigerant line pressures on air handlers when used with optional refrigerant valve depressor
- Trash compaction equipment

SPECIFICATIONS

Service: Compatible gases and liquids.

Wetted Materials: Type 316 SS, 316L SS.

Accuracy: 626: 0.25% full scale. 628: 1% full scale (includes linearity, hysteresis, and repeatability).

Temperature Limit: 0 to 200°F (-18 to 93°C).

Compensated Temperature Range: 0 to 175°F (-18 to 79°C).

Thermal Effect: 626: ±0.02% FS/°F. 628: ±0.04% FS/°F (includes zero and span).

Pressure Limits: See table.

Power Requirements: 13 to 30 VDC.

Output Signal: 4 to 20 mA. Optional 0-5, 1-5, 0-10, 1-6 or 2-10.

Response Time: 50 msec.

Loop Resistance: 0 - 1300 ohms maximum for current. For voltage outputs, minimum load resistance: 2000 ohms.

Current Consumption: 38 mA (maximum).

Electrical Connections: Conduit Housing (-CH): terminal block, 1/2" female NPT conduit. General Purpose Housing (-GH): cable, DIN connector or 4 pin M-12.

Process Connection: 1/4" male or female NPT and BSPT.

Enclosure Rating: NEMA 4X (IP66).

Mounting Orientation: Mount in any position.

Weight: 10 oz (283 g).

Agency Approvals: CE.

PRESSURE LIMITS

Range Number	Pressure Range (psig)	Maximum Pressure (psig)	Over Pressure (psig)	Range Number	Pressure Range (psig)	Maximum Pressure (psig)	Over Pressure (psig)
00	30" Hg-0	30	150	11	0-150	300	750
30	0-30" Hg	30	150	12	0-200	400	1000
01	30-0-15	30	150	13	0-300	600	1500
02	30-0-30	60	300	14	0-500	1000	2500
03	30-0-45	100	300	15	0-1000	2000	5000
04	30-0-60	200	500	16	0-1500	3000	5000
05	30-0-100	200	500	17	0-2000	4000	5000
06	0-5	10	50	18	0-3000	6000	7500
07	0-15	30	150	19	0-5000	7500	10000
08	0-30	60	300	26	0-8000	10000	12000
09	0-50	100	300				
10	0-100	200	500				

ORDERING CHART

Accuracy	626 628							0.25% Full Scale Accuracy 1.0% Full Scale Accuracy
Range		-30 -00 -01 -02 -03 -04 -05 -06 -07 -08 -09 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19 -26						0-30" Hg Vacuum 30" Hg Vacuum - 0 psi 30-0-15 psi 30-0-30 psi 30-0-45 psi 30-0-60 psi 30-0-100 psi 0-5 psi 0-15 psi 0-30 psi 0-50 psi 0-100 psi 0-150 psi 0-200 psi 0-300 psi 0-500 psi 0-1000 psi 0-1500 psi 0-2000 psi 0-3000 psi 0-5000 psi 0-8000 psi
Housing			-CH -GH					Conduit Housing General Purpose Housing
Process Connection				-P1 -P2 -P3 -P4 -P5				1/4" male NPT 1/4" female NPT 1/4" male BSPT 1/4" female BSPT 1/4" female SAE with Refrigerant Valve Depressor
Electrical Connection					-E1 -E2 -E3 -E4 -E5 -E6			Cable Gland with 3' of Prewired Cable Cable Gland with 6' of Prewired Cable Cable Gland with 9' of Prewired Cable DIN Connector Available with -GH Housing Only 1/2" female NPT Conduit Available with -CH Housing Only M-12 4 Pin Connector
Signal Output						-S1 -S2 -S3 -S4 -S5 -S6		4-20 mA 1-5 Volt 2-10 Volt 0-5 Volt 0-10 Volt 1-6 Volt
Options							-AT -NIST -LED	Aluminum Tag NIST Traceable Certificate Bright Red LED display. Available with -CH housing only

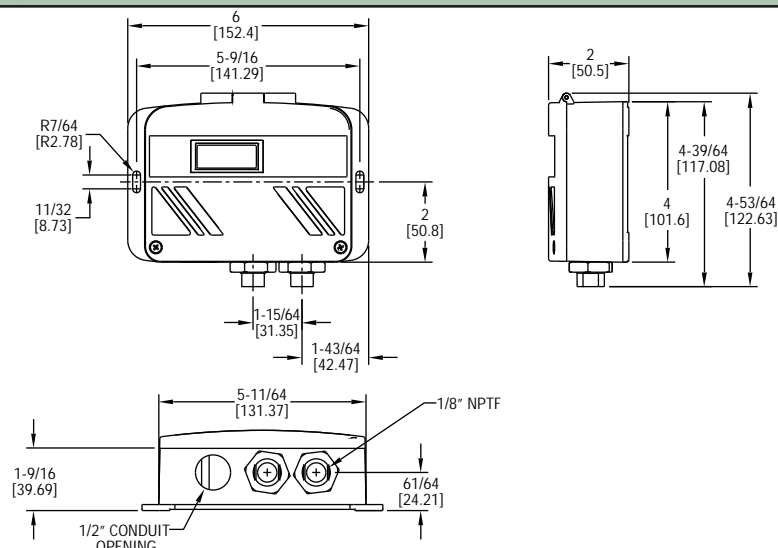
626 with LED Display (CH housing only)

Note: LED option is not NEMA 4X rated.

**Optional -E4 DIN Connector (GH housing only)**

Differential Pressure Transmitter

Selectable Ranges of Uni-Directional or Bi-Directional, Selectable Outputs



The **Series WWDP Wet-to-Wet Differential Pressure Transmitter** offers everything in one package by having 30 field selectable variations in just 3 models. The WWDP provides field selectable unidirectional and bidirectional pressure ranges, configurable 0-5, 1-5, 0-10 VDC, and 4 to 20 mA output. It also provides an auto-zero capability. The field selectable port swap feature eliminates costly replumbing if the unit is improperly installed or if the transmitter is simply replaced. An optional LCD display is available for on-sight indication of line and differential pressure. The all cast aluminum housing is rated NEMA 4 (IP66). These features make the WWDP transmitter an ideal instrument for measuring the flow of various liquids and gases, pressure drop across filters, measurement of liquid level or pressurized vessels, and for use in energy management and process control systems.

APPLICATIONS

- Monitor differential pressure of a chiller

Model	Description	Max. Working Pressure
WWDP-1	Selectable 5,10,25,50 psid	50 psi
WWDP-2	Selectable 10,20,50,100 psid	100 psi
WWDP-3	Selectable 25,50,125,250 psid	250 psi

Model	Description	Max. Working Pressure
WWDP-1-LCD	Selectable 5,10,25,50 psid	50 psi
WWDP-2-LCD	Selectable 10,20,50,100 psid	100 psi
WWDP-3-LCD	Selectable 25,50,125,250 psid	250 psi

SPECIFICATIONS

Service: Gases or liquids compatible with 17-4 PH stainless steel.

Accuracy: All pressure ranges have $\pm 1\%$ full scale accuracy except the lowest selectable range of each unit is $\pm 2\%$ full scale.

Stability: $\pm 0.5\%$ per year.

Temperature Limits: Compensated temperature range: 32 to 130°F (0 to 54°C); Operating temperature range: -4 to 185°F (-20 to 85°C).

Pressure Limits: Max working pressure: WWDP-1: 50 psi; WWDP-2: 100 psi; WWDP-3: 250 psi; Proof pressure: 2.2X of full scale; Burst pressure: 40X of full scale.

Thermal Effect: 2% FS/100°F (50°C) includes zero and span.

Power Requirements: 12 to 30 VDC/18 to 28 VAC (Reverse Excitation Protected). NOTE: 4-20 mA output cannot be powered with AC voltage.

Output Signal: Selectable 0-5, 0-10 and 1-5 VDC; 4 to 20 mA.

Zero & Span: Digital "re" zero button (should be used when changing ranges). Span can be adjusted by changing between field selectable ranges.

Response Time: 1 to 5 sec (selectable).

Loop Resistance: 1000 ohms.

Current Consumption: VDC power: 0-5, 1-5 VDC output 4 mA (typ); 0-10 VDC output 5 mA (typ); 4-20 mA output 20 mA max. Current consumption will equal the transmitter output in current mode. VAC power: 0-5, 1-5, 0-10 VDC output 40 mA (typ).

Electrical Connections: 1/2" conduit.

Process Connections: 1/8" female NPT internal.

Enclosure Rating: Designed to meet NEMA 4 (IP66).

Mounting Orientation: Vertical; mount the pressure ports down (keeps debris from building up inside the pressure port).

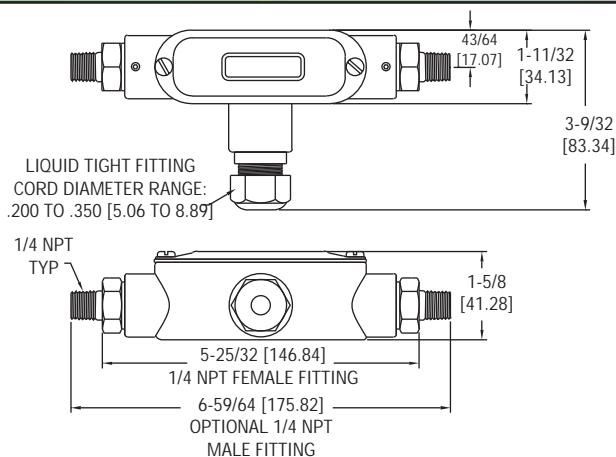
Size: 4 x 6 x 2 in (102 x 152 x 51 mm).

Weight: 1.5 lb (680.4 g).

Agency Approvals: CE.



Series 629 shown with optional cable gland.



The **Series 629 Differential Pressure Transmitter** monitors differential pressure of air and compatible gases and liquids with 0.5% accuracy. The design employs dual pressure sensors converting pressure changes into a standard 4-20 mA output signal for two wire circuits. Small internal volume and minimum moving parts result in exceptional response and reliability. Terminal block, zero and span adjustments are easily accessed under the top cover. The Series 629 Differential Pressure Transmitter is designed to meet NEMA4X (IP66) construction.

APPLICATIONS

Monitor Differential Pressures Across:

- Flow elements
- Heat exchangers
- Filters
- Pumps
- Coils
- Compressors

SPECIFICATIONS

Service: Compatible gases & liquids.

Wetted Materials: Types 316, 316L SS. Additional with 3-way valve option: Buna-N, Silicone Grease, PTFE, Brass 360, Copper, reinforced acetal copolymer.

Accuracy: $\pm 0.5\%$ F.S. (includes linearity, hysteresis & repeatability).

Temperature Limits: 0 to 200°F (-18 to 93°C).

Compensated Temperature Limits: 0 to 175°F (-18 to 79°C).

Pressure Limits: See chart.

Thermal Effect: 0.02%/°F (0.036%/°C) includes zero & span.

Power Requirements: 13-30 VDC (2-wire).

Output Signal: 4 to 20 mA. Optional 0-5, 0-10 VDC.

Response Time: 50 msec.

Loop Resistance: 0-1300 ohms maximum for current output.

For voltage outputs, minimum load resistance: 2000 ohms.

Electrical Connections: Terminal block; 1/2" female NPT conduit.

Process Connections: 1/4" female NPT.

Enclosure Rating: Designed to meet NEMA 4X (IP66).

Mounting Orientation: Not position sensitive.

Weight: 10.1 oz (286 g).

Agency Approvals: CE.

OPTIONS

-LED, 4.5 Digit LED Display

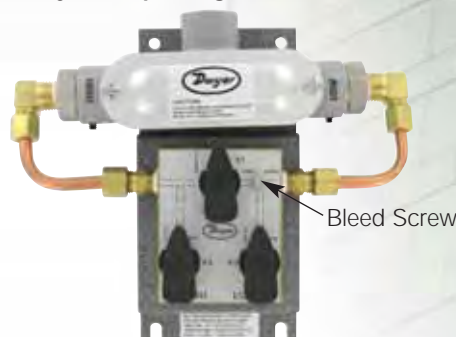
ACCESSORIES

A-228, Stainless steel flex hose, 12" (30.48 cm) long, 1/8" male NPT connections.

A-229, Stainless steel flex hose, 18" (45.72 cm) long, 1/8" male NPT connections.

A-332, Brass adapter, 1/8" female NPT to 1/4" male NPT.

3-way valve package with bleed screw



Standard

Model Number	Range (psid)	Pressure Limits	
		Working* Pressure (psid)	Over Pressure (psi)
629-02-CH-P2-E5-S1	10	20	100
629-03-CH-P2-E5-S1	25	50	250
629-04-CH-P2-E5-S1	50	100	250
629-05-CH-P2-E5-S1	100	200	500

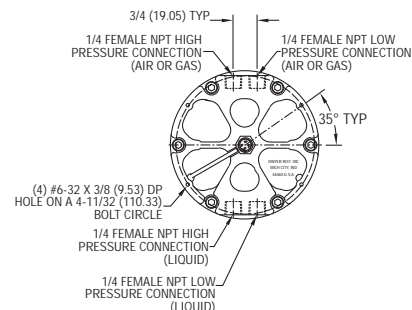
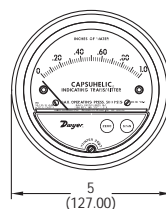
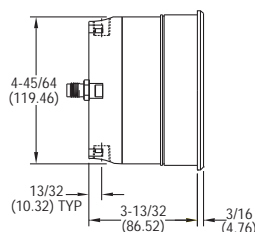
* Pressures exceeding the working pressure limit may cause a calibration shift of up to $\pm 3\%$ of full scale.

3-Way Valve Manifold

Model Number	Range (psid)	Pressure Limits	
		Working* Pressure (psid)	Over Pressure (psi)
629-02-CH-P2-E5-S1-3V	10	20	100
629-03-CH-P2-E5-S1-3V	25	50	100
629-04-CH-P2-E5-S1-3V	50	100	100
629-05-CH-P2-E5-S1-3V	100	100	100

Series 631B Wet/Wet Differential Pressure Transmitter

Ranges Down to 0.5" w.c. with 500 psi Static Pressure Rating



The **Series 631B Differential Pressure Transmitter** monitors differential pressure of air and compatible gases and liquids with accuracy. The design employs converting pressure changes into a standard 4-20 mA output signal for two wire circuits. Digital push-button, zero and span adjustments are easily accessed on the front cover. The Series 631B Differential Pressure Transmitter is designed to meet NEMA 4X (IP66) construction. Robust housing offers 500 psi static pressure rating on ranges down to 0.5" w.c.

SPECIFICATIONS

Service: Compatible gases & liquids.

Wetted Materials: Brass, silicone, 300 SS.

Accuracy: Transmitter Output: $\pm 2\%$ F.S. (includes linearity, hysteresis and repeatability). Gage: $\pm 3\%$ of full scale at 70°F (21.1°C).

Stability: $\pm 1\%$ F.S./yr.

Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).

Pressure Limits: -20" Hg to 500 psig (-0.677 bar to 34.4 bar).

Thermal Effect: 0.025%/°F (0.045%/°C) includes zero & span.

Power Requirements: 10-35 VDC.

Output Signal: 4 to 20 mA.

Response Time: 50 msec.

Loop Resistance: 0-1250 ohms maximum.

Electrical Connections: M-12 circular 4 pin connector.

Process Connections: 1/4" female NPT high and low pressure taps, duplicated - one pair top for air and gas, and one pair bottom for liquids.

Enclosure Rating: Designed to meet NEMA 4X (IP66).

Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.

Weight: 8 lb, 4 oz (3.74 kg).

Agency Approvals: CE.

Model	Range
631B-0	0-0.5" w.c.
631B-1	0-1" w.c.
631B-2	0-2" w.c.
631B-3	0-5" w.c.
631B-5	0-25" w.c.

ACCESSORIES

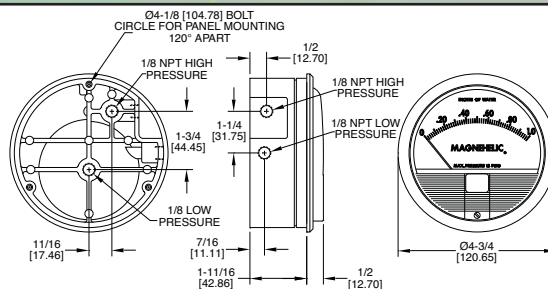
A-164, 16.4' (5 m) cable with M-12 4-pin female connector

APPLICATIONS

- Refrigeration equipment
- Energy and water management
- Liquid level in water storage tanks

Magnehelic® Differential Pressure Gages

Monitor Filters, Air Velocities and Static Pressures



Patent Nos. 4,030,365
5,012,678

Dimensions, Standard Series 2000 Magnehelic® Pressure Gages.
(Slightly different on medium and high pressure models)

Select the **Dwyer Magnehelic® gage** for high accuracy — guaranteed within 2% of full scale — and for the wide choice of 81 models available to suit your needs precisely. Using Dwyer's simple, frictionless **Magnehelic®** gage movement, it quickly indicates low air or non-corrosive gas pressures — either positive, negative (vacuum) or differential. The design resists shock, vibration and over-pressures. No manometer fluid to evaporate, freeze or cause toxic or leveling problems. It's inexpensive, too.

Note: May be used with Hydrogen when ordering a Buna-N diaphragm. Pressures must be less than 35 psi.

APPLICATIONS

- Filter monitoring
- Air velocity with Dwyer Pitot tube
- Blower vacuum monitoring
- Fan pressure indication
- Duct, room or building pressures
- Clean room positive pressure indication

SERIES 2000 MAGNEHELIC® GAGE — MODELS AND RANGES

The models below will fulfill most requirements. Special models built for OEM customers are also available. For special scales furnished in ounces per square inch, inches of mercury, metric units, etc., contact the factory.

SPECIFICATIONS

Service: Air and non-combustible, compatible gases. (Natural Gas option available.)

Wetted Materials: Consult factory.

Housing: Die cast aluminum case and bezel, with acrylic cover. Exterior finish is coated gray to withstand 168 hour salt spray corrosion test.

Accuracy: $\pm 2\%$ of full scale ($\pm 3\%$ on - 0, -100 PA, -125 PA, 10MM and $\pm 4\%$ on - 00, -60PA, -6MM ranges), throughout range at 70°F (21.1°C).

Pressure Limits: -20" Hg to 15 psig.† (-0.677 bar to 1.034 bar); MP option: 35 psig (2.41 bar), HP option: 80 psig (5.52 bar).

Overpressure: Relief plug opens at approximately 25 psig (1.72 bar), standard gages only.

Temperature Limits: 20 to 140°F.* (-6.67 to 60°C).

Size: 4" (101.6 mm) Diameter dial face.

Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.

Process Connections: 1/8" female NPT duplicate high and low pressure taps - one pair side and one pair back.

Weight: 1 lb 2 oz (510 g).

Standard Accessories: Two 1/8" NPT plugs for duplicate pressure taps, two 1/8" pipe thread to rubber tubing adapter and three flush mounting adapters with screws.

*Low temperature models available as special option.

†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options at lower left.

Note: Scales available in any pressure units. Air Velocity and volumetric scales also can be specified.

Model Number	Range Inches of Water	Model Number	Range Zero Center Inches of Water	Dual Scale Air Velocity Units		Model Number	Range, Pascals	Dual Scale English/Metric Models		
				Model Number	Range in W.C. Velocity, F.P.M.			Model Number	Range, In. W.C.	Range, Pa or kPa
2000-00† • •	0-.25	2300-0† • •	.25-0-.25	2000-00AV† • •	0-.25/300-2000	2000-60PA† • •	0-60	2000-OD	0-0.5	0-125 Pa
2000-0† • •	0-.50	2301	.5-0-.5	2000-0AV† • •	0-.50/500-2800	2000-100PA† • •	0-100	2001D	0-1.0	0-250 Pa
2001	0-1.0	2302	1-0-1	2001AV	0-1.0/500-4000	2000-125PA† • •	0-125	2002D	0-2.0	0-500 Pa
2002	0-2.0	2304	2-0-2	2002AV	0-2.0/1000-5600	2000-250PA	0-250	2003D	0-3.0	0-750 Pa
2003	0-3.0	2310	5-0-5	2010AV	0-10/2000-12500	2000-300PA	0-300	2004D	0-4.0	0-1.0 kPa
2004	0-4.0	2320	10-0-10	For use with pitot tube.		2000-500PA	0-500	2006D	0-6.0	0-1.5 kPa
2005	0-5.0	2330	15-0-15			2000-750PA	0-750	2008D	0-8.0	0-2.0 kPa
2006	0-6.0							2010D	0-10	0-2.5 kPa
2008	0-8.0		Zero Center Ranges							
2010	0-10		2300-250PA	125-0-125						
2015	0-15		2300-500PA	250-0-250						
2020	0-20		2300-60PA	30-0-30						
2025	0-25		2300-100PA	50-0-50						
			2300-1200PA	60-0-60						

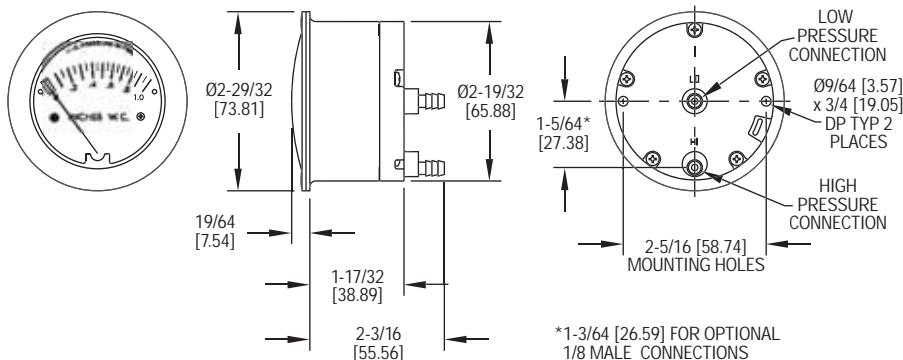
Series
2-5000

Minihelic® II Differential Pressure Gages

Combining High Accuracy, Compactness, and Dependability



Patent No. 4,347,744



Combining clean design, small size and low cost with enough accuracy for all but the most demanding applications our **Minihelic® II** gage offers the latest in design features for a dial type differential pressure gage. It is our most compact gage but is easy to read and can safely operate at total pressures up to 30 psig. The **Minihelic® II** gage is designed for panel mounting in a single 2 5/8" diameter hole. Standard pressure connections are barbed fittings for 3/16" I.D. tubing; optional 1/8" male NPT connections are also available. Over-pressure protection is built into the **Minihelic® II** gage by means of a blow-out membrane molded in conjunction with the diaphragm. Accidental over-ranging up to the rated total pressure will not damage the gage. With removable lens and rear housing, the gage may be easily serviced at minimum cost.

With the housing molded from mineral and glass filled nylon and the lens molded from polycarbonate, the gage will withstand rough use and exposure as well as high total pressure. The 5% accuracy and low cost of the **Minihelic® II** gage make it well-suited for a wide variety of OEM and user applications. OEM applications include cabinet air purging, medical respiratory therapy equipment, air samplers, laminar flow hoods, and electronic air cooling systems. As an air filter gage, the **Minihelic® II** gage finds many end use applications on large stationary engines, compressors, ventilators, and air handling units. The **Minihelic® II** gage is suitable for many of the same applications as the **Magnehelic®** gage where the greater accuracy, sensitivity, and higher and lower differential pressure ranges of the **Magnehelic®** gage are not required.

APPLICATIONS

- Room positive pressure sensing
- Local indication on filter status
- Face velocity on fume hood
- Duct pressures

SPECIFICATIONS

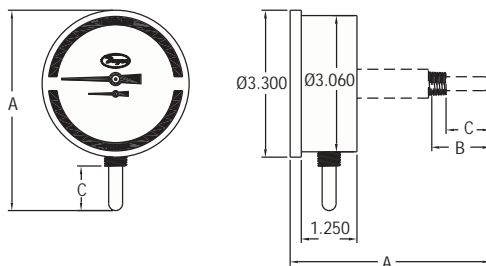
Service: Air and compatible gases.**Wetted Materials:** Consult factory.**Housing:** Glass filled nylon; polycarbonate lens.**Accuracy:** ±5% of full scale at 70°F (21.1°C).**Pressure Limits:** 30 psig (2.067 bar) continuous to either pressure connection.**Temperature Limits:** 20 to 120°F (-6.67 to 48.9°C).**Size:** 2-1/16" (52.39 mm) diameter dial face.**Mounting Orientation:** Diaphragm in vertical position. Consult factory for other position orientations.**Process Connections:** Barbed, for 3/16" I.D. tubing (standard); 1/8" male NPT (optional).**Weight:** 6 oz (170.1g).**CAUTION: FOR USE ONLY WITH AIR OR COMPATIBLE GASES.**

Model Number	Range, Inches of Water	Model Number	Range, PSI	Model Number	Range, MM of Water
2-5000-0	0-0.5	2-5205	0-5	2-5000-25MM	0-25
2-5001	0-1.0	2-5210	0-10	2-5000-50MM	0-50
2-5002	0-2.0	2-5215	0-15	2-5000-100MM	0-100
2-5003	0-3.0	*2-5230	0-30	Model Number	Range, Pascals
2-5005	0-5.0			2-5000-125Pa	0-125
2-5010	0-10			2-5000-250Pa	0-250
2-5020	0-20			2-5000-500Pa	0-500
2-5040	0-40			Model Number	Range, kPa
2-5060	0-60			2-5000-1 kPa	0-1
2-5100	0-100			2-5000-3 kPa	0-3
ACCESSORIES A-434 Portable Kit A-497 Surface Mtg. Brkt. A-609 Air Filter Kit		*THIS RANGE EMPLOYS SPIRALLY WOUND BERYLLIUM COPPER BOURDON TUBE POINTER DRIVE MECHANISM.			
		NOTE: CONSULT FACTORY REGARDING AVAILABILITY OF ADDITIONAL RANGES.			

For optional 1/8" male NPT connections, add suffix -NPT to model numbers listed above.
Example: 2-5001-NPT. No extra charge. Allow additional lead time.

Tridicator Gage

Combination Pressure/Temperature Gage



MODEL NO.	A	B	C
TRI-60-25E			
TRI-75-25E	4-1/2	1-21/64	1
TRI-100-25E	[114.3]	[33.74]	[25.4]
TRI-200-25E			
TRI-60-50			
TRI-75-50	5-15/64	3	2-39/64
TRI-100-50	[132.95]	[76.2]	[66.78]
TRI-200-50			
TRI-60-50L			
TRI-75-50L	6-43/64	2-13/16	2-3/8
TRI-100-50L	[169.47]	[71.44]	[60.33]
TRI-200-50L			

The Series TRI combines the value of an individual pressure gage and thermometer in one instrument. These tridicators simplify installation which reduces time and saves money. The moveable dial with blue pressure markings and red temperature markings make the instrument easy to read. Pressure is indicated in both psi and kPa, while temperature is measured in both Fahrenheit and Celsius. Series TRI comes in three different connection options including lower mount, center back mount, and center back mount with extension shank.

APPLICATIONS

- Boiler Monitoring

SPECIFICATIONS

Service: Compatible gases and liquids.

Wetted Materials: Brass connection and phosphor bronze Bourdon tube.

Housing: Drawn Steel, black finish.

Accuracy: Pressure $\pm 3-2-3\%$; Temperature ± 1 scale division.

Temperature Range: All models: 80 to 290°F (30 to 140°C).

Temperature Limits:

Ambient: -40 to 250°F (-40 to 120°C);

Process: 80 to 290°F (30 to 140°C).

Pressure Limits: Full scale range.

Size: 3" (76 mm).

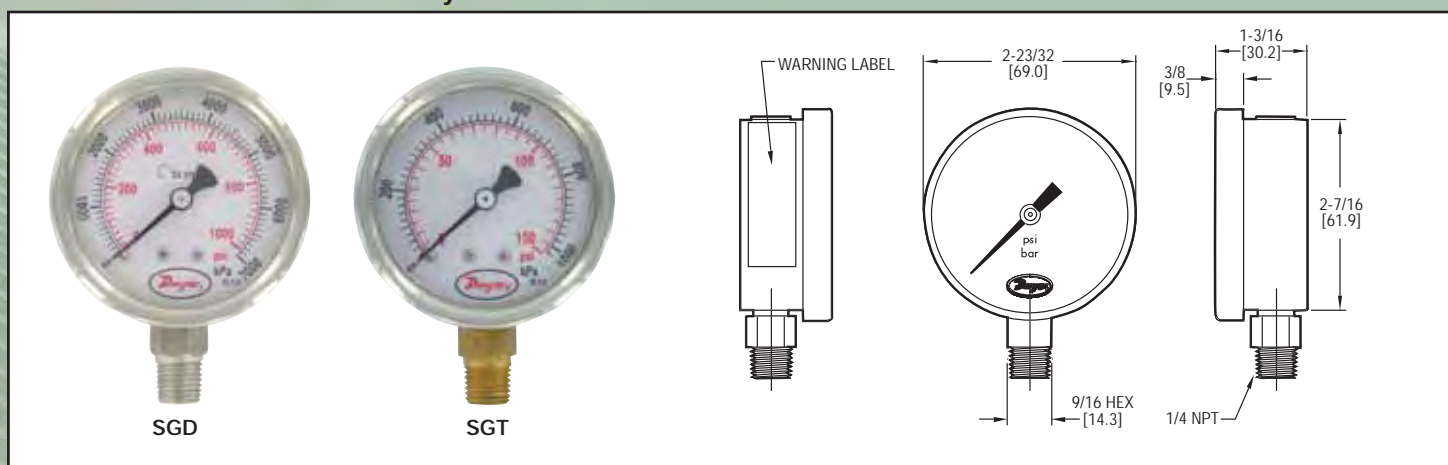
Process Connections: 1/2" male NPT back or bottom, 1/4" male NPT back connection.

Weight: 12.3 oz (348.7 g).

Model Number	Range	Connection
TRI-60-25E	0-60 psi (0-400 kPa)	1/4" NPT CBM (ext. shank)
TRI-75-25E	0-75 psi (0-500 kPa)	1/4" NPT CBM (ext. shank)
TRI-100-25E	0-100 psi (0-700 kPa)	1/4" NPT CBM (ext. shank)
TRI-200-25E	0-200 psi (0-1400 kPa)	1/4" NPT CBM (ext. shank)
TRI-60-50	0-60 psi (0-400 kPa)	1/2" NPT CBM
TRI-75-50	0-75 psi (0-500 kPa)	1/2" NPT CBM
TRI-100-50	0-100 psi (0-700 kPa)	1/2" NPT CBM
TRI-200-50	0-200 psi (0-1400 kPa)	1/2" NPT CBM
TRI-60-50L	0-60 psi (0-400 kPa)	1/2" NPT LM
TRI-75-50L	0-75 psi (0-500 kPa)	1/2" NPT LM
TRI-100-50L	0-100 psi (0-700 kPa)	1/2" NPT LM
TRI-200-50L	0-200 psi (0-1400 kPa)	1/2" NPT LM

2.5" Stainless Steel Industrial Pressure Gage

1.6% Full Scale Accuracy, 316 SS or Brass Wetted Parts



The Series SGD/SGT Gages have dual English/metric scales with $\pm 1.6\%$ full scale accuracy. The Series SGD/SGT gages are designed with 304 SS housings and 316 SS or brass wetted parts for excellent chemical compatibility. These gages cover a wide variety of ranges from full vacuum to 15,000 psi. Series SGD/SGT gages may be easily liquid filled in the field without the need for a separate kit.

APPLICATIONS

- Positive pressure in compressed air lines
- Water pressure in hot and cold lines

SPECIFICATIONS

Service: Compatible gases and liquids.

Wetted Materials: SGD: 316 SS;
SGT: Brass.

Housing: 304 SS.

Lens: Plexi-glass.

Accuracy: $\pm 1.6\%$ full scale.

Pressure Limit: 130% full scale for ranges <6000 psi, 115% for 6000 psi and greater.

Temperature Limits: SGD:

Ambient: -4 to 149°F (-25 to 65°C),
Process: 518°F max. (270°C max.);
SGT: Ambient: -4 to 140°F (-20 to 60°C),
Process: 248°F max. (120°C max.).

Size: 2.5" (63 mm).

Process Connections: 1/4" male NPT.

Enclosure Rating: NEMA 3 (IP55).

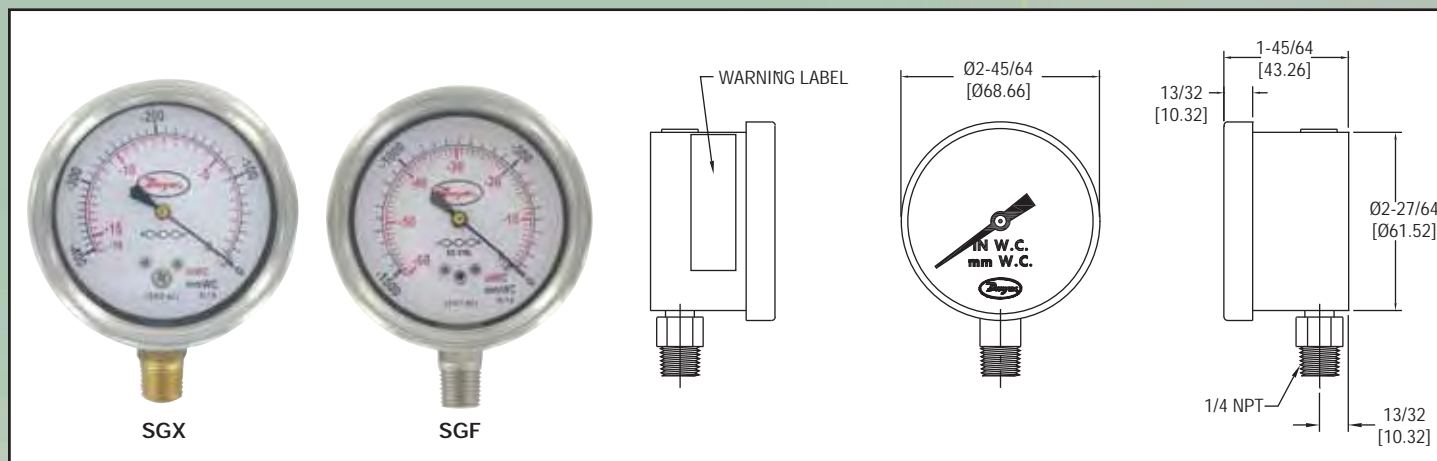
Weight: 4.6 oz (0.13 kg).

316SS Gages		Brass Gages	
Model Number	Range	Model Number	Range
SGD-D0122N	30" Hg-0 (-100-0 kPa)	SGT-D0122N	30" Hg-0 (-100-0 kPa)
SGD-D0222N	0-15 psi (0-100 kPa)	SGT-D0222N	0-15 psi (0-100 kPa)
SGD-D0322N	0-30 psi (0-200 kPa)	SGT-D0322N	0-30 psi (0-200 kPa)
SGD-D0422N	0-60 psi (0-400 kPa)	SGT-D0422N	0-60 psi (0-400 kPa)
SGD-D0522N	0-100 psi (0-700 kPa)	SGT-D0522N	0-100 psi (0-700 kPa)
SGD-D0622N	0-150 psi (0-1000 kPa)	SGT-D0622N	0-150 psi (0-1000 kPa)
SGD-D0722N	0-200 psi (0-1400 kPa)	SGT-D0722N	0-200 psi (0-1400 kPa)
SGD-D0822N	0-300 psi (0-2000 kPa)	SGT-D0822N	0-300 psi (0-2000 kPa)
SGD-D0922N	0-400 psi (0-2800 kPa)	SGT-D0922N	0-400 psi (0-2800 kPa)
SGD-D1022N	0-500 psi (0-3400 kPa)	SGT-D1022N	0-500 psi (0-3400 kPa)
SGD-D1122N	0-600 psi (0-4000 kPa)	SGT-D1122N	0-600 psi (0-4000 kPa)
SGD-D1222N	0-1000 psi (0-7000 kPa)	SGT-D1222N	0-1000 psi (0-7000 kPa)
SGD-D1322N	0-1500 psi (0-10 MPa)	SGT-D1322N	0-1500 psi (0-10 MPa)
SGD-D1422N	0-2000 psi (0-14 MPa)	SGT-D1422N	0-2000 psi (0-14 MPa)
SGD-D1522N	0-3000 psi (0-20 MPa)	SGT-D1522N	0-3000 psi (0-20 MPa)
SGD-D1622N	0-4000 psi (0-28 MPa)	SGT-D1622N	0-4000 psi (0-28 MPa)
SGD-D1722N	0-5000 psi (0-34 MPa)	SGT-D1722N	0-5000 psi (0-34 MPa)
SGD-D1822N	0-6000 psi (0-40 MPa)	SGT-D1822N	0-6000 psi (0-40 MPa)
SGD-D2122N	30" Hg-0-15 psi (-100-0-100 kPa)	SGT-D2122N	30" Hg-0-15 psi (-100-0-100 kPa)
SGD-D2222N	30" Hg-0-30 psi (-100-0-200 kPa)	SGT-D2222N	30" Hg-0-30 psi (-100-0-200 kPa)
SGD-D2322N	30" Hg-0-60 psi (-100-0-400 kPa)	SGT-D2322N	30" Hg-0-60 psi (-100-0-400 kPa)
SGD-D2422N	30" Hg-0-100 psi (-100-0-700 kPa)	SGT-D2422N	30" Hg-0-100 psi (-100-0-700 kPa)
SGD-D2522N	30" Hg-0-150 psi (-100-0-1000 kPa)	SGT-D2522N	30" Hg-0-150 psi (-100-0-1000 kPa)
SGD-D2622N	30" Hg-0-200 psi (-100-0-1400 kPa)	SGT-D2622N	30" Hg-0-200 psi (-100-0-1400 kPa)
SGD-D2722N	30" Hg-0-300 psi (-100-0-2000 kPa)	SGT-D2722N	30" Hg-0-300 psi (-100-0-2000 kPa)

Note: To order with glycerin fill add -PY to the end of the model.

2.5" Stainless Steel Low Pressure Gages

Brass or 316 SS Wetted Parts



The Series SGX/SGF Gages have dual English/metric scales with $\pm 1.6\%$ full scale accuracy. The Series SGX/SGF gages are designed with 304 SS housing and brass or 316 SS wetted parts. Units can withstand ambient temperatures up to 149°F (65°C) and process temperatures up to 212°F (100°C). Ranges of vacuum, compound and pressures to 235 inches w.c. are available. Included on the dial is a convenient zero adjustment screw which allows the user to easily re-zero the needle.

SPECIFICATIONS

Service: Compatible gases & liquids.

Wetted Materials: SGX: Brass; SGF: 316/316L-SS.

Housing: 304 SS.

Lens: Glass.

Accuracy: $\pm 1.6\%$ full scale on positive pressure ranges 15" w.c. and greater. $\pm 2.5\%$ full scale on all other ranges.

Pressure Limit: Full scale value.

Temperature Limits:

Ambient: -13 to 149°F (-25 to 65°C);

Process: 212°F max. (100°C max.).

Size: 2.5" (63 mm).

Process Connections: 1/4" male NPT.

Enclosure Rating: NEMA 3 (IP55).

Weight: 4.6 oz (0.13 kg).

APPLICATIONS

Pneumatic, draft measurement, filter monitoring, liquid level

Brass Gages		316SS Gages	
Model Number	Range	Model Number	Range
SGX-D7122N	-10-0 in. w.c. (-250-0 mm)	SGF-D7122N	-10-0 in. w.c. (-250-0 mm)
SGX-D7222N	-15-0 in. w.c. (-400-0 mm)	SGF-D7222N	-15-0 in. w.c. (-400-0 mm)
SGX-D7322N	-25-0 in. w.c. (-600-0 mm)	SGF-D7322N	-25-0 in. w.c. (-600-0 mm)
SGX-D7422N	-40-0 in. w.c. (-1000-0 mm)	SGF-D7422N	-40-0 in. w.c. (-1000-0 mm)
SGX-D7522N	-60-0 in. w.c. (-1600-0 mm)	SGF-D7522N	-60-0 in. w.c. (-1600-0 mm)
SGX-D7622N	-80-0 in. w.c. (-2000-0 mm)	SGF-D7622N	-80-0 in. w.c. (-2000-0 mm)
SGX-D7722N	-100-0 in. w.c. (-2500-0 mm)	SGF-D7722N	-100-0 in. w.c. (-2500-0 mm)
SGX-D7822N	-160-0 in. w.c. (-4000-0 mm)	SGF-D7822N	-160-0 in. w.c. (-4000-0 mm)
SGX-D7922N	-235-0 in. w.c. (-6000-0 mm)	SGF-D7922N	-235-0 in. w.c. (-6000-0 mm)
SGX-D8022N	0-10 in. w.c. (0-250 mm)	SGF-D8022N	0-10 in. w.c. (0-250 mm)
SGX-D8122N	0-15 in. w.c. (0-400 mm)	SGF-D8122N	0-15 in. w.c. (0-400 mm)
SGX-D8222N	0-25 in. w.c. (0-600 mm)	SGF-D8222N	0-25 in. w.c. (0-600 mm)
SGX-D8322N	0-40 in. w.c. (0-1000 mm)	SGF-D8322N	0-40 in. w.c. (0-1000 mm)
SGX-D8422N	0-60 in. w.c. (0-1600 mm)	SGF-D8422N	0-60 in. w.c. (0-1600 mm)
SGX-D8522N	0-80 in. w.c. (0-2500 mm)	SGF-D8622N	0-100 in. w.c. (0-2500 mm)
SGX-D8722N	0-160 in. w.c. (0-4000 mm)	SGF-D8722N	0-160 in. w.c. (0-4000 mm)
SGX-D8822N	0-235 in. w.c. (0-6000 mm)	SGF-D8822N	0-235 in. w.c. (0-6000 mm)
SGX-D8922N	-4-0-6 in. w.c. (-100-0-150 mm)	SGF-D8922N	-4-0-6 in. w.c. (-100-0-150 mm)
SGX-D9022N	-6-0-10 in. w.c. (-150-0-250 mm)	SGF-D9022N	-6-0-10 in. w.c. (-150-0-250 mm)
SGX-D9122N	-8-0-16 in. w.c. (-200-0-400 mm)	SGF-D9122N	-8-0-16 in. w.c. (-200-0-400 mm)
SGX-D9222N	-16-0-24 in. w.c. (-400-0-600 mm)	SGF-D9222N	-16-0-24 in. w.c. (-400-0-600 mm)
SGX-D9322N	-24-0-40 in. w.c. (-600-0-1000 mm)	SGF-D9322N	-24-0-40 in. w.c. (-600-0-1000 mm)
SGX-D9422N	-30-0-50 in. w.c. (-800-0-1200 mm)	SGF-D9422N	-30-0-50 in. w.c. (-800-0-1200 mm)
SGX-D9522N	-40-0-60 in. w.c. (-1000-0-1500 mm)	SGF-D9522N	-40-0-60 in. w.c. (-1000-0-1500 mm)
SGX-D9622N	-60-0-100 in. w.c. (-1500-0-2500 mm)	SGF-D9622N	-60-0-100 in. w.c. (-1500-0-2500 mm)
SGX-D9722N	-80-0-160 in. w.c. (-2000-0-4000 mm)	SGF-D9722N	-80-0-160 in. w.c. (-2000-0-4000 mm)

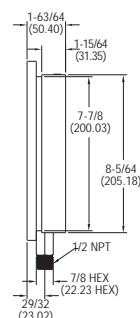
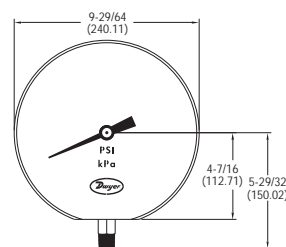
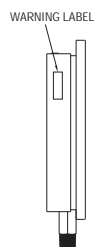
Series
SGK

8" & 10" Stainless Steel Pressure Gage

1.0% Full Scale Accuracy, 316L SS Wetted Parts



WARNING LABEL



The **Series SGK Gages** have dual English/metric scales with $\pm 1\%$ full scale accuracy. Series SGK gages are designed with 304 SS housings and 316L SS wetted parts. Units can withstand ambient temperatures up to 149°F (65°C) and process temperatures up to 518°F (270°C). SGK-I models have 8" dial faces while the SGK-J models have large 10" dial faces. A wide selection of ranges are available from full vacuum, compound to 15,000 psi.

APPLICATIONS

- Boiler pressures
- Pumps
- Diesel engine power generators

SPECIFICATIONS

Service: Compatible gases and liquids.

Wetted Materials: 316L SS.

Housing: 304 SS.

Lens: Glass.

Accuracy: $\pm 1\%$ full scale, ANSI B40.1 Grade 1A.

Pressure Limit: 130% full scale for ranges <10,000 psi; 115% for 10,000 psi and greater.

Temperature Limit:

Ambient: -4 to 149°F (-20 to 65°C);

Process: 518°F max. (270°C max.).

Size: 8" (200 mm); 10" (250 mm).

Process Connection: 1/2" male NPT.

Enclosure Rating: NEMA 3 (IP55).

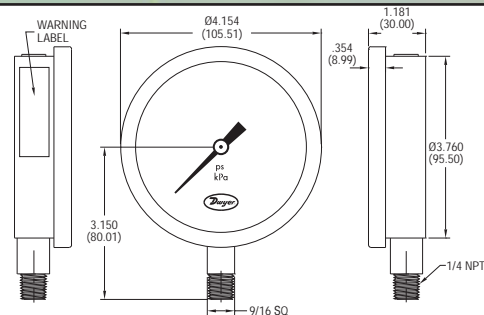
Weight: 8": 3.1 lb (1.42 kg); 10": 4.7 lb (2.12 kg).

Model Number*	Range	Model Number*	Range	Model Number	Range
SGK-I0124N	30" Hg-0 (-100-0 kPa)	SGK-I0924N	0-400 psi (0-2800 kPa)	SGK-I1724N	0-5000 psi (0-34 MPa)
SGK-I0224N	0-15 psi (0-100 kPa)	SGK-I1024N	0-500 psi (0-3400 kPa)	SGK-I1824N	0-6000 psi (0-40 MPa)
SGK-I0324N	0-30 psi (0-200 kPa)	SGK-I1124N	0-600 psi (0-4000 kPa)	SGK-I1924N	0-10000 psi (0-70 MPa)
SGK-I0424N	0-60 psi (0-400 kPa)	SGK-I1224N	0-1000 psi (0-7000 kPa)	SGK-I2324N	30" Hg-0-60 psi (-100-0-400 kPa)
SGK-I0524N	0-100 psi (0-700 kPa)	SGK-I1324N	0-1500 psi (0-10 MPa)	SGK-I2424N	30" Hg-0-100 psi (-100-0-700 kPa)
SGK-I0624N	0-150 psi (0-1000 kPa)	SGK-I1424N	0-2000 psi (0-14 MPa)	SGK-I2524N	30" Hg-0-150 psi (-100-0-1000 kPa)
SGK-I0724N	0-200 psi (0-1400 kPa)	SGK-I1524N	0-3000 psi (0-20 MPa)	SGK-I2624N	30" Hg-0-200 psi (-100-0-1400 kPa)
SGK-I0824N	0-300 psi (0-2000 kPa)	SGK-I1624N	0-4000 psi (0-28 MPa)	SGK-I2724N	30" Hg-0-300 psi (-100-0-2000 kPa)

* For 10" dial gages change above models from SGK-I to SGK-J.

4" Plastic Utility Gage

Ideal for HVAC Applications



The economical Series UGB gages are ideal for air and chilled water usage typically found in refrigeration and HVAC applications. The UGB gages are enclosed in a plastic case that will not corrode or rust and contains brass wetted parts. UGB gages have dual English/metric scales with a $\pm 2.5\%$ accuracy. A wide variety of ranges are available from full vacuum, compound to 15,000 psi.

APPLICATION

- Perfect for air, water, refrigeration & HVAC applications

SPECIFICATIONS

Service: Compatible gases & liquids.

Wetted Materials: Brass.

Housing: Plastic.

Lens: Glass.

Accuracy: 2.5% between 10 to 90% of span.

Pressure Limits: Full scale range.

Temperature Limits: Ambient: -4 to 140°F (-20 to 60°C); Process: Maximum 248°F (120°C).

Size: 4" (100 mm).

Process Connection: 1/4" male NPT.

Weight: 9.6 oz (272 g).

Model Number	Range	Model Number	Range
UGB-F0122N	30" Hg-0 (-100-0 kPa)	UGB-F1422N	0-2000 psi (0-14 MPa)
UGB-F0222N	0-15 psi (0-100 kPa)	UGB-F1522N	0-3000 psi (0-20 MPa)
UGB-F0322N	0-30 psi (0-200 kPa)	UGB-F1622N	0-4000 psi (0-28 MPa)
UGB-F0422N	0-60 psi (0-400 kPa)	UGB-F1722N	0-5000 psi (0-34 MPa)
UGB-F0522N	0-100 psi (0-700 kPa)	UGB-F1822N	0-6000 psi (0-40 MPa)
UGB-F0622N	0-150 psi (0-1000 kPa)	UGB-F2122N	30" Hg-0-15 psi (-100-0-100 kPa)
UGB-F0722N	0-200 psi (0-1400 kPa)	UGB-F2222N	30" Hg-0-30 psi (-100-0-200 kPa)
UGB-F0822N	0-300 psi (0-2000 kPa)	UGB-F2322N	30" Hg-0-60 psi (-100-0-400 kPa)
UGB-F0922N	0-400 psi (0-2800 kPa)	UGB-F2422N	30" Hg-0-100 psi (-100-0-700 kPa)
UGB-F1022N	0-500 psi (0-3400 kPa)	UGB-F2522N	30" Hg-0-150 psi (-100-0-1000 kPa)
UGB-F1122N	0-600 psi (0-4000 kPa)	UGB-F2622N	30" Hg-0-200 psi (-100-0-1400 kPa)
UGB-F1222N	0-1000 psi (0-7000 kPa)	UGB-F2722N	30" Hg-0-300 psi (-100-0-2000 kPa)
UGB-F1322N	0-1500 psi (0-10 MPa)		

Sprinkler Gage

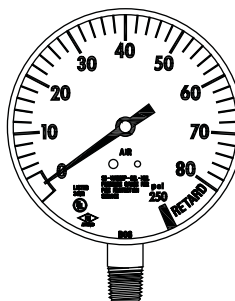
UL and FM Approved for Fire Protection Systems



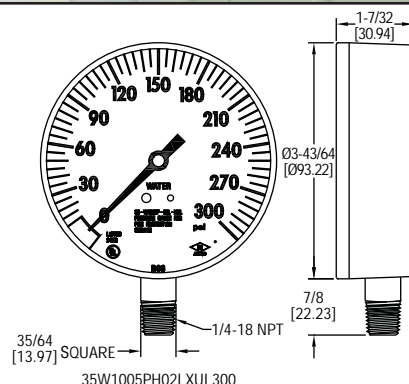
35W1005PH02LXUL100



35W1005PH02LXUL300



35W1005PH02LXUL100



35W1005PH02LXUL300

Series 35W Fire Protection, Sprinkler Service Gage is Underwriters Laboratory listed and Factory Mutual approved for fire protection sprinkler service. This gage features a corrosion-resistant ABS case and heat-resistant polycarbonate push-in window. In addition, it also features a movement that is designed to provide shock and vibration resistance that results in superior performance and extended gauge life. The 0-300 psi pressure range is used on "wet" systems where water is available to the sprinkler heads. The 0-80 retard to 250 psi pressure range is used on dry systems where the lines are filled with air pressure until system activation.

ASME B 40.1 Grade B ($\pm 3-2-3\%$ of span)	
Model Number	Range
35W1005PH02LXUL100	80 psi
35W1005PH02LXUL300	300 psi

SPECIFICATIONS

Service: The 0-300 psi pressure range is used on "wet" systems where water is available to the sprinkler heads. The 0-80 retard to 250 psi pressure range is used on dry systems where the lines are filled with air pressure until system activation.

Wetted Material: Brass socket and "C" shaped bronze Bourdon tube.

Housing: Black-painted ABS case with clear polycarbonate window.

Accuracy: ASME B 40.1 Grade B ($\pm 3-2-3\%$ of span).

Pressure Limit: Max pressure for 0/300 psi: 300 psi. Max pressure for 80 psi: 80 psi with overload protection to 250 psi.

Temperature Limit: -40 to 150°F (-40 to 65.5°C).

Size: 3-1/2" Dial face.

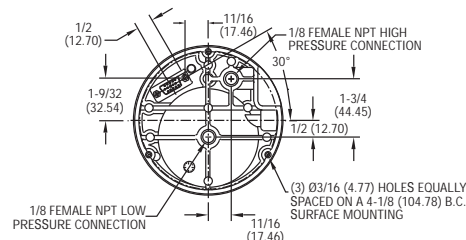
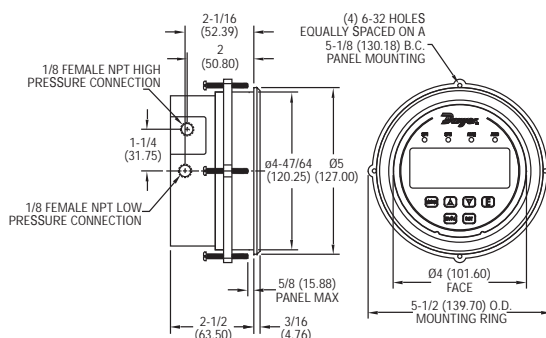
Process Connections: 1/4" NPT male.

Weight: 6.8 oz (192.78 g).

Agency Approval: UL, FM.

Digihelic® Differential Pressure Controller

Digihelic® Controller in Photohelic® Gage, Square Root Output for Flow



The Series DH3 Digihelic® Differential Pressure Controller is a 3 in 1 instrument possessing a digital display gage, control relay switches, and a transmitter with current output all packed in the popular Photohelic® gage style housing. Combining these 3 features allows the reduction of several instruments with one product, saving inventory, installation time and money. The Digihelic® controller is the ideal instrument for pressure, velocity and flow applications, achieving a 1% full scale accuracy on ranges down to the extremely low 0.25" w.c. to 2.5" w.c. full scale. Ranges of 5" w.c. and greater maintain 0.5% F.S. accuracy. Bi-directional ranges are also available.

The Series DH3 Digihelic® controller allows the selection of pressure, velocity or volumetric flow operation in several commonly used engineering units. 2 SPDT control relays with adjustable deadbands are provided along with a scalable 4-20 mA process output.

Programming is easy using the menu key to access 5 simplified menus which provide access to: security level; selection of pressure, velocity or flow operation; selection of engineering units; K-factor for use with flow sensors; rectangular or circular duct for inputting area in flow applications; set point control or set point and alarm operation; alarm operation as a high, low or high/low alarm; automatic or manual alarm reset; alarm delay; view peak and valley process reading; digital damping for smoothing erratic process applications; scaling the 4-20 mA process output to fit your applications range and field calibration. See applications below for some popular uses.

APPLICATIONS

- SCFM flow in ducts
- Filter status
- Static pressures in ducts or buildings
- Damper control
- Fan control

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.

Wetted Materials: Consult factory.

Housing Material: Die cast aluminum case and bezel.

Accuracy: < 5" w.c. (except ± 2.5 " w.c.): $\pm 1\%$; All other ranges: $\pm 0.5\%$ at 77°F (25°C) including hysteresis and repeatability (after 1 hour warm-up).

Stability: < $\pm 1\%$ per year.

Pressure Limits: Ranges ≤ 2.5 " w.c.: 25 psi; ± 2.5 ", 5" w.c.: 5 psi; 10" w.c.: 5 psi; 25" w.c.: 5 psi; 50" w.c.: 5 psi; 100" w.c.: 9 psi.

Temperature Limits: 32 to 140°F (0 to 60°C).

Compensated Temperature Limits: 32 to 140°F (0 to 60°C).

Thermal Effects: 0.020%/°F (0.036/°C) from 77°F (25°C).

Power Requirements: 12-24 VAC/VDC.

Power Consumption: 3 VA max.

Output Signal: 4-20 mA DC into 900 ohms max.

Zero & Span Adjustments: Accessible via menus.

Response Time: 250 ms (damping set to 1).

Display: Backlit 4 digit LCD 0.4" height LED indicators for set point and alarm status.

Electrical Connections: 15 pin male high density D-Sub connection. 18" (46 cm) cable with 10 conductors included.

Process Connections: 1/8" female NPT. Side or back connections.

Mounting Orientation: Mount unit in vertical plane.

Size: 5" (127 mm) O.D. x 3-1/8" (79.38 mm).

Weight: 1.75 lbs. (794 g).

Agency Approvals: CE.

SWITCH SPECIFICATIONS

Switch Type: 2 SPDT relays.

Electrical Rating: 1 amp @ 30 VAC/VDC.

Set Point Adjustment: Adjustable via keypad on face.

ACCESSORIES

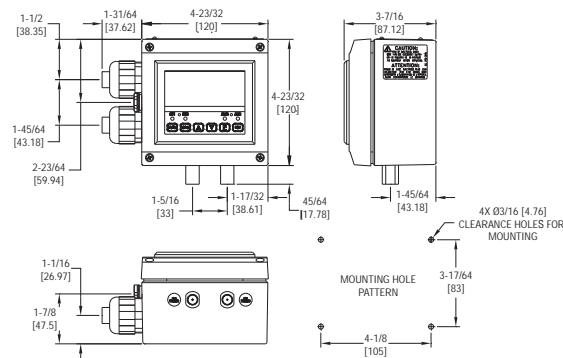
A-298 Flat Aluminum Bracket, for flush mounting.

A-370 Mounting Bracket, flush mount bracket. Bracket is then surface mounted. Steel with gray hammertone epoxy finish.

Model	Ranges
DH3-002	0-0.25" w.c.
DH3-003	0-0.5" w.c.
DH3-004	0-1" w.c.
DH3-005	0-2.5" w.c.
DH3-006	0-5" w.c.
DH3-007	0-10" w.c.
DH3-009	0-25" w.c.
DH3-010	0-50" w.c.
DH3-011	0-100" w.c.
DH3-013	0.25-0-0.25" w.c.
DH3-014	0.5-0-0.5" w.c.
DH3-015	1-0-1" w.c.
DH3-016	2.5-0-2.5" w.c.
DH3-017	5-0-5" w.c.
DH3-018	10-0-10" w.c.

Digihelic® II Differential Pressure Controller

NEMA 4 (IP66) Housing With Large, Bright LCD



The Digihelic® II Controller just got better with the New Series DHII Differential Pressure Controller. The DHII takes all the fabulous features of the standard Digihelic® Pressure Controller and packages them in a robust NEMA 4 (IP66) housing.

The Digihelic® II Pressure Controller combines the 2 SPDT control relays, 4-20 mA process output and Modbus® communications with a large, brightly backlit 4 digit LCD display that can easily be seen from long distances. The electrical wiring has also been enhanced in the DHII with its detachable terminal blocks. The removable terminals allow the installer to easily wire the terminal block outside the housing and then attach to the circuit board, reducing wiring difficulties and installation time in the process.

The Digihelic® II Differential Pressure Control in the new NEMA 4 (IP66) enclosure enables this product to be the perfect choice when mounting pressure controls outdoors in such applications as rooftop air handlers. This housing also makes it the ideal solution for surface mounting in clean rooms or facilities where water or a cleaning solution is utilized in maintaining plant cleanliness.

APPLICATIONS

- Air handlers
- Clean rooms

ACCESSORIES

351-9, Mother Node™ silver RS-232 to RS-485 Converter with DB9F Connector.

Includes 120 VAC to 12 VDC adapter

MN-1, Mini-Node™ USB/RS-485 converter

A-438, Surface Mounting Brackets

Digihelic® Links Communications Software

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.

Wetted Materials: Consult factory.

Housing Material: Aluminum, glass.

Accuracy: $\pm 0.5\%$ at 77°F (25°C) including hysteresis and repeatability (after 1 hour warm-up).

Stability: $< \pm 1\%$ per year.

Pressure Limits: Ranges ≤ 2.5 in. w.c. = 2 psi 5": 5 psi; 10": 5 psi; 25": 5 psi; 50": 5 psi, 100": 9 psi.

Temperature Limits: 32 to 140°F (0 to 60°C).

Compensated Temperature Limits: 32 to 140°F (0 to 60°C).

Thermal Effects: 0.020%/°F (0.036/°C) from 77°F (25°C).

Power Requirements:

High Voltage Power = 100 to 240 VAC, 50 to 400 Hz or 132 to 240 VDC.

Low Voltage Power = 24 VDC $\pm 20\%$.

Power Consumption:

Low Voltage Power = 24 VDC - 130 mA max.

High Voltage Power = 100 to 240 VAC, 132 to 240 VDC - 7VA max.

Output Signal: 4-20 mA DC into 900 ohms max.

Zero & Span Adjustments:

Accessible via menus.

Response Time: 250 ms (dampening set to 1).

Display: 4 digit backlit LCD 0.6" height. LED indicators for set point and alarm status.

Electrical Connections: Euro type removable terminal blocks with watertight conduit fittings for 1/2" watertight conduit.

Process Connections: 1/8" female NPT.

Enclosure Rating: Designed to meet NEMA 4 (IP66).

Mounting Orientation: Mount unit in horizontal plane.

Size: 4.73" x 4.73" x 3.43" (120 mm x 120 mm x 87.1 mm).

Weight: 2 lb 10 oz (1.19 kg).

Serial Communications: Modbus® RTU, RS485, 9600 Baud.

Agency Approvals: CE, UL.

SWITCH SPECIFICATIONS

Switch Type: 2 SPDT relays.

Electrical Rating: 8 Amps at 240 VAC resistive.

Set Point Adjustment:

Adjustable via keypad on face.

Modbus® is a registered trademark of Schnieder Automation.

Available Pressure Engineering Units

Model No.	in. wc	ft. wc	mm wc	cm wc	psi	in. Hg	mm Hg	mbar	Pa	kPa	hPa	oz. in ² .
DHII-002	.2500		6.350	0.635			0.467	0.623	62.28		0.623	0.114
DHII-004	1.000		25.40	2.540			1.868	2.491	249.1	0.249	2.491	0.578
DHII-006	5.000	.4167	127.0	12.70	.1806	.3678	9.342	12.45	1245	1.245	12.45	2.890
DHII-007	10.00	.8333	254.0	25.40	.3613	.7356	18.68	24.91	2491	2.491	24.91	5.780
DHII-008	25.00	2.083	635.0	63.50	.9032	1.839	46.71	62.27	6227	6.227	62.27	14.45
DHII-009*	50.00	4.167	1270	127.0	1.806	3.678	93.42	124.5		12.45	124.5	28.90
DHII-010*	100.0	8.333	2540	254.0	3.613	7.356	186.8	249.1		24.91	249.1	57.80

Bi-Directional* Ranges also available: DHII-012 Range: 0.25 - 0 - 0.25" w.c.

DHII-014 Range: 1.0 - 0 - 1.0" w.c.

DHII-015 Range: 2.5 - 0 - 2.5" w.c.

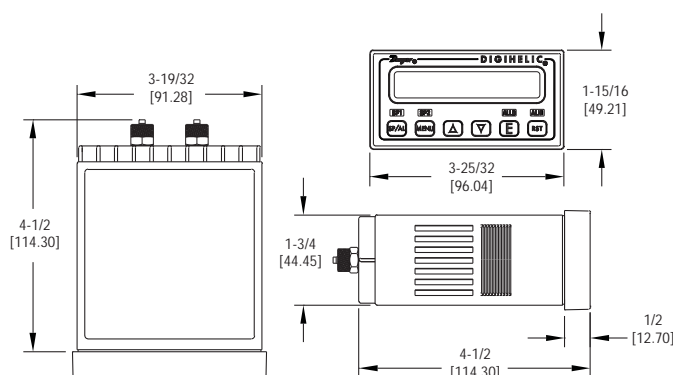
DHII-016 Range: 5 - 0 - 5" w.c.

DHII-017 Range: 10 - 0 - 10" w.c.

*Velocity and volumetric flow not available on bi-directional range units and models DHII-009 & DHII-010.

Digihelic® Differential Pressure Controller

3-in-1 Instrument: Gage, Switch and Transmitter



The Series DH Digihelic® Differential Pressure Controller is a 3-in-1 instrument possessing a digital display gage, control relay switches, and a transmitter with current output. Combining these three features allows the reduction of several instruments with one product, saving inventory, installation time and money. The Digihelic® Controller is the ideal instrument for pressure, velocity and flow applications, achieving a 0.5% full scale accuracy on ranges from 5 to 100 in. w.c.

The Digihelic® Controller allows the selection of pressure, velocity or volumetric flow operation in several commonly used engineering units. Two SPDT control relays with adjustable dead bands are provided along with a scalable 4-20 mA process output. The Series DH provides extreme flexibility in power usage by allowing 120/220 VAC and also 24 VDC power which is often used in control panels.

Programming is easy using the menu key to access five simplified menus which provide access to: security level; selection of pressure, velocity or flow operation; selection of engineering units; K-factor for use with flow sensors; rectangular or circular duct for inputting area in flow applications; set point control or set point and alarm operation; alarm operation as a high, low or high/low alarm; automatic or manual alarm reset; alarm delay; view peak and valley process readings; digital damping for smoothing erratic process applications; scaling the 4-20mA process output to fit your application's range; Modbus® communications; and field calibration.

With all this packed into one product it is easy to see why the Digihelic® Controller is the only instrument you will need for all your pressure applications.

APPLICATIONS

- SCFM flow in ducts
- Filter status
- Clean room pressure
- Fume hood Air Flow
- Medical room pressures
- Static pressures in ducts or buildings
- Damper control
- Fan control

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.

Wetted Materials: Consult factory.

Housing Material: ABS plastic, UL approved 94-V-0.

Accuracy: $\pm 0.5\%$ at 77°F (25°C) including hysteresis and repeatability.

Stability: $< \pm 1\%$ per year.

Pressure Limits: Ranges ≤ 2.5 in. w.c. = 2 psi 5": 5 psi; 10": 5 psi; 25": 5 psi; 50": 5 psi, 100": 9 psi.

Temperature Limits: 32 to 140°F (0 to 60°C).

Compensated Temperature Limits: 32 to 140°F (0 to 60°C).

Thermal Effects: 0.020%/°F (0.036/°C) from 77°F (25°C).

Power Requirements: High Voltage Power = 100 to 240 VAC, 50 to 400 Hz or 132 to 240 VDC. Low Voltage Power = 24 VDC $\pm 20\%$.

Power Consumption:

Low Voltage Power = 24 VDC - 130 mA max.

High Voltage Power = 100 to 240 VAC, 132 to 240 VDC - 7VA max.

Output Signal: 4-20 mA DC into 900 ohms max.

Zero & Span Adjustments: Accessible via menus.

Response Time: 250 ms.

Display: 4 digit LCD 0.4" height. LED indicators for set point and alarm status.

Electrical Connections: Screw terminals.

Process Connections: Compression fitting for use with 1/8" ID X 1/4" OD tubing (3.175 mm ID x 6.35 mm OD).

Enclosure Rating: Face designed to meet NEMA 4X (IP66).

Mounting Orientation: Mount unit in horizontal plane.

Size: 1/8 DIN.

Panel Cutout: 1.772 x 3.620 in (45 x 92 mm).

Weight: 14.4 oz. (408 g).

Serial Communications: Modbus® RTU, RS485, 9600 Baud.

Agency Approvals: CE, UL.

SWITCH SPECIFICATIONS

Switch Type: 2 SPDT relays.

Electrical Rating: 8 Amps at 240 VAC resistive.

Set Point Adjustment: Adjustable via keypad on face.

Modbus® is a registered trademark of Schneider Automation.

One Control for all your Pressure Applications

Reduces Instruments, Inventory, Installation Time and Cost

Compact 1/8 DIN housing reduces panel space.

Set Point Status LED Indicators display set point activation. Allows user to view process status from a distance.

"Hot Key" saves time by allowing instant access to set point and alarms. Set points/alarms can be easily adjusted with arrow keys.

Menu Key Scrolls through menus to adjust settings. 5 simple menus allow for quick set-up and reduced installation time.

Adjustable clip for panel mounting.

Set point 2 or alarm output (SPDT). Selectable direct acting control relay with adjustable deadband or high, low or high low alarm.

4-20 mA process output. View process remotely or send signal to PLC. Alleviates purchase of a separate transmitter.

24 VDC power supply. Universal power supply eliminates options, inventory and ordering mistakes.

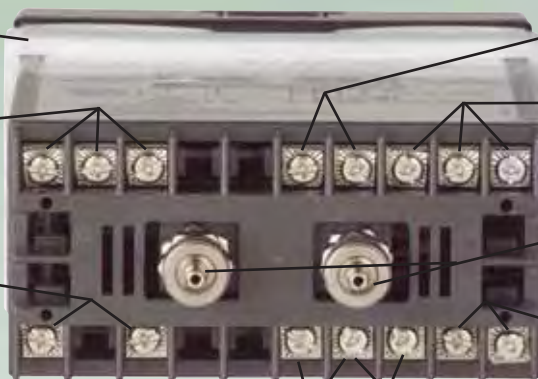


Selectable Engineering Units in Pressure, Velocity or Flow, programmed on one unit. Alleviates time consuming conversions and flow charts.

Alarm LED Indicator shows alarm activation status. View alarm status from a distance.

Reset button for clearing an alarm when alarm is set for manual operation.

Enter a menu or store a value. From home display press to view full scale range.



120-240 VAC power supply. Reduce inventory and eliminate lead times with universal power supply.

Set point 1 output (SPDT). Direct or reverse acting control relay with adjustable deadband.

Durable compression fittings for 1/4" O.D. x 1/8" I.D. plastic tubing. Secures tubing in harsh applications where vibration & temperature fluctuations occur.

RS-485 serial communications. View, record, and adjust control settings remotely from a computer with Modbus[®] protocol.

Remote reset switch for alarm. Acknowledge alarm from remote location. For users that need quick alarm reset from a distance.

Available Pressure Engineering Units

Model No.	in. wc	ft. wc	mm wc	cm wc	psi	in. Hg	mm Hg	mbar	Pa	kPa	hPa	oz./in. ²
DH-002	.2500		6.350	0.635			0.467	0.623	62.28		0.623	0.144
DH-004	1.000		25.40	2.540			1.868	2.491	249.1	0.249	2.491	0.578
DH-006	5.000	.4167	127.0	12.70	.1806	.3678	9.342	12.45	1245	1.245	12.45	2.890
DH-007	10.00	.8333	254.0	25.4	.3613	.7356	18.68	24.91	2491	2.491	24.91	5.780
DH-008	25.00	2.083	635.0	63.50	.9032	1.839	46.71	62.27	6227	6.227	62.27	14.45
DH-009*	50.00	4.167	1270	127.0	1.806	3.678	93.42	124.5		12.45	124.5	28.90
DH-010*	100.0	8.333	2540	254.0	3.613	7.356	186.8	249.1		24.91	249.1	57.80

Bi-Directional* Ranges also available: DH-012 Range: 0.25 - 0 - 0.25" w.c.

DH-014 Range: 1.0 - 0 - 1.0" w.c.

DH-015 Range: 2.5 - 0 - 2.5" w.c.

DH-016 Range: 5 - 0 - 5" w.c.

DH-017 Range: 10 - 0 - 10" w.c.

*Velocity and volumetric flow not available on bi-directional range units and models DH-009 & DH-010.

ACCESSORIES

The Mother Node[™] and Mini-Node[™] converters are an easy solution for utilizing the DigiHelic[®] Controller's RS-485 serial communication and connecting to virtually any PC.

MN-1, Mini-Node[™] USB/RS-485 converter

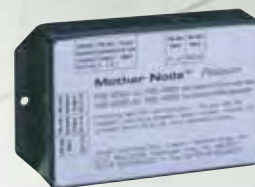
351-9, Mother Node[™] silver RS-232 to RS-485 Converter with DB9F Connector.

Includes 120 VAC to 12 VDC adapter

A-266, DigiHelic[®] surface mounting bracket

A-203, 1/8" I.D. x 1/4" O.D. PVC tubing

DigiHelic[®] Links, Communication Software



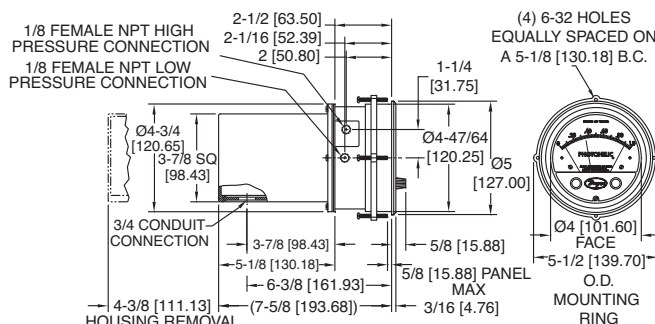
Photohelic® Pressure Switch/Gages

3-in-One Indicating Gage, Lo-Limit and Hi-Limit Control



Series A3000
Photohelic®
Switch/Gage.

Set points are instantly adjusted with front knobs.



Photohelic® Switch/Gages function as versatile, highly repeatable pressure switches combined with a precise pressure gage employing the time-proven Magnehelic® gage design. The Photohelic® gage measures and controls positive, negative or differential pressures of air and compatible gases. Standard models are rated to 25 psig (1.7 bar) with options to 35 (2.4) or 80 (5.5 bar) psig. Single pressure 36000S models measure to 6000 psig (413 bar) with a 9000 psig (620 bar) rating.

Two phototransistor actuated, DPDT relays are included for low/high limit control. Easy to adjust setpoint indicators are controlled by knobs located on the gage face. Individual setpoint deadband is one pointer width – less than 1% of full scale. Setpoints can be interlocked to provide variable deadband – ideal for control of fans, dampers, etc. Gage reading is continuous and unaffected by switch operation, even during loss of electrical power. Choose from full scale pressure ranges from a low 0-.25" (0-6 mm) w.c. up to 30 psi (21 bar); single positive pressure to 6000 psig (413 bar).

APPLICATIONS

- Air Conditioner Systems
- Clean Rooms
- Fume Exhaust Systems

SPECIFICATIONS

GAGE SPECIFICATIONS

Service: Air and non-combustible, compatible gases.

Wetted Materials: Consult factory.

Accuracy: $\pm 2\%$ of full scale at 70°F (21.1°C). $\pm 3\%$ on -0 and $\pm 4\%$ on -00 models.

Pressure Limits: -20" Hg. to 25 psig (-0.677 to 1.72 bar). MP option; 35 psig (2.41 bar), HP option; 80 psig (5.52 bar). 36003S - 36010S; 150 psig (10.34 bar). 36020S and higher; 1.2 x full scale pressure.

Temperature Limits: 20 to 120°F (-6.67 to 48.9°C) Low temperature option available.

Process Connections: 1/8" female NPT

Size: 4" (101.6 mm) dial face, 5" (127 mm) O.D. x 8-1/4" (209.55 mm).

Weight: 4 lb (1.81 kg).

SWITCH SPECIFICATIONS

Switch Type: Each setpoint has 2 Form C relays (DPDT).

Repeatability: $\pm 1\%$ of full scale.

Electrical Rating: 10A @ 28 VDC,
10A @ 120, 240 VAC.

Electrical Connections: Screw terminals. Use 167°F (75°C) copper conductors only.

Power Requirements: 120 VAC, 50/60 Hz; 240 VAC & 24 VAC Power optional.

Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.

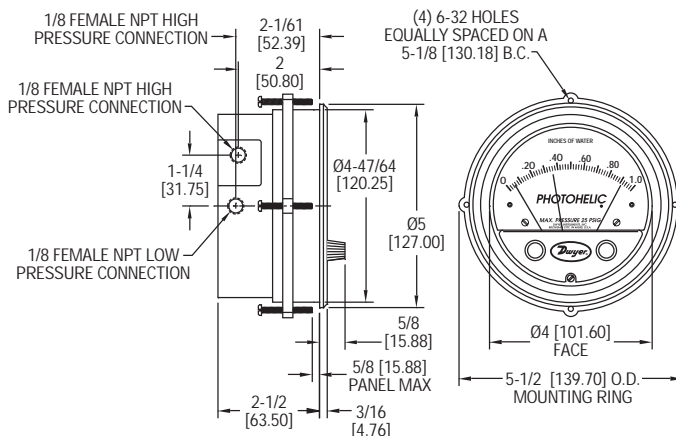
Set Point Adjustment: Adjustable knobs on face.

Agency Approvals: UL, CSA, CE.

Model Number	Range, In W.C.	Model Number	Range, PSI	Model Number	Range, MM W.C.	Model Number	Range, Pascals
A3000-00	0-.25	A3201	0-1	A3000-6MM	0-6	A3000-60PA	0-60
A3000-0	0-.50	A3202	0-2	A3000-10MM	0-10	A3000-125PA	0-125
A3001	0-1.0	A3203	0-3	A3000-25MM	0-25	A3000-250PA	0-250
A3002	0-2.0	A3204	0-4	A3000-50MM	0-50	A3000-500PA	0-500
A3003	0-3.0	A3205	0-5	A3000-80MM	0-80	A3000-750PA	0-750
A3004	0-4.0	A3210**	0-10	A3000-100MM	0-100		
A3005	0-5.0	A3215**	0-15	Zero Center Ranges		Zero Center Ranges	
A3006	0-6.0	A3220**	0-20	A3300-20MM	10-0-10	A3300-250PA	125-0-125
A3008	0-8.0	A3230***	0-30	A3300-30MM	15-0-15	A3300-500PA	250-0-250
A3010	0-10	**MP or ***HP option standard		Model Number	Range, CM W.C.	Model Number	Range, Kilopascals
A3015	0-15			A3000-15CM	0-15	A3000-1kPA	0-1
A3020	0-20			A3000 20CM	0-20	A3000-1.5kPA	0-1.5
A3025	0-25	Photohelic® — Single Pressure		A3000-25CM	0-25	A3000-2kPA	0-2
A3030	0-30	A36003S	0-30	A3000-50CM	0-50	A3000-3kPA	0-3
A3040	0-40	A36006S	0-60	A3000-80CM	0-80	A3000-4kPA	0-4
A3050	0-50	A36010S	0-100	A3000-100CM	0-100	A3000-5kPA	0-5
A3060	0-60	A36020S	0-200	A3000-150CM	0-150	A3000-8kPA	0-8
A3080	0-80	A36030S	0-300	A3000-200CM	0-200	A3000-10kPA	0-10
A3100	0-100	A36060S	0-600	A3000-250CM	0-250	A3000-15kPA	0-15
A3150	0-150	A36100S	0-1000	A3000-300CM	0-300	A3000-20kPA	0-20
Bi-Directional Range		A36300S	0-3000	Zero Center Ranges		A3000-25kPA	0-25
A3000-00N	.05-.20	A36500S	0-5000	Zero Center Ranges		A3000-30kPA	0-30
Zero Center Ranges		Model Number	Range In W.C./ Air Velocity, F.P.M.	A3300-4CM	2-0-2	Zero Center Ranges	
A3300-0	.25-0-.25	A3000-00AV	0-.25/300-2000	A3300-10CM	5-0-5	A3300-1kPA	.5-0-.5
A3301	.5-0-.5	A3000-0AV	0-.50/500-2800	A3300-30CM	15-0-15	A3300-3kPA	1.5-0-1.5
A3302	1-0-1	A3001AV	0-1.0/500-4000	Options and Accessories — Add options as a suffix. Example: A3001-LT			
A3304	2-0-2	A3002AV	0-2.0/1000-5600	-SRH, Single Relay Activates on Increase		-MP, Medium pressure	
A3310	5-0-5	A3010AV	0-10/2000-12500	-SRL, Single Relay Activates on Decrease		-HP, High pressure	
A3320	10-0-10			-OLS, OEM model		-LT, Low temperature (-20°F)	
A3330	15-0-15			-RMR, Remote mounted relay		A-298 Flat Flush Mounting Bracket	
				-TAMP, Tamper proof knobs		A-601, Manual reset switch	

Photohelic® Switch/Gages

Combines Differential Pressure Gage with Low/High Set-points



Using solid state technology, the Series 3000MR and 3000MRS Photohelic® switch/gages combine the functions of a precise, highly repeatable differential pressure switch with a large easy-to-read analog pressure gage employing the durable, time-proven Magnehelic® gage design. Switch setting is easy to adjust with large external knobs on the gage face. Gage reading is unaffected by switch operation – will indicate accurately even if power is interrupted. Solid state design now results in greatly reduced size and weight. Units can be flush mounted in 4-13/16" (122 mm) hole or surface mounted with hardware supplied. 3000MR models employ versatile electromechanical relays with gold over silver contacts – ideal for dry circuits. For applications requiring high cycle rates, choose 3000MRS models with SPST (N.O.) solid state relays. All models provide both low and high limit control and include 18-inch (45 cm) cable assemblies for electrical connections.

Gage accuracy is $\pm 2\%$ of full scale and switch repeatability is $\pm 1\%$. Switch dead-band is one pointer width – less than 1% of full scale. Compatible with air and other non-combustible, non-corrosive gases, they can be used in systems with pressures to 25 psig (1.725 bar). Optional construction is available for use to either 35 psig (2.42 bar) or 80 psig (5.51 bar).

APPLICATIONS

- Fan control
- Damper control
- Environmental pollution control

Included Accessories

- Mounting ring, snap ring
- 18" (45 cm) cable assembly
- (2) 3/16" tubing to 1/8" NPT adapters
- (2) 1/8" NPT pipe plugs
- (4) 6-32 x 1-1/4" RH machine screws (panel mounting)
- (3) 6-32 x 5/16" RH machine screws (surface mounting)

SERIES 3000MR, 3000MRS PHOTOHELIC®

Model Number	Range, Inches w.c.	Minor Divs.	Model Number	Range, Kilopascals	Minor Divs.
3000(MR)(MRS)**-00	0-0.25	.005	3000(MR)(MRS)-1KPA	0-1.0	.02
3000(MR)(MRS)*-0	0-0.5	.01	3000(MR)(MRS)-3KPA	0-3.0	.10
3001(MR)(MRS)	0-1.0	.02	3000(MR)(MRS)-4KPA	0-4.0	.10
3002(MR)(MRS)	0-2.0	.05	Model Number	Range, MM W.C.	Minor Divs.
3003(MR)(MRS)	0-3.0	.10	3000(MR)(MRS)-6MM*	0-6	.20
3005(MR)(MRS)	0-5.0	.10	3000(MR)(MRS)-10MM	0-10	.50
3010(MR)(MRS)	0-10	.20	3000(MR)(MRS)-25MM	0-25	.50
3015(MR)(MRS)	0-15	.50	3000(MR)(MRS)-50MM	0-50	1.0
3020(MR)(MRS)	0-20	.50	3000(MR)(MRS)-100MM	0-100	2.0
3030(MR)(MRS)	0-30	1.0	Model Number	Range, CM W.C.	Minor Divs.
3050(MR)(MRS)	0-50	1.0	3000(MR)(MRS)-20CM	0-20	.50
3100(MR)(MRS)	0-100	2.0			
Model Number	Range, Pascals	Minor Divs.	When ordering, select either MR or MRS suffix to Series 3000 number. Examples: 3001MR or 3001MRS		
3000(MR)(MRS)-60PA*	0-60	2.0			
3000(MR)(MRS)-125PA	0-125	5.0			
3000(MR)(MRS)-250PA	0-250	5.0			
3000(MR)(MRS)-500PA	0-500	10.0			

* $\pm 3\%$ of full scale. ** $\pm 4\%$ of full scale.

SPECIFICATIONS

GAGE SPECIFICATIONS

Service: Air and non-combustible, compatible gases.

Wetted Materials: Consult factory.

Accuracy: $\pm 2\%$ of full scale (3000-0 $\pm 3\%$ of full scale). (3000-00 $\pm 4\%$ of full scale).

Pressure Limit: -20" Hg. to 25 psig (-0.677 bar to 1.72 bar). MP option; 35 psig (2.41 bar), HP option; 80 psig (5.52 bar).

Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).

Process Connections: 1/8" female NPT (duplicated side and back).

Size: 4" (101.6 mm) dial face, 5" (127 mm) O.D. x 3-1/8" (79.38 mm).

Weight: 1.8 lb (816 g).

SWITCH SPECIFICATIONS 3000MR

Switch Type: Each setpoint has 1 Form C relays (SPDT).

Relay Contacts: (resistive load) 1 Form C rated 1.0A @ 30 VDC, 0.3A @ 110 VDC or 0.5A @ 125 VAC. Gold over clad silver - suitable for dry circuits.

Electrical Connections: 18" (46 cm) cable assembly with 8 conductors. Optional lengths to 100' (30.5 m).

Power Requirements: 24 VDC, regulated $\pm 10\%$.

Mounting Orientation:

Diaphragm in vertical position. Consult factory for other position orientations.

Set Point Adjustment:

Adjustable knobs on face.

Agency Approvals: CE.

SWITCH SPECIFICATIONS 3000MRS

Switch Type: Each setpoint has a solid state relay.

Switching Voltage: 20-280 VAC (47 - 63 Hz).

Switching Current: 1.0 amp (AC) max., 0.01 mA (AC) min., (2) SPST N.O.

Electrical Connections: 18" (46 cm) cable assembly with 6 conductors. Optional lengths to 100' (30.5 m).

Power Requirements: 24 VDC, regulated $\pm 10\%$.

Mounting Orientation:

Diaphragm in vertical position. Consult factory for other position orientations.

Set Point Adjustment:

Adjustable knobs on face.

Agency Approvals: CE.

OPTIONS — ACCESSORIES

Tamper-proof Knobs, require spanner type key (supplied) to change set-points. Add suffix -TAMP

Low Temperature Option for use under 20°F (-6.7°C).

Add suffix -LT

Medium Pressure increases maximum rated pressure to 35 psig (2.41 bar). Add suffix -MP

High Pressure increases maximum rated pressure to 80 psig (5.5 bar). Add suffix -HP

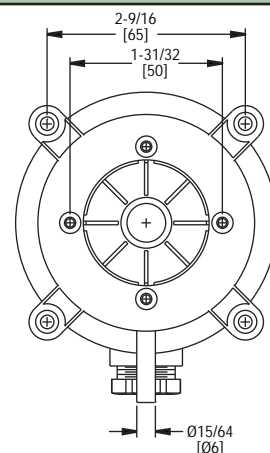
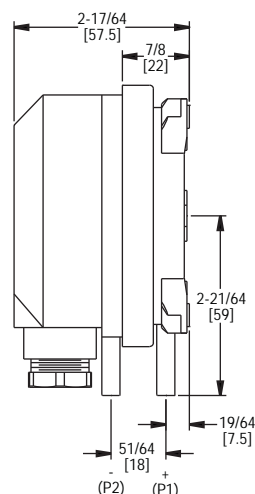
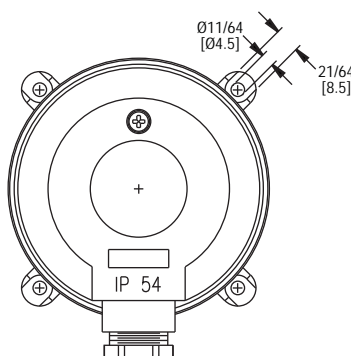
A-298 Flat Aluminum Bracket, for flush mounting 3000MR/MRS

A-370 Mounting Bracket, flush mount 3000MR/MRS bracket. Bracket is then surface mounted. Steel with gray hammertone epoxy finish

A-600 R/C Snubber: Recommended for inductive loads like a solenoid or contactor

H.V.A.C. Differential Pressure Switch

With Dual Scale Field Adjustable Set Point Knob



The Series ADPS Adjustable Differential Pressure Switch is designed for pressure, vacuum, and differential pressures. The dual scaled adjustment knob in inches water column and pascals allows changes to the switching pressure to be made without a pressure gage. The ADPS is available with settings from 0.08" w.c. (20 Pa) up to 16" w.c. (4000 Pa). The silicone diaphragm and PA 6.6 body make the series ADPS ideal for use with air and other noncombustible gases. The compact size, adjustment knob and low cost make the ADPS the perfect choice for H.V.A.C. applications.

Typical Applications Include:

- Monitoring air filters and ventilators.
- Monitoring industrial cooling-air circuits.
- Overheating protection for fan heaters.
- Monitoring flows in ventilation ducts.
- Controlling air and fire-protection dampers.
- Frost protection for heat exchanges.



Dual Scale
Field Adjustable
Set Point Knob

SPECIFICATIONS

Service: Air and noncombustible, compatible gases.

Wetted Materials: Diaphragm Material: Silicone. Housing Material: switch body: PA 6.6; Cover: Polystyrene.

Temperature Limits: Process ambient temperature from -4 to 185°F (-20 to 85°C).

Pressure Limits: Max. Operating Pressure: 40" W.C. (10 kPa) for all pressure ranges.

Switch Type: Single-pole double-throw (SPDT).

Electrical Rating: Standard: Max., 1.5A/250 VAC, max. switching rate: 6 cycles/min.; Gold Contact Option: 0.4 A/ 250 VAC.

Electrical Connections: Push-on screw terminals. M20x1.5 with cable strain relief or optional 1/2" NPT connection.

Process Connections: 5/16" (7.94 mm) outside diameter tubing, 1/4" (6.0 mm) inside diameter tubing.

Mounting Orientation: Vertically, with pressure connections pointing downwards.

Mechanical Working Life: Over 10⁶ switching operations.

Weight: 5.6 oz (160 g).

Enclosure Rating: NEMA 13, IP54.

Agency Approvals: CE.

Model No.	Set Point Range IN W.C. (Pa)	Approx. Dead Band @ Min Set Point IN W.C. (Pa)	Approx. Dead Band @ Max Set Point IN W.C. (Pa)
ADPS-01-2-N	0.08 to 0.80 (20-200)	0.04 (10)	0.05 (12)
ADPS-04-2-N	0.12 to 1.60 (30-400)	0.06 (15)	0.09 (22)
ADPS-03-2-N	0.20 to 2.00 (50-500)	0.08 (20)	0.09 (23)
ADPS-05-2-N	0.80 to 4.00 (200-1000)	0.4 (100)	0.5 (130)
ADPS-06-2-N	2.00 to 10.00 (500-2500)	0.6 (150)	0.8 (200)
ADPS-07-2-N	4.00 to 16.00 (1000-4000)	1.0 (250)	1.4 (350)

ACCESSORIES

A-288, "L" type metal mounting bracket with screws

A-289, "S" type metal mounting bracket with screws

Compact Low Differential Pressure Switches

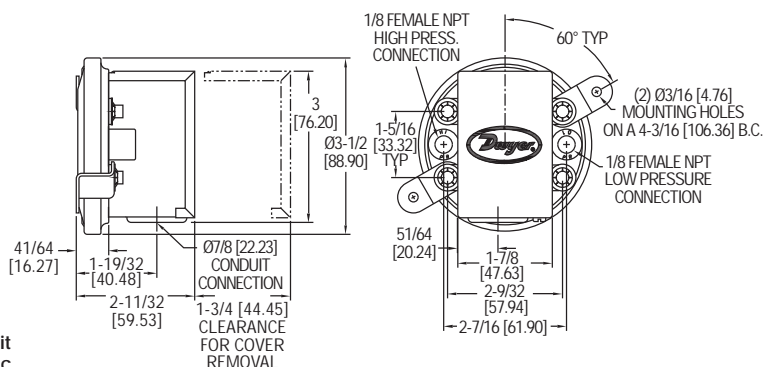
Set Points from 0.07" to 20" W.C. Repetitive Accuracy within 3%



Series 1910 pressure switch. All pressure and electrical connections and set point adjustments are on one side for easy installation.



Series 1910 switch with conduit enclosure off. Shows electric switch and set point adjustment screw.



The Dwyer-engineered force-motion amplifier increases the leverage of diaphragm movement and results in a switch with excellent sensitivity and repeatability.

Our most popular series combines advanced design and precision construction to make these switches able to perform many of the tasks of larger, costlier units. Designed for air conditioning service, they also serve many fluidics, refrigeration, oven and dryer applications. For air and non combustible compatible gases, Series 1900 switches have set points from 0.07 to 20" (1.8 to 508 mm) w.c. Set point adjustment is easy with range screw located inside conduit enclosure. Internal location helps prevent tampering. UL, CE, CSA listed, and FM approved.

APPLICATIONS

- Air conditioning refrigeration coil icing detection; defrost cycle initiation
- Clogged filter detection
- Variable air volume controller

SPECIAL MODELS AND ACCESSORIES

MANUAL RESET MODEL 1900 MR includes special snap switch which latches on pressure increase above the setpoint. Switch must be manually reset after pressure drops below the setpoint. To order, change base model to 1900 and add MR suffix after range number. Example: 1900-10-MR. Available on -1, -5, -10 or -20 ranges only. Option is not UL, CSA or FM listed.

Note: Manual Reset (MR) Option for use only in single positive pressure applications.

A-399 Duct Pressure Monitor Kit — For use with standard or manual reset model switches. Includes mounting flange, tubing and adapters.

A-329 Street Ell — Brass adapter for applications requiring right angle connections. Two required for differential pressures.

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.

Wetted Materials: Consult Factory.

Temperature Limits: -30 to 180°F (-34 to 82.2°C).

Pressure Limits: 45" w.c. (11.2 kPa) continuous, 10 psig (68.95 kPa) surge.

Switch Type: Single-pole double-throw (SPDT).

Repeatability: ±3%.

Electrical Rating: 15 A @ 120-480 VAC, 60 Hz. Resistive 1/8 HP @125 VAC, 1/4 HP @ 250 VAC, 60 Hz. Derate to 10 A for operation at high cycle rates.

Electrical Connections: 3 screw type, common, normally open and normally closed.

Process Connections: 1/8" female NPT.

Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.

Set Point Adjustment: Screw type inside conduit enclosure.

Weight: 1lb, 4.5 oz (581 g).

Agency Approvals: CE, UL, CSA, and FM. Optional-EXPL Explosion-proof enclosure does not possess any agency approvals.

CAUTION: FOR USE ONLY WITH AIR OR COMPATIBLE GASES.

SERIES 1910 SWITCHES OPERATING RANGES, DEADBANDS

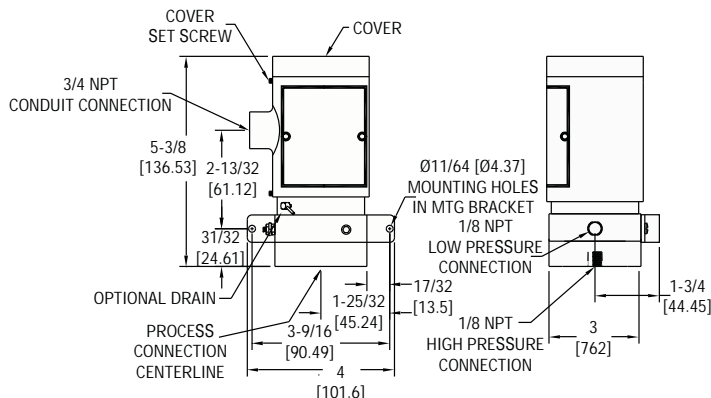
Model Number	Operating Range, Inches W.C.	Approximate Dead Band	
		At Min. Set Point	At Max. Set Point
1910-00	0.07 to 0.15	0.04	0.04
1910-0	0.15 to 0.55	0.10	0.10
1910-1	0.40 to 1.6	0.15	0.16
1910-5	1.40 to 5.5	0.30	0.30
1910-10	3.0 to 11.75	0.40	0.40
1910-20	4.0 to 20.0	0.40	0.50

Explosion-Proof Differential Pressure Switches

Great for Water Flow Proving or Filter Status



Patent No. 4,827,095



Explosion-proof, heavy duty, industrial unit has patented and unique new design which provides sensitivity to differential pressures as low as 10 inches of water (254 mm w.c.), yet handles total pressure of 1500 psi (103 bar). Unlike common differential pressure switches that use a piston-type motion transfer, the Series H3 utilizes a rotary motion transfer shaft that prevents a change in total pressure from causing a setpoint shift. Unit yields deadbands approximately 5% of range, with zero setpoint shift due to variation in working pressures. Friction is minimized and repeatability increased by allowing range spring to act directly on diaphragm plate. Rolling diaphragm design maintains constant effective area to further reduce friction. Diaphragm is allowed to "seat", allowing application of full rated pressure, up to 1500 psi (103 bar), on either high or low pressure port, without damage. Special overtravel feature prevents overtightening of range adjust screw. Choose optional 316SS chamber for water and water-based fluids or harsher applications.

APPLICATIONS

- Water flow proving with an orifice plate
- Differential pressure across chiller
- Liquid filter status
- Perfect for monitoring differential water pressure on filters, chiller coils, and flow elements.

SPECIFICATIONS

Wetted Materials: See pressure chamber and diaphragm material in model chart.

Temperature Limit: -4 to 220°F (-20 to 104°C), ATEX: -20 to 90°C (-4 to 194°F).

Pressure Limit: 1500 psig (103 bar).

Enclosure Rating: Standard meets NEMA 4X (IP56), Drain option meets NEMA 3 (IP54). For hazardous use see the Hazardous Location Ratings chart.

Switch Type: SPDT or DPDT snap switch.

Electrical Rating: 5A @ 125/250 VAC, 30 VDC.

Electrical Connections: See model chart.

Conduit Connection: 3/4" female NPT.

Process Connection: 1/8" female NPT.

Mounting Orientation: Vertical.

Set Point Adjustment: Internal screw.

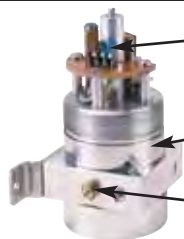
Weight: 4 lb, 2 oz (2 kg).

Deadband: Approximately 5% of range.

Agency Approvals: UL, CSA, CE, and ATEX see ratings chart.

HAZARDOUS LOCATION RATINGS

MODEL	UL	CSA	Directive 94/9/EC ATEX Compliant
H3 _ _ _ C	—	—	CE 0344 Ex II 2 G EEx d IIB -20°C ≤ T amb ≤ 75°C T6 EC-Type Certificate No. KEMA 03ATEX 2584
H3 _ _ _ L H3 _ _ _ T	Cl. I, Gr.B, C & D Cl. II, Gr.E, F & G	Cl. I, Gr.B, C & D Cl. II, Gr.E, F & G	—
H3 _ _ _ C-DR	—	—	CE 0344 Ex II 2 G EEx d IIB -20°C ≤ T amb ≤ 75°C T6 EC-Type Certificate No. KEMA 03ATEX 2584
H3 _ _ _ L-DR	Cl. I, Gr.B, C & D Cl. II, Gr.E, F & G	—	—



Internal terminal blocks for conductors up to 18 gauge are optional.

Optional NEMA 3 (IP 54) housing includes explosion-proof drain. Standard NEMA 4X (IP 56) version is without drain.

External Ground Connection Standard — Internal ground connection also standard — use either one.

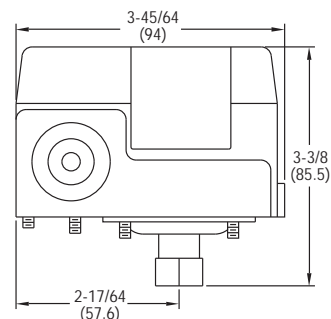
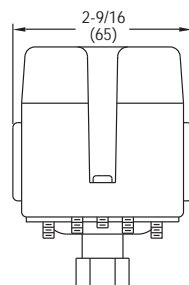
Note: Shown without housing and cover.

A-610 Pipe Mounting Kit for 1-1/4 to 2" pipe

Example	H3	S	2	S	C	MV	H3S-2SC-MV Differential Pressure Control: 316 SS pressure chamber and Fluoroelastomer diaphragm; weatherproof and ATEX; SPDT snap action switch with gold contacts; fixed deadband, automatic reset; adjustable range 0.5-15 psid
Construction	H3						Series designator, weatherproof and explosion-proof
Pressure Chamber & Diaphragm Material (Wetted)		A S					Aluminum chamber with Nitrile diaphragm 316 SS chamber with Fluoroelastomer diaphragm
Adjustable Operating Range			1 2 3 4				Adjustable range 10-180 in. w.c. (2.48-44.78 kPa) Adjustable range 0.5-15 psid (0.03-1 bar) Adjustable range 5-70 psid (.34-4.8 bar) Adjustable range 10-200 psid (7-13.8 bar) Maximum pressure for all ranges is 1500 psi (103 bar)
Deadband approximately 5% of range							
Circuit (Switch) Options				S D			SPDT snap action switch rated 5A @ 125/250 VAC, 30 VDC DPDT snap action switch rated 5A @ 125/250 VAC, 30 VDC
Electrical Connection					L T C		18 AWG x 18 inch lead wires UL, CSA approved internal terminal block ATEX approved internal terminal block
Options						DRAIN MV VIT	Housing with drain - allows condensate to be drained from inside enclosure (meets NEMA 3 instead of 4X) Gold contacts on snap switch for dry circuits rated 1A @ 125 VAC, 1A resistive or 0.5 A inductive @ 30 VDC Fluoroelastomer diaphragm option where not standard

Water Pump Pressure Switch

Simple, Reliable, Adjustable Set Point and Deadband



The Series CXA Water Pump Pressure Switches have been proven reliable for controlling automatic water systems. These switches are very popular for use on water pumping systems. The set point and deadband are both easily adjustable via screws inside the cover. For ease of installation, the switches come with a 1/4" female NPT process connection and can be mounted in any orientation. The series CXA's simple design makes it a great switch for an installer at any skill level.

APPLICATIONS

- Pump Control for water systems.

SPECIFICATIONS

Service: Compatible liquids and gases.

Wetted Materials: Silicone, steel, and SS.

Temperature Limits: 140°F (60°C).

Pressure Limits: See model chart.

Enclosure Rating: General purpose.

Repeatability: ±5 psig (±0.3 bar).

Switch Type: SPST snap action (see model chart).

Electrical Ratings: 20A @ 120 VAC, 12A @ 240 VAC, 9.6A @ 240 VAC (3 phase), 8.6A @ 32 VDC, 3.1A @ 120 VDC, 1.6A @ 240 VDC.

Electrical Connections: Screw terminal.

Conduit Connection: 7/8" hole for 1/2" conduit hub (2 places).

Process Connection: 1/4" female NPT.

Mounting Orientation: Switch can be installed in any position.

Setpoint Adjustment: Internal screws.

Weight: 0.75 lb (0.34 kg).

Deadband: See model chart.

Agency Approvals: CE, UL pending.

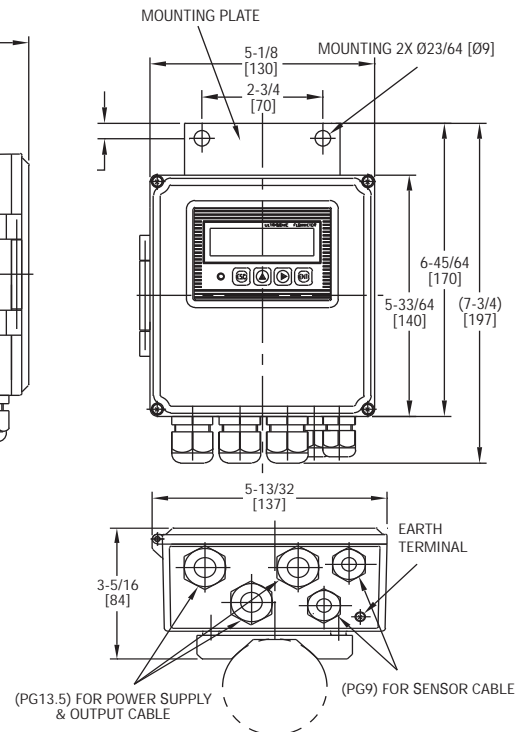
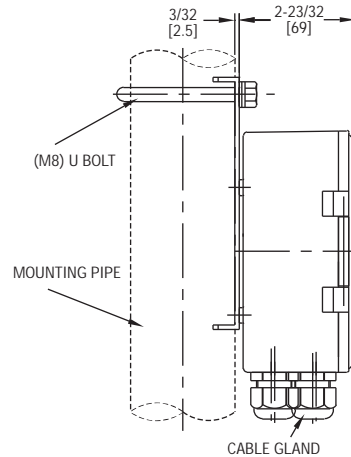
FEATURES

- Designed for electrically driven water pumps.
- Suitable for all types of pumps: jets, submersible, reciprocating, etc.
- Direct acting (NC) or reverse acting (NO) available depending on switch type and model number.

Model Number	Switch Type	Range psig (bar)	Approx. Adjustable Deadband psig (bar)	Max. Pressure psig (bar)
CXA-S1	NC	15-80 (1.0-5.5)	15-30 (1.0-2.1)	129 (8.9)
CXA-S2	NC	30-100 (2.1-6.9)	20-35 (1.4-2.4)	179 (12.3)
CXA-S3	NC	35-150 (2.4-10.3)	30-40 (2.1-2.8)	204 (14.1)
CXA-R1	NO	15-80 (1.0-5.5)	15-30 (1.0-2.1)	129 (8.9)
CXA-R2	NO	30-100 (2.1-6.9)	20-35 (1.4-2.4)	179 (12.3)
CXA-R3	NO	35-150 (2.4-10.3)	30-40 (2.1-2.8)	204 (14.1)

Ultrasonic Flow Converter

Excellent Performance and Easy Operation



Series UXF2 Ultrasonic Flow Converters are paired with Series SX3 detectors in order to utilize the transit-time measuring method. Two ultrasonic sensors are mounted on the pipe exterior, and each transmits an ultrasonic pulse to the opposite sensor. The difference in the transit times of the two waves is used to calculate the flow velocity. This meter is a clamp-on type ultrasonic flowmeter for permanent use and is ideal for clean liquids containing no air bubbles such as pure water. The easy-to-use compact and lightweight design is intended for integration into mechanical devices. The adoption of a sound velocity measurement system, which calculates sound velocity from the transit time, keeps the flowmeter unaffected by the temperature and the pressure of the fluid to be measured. Additionally, with the use of a high-speed transit time processor, the system cycle is 0.2 seconds and applicable to short batch processes.

Series UXF2 Ultrasonic Flowmeter Converter:

- Compact and lightweight
- Easy operation by external keypads
- Plastic housing with IP65
- Communication and Synchronization options available

Model Number	Power Supply	Communication
UXF2-11P1	100 to 120 VAC	None
UXF2-21P1	200 to 240 VAC	None
UXF2-31P1	20 to 30 VDC	None
UXF2-12P1	100 to 120 VAC	RS-232
UXF2-22P1	200 to 240 VAC	RS-232
UXF2-32P1	20 to 30 VDC	RS-232
UXF2-13P1	100 to 120 VAC	RS-485
UXF2-23P1	200 to 240 VAC	RS-485
UXF2-33P1	20 to 30 VDC	RS-485
UXF2-14P1	100 to 120 VAC	Sync
UXF2-24P1	200 to 240 VAC	Sync
UXF2-34P1	20 to 30 VDC	Sync

SPECIFICATIONS

Service: Clean liquids that pass ultrasound and do not contain air bubbles (such as pure water and chemical solution).

Input: BNC connector, coaxial cable from sensor.

Range: 0 to ± 32.8 fps (0 to ± 10 m/s).

Display: 2-color LED (Normal: green, Abnormal: red), LCD with 2 lines of 16 characters and back light, Languages: English, Japanese, French, German, or Spanish.

Accuracy: See SX3.

Power Requirement: 100 to 120 VAC $\pm 10\%$ 50/60 Hz, or 200 to 240 VAC $\pm 10\%$ 50/60 Hz, or 20 to 30 VDC.

Power Consumption: 15 VA or less for AC power supply, 5W or less for DC power supply.

Temperature Limits: Ambient 122°F (50°C).

Outputs:

Analog: 4 to 20 mA DC, 1 point.

Digital: Open Collector: 1 point, Relay contact: 1 point.

Serial Communications: RS-232C or RS-485.

Enclosure Rating: IP65.

Materials: Plastic ABS.

Electrical Connections: Screw terminals.

Mounting: Wall or 2B pipe mount.

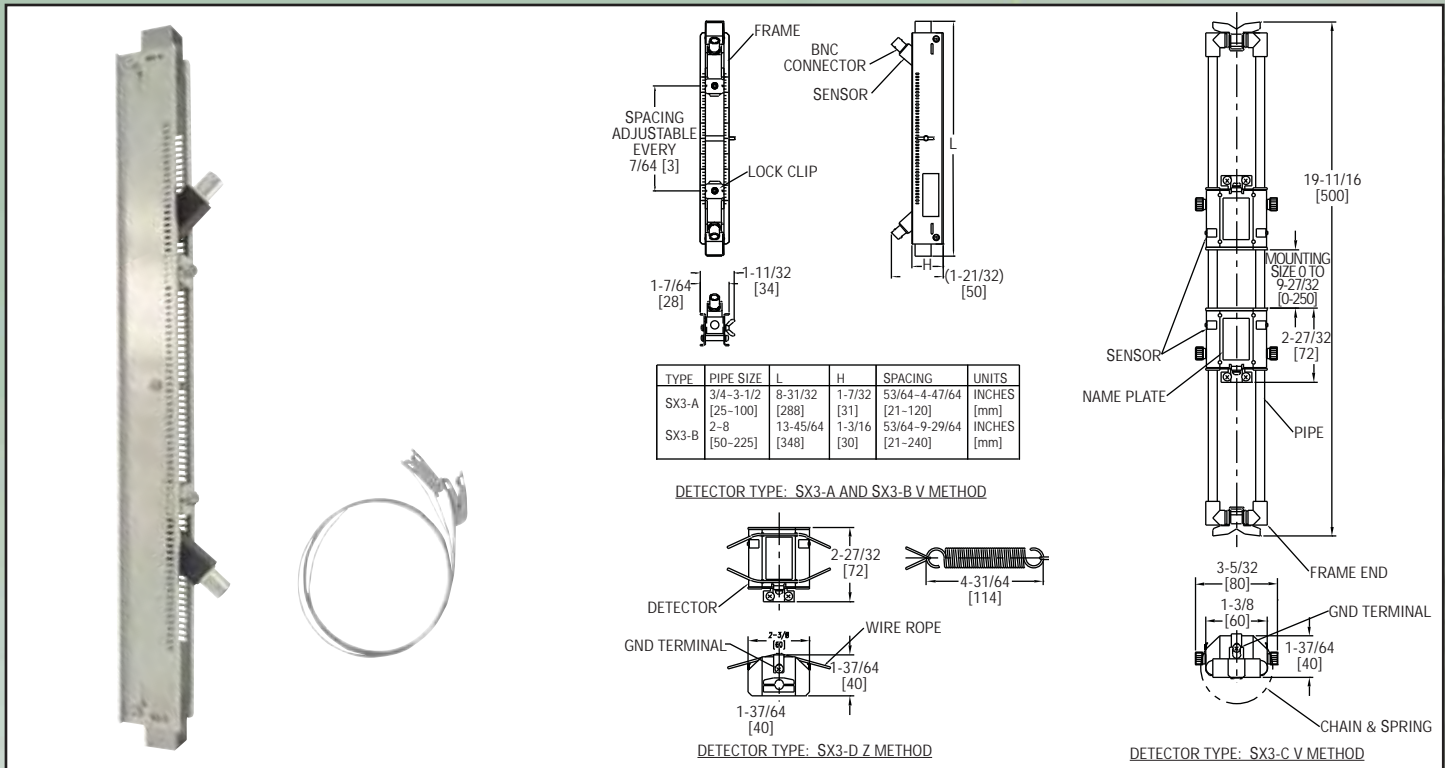
Weight: 1.8 lb (0.8 kg).

APPLICATIONS

- Monitor flow rate of heating and cooling water.
- Monitor flow rate as part of BTV calculations.

Ultrasonic Flowmeter Detector

Quick and Easy Mounting



Series SX3 Ultrasonic Flowmeter Detectors are paired with Series UXF2 converters and employ a clamp-on type design for permanent use based on transit time measuring method. These detectors are ideal for clean liquids containing no air bubbles such as pure water. The easy-to-use compact and lightweight design is intended for integration into mechanical devices. It is applicable for small to medium size pipes of diameter range from 25 mm to 600 mm and provides superior cost performance.

Series SX3 Ultrasonic Flowmeter Detectors:

- Helps ensure pumping efficiency
- Provides accurate leak detection
- Not influenced by fluid's temperature or pressure

Model Number	Kind of Detector	Flow Pipe Size in (mm)	Acoustic Coupler
SX3-A0	Small Standard	0.98 to 3.94 (25 to 100)	None
SX3-B0	Small	1.97 to 8.86 (50 to 225)	None
SX3-C0	Medium	1.97 to 11.81 (50 to 300)	None
SX3-D0	Large	11.81 to 23.62 (300 to 600)	None

ACCESSORIES

Model Number	Description
A-186	Silicone-based grease acoustic couplant, 3 oz tube
A-187	Silicone RTV acoustic couplant, 4 oz tube
A-188	Silicone-free acoustic couplant, 4 oz tube

SPECIFICATIONS

Service: Clean liquids that pass ultrasound and do not contain air bubbles (such as pure water and chemical solution).

Turbidity: 10000 deg (mg/L) or less.

Type of Flow: Well-developed turbulent or laminar flow in a fluid-filled pipe.

Permissible Air Volume Rate: Up to 2% at 1 m/s (inversely proportional to velocity).

Range: 0 to ± 32.8 fps (0 to ± 10 m/s).

Flow Pipe Sizes: SX3A: 0.98 to 3.94 in (25 to 100 mm) for plastic piping 1.97 to 3.94 in (50 to 100 mm) for metal piping; SX3B: 1.97 to 8.86 in (50 to 225 mm); SX3C: 1.97 to 11.81 in (50 to 300 mm); SX3D: 11.81 to 23.62 in (300 to 600 mm).

Accuracy: 1.5 to 2% of rate.

Response Time: System cycle: 0.2 s, Dead time: 0.2 s or less, Time constant: 0.1s.

Temperature Limits: Ambient -4 to 140°F (-20 to 60°C). Fluid Temperature: SX3A/SX3B: -4 to 212°F (-20 to 100°C); SX3C/SX3D w/ silicone rubber for acoustic couplant: -4 to 176°F (-20 to 80°C), w/ silicone free grease for acoustic couplant: 32 to 140°F (0 to 60°C).

Enclosure Rating: SX3A and SX3B: IP65 (Jetproof) when using waterproof BNC connector. SX3C and SX3D: IP67 (Immersion-proof) when the terminal block is filled with silicone rubber after wiring.

Materials: For SX3A and SX3B: Plastic PBT for sensor housing, 304SS for guide frame. For SX3C and SX3D: Plastic PBT for sensor housing, 304SS for sensor cover, 304SS and PBT for guide rail.

Electrical Connection: Coaxial cable up to 98.4 ft (30 m) and thermal stability of 212°F (100°C).

Mounting: Clamped on pipe surface.

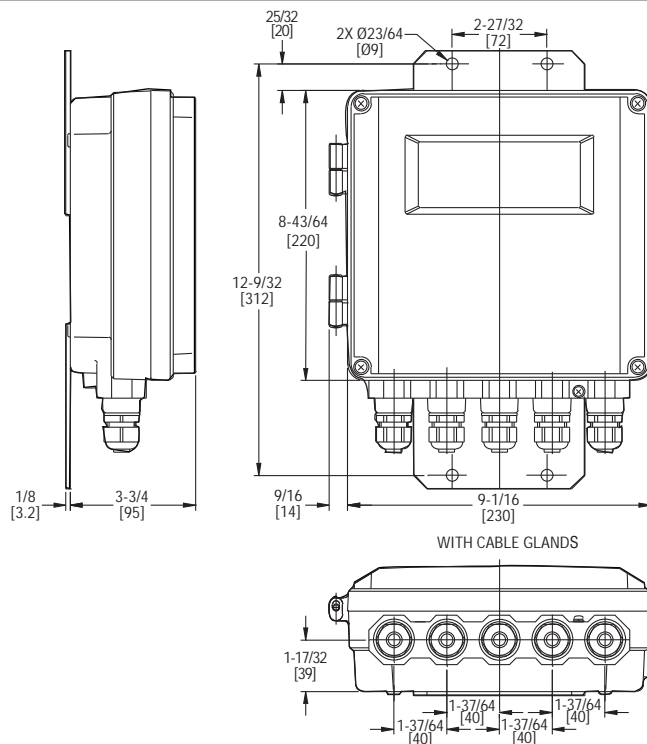
Weight: SX3A: 10.6 oz (0.3 kg), SX3B: 14.1 oz (0.4 kg), SX3C: 2.2 lb (1 kg), SX3D: 14.1 oz (0.4 kg).

Model Number	Description	Cable Length ft (m)
SX3C-1A	Heat Resistant Cable with waterproof BNC connector for SX3-A and SX3-B	16.4 (5)
SX3C-1B	Heat Resistant Cable with waterproof BNC connector for SX3-A and SX3-B	32.8 (10)
SX3C-2A	Heat Resistant Cable for SX3-C and SX3-D	16.4 (5)
SX3C-2B	Heat Resistant Cable for SX3-C and SX3-D	32.8 (10)

Option-Consult factory for other cable lengths.

Ultrasonic Flowmeter Converter

Excellent Performance and Easy Operation



Series UXF1 Ultrasonic Flowmeter Converters are paired with Series SX1 or SX2 sensors in order to utilize the transit-time measuring method. Thanks to microprocessor based electronics, the flowmeter can easily be configured from the front keypad to specific applications. The flowmeter is suitable for liquid flow measurements for pipes from 1/2 inch to 19.5 feet diameter.

This flowmeter is a compact and lightweight instrument incorporating the latest electronics and high speed digital signal processing technologies (32 bit MPU), realizing high performance and easy operation.

Series UXF1 Ultrasonic Flowmeter Converters:

- Compact and lightweight
- High accuracy
- Excellent resistance against aerated flow
- Quick response with high-speed microprocessor
- Multilingual display (English, Japanese, German, and French)
- Large LCD and function keys

APPLICATIONS

- Monitor flow rate of heating and cooling water.
- Monitor flow rate as part of BTV calculations.

SPECIFICATIONS

Service: Liquid flow through which ultrasonic signal can be transmitted (water, sea water, oil, and fluid of unknown velocity).

Input: Sensor cable radio frequency coaxial cable RG-58A/U.2.

Range: 0 to ± 105 fps (0 to ± 32 m/s) (bidirectional flow).

Display: LCD with backlight, 16 letters 2 lines.

Accuracy: See SX1.

Power Requirement: 100 to 240 VAC $\pm 10\%$ 50/60Hz, or 20 to 30 VDC.

Power Consumption: Approx. 20 VA.

Temperature Limits: Ambient 14 to 140°F (-10 to 60°C).

Outputs: Analog: One 4 to 20 mA DC current output;
Digital: Two transistor outputs available, Open collector output: 30V DC, 0.1A.

Serial Communications: RS232-C equivalent.

Enclosure Rating: IP65.

Materials: Aluminum alloy.

Electrical Connections: Screw terminals.

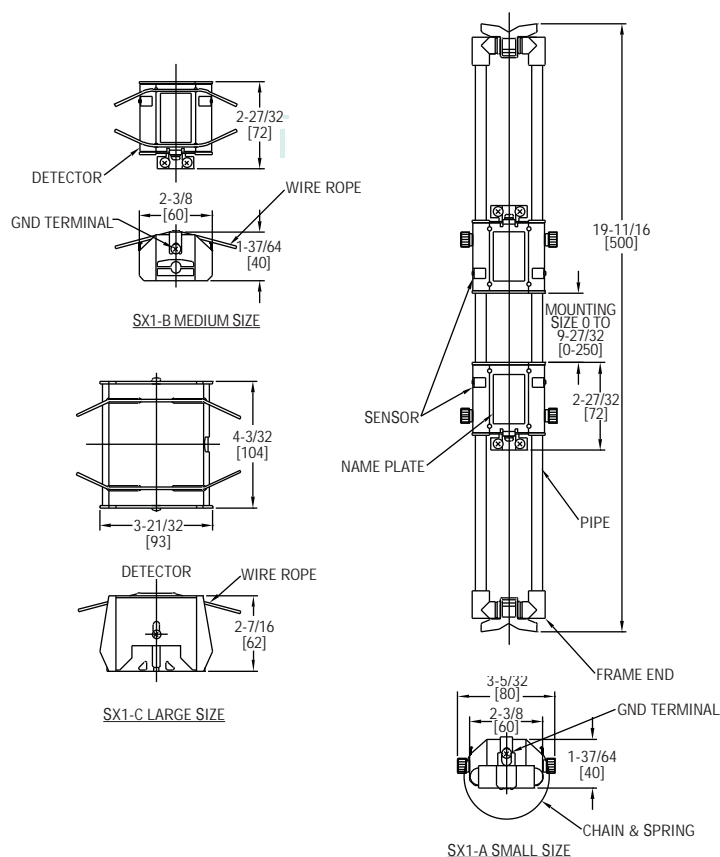
Mounting: Wall or pipe mount.

Weight: 10 lb (4.5 kg).

Model No.	Description	Power Supply
UXF1-A	Outdoor Converter	100-240 VAC 50/60Hz
UXF1-B	Outdoor Converter	20-30 VDC

Ultrasonic Flowmeter Detector

Excellent Performance and Easy Operation



Series SX1 Ultrasonic Flowmeter Detectors are paired with Series UXF1 converters in order to utilize the transit-time measuring method. Two ultrasonic sensors are mounted on the pipe exterior, and each transmits an ultrasonic pulse to the opposite sensor. The difference in the transit times of the two waves is used to calculate the flow velocity.

Series SX1 Ultrasonic Flowmeter Detector:

- Easy installation, no pipe work required
- Simple maintenance, no moving parts
- Free from pressure loss, choking, and leakage
- Clamp-on features allow for reduction of total ownership cost

Model Number	Description
SX1-A	Standard Detector, Small Sensor
SX1-B	Standard Detector, Medium Sensor
SX1-C	Standard Detector, Large Sensor

ACCESSORIES

Model Number	Description
SXC-1A	16.4 ft (5 m) cable for SX1
SXC-1B	32.8 ft (10 m) cable for SX1
A-186	Silicone-based grease acoustic couplant, 3 oz tube
A-187	Silicone RTV acoustic couplant, 4 oz tube
A-188	Silicone-free acoustic couplant, 4 oz tube

Options- Consult factory for other cable lengths.

SPECIFICATIONS

Service: Liquid flow through which ultrasonic signal can be transmitted (water, sea water, oil, and fluid of unknown velocity).

Turbidity: 10000 deg (mg/L) or less.

Type of Flow: Well-developed turbulent or laminar flow in a full-filled pipe.

Range: 0 to ± 32 m/s (bidirectional flow).

Flow Pipe Sizes: SX1-A: 1.97 to 15.75 in (50 to 400 mm), SX1-B: 1.97 to 47.24 in (50 to 1200 mm), SX1-C: 7.87 to 236.2 in (200 to 6000 mm).

Accuracy: Pipe Size: 0.51 in (13 mm) to under 1.99 in (50 mm)
 ± 0.03 m/s for flow rate: under 2 m/s
 $\pm 0.75\%$ to $\pm 1.5\%$ of rate for flow rate:
 2 m/s to 32 m/s

Pipe Size: 1.99 in (50 mm) to under 11.8 in (300 mm)
 ± 0.02 m/s for flow rate: under 2 m/s
 $\pm 0.5\%$ to $\pm 1.0\%$ of rate for flow rate:
 1 m/s to 32 m/s.

Pipe Size: 11.8 in (300 mm) up to 19.69 ft (6000 mm)
 ± 0.01 m/s for flow rate: under 1 m/s
 $\pm 0.5\%$ to $\pm 1.0\%$ of rate for flow rate
 1 m/s to 32 m/s.

Response Time: 0.5s or less.

Temperature Limits: Ambient 176°F (80°C). Fluid Temperature: -40 to 176°F (-40 to 80°C) for SX1-A, SX1-B, SX1-C.

Enclosure Rating: IP67

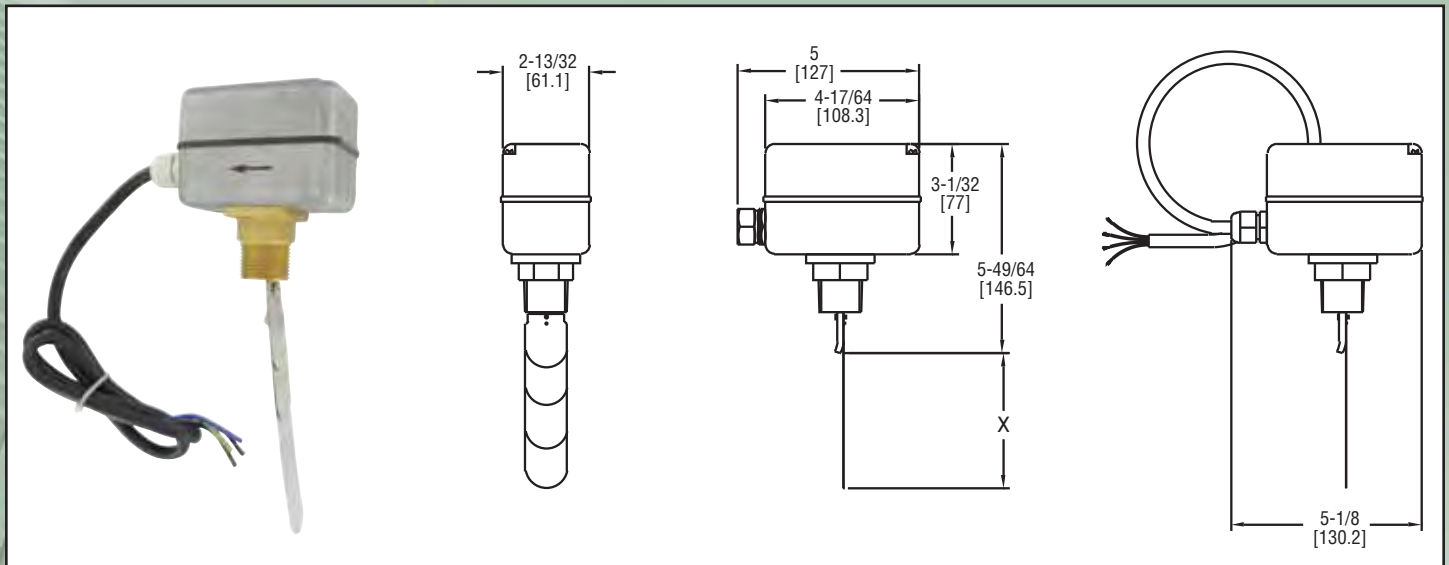
Materials: SX1A: Plastic case and 304 Stainless Steel and plastic guide rail; SX1B and SX1C: Plastic case; Silicone rubber couplers on all models.

Sensor Cable: Radio frequency coaxial cable (RG-58A/U), see accessories table for specific lengths.

Electrical Connection: Screw terminals.

Mounting: Clamped on pipe wall.

Weight: SX1-A: 2.2 lb (1 kg), SX1-B: 0.88 lb (0.4 kg), SX1-C: 3.1 lb (1.4 kg).



The **Series FS-2 Vane Flow Switch** offers an economical flow proving solution. Custom set points tailored for the application are enabled by field adjustable vane layers and a set point adjustment screw. The FS-2 features an aluminum weatherproof housing for outdoor installation. Paddles are adjustable to fit 1" to 8" size pipe. FS-2 is ideal for use in "flow or no flow" applications in cold and hot water systems. Perfect for proving flow in boilers, hot water heaters, and chillers.

APPLICATION

- Perfect for proving flow in boilers, hot water heaters, and chillers.

FEATURES

- Field adjustable paddle
- Field adjustable set point
- Weatherproof construction

FLOW RATE CHART

Pipe Diameter (inch)	Blade Vane Length in (mm) Dim. X	Approximate Actuation and Deactuation Flow Rates for Water			
		Minimum Setting GPM (LPM)		Maximum Setting GPM (LPM)	
		Actuate	Deactuate	Actuate	Deactuate
1	1.34 (34)	4.0 (15.0)	1.8 (6.7)	8.8 (33.3)	6.6 (25.0)
1-1/4	1.34 (34)	5.3 (20.0)	2.6 (10.0)	11.4 (43.3)	8.4 (31.7)
1-1/2	2.24 (57)	7.0 (26.7)	4.0 (15.0)	14.5 (55.0)	11.4 (43.3)
2	2.24 (57)	14.1 (53.3)	9.7 (36.7)	31.3 (118.3)	22.5 (85.0)
2-1/2	3.46 (88)	18.5 (70.0)	15.4 (58.3)	35.2 (133.3)	30.8 (116.7)
3	3.46 (88)	27.7 (105.0)	25.1 (95.0)	52.8 (200.0)	46.2 (175.0)
4	3.46 (88)	59.4 (225.0)	52.8 (200.0)	123.3 (466.7)	114.5 (433.3)
5	6.57 (167)	52.8 (200.0)	39.6 (150.0)	132.1 (500.0)	123.3 (466.7)
6	6.57 (167)	75.7 (286.7)	52.8 (200.0)	154.1 (583.3)	140.9 (533.3)
8	6.57 (167)	184.9 (700.0)	158.5 (600.0)	396.3 (1500.0)	374.2 (1416.7)

SPECIFICATIONS

Service: Compatible liquids.

Wetted Materials:

Bellow: Tin-bronze.

Vane: Stainless Steel.

Body: Forged brass.

Temperature Limit: 230°F (110°C).

Pressure Limit: 145 psig (10 bar).

Enclosure Rating: NEMA 4 (IP64).

Switch Type: SPDT snap switch.

Electrical Rating: 10A res, 3A ind @ 250 VAC.

Electrical Connection: Cable gland with attached wire leads or optional conduit connection.

Process Connection: 1" male NPT or BSPT.

Mounting Orientation: Switch must be installed vertically on horizontal pipe runs.

Set Point Adjustment: Four vane combinations and an adjustment screw.

Enclosure: Die-cast aluminum alloy.

Weight: 28.22 oz (0.8 kg).

Agency Approvals: CE.

Series FS-2 Paddle Flow Switch

OPTIONS:

BSPT Process Connection,

To order add suffix -BSPT.

Example: **FS-2-BSPT**

Conduit Connection, 1" NPT female conduit connection with no wire leads.

To order add suffix -CND.

Example: **FS-2-CND**

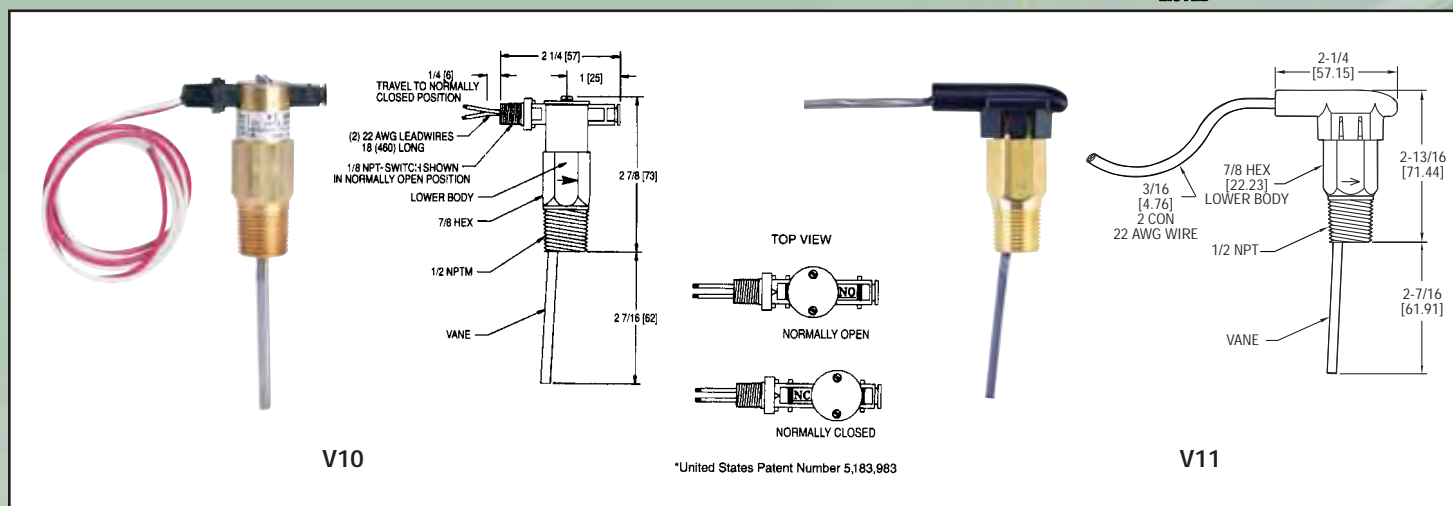
Series
V10
&
V11

FLOTECT® Mini-Size Flow Switch

Proof of Flow or No Flow in 1/2 to 2" Pipe,
Low Cost, Leak Proof Body, Weatherproof



FLOW



Designed to provide an inexpensive, reliable unit to monitor the presence or absence of flow in a system. The V10 and V11 flow switches are used to monitor unattended equipment and protect it from costly damage. The V10 flow switch utilizes a rugged, hermetically sealed reed switch which is encapsulated in a polypropylene switch housing that fits into a standard heavy duty leak proof brass body or optional 303 SS body. The patented switch adjustment* allows the user to change the switch to Normally Open (NO) or Normally Closed (NC) in the field merely by loosening two screws. The switch housing is located outside the process media, making switch change-over or maintenance easy without interruption of process flow.

The V11 Flotect® flow switch takes our very popular V10 design and adds rugged, integral electrical wiring. The one-piece PBT switch housing snaps onto the body and the wiring is epoxy sealed making the switch weatherproof, meeting NEMA 4 standards. The 22 AWG cable used is UV resistant, flame retardant, and comes standard 6 feet in length. This unique design eliminates the need for running conduit between the switch and panel, lowering installation costs.

A full size, trimmable stainless steel vane is provided with a removable laminated template. This template is calibrated for brass or ductile iron reducing tees and forged steel straight tee/bushing combinations. Allows for field installation in pipelines from 1/2" to 2" diameter. A table with approximate actuation and deactivation values is provided below.

APPLICATION

- Perfect for proving flow in boilers, hot water heaters, and chillers

Cold Water Flow Rates Approximate actuation/deactuation GPM upper, LPM lower				Air Flow Rates Approximate actuation/deactuation SCFM upper, LPM lower			
Pipe	Trim	N.O.	N.C.	Pipe	Trim	N.O.	N.C.
1/2"	L	2.6/2.3 9.8/8.7	2.6/2.5 9.8/9.5	1/2"	L	10.3/8.8 291.7/250	10.2/9.2 288/260
3/4"	J	3.1/2.7 11.7/10.2	3.1/2.8 11.7/10.6	3/4"	J	13/11.6 368.3/328	12.9/11.6 365/328
1"	H	4.8/4.5 18.2/17	4.8/4.4 18.2/16.7	1"	H	19.2/17.6 543.3/498	18.9/17.6 535/498
1 1/4"	E	6.2/5.6 23.5/21.2	6.1/5.6 23.1/21.2	1 1/4"	E	24.8/22.2 701.7/628	24.5/22.5 693/637
1 1/2"	C	8.2/7.7 31/29.1	8.2/7.7 31/29.1	1 1/2"	C	33.4/31.2 946.7/883	33/30.6 935/867
2"	Full	9.5/9.1 36/34.4	9.5/9 36/34.1	2"	Full	50.2/48.4 1422/1370	50.2/47.7 1422/1352

SPECIFICATIONS

Service: Compatible gases or liquids.

Wetted Materials:

- Vane: 301 SS.
- Body: Brass or 303 SS.
- Pin and Spring: 301 SS, 302 SS, and 316 SS.
- Magnet: Ceramic 8.

Temperature Limit: V10: 200°F (93°C), V11: 190°F (88°C) maximum.

Pressure Limit: Brass body: 1000 psig (69 bar), 303 SS body: 2000 psig (138 bar).

Switch Type: SPST hermetically sealed reed switch. V10: Field adjustable for normally open or normally closed.

Electrical Rating: 0.5A @ 30VAC, 1.5A @ 24VDC.

Electrical Connections: V10: 22 AWG, 18' (460 mm) long, V11: 22 AWG, 6' (1.83 m) long. Rated 392°F (200°C). 300V. Flame retardant extruded FEP insulation and overall shield.

Conduit Connection: V10: 1/8" male NPT.

Process Connection: 1/2" male NPT standard. Contact factory for other options.

Mounting Orientation: Switch can be installed in any position but the actuation/deactuation flow rates are based on horizontal pipe runs and are nominal values.

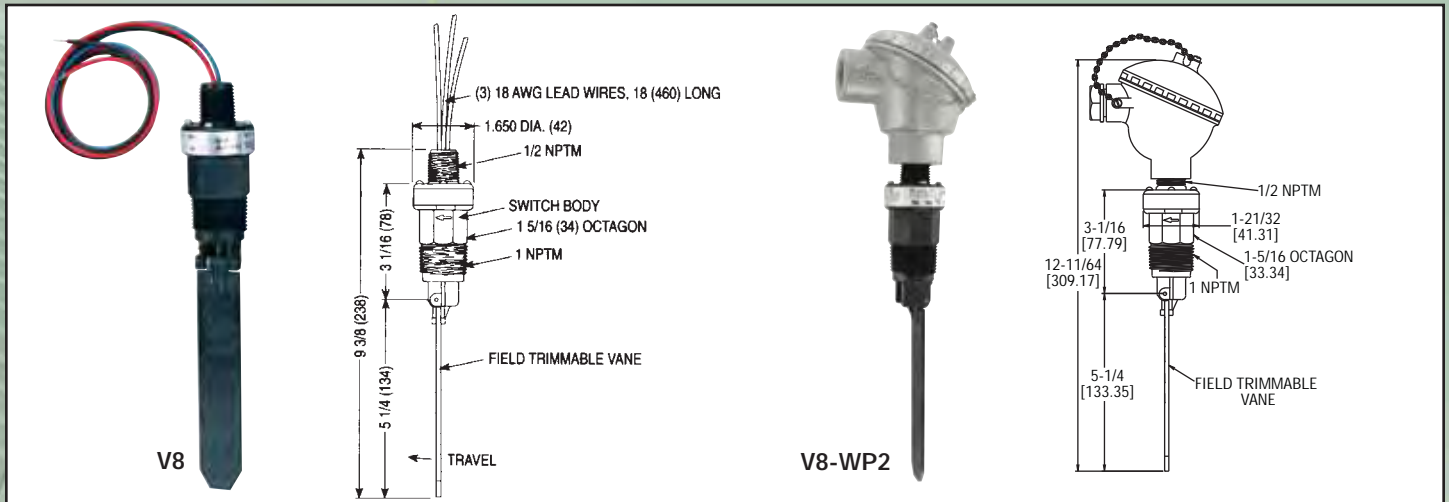
Set Point Adjustment: Vane is trimmable.

Weight: V10: 4.5 oz (0.13 kg), V11: 5.8 oz (0.165 kg).

Agency Approvals: V10: CE, UL and CSA; V11: UL.

Switch Enclosure: V10: Polypropylene, V11: Polybutylene terephthalate (PBT).

Model Number	Body Material	Switch Configuration
V11-BNOA-6	Brass	Normally Open
V11-BNCA-6	Brass	Normally Closed
V11-SNOA-6	303 SS	Normally Open
V11-SNCA-6	303 SS	Normally Closed
V10	Brass	Normally Open or Closed
V10SS	303SS	Normally Open or Closed



V8 Flotect® Flow Switch Protects Equipment: Operation is simple and dependable. In most applications, the switch is normally off while there is sufficient flow of liquid or air. When flow stops, the vane spring moves the vane, actuating a single pole double throw switch rated 5A @ 120/250 VAC to start or stop motor, pump, engine, etc. Operate a damper or valve; shut down a burner or actuate an alarm or signal, protecting unattended equipment from damage or loss of production.

The V8 Flotect® Flow Switch has a leak proof body and vane constructed of tough durable polyphenylene sulfide which has excellent chemical resistance. The full size trimmable vane is provided with molded-in graduations allowing for installation in a 1 inch through 6 inch pipe. Operating pressures are up to 150 psig (10 bar) and temperatures to 212°F (100°C). The V8 flow switch can be used in various chemical processes, industrial systems and similar applications where process conditions are compatible with polyphenylene sulfide, ceramic 8 and 316SS. The V8 Flotect® flow switch is UL recognized as an industrial motor controller per UL standard 508, suitable for mounting in a protected environment.

APPLICATIONS

- HVAC and building automation systems that incorporate components that located outside of the building and exposed to the building and exposed to the elements are ideal applications
- Perfect for proving flow in boilers, hot water heaters, and chillers

Cold Water Flow Rates Approximate actuation/deactuation GPM upper, LPM lower		Air Flow Rates Approximate actuation/deactuation SCFM upper, LPM lower	
Pipe Size		Pipe Size	
1"	10.8/9.1 40.9/34.6	1"	39/32.6 1105/923
1 1/4"	9.8/8.3 37.2/31.4	1 1/4"	37.5/32.2 1062/912
1 1/2"	8.6/6.8 32.4/25.7	1 1/2"	33.4/26.7 945/757
2"	10.9/8.8 41.2/33.4	2"	43/36.8 1218/1042
3"	12.9/8.9 48.8/33.5	3"	52.7/38.9 1493/1100
4"	21.1/13.8 79.7/52.2	4"	87.6/63.6 2482/1802
6"	45/33 170.2/124.7	6"	168.6/137.4 4775/3890

SPECIFICATIONS

Service: Compatible gases or liquids.

Wetted Materials:

Vane and Body: Polyphenylene Sulfide (PPS).

Pin and Spring: 316 SS or Inconel®.

Magnet: Ceramic 8.

Temperature Limit: 212°F (100°C).

Pressure Limit: 150 psig (10.34 bar).

Enclosure Rating: General purpose, WP/WP2 option is weatherproof.

Switch Type: SPDT snap switch, MV option: SPDT gold contact snap switch.

Electrical Rating: 5A @ 125/250 VAC, 5A resistive, 3A inductive @ 30 VDC. MV option: 1A @ 125 VAC, 1A resistive, 0.5A inductive @ 30 VDC.

Electrical Connections: 18 AWG, 18' (460 mm) long.

Conduit Connection: 1/2" male NPT, 1/2" female NPT on WP and WP2.

Process Connection: 1" male NPT.

Mounting Orientation: Switch can be installed in any position but the actuation/deactuation flow rates are based on horizontal pipe runs and are nominal values.

Set Point Adjustment: Vane is trimmable.

Weight: 4.5 oz (0.13 kg).

Agency Approvals: CE, UL 508 for US and Canada.

V8 Flow Switch

OPTIONS:

Gold Plated Contacts, for dry circuits. Rated 1A @ 125 VAC; 1A resistive, 0.5A inductive @ 30 VDC. To order add suffix -MV.

Example: **V8-MV**

Inconel® Alloy Option. Inconel® Alloy replaces standard 316 SS wetted parts. Wetted parts are Inconel® Alloy, ceramic 8, and Polyphenylene Sulfide. To order add suffix -INC. Example: **V8-INC**

Weatherproof Enclosure. Optional housing is phenylpolioxide and provides weatherproof protection for electrical wiring.

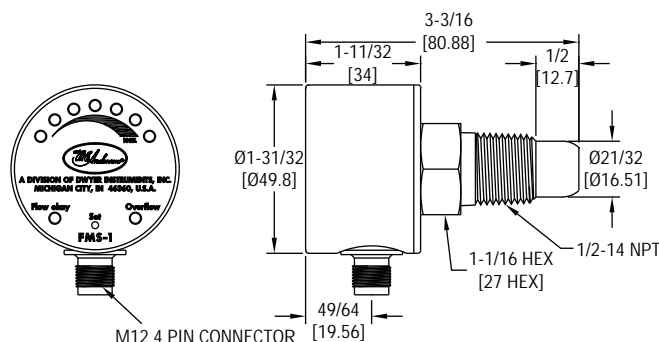
To order add suffix -WP. (Not UL approved)

Example: **V8-WP**

Weatherproof Enclosure. Optional housing is aluminum and provides weatherproof protection for electrical wiring.

To order add suffix -WP2. (Not UL approved)

Example: **V8-WP2**



FMS Series Flow Sensor

- Automatic scaling and set-point
- No moving parts
- Learn function for flow rate
- Push-button re-scaling if needed
- Easy to install

Series FMS Flow Sensor FMS-1 is for applications requiring RELATIVE measurement and set-point of flow rate. This means that the actual velocity of the flow or the quantitative measurement in GPM is not known and is not important. What is important is that the set-point can be set as a “percentage of” or “relative to” the full flow rate. No other flow sensor could do it this simply or effectively.

HOW IT OPERATES

The model FMS uses a set of flashing LED's to indicate flow. All 7 of the LED's will remain lit to show 100% flow rate. The flow OK light will also be lit showing that the established full flow rate is what is flowing in the pipe. When you initially set the flow rate, it will mark that as your 100% mark. If your flow reduces below the 50% mark, you will get an alarm from the sensor.

If flow increases beyond the initially established flow rate, the “Overflow” LED light will come on. It is then the operator's decisions as to whether to ignore it if too much flow is not a problem and may actually choose this flow rate to be the new “normal” flow rate. This can be done by just depressing the “set” button until all LED's flash. The FMS has now recalibrated itself to the new flow rate. The “flow ok” LED will again light and the set-point will automatically be re-set at the 50% of flow point.

SPECIFICATIONS

Service: Water and water based liquids/oil and oil-based liquids.

Wetted Materials: Sensor Head: 303 SS.

Low Flow Set Point: Auto set @ 50% / Adjustable via “set” push button.

Set Point Range: 5.0 ft/sec (0-150 cm/sec.)

Repeatability: < 0.5%.

Hysteresis: 10% of set-point value typical.

Medium Temperature Limits: -4 to 176°F (-20 to 80°C.)

Pressure: 450 psi (30 bar).

Response Time: 25 seconds (typical).

Supply Voltage: 20-30 VDC (short circuit protected).

Switching Current: < 200 mA.

Power Consumption: 6 W max.

Electical Connection: M12 male socket 4pin. Comes with 6.5 ft (2 m) cable with M12 connector and pigtail.

Process Connection: 1/2" Male NPT Thread.

Enclosure Rating: IP 65 (NEMA 4).

Initial Operation: After 15 seconds.

Switch Type: PNP N.O. (switch closed with flow), PNP N.C. (switch open with flow).

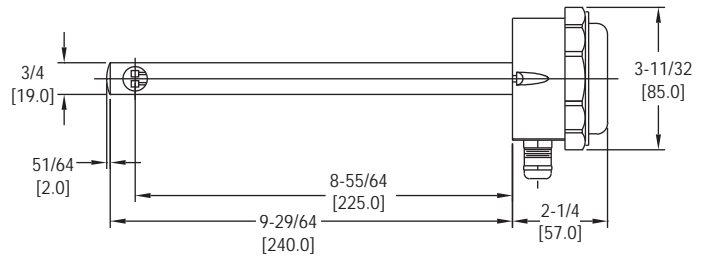
Weight: .55 lb. (.25 kg).

APPLICATIONS

- Perfect for proving flow in boilers, hot water heaters, and chillers.

FMS-1 Flow Sensor PNP N.O.

FMS-2 Flow Sensor PNP N.C.



The Series AVU Air Velocity Transmitter is ideal for a wide range of HVAC measurement and control applications, particularly in complete building control and energy management systems. The Series AVU offers 5% accuracy at a surprisingly low cost, with six units covering ranges from 0-785 fpm to 0-3150 fpm, with either 4-20 mA or 0-10 VDC output.

The Series AVU Transmitter operates by measuring the heat loss from one of the two sensing elements in the air stream, then calculating the air velocity. Units are virtually immune to drift due to the design of the sensing element, which makes the transmitter accurate over the whole air velocity range.

FEATURES

- 4-20 mA or 0-10 V Output Versions
- NEMA 6 (IP67) Enclosure Rating
- AC or DC Powered (Loop Version DC Only)
- 5% Accuracy

APPLICATIONS

- Supply and exhaust fan tracking
- Clean room systems
- Medical rooms

SPECIFICATIONS

Service: Clean air and compatible, non-combustible gases.

Accuracy: $\pm 5\%$ of full scale.

Response Time (90%): 5 sec (typical).

Temperature Limits: 32 to 122°F (0 to 50°C).

Humidity Limit: 0-90% RH, non-condensing.

Power Requirements: -A models 24 VDC $\pm 10\%$ -15%; -V models 24 VDC or 24 VAC $\pm 10\%$ -15%.

Output Signal: -A models 4-20 mA current loop; -V models 0-10 VDC.

Loop Resistance: (-A models) 700 ohms.

Current Consumption: 60 mA + output current.

Max. Start Up Current: 85 mA; 10 V.

Output Current Limit: (-V models) > 10 mA.

Electrical Connections: Screw terminal. Cable gland for 4-8 mm wire (16 gauge wire).

Enclosure Rating: NEMA 6 (IP67) except sensing point.

Probe Dimensions: 9.45 x .75" (240 x 19 mm).

Mounting Orientation: Unit not position sensitive. Probe must be aligned with airflow.

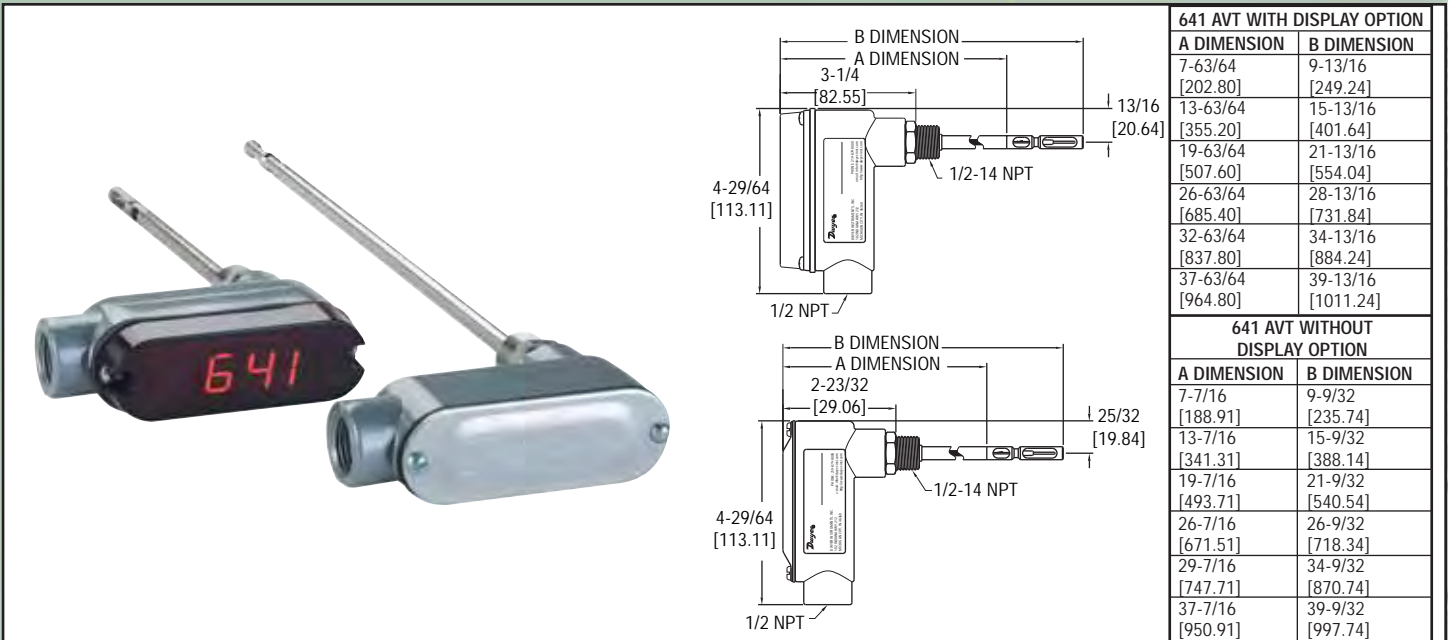
Weight: 8.8 oz (250 g).

Agency Approvals: CE.

Model	Range	Output
AVU-1-A	0-785 fpm (0-4 m/s)	4-20 mA
AVU-2-A	0-1575 fpm (0-8 m/s)	4-20 mA
AVU-3-A	0-3150 fpm (0-16 m/s)	4-20 mA
AVU-1-V	0-785 fpm (0-4 m/s)	0-10 VDC
AVU-2-V	0-1575 fpm (0-8 m/s)	0-10 VDC
AVU-3-V	0-3150 fpm (0-16 m/s)	0-10 VDC

Air Velocity Transmitter

16 Field Selectable Ranges in FPM or MPS



The new Series 641 Air Velocity Transmitter is the ideal instrument for monitoring air flow. This transmitter uses a heated mass flow sensor which allows for precise velocity measurements at various flow rates and temperatures. The 641's 16 field selectable ranges provides it the versatility to be selected for several air flow applications. The optional LED produces a complete, low-cost solution for local indication of air flow.

FEATURES

- Ranges to 15,000 FPM or 75 MPS
- Optional Bright LED Display
- Easy Push Button Set-up
- Compact Housing
- 4-20 mA Output
- Digital Filter for Signal Damping

APPLICATIONS

- Clean room fresh air supply
- HVAC air velocity measurements
- Fan supply and exhaust tracking
- Ensure proper lab hood exhaust flow rates

Model Number	Probe Length*
641-6	6" (152.4 mm)
641-6-LED	6" (152.4 mm)
641-12	12" (304.8 mm)
641-12-LED	12" (304.8 mm)
641-18	18" (457.2 mm)
641-18-LED	18" (457.2 mm)
641-24	24" (609.6 mm)
641-24-LED	24" (609.6 mm)
641-30	30" (762 mm)
641-30-LED	30" (762 mm)
641-36	36" (914 mm)
641-36-LED	36" (914 mm)

*Other probe lengths available contact factory.

SPECIFICATIONS

Service: Clean air and compatible, non-combustible gases.

Accuracy:

3% FS Process gas: 32 to 122°F (0 to 50°C).

4% FS Process gas: -40 to 32°F & 122 to 212°F
(-40 to 0°C & 50 to 100°C).

Response Time: Flow: 1.5 seconds to 95% of final value (Output filter set to minimum).

Temperature Limits: Process: -40 to 212°F (-40 to 100°C). Ambient: 32 to 140°F (0 to 60°C).

Pressure Limit: 100 psi (6.89 bar) maximum.

Humidity Limit: Non-Condensing.

Power Requirements: 12-35 VDC, 10-16 VAC. 1.5A rating required on supply due to initial power surge drawn by transmitter.

Output Signal: 4-20 mA, isolated 24V source, 3 or 4-wire connection.

Output Filter: Selectable 0.5 - 15 (seconds).

Loop Resistance: 600 ohms max.

Current Consumption: 300 mA max.

Electrical Connections: Screw terminal.

Process Connections: 1/2" male NPT.

Enclosure Rating: Designed to meet NEMA 4X (IP66) for non LED models only.

Mounting Orientation: Unit not position sensitive. Probe must be aligned with airflow.

Weight: 12.6 oz (357.2 g).

Agency Approval: CE.

OPTIONAL DISPLAY VERSION:

Display: 4-1/2 digit 1/2" red LED.

Resolution: 1 FPM, 0.01 MPS

(10 FPM @ 10,000 and 15,000 FPM ranges).

Weight: 13.3 oz (377 g).

ACCESSORIES

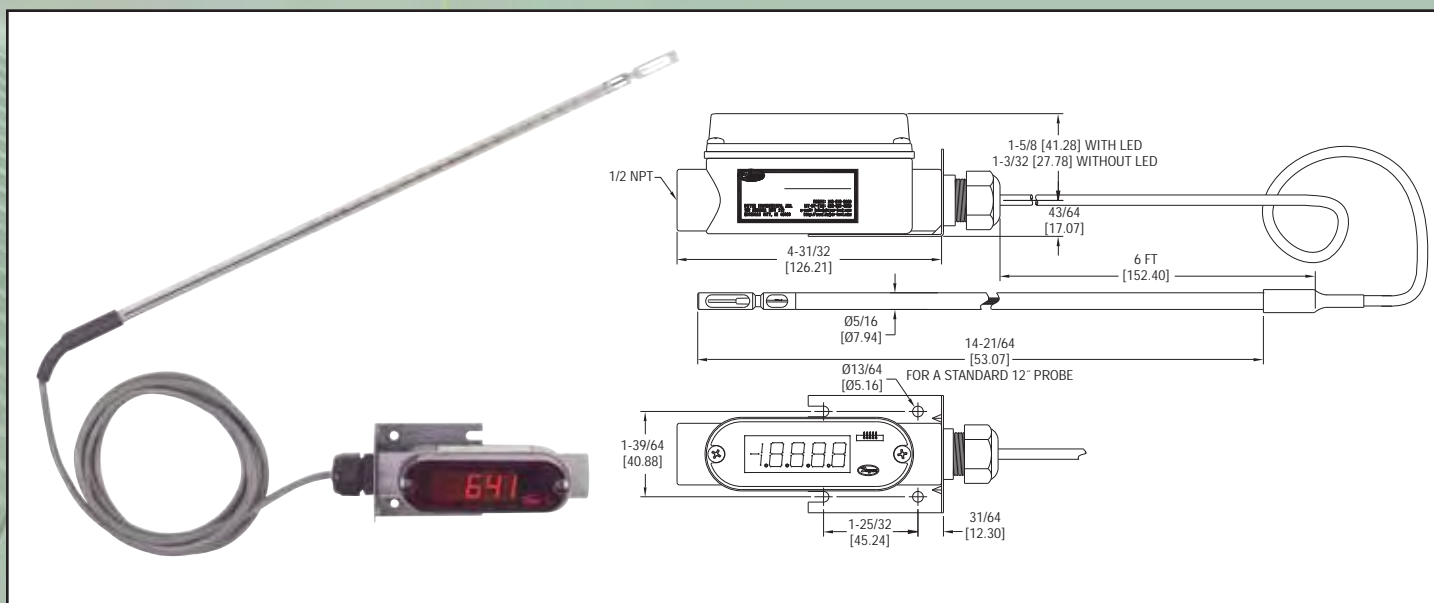
A-156 Universal Mounting Plate 1/2" female NPT

A-158 Split Flange Mounting Kit

A-159 Duct Mounting Gland

Air Velocity Transmitter with Cable

For Remotely Mounting Electronic Enclosure



The Series 641RM is the ideal instrument for monitoring air flow. This transmitter uses a heated mass flow sensor, which allows for precise velocity measurements at various flow rates and temperatures. The 641RM's 16 field selectable ranges from 0-250 to 15,000 FPM (0-1.25 to 75 MPS) provide it the versatility to be selected for a multitude of applications. The unit's 6' cable which connects the sensing probe with the electronic enclosure allows the enclosure to be mounted where it can be more easily accessed. Longer cable lengths are available for ducts that are at very high elevations from the plant floor. The optional LED produces a complete, compact solution for local indication of air flow.

APPLICATIONS

- Clean room fresh air supply
- HVAC air velocity measurements
- Fan supply and exhaust tracking
- Ensure proper lab hood exhaust flow rates

Model 641RM-12, Air Velocity Transmitter with 6' cable

Model 641RM-12-LED, same as above with LED display

ACCESSORIES

A-156 Universal Mounting Plate, 1/2" female NPT

A-158 Split Flange Mounting Kit

A-159 Duct Mounting Gland

SPECIFICATIONS

Service: Clean air and compatible, non-combustible gases.

Accuracy:

3% FS Process gas: 32 to 122°F (0 to 50°C).

4% FS Process gas: -40 to 32°F & 122 to 212°F
(-40 to 0°C & 50 to 100°C).

Response Time: Flow: 1.5 seconds to 95% of final value (output filter set to minimum).

Temperature Limits: Process: -40 to 212°F (-40 to 100°C). Ambient: 32 to 140°F (0 to 60°C).

Pressure Limit: 100 psi (6.89 bar) maximum.

Humidity Limit: Non-Condensing.

Power Requirements: 12-35 VDC, 10-16 VAC. 1.5A rating required on supply due to initial power surge drawn by transmitter.

Output Signal: 4-20 mA, isolated 24V source, 3 or 4-wire connection.

Output Filter: Selectable 0.5-15 (seconds).

Loop Resistance: 600 ohms max.

Current Consumption: 300 mA max.

Electrical Connections: Screw terminal.

Mounting Orientation: Unit not position sensitive. Probe must be aligned with airflow.

Weight: 13.2 oz (374.26 g).

Cable Length: 6 ft (1.82 m).

Probe Length: 12" (30.48 cm) standard.

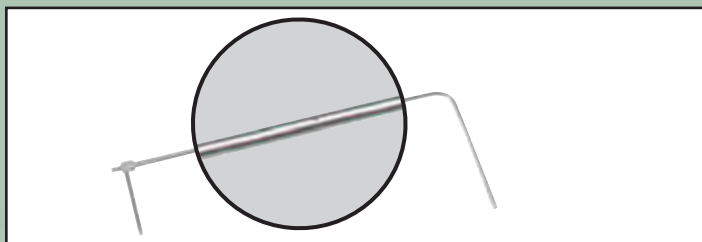
Probe Diameter: 5/16" (0.79 cm).

OPTIONAL DISPLAY VERSION:

Display: 4-1/2 digit 1/2" red LED.

Resolution: 1 FPM, 0.01 MPS
(10 FPM @ 10,000 and 15,000 FPM ranges).

Weight: 13.9 oz (394.16 g).



Standard Model 160 Pitot Tube

Ideal for use with our precision manometers and air velocity gages, Dwyer® Pitot Tubes are constructed from corrosion resistant stainless steel for a lifetime of service. ASME design meets AMCA and ASHRAE specifications for maximum accuracy over a wide variety of flow conditions. No correction factors required as ASHRAE tip design yields a calibration factor of 1. ASHRAE design needs no calibration! Permanent, stamped insertion depth graduations on sides of 160 series facilitate accurate positioning. Static pressure port is parallel to sensing tube allowing quick, easy alignment of tube with air flow. Low sensitivity to misalignment gives accurate reading even when tube is misaligned up to 15 degrees. Various standard sizes are available for use in ducts as small as 4" dia. or as large as 36 ft dia. A universal model fits user supplied 3/4" schedule 40 (standard) pipe in any length. Several convenient mounting options are available for permanent installations.

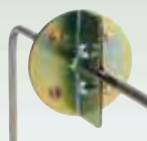
- No calibration needed.
- Precisely located, burr-free static pressure holes.
- Hemispherical tip design, best for accuracy if imperfectly aligned and nearly impossible to damage.
- Long lasting 304 SS construction.
- Silver soldered connections for leak-proof operation.
- Coefficient of "1."
- 5/16" models rated to 1500°F.
- Extended static connection helps guide tip within recommended 15° of air flow direction.
- Inch graduations on sides of 160 series to quickly determine exact insertion depth.
- Dwyer® Air Velocity Calculator, direct reading flow charts and instructions included.
- Use 1/8" models in ducts as small as 4", 5/16" models in ducts 10" or larger.
- Optional mounting gland or split flange make permanent installation fast and simple.

Series 160 is designed to meet:

- ASME "Fluid Meters" 6th Ed.
- ANSI/AMCA 210-99
- ANSI/ASHRAE 51-1999
- British Standard 1042

APPLICATIONS

- Monitor or control static or differential pressure when combined with differential pressure gage, switch or transmitter.



A-158 Split Flange Mounting

ACCESSORIES

No. A-158 Split Flange Mounting can be added to any Dwyer® No. 160 Standard Pilot Tube. Cadmium plated steel. Gasket is pattern for mounting holes. Secure flange loosely to tube, adjust tube depth and tighten screws. Gasket of 1/16" Neoprene fits tightly around tube and against duct for leak-proof seal. Nuts, washers included.

No. A-159 Mounting Gland — No. A-159 Mounting Gland — Versatile adapter slips on any Series 160, 5/16" standard Pilot tube made after Dec. 1990. Two-part stainless steel fitting slides over tube and provides permanent, secure mounting. Where duct interior is accessible, use the washers and jam nut supplied. For blind applications or in thicker materials, use model A-159 flange mounting plate. Once tube is adjusted to proper depth and angle, tighten smaller hex bushing to lock position. Tighten bushing inside assures leak-proof seal even at higher temperatures. TFE bushing also available.

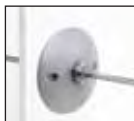
NOTE: For full insertion with this fitting, order next longer Pitot tube.

No. A-397 Step Drill. For fast, convenient installation of Pitot tubes in sheet metal ducts. No center punch needed; automatic de-burring. Drills six sizes from 3/16"-1/2" in 1/16" increments.

A-159 Mounting Gland is used for both duct mounting and flange mounting. To flange mount, the A-159 must be used with the A-156 flange mounting plate.



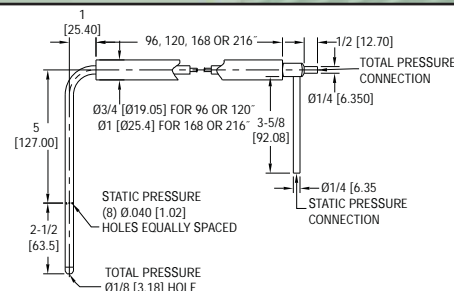
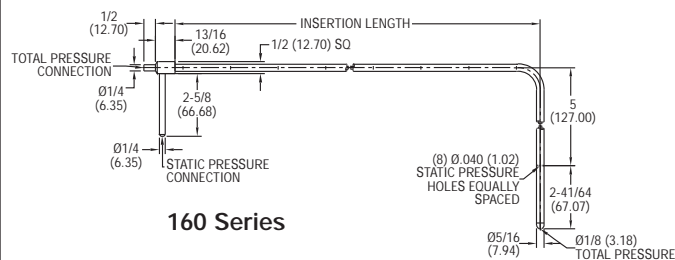
A-159 Duct
Mounting Glance



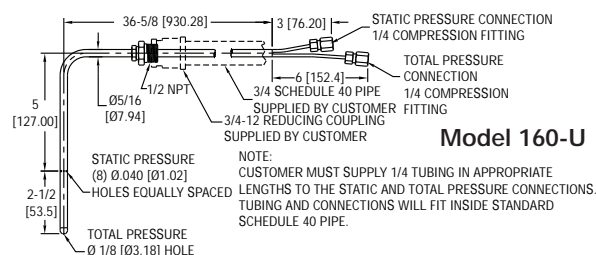
A-156 Flange
Mounting Plate
with 1/2" female NPT



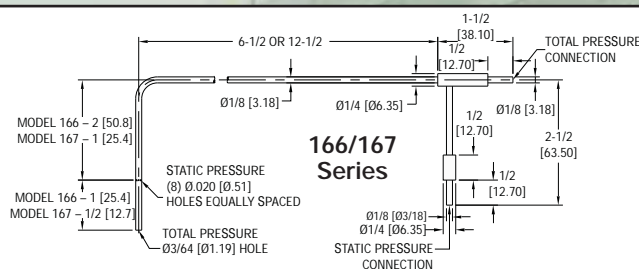
A-397 Step Drill



**160 Series
Longer
Models with
Stiffener**



Model 160-U

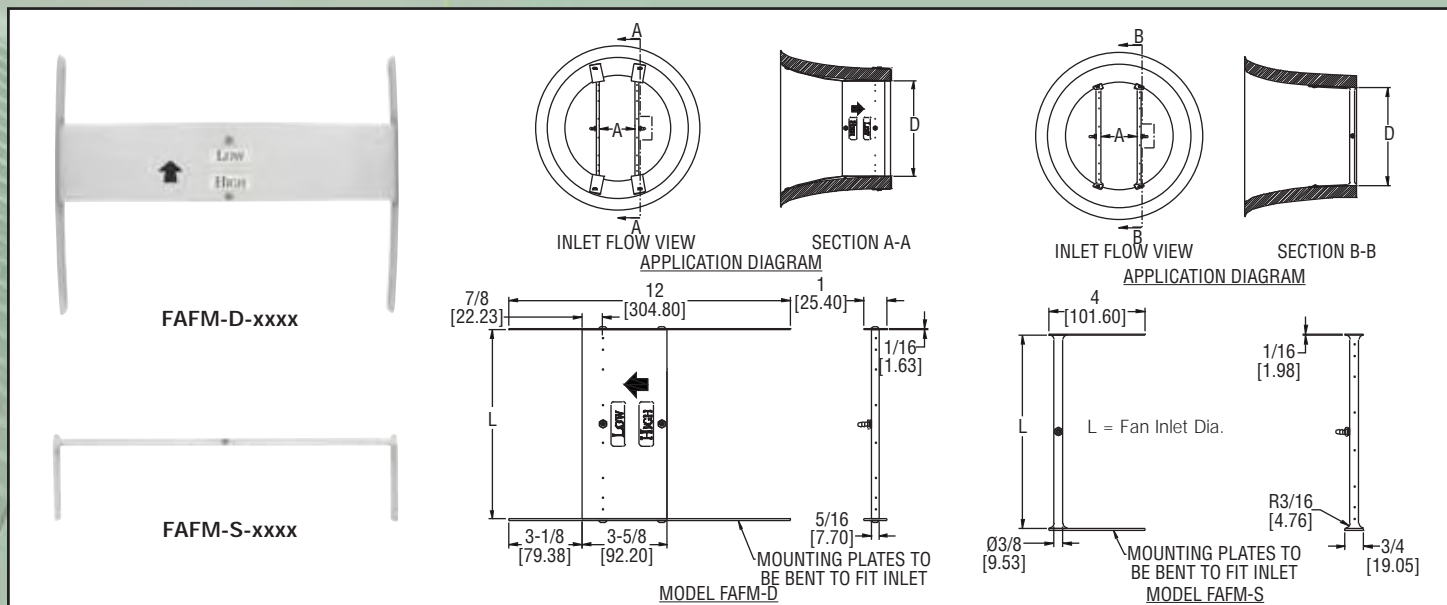
166/167
Series

Standard 5/16" Dia.		Longer Length w/ Stiffener	
Model Number	Insertion Length	Model Number	Insertion Length
160-8	8-5/8"	160-96	96"
160-12	12-5/8"	160-120	120"
160-18	18-5/8"	160-168	168"
160-24	24-5/8"	160-216	216"
160-36	36-5/8"	Pocket Size 1/8" Dia.	
160-48	48-5/8"	166-6	6"
160-60	60-5/8"	166-12	12"
Universal Model for 3/4" Pipe		167-6	6"
160-U	*	167-12	12"
Accessories & Options			
A-156 Flange Mounting Plate 1/2" female NPT A-158 Split Flange A-159 Mounting Gland A-397 Step Drill		Compression Fitting mounting option for 166/167 Series. Add -CF suffix (166-6-CF).	

*Universal model for permanent installation and connection to metal tubing. Make any length Pitot tube with 3/4" schedule 40 pipe, 3/4" to 1/2" reducing bushing and 1/4" metal tubing.

Fan Inlet Air Flow Measuring Probe

Lightweight, Durable, & Easy to Install



The Model FAFM Fan Inlet Air Flow Measuring Probes use evenly distributed total and static pressure measuring points to deliver an accurate measurement of flows in a fan inlet. The Air Flow Measuring Probes can be completely installed from outside of the fan making it ideal for when proper duct locations are unavailable. With its lightweight and durable construction in addition to its ease of installation, this product lends itself to being used in the HVAC industry.

There are two versions of the model FAFM fan inlet air flow probes to choose from depending on the depth of the fan inlet.

For fan inlets with depth less than 3-1/2" (8.89 cm): Please order a fan inlet probe with an "S" suffix. This probe has a diameter of .375" (.95 cm). It employs one total flow measuring tube and one static measuring tube. Each probe is covered with an extruded aluminum anodized coat. Each measuring tube has multiple sensing points.

For fan inlets with depth greater than 3-1/2" (8.89 cm): Please order a fan inlet probe with a "D" suffix. This probe has a diameter of 3-1/2" (8.89 cm). It employs extruded aluminum anodized coated probes with both total and static sensors on each tube.

Please Note: One model number is for a **set of two fan inlet air flow measurement probes**. A set is necessary in order to ensure an accurate reading. No more than two air flow measurement probes will be needed to obtain an accurate reading

SPECIFICATIONS

Wetted Materials: Aluminum with clear anodized finish.

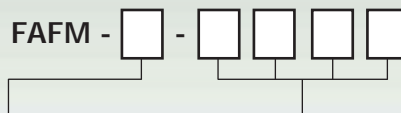
Accuracy: ±2% (Note: Field Calibration May Be Required).

Max. Temperature: 400°F (204°C).

Minimum Design Flow: 400 fpm (2.03 m/sec).

Maximum Design Flow: 12,000 fpm (60.96 m/sec).

Process Connections: 1/4" NPT female.



S - Fan inlet depth less than 3-1/2"

D - Fan inlet depth greater than 3-1/2"

Fan inlet diameter in inches where the boxes represent the tens, ones, tenths, and hundredths digits of the diameter respectively. i.e. ____ . ____ go to the corresponding box in the sequence.

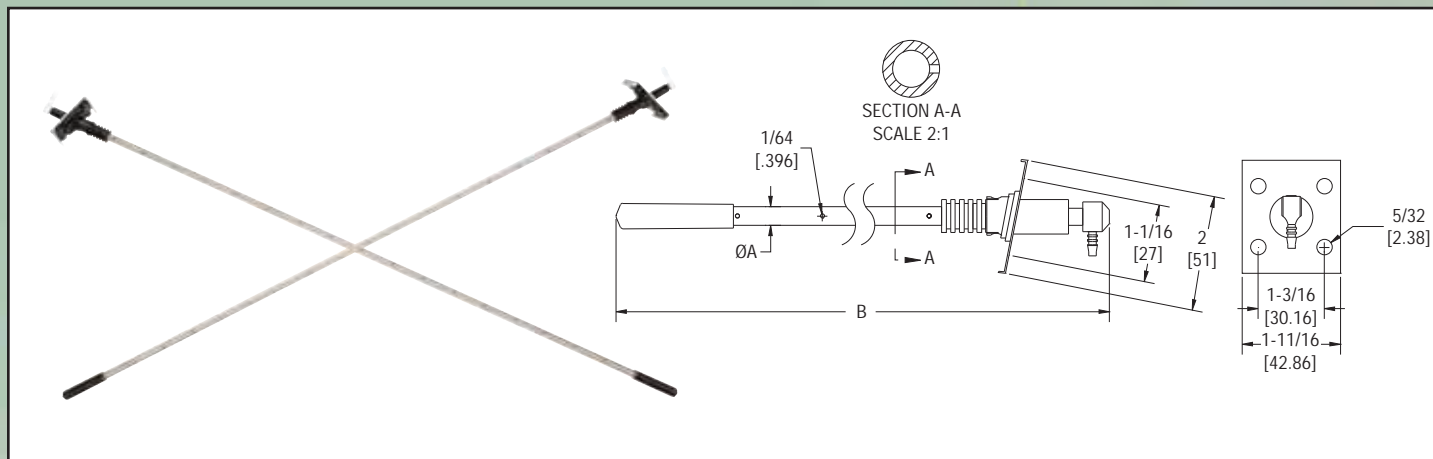
Example: For a fan inlet that is exactly 12" in diameter and has a depth of more than 3-1/2" the model number will be: FAFM-D-1200.

Example: For a fan inlet that is 23.89" in diameter and has a depth of less than 3-1/2" the model number will be: FAFM-S-2389.

Example: For a fan inlet that is 6.24" in diameter and has a depth of less than 3-1/2" the model number will be: FAFM-S-0624.

Averaging Flow Grid

Cost Effective Air Flow Station for Ducts up to 60"



The **Series AFG Flow Grid** is an outstandingly simple yet accurate and cost effective alternative to other duct mounted pressure sensors. Once installed and connected to a suitable measuring instrument, the device will provide years of trouble free monitoring of both air and gas flow. Installing the AFG Flow Grid is quick and easy, the AFG is supplied in kit form to allow both workshop and on-site installation into a wide range of square and circular ducts up to approximately 60".

The AFG Flow Grid is a fundamental pressure-sensing device designed to transmit a continuous differential pressure signal. When this output is connected to a suitable measuring instrument (i.e. manometer, pressure transducer, etc.) it may be used to determine air velocity and volume flow rate.

HOW THE AFG FLOW GRID WORKS

The AFG Flow Grid consists of two tubes mounted diagonally across a square or rectangular duct, or diametrically across a round duct. The tubes are drilled with a series of equi-spaced holes.

The holes in one tube face directly upstream and sense total pressure, while the pairs of holes in the second tube also face forward but at an included angle of 79 degrees, sensing static pressure.

The total and (sub) static pressures are averaged along the length of each tube and provide pressure signals at connectors outside the duct wall. The pressure differentials across these connectors constitute the output signal.

SPECIFICATIONS

Service: Monitor air or compatible gas flow.

Wetted Materials: 304 SS, PVC, Polyurethane, acetyl plastics, and neoprene rubber.

Accuracy: $\pm 5\%$.

Maximum Temperature: 176°F (80°C).

Velocity Range: 295.2 ft/min to 5904 ft/min (1.5 to 30 m/sec).

Diameter of Tubes: 5/16" (8 mm) or 5/8" (16 mm).

Max Duct Diagonal: 60.4" (153.4 cm).

Max Duct Diameter: 59.4" (150.9 cm).

Process Connections: 5/16" barbed.

Weight: AFG-1: 1 lb (454 g); AFG-2: 3 lb (1361 g).

APPLICATIONS

The AFG Flow Grids will give useful and reliable readings in a wide variety of 'in duct' locations often where other flow rate measuring devices are found to be unsatisfactory.

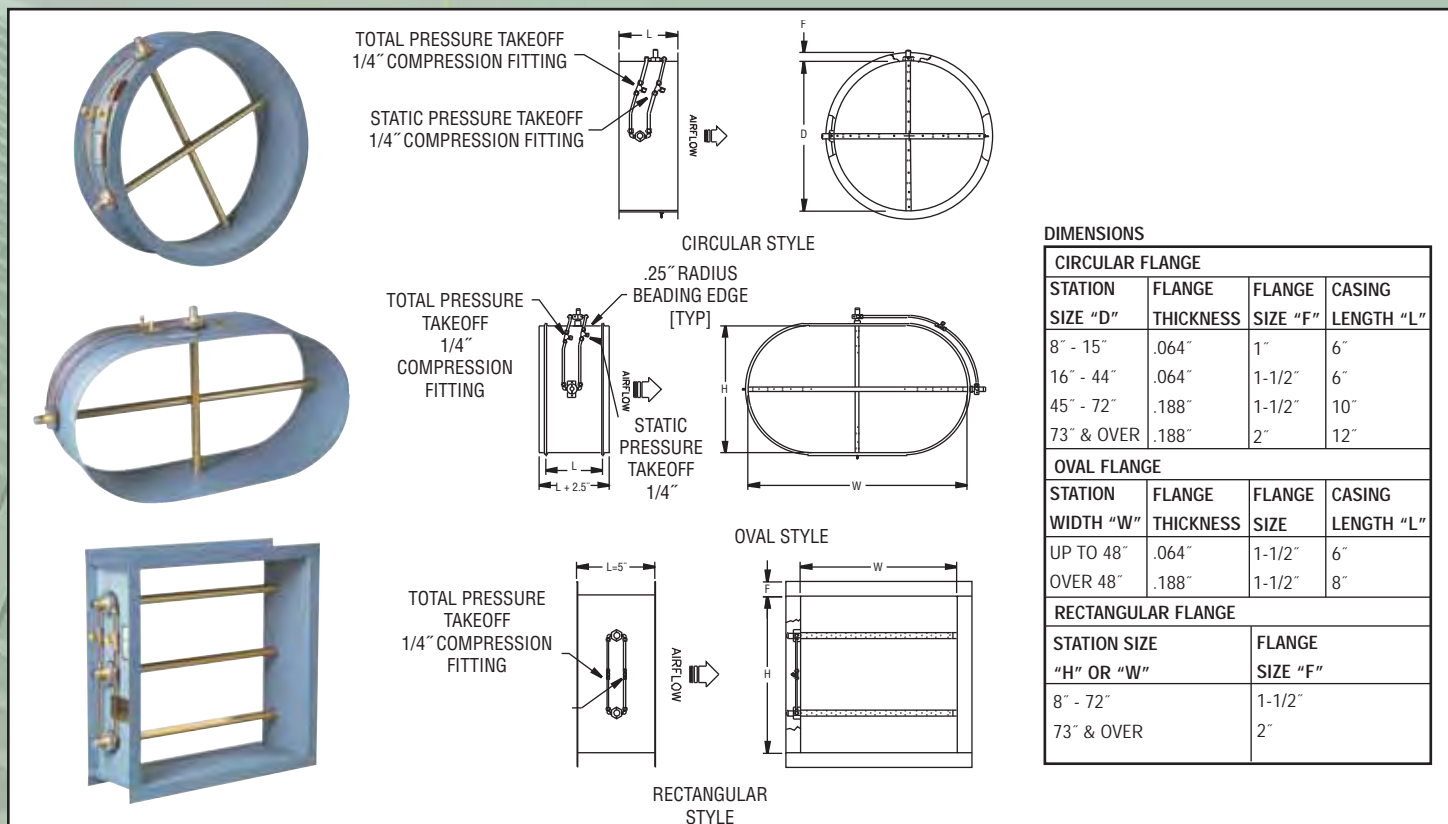
The signal from an AFG Flow Grid can be used in a variety of ways, for example:

- To display differential pressure, velocity or volume flow using a micro manometer, gage or transmitter.
- To give a warning of over or under flow rate using a pressure switch.
- To control air supply in a system by connecting the grid to a pressure transmitter with an electrical output which can be used to feed into a control system.
- To display differential pressure on a simple fluid manometer to give visual indication of changes in volume flow rate in the duct.

Model	Diameter Tube "A"	Length "B"
AFG-1	5/16" (8 mm)	27" (688 mm)
AFG-2	5/8" (16 mm)	59-4/5" (1518 mm)

Duct Mounted Airflow Measurement Station

Rectangular, Oval or Circular Configurations



The Series FLST Airflow Measurement Station is easy to install – simply connect the tubing to the station fittings, then to a differential pressure manometer, gage, transmitter or switch. Single or multiple airflow elements are factory mounted and pre-piped in a casing designed for flanged connection to the ductwork. Standard materials consist of a G90 galvanized casing and 6063-T5 anodized aluminum flow sensors, suitable for most HVAC applications. The Series FLST utilizes an airflow averaging element in a head-type device, generating a differential (velocity) pressure signal similar to the orifice, venturi, and other head producing primary elements. Strategically located sensing ports continually sample the total and static pressures when inserted normal to flow.

Total pressures sensed by the upstream ports are continually averaged within the airflow element in an isolated chamber. The static sensing ports are averaged in a second isolation chamber. Multiple elements are joined together for connection to a differential measurement device (gage, transmitter, etc.) for flow measurement and indication purposes.

FEATURES

- Low signal-to-noise ratio.
- Multiple total and static pressure sensing ports along the length of the element.
- Factory mounted and pre-piped in a flanged duct section (casing).
- $\pm 2\%$ accuracy throughout velocity ranges of 100 fpm and over.
- Standard construction includes galvanized casing and 6063-T5 anodized aluminum flow sensors.
- Standard airflow stations can be operated (in air) continuously in temperatures up to 350°F or intermittently in temperatures up to 400°F.
- All airflow stations can be operated in humidity ranges of 0 to 100%.
- Standard airflow stations have good salt air resistance and are suitable for most HVAC applications.

APPLICATIONS

- Sensing fan, blower, and air handler output
- Determine duct flow rates in various zones in building

SPECIFICATIONS

Accuracy: Within 2% of actual flow when installed in accordance with published recommendations.

K-Factor: 0.97.

Velocity Range: 100 to 10,000 fpm (0.51-51 m/s).

Wetted Material: Elements 6063-T5 anodized aluminum; Casings 16 ga G90 galvanized steel.

Coatings: Imron 333 polyurethane enamel.

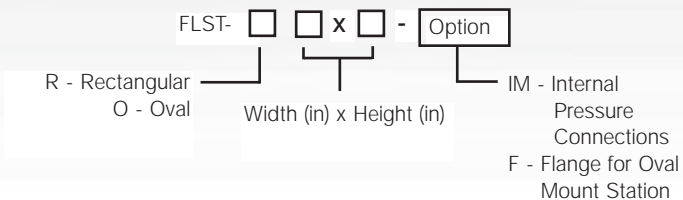
Temperature Limits: Galvanized Casings and Aluminum Elements 350°F (177°C) continuous operation (in air) 400°F (204°C) intermittent operation (in air).

Humidity: All Airflow Stations 0 to 100% non condensing.

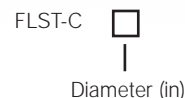
Process Connections: 1/4" compression fittings.

How To Order:

Rectangular or Oval Models



Circular Models



Note: When ordering rectangular or oval flow stations, pressure taps will always be located on the longer of the two dimensions.

Series FLST Rectangular or Oval

Size (in)	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"
8"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10"		X	X	X	X	X	X	X	X	X	X	X	X	X	X
12"			X	X	X	X	X	X	X	X	X	X	X	X	X
14"				X	X	X	X	X	X	X	X	X	X	X	X
16"					X	X	X	X	X	X	X	X	X	X	X
18"						X	X	X	X	X	X	X	X	X	X
20"							X	X	X	X	X	X	X	X	X
22"								X	X	X	X	X	X	X	X
24"									X	X	X	X	X	X	X
26"										X	X	X	X	X	X
28"											X	X	X	X	X
30"												X	X	X	X
32"													X	X	X
34"														X	X
36"															X

AIR VELOCITY

Size (in)	40"	44"	48"	52"	56"	60"	66"	72"	78"	84"	90"	96"	102"	108"	114"	120"
8"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
22"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
24"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
26"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
30"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
32"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
34"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
36"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
40"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
44"		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
48"			X	X	X	X	X	X	X	X	X	X	X	X	X	X
52"				X	X	X	X	X	X	X	X	X	X	X	X	X
56"					X	X	X	X	X	X	X	X	X	X	X	X
60"						X	X	X	X	X	X	X	X	X	X	X
66"							X	X	X	X	X	X	X	X	X	X
72"								X	X	X	X	X	X	X	X	X
78"									X	X	X	X	X	X	X	X
84"										X	X	X	X	X	X	X
90"											X	X	X	X	X	X
96"												X	X	X	X	X
102"													X	X	X	X
108"														X	X	X
114"															X	X
120"																X

Options

IM – Internal Pressure Connections

F – (Oval Stations Only)

Series FLST Circular*

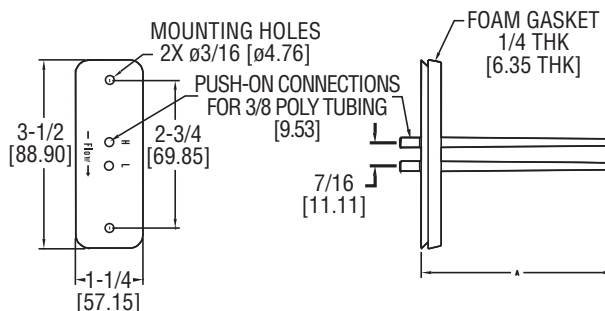
Size (in)	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	32"	36"	40"
	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Size (in)	44"	48"	54"	60"	66"	72"	78"	84"	90"	96"	102"	108"	114"	120"
	X	X	X	X	X	X	X	X	X	X	X	X	X	X

NOTE: When ordering rectangular or oval flow stations, pressure taps will always be located on the longer of the two dimensions.

Lightweight Averaging Flow Sensor

Ideal for Sensing Fan Flow Rates

AIR VELOCITY



The **Series SSS-1000 Lightweight Flow Sensor** is ideal for sensing differential pressure in the inlet section of variable air volume terminal units and fan terminal units. Units can also be used to sense differential pressure at other locations in the main or branch duct systems.

The “H” port senses total pressure and the “L” port senses static pressure. The difference between these signals is the differential, or velocity pressure.

Up to four sensing points and lengths of 3-5/32” to 9-29/32” (8.02 to 25.26 cm) to accommodate box size diameters of 4” to 16” (10.16 to 40.64 cm) are available.

APPLICATION

- Variable air volume terminal units.
- Fan terminal units
- Duct velocities
- Zone control in HVAC systems

SPECIFICATIONS

Service: Air and compatible gases.

Wetted Materials: ABS/Polycarbonate (UL94-5V).

Temperature Limits: Operating: 40 to 120°F (4 to 49°C); Storage: -40 to 140°F (-40 to 60°C).

Connection: 1/4” (6 mm) I.D. tubing for 3/8” (10 mm) O.D. tubing.

Mounting Orientation: Integral flange with gasket.

Weight: 1 oz (28 g).

Model	Length (Dimension A)
SSS-1002	3-5/32” (8.02 cm)
SSS-1003	5-13/32” (13.73 cm)
SSS-1004	7-21/32” (19.55 cm)
SSS-1005	9-29/32” (25.26 cm)
SSS-1006	12-1/2” (31.75 cm)
SSS-1007	14-3/4” (37.47 cm)
SSS-1008	17-1/8” (43.50 cm)
SSS-1009	19-13/32” (49.29 cm)
SSS-1010	21-21/32” (55.01 cm)
SSS-1011	23-29/32” (60.72 cm)

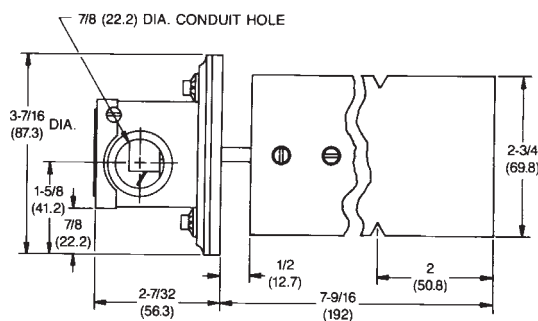
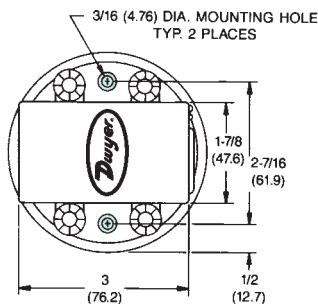
Model
530

Air Flow Switch

Adjustable from 400-1600 FPM, Stainless Steel Vane



Patent No. 4,725,700



The Model 530 air flow switch provides excellent sensitivity and reliability at a very reasonable price. Quality features include a rugged die cast body, stainless steel vane and SPDT snap switch. Unit is field adjustable from 400-1600 FPM. Mounting is fast and simple, with only two screws needed. Vane fits 6 in. or larger ducts.

APPLICATIONS

- Low air flow condition duct alarm

Model 530, Air Flow Switch

Range 400-1600 FPM mounted on top of horizontal duct.

CAUTION: FOR USE ONLY WITH AIR OR NON-COMBUSTIBLE NON-CORROSIVE GASES. UNIT IS NOT SEALED AGAINST DUST.

SPECIFICATIONS

Service: Air and non-combustible gas flow.

Wetted Materials: Contact factory.

Vane: Stainless Steel.

Temperature Limit: 180°F (82°C).

Switch Type: SPDT.

Electrical Rating: 125 VAC - 9.8 amp full load 58.8 amp locked rotor. 250 VAC - 4.9 amp full load 29.4 amp locked rotor. Pilot Rating: 470 VA at 125, 250 VAC. Resistive: 15 amp at 125, 250, or 480 VAC.

Electrical Connections: Screw type terminal.

Conduit Connection: 7/8" conduit hole.

Mounting Orientation: Horizontal duct flow

Set Point Adjustment: Screw type.

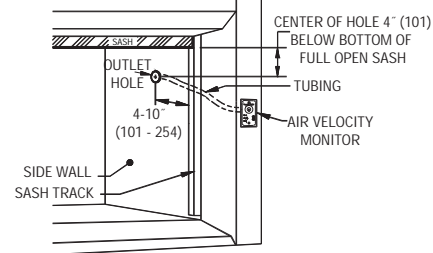
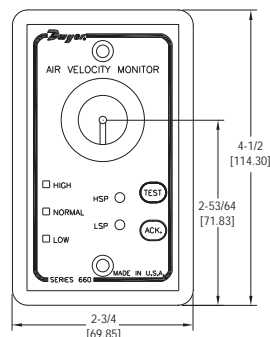
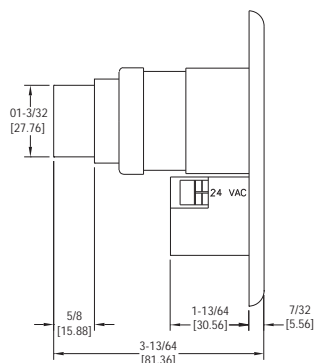
Weight: 1 lb, 1 oz (481.94 g)

Agency Approvals: UL, CSA, CE.

Model
660

Air Velocity Monitor

Continuously Measures Fume Hood Airflow



Model 660 Air Velocity Monitors are a practical, affordable way to continuously monitor for safe airflows through laboratory fume hoods. They are typically installed in the fume hood side fascia and connected to the interior sidewall via 1-1/8" flexible tubing. As the exhaust fan draws air through the device, a sensitive constant temperature thermistor measures flow and lights a green (normal), yellow (high) or red (low) LED. An audible alarm also warns of low flow and requires manual resetting. Mounting holes fit standard single gang electrical box.

APPLICATIONS

- Warns user if insufficient fume hood face velocity is encountered

Model 660 Air Velocity Monitor. Includes 3' flexible tubing, pre-fittings and 90° elbow, 120 VAC to 24 VAC power transformer.

SPECIFICATIONS

Service: Air and non-combustible, non-corrosive gases.

High Setpoint Range: 0-275 FPM (0-1.397 m/s).

Low Setpoint Range: 0-150 FPM (0-.792 m/s).

Repeatability: ±7% of full span, 0-50 and 150-275 FPM; ±5% of full span, 50-150 FPM.

Compensated Temperature Range: 50 to 90°F (10 to 32.2°C).

Operating Temperature Range: 32 to 120°F (0 to 48.9°C).

Power Supply: 24 VAC, 3 watts maximum.

Response Time: 6-10 seconds.

Warm-Up Time: 3-5 minutes (no flow).

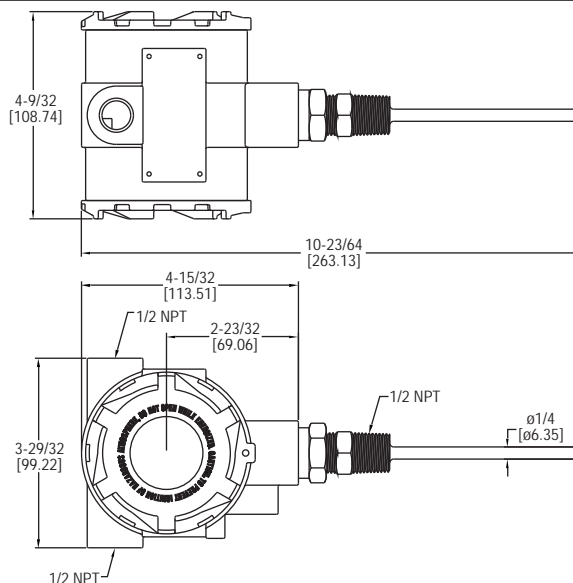
Audible Alarm: 75 dB between 3-10 feet.

Weight: 3 oz (85 g).

Mounting Hardware: (2) #6 x 1" sheet metal screws, (2) 6-32 x 7/8" machine screws.

Explosion-Proof RTD Temperature Transmitter

User Selectable Ranges, Optional LCD Display



The **Series TTE Explosion-Proof RTD Temperature Transmitter** is the ideal product for hazardous temperature measurement applications. The TTE series has seven pre-programmed temperature ranges that are selectable via an internal dip switch. For those applications that need a custom range, the transmitter can be easily configured for any range between -30 to 250°F with a minimum span of 40°F. The span and zero can be quickly adjusted with a simple push button design. The compact housing allows for the transmitter to be mounted in virtually any application.

Model Number	Probe Length
TTE-104-W	4"
TTE-106-W	6"
TTE-109-W	9"
TTE-112-W	12"

Note: Add "-LCD" to end of model for LCD option. Other probe lengths available. Consult factory for details.

Field Selectable Ranges

40 to 90°F (4.4 to 32.2 °C)
 -20 to 140°F (-28.9 to 60°C)
 0 to 100°F (-17.8 to 37.8°C)
 30 to 240°F (-1.1 to 115.6°C)
 32 to 212°F (0 to 100°C)
 32 to 122°F (0 to 50°C)
 -30 to 65°C (-1.1 to 18.3°C)
 Custom range between -30 to 250°F (-34.4 to 121.1°C)

SPECIFICATIONS

Temperature Sensor: Pt1000, 0.00385 DIN.

Output Temperature Ranges: User selectable – any range between -30 to 250°F with a minimum span of 40°F.

Temperature Limits: Ambient: 0 to 158°F (-18 to 70°C).
 Process: -30 to 250°F (-34.4 to 121.1°C).

Accuracy: Transmitter ± 0.1% F.S. Probe ± 0.3% F.S.

Thermal Drift Effects: ± 0.02%/°C Max.

Response Time: 250 ms.

Wetted Materials: 316 Stainless Steel.

Process Connection: 1/2" male NPT.

Conduit Connection: 1/2" female NPT.

Probe Length: 2" to 18" (Depending on model).

Pressure Limits: 2000 psi (137 bar).

Power Requirements: 10 to 35 VDC.

Output Signal: 4-20 mA (two wire loop powered).

Optional Display: 2 Lines X 8 Character LCD.

Enclosure Rating: Weatherproof and Explosion-proof for Class I, Groups B, C, D; Class II, Groups E, F, G; Class III.

Weight: 2 lb 8 oz (1134 g).

Agency Approvals: FM, CE.

APPLICATIONS

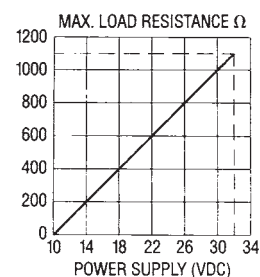
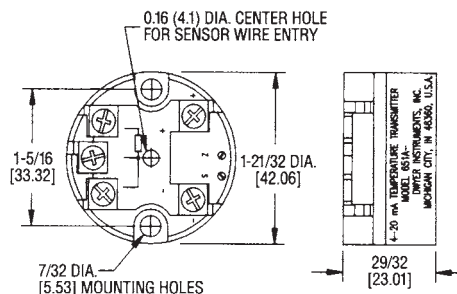
- Temperature transmitters used with RTD to monitor water temperature for boilers or air temperature ducts.

Series
651

Temperature Transmitter

RTD or Thermocouple Input, Zero and Span Adjust, Linearized 4-20 mA Signal

CE



Linearized output for precise temperature monitoring or control is combined with small size and quick, easy mounting. Rugged Series 651 transmitters are designed for use with 2 or 3 wire Pt100 RTDs (to DIN standard 43760 or BS1904) or ungrounded Type K thermocouples. Thermocouple models 651TC are cold junction compensated, automatic 32 to 160°F (0 to 70°C) with upscale burnout. These economical devices provide the accuracy and reliability you need at the lowest possible cost.

APPLICATION

- Temperature transmitters used with RTD to monitor water temperature for boilers or air temperature for ducts

Model No.	Input Type	Range, °F (°C)
651A-10	Pt100 RTD	32-212 (0-100)
651A-20	Pt100 RTD	32-392 (0-200)
651A-40	Pt100 RTD	32-752 (0-400)
651TC-01	Type K Thermocouple	32-212 (0-100)
651TC-02	Type K Thermocouple	32-392 (0-200)
651TC-04	Type K Thermocouple	32-752 (0-400)
651TC-06	Type K Thermocouple	32-1112 (0-600)

SPECIFICATIONS

Input: 2 or 3 -wire Pt100 RTD (models 651A), or ungrounded Type K thermocouple (models 651TC).

Output: 4-20 mA DC, linearized. **Transmitter Type:** 2-wire.

Output Impedance: 700Ω @ 24 VDC.

Power Requirements: 10-32 VDC, reverse connection protected.

Accuracy: ±0.2°C plus 0.2% reading (models 651A), ±0.1% FS plus cold junction errors (models 651TC).

Temperature Drift: ZERO drift typical 0.02%/°C (0.09°F), SPAN typical 0.005%/°C (0.0036°F).

Temperature Limits: Ambient: 32 to 122°F (0 to 50°C).

Maximum Storage Temperature: 160°F (70°C).

Response Time: 10-90% in 200 ms (models 651A), 70% in 2 ms (models 651TC).

Agency Approvals: CE.

ACCESSORY

A-709, Optional enclosure for Series 651 Transmitters. NEMA 1 protective housing is 3" x 2 1/8" (76 x 54 mm). Supplied with mounting hardware, strain relief fitting and assembly instructions (See page 366)

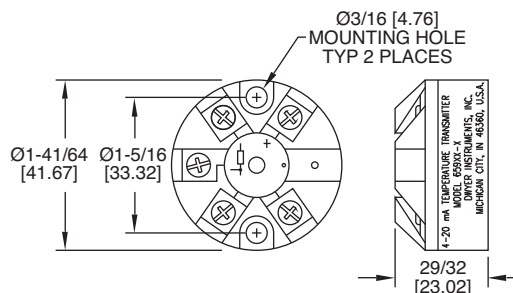
TEMPERATURE

Series
659

Push-Button Temperature Transmitter

Programmable, RTD, Thermistor or Thermocouple Input, In-Head Mounting

CE



Series 659 Push-Button Temperature Transmitters accept thermocouple (J, K, T), RTD (Pt100Ω) or thermistor input and provide a linearized 4 to 20 mA output. The transmitter is quickly ranged and calibrated by using a single on-board switch. An LED provides visual indication of sensor fault and programming mode. Models feature reverse polarity protection. Thermocouple models are also galvanically isolated and cold junction compensated.

The compact transmitter can be mounted directly within any standard thermal head for connection to the sensor. The Series 659 Transmitters are ideal for temperature measurement in boilers, burners, ducts, furnaces, refrigeration systems, food processing, tanks, chemical processing, steam generators or any other process application.

APPLICATION

- Temperature Transmitters used with RTD to monitor water temperature for boilers or air temperature for ducts

Model Number	Input
659TC-1	Thermocouple (Type J, K, T)
659RTD-1	3-wire RTD (Pt100)
659TH-1	Thermistor (2252)

SPECIFICATIONS

Input Range: Type J T/C: -328 to 2192°F (-200 to 1200°C); Type K T/C: -328 to 2498°F (-200 to 1370°C); Type T T/C: -328 to 752°F (-200 to 400°C); Pt100Ω RTD: -328 to 1562°F (-200 to 850°C); Thermistor: -13 to 257°F.

Accuracy: T/C models: ±0.04% F.S., ±0.04% of reading or ±0.5°C whichever is greater; RTD: ±0.2°C ±0.1% of rdg; Thermistor: ±0.25°F (±0.1°C).

Output: Linearized 4 to 20 mA, 2-wire loop powered.

Sample Rate: 500 ms.

Loop Resistance: T/C: 700Ω @ 24 VDC; RTD: 800Ω @ 24 VDC; Thermistor: 24 VDC.

Output Thermal Drift: Zero: 0.2μA/°C; Span: 0.5μA/°C.

Temperature Limits: Ambient: -4 to 158°F (-20 to 70°C), 80% RH max.

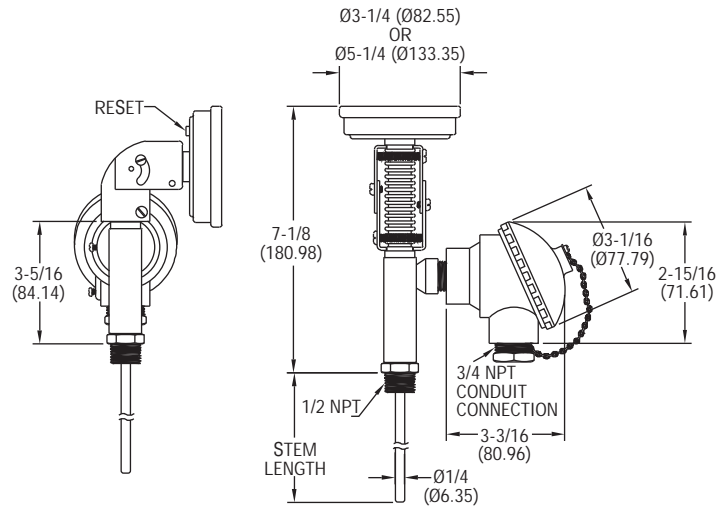
Ambient Storage Temperature: -40 to 158°F (-40 to 70°C), 95% RH max.

Burnout: Upscale 22 mA.

Weight: 0.92 oz (26 g).

Bimetal Thermometer with Transmitter Output

Bimetal Stem with 4-20 mA Output, 3" or 5" Dial



The Series BTO Bimetal Thermometer with Transmitter Output eliminates the need for a separate thermometer and transmitter. By only needing one connection, the BTO series reduces installation cost and saves space. The head-mount transmitter is located in a weatherproof thermal head located on the side of the stem. The BTO series is ideal for use on power generating boilers, skid mounted compressors, and thermal oxidation systems.

SPECIFICATIONS

Thermometer Specifications

Wetted Materials: 304 SS.

Housing Material: 304 SS.

Lens: Glass.

Accuracy: $\pm 1\%$ full scale.

Temperature Limits: Ambient:

-58 to 185°F (-50 to 85°C).

Dial Size: 3" or 5".

Process Connection: 1/2"

NPT.

Resolution: 2°F (5°F for 400°F and 550°F models).

Transmitter Specifications

Temperature Limits: Ambient:

-58 to 185°F (-50 to 85°C).

Power Requirement: 10 to 33

VDC.

Output Signal: 4 to 20 mA.

Loop Resistance: 1045Ω.

Power Consumption: 38 mA.

Enclosure Rating: NEMA 4X

(IP65).

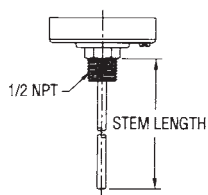
Weight: 1.95 lb.

Model Number	Dial Size	Stem Length	Range	Model Number	Dial Size	Stem Length	Range
BTO325101	3"	2.5"	0 to 200°F	BTO525101	5"	2.5"	0 to 200°F
BTO32551	3"	2.5"	0 to 250°F	BTO52551	5"	2.5"	0 to 250°F
BTO32561	3"	2.5"	50 to 300°F	BTO52561	5"	2.5"	50 to 300°F
BTO325121	3"	2.5"	50 to 400°F	BTO525121	5"	2.5"	50 to 400°F
BTO32571	3"	2.5"	50 to 550°F	BTO52571	5"	2.5"	50 to 550°F
BTO340101	3"	4"	0 to 200°F	BTO540101	5"	4"	0 to 200°F
BTO34051	3"	4"	0 to 250°F	BTO54051	5"	4"	0 to 250°F
BTO34061	3"	4"	50 to 300°F	BTO54061	5"	4"	50 to 300°F
BTO340121	3"	4"	50 to 400°F	BTO540121	5"	4"	50 to 400°F
BTO34071	3"	4"	50 to 550°F	BTO54071	5"	4"	50 to 550°F
BTO360101	3"	6"	0 to 200°F	BTO560101	5"	6"	0 to 200°F
BTO36051	3"	6"	0 to 250°F	BTO56051	5"	6"	0 to 250°F
BTO36061	3"	6"	50 to 300°F	BTO56061	5"	6"	50 to 300°F
BTO360121	3"	6"	50 to 400°F	BTO560121	5"	6"	50 to 400°F
BTO36071	3"	6"	50 to 550°F	BTO56071	5"	6"	50 to 550°F
BTO390101	3"	9"	0 to 200°F	BTO590101	5"	9"	0 to 200°F
BTO39051	3"	9"	0 to 250°F	BTO59051	5"	9"	0 to 250°F
BTO39061	3"	9"	50 to 300°F	BTO59061	5"	9"	50 to 300°F
BTO390121	3"	9"	50 to 400°F	BTO590121	5"	9"	50 to 400°F
BTO39071	3"	9"	50 to 550°F	BTO59071	5"	9"	50 to 550°F
BTO312101	3"	12"	0 to 200°F	BTO512101	5"	12"	0 to 200°F
BTO31251	3"	12"	0 to 250°F	BTO51251	5"	12"	0 to 250°F
BTO312061	3"	12"	50 to 300°F	BTO512061	5"	12"	50 to 300°F
BTO312121	3"	12"	50 to 400°F	BTO512121	5"	12"	50 to 400°F
BTO31271	3"	12"	50 to 550°F	BTO51271	5"	12"	50 to 550°F

Series
BT

Bimetal Thermometers

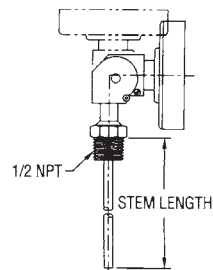
2", 3" or 5" Dial, Dual Scale, $\pm 1\%$ FS Accuracy, External Reset



BACK CONNECTION



HEAD SIZE



ADJUSTABLE ANGLE
CONNECTION

Series BT Bimetal Thermometers offer accurate, reliable service even in the toughest environments. These corrosion resistant units are constructed from stainless steel and are hermetically sealed to prevent crystal fogging. The bimetal element directly drives pointer, eliminating gears and linkage. An external reset screw allows field calibration and easy-to-read aluminum dial minimizes parallax error. Choose back connection, lower connection or adjustable angle for easy viewing and installation. Adjustable models can be rotated a full 360° and tilted over a 180° arc. NOTE: When using in pressurized applications, use a suitable thermowell. Bimetal thermometers are commonly used to measure water temperature on chillers and boilers.

SPECIFICATIONS

Wetted Materials: 304 SS.

Housing Material: Series 300SS Lens: Glass

Accuracy: $\pm 1\%$ full scale.

Response Time: ≤ 40 seconds.

Temperature Limits: Head: 200°F (93°C). Stem: Not to exceed 50% over-

range or 1000°F (538°C) or 800°F (427°C) continuously.

Process Connection: 1/4" NPT on 2" dial size; 1/2" NPT on 3" or 5" dial size.

Stem Diameter: 1/4" O.D.

Immersion Depth: Minimum 2' in liquids, 4' in gas.

TEMPERATURE

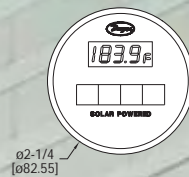
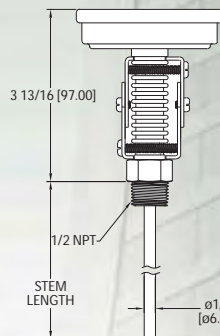
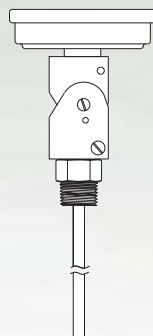
Model Number	Dial Size, Stem Length	Temperature Range, °F(°C)	Degree Div., °F(°C)	Model Number	Dial Size, Stem Length	Temperature Range, °F(°C)	Degree Div., °F(°C)
Back Connection				Adjustable Angle Connection			
BTB22551*	2", 2-1/2"	0/250	2	BTA54010D	5", 4"	0/200 (-20/100)	2 (2)
BTB2405D	2", 4"	0/250 (-20/120)	2 (2)	BTA5405D	5", 4"	0/250 (-20/120)	2 (2)
BTB2409D	2", 4"	200/1000 (100/550)	10 (5)	BTA5407D	5", 4"	50/550 (10/290)	5 (5)
BTB32510D	3", 2 1/2"	0/200 (-20/100)	2 (2)	BTA56010D	5", 6"	0/200 (-20/100)	2 (2)
BTB3255D	3", 2 1/2"	0/250 (-20/120)	2 (2)	BTA5605D	5", 6"	0/250 (-20/120)	2 (2)
BTB3257D	3", 2 1/2"	50/550 (10/290)	5 (5)	BTA5607D	5", 6"	50/550 (10/290)	5 (5)
BTB34010D	3", 4"	0/200 (-20/100)	2 (2)	Lower Connection			
BTB3405D	3", 4"	0/250 (-20/120)	2 (2)	BTC3255D	3", 2.5"	0/250 (-20/120)	2 (2)
BTB3407D	3", 4"	50/550 (10/290)	5 (5)				
BTB3605D	3", 6"	0/250 (-20/120)	2 (2)				

*Model offered in Fahrenheit scale only.

Series
DBT

Digital Solar-Powered Bimetal Thermometer

LCD Display, Adjustable Angle Stem



The Series DBT Digital Solar-Powered Bimetal Thermometer takes the guesswork out of temperature measurement. The 3-1/2 digit LED display is easy to read and provides resolution to 0.1°F. The adjustable angle can be mounted in virtually any position. The engineering units can be selected in the field by removing the back cover.

APPLICATION

• Used to measure water temperature on hot and cold lines.

SPECIFICATIONS

Range: 14 to 302°F (-10-150°C).

Wetted Materials: 304 SS.

Housing Material: Series 300 SS.

Lens: Acrylic.

Accuracy: 32 to 122°F

(0 to 50°C): $\pm 1^\circ\text{C}$.

Dial Size: 3".

Process Connection: 1/2" NPT-adjustable angle.

Display: 3-1/2 digit LCD.

Response Time: 15 seconds.

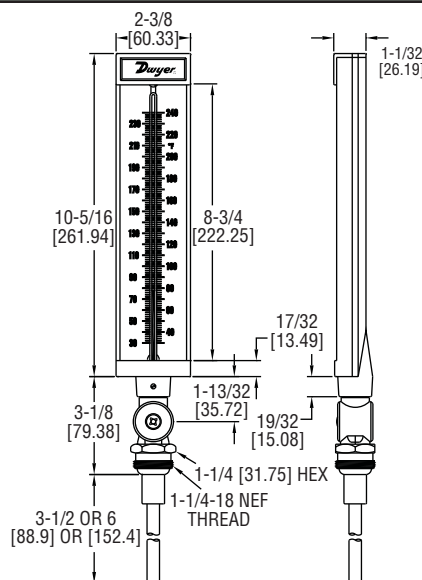
Power Requirements: 3-Volt solar cell (minimum 35 LUX required).

Weight: 12 oz (350 g).

Model No.	Stem Length	Range	Model No.	Stem Length	Range
DBTA3251	2.5"	-58 - 302°F (-50 - 150°C)	DBTA3121	12"	-58 - 302°F (-50 - 150°C)
DBTA3252	2.5"	-58 - 158°F (-50 - 70°C)	DBTA3122	12"	-58 - 158°F (-50 - 70°C)
DBTA3401	4"	-58 - 302°F (-50 - 150°C)	DBTA3151	15"	-58 - 302°F (-50 - 150°C)
DBTA3402	4"	-58 - 158°F (-50 - 70°C)	DBTA3152	15"	-58 - 158°F (-50 - 70°C)
DBTA3601	6"	-58 - 302°F (-50 - 150°C)	DBTA3181	18"	-58 - 302°F (-50 - 150°C)
DBTA3602	6"	-58 - 158°F (-50 - 70°C)	DBTA3182	18"	-58 - 158°F (-50 - 70°C)
DBTA3901	9"	-58 - 302°F (-50 - 150°C)	DBTA3241	24"	-58 - 302°F (-50 - 150°C)
DBTA3902	9"	-58 - 158°F (-50 - 70°C)	DBTA3242	24"	-58 - 158°F (-50 - 70°C)

Industrial Thermometer

9" Scale, Adjustable Angle Stem



The Series IT Industrial Thermometer allows users to easily take accurate temperature measurements in any environment. The case of the IT series is made of die cast aluminum for extra durability in industrial environments. The glass lens is easily cleaned and resists scratches for better viewing of the scale. The stem can be adjusted 180° in order to achieve the best viewing angle. The blue organic fill is non-toxic and allows users to better see the temperature reading. The scales can be ordered with dual units, °F, or °C.

3-1/2" Stem		6" Stem	
Model Number	Range	Model Number	Range
ITA9351D	-40 to 110°F (-40 to 40°C)	ITA9601D	-40 to 110°F (-40 to 40°C)
ITA9352D	0 to 120°F (-15 to 50°C)	ITA9602D	0 to 120°F (-15 to 50°C)
ITA9353D	0 to 160°F (-15 to 70°C)	ITA9603D	0 to 160°F (-15 to 70°C)
ITA9354D	30 to 180°F (0 to 80°C)	ITA9604D	30 to 180°F (0 to 80°C)
ITA9355D	30 to 240°F (0 to 115°C)	ITA9605D	30 to 240°F (0 to 115°C)
ITA9356D	30 to 300°F (0 to 150°C)	ITA9606D	30 to 300°F (0 to 150°C)
ITA9357D	50 to 400°F (10 to 205°C)		
ITA9358D	100 to 550°F (40 to 300°C)		

SPECIFICATIONS

Wetted Material: Tapered cast aluminum with graphite fill

Housing Material: 9" (228 mm) aluminum.

Lens: Glass.

Accuracy: 1% accuracy.

Scales: Aluminum painted white with black markings.

Process Connection: 1-1/4-18 NEE thread.

Liquid Filling: Organic blue liquid filled tube.

Mounting: Adjustable stem:
vertical plane 180° horizontal
plane 360°.

Weight: 1 lb 7 oz (0.65 kg).

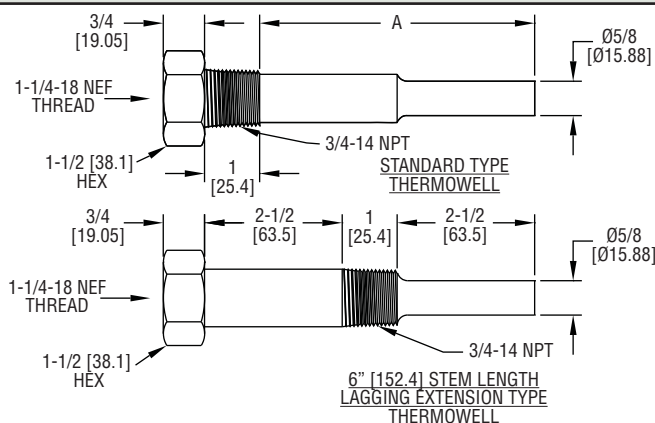
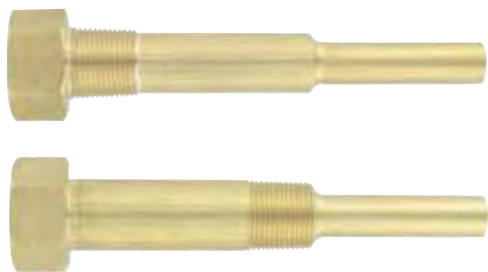
APPLICATIONS

Used on boilers and chillers to monitor temperature on hot and cold water lines.

Series
IT-W

Industrial Thermometer Thermowells

Fits Thermometers with 3-1/2" and 6" Stem Lengths

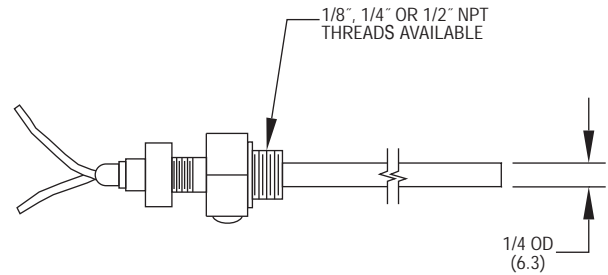


The Series IT-W Thermowells reduce installation cost and time by eliminating the need to drain the system when servicing industrial thermometers. The thermowells protect industrial thermometers from high pressure, flow and corrosive media. Series IT-W Thermowells are available with 2-1/2" and 5" insertion lengths and with the option of a 2-1/2" lagging extension. These cost efficient brass, 304 stainless steel, and 316 stainless steel thermowells with 3/4" NPT threads are compatible with most applications.

Model	Materials	Insertion Length	Lag
IT-W01	Brass	2-1/2"	N/A
IT-W11	304 SS	2-1/2"	N/A
IT-W21	316 SS	2-1/2"	N/A
IT-W04	Brass	5"	N/A
IT-W14	304 SS	5"	N/A
IT-W24	316 SS	5"	N/A
IT-W07	Brass	2-1/2"	2-1/2"
IT-W17	304 SS	2-1/2"	2-1/2"
IT-W27	316 SS	2-1/2"	2-1/2"

Immersion Temperature Probes

RTD & Thermistor, 304 SS Probe



The Series I-1 Immersion Temperature Probes are designed with an adjustable insertion depth for greater application flexibility. The probe is constructed with a 6" (15 cm) 304 SS stem and a brass adapter with a compression sleeve. The probes include a 6 ft (1.8 m) plenum-rated cable for remote termination. Probes are available with RTD or thermistor sensors. The Series I-1 probes are ideal for hot or chilled water, condensed water or low pressure steam applications that require an adjustable insertion length.

SPECIFICATIONS

Accuracy:

Platinum RTD: $\pm 0.1\%$ at 32°F (0°C);

Nickle RTD: $\pm 0.5^\circ\text{F}$ at 70°F (21.1°C);

Balco: $\pm 0.5^\circ\text{F}$ at 70°F (21.1°C);

Thermistor: $\pm 0.2^\circ\text{C}$ interchangeable at 77°F (25°C).

Operating Temperature: -40 to 250°F (-40 to 121°C).

Probe Diameter: 1/4" (6.3 mm).

Probe Length: 6" (15 cm).

Cable Length: 6 ft (1.8 m).

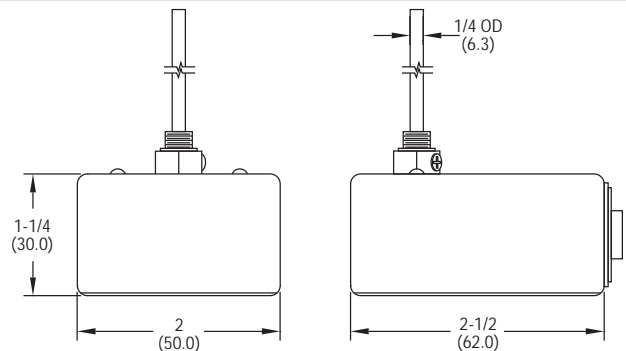
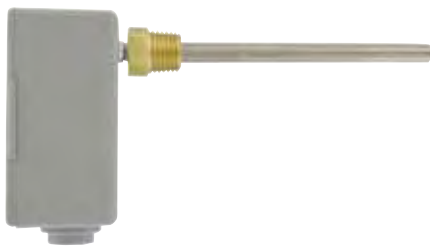
Probe Material: 304 SS.

Mounting: 1/4" NPT brass adapter.

Model Number	Input
I-11062	Pt 100Ω RTD
I-12062	Pt 1000Ω RTD
I-13062	Ni 1000Ω RTD
I-14062	1000Ω Balco RTD
I-15062	10KΩ NTC Thermistor
I-16062	3KΩ NTC Thermistor
I-17062	5KΩ NTC Thermistor
I-18062	100KΩ NTC Thermistor
I-19062	20KΩ Thermistor
I-1A062	2252Ω Thermistor

Immersion Sensor Assemblies

Plastic Enclosure, RTD Sensor



The Series I-2 Immersion Sensor Assemblies are designed for immersion temperature applications and installations for building automation systems. The unit is constructed with a waterproof 6" (15 cm) length 304 SS probe and a polycarbonate enclosure. The assembly can be threaded directly into a 1/2" NPT well (sold separately) or 1/2" saddle fitting. Series I-2 immersion sensor assemblies are available with a Pt 100Ω or Pt 1000Ω RTD sensor.

SPECIFICATIONS

Accuracy: $\pm 0.1\%$ @ 32°F (0°C), alpha 385 per DIN 43 760.

Operating Temperature: -40 to 250°F (-40 to 121°C).

Probe Diameter: 1/4" (6.3 mm).

Probe Length: 6" (15 cm).

Probe Material: 304 SS.

Mounting: 1/2" male NPT.

Enclosure Material: Polycarbonate.

ACCESSORIES

IW-162 6" brass well with 1/2" NPT

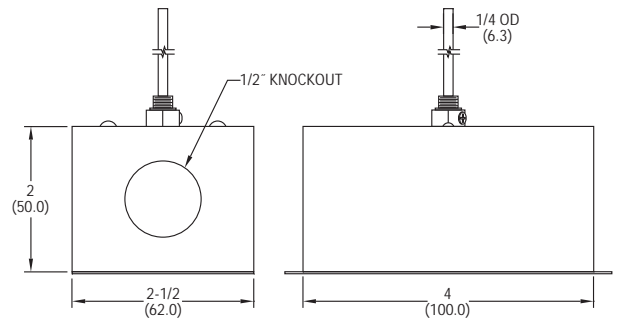
IW-262 6" SS well with 1/2" NPT

IW-C Thermowell compound

Model Number	Input
I-21063	Pt 100Ω RTD
I-22063	Pt 1000Ω RTD

Weatherproof Immersion Assemblies

NEMA 4 (IP-65), RTD Sensor



The Series I-4 Weatherproof Immersion Assemblies are designed for harsh environments where dust, condensation, vapor, oil and other contaminants may be present. The assembly combines a powder-coated steel enclosure with a fast response RTD sensor for immersion temperature applications. The probe is constructed of 304 SS in a 6" (15 cm) length. Use the brass adaptor supplied with each unit to adjust the immersion depth of the probe. The Series I-4 can be threaded directly into a 1/2" NPT well (sold separately) or 1/2" saddle fitting.

SPECIFICATIONS

Accuracy: $\pm 0.1\%$ @ 32°F (0°C).

Operating Temperature: -40 to 250°F (-40 to 121°C).

Probe Diameter: 1/4" (6.3 mm).

Probe Length: 6" (15 cm).

Probe Material: 304 SS.

Mounting: 1/2" NPT male.

Enclosure Material: Powder-coated steel, NEMA 4 (IP-65).

ACCESSORIES

IW-162 6" brass well with 1/2" NPT

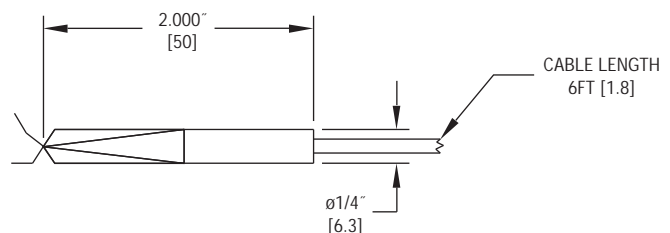
IW-262 6" SS well with 1/2" NPT

IW-C Thermowell compound

Model Number	Input
I-41063	Pt 100Ω RTD
I-42063	Pt 1000Ω RTD

Surface Mount Temperature Sensor

RTD and Thermistor, 304 SS Probe, Waterproof



The Series S Surface Mount Temperature Sensors provide a cost effective and reliable solution for surface contact temperature measurement of conditioned water pipes, low pressure steam or refrigerant lines. The sensors are ideal for applications where immersion wells are not practical to install. Models are constructed with a 2" (50 mm) 304 SS probe and a 6 ft (1.8 m) plenum rated cable. Nylon ties are included to secure the sensor to the pipe.

SPECIFICATIONS

Accuracy:

Platinum RTD: $\pm 0.1\%$ @ 32°F (0°C), alpha 385 per DIN 43760.

Nickel RTD: $\pm 0.5^\circ\text{F}$ @ 70°F (21.1°C).

Balco: $\pm 0.5^\circ\text{F}$ @ 70°F (21.1°C).

Thermistor: $\pm 0.2^\circ\text{C}$ interchangeable @ 77°F (25°C).

Operating Temperature: -40 to 250°F (-40 to 125°C).

Probe Diameter: 1/4" (6.3 mm).

Probe Length: 2" (50 mm).

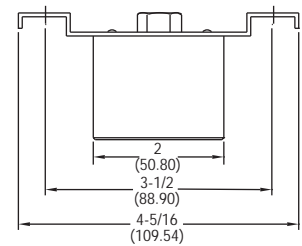
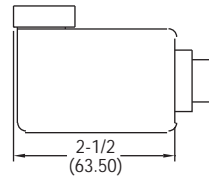
Probe Material: 304 SS.

Models	Sensor Type
S-11	Pt 100Ω RTD
S-12	Pt 1000Ω RTD
S-13	Ni 1000Ω RTD
S-14	1000Ω Balco RTD
S-15	10 kΩ NTC Thermistor
S-16	3 kΩ NTC Thermistor
S-17	5 kΩ NTC Thermistor
S-18	100 kΩ NTC Thermistor
S-19	20 kΩ NTC Thermistor
S-1A	2252Ω NTC Thermistor

Series
S-2

Surface Temperature Assembly

Polycarbonate Enclosure, Brass Sensor



Monitor pipe surface temperatures using the Series S-2 Surface Temperature Assembly. The Series S-2 combines a low profile brass temperature sensor and a 30% glass-filled polycarbonate enclosure designed to withstand temperature extremes, mechanical shock and vibration. The unit includes a mounting bracket for pipe clamp installations. The Series S-2 are available with Pt 100Ω or Pt 1000Ω RTD sensors.

SPECIFICATIONS

Accuracy: $\pm 0.1\%$ @ 32°F (0°C).

Operating Temperature: -40 to 250°F (-40 to 121°C).

Probe Material: Brass.

Enclosure Material: 30% glass-filled polycarbonate.

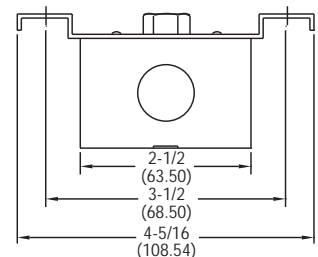
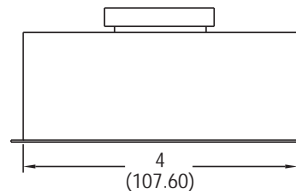
Model	Input
S-21	Pt 100Ω RTD
S-22	Pt 1000Ω RTD

TEMPERATURE

Series
S-4

Weatherproof Surface Temperature Assembly

NEMA 4 (IP-65), Steel Enclosure



The Series S-4 Weatherproof Surface Temperature Assembly is designed for applications in unconditioned environments where the unit may be subjected to dust, condensation, oil, vapor and other contaminants. The rugged steel enclosure meets NEMA 4 (IP-65) requirements. The Series S-4 includes a fast response brass, Pt 100Ω or Pt 1000Ω contact sensor. The sensor is insulated from the enclosure to provide accurate pipe surface temperature measurement. The assembly includes a mounting bracket for quick installation.

SPECIFICATIONS

Accuracy: $\pm 0.1\%$ @ 32°F (0°C).

Operating Temperature: -40 to 250°F (-40 to 121°C).

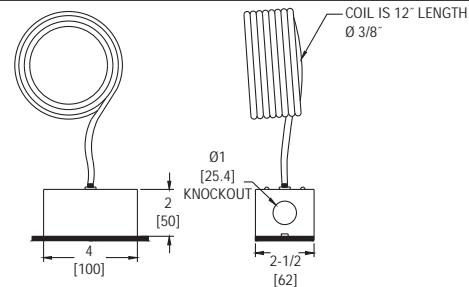
Probe Material: Brass.

Enclosure Material: Powder-coated steel, NEMA 4 (IP65).

Model	Input
S-41	Pt 100Ω RTD
S-42	Pt 1000Ω RTD

Averaging Temperature Sensor

Bendable Aluminum Casing, RTD or Thermistor



The Series AVG Averaging Temperature Sensor provides a cost effective solution for HVAC system temperature control. Measure average supply air temperature in large ducts or plenums with the Series AVG. The sensors are designed with a 3/8" (9 mm) diameter bendable aluminum casing terminating into a painted steel, NEMA 4 (IP65) enclosure. Four environmentally sealed sensor modules are evenly spaced throughout the length of the casing. Select platinum RTD or thermistor modules.

APPLICATION

- Monitors air temperature in large ducts

Model No.	Sensor Type
AVG-31121	Pt 100Ω RTD
AVG-32121	Pt 1000Ω RTD
AVG-35121	10 kΩ NTC Thermistor
AVG-36121	3 kΩ NTC Thermistor
AVG-37121	5 kΩ NTC Thermistor
AVG-38121	100 kΩ NTC Thermistor
AVG-39121	20 kΩ NTC Thermistor
AVG-3A121	2252Ω NTC Thermistor

SPECIFICATIONS

Accuracy: RTD: $\pm 0.1\%$ @ 0°C , alpha 385; thermistor: $\pm 0.2^{\circ}\text{C}$ interchangeability @ 77°F (0°C).

Operating Temperature: -40 to 250°F (-40 to 125°C).

Probe Diameter: 3/8" (9 mm).

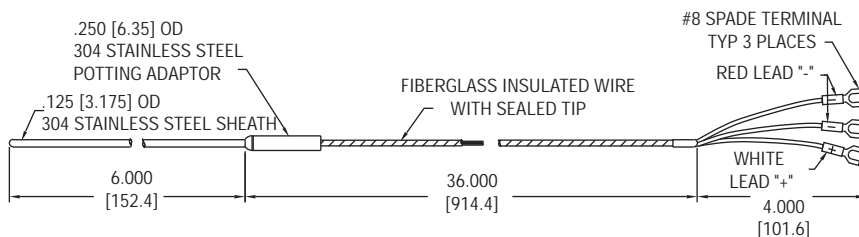
Probe Length: 12 ft (3.6 m).

Probe Material: Bendable aluminum

Enclosure: Painted steel NEMA 4 (IP65).

Resistance Temperature Detector

High Temperature, Mineral Insulated, 316 SS Sheath



Precision RTD (Resistance Temperature Detector) offers excellent accuracy and stability over a wide temperature range. Industry standard 3-wire 100 ohm (DIN) probes are available in 6" (15 cm), 12" (30.5 cm), or 18" (46 cm) sheath lengths with 30" (76 cm) extension cable and spade lug terminals.

Model Number	Length	Diameter
RTD-686	6' (15 cm)	1/8"
RTD-6812	12' (30.5 cm)	1/8"
RTD-6818	18' (46 cm)	1/8"
RTD-646	6' (15 cm)	1/4"
RTD-6412	12' (30.5 cm)	1/4"
RTD-6418	18' (46 cm)	1/4"

SPECIFICATIONS

Sensor Type: Wire wound, 100 ohm.

Temperature Range: -328 to 1202°F (-200 to 650°C).

Pressure Limits: 250 psig (17.2 bar).

Probe Material: 316 SS.

Extension Length: 30" (76 cm).

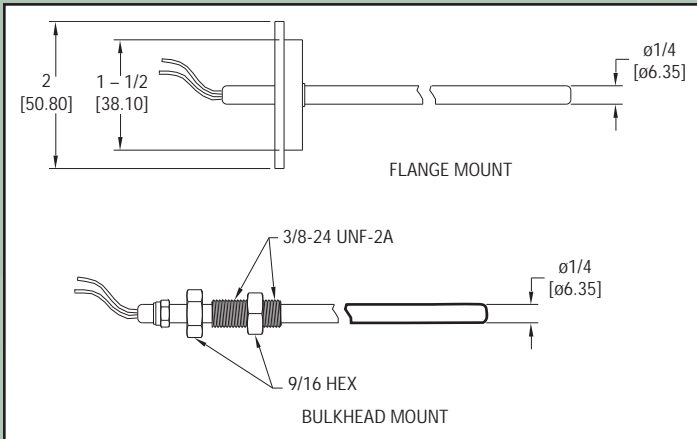
Standard: DIN .00385 (Class B, 0.12%).

APPLICATIONS

Typical applications are: air ducts, bearing temperature, oil temperature indicator, environmental test chambers.

Series
AD

Air/Duct Temperature Sensors



Air/Duct Temperature Sensors are available in precision platinum, nickel, or balco RTDs and interchangeable NTC thermistors. Sensors are constructed with a hermetically sealed 304 SS sheath and are unaffected by high humidity, contamination, thermal shock or vibration. Flange mount sensors offer low profile mounting and quick installation directly into duct work. Select bulkhead mounting if an adjustable insertion depth is required. Rugged air/duct sensors are ideal for air handlers, fan coil units, ducts, furnaces, freezers, ovens and other through wall temperature sensing applications.

Model Coding

Fill in the appropriate numbers or letters to specify the probe of your choice. Fill in all boxes. If an item or dimension does not apply, fill those boxes with zeros '0'.

AD

INSTALLATION

- 1 - Flange mount
3" (75 mm) wire leads
- 2 - Flange mount
6 ft (1.8 m) cable
- 3 - Bulkhead mount
3" (75 mm) wire leads
- 4 - Bulkhead mount
6 ft (1.8 m) cable

SENSOR TYPE

- 1 - Pt 100 Ω RTD
- 2 - Pt 1000 Ω RTD
- 3 - Ni 1000 Ω RTD
- 4 - 1000 Ω Balco RTD
- 5 - 10 k Ω NTC Thermistor
- 6 - 3 k Ω NTC Thermistor
- 7 - 5 k Ω NTC Thermistor
- 8 - 100 k Ω NTC Thermistor
- 9 - 20 k Ω NTC Thermistor
- A - 2252 Ω NTC Thermistor

PROBE LENGTH
04 - 4" (100 mm)
06 - 6" (150 mm)
08 - 8" (200 mm)
12 - 12" (300 mm)

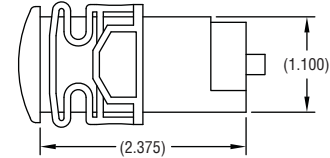
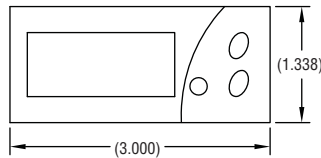
* Minimum order quantity: 10 pieces.

TEMPERATURE

Series
TSX

Digital Temperature Switch

Dual Input, Cooling Applications, Single or Dual Relay Output



Panel Cutout 2-51/64" x 1-9/64" (71 x 29 mm)

The microprocessor based Series TSX offers a low cost solution for cooling applications. Units are designed to accept up to two temperature probes selectable between PTC or NTC thermistor input. The probe temperature is displayed on the bright 3-digit LED. The Series TSX offers 23 programming parameters for specific application requirements. To quickly program multiple units with the same settings, use the configuration key TS2-K (sold separately). The user can define set point, hysteresis, probe error performance, and defrosting. The defrosting mode can also be initiated or interrupted manually by pressing the up arrow button. Units include password protection to secure from unwanted setting changes except for set point adjustment. If required, the keypad can be locked out so no adjustments can be made.

Select from single output units with one 16A SPST relay dual output with one 16A SPST relay and one 8A SPDT relay for defrosting or three output models with one 16A SPST, 8A SPST and 5A SPDT. The temperature switch includes one NTC probe, gasket, mounting clips, and instruction manual.

SPECIFICATIONS

Probe Range:

PTC: -58 to 302°F (-50 to 150°C);
NTC: -58 to 230°F (-50 to 110°C).

Input: PTC/NTC thermistor 1000 Ω @ 25°C.

Output: All models include 16A SPST relay @ 250 VAC resistive, 5A inductive; Dual output units also have one 8A SPDT relay @ 250 VAC resistive, 3A inductive, 3 output models also have 5A SPDT @ 250 VAC and 8A SPST @ VAC.

Horsepower Rating (HP): 16A: 1HP
240 VAC - 10FLA, 60LRA 250 VAC.

Control Type: ON/OFF.

Power Requirements: 110 VAC; 230

VAC; 24 VAC/DC;
(depending on model).

Accuracy: $\pm 1\%$ F.S.

Display: 3-digit, red, 1/2" (12.7 mm) digits.

Resolution: 0.1° (<100°); 1° ($\geq 100^\circ$).

Memory Backup: Nonvolatile memory.

Temperature Limit: Ambient: 14 to 131°F (-10 to 70°C).

Storage Temperature: -4 to 176°F (-20 to 80°C).

Weight: 2.3 oz (65 g).

Front Panel Rating: IP64.

Agency Approvals: CE, UL.

ACCESSORIES

TS2-K, Configuration Key

TS-5, PVC Probe (PTC), 5 ft

TS-6, Metal Probe (PTC), 5 ft

TS-7, Plastic Probe (NTC), 3 ft

APPLICATIONS

Controls chiller operation up to 1HP.

DUAL INPUT, THREE OUTPUT

Model Number	Supply Voltage	Degrees
TSX-10340	110 VAC	°F
TSX-11340	110 VAC	°C
TSX-20340	230 VAC	°F
TSX-21340	230 VAC	°C
TSX-40340	24 VAC/DC	°F
TSX-41340	24 VAC/DC	°C

DUAL INPUT, SINGLE OUTPUT

Model Number	Supply Voltage	Degrees
TSX-10140	110 VAC	°F
TSX-11140	110 VAC	°C
TSX-20140	230 VAC	°F
TSX-21140	230 VAC	°C
TSX-40140	24 VAC/DC	°F
TSX-41140	24 VAC/DC	°C

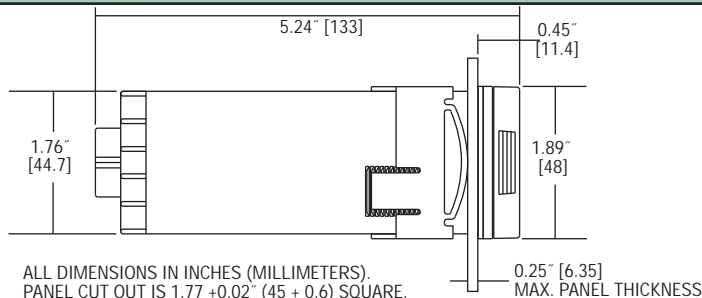
DUAL INPUT, DUAL OUTPUT

Model Number	Supply Voltage	Degrees
TSX-10240	110 VAC	°F
TSX-11240	110 VAC	°C
TSX-20240	230 VAC	°F
TSX-21240	230 VAC	°C
TSX-40240	24 VAC/DC	°F
TSX-41240	24 VAC/DC	°C

Series
16L

Limit Controls

FM Approved, Manual Reset, Large Dual Display, Universal Input



TEMPERATURE

STANDARD FEATURES

- FM Approved Limit
- Large Dual Display
- Universal Input
- Dedicated, Illuminated Reset Key
- Remote Reset Capability Standard
- Four Password Protected Security Levels

The 16L Series Temperature/Process FM Approved Limit Controls set a new standard in 1/16 DIN Limit controls. The 16L offers universal input (10 thermocouple types, 4 RTD types, voltage, and current), single set point or dual set point. Standard features include Remote Reset capability, Peak/Valley indication, open sensor protection, input rate of change protection, and much more.

Unit offers 1500 VAC resolution, selectable high or low input, programmable sensor break protection and adjustable differential.

Outputs include normally open (form A) and normally closed (form B) relays. Form A and form B relays can be setup one for each set point output and logically linked to emulate a form C output.

Designed and built in the USA, the 16L family of controls offers the highest levels of features, function, and quality available today.

APPLICATIONS

- Boiler over temperature alarm
- Boiler shut down
- Used as a high limit temperature switch for boilers

SPECIFICATIONS

Selectable Inputs: 10 Thermocouple, 4 RTD, DC Voltage, or DC Current selectable.

Display: Two 4 digit, 7 segment 0.3" (7.62 mm) high LEDs.

Accuracy: $\pm 0.25\%$ of span, ± 1 least significant digit.

Supply Voltage: 100 to 240 VAC, nominal, +10 -15%, 50 to 400 Hz. single phase; 132 to 240 VDC, nominal, +10 -20%.

Power Consumption: 5 VA maximum.

Operating Temperature: 14 to 131°F (-10 to 55°C).

Memory Backup: Nonvolatile memory. No batteries required.

Control Output Ratings: Relay: SPST, 3A @ 240 VAC resistive; 1.5A @ 240 VAC inductive.

Weight: 8 oz (227 g).

Agency Approvals: UL, FM.

Model No.	Output A	Output B
16L2030	N.O. Relays	None
16L2034	N.O. Relays	N.C. Relays

OPTIONS

Add as a suffix to model number. Example: 16L2030-992.

934, Process Signal Output, PV or SV. Isolated 0 to 20 mA DC

936, Process Signal Output, Isolated 0 to 10 VDC

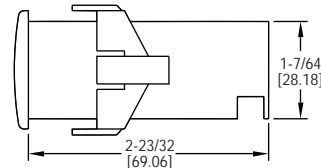
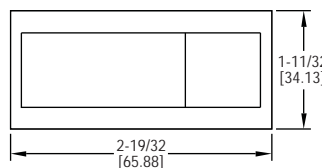
992, RS-485 Serial Communications

993, RS-232 Serial Communications

Series
TSF

Thermocouple Limit Control

FM Approved High Limit Switch



Panel Cutout 2-51/64 x 1-9/64 (71 x 29)

The Series TSF Thermocouple FM Approved Limit Control provides audible alarm status along with a robust 16 amp relay output. Unit allows the user to easily select automatic or manual reset along with 10 other parameters. The TSF series has a built in reset button on the front panel or can accept an external reset.

The ease of programming and low price make the TSF series the best value limit control on the market. The Series TSF can be used as a boiler shut down or over temperature alarm.

Model Number	Description
TSF-4010	Type J/K/S input, 110 V, °F
TSF-4011	Type J/K/S input, 110 V, °C
TSF-4020	Type J/K/S input, 230 V, °F
TSF-4021	Type J/K/S input, 230 V, °C
TSF-4030	Type J/K/S input, 12 VAC/VDC, °F
TSF-4031	Type J/K/S input, 12 VAC/VDC, °C
TSF-4040	Type J/K/S input, 24 VAC/VDC, °F
TSF-4041	Type J/K/S input, 24 VAC/VDC, °C

SPECIFICATIONS

Probe Range: 0 to 700°C (32 to 999°F) for thermocouple J type. 0 to 999°C (32 to 999°F) for thermocouples K or S type.

Input: Type J, K or S thermocouple.

Output: 16 A SPDT relay @ 250 VAC resistive.

Horsepower Rating (HP): 1 HP.

Control Type: ON/OFF; manual/automatic reset.

Power Requirements: 110 VAC, 230 VAC, 12 VAC/VDC or 24 VAC/VDC (depending on model).

Power Consumption: 4 VA.

Accuracy: $\pm 1\%$ FS.

Display: 3-digit, red, 1/2" (12.7 mm) digits, plus sign.

Resolution: 1°.

Memory Backup: Nonvolatile memory.

Temperature Limits: Ambient: 14 to 131°F (-10 to 55°C).

Storage Temperature: -4 to 176°F (-20 to 80°C).

Weight: 2.3 oz (65 g).

Front Panel Rating: IP64.

Agency Approvals: CE, FM, UL, ULc.

ACCESSORIES

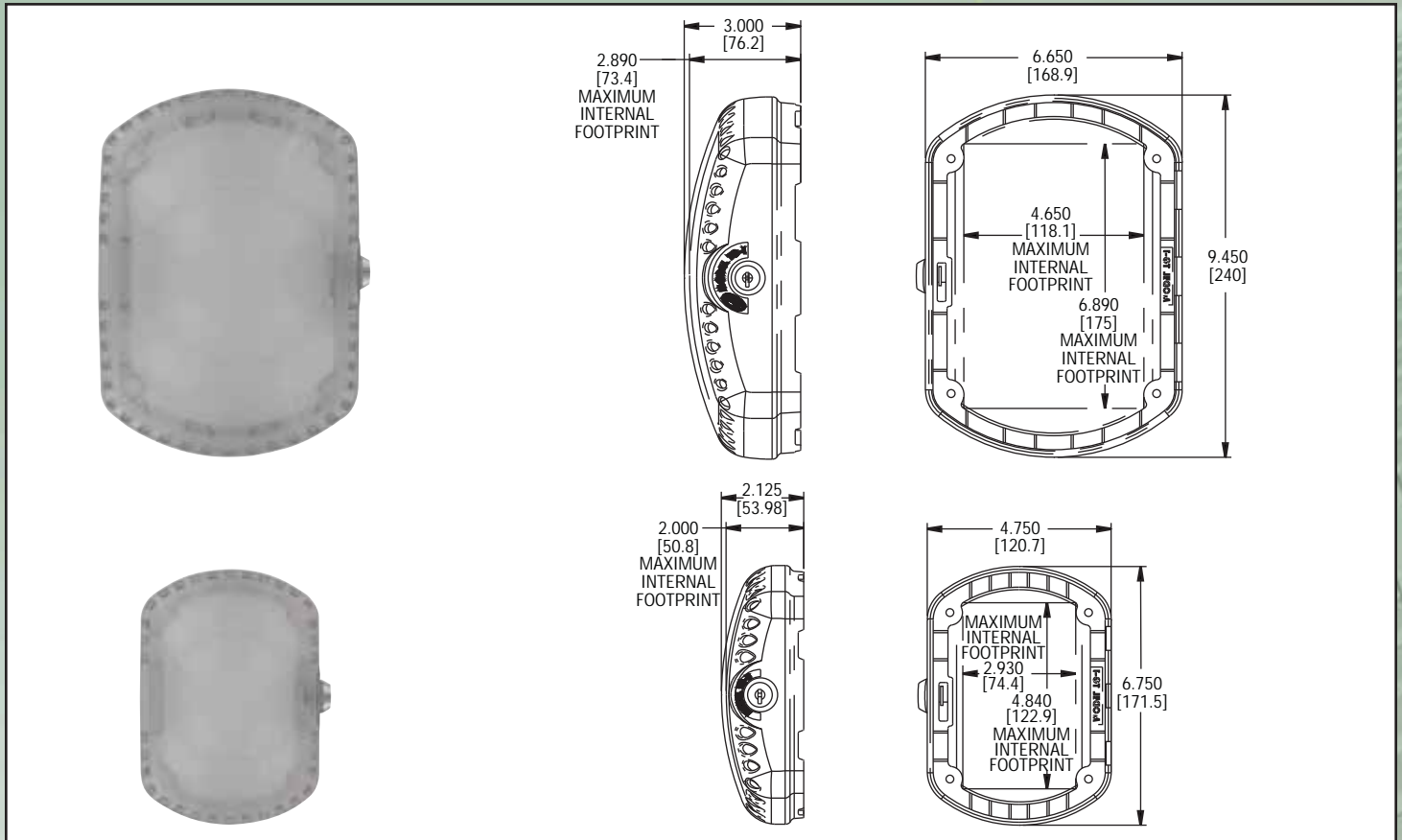
TCS-J, J type thermocouple, 4' probe, 48" extension

TCS-K, K type thermocouple, 4' probe, 48" extension

TS2-K, Configuration Key

Polycarbonate Wall Mount Thermostat Covers

Key Lock Protection, Easy to Mount



The **Series TG Polycarbonate Thermostat Cover** prevents physical damage and unauthorized adjustments of thermostats. Two sizes of covers are available to fit most common thermostats and transmitters. The low profile design with ventilation slits allows exceptional air flow in order to obtain accurate measurements. Each cover comes with two keys and mounting hardware for drywall and concrete walls.

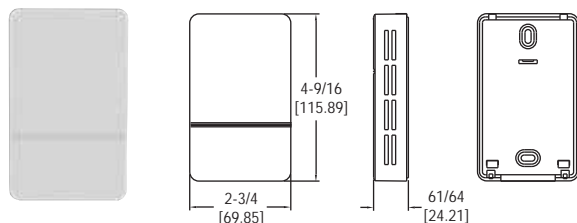
Model TG-1, Large Thermostat Cover

Model TG-2, Small Thermostat Cover

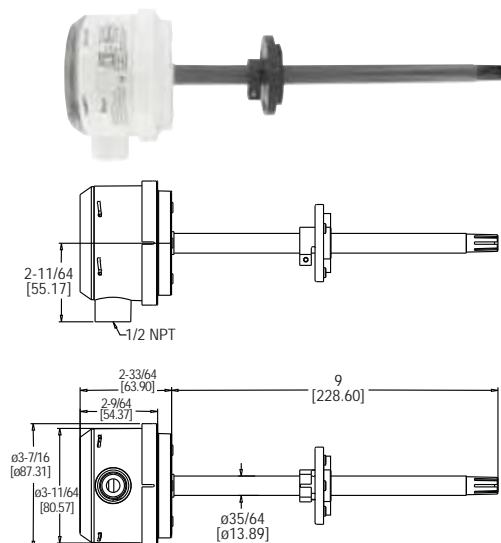
ACCESSORY

Model TG-KEY, Replacement Keys

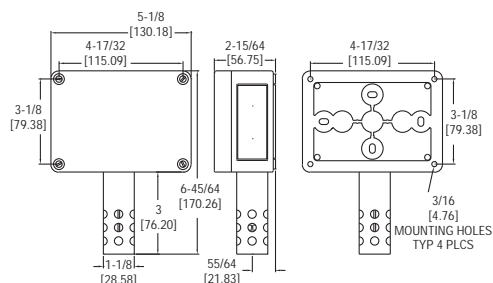
Wall Mount



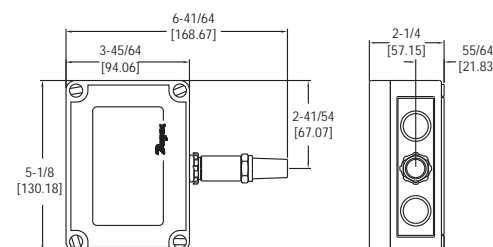
Duct Mount



OSA (Outside Air)



Sintered Filter Version



Demanding humidity/temperature applications require the Series RH/RHL Transmitter which offers high accuracy, long term stability, and reliable operation. The Series RH/RHL is designed for monitoring and controlling humidity or both humidity and temperature in building energy management systems, HVAC, commercial, residential, clean rooms, museums, climate chambers, and other space monitoring applications.

The Series RH/RHL is a two-wire transmitter with a 4-20 mA loop powered output or 0 to 10 VDC output. The state of the art sensor recovers from 100% saturation and is calibration-free. A variety of mounting configurations are available including wall mount, duct mount, and OSA (outside air) models. Select humidity monitoring or humidity and temperature models.

The combined humidity/temperature version (RHT) provides dual 4-20 mA or 0 to 10 VDC output signals to control both humidity and temperature with one sensor which reduces installation costs. The duct mount version is also available with an optional alpha-numeric LCD to provide local indication of humidity and temperature simultaneously. The displayed temperature is field selectable for °F or °C. Monitor humidity in ducts, rooms, and outside air.

APPLICATIONS

- Room temperature/humidity monitoring
- Supply air temperature/humidity monitoring
- Exhaust air temperature/humidity monitoring
- Outside air temperature/humidity monitoring

SPECIFICATIONS

Relative Humidity Range: 0 to 100% RH.

Temperature Range: -40 to 140°F (-40 to 60°C).

Accuracy: (RH): ±2% @ 10 - 90% RH; (RHL): ± 3% @ 20-80% RH; ±0.9°F @ 72°F (±0.3°C @ 25°C).

Temperature Limits: -40 to 140°F (-40 to 60°C).

Storage Temperature: -40 to 176°F (-40 to 80°C).

Compensated Temperature Range: -4 to 140°F (-20 to 60°C).

Power Requirements: 10-35 VDC.

Output Signal: 4-20 mA or 0-10 VDC, 2 channels for humidity/temperature models (loop powered on RH current models).

Response Time: 5-15 seconds.

Electrical Connections: Screw terminal block.

Conduit Connection: Duct mount: 1/2" NPS; OSA: 1/2" (22.3 mm).

Drift: <1% RH/year.

RH Sensor: Capacitance polymer.

Temperature Sensor: Solid state band gap.

Housing Material: Wall Mount: ABS; Duct Mount: PBT; OSA: Polycarbonate.

Enclosure Rating: NEMA 4X (IP65) for OSA mount only.

Display: Optional 2-line alpha-numeric, 8 characters/line for duct mount only.

Display Resolution: RH: 0.1%; 0.1°F (0.1°C).

Weight: Wall Mount: 0.5 lb (0.25 kg); Duct Mount: 0.6 lb (0.3 kg); OSA: 1 lb (0.45 kg).

Agency Approvals: CE.

Designed for Demanding Humidity/Temperature Applications

FEATURES

- Long term stability
- Selectable temperature units
- Designer wall, duct or outside air models
- $\pm 2\%$ or $\pm 3\%$ accuracy for RH
- Dual 4-20 mA or 0-10 VDC outputs on humidity/temperature models
- Two-line alpha-numeric display for local indication
- Completely recovers from 100% saturation

DESIGNER WALL MODELS

Model Number	Accuracy	Output
RHUL-W	3%	4 to 20 mA
RHTL-W	3%	4 to 20 mA
RHUL-W1	3%	0 to 10 VDC
RHTL-W1	3%	0 to 10 VDC
RHU-W	2%	4 to 20 mA
RHT-W	2%	4 to 20 mA
RHU-W1	2%	0 to 10 VDC
RHT-W1	2%	0 to 10 VDC

OUTSIDE AIR MODELS

Model Number	Accuracy	Output
RHUL-O	3%	4 to 20 mA
RHTL-O	3%	4 to 20 mA
RHUL-O1	3%	0 to 10 VDC
RHTL-O1	3%	0 to 10 VDC
RHU-O	2%	4 to 20 mA
RHT-O	2%	4 to 20 mA
RHU-O1	2%	0 to 10 VDC
RHT-O1	2%	0 to 10 VDC

DUCT MOUNT MODELS

Model Number	Accuracy	Output
RHUL-D	3%	4 to 20 mA
RHTL-D	3%	4 to 20 mA
RHUL-D1	3%	0 to 10 VDC
RHTL-D1	3%	0 to 10 VDC
RHU-D	2%	4 to 20 mA
RHT-D	2%	4 to 20 mA
RHU-D1	2%	0 to 10 VDC
RHT-D1	2%	0 to 10 VDC
RHT-D-LCD	2%	4 to 20 mA
RHT-D1-LCD	2%	0 to 10 VDC
RHTL-D-LCD	3%	4 to 20 mA
RHTL-D1-LCD	3%	0 to 10 VDC

SINTERED FILTER MODELS

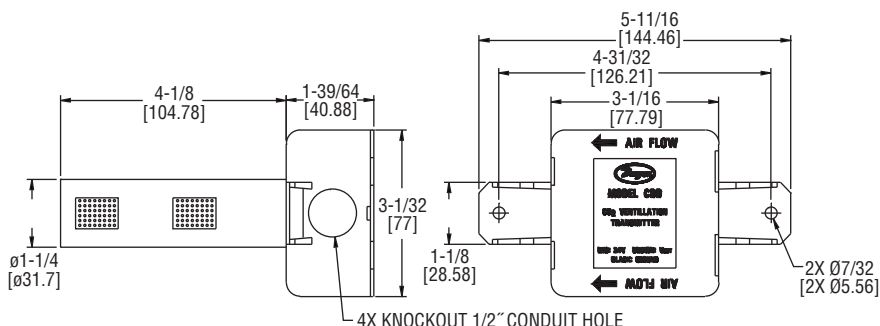
Model Number	Accuracy	Output
RHUL-S	3%	4 to 20 mA
RHTL-S	3%	4 to 20 mA
RHUL-S1	3%	0 to 10 VDC
RHTL-S1	3%	0 to 10 VDC
RHU-S	2%	4 to 20 mA
RHT-S	2%	4 to 20 mA
RHU-S1	2%	0 to 10 VDC
RHT-S1	2%	0 to 10 VDC

HUMIDITY/
AIR QUALITY



Duct Mount Carbon Dioxide Transmitter

NDIR Sensing Technology, 2000 PPM Range



The Model CDD Duct Mount Carbon Dioxide Transmitter monitors the occupancy in a room by detecting the concentration of carbon dioxide in the return air duct. The non-dispersive infrared sensing technology automatically updates the calibration of the transmitter using a proprietary logic feature which limits the amount of error due to drift. The Model CDD can measure up to 2000 PPM in duct air flows less than 1500 FPM.

APPLICATION

- On demand room ventilation.

Model CDD Carbon Dioxide Transmitter

SPECIFICATIONS

Range: 0 to 2000 PPM.

Accuracy: ± 40 PPM + 3% of reading @ 22°C.

Temperature Dependence: 0.2% FS per °C.

Stability: < 2% of FS over life of sensor.

Non-Linearity: < 1% of FS.

Pressure Dependence: 0.13% of reading per mm of Hg.

Response Time: 3 minutes typical for 90% step change.

Duct Air Velocity Range: 0 to 1500 FPM (7.63 m/s).

Ambient Operating Temperature: 32 to 122°F (0 to 50°C).

Storage Temperature: -4 to 158°F (-20 to 70°C).

Power Requirements: 18 to 30 VAC RMS 50/60 Hz or 18 to 42 VDC.

Power Consumption: 1.65 watts peak (0.65 watts average at 42 VDC).

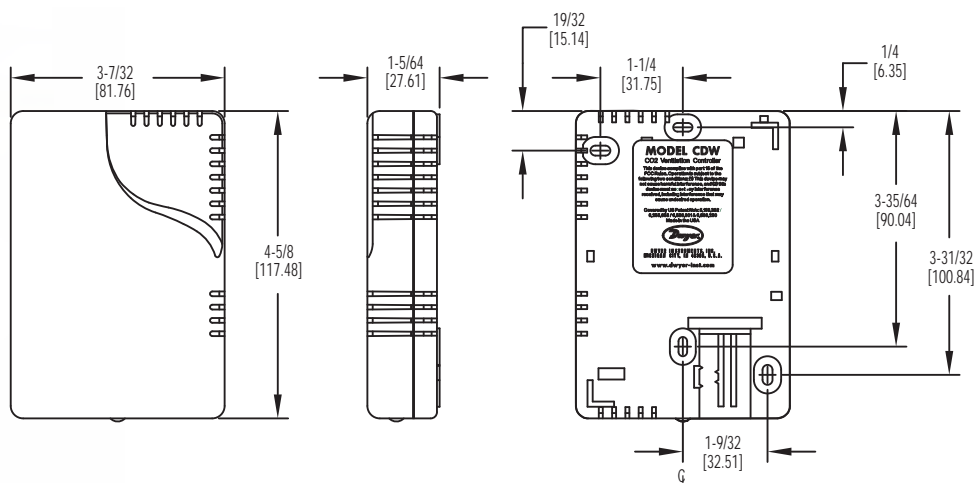
Outputs: 0 to 10 VDC.

Housing: Flammability Classification UL rated 94V-5.

Weight: 8 oz (230 g).

Wall Mount Carbon Dioxide/Temperature Transmitter

Measure up to 2000 PPM, NDIR Sensor



The Series CDW Wall Mount Carbon Dioxide/Temperature Transmitter combines accurate CO₂ measurements with a passive temperature output. The Non-Dispersive Infrared (NDIR) sensor continuously updates the calibration through a proprietary logic feature which limits the amount of error due to drift. The CDW series is ideal for building automation systems to help control the fresh air intake in a room.

APPLICATION

- On demand room ventilation.

Model CDW, Wall Mount CO₂/Temperature Transmitter

Model CDW-LED, Standard Model with LED Option

SPECIFICATIONS

Range: 0 to 2000 PPM CO₂.

Accuracy: ±100 PPM @ 22°C.

Temperature Dependence: 0.2% FS per °C Stability < 2% of FS over life of sensor.

Non-linearity: < 1% of FS.

Pressure Dependence: 0.13% of reading per mm of Hg.

Response Time: 3 to 5 minutes for 90% step change.

Ambient Operating Temperature: 32 to 122°F (0 to 50°C).

Storage Temperature: -4 to 158°F (-20 to 70°C).

Power Requirements: 18 - 30 VAC RMS 50/60 Hz, 18 to 42 VDC polarity protected.

Power Consumption: 1.75 VA average 3.25 VA peak.

Sensor: Non-Dispersive Infrared Sensor.

Output: 0 to 10 VDC for CO₂; 20K Ohm NTC Thermistor for temperature.

Weight: 0.5 lb (227 g).

Agency Approval: CE.

Water Leak Detector

Visual & Audible Alarm, Optional Switch Output



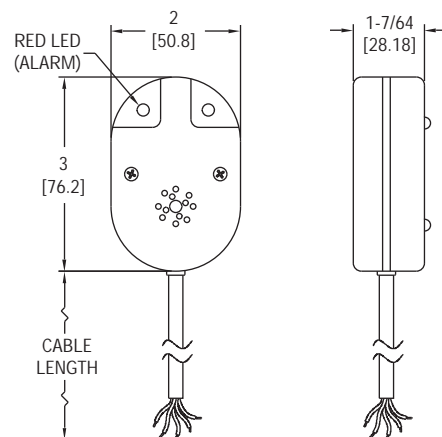
WD2-BP1



WD2-BP2



WD2-LP



Protect your equipment from water leaks. The WD2 Water Leak Detector detects leaking water and sounds an alarm before the leak turns into a costly mess. Simply place it on a flat surface under HVAC equipment, pumps, compressors, or electrical switchgear rooms. The WD2 relies on the electrical conductivity of water to change the resistance across the two contacts located at the base of the enclosure. When there is enough water to bridge the contacts, the resistance changes and triggers an alarm.

The Model WD2-BP1 and WD2-BP2 are stand-alone battery powered units and are provided with audible and visual alarms, plus low battery warning. The Model WD2-BP2 includes a solid state relay output.

Choose Model WD2-LP for application that requires an external 24 VAC/DC power supply. Unit features both audible and visual alarms with a SPDT relay output.

FEATURES

- Visual and audible alarm
- Low battery warning on battery powered versions
- SPDT switch output on WD2-LP
- SSR switch output on WD2-BP2
- Compact size

SPECIFICATIONS

Service: Water.

Switch Type: WD2-BP2: Solid state relay; WD2-LP: SPDT relay.

Electrical Rating: WD2-BP2: Pilot duty rating max. 250 mA @ 24 VDC; WD2-LP: SPDT 1A @ 24 VAC/DC, 1A @ 120 VAC.

Audible Alarm Function on WD2-BP1/WD2-BP2: 10 sec on, 30 sec off.

LED Alarm Function on WD2-BP1/WD2-BP2: 10 sec off, 30 sec on.

Power Requirements: WD2-BP1/WD2-BP2: 3V lithium battery (approximately 2 years battery life); WD2-LP: 11-27 VAC/DC.

Power Consumption: WD2-BP1/WD2-BP2: 0.9 mA steady state non-alarm, 3.0 mA during audible alarm, 2.4 mA during LED illumination; WD2-LP: DC 25 mA typical and 75 mA max, AC 30 mA typical and 85 mA max.

Electrical Connections: WD2-BP2: Attached 22 AWG, PVC insulated cable (0.8 ft long); WD2-LP: Attached 22 AWG, PVC insulated cable (4.8 ft long).

Enclosure: Acrylic, ABS plastic.

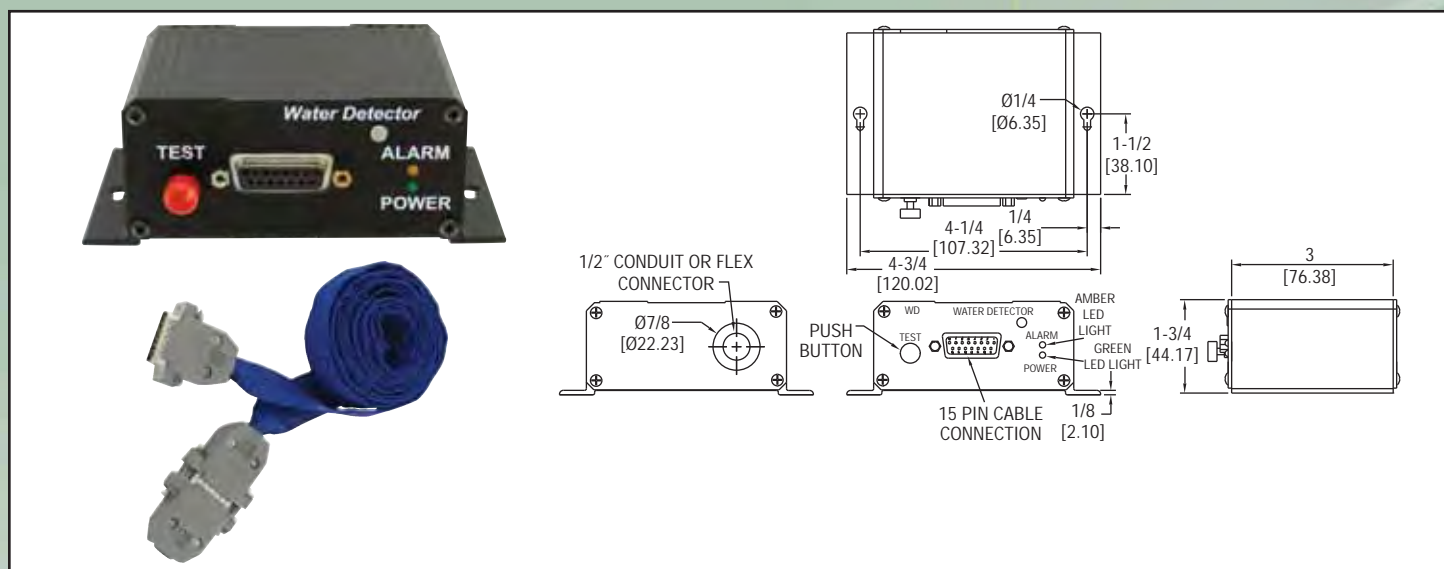
Temperature Limits: 32 to 122°F (0 to 50°C).

Weight: WD2-BP1: 2 oz; WD2-BP2: 3.5 oz; WD2-LP: 4.3 oz.

Model No.	Description
WD2-BP1	Battery Powered Leak Detector
WD2-BP2	Battery Powered Leak Detector With SSR Output
WD2-LP	Line Powered 24 VAC/DC Leak Detector With Relay Output

Water Detector and Sensor Tape

Detects Low Levels Of Conductive Liquids



The small and discreet Model WD Water Detector is designed for dependable detection of low levels of conductive liquids. The module features a sturdy and reliable aluminum enclosure and is powered by 24 VAC or 24 to 30 VDC. Water sensing tape attaches to module and if any liquid comes in contact with the tape the resistance is changed and the alarm will be triggered. The tape is hydrophobic so it does not absorb any of the liquid it is detecting which makes for a faster drying time and faster return to service after a water leak.

The sensing tape is 1" wide and can be bought in lengths of 5, 10, 15 and 25 feet. Multiple tapes can be connected together to extend the coverage area which makes it ideal for domestic as well as commercial applications. Typical uses include computer rooms, telecommunication facilities, in drip pans under HVAC equipment and around water pumps.

APPLICATIONS

- Water detection in drip pans under HVAC equipment
- Leak detection around pumps

FEATURES

- Alarm Output DPDT Relay
- Power and Alarm LED's
- Alarm Test Switch
- Continuous Tape Integrity Self Check
- Easy Trouble Shooting
- Extendable Tape Sensor

SPECIFICATIONS

Service: Conductive liquid.

Switch Type: DPDT.

Electrical Rating: 1A @ 24 VAC/VDC.

Power Requirements: 24 VAC, 24 to 30 VDC.

Power Consumption: 35 mA maximum.

Electrical Connections: Screw terminals.

Conduit Connections: Hole for 1/2" conduit.

Enclosure: Extruded aluminum.

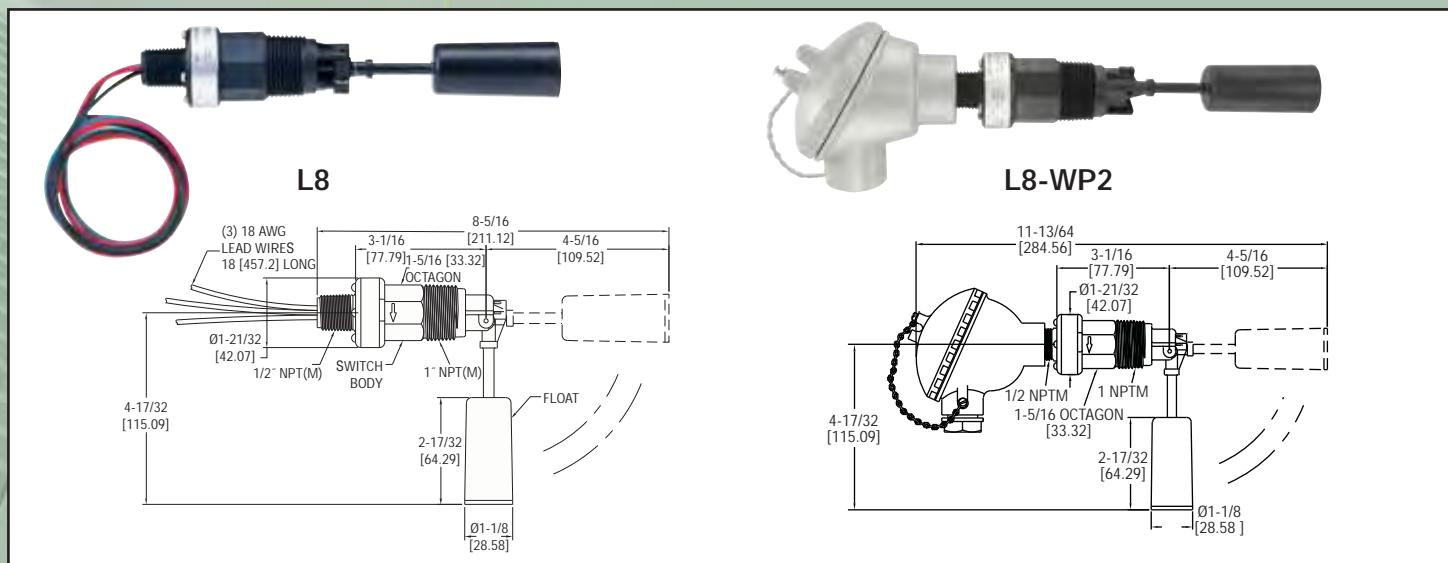
Sensor Tape: 1" (25.4 mm) wide and 5, 10, 15 or 25 feet long.

Weight: 8 oz (.23 kg).

Model	Description
WD	Water Module
TP05	5' (1.52 m) Tape
TP10	10' (3.05 m) Tape
TP15	15' (4.57 m) Tape
TP25	25' (7.62 m) Tape

FLOTECT® Liquid Level Switch

Weatherproof, Low Cost, Leak Proof Body



Model L8 Flotect® Liquid Level Switch features a leak proof body and float constructed from tough, durable polyphenylene sulfide which has excellent chemical resistance. Because the liquid level snap switch is magnetically actuated, there is no direct mechanical linkage to leak or fail, assuring longer life and decreased maintenance costs. This inexpensive unit is ideal for liquid level alarm, indication or control. Installation is quick and easy – simply install in a horizontal position with the index arrow pointing down.

The L8 Flotect® Liquid Level Switch is UL recognized as an industrial motor controller per UL standard 508, suitable for mounting in a protected environment. This lightweight switch can be used in numerous chemical process, industrial systems and similar applications where process conditions are compatible with polyphenylene sulfide, ceramic 8 and 316 SS. This liquid level switch provides accurate setpoint control of liquids with specific gravities as low as 0.6. This compact and reliable control is designed to handle temperatures up to 212°F (100°C) and pressures to 150 psig (10 bar).

APPLICATIONS

- HVAC and building automation systems that incorporate components that are located outside of the building and exposed to the elements are ideal applications.
- Perfect for level monitoring, especially in cooling towers and thermal storage systems.

Inconel® is a registered trademark of Huntington Alloys Corporation.

SPECIFICATIONS

Service: Compatible liquids.

Wetted Materials:

- Float and Body: Polyphenylene Sulfide (PPS).
- Pin and Spring: 316 SS or Inconel.
- Magnet: Ceramic 8.

Temperature Limit: 212°F (100°C).

Pressure Limit: 150 psig (10.34 bar).

Enclosure Rating: General purpose. WP/WP2 option is weatherproof.

Switch Type: SPDT snap switch. MV option is a SPDT gold contact snap switch.

Electrical Rating: 5A @ 125/250 VAC, 5A resistive, 3A inductive @ 30 VDC.

Electrical Connections: 18 AWG, 18" (460 mm) long.

Conduit Connection: 1/2" male NPT, 1/2" female NPT on WP and WP2.

Process Connection: 1" male NPT.

Mounting Orientation: Horizontal with index arrow pointing down.

Weight: 5 oz (0.142 kg).

Agency Approvals: CE, UL 508 for US and Canada.

Specific Gravity: 0.6 minimum.

L8 Level Switch

OPTIONS:

Gold Plated Contacts, for dry circuits. Rated 1A @ 125 VAC; 1A resistive, 0.5A inductive @ 30 VDC. To order add suffix -MV.

Example: **L8-MV**

Inconel® Alloy Option. Inconel® Alloy replaces standard 316 SS wetted parts. Wetted parts are Inconel® Alloy, ceramic 8, and Polyphenylene Sulfide. To order add suffix -INC.

Example: **L8-INC**

Weatherproof Enclosure. Optional housing is phenylpolioxide and provides weatherproof protection for electrical wiring.

To order add suffix -WP. (Not UL approved)

Example: **L8-WP**

Weatherproof Enclosure. Optional housing is aluminum and provides weatherproof protection for electrical wiring. To order add suffix -WP2. (Not UL approved)

Example: **L8-WP2**



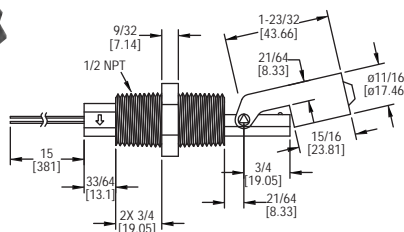
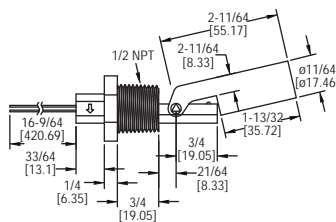
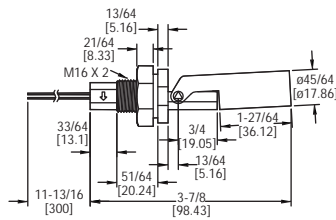
F6-HPS-11



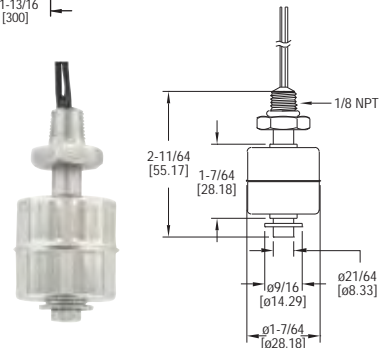
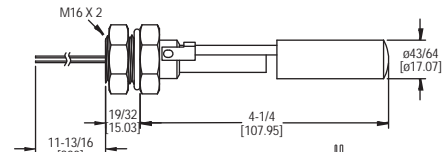
F6-HPS-21



F6-HPS-31



F6-MHS



Series F6 Horizontal and Vertical Mount Level Switches provide a simple, inexpensive control of the liquid level within a tank. Switch ratings are suitable for many solid-state control systems and monitors or alarms. Hermetically sealed reed switches are actuated by magnets permanently bonded inside the float and can be easily adapted to open or close a circuit on rising or falling levels. Models F6-HPS-11, F6-SS are internally mounted and are secured to the wall of the tank or vessel from the inside while model F6-HPS-21 is mounted from the outside (externally). Model F6-HPS-31 can be installed by mounting either internally or externally.

APPLICATIONS

Liquid level indication in tanks, sumps and drip pans

SPECIFICATIONS

Service: Compatible liquids.

Wetted Materials: See model table.

Temperature: F6-SS & F6-MHS: -4 to 275°F (-20 to 125°C). F6-HPS-11, 21, 31: 14 to 176°F (-10 to 80°C).

Pressure Limit: F6-SS & F6-MHS: 218 psi (15 bar). F6-HPS-11, 21, 31: 116 psi (8 bar).

Enclosure Rating: General Purpose.

Switch Type: SPST Hermetically sealed reed switch, reversible for N.O. or N.C.

Electrical Rating: 20VA: 0.17A @ 120VAC, 0.08A @ 240 VAC.

Electrical Connection: 22 AWG, 11.811" (300mm) long.

Process Connection: F6-SS: 1/8" NPT, HPS-21, 31: 1/2" NPT, F6-MHS, F6-HPS-11: M16*2.

Mounting Orientation: F6-SS: vertical $\pm 20^\circ$, F6-MHS/HPS: horizontal with index arrow pointing up or down.

Weight: F6-HPS-11, 21: 1.23 oz (38 g), F6-MHS-31: 1.41 oz (40 g), F6-MHS: 3.35 oz (95 g), F6-SS: 1.59 oz (45 g).

Agency Approvals: CE.

Specific Gravity: F6-SS: 0.65, F6-MHS: 0.85, F6-HPS-11, 21, 31: 0.6.

Horizontal Float

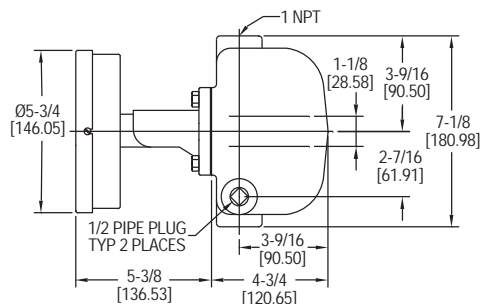
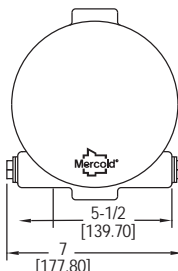
Model Number	Wetted Materials	Minimum Specific Gravity	Weight oz (g)
F6-HPS-11	Polypropylene/Polypropylene	0.6	1.23 (38)
F6-HPS-21	Polypropylene/Polypropylene	0.6	1.23 (38)
F6-HPS-31	Polypropylene/Polypropylene	0.6	1.41 (40)
F6-MHS	304 SS/304 SS	0.85	3.35 (95)

Vertical Float

Model Number	Wetted Materials	Minimum Specific Gravity	Weight oz (g)
F6-SS	316SS/316SS	0.65	1.59 (45)

Boiler Water Level Control

Heavy Duty, Cast Iron Chamber



A special snap action mechanism eliminates frequent operation due to surging water level. Visible operation adds convenience in servicing. Stainless steel trim and hand reset are available if required. Options include DPDT switch, two stage, and weatherproof housing.

APPLICATIONS

- Boiler Low Water Cut-Off
- Boiler Feed-Water Control
- Condensate Tanks
- Deaerators

Model Number	Switch Type
123-153	SPDT Mercury
123-7000-153	SPDT Snap

SPECIFICATIONS

Service: Compatible liquids. Cast iron is not for use with lethal or flammable substances either liquid or gaseous.

Wetted Materials: Body: Cast iron. Float and Trim: 304 SS. Packing Gland: Brass. Packing: Carbon. Body Gasket: Carbon.

Temperature Limit: 365°F (185°C).

Pressure Limit: 150 psig (10.34 bar).

Enclosure Rating: General Purpose. Optional weatherproof.

Switch Type: SPDT snap switch or mercury switch. Optional DPDT or two stage.

Electrical Rating: Snap Switch: 15A @ 120/240/480 VAC, 0.5A @ 120 VDC resistive, 0.25A @ 240 VDC resistive. Mercury Switch: 4A @ 120 VAC/DC, 2A @ 240 VAC/DC.

Electrical Connections: Screw terminal.

Conduit Connection: 7/8" (22.23 mm) hole for 1/2" (12.7 mm) conduit.

Process Connections: 1" female NPT.

Mounting Orientation: Vertical.

Weight: 20 lb (9.1 kg).

Agency Approvals: UL and CSA. (Snap switch is not rated).

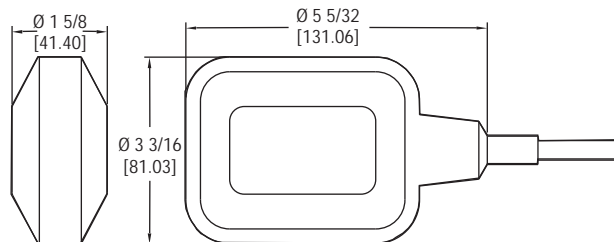
Deadband: Approximately 1-1/2" (38.1 mm).

Specific Gravity: 0.88 minimum.

Options: Manual Reset.

Cable Float Switch

No Hazardous Mercury, Adjustable Counterweight



Control the level of liquids in filling or draining reservoirs and tanks with the Series CFS. The mercury-free switch is designed with an inverter microswitch housed in a polypropylene cover. The unit includes a counterweight to adjust the stop and start levels of pump up/pump down application.

APPLICATIONS

- Sump pump control

Model Number	Cable Length
CFS-2	6.5 ft (2 m)
CFS-10	32.8 ft (10 m)

SPECIFICATIONS

Service: Compatible liquids.

Wetted Materials: Polypropylene housing, PVC cable.

Temperature Limits: 140°F (60°C).

Pressure Limits: 60 psi (4 bar).

Enclosure Rating: NEMA 6 (IP68).

Switch Type: SPDT.

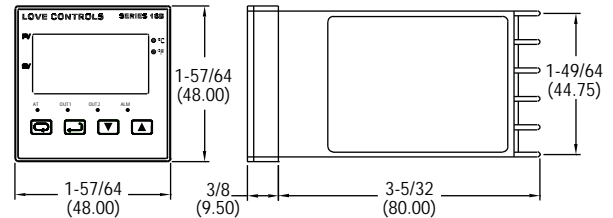
Electrical Rating: 10 A @ 250 VAC, resistive.

Mounting Orientation: Vertical.

Weight: CFS-2: 1.416 lb (.62 kg).

CFS-10: 3.316 lb (1.48 kg).

Agency Approvals: CE.



Monitor and control temperature or process applications with precision using the Series 16B controllers. The units offer two separate outputs for dual loop control in direct or reverse acting. Select relay, voltage, or current output combined with a second relay output. The Series 16B provides dual LED displays for local indication of process value and setpoint value. Output status, engineering scale, auto tuning and alarm status is also indicated on the front panel. Control methods include ON/OFF, PID, self-tune and manual tune. PID control is supported with 64 ramp/soak control actions. Two additional alarm outputs are standard on the Series 16B. The alarm outputs can be quickly configured by using the thirteen built-in alarm functions. The controller easily communicates with other external devices such as PC's and PLC's for data search and system integration using the built-in RS-485 interface. Up to 247 communication addresses are available with transmission speeds of 2400 to 38,400 bps. The Series 16B also features universal input, selectable °F/°C, selectable resolution and security functions.

APPLICATIONS

Control temperature for boilers, damper control based on temperature or pressure.

Model Number	Output 1	Output 2
16B-23	Voltage Pulse	Relay
16B-33	Relay	Relay
16B-53	Current	Relay

ACCESSORIES

SCD-SW, Configuration Software

A-277, 250 Ohm Precision Resistor

MN-1, Mini-Node™ USB/RS-485 converter

SPECIFICATIONS

Inputs: Thermocouple, RTD, DC voltages or DC current.

Display: Two 4-digit, 7 segment .25" H (6.35 mm) LED's. PV: red; SV: green.

Accuracy: ±0.25% span, ±1 least significant digit.

Supply Voltage: 100 to 240 VAC, 50/60 Hz.

Power Consumption: 5 VA max.

Operating Temperature: 32 to 122°F (0 to 50°C).

Memory Backup: Nonvolatile memory.

Control Output Ratings:

Relay: SPST, 5A @ 250 VAC resistive.

Voltage Pulse: 14V, 10% to -20% (max 40 mA).

Current: 4 to 20 mA.

Communication: RS-485 Modbus® A-5-11/RTU communication protocol.

Weight: 4 oz (114 g).

Agency Approvals: CE, UL, cUL.

Front Panel Rating: IP66.

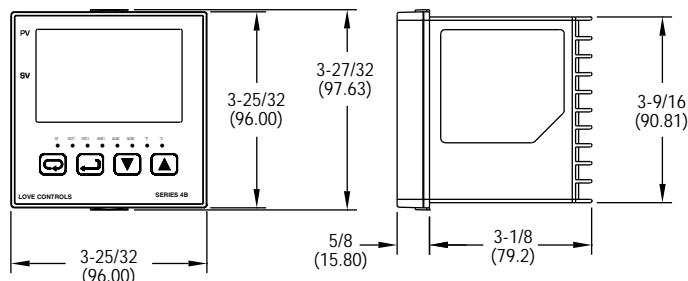
Input Types	Range
Type K T/C	-328 to 2372°F (-200 to 1300°C)
Type J T/C	-148 to 2192°F (-100 to 1200°C)
Type T T/C	-328 to 752°F (-200 to 400°C)
Type E T/C	32 to 1112°F (0 to 600°C)
Type W T/C	-328 to 2372°F (-200 to 1300°C)
Type R T/C	32 to 3092°F (0 to 1700°C)
Type S T/C	32 to 3092°F (0 to 1700°C)
Type B T/C	212 to 3272°F (100 to 1800°C)
Type L T/C	-328 to 1562°F (-200 to 850°C)
Type U T/C	-328 to 932°F (-200 to 500°C)
Pt 100 RTD	-328 to 1112°F (-200 to 600°C)
0-50 mV	-999 to 9999
0-5 V	-999 to 9999
0-10 V	-999 to 9999
0-20 mA*	-999 to 9999
4-20 mA*	-999 to 9999

*Requires 250 Ohm Precision Resistor

Modbus® is a registered trademark of Schneider Automation

1/4 DIN Temperature/Process Controller

Dual Control Output, RS-485 Communication, Auto-Tuning



The Series 4B 1/4 DIN Temperature/Process Controller is designed to accept thermocouple, RTD, current or voltage input and provide dual outputs for control. Available outputs include relay/relay, voltage pulse/relay, current/relay, or linear voltage/relay.

The units can be programmed for ON/OFF, PID, auto-tuning, or manual tuning control methods. The PID control is supported by 64 ramp/soak actions. The Series 4B also includes two additional alarm outputs. The second relay output can be reconfigured as a third alarm output. The alarm type can be selected from 13 different preprogrammed alarm functions. The controller features dual LED displays for local indication of process and setpoint values.

APPLICATIONS

Control temperature for boilers, damper control based on temperature or pressure.

SPECIFICATIONS

Inputs: Thermocouple, RTD, DC voltages or DC current.

Display: Two 4-digit, 7 segment. PV: 3/4" H (19 mm) red; SV: 1/2" H (12.7 mm) green.

Accuracy: $\pm 0.25\%$ span, ± 1 least significant digit.

Supply Voltage: 100 to 240 VAC, 50/60 Hz.

Power Consumption: 5 VA max.

Operating Temperature: 32 to 122°F (0 to 50°C).

Memory Backup: Nonvolatile memory.

Control Output Ratings:

Relay: SPDT, 5A @ 250 VAC resistive.

Voltage Pulse: 14V, 10% to -20% (max 40 mA).

Current: 4 to 20 mA.

Linear Voltage: 0-10V.

Communication: RS-485 Modbus® A-5-11/RTU communication protocol.

Weight: 15 oz (425 g).

Agency Approvals: CE, UL, cUL.

Front Panel Rating: IP66.

Input Types	Range
Type K T/C	-328 to 2372°F (-200 to 1300°C)
Type J T/C	-148 to 2192°F (-100 to 1200°C)
Type T T/C	-328 to 752°F (-200 to 400°C)
Type E T/C	32 to 1112°F (0 to 600°C)
Type W T/C	-328 to 2372°F (-200 to 1300°C)
Type R T/C	32 to 3092°F (0 to 1700°C)
Type S T/C	32 to 3092°F (0 to 1700°C)
Type B T/C	212 to 3272°F (100 to 1800°C)
Type L T/C	-328 to 1562°F (-200 to 850°C)
Type U T/C	-328 to 932°F (-200 to 500°C)
Pt 100 RTD	-328 to 1112°F (-200 to 600°C)
0-50 mV	-999 to 9999
0-5 V	-999 to 9999
0-10 V	-999 to 9999
0-20 mA*	-999 to 9999
4-20 mA*	-999 to 9999

*Requires 250 Ohm Precision Resistor.

Model Number	Output 1	Output 2
4B-23	Voltage Pulse	Relay
4B-33	Relay	Relay
4B-53	Current	Relay
4B-63	Linear Voltage	Relay

ACCESSORIES

SCD-SW, Configuration Software

A-277, 250 Ohm Precision Resistor

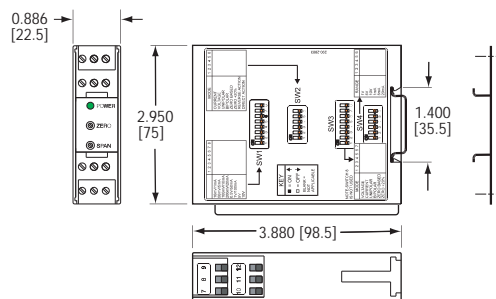
MN-1, Mini-Node™ USB/RS-485 converter

Modbus® is a registered trademark of Schneider Automation

Series
SC4130
SC4151
SC4380

Iso Verter® II Signal Conditioning Modules

Voltage & Current Converter/Rescaler



Linearized and isolated RTD and Thermocouple transmitters are part of the Series SC4000 Iso Verter® II Signal Conditioning Modules. These modules completely isolate the input from the output and from ground. Compatible with industry standard 35 mm DIN Rail mount transmitters and isolators, these modules are easily applied in new or existing installations.

The **SC4380 Process Signal Converter/Isolator** accepts virtually all standard process signals as an input, and isolates and retransmits the signal in either the same units or virtually any other standard process signal. The SC4380 can be field programmed for reverse or direct action and can receive and transmit single sided or bipolar* signals. Low Voltage units (SCL) are also available.

The **SC4151 RTD Transmitters** each offer a fixed scale range input (selected when ordered) and a linearized, isolated, field selectable 4 to 20 mA or 0 to 10 VDC output. Output is selected by simple switch settings. Low Voltage units (SCL) are also available.

The **SC4130 Thermocouple Transmitter** offers a fixed scale range input (selected when ordered) and a linearized, isolated, field selectable 4 to 20 mA or 0 to 10 VDC output. Output is selected by simple switch settings.

Low Voltage units (SCL) are also available.

*Note: The term "bipolar" refers to an input or output that crosses zero volts. Certain devices have ranges that run from minus to plus voltages (eg. -1 to +5 VDC, -10 to +10 VDC, etc.). The SC4380 Iso Verter® II can be set up to accept a bipolar signal input or provide a bipolar output.

APPLICATIONS

Signal conditioners used in panels for isolation and converting signals for boilers and controls systems.

To Order Use Range Code as Suffix:

SC4130 & SCL4130

Model SC4130 Range Codes	Model SCL4130 Range Codes
A = J, -100 to 200°C	A = J, -100 to 200°C
C = J, 0 to 100°C	C = J, 0 to 100°C
D = J, 0 to 500°F	D = J, 0 to 500°F
E = J, 0 to 250°C	E = J, 0 to 250°C
F = J, 0 to 750°C	F = J, 0 to 750°C
G = J, 0 to 1000°F	G = J, 0 to 1000°F
H = K, -150 to 350°F	H = K, -150 to 350°F
J = K, -100 to 200°C	J = K, -100 to 200°C
K = K, 0 to 500°F	K = K, 0 to 500°F
L = K, 0 to 250°C	L = K, 0 to 250°C
M = K, 0 to 1000°F	M = K, 0 to 1000°F
N = K, 0 to 500°C	N = K, 0 to 500°C
P = K, 0 to 2000°F	P = K, 0 to 2000°F
R = K, 0 to 1000°C	R = K, 0 to 1000°C
S = T, -300 to 250°F	S = T, -300 to 250°F
T = T, -200 to 200°C	T = T, -200 to 200°C

SPECIFICATIONS

Isolation: 1500 VAC RMS.

Linearity: 0.1% of full scale.

Drift: ±0.02%/°C typical, ±0.05%/°C maximum.

Power Supply: SC: 85 to 265 VDC/VAC 50 to 400 Hz; SCL: 12 to 24 VDC/VAC 50 to 400 Hz.

Output Loads: Current: 600 ohms maximum Voltage: 500 ohms minimum (20 mA maximum).

Input Characteristics: SC4380: Voltage: 1 megohms impedance, Current: 10 ohms; SC4151: RTD Search current < 500 µA; SC4130: 3 megohms impedance.

Case Size: 0.866" W (22.5 mm) x 2.950" H (75.0 mm) 3.880" D (98.5 mm).

Mounting: Mounts on industry standard 35 mm DIN Rail (DIN EN50022-35).

SC4151 & SCL4151

Model SC4151 Range Codes	Model SCL4151 Range Codes
A = DIN, -100 to 200°C	A = DIN, -100 to 200°C
B = DIN, 0 to 100°C	B = DIN, 0 to 100°C
C = DIN, 0 to 150°C	C = DIN, 0 to 150°C
D = DIN, 0 to 200°F	D = DIN, 0 to 200°F
E = DIN, 0 to 200°C	E = DIN, 0 to 200°C
F = DIN, 0 to 400°F	F = DIN, 0 to 400°F
G = DIN, 0 to 250°C	G = DIN, 0 to 250°C
H = DIN, 0 to 500°F	H = DIN, 0 to 500°F
J = DIN, 0 to 500°C	J = DIN, 0 to 500°C
K = DIN, 0 to 1000°F	K = DIN, 0 to 1000°F

SC4380 & SCL4380 OPERATING RANGES

Inputs		Outputs	
Current	Voltage	Current	Voltage
0 to 5 mA	0 to 100 mV	0 to 1 mA	0 to 1 V
0 to 10 mA	0 to 200 mV	0 to 5 mA	0 to 5 V
0 to 10 mA	0 to 500 mV	0 to 20 mA	0 to 10 V
0 to 20 mA	0 to 1 V	1 to 5 mA	1 to 5 V
0 to 50 mA	0 to 5 V	4 to 20 mA	2 to 10 V
0 to 100 mA	0 to 10 V		
1 to 5 mA	1 to 5 V		
4 to 20 mA	2 to 10 V		
10 to 50 mA			

SC4130 & SCL4130* Thermocouple Transmitters

SC4151 & SCL4151* RTD Transmitters

SC4380 & SCL4380*

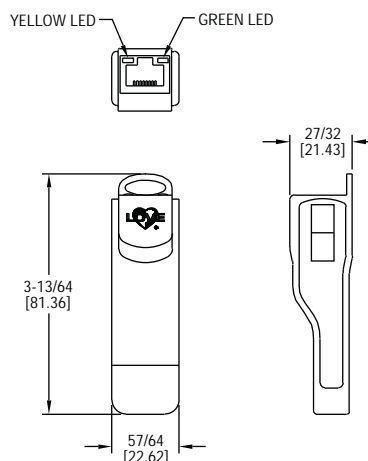
Iso Verter® II Process Signal Converter/Isolators

*SCL models are low voltage units.

Model
MN-1

Mini-Node™ Communication Signal Converter

Converts USB to RS-485, Integral USB Connector, No External Power



The Model MN-1 Mini-Node™ Communication Signal Converter is a low cost device that converts half duplex RS-485 serial communications signals into a signal that can be read by any computer with a USB port. The integral USB connector and RJ-45 connector reduces set up time by eliminating extra wiring. The Model MN-1 is powered via the USB connection which eliminates the need for an external power source. The compact size is great for field installation, control panels, and lab testing.

SPECIFICATIONS

Power Requirements: No external power required.

Power Consumption: 0.4 W.

Isolated Voltage: 3000 VDC.

Input Impedance: 96 kΩ.

USB Connector: B-Type (Female).

RS-485 Connector: RJ-45.

Baud Rate: 75, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200 bps.

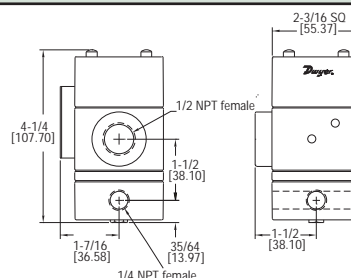
Compatibility: Full compliance with USB V.2.0 specification.

Model MN-1 Mini-Node™ USB to RS-485 Converter

Series
IP

Current to Pressure Transducer

Intrinsically Safe, NEMA 4X Enclosure, Field Reversible



The Series IP Current to Pressure Transducer converts a current input signal to a linearly proportional pneumatic output pressure. The features include built-in volume booster, low air consumption, field reversible (provides output which is inversely proportional to input signal) and flexible zero and span adjustments. The rugged NEMA 4X enclosure allows splashdown and outdoor installation. The IP can be used for applications that require operation of valve actuators, pneumatic valve positioners, damper and louver actuators, final control elements and relays.

Model Number	Input Ranges	Output Range	
		psi	kPa
IP-42	4-20 mA	3-15	20-100
IP-43	4-20 mA	3-27	20-185
IP-44	4-20 mA	6-30	40-200

SPECIFICATIONS

Service: Oil free, clean dry air filtered to 40 microns.

Input Signal: 4-20 mA.

Input Impedance: IP-42: 180 ohms; IP-43 and IP-44: 220 ohms.

Air Pressure: Minimum: 3 psig (21 kPa) above maximum output; Maximum: 100 psig (700 kPa).

Linearity: $\pm 0.75\%$ of span.

Hysteresis: $< 1\%$ of span.

Repeatability: $< 0.5\%$ of span.

Supply Pressure Sensitivity: $\pm 0.1\%$ of span per psig ($\pm 0.15\%$ of span per 10 kPa).

Power Requirements: Loop-powered.

Temperature Limits: -20 to 140°F (-30 to 60°C).

Pressure Connections: 1/4" female NPT.

Electrical Connection: 1/2" female NPT.

Air Consumption: 0.03 SCFM (0.5 m³/h) typical.

Output Capacity: 4.5 SCFM (7.6 m³/h ANR) at 25 psig (175 kPa) supply; 12 SCFM (20 m³/h) at 100 psig (700 kPa) supply.

Relief Capacity: 2 SCFM (3.4 m³/h) at 5 psig (35 kPa) above 20 psig (140 kPa) setpoint.

Weight: 2.1 lb (0.94 kg).

Agency Approvals: CE, FM.

Electro-Pneumatic Transducer

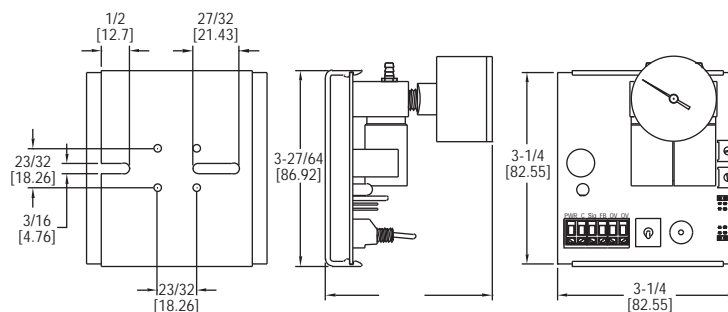
Low Cost, Selectable Input/Output, Manual Override



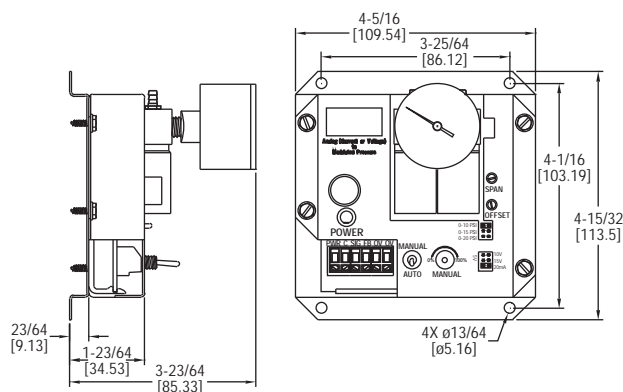
EPTA-B



EPTA-S



SHOWN WITH SNAP-TRACK MOUNTING



SHOWN WITH METAL BRACKET MOUNTING

The Series EPTA is an electric to pneumatic transducer that converts an analog input signal to a linearly proportionate pneumatic output by modulating its control valves to regulate branch line pressure to the set point determined by the input signal. All models incorporate two low voltage valves, an integral in-barb filter, a 0 to 30 psi analog gauge, an anodized aluminum manifold, and brass barbed fittings. The EPTA offers adjustable span and offset as well as manual override. This unit has no air consumption and is immune to mounting orientation. Output pressure ranges include field selectable 0 to 10, 0 to 15, and 0 to 20 psig. Also included is an analog 0 to 5 VDC feedback signal indicating the resultant branch line pressure. Universal 24 VAC/24 VDC supply voltage and field selectable 4 to 20 mA, 0 to 5 VDC, 0 to 10 VDC, or 0 to 15 VDC inputs ensure single unit compatibility with most systems. The standard models maintain branch pressure on power loss while the Fail-Safe models will drop the branch pressure to 0 psi on power loss. Mounting configurations include a metal bracket mount in the EPTA-B models and a snap-track mount in the EPTA-S models. The A-400 accessory kit will allow the EPTA-S models to be mounted on a standard DIN rail.

APPLICATIONS

- Operation of valve actuators, positioners, damper and louver actuators.

Model No.	Description
EPTA-S0	Standard Snap-Track Mount Transducer
EPTA-B0	Standard Metal Bracket Mount Transducer
EPTA-S1	Snap-Track Mount Transducer with Fail-Safe
EPTA-B1	Metal Bracket Mount Transducer with Fail-Safe

ACCESSORIES

- A-400, DIN Mounting Kit
- A-403, Replacement Integral Barb Filter

SPECIFICATIONS

Service: Clean dry air or any inert gas.

Input Signal: DC Current (4-20 mA) or DC Voltage (0-5/0-10/0-15).

Input Impedance:

Current: 250 ohms.

Voltage: Infinite.

Output Signal: Jumper selectable 0-10 psig (0-69 kPa), 0-15 psig (0-103 kPa), or 0-20 psig (0-138 kPa).

Feedback Output: 0 to 5 VDC.

Air Supply: 25 psig (172 kPa) maximum.

Air Flow: 750 scim.

Air Consumption: 0 scim normal operation, Fail-Safe model vents to 0 psi on power loss.

Accuracy:

±1.0% Full Scale @ room temperature.

±2.0% Full Scale @ 32 to 120°F (0 to 48.8°C).

Supply Voltage: 24 VDC (+10%/-5%) or 24 VAC (±10%) 50/60 Hz.

Supply Current: 180 mA maximum, 200 mA maximum on Fail-Safe model.

Temperature Limits:

Operating: 32 to 120°F (0 to 48.8°C).

Storage: -20 to 150°F (-6.7 to 65.6°C).

Operating Humidity Range: 5 to 95%, non-condensing.

Pressure Connections: 1/4" O.D. (polyethylene tubing optimum).

Electrical Connections: Plug-in Block Terminal type with 5mm pin spacing.

Wire Size: Up to one 14 AWG per terminal.

Weight: EPTA-S0: 6.9 oz. (196 g), EPTA-S1: 9.2 oz. (261 g), EPTA-B: 14.5 oz. (411 g).

Series 476A Single Pressure Digital Manometer & Series 478A Digital Manometer

Electronic Zeroing, $\pm 1.5\%$ Accuracy

- One-Button Auto-Zero Function
- Auto Power Off.
- Large, Easy-to-Read Display.
- Extruded Aluminum Case.
- Instant Selection from up to Eight English/Metric Units.

Ideal for field or laboratory use, the Model 476A Single Pressure Digital Manometer measures low pressures from -20 to 20" w.c. with $\pm 1.5\%$ full scale accuracy. Designed especially for the HVAC contractor, the Model 476A can be used to set supply pressures, verify pressure switch operation, adjust regulators, check pneumatic systems and computer peripherals. The rugged, hand-held unit is constructed with an extruded aluminum case for exceptional durability.

The Series 478A manometer can be used to measure positive, negative, or differential pressures. The unit features selectable units, auto zero, hold and a Min/Max function. Press the Hold key to freeze the current pressure measurement on the display. The 478A manometer includes a zeroing button to null out any minor pressure differences.

APPLICATIONS

Monitoring or troubleshooting HVAC systems



SPECIFICATIONS

Service: Air and compatible gases.

Wetted Materials: Consult factory.

Accuracy: $\pm 1.5\%$ F.S. at 72°F (22.2°C). Includes linearity and repeatability.

Pressure Hysteresis: $\pm 0.1\%$ of F.S.

Pressure Limits: 5 psig (.74 bar).

Temperature Limits: 0 to 140°F (-17.8 to 60°C).

Compensated Temperature Limits: 32 to 104°F (0 to 40°C).

Thermal Effect: 0.05% F.S./°F.

Display: 4 digit LCD (.425"H x .234"W digits).

Power Requirements: 9V alkaline battery. Battery included but not connected.

Process Connections: For use with 3/16" or 1/4" I.D. tubing.

Weight: 10.8 oz (306 g).

Agency Approvals: CE.

A-402A CARRYING CASE — Tough gray nylon pouch protects any Series 476A/478A Manometer. Double zippered for quick and easy access. With belt loop that snaps closed.

7-1/2"H x 3"W x 2-1/4"D (191 x 76 x 57 mm)



Model Number	Range in w.c.	Available Pressure Units								Resolution in w.c.	Maximum Pressure
		bar	psi	in Hg	kPa	in w.c.	mm Hg	mbar	mm w.c.		
476A-0	-20.0 to 20.0	.0498	0.723	1.471	4.98	20.00	37.4	49.8	508	0.02	5 psig

Model Number	Range in w.c.	Available Pressure Units									Resolution in w.c.	Maximum Pressure
		bar	psi	in Hg	kPa	in w.c.	mm Hg	mbar	mm w.c.	Pa		
478A-0	-4.00 to 4.00		.1445	.294	0.996	4.00	7.47	9.96	101.6	996	0.01	5 psig
478A-1	-60.0 to 60.0	.1495	2.168	4.41	14.95	60.0	112.1	149.5	1524		0.1	5 psig

- New LOW Range Option 0-1.000 in. w.c.
- Measures Positive, Negative and Differential Pressures
- Rugged, Extruded Aluminum Case
- Lightweight, Fast and Easy to Use
- Selectable English/Metric Units
- FM Approved

The Dwyer® Series 475-FM Mark III Handheld Digital Manometer is ideal for field calibration, monitoring or trouble shooting HVAC systems, clean rooms, or a wide range of other low pressure pneumatic systems. This handy instrument measures positive, negative or differential pressures of air and natural gases in ranges from 1 in. w.c. (0.249 kPa) to 150 psid (10.34 bar). The Series 475-FM is approved and is intrinsically safe for hazardous locations, Class 1, Div. 1, Group A, B, C, D, T4. Its simple operation and easy to read digital display make it an indispensable test instrument for the plant engineer, industrial hygienist and HVAC technician. When used with a Dwyer® Pitot tube (see Flow and Air Velocity), the Series 475-FM Mark III can also be used as an air velocity gage. See the complete 475-1-FM-AV kit described below.

The Series 475-FM Mark III is housed in a durable extruded aluminum case with its solid state circuitry mounted on a tough fiberglass epoxy circuit board. To meet the most demanding applications and to provide stability of instrument reading, the 1 in. w.c. range is compensated for position sensitivity through the use of a unique patented dual sensor system. A standard 9 volt battery provides up to 100 hours of operation. Dual push pads on the front panel control on-off, auto zero, and pressure unit selection. No set-up or leveling. The large 0.42" LCD display is easy to read, minimizing data collection errors. Units include a "low battery" indicator. The pressure sensor used is a highly stable silicon piezoresistive device. Standard connections are dual sized for 1/8" or 3/16" I.D. vinyl or rubber tubing. Complete instructions are conveniently printed on rear of housing.

APPLICATIONS

- Field calibration
- Monitoring or trouble shooting HVAC systems
- Clean room checks
- Air velocity monitoring with Dwyer Pitot Tube
- Natural gas appliance line pressure



SPECIFICATIONS

Service: Air and compatible combustible gases.

Wetted Materials: Consult factory.

Accuracy: $\pm 0.5\%$ F.S., 60 to 78°F (15.6 to 25.6°C); $\pm 1.5\%$ F.S. from 32 to 60°F and 78 to 104°F (0 to 15.6°C and 25.6 to 40°C).

Pressure Hysteresis: $\pm 0.1\%$ of full scale.

Pressure Limits: See chart.

Temperature Limits: 0 to 140°F (-17.8 to 60°C).

Compensated Temperature Limits: 32 to 104°F (0 to 40°C).

Storage Temperature Limits: -4 to 176°F (-20 to 80°C).

Display: 0.42" (10.6 mm) 4 digit LCD.

Resolution: See chart.

Power Requirements: 9 volt alkaline battery. Battery not connected.

Weight: 10.8 oz (306 g).

Connections: Two barbed connections for use with 1/8" (3.18 mm) or 3/16" (4.76 mm) I.D. tubing. Two compression fittings for use with 1/8" (3.18 mm) I.D. x 1/4" (6.35 mm) O.D. tubing for 475-7-FM & 475-8-FM only.

Agency Approvals: FM, CE.

A-402A Carrying Case — Tough gray nylon pouch protects any Series 475 Manometer. Double zippered for quick and easy access. With belt loop that snaps closed.

7-1/2"H x 3"W x 2-1/4"D (191 x 76 x 57 mm)



475-AV AIR VELOCITY KIT — Includes the Series 475-FM Manometer, two A-303 static pressure tips two 9 ft. lengths 3/16" I.D. rubber tubing, no. 166-6-CF Pitot tube, A-397 step drill, A-532 air velocity slide chart and instruction bulletin H-11, all packed in a tough, molded plastic carrying case with die cut foam liner. To order, add AV suffix to any standard 475 model no.

Example: 475-1-FM-AV

Model Number	English Range	Metric Range	Maximum Pressure
475-000-FM	0-1.000 in w.c.	.2491 kPa	5 psig
475-00-FM	0-4.000 in w.c.	0.996 kPa	5 psig
475-0-FM	0-10.00 in w.c.	2.491 kPa	5 psig
475-1-FM	0-20.00 in w.c.	4.982 kPa	10 psig
475-2-FM	0-40.00 in w.c.	9.96 kPa	10 psig
475-3-FM	0-200.0 in w.c.	49.82 kPa	30 psig
475-4-FM	0-10.00 psi	.6895 bar	30 psig
475-5-FM	0-20.00 psi	1.379 bar	60 psig
475-6-FM	0-30.00 psi	2.069 bar	60 psig
475-7-FM	0-100.0 psi	6.895 bar	150 psig
475-8-FM	0-150.0 psi	10.34 bar	200 psig

Handheld Digital Manometer

Selectable Pressure Units, $\pm 0.5\%$ Accuracy, FM Approved Intrinsically
Safe for Hazardous Locations, Class 1, Div. 1, Group A, B, C, D, T4



- New Low Pressure Ranges
- USB Option Comes with Cable and Software for Easy Data Downloading.
- Instant Selection from up to Nine English/Metric Units.
- Stores 40 Readings in Memory for Later Reference.
- Measure Positive, Negative or Differential Pressures.
- Large Easy-to-Read 0.4" LCD Display Includes Switchable Backlight for Great Visibility — Anywhere!
- Both Audible and Visual Overpressure Alarms.
- Includes + and - Indicators plus Low Battery Warning.
- Operates up to 100 Hours on a Single 9 Volt Battery.

Series 477 Handheld Digital Manometers are packed with features you need to make pressure measurement and recording faster, easier and more accurate than ever. First, you can instantly select from up to nine of the most widely used pressure units without having to waste time and risk mistakes with tedious conversions. Next, a non-volatile memory function enables storage of up to 40 readings — perfect for HVAC technicians making Pitot tube traverses of airflow readings across a duct. The FM approved models are intrinsically safe for hazardous locations, Class 1, Div. 1, Group A, B, C, D, T4.

When working in poorly lighted areas, just switch on the handy backlight feature. It automatically shuts itself off after 20 minutes to minimize battery drain. Electronic zeroing means you simply touch a single key to perfectly null out any minor pressure differences. A display HOLD key freezes the current pressure for those all-too-common situations where readings fluctuate. We even included an audible alarm to warn you of overpressure plus a visual alarm warning in case ambient noise levels are too high to hear the alarm. Audible alarm also confirms a value has been stored, eliminating the need to observe display during a duct traverse.

A new option for the Series 477 is a USB interface. Combined with the 477's datalogging capability, a user can now quickly and conveniently download the stored readings to any USB compatible device. Data manipulation can be easily accomplished in a multitude of word processing or spreadsheet programs. USB models come with a USB cable and a software CD.

APPLICATIONS

- Field calibration
- Monitoring or trouble shooting HVAC systems
- Clean room checks
- Air velocity monitoring with Dwyer Pitot Tube
- Natural gas appliance line pressure

New USB Connection Capability



SPECIFICATIONS

Service: Air and compatible gases. FM models air and compatible combustible gases.

Wetted Materials: Consult factory.

Accuracy: $\pm 0.5\%$ F.S., 60 to 78°F (15.6 to 25.6°C); $\pm 1.5\%$ F.S. from 32 to 60°F and 78 to 104°F (0 to 15.6°C and 25.6 to 40°C).

Pressure Hysteresis: $\pm 0.1\%$ of full scale.

Pressure Limits: See chart.

Temperature Limits: 0 to 140°F (-17.8 to 60°C).

Compensated Temperature Limits: 32 to 104°F (0 to 40°C).

Storage Temperature Limits: -4 to 176°F (-20 to 80°C).

Display: 0.42" (10.6 mm) 4 digit LCD.

Response Time: 1 seconds.

Resolution: See chart.

Power Requirements: 9 volt alkaline battery. Battery included but not connected.

Weight: 10.2 oz (289 g).

Connections: Two barbed connections for use with 1/8" (3.18 mm) or 3/16" (4.76 mm) I.D. tubing. Two compression fittings for use with 1/8" (3.18 mm) I.D. x 1/4" (6.35 mm) O.D. tubing for 477-7-FM & 477-8-FM only.

Agency Approvals: CE and FM, USB models are not FM approved Intrinsically safe.

A-402A Carrying Case — Tough gray nylon pouch protects any Series 477 Manometer. Double zippered for quick and easy access. With belt loop that snaps closed.

7-1/2"H x 3"W x 2-1/4"D (191 x 76 x 57 mm)



Model Number*	Range	Available Pressure Units									Maximum Pressure
		bar	psi	in Hg	kPa	in w.c.	mm Hg	mbar	mm w.c.	Pa	
477-000-FM	0-1.000 in w.c.			.0736	.2491	1.000	1.868	2.491	25.40	249.1	5 psig
477-00-FM	0-4.000 in w.c.		.1445	.2942	0.996	4.000	7.473	9.96	101.6	996	5 psig
477-0-FM	0-10.00 in w.c.		.3613	.7355	2.491	10.00	18.68	24.91	254.0	2491	5 psig
477-1-FM	0-20.00 in w.c.	.0498	.7225	1.471	4.982	20.00	37.36	49.82	508.0	4982	10 psig
477-2-FM	0-40.00 in w.c.	.0996	1.445	2.942	9.96	40.00	74.73	99.6	1016	9964	10 psig
477-3-FM	0-200.0 in w.c.	.4982	7.225	14.71	49.82	200.0	373.6	498.2	5080		30 psig
477-4-FM	0-10.00 psi	.6895	10.00	20.36	68.95	276.8	517.1	689.5	7031		30 psig
477-5-FM	0-20.00 psi	1.379	20.00	40.72	137.9	553.6	1034	1379			60 psig
477-6-FM	0-30.00 psi	2.069	30.00	61.08	206.9	830.4	1551	2069			60 psig
477-7-FM	0-100.0 psi	6.895	100.0	203.6	689.5	2768	5171	6895			150 psig
477-8-FM	0-150.0 psi	10.34	150.0	305.4	1034	4152	7757				200 psig

*Note: USB models include a software CD and cable. Change "FM" to "USB". Example: 477-2-FM becomes 477-2-USB

- Measure Positive, Negative, or Differential Pressures.
- Instant Selection from up to Nine English/Metric Units.
- Stores 40 Readings in Memory for Later Reference.
- Both Audible and Visual Overpressure Alarms.
- Operates up to 100 Hours on a Single 9 Volt Battery.
- New Adjustable Damping Feature for Averaging Fluctuating Reading.

The Popular Model 477 is now available with 0.1% full scale accuracy in the new **Series 477A**. The 477A contains a highly accurate differential pressure sensor that offers a 0.1% full scale accuracy on air ranges from 20" w.c. to 100 psid. Series 477A Handheld Digital Manometers are packed with features needed to make pressure measurement and recording faster, easier and more accurate than ever. Instantly select from up to nine of the most widely used pressure units without having to waste time and risk mistakes with tedious conversions. A non-volatile memory function enables storage of up to 40 readings — perfect for HVAC technicians making Pitot tube traverses of airflow readings across a duct. The 477A is also ideal for maintenance personnel or technicians that require a highly accurate standard to check their instrumentation or equipment to ensure proper performance.

When working in poorly lighted areas, just switch on the handy backlight feature. The manometer automatically shuts itself off after 20 minutes to minimize battery drain. Electronic zeroing means you simply touch a single key to perfectly null out any minor pressure differences. A display HOLD key freezes the current pressure for those all-too-common situations where readings fluctuate. Included is an audible alarm to warn of overpressure plus a visual alarm warning in case ambient noise levels are too high to hear the alarm. Audible alarm also confirms a value has been stored, eliminating the need to observe display during a duct traverse.

Clear, concise operating instructions for all functions are printed on the rear of the rugged extruded aluminum case for quick reference. One-piece front membrane fully protects all keys from dust and moisture; wipes clean in seconds. Detailed written instructions, a wrist strap and 9 volt alkaline battery are included.

APPLICATIONS

- Verify field instrumentation and equipment performance
- Field calibration



SPECIFICATIONS

Service: Air and non-combustible compatible gases.

Wetted Parts: Consult factory.

Accuracy: $\pm 0.10\%$ of full scale from 60 to 78°F (15.6 to 25.6°C); $\pm 1\%$ of full scale from 32-60 and 78-104°F (0-15.6 and 25.6-40°C).

Pressure Hysteresis: $\pm 0.1\%$ of full scale.

Pressure Limits: See chart.

Temperature Limits: 32 to 104°F (0 to 40°C).

Storage Temperature Limits: -4 to 176°F (-20 to 80°C).

Display: 0.42" (10.6 mm) 4 digit LCD.

Resolution: See chart.

Power Requirements: 9 volt alkaline battery. Battery included but not connected.

Weight: 10.2 oz. (289 g).

Connections: Two barbed connections for use with 1/8" (3.18 mm) or 3/16" (4.76 mm) I.D. tubing for 477A-1, 477A-2, 477A-3, 477A-4 and 477A-5 only. Two compression fittings for use with 1/8" (3.18 mm) I.D. x 1/4" (6.35 mm) O.D. tubing for 477A-6 and 477A-7 only.

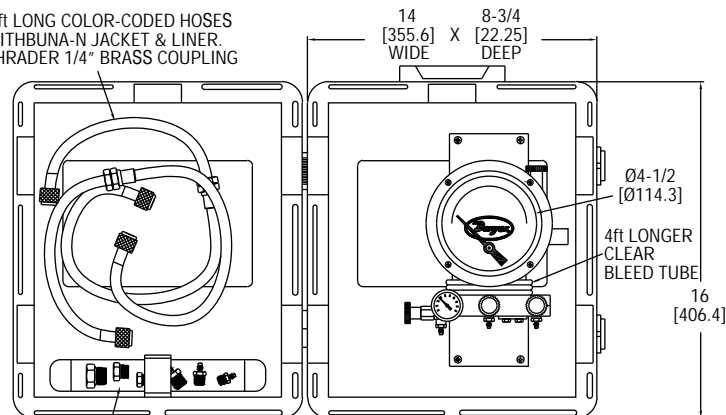
Model Number	Range	Available Pressure Units										Maximum Pressure
		bar	psi	in Hg	kPa	in w.c.	mm Hg	mbar	FTWC	mm w.c.	Pa	
477A-1	0-20.00 in w.c.	.0498	.7225	1.471	4.982	20.00	37.36	49.82	1.667	508.0	4982	3 psig
477A-2	0-40.00 in w.c.	.0996	1.445	2.942	9.96	40.00	74.73	99.6	3.333	1016	9964	3 psig
477A-3	0-200.0 in w.c.	.4982	7.225	14.71	49.82	200.0	373.6	498.2	16.67	5080		15 psig
477A-4	0-10.00 psi	.6895	10.00	20.36	68.95	276.8	517.1	689.5	23.07	7031		30 psig
477A-5	0-30.00 psi	2.069	30.00	61.08	206.9	830.4	1551	2069	69.20			60 psig
477A-6	0-50.00 psi	3.447	50.00	101.8	344.7	1384	2585	3447	115.3			100 psig
477A-7	0-100.0 psi	6.895	100.0	203.6	689.5	2768	5171	6895	230.7			200 psig

Backflow Prevention Test Kit

For Testing Flow in Hydronic Systems



3 5ft LONG COLOR-CODED HOSES
WITH BUNA-N JACKET & LINER.
SCHRADER 1/4" BRASS COUPLING



ADAPTOR FITTINGS
3 SETS OF BRASS FITTINGS

The Model BTK Backflow Prevention Test Kit is capable of testing hydronic systems with test procedures including those recommended by ASSE, AWWA, CSA, FCCC, HR-USC and NWWA. It possesses a quick release latch pin mechanism and a new manifold design. The tests can be performed with the gage mounted in the case or removed from the case. The BTK is comprised of five valves and is specially designed for testing backflow prevention assemblies. The 90-micron filters protect the test kit to minimize plugging with scale and sand. Filter elements can be cleaned or replaced. The kit includes a diaphragm differential pressure gage (4.5", 0-15 psid), a line pressure gage (1.5", 0-200 psig), a 4 foot long bleed tube, three 5 foot long hoses (color-coded), three sets of brass adapter fittings provided for hookup to all standard size test cocks, and a durable molded polyethylene carrying case with removable lid.

SPECIFICATIONS

Service: To test water systems for backflow.

Wetted Materials: Gage: EP Elastomers, Brass and 316 SS Metal Parts; Hose: Buna-N jacket and liner; Fittings: Brass.

Housing Material: Gage: Glass Reinforced Engineered Thermoplastic; Case: Polyethylene.

Accuracy: ± 0.2 psid (Descending).

Pressure Limits: Working pressure: 200 psig.

Temperature Limits: Maximum 150°F (65°C). * Freezing Temperatures must be avoided.

Size: Dial: 4.5"; Case: 16" H x 14" W x 8 3/4" D (406.4 mm H x 355.6 mm W x 222.25 mm D).

Weight: Gage: 3.6 lb (1.6 kg); Gage & Case combined: 11.6 lb (5.2 kg).

Accessory	Description
A-442	Professional Test Clock Cleaning Tool
A-443	90° Swivel Quick Connection Test Clock Adapter with 1/4" NPT x 1/4" flare quick connect fittings, 1/2" NPT x 1/4" female NPT and 3/4" NPT x 1/4" FNPT quick connect fittings, and O-rings.

Model Number	Description
BTK-1	Backflow Prevention Test Kit 0-15 PSID/0-100 KPA

Wet/Wet Handheld Digital Manometer

Liquid & Gas Pressure Measurement, $\pm 0.5\%$ F.S. Accuracy

CE

Series 490 Digital Manometers are versatile, hand-held, battery operated manometers available in several basic ranges for positive or positive differential pressure measurement and can tolerate most liquid media compatible with 316LSS.

A memory function allows storage of up to 40 readings for later recall and a backlight provides auxiliary lighting for hard-to-see locations.

Standard are a hold feature and both visual and audible overpressure alarms. A new feature added to the Series 490 is a field adjustable damping. This allows the user to choose the level of display averaging rate corresponding to the fluctuation level common in many applications. A 9V alkaline battery is included that provides up to 100 hours of operation.

APPLICATIONS

- Balance hydronic heating or cooling water loops
- Check pump or chiller performance
- Determine pressure head loss from valves and pipe reduction

OPTIONS

-3V, 3-way Valve Package

Note: Option only available on ranges up to 100 psi.



A-402A Carrying Case — Tough gray nylon pouch protects any Series 490 Wet/Wet Handheld Digital Manometer. Double zippered for quick and easy access. With belt loop that snaps closed.

7-1/2"H x 3"W x 2-1/4"D (191 x 76 x 57 mm)



Model Number	Range	Available Pressure Units								Maximum Pressure
		bar	psi	in Hg	kPa	FTWC	in w.c.	mm Hg	mbar	
490-1	0-15.00 psi	1.034	15.00	30.54	103.4	34.60	415.2	775.7	1034	30 psig
490-2	0-30.00 psi	2.069	30.00	61.08	206.9	69.20	830.4	1551	2069	60 psig
490-3	0-50.00 psi	3.447	50.00	101.8	344.7	115.3	1384	2585	3447	100 psig
490-4	0-100.0 psi	6.895	100.0	203.6	689.5	230.7	2768	5171	6895	200 psig
490-5	0-500.0 psi	34.47	500.0	1018	3447	1153				1000 psig
490-6	0-200.0 psi	13.79	200.0	407.2	1379	461.3	5536			400 psig



SPECIFICATIONS

Service: Compatible gases & liquids.

Wetted Materials: Type 316L SS.

Accuracy: $\pm 0.5\%$ F.S., 60 to 78°F (15.6 to 25.6°C); $\pm 1.5\%$ F.S. from 32 to 60°F and 78 to 104°F (0 to 15.6°C and 25.6 to 40°C).

Pressure Hysteresis: $\pm 0.1\%$ of full scale.

Pressure Limits: See chart.

Temperature Limits: 32 to 104°F (0 to 40°C).

Storage Temperature Limits: -4 to 176°F (-20 to 80°C).

Display: 0.42" (10.6 mm) 4 digit LCD.

Resolution: See chart.

Power Requirements: 9 volt alkaline battery. Battery included but not connected.

Weight: 14.1 oz (400 g).

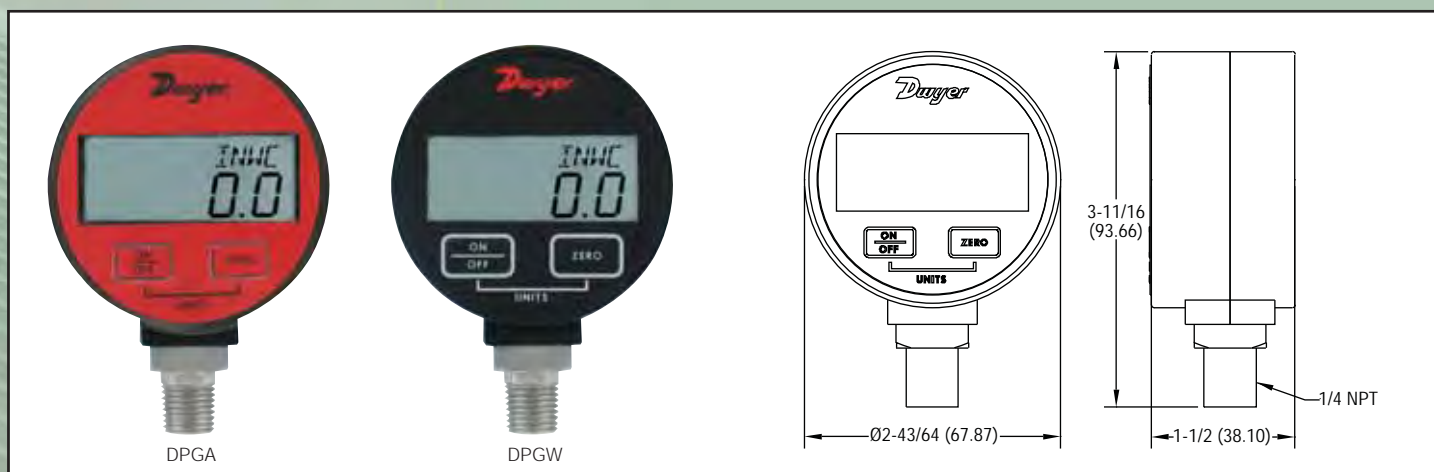
Connections: Two 1/8" (3.18 mm) female NPT.

Agency Approvals: CE.

TEST
EQUIPMENT

Digital Pressure Gage

Economic Gage With Selectable Engineering Units



The Series DPGA is the only economic digital pressure gage with selectable engineering units on the market. With its 1% accuracy and digital push-button zero, the DPGA is the perfect choice for digitally monitoring the pressures of air and compatible gases.

The Series DPGW is the only economic digital pressure gage for liquids with the ability to select engineering units on the market. With its 1% accuracy and digital push-button zero, the DPGW is the perfect choice for digitally monitoring the pressures of compatible liquids and gases.

APPLICATIONS

Ideal for checking line pressures at system startup

SPECIFICATIONS

Service: DPGA: Air and compatible gases; DPGW: Liquids and compatible gases.

Wetted Materials: DPGA: 316L SS, Silicone sensor; DPGW: 316L SS.

Housing Materials: ABS plastic.

Accuracy: $\pm 1.0\%$ F.S. (Includes linearity, hysteresis, repeatability).

Pressure Limits: 2X pressure range. Vacuum range max. pressure is 30 psig.

Temperature Limits: 30 to 120°F (-1 to 49°C).

Thermal Effect: 0.05% FS/°F.

Size: 2.62" O.D. x 1.52" deep.

Process Connections: 1/4" male NPT.

Display: 4-digit LCD (.425" H x .234" W digits).

Power Requirements: 9 volt alkaline battery. Battery included but not connected.

Auto Shut-off: 20 minute auto shut-off.

Weight: 5.6 oz (160 g).

Agency Approvals: CE.

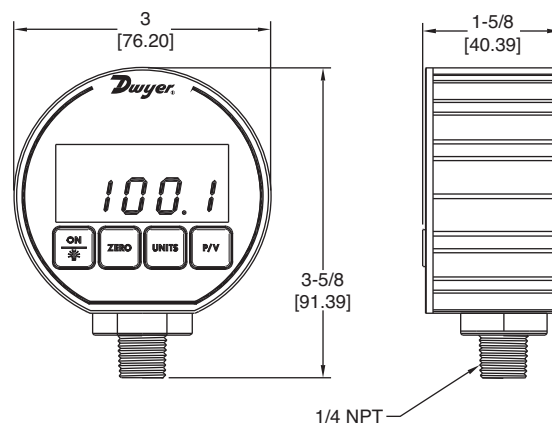
Model Number	Range	Pressure Ranges											Resolution
		psi	kg/cm ²	bar	in Hg	ft wc	kPa	oz/in ²	in wc	mbar	cm wc	mm Hg	
DPGA-00	30" Hg to 0 (vac)	-14.70	-1.033	-1.013	-29.93	-33.94	-101.4	-235.2	-407.3	-1013	-1034	-761	0.01
DPGA-01	0 to 20" w.c.	0.722	.0508	.0498	1.471	1.667	4.980	11.55	20.00	49.80	50.8	37.37	0.001
DPGA-02	0 to 1 psi	1.000	.0703	.0689	2.036	2.307	6.89	16.00	27.68	68.9	70.3	51.7	0.001
DPGA-03	0 to 2 psi	2.000	.1406	.1379	4.072	4.614	13.79	32.00	55.4	137.9	140.6	103.4	0.001
DPGA-04	0 to 5 psi	5.000	.3515	.3447	10.18	11.53	34.47	80.0	138.4	344.7	351.5	258.6	0.002
DPGA-05	0 to 15 psi	15.00	1.055	1.034	30.54	34.60	103.4	240.0	415.2	1034	1055	776	0.01
DPGA-06	0 to 30 psi	30.00	2.109	2.068	61.1	69.2	206.8	480.0	830	2068	2109	1551	0.01
DPGA-07	0 to 50 psi	50.00	3.515	3.447	101.8	115.3	344.7	800	1384	3447	3515	2586	0.02
DPGA-08	0 to 100 psi	100.0	7.03	6.89	203.6	230.7	689	1600	2768				0.1
DPGA-09	0 to 200 psi	200.0	14.06	13.79	407.2	461.3	1379	3200					0.1
DPGA-10	0 to 300 psi	300.0	21.09	20.68	611	692	2068	4800					0.1
DPGA-11	0 to 500 psi	500.0	35.15	34.47	1018	1153	3447						0.2

Model Number	Range	Pressure Ranges											Resolution
		psi	kg/cm ²	bar	in Hg	ft wc	kPa	oz/in ²	in wc	mbar	cm wc	mm Hg	
DPGW-00	30" Hg to 0 (vac)	-14.70	-1.033	-1.013	-29.93	-33.94	-101.4	-235.2	-407.3	-1013	-1034	-761	0.01
DPGW-04	0 to 5 psi	5.000	.3515	.3447	10.18	11.53	34.47	80.0	138.4	344.7	351.5	258.6	0.002
DPGW-05	0 to 15 psi	15.00	1.055	1.034	30.54	34.60	103.4	240.0	415.2	1034	1055	776	0.01
DPGW-06	0 to 30 psi	30.00	2.109	2.068	61.1	69.2	206.8	480.0	830	2068	2109	1551	0.01
DPGW-07	0 to 50 psi	50.00	3.515	3.447	101.8	115.3	344.7	800	1384	3447	3515	2586	0.02
DPGW-08	0 to 100 psi	100.0	7.03	6.89	203.6	230.7	689	1600	2768				0.1
DPGW-09	0 to 200 psi	200.0	14.06	13.79	407.2	461.3	1379	3200					0.1
DPGW-10	0 to 300 psi	300.0	21.09	20.68	611	692	2068	4800					0.1
DPGW-11	0 to 500 psi	500.0	35.15	34.47	1018	1153	3447						0.2

Compound Range Available: DPGW-12 30" Hg-0-100 psi

Digital Pressure Gage

± 0.25% Full Scale Accuracy, NEMA 4X Housing



Replace your outdated analog gages with the new **Series DPG-100 Digital Pressure Gage**. The Series DPG-100 has a high $\pm 0.25\%$ full scale accuracy. The 4 digit digital display will reduce the potential for errors in readings by eliminating parallax error commonly produced with analog gages.

Series DPG-100 is battery powered and has an auto-shut off to conserve battery life. Battery life, on average, will last 2000 hours. A 4 button key pad allows easy access to features without the need to work through complex menus or difficult key combinations. These features include backlight, peak and valley, tare or auto zero and conversion of the pressure units.

APPLICATIONS

- Line pressure verification
- Confirm proper performance of installed analog gages

ACCESSORIES

A-183, Protective Rubber Boot

A-184, Carrying Case



Protective Carrying Case



DPG-100 with Protective Rubber Boot

SPECIFICATIONS

Service: Compatible liquids and combustible gases (for FM listing see Agency Approvals below. Some ranges not FM approved. See model chart).

Wetted Materials: Type 316L SS.

Housing Materials: Black Polycarbonate front & back cover, anodized aluminum extruded housing with recessed grooves, Polycarbonate overlay, Buna-N O-rings, 316L SS sensor construction.

Accuracy: 0.25% F.S. \pm 1 least significant digit @ 70°F (21°C) (Includes linearity, hysteresis, repeatability).

Pressure Limit: 2x pressure range for models ≤ 1000 psi; 5000 psi for 3000 psi range; 7500 psi for 5000 psi range.

Enclosure Rating: Designed to meet NEMA 4/4X (IP66).

Temperature Limits: 0 to 130°F (-18 to 55°C).

Thermal Effect: Between 70 to 130°F is 0.016%/F.

Between 32 to 70°F is 0.026%/F. Between 10 to 32°F is 0.09%/F.

Size: 3.00" OD x 1.90 deep (max).

Process Connection: 1/4" male NPT.

Weight: 8.84 oz (275 g).

Display: 4 digit (.425 H x .234 W digits).

Power Requirements: Two AAA batteries.

Battery Life: 2000 hours typical; Low battery indicator.

Auto Shut-Off:

Gage: 60 minute auto shut off. Auto shut-off may be disengaged.

Backlight: 2 minute auto shut-off.

Agency Approvals: CE, FM approved to be intrinsically safe for Class I, Division I, Groups A, B, C and D, for ranges 0-15 to 0-3000 psi.

Model Number	Range psi	Pressure Ranges									
		kg/cm ²	bar	in Hg	ft wc	kPa	oz/in ²	in wc	mbar	cm wc	mm Hg
DPG-100*	-14.70-0	-1.033	-1.013	-29.93	-33.94	-101.4	-235.2	-407.3	-1013	-1034	-760.7
DPG-102	15.00	1.055	1.034	30.54	34.61	103.4	240	415.2	1034	1055	775.7
DPG-103	30.00	2.109	2.069	61.08	69.21	206.9	480	830.4	2069	2109	1551
DPG-104	50.00	3.515	3.448	101.8	115.4	344.8	800	1384	3448	3515	2586
DPG-105	100.0	7.03	6.895	203.6	230.7	689.5	1600	2768	6895	7031	5172
DPG-106	200.0	14.06	13.79	407.2	461.4	1379	3200	5536			
DPG-107	300.0	21.09	20.69	610.8	692.1	2069	4800	8304			
DPG-108	500.0	35.15	34.48	1018	1154	3448	8000				
DPG-109	1000	70.3	68.98	2036	2307	6895					
DPG-110	3000	210.9	206.9	6108	6921						
DPG-111*	5000	351.5	344.8								

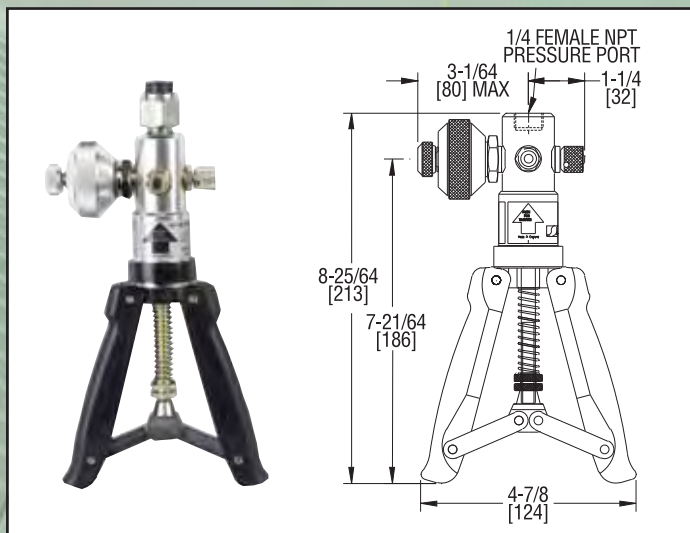
Compound Ranges Available: DPG-120* Range: 30" Hg-0-15 psi; DPG-121* Range: 30" Hg-0-30 psi; DPG-122* Range: 30" Hg-0-45 psi; DPG-123*: Range 30" Hg-0-60 psi; DPG-124*: 30" Hg-0-100 psi.

* Models DPG-100, DPG-111, DPG-120, DPG-121, DPG-122, DPG-123 and DPG-124 are not FM approved.

Model
PHP

Pneumatic Hand Pump

Generates Pressures up to 600 psi (40 bar), Portable



Model PHP-1, Pneumatic Hand Pump

ACCESSORIES

Model PHP-1K, Service Kit

Model PHP-1C, Hard Case

Verify calibration of pressure transmitters, switches, controllers, indicators, and recorders with Model PHP Pneumatic Hand Pump. The Model PHP is a hand operated pump for sourcing pressure and vacuum. Use in conjunction with an analog or digital gage for a complete calibration system.

The unit provides output pressures up to 600 psi (40 bar) or vacuum down to -28.5" Hg (-0.960 bar). The reliable pump reaches 100 psi in 4 strokes. Model PHP is fitted with a fine adjustment valve for precise volume control and an adjustable stroke to provide over pressure protection.

Model PHP includes a 39" (1 m) hose with a 1/4" female NPT quick fit connector. The optional service kit includes seals, O-rings, retaining screws and an allen key.

SPECIFICATIONS

Output Ranges: -28.5" Hg to 600 psi (-0.960 to 40 bar).

Process Connection: 1/4" female NPT (quick fit).

Gage Connection: 1/4" female NPT.

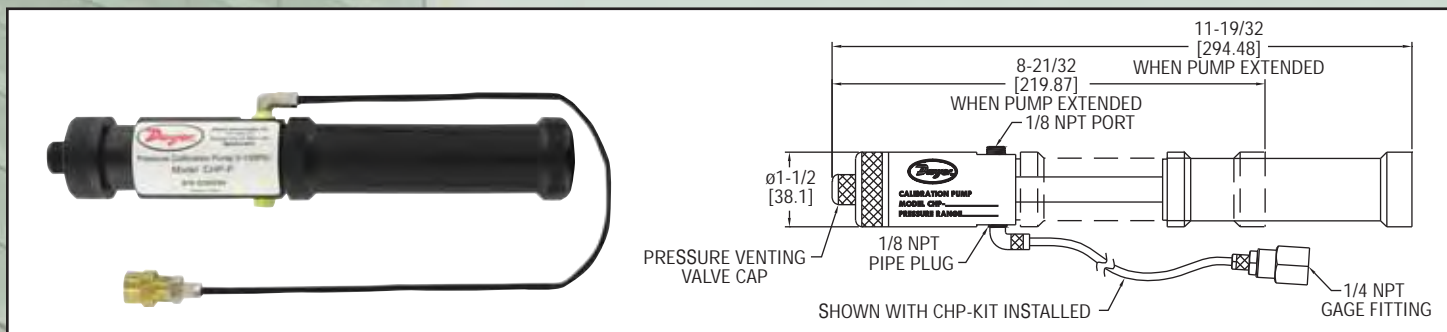
Materials: Nickel plated brass, anodized aluminum, and nylon.

Weight: 1.4 lb (0.65 kg).

Series
CHP

Pneumatic Hand Pump

Vacuum or Pressure, Ranges up to 100 psig



The **Series CHP Pneumatic Hand Pump** is the most dependable and rugged pump for applications up to 100 psi or 28.8" Hg Vacuum. The durable Acetel plastic and anodized aluminum construction prevents body heat transfer, resulting in drift-free, accurate readings. The Series CHP is equipped with oversized check valves in order to provide smooth and controlled operation. Dual O-Rings on all pistons ensure the pump to be leak-free. The unit includes a 2 foot long hose, 1/8" female NPT gauge fitting, and 1/8" NPT pipe plug. An optional hose kit is available so that a tee is not required when connecting a sensor and a calibrator. The Series CHP is ideal for checking calibration of pressure or vacuum gauges, switches, or transmitters.

Model CHP-P, Pressure Calibration Pump

Model CHP-V, Vacuum Calibration Pump

SPECIFICATIONS

Output Range: CHP-P: 0 to 100 psi; CHP-V: 0 to -28.8" Hg.

Process Connection: Two 1/8" female NPT ports, one with a removable plug.

Materials: Acetel plastic and anodized aluminum.

Pressure Limit: 150 psig (10.34 bar).

Temperature Limit: Not to exceed 150°F (65.6 °C).

Displaced Volume: Approximately 4 in³.

Dimensions: 9" length x 1.5" diameter.

Weight: 1.5 lb (680 g).

ACCESSORY

CHP-KIT, 2' Hose and NPT Fitting

Air Velocity Kits

Digital Manometer and Pitot Tube for Balancing System Air Flows

Model 475-1-FM-AV

Convenient all-in-one kit is small, light and easy to use. No set-up or leveling needed. Digital manometer reads from 0-19.99 in. w.c. with $\pm 0.5\%$ F.S. accuracy and minor divisions to 0.01. Large $\frac{1}{2}$ " LCD readout is easy to see in poorly lighted areas and has "low battery" warning. Included is a 6" stainless steel Pitot tube with integral compression fitting to hold it securely when taking readings. Also, two static pressure tips with magnetic mounting measure pressure drop across filters, condenser coils, etc. Kit comes complete with rubber tubing, 9V battery, step drill, AV calculator slide rule, and custom fitted carrying case. An indispensable test kit for the plant engineer, and HVAC technician that must balance system air flows at start-up.

Complete Kit Includes:

- Model 475-1 Digital Manometer, range 0-19.99 in. w.c.
- Model 166-6-CF, 6" Pitot Tube with Compression Fitting
- Two No. A-303 Static Pressure Tips with Magnetic Mounting
- Two 9 Ft. Lengths 3/16" I.D. Rubber Tubing
- No. A-397 Step Drill for 3/16"-1/2" Holes in 1/16" Increments
- No. A-532 AV Slide Chart
- 9 Volt Battery
- Fitted Polyethylene Case



475-1-FM-AV Air Velocity Kit

Model 475-1T-FM-AV

Convenient all-in-one kit is small, light and easy to use. No set-up or leveling needed. Digital manometer reads from 0-19.99 in. w.c. with $\pm 0.5\%$ F.S. accuracy and minor divisions to 0.01. Large $\frac{1}{2}$ " LCD readout is easy to see in poorly lighted areas and has "low battery" warning. Kit includes convenient telescoping Pitot tube, Model 166T, fully adjustable from 11.5 to 36 inches (29.2 to 91.4 cm). Also, two static pressure tips with magnetic mounting measure pressure drop across filters, condenser coils, etc. Kit comes complete with rubber tubing, 9V battery, step drill, AV calculator slide rule, and custom fitted carrying case. An indispensable test kit for the plant engineer, and HVAC technician that must balance system air flows at start-up.

Complete Kit Includes:

- Model 475-1 Digital Manometer, range 0-19.99 in. w.c.
- Model 166T, 36" Telescoping Stainless Steel Pitot Tube
- Two No. A-303 Static Pressure Tips with Magnetic Mounting
- Two 4 1/2 Ft. Lengths 3/16" I.D. Rubber Tubing
- No. A-397 Step Drill for 3/16"-1/2" Holes in 1/16" Increments
- No. A-532 AV Slide Chart
- 9 Volt Battery
- Fitted Polyethylene Case



475-1T-FM-AV Air Velocity Kit

Model 477-1T-FM-AV

Convenient all-in-one kit is small, light and easy to use. No set-up or leveling needed. Digital manometer reads from 0-20 in. w.c. with $\pm 0.5\%$ F.S. accuracy. The Series 477 stores up to 20 readings in memory for later reference, instantly selecting up to nine English/Metric pressure units that are visible on a large, backlit 0.4" LCD readout. Both audible and visual overpressure alarms and a "low battery" warning are standard features.

Each kit includes convenient telescoping Pitot tube, Model 166T which is fully adjustable from 11.5 to 36 inches (29.2 to 91.4 cm). In addition, two static pressure tips with magnetic mountings measure pressure drop across filters, condenser coils, etc.

Kit comes complete with rubber tubing, 9V battery, step drill, AV calculator slide rule, and custom fitted carrying case. An indispensable test kit for the plant engineer, and HVAC technician that must balance system air flows at start-up..

Complete Kit Includes:

- Model 477-1 Digital Manometer, range 0-20 in. w.c.
- Model 166T, 36" Telescoping Stainless Steel Pitot Tube
- Two No. A-303 Static Pressure Tips with Magnetic Mounting
- Two 4 1/2 Ft. Lengths 3/16" I.D. Rubber Tubing
- No. A-397 Step Drill for 3/16"-1/2" Holes in 1/16" Increments
- No. A-532 AV Slide Chart
- 9 Volt Battery
- Fitted Polyethylene Case



477-1T-FM-AV Air Velocity Kit

Digital Thermo-Anemometer

Three Models, Four Field Selectable Ranges, $\pm 3\%$ F.S. Accuracy



Model 471-1

Model 471-2 w/
Telescopic ProbeModel 471-3 w/
Telescoping Bendable Tip

The **Series 471 Digital Thermo Anemometers** are versatile dual function instruments that quickly and easily measure air velocity in four field selectable ranges, in either feet per minute or meters per second, plus air temperature in °F or °C. High contrast LCD display shows both range selected and present velocity. Convenient backlight provides perfect visibility in low light conditions. Light automatically shuts off after 2-1/2 minutes to prolong battery life. Low battery warning is included.

Stainless steel probe with comfortable hand grip is etched with insertion depth marks from 0-8 inches and 0-20 cm on the Model 471-1. When fully extended, the probe length on models 471-2 and 471-3 reach 33 inches (83 cm). Model 471-3 features a telescoping bendable probe for easy access in hard-to-reach locations.

Extruded aluminum housing fully protects electronics, yet is lightweight and comfortable to hold even when taking multiple readings as part of duct traverses. An integral sliding cover protects sensors when not in use.

Standard accessories are 9 volt alkaline battery, wrist strap, custom fitted carrying case and step drill for making duct holes from 3/16" to 1/2".

APPLICATIONS

- Air flow readings in ducts
- Room or zone air flow and temperature balancing
- Fan performance
- Check register or diffuser face velocities

Note: Ranges are field selectable.

Range Number	Velocity, FPM	Velocity, MPS	Accuracy
1	0-500	0-3.0	$\pm 3\%$ F.S.
2	0-1500	0-7.0	$\pm 3\%$ F.S.
3	0-5000	0-30	$\pm 4\%$ F.S.
4	0-15000	0-75	$\pm 5\%$ F.S.

SPECIFICATIONS

AIR VELOCITY SPECIFICATIONS:

Service: Air.

Range: Field Selectable 0-500, 0-1500, 0-5000, 0-15000 FPM (see chart for Metric Conversions).

Accuracy: Depending on range (See chart) @ 59 to 86°F (15 to 30°C). Outside this range add 0.11% per °F (0.2% per °C).

Temperature Limits: Probe: 0 to 200°F (-18 to 100°C).

Ambient: 32 to 104°F (0 to 40°C).

Display: 4-1/2 Digit 0.4" High.

Resolution: 1 FPM / 0.1 MPS.

Response Time: 15 Seconds.

Power Requirements: 9 volt alkaline battery, included.

Probe: 5/16" (8.13 mm) diameter probe with integral hand grip and 6 ft. (15.2 cm) coiled cord. Length of probe: Model 471-1 = 10" (25.4 cm); Models 471-2 and 471-3 = 33" (83 cm) extended.

Weight: 12 oz (340 g).

TEMPERATURE SPECIFICATIONS:

Range: 0 to 200°F (-18 to 100°C).

Accuracy: $\pm 2^\circ\text{F}$ (1°C).

Temperature Limits: Probe: 0 to 200°F (-18 to 100°C).

Ambient: 32 to 104°F (0 to 40°C).

Display: 4-1/2 Digit 0.4" high.

Resolution: 0.1°.

Response Time: 30 Seconds.

Model 471-1 Digital Thermo Anemometer

includes battery, wrist strap, 6-step drill, carrying case and instructions.

Model 471-2 Digital Thermo Anemometer

with telescoping probe includes battery, wrist strap, 6-step drill, carrying case and instructions.

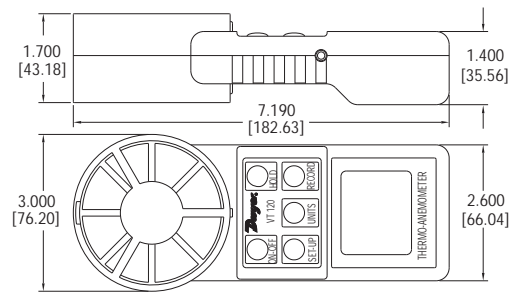
Model 471-3 Digital Thermo Anemometer

with telescoping bendable tip includes battery, wrist strap, 6-step drill, carrying case and instructions.

Model
VT120

Integral Vane Thermo-Anemometer

Large 1-1/4" Dual Display, One Hand Operation



Simultaneously measure air velocity and temperature with the Model VT120 Integral Vane Thermo-Anemometer. Easily view readings on the large 1.25" (31.75 mm) dual display. User-selectable air velocity ranges include ft/min, m/sec, mph, knots, and km/hr. Built-in thermistor records ambient temperature in °F or °C. Model VT120 features include data hold and record/recall minimum, maximum and average readings. Also, units have the ability to record and average up to 2 hours of data while displaying the continuous running average. If desired, sleep mode automatically shuts down the meter after 20 minutes of non-use. Model VT120 includes hard carry case, one 9V battery, and instruction manual.

Model VT120 Integral Vane Thermo-Anemometer
Model VT120-N includes NIST certification

APPLICATIONS

Air duct measurement and analysis, fume hood analysis, ionizer flow output monitoring, positive pressure reading in clean rooms, or ventilation system inspection.

SPECIFICATIONS

Air Velocity Ranges: 80 to 5900 ft/min, 0.4 to 30 m/sec, 0.9 to 68 mph, 0.8 to 58 knots, 1.4 to 108 km/hr.

Temperature Range: 14 to 122°F (-10 to 50°C).

Accuracy: Air velocity: $\pm 3\%$, Temperature: $\pm 1^\circ\text{F}$ ($\pm 0.6^\circ\text{C}$).

Resolution: 1 ft/min, 0.01 m/sec, 0.1 mph, 0.1 knots, 0.1 km/hr, 0.1°F , 0.1°C .

Temperature Sensor: Thermistor.

Temperature Limits: 14 to 122°F (-10 to 50°C) max 80% RH.

Power Supply: One 9V battery.

Battery Life: 100 hours continuous (with 20 min sleep mode enabled).

Display: Large 1.25 x 1.62" (37 x 42 mm) LCD, 9999 count.

Housing: ABS plastic.

Sensor Diameter: 2.87" (70 mm).

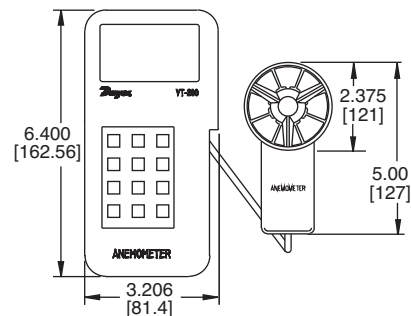
Weight: 1.5 lb (680 g).

Agency Approvals: CE.

Model
VT-200

Vane Thermo-Anemometer

Measures Air Volume, Air Velocity, and Temperature, Built-in Datalogging



Model VT-200 Vane Thermo-Anemometer is ideal for balancing air conditioning and heating ducts or checking the operation of fans and blowers. Model VT-200 measures air volume in cubic feet per minute and cubic meters per minute. Air velocity measurements can be viewed in ft/min, m/s, knots, km/hr, and mph with $\pm 3\%$ accuracy. The multifunction LCD can simultaneously display air velocity and temperature in selectable units or air flow and air area. Built-in datalogger can store up to 1000 measurements or transfer the data to a PC via RS-232 communication. Additional features include data hold and record/recall minimum, maximum and average readings. Model VT-200 includes RS-232 interface, PC Windows™ software, cable, 9V battery, carrying case, and instruction manual.

APPLICATIONS

- Verify fume hood flow performance
- Check diffuser of register face velocities

Model VT-200 Vane Thermo-Anemometer

SPECIFICATIONS

Air Velocity Ranges: 0.3 to 45 m/s; 0.7 to 100 mph; 0.6 to 88.0 knots; 1 to 140.0 km/hr; 60 to 8,800 ft/min.

Temperature Range: 32 to 122°F (0 to 50°C).

Air Volume Ranges: CFM (ft³/min) or CMM (m³/min).

Accuracy: Air Velocity: $\pm 3\%$ of reading ± 0.1 , whichever is greater; Temperature: $\pm 1.5^\circ\text{F}$ ($\pm 0.8^\circ\text{C}$).

Resolution: 0.1 knots, m/s, km/hr, and mph; 0.1/1 ft/min; 0.1°C .

Temperature Sensor: Type K thermocouple.

Temperature Limits: 32 to 140°F (0 to 60°C).

Display: Dual line, 4-digit, 1.1" (27.9 mm) height.

Power: 9V alkaline battery (included). Battery Life: Approx. 50 hours.

Output: RS232 serial interface via DB9 female connector.

Housing: ABS plastic, 1" (25 mm) diameter.

Weight: 12.3 oz (350 g).

Agency Approval: CE.

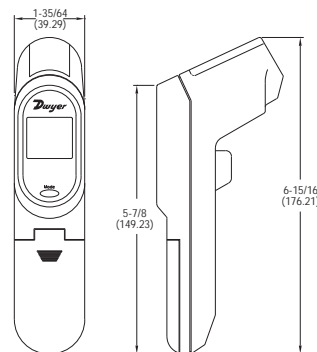
TEST
EQUIPMENT

Model
IR2

Infrared Non-Contact Thermometer

12:1 Distance-to-Target Ratio, Laser Sighting

CE



The **Model IR2 Infrared Temperature Thermometer** allows users to economically take accurate measurements in hard to reach areas. Measurements can be taken at a safe distance with a 12:1 Distance to Target Ratio. The IR2 easily takes measurements within 2% accuracy using a built-in laser sighting. The fixed emissivity of 0.95 is perfect for measuring surface temperatures of concrete, asphalt, rubber or oxidized metals. Besides reading the process temperature, the back lit display also reads the maximum temperature seen. Excellent for monitoring surface temperatures of air ducts, boilers, engines or light fixtures.

Model IR2, Infrared Temperature Thermometer

SPECIFICATIONS

Measurement Range: -76 to 932°F (-60 to 500°C).

Operating Range: 32 to 122°F (0 to 50°C).

Accuracy: 2% of reading or 4°F (2°C), whichever is greater.

Resolution: 0.1°F/0.1°C.

Response Time: 1 second.

Distance to Target: 12:1.

Emissivity: 0.95 fixed.

Battery Life: 2 AAA, 180 hours continuous use (auto power off after 15 seconds).

Dimensions: 6.90 x 1.54 x 2.83 in (175.2 x 39.0 x 71.9 mm).

Weight: 3.61 oz (102 g).

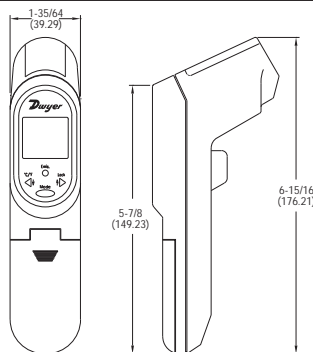
Agency Approvals: CE.

Model
IR4

Infrared Non-Contact Thermometer

20:1 Distance-to-Target Ratio, Thermocouple Input, Laser Sighting

CE



For those long range applications, the IR4 Non Contact Infrared Thermometer is the perfect instrument. It has a distance to target ratio of 20:1 and laser sighting to accurately measure within 1% of reading. The adjustable emissivity allows this thermometer to measure the temperature of virtually any surface. There is no guessing when the battery is low as the IR4 has a battery indicator on its back lit display. This useful hand held has programmable low and high audible alarms built in. The IR4 accepts any K-type thermocouple to display both a IR and a contact reading simultaneously. MAX, MIN, DIF, and AVG can be displayed with a push of a button. Excellent for monitoring surface temperatures of air ducts, boilers, engines or light fixtures.

Model IR4, Infrared Temperature Thermometer

SPECIFICATIONS

Measurement Range: -76 to 1400°F (-70 to 760°C).

Operating Range: 32 to 122°F (0 to 50°C).

Accuracy: 1% of reading or 1.8°F (1°C) whichever is greater.

Resolution: 0.1°F/0.1°C.

Response Time: 1 second.

Distance to Target: 20:1 optics ratio.

Emissivity Range: 0.95 default – adjustable 0.05 to 1.00 emissivity.

Additional Input: K-type thermocouple.

Battery Life: 2 AAA typical, 180 hours continuous use (auto power off after 15 seconds).

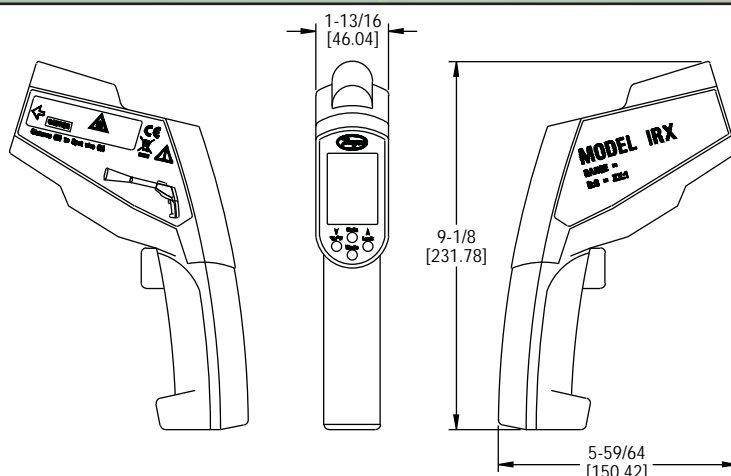
Dimensions: 6.9 x 1.54 x 2.83 in (175.2 x 39.0 x 71.9 mm).

Weight: 6.31 oz (179 g).

Agency Approvals: CE.

Dual Laser Extended Range Infrared Thermometer

Up to 50:1 Distance-to-Target Ratio



The Series IR6/IR7 Dual Laser Extended Range Infrared Thermometer is ideal for accurately measuring surface temperatures from long distances. This feature packed handheld device allows the user to read the maximum, minimum, average, and differential readings. The high and low alarms give audible and visual indication of the process temperature. When taking measurements in dark areas, a built-in white light can be used to illuminate the measurement area. For long term measurements, the unit includes a dual magnetic base attachment that allows hands-free measurements. The IR6/IR7 monitors temperature of air ducts and lights in large rooms.

Model Number	Distance to Target Ratio	NIST Certificate
IR6	30:1	No
IR7	50:1	No
IR6-NIST	30:1	Yes
IR7-NIST	50:1	Yes

SPECIFICATIONS

Measurement Range: IR6: -76 to 1600°F (-60 to 900°C); IR7: -76 to 1832°F (-60 to 1000°C).

Operating Range: 32 to 122°F (0 to 50°C).

Accuracy: ±2% of readings or 4°F (2°C) whichever is greater.

Resolution: 0.1°F (0.1°C).

Response Time: 1 second.

Distance to Target: IR6: 30:1, IR7: 50:1.

Emissivity: 0.95 Default – adjustable 0.10 to 1.00 in 0.01 steps.

Battery: 2 AAA, 180 hours continuous use.

Units: User selectable F or C.

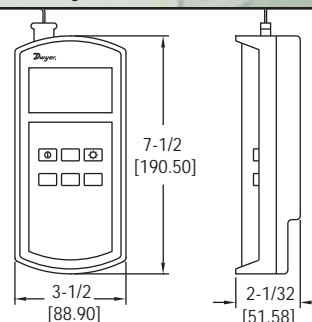
Weight: 13.62 oz (386.1 g).

Agency Approvals: CE.

Model
TC10

Digital Thermocouple Thermometer

Type K Thermocouple, Large 3-1/2 Digit Display, ±0.3% Accuracy



Quickly and accurately measure temperature with the Model TC10 Digital Thermocouple Thermometer. The TC10 accepts any type K thermocouple and connects via a standard mini-connection. View temperature readings in °F or °C (field selectable) on the large 3-1/2 digit LCD. The 0.8" (20 mm) display is backlit for dark or low light conditions. Choose either 0.1° or 1° resolution each with the basic accuracy of 0.3%. Thermometers respond quickly to environmental changes by updating the readings 2.5 times every second. Rugged, water resistant design comes with a protective holster and stand—ideal for field use. Additional features include low battery indication, MAX and HOLD functions. Units include protective holster, Type K thermocouple bead wire temperature probe, 9V battery and instruction manual.

Model TC10 Digital Thermocouple Thermometer

Model TC10-N includes NIST certification

SPECIFICATIONS

Input: Type K (4' type K thermocouple bead probe included).

Temperature Range:

-58 to 2000°F (-50 to 1300°C).

Accuracy: -58 to 2000°F: ±(0.3% of reading + 2°F); -50 to 1000°C: ±(0.3% of reading + 1°C); 1000 to 1300°C: ±(0.5% of reading + 1°C).

Display: 0.8" (20 mm) height, 3 1/2 digit LCD with switchable back light.

Resolution: Selectable 1° or 0.1°.

Response Time: 1 second.

Temperature Limits:

32 to 122°F (0 to 50°C) max 80% RH.

Storage Temperature: -4 to 140°F (-20 to 60°C) max 70% RH.

Power Requirements: Standard 9V battery (included).

Battery Life: 200 hours typical.

Input Protection: 24V rms.

Thermocouple Connection: Standard (F) mini-connector.

Housing: ABS plastic.

Weight: 12.9 oz (365 g).

Agency Approvals: CE.

Series 485 Digital Hygrometer

Measures % RH and Temperature



Model 485 Digital Hygrometer is a versatile, compact, hand-held instrument for measuring percentage of relative humidity and temperature in °F or °C. Dew point and wet bulb temperature is derived from relative humidity and temperature measurements and displayed on the 0.4" LCD display. Hold key freezes the current temperature and relative humidity readings for situations where readings fluctuate. Store up to 25 readings with the non-volatile memory function - ideal for technicians needing to take multiple readings for later analysis.

APPLICATIONS

- Verify humidity levels in ducts
- Test indoor air quality

SPECIFICATIONS

Service: Humidity & temperature detection in air.

Range: Relative Humidity: 0 to 100% (non-condensing); Temperature: -22 to 185°F (-30 to 85°C).

Accuracy: Relative Humidity: ±2%; Temperature: ±1°F (±0.5°C).

Display: Dual 4.5 digit LCD. Temperature 0.4" High, RH: 0.2" High.

Temperature Limits: Probe: -22 to 185°F (-30 to 85°C).

Ambient: 32 to 104°F (0 to 40°C).

Resolution: Relative Humidity: 0.1%; Temperature: 0.1°.

Power Requirements: 9V alkaline battery (included).

Probe: 485-2 only 8-5/8" (219 mm).

Weight: 12 oz (340 g).

Model 485-1 Digital Hygrometer

Model 485-2 Digital Hygrometer w/Remote Probe

ACCESSORY

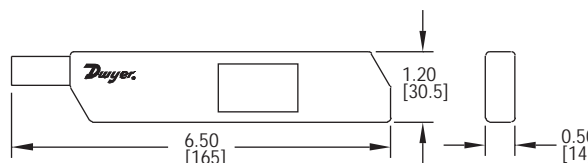
A-402A Carrying Case - Tough grey nylon pouch protects Series 485 Digital Hygrometer. Double zippered for quick and easy access. With belt loop that snaps closed. 7-1/2H" x 3W x 2-1/4D (191x76x57 mm)



Series TH Thermohygrometer Pen

Dual Display, Compact Design

CE



Simultaneously measure temperature and relative humidity with the Series TH Thermohygrometer Pen. This unit features a dual LCD, user selectable units of measure, MAX/MIN functions, reset and display hold. A built-in self calibration utility allows for field calibration using the optional relative humidity calibration reference. The Model TH-10 includes a pocket clip, battery and instruction manual. The optional kit, Model TH-10K, includes thermohygrometer pen with 33% and 75% RH calibration standards and a hard vinyl carrying case.

APPLICATIONS

Measure temperature and humidity in greenhouses, clean rooms, drying rooms, HVAC, food, pharmaceutical, and textile industries.

SPECIFICATIONS

Range: RH: 10 to 90%, Temp: 32 to 122°F (0 to 50°C).

Accuracy: RH: ±5%, Temp: ±1.5°F or °C.

Display: Dual 3 digit LCD.

Resolution: RH: 1%; Temp: 0.1°F or °C.

Response Time: Temp: 1 sec; RH: 1 min 80% of change.

Compensated Temperature Range: 32 to 122°F (0 to 50°C).

Power Requirements: 3V Lithium (CR2032) battery (included).

Weight: 2.3 oz (65 g).

Agency Approvals: CE.

Model TH-10 Thermohygrometer Pen

Model TH-10K Thermohygrometer Pen Kit

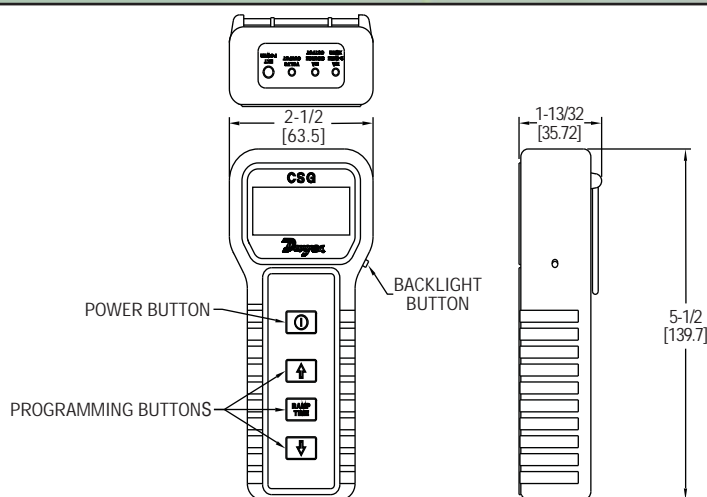
ACCESSORIES

Model TH-CAL, 33% and 75% RH Calibration Standard

Model
CSG

Current/Voltage Signal Generator

Ramp Function, Large Numeric LCD Display



The pocket size CSG Current and Voltage Signal Generator is an ideal tool for troubleshooting transmitters, transducers, motors, and actuators. The unit generates a 0 to 10 VDC signal in increments of 1 volt or a 0 to 20 mA signal in increments of 1 mA. The Model CSG features a large LCD display with a blue backlight for use in dimly lit areas. The Model CSG continuously ramps the output using user selected minimum, maximum, and ramp interval timing parameters. Units are furnished with a 9V battery, 120 VAC plug-in power supply, test leads with alligator clips, carrying case, and instruction manual.

Model CSG, Current Voltage Calibrator

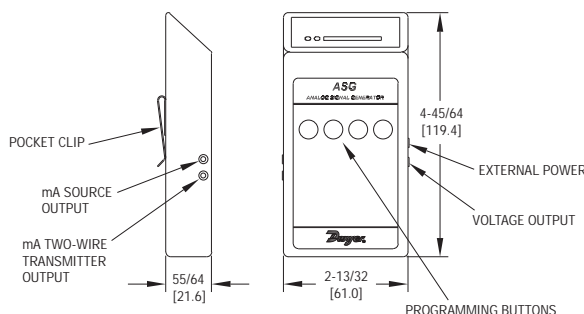
SPECIFICATIONS

Impedance: Voltage: 1000 min. **Current:** 300Ω max.
Output: 0 to 20 mA (1 mA increments).
 0-10 VDC (1 VDC increments).
Resolution: 1 mA (current); 1 VDC (voltage).
Ramping Time Intervals: 1 to 20 sec (1 sec increments).
Ambient Operating Temperature: 32 to 122°F (0 to 50°C).
Power Requirements: 9-Volt battery or 120 VAC (provided).
Auto Power Off: 1 to 20 min.
Electrical Connections: 6 ft (1.8 m) with alligator clips.
Weight: 6 oz (170 g).

Model
ASG

Analog Signal Generator

Ramp Function, Bar Graph LED, Selectable Auto Shut Off



The pocket size model ASG Analog Signal Generator is an ideal tool for troubleshooting transmitters, transducers, motors and actuators. The unit generates a 0 to 10 VDC signal in increments of 1 volt or a 4 to 20 mA signal in increments of 2 mA. An LED bar graph visually indicates analog signal level. The model ASG will also continuously ramp to user defined maximum and minimum values with user defined ramp interval timing. Units are furnished with 6 ft (1.8 m) leads with alligator clips, 120 VAC plug in adapter protective carrying case and instruction manual.

Model ASG Analog Signal Generator

SPECIFICATIONS

Impedance: Voltage: 1000Ω min. **Current:** 300Ω max.
Output: 0 to 20 mA (2 mA increments).
 0-10 VDC (1 VDC increments).
Resolution: 2 mA (current). 1 VDC (voltage).
Ramping Time Intervals: 2 to 20 sec (2 sec increments).
Ambient Operating Temperature: 32 to 122°F (0 to 50°C).
Power Requirements: 9-Volt battery or 120 VAC (provided).
Auto Shutoff Times: 2 to 20 min. (2 min. increments) (6 minute default).
Electrical Connections: 6 ft (1.8 m) with alligator clips.
Weight: 3.2 oz (without battery).
Agency Approvals: CE.

CE

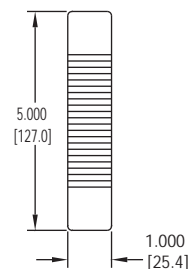
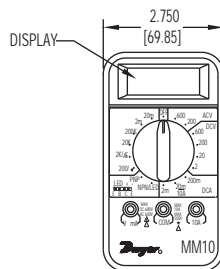
TEST
EQUIPMENT

Model
MM10

Digital Multimeter

Measures DC /AC Voltage, DC Current and Resistance, Overload Protection

CE



Our compact, low cost Model MM10 Digital Multimeter is ideal for general electrical testing and troubleshooting. This full function multimeter measures DC and AC voltage to 600V, DC current to 10A and resistance to 20M Ω . In addition to volts, amps and ohms, this meter includes audible continuity, diode, LED and transistor hFE tests. The 3-1/2 digit LCD features automatic polarity correction, low battery and overload indication. Rugged, high impact case comes equipped with built-in tilt-stand for versatile, hands-free operation. Overload protected to 600VAC/600VDC for voltage ranges and to 500VAC/500VDC for resistance, diode and continuity test ranges. Current ranges are protected by 0.5A/250V, replaceable fuse. Multimeter is furnished with 22" test leads, 9V battery and instruction manual.

Model MM10 Digital Multimeter

SPECIFICATIONS

DC VOLTAGE

Ranges: 2V, 20V, 200V, 600V.

Resolution: 1 mV, 10 mV, 100 mV, 1V.

Accuracy: 2V: $\pm(0.5\% + 1 \text{ digit})$; 20 to 600V: $\pm(1.5\% + 1 \text{ digit})$.

AC VOLTAGE

Ranges: 200V, 600V.

Resolution: 100mV, 1V.

Accuracy: 200V: $\pm(2\% + 3 \text{ digits})$; 600V: $\pm(2.5\% + 3 \text{ digits})$.

RESISTANCE

Ranges: 200 Ω , 2k Ω , 20k Ω , 200k Ω , 2M Ω , 20M Ω .

Accuracy: 200 Ω : $\pm(2\% + 2 \text{ digits})$; 2k Ω to 2M Ω : $\pm(1.5\% + 2 \text{ digits})$; 20M Ω : $\pm(2.5\% + 2 \text{ digits})$.

DC CURRENT

Ranges: 2 mA, 20 mA, 200 mA, 10A.

Resolution: 1 μ A, 10 μ A, 100 μ A, 10 mA.

Accuracy: 2 to 200 mA: $\pm(1.5\% + 1 \text{ digit})$; 10A: $\pm(2\% + 1 \text{ digit})$.

CONTINUITY TEST

Range: < 30 Ω . **Resolution:** 0.1 Ω .

DIODE TEST

Resolution: 1 mV.

Test Current: 1 mA.

TRANSISTOR (hFE) TEST

Type: NPN, PNP.

Range: 0-1000.

LED TEST

Test Voltage: < 3V.

Range: 1.5 - 3V.

GENERAL

Display: 3-1/2 digit LCD with a maximum reading of 1999.

Sampling Rate: 2.5 times per second.

Ambient Operating Temperature: 32 to 104°F (0 to 40°C), 0 to 80% RH.

Storage Temperature: 14 to 140°F (-10 to 60°C), 0 to 80% RH.

Power Requirements: One 9V battery.

Battery Life: 150 hrs. approx.

Weight: 5.2 oz (150 g).

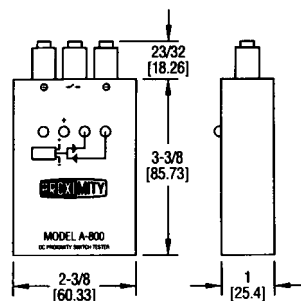
Agency Approvals: CE.

Model
A-800

Proximity Switch Tester

For 2, 3 or 4 Wire DC Switches

CE



Quickly check the operation of DC proximity sensors or level switches without dismounting. Designed to test any two-, three- or four-wire sensor with a solid state switch output. The A-800 provides visual and audible indication of whether the switch is operational. Switch status (NPN/PNP) indication is designated by a yellow LED. Power "on" is indicated by a bright green LED, "low battery" is indicated by a red LED. Unit can be used with capacitive, inductive, or photo electric sensors. The pocket sized A-800 is supplied with two 9 volt batteries.

SPECIFICATIONS

Voltage Supply: 18 VDC.

Batteries: Two 9 volt (included).

Connections: Three spring loaded terminals.

Housing Material: ABS plastic.

Weight: 0.77 lb (350 g).

Agency Approvals: CE.

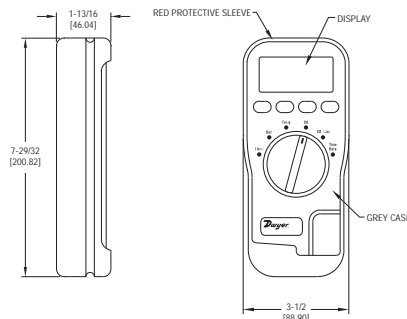
Model No. A-800 DC Proximity Switch Tester

Model
1205A-5

Handheld CO Analyzer

Dual-Line Alpha-Numeric Display, Auto Calibration

CE



Model 1205A-5 Handheld CO Analyzer provides a simple, cost effective answer to detecting and monitoring colorless, odorless, toxic carbon monoxide. The portable, battery operated unit measures CO from 0 to 2000 ppm and can record maximum CO values. Use a Type K thermocouple (sold separately) to measure temperatures. Simultaneously display two different functions on the large two-line alpha-numeric LCD. Quickly program time, date, engineering units, language and other display functions. The rotary dial allows easy function selections. The analyzer features auto zeroing, battery indication, infrared printer link, and a backlight display for low light areas. The Model 1205A-5 is ideal for ambient air monitoring in residential and commercial markets, flue testing in small boilers, and source investigation in areas where CO monitors have alarmed. The unit includes a stainless steel flue probe with filter and flexible tubing, batteries and instruction manual.

Model 1205A-5, Handheld CO Analyzer

ACCESSORY

1718-0002, Type K Thermocouple with integral handle

SPECIFICATIONS

Range: CO: 0 to 2000 ppm;
Temperature: 32 to 1112°F (0 to 600°C).

Accuracy: CO: ±5% of reading;
Temperature: ±5°F (2°C).

Display: Alpha-numeric LCD,
dual digits.

Ambient Operating

Temperature: 32 to 104°F (0 to 40°C).

Operating RH: 10 to 90%
non-condensing.

Response Time: 20 to 30
seconds.

Sensor Type: Electrochemical
cell.

Calibration: Auto zero function.

Flexible Tubing: 9 ft (3 m)

polyurethane tubing with quick fit
connector. Max. temperature:
180°F (82°C).

Flue Probe: 11.8" (30 cm)
length, stainless steel with quick
fit connector to aluminum handle. Max. temperature: 1100°F
(600°C).

Temperature Probe: Type K
thermocouple with mini-connec-
tor (sold separately).

Power Requirements: Four AA
size alkaline batteries.

Battery Life: 8 hours with alka-
line batteries (continuous use
without backlight).

Weight: 1.5 lb (0.7 kg).

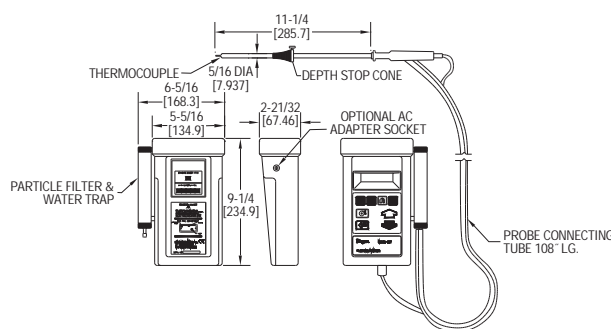
Agency Approvals: CE.

Series
1207

Handheld Flue Gas Analyzer

RS232 Output, Stores 150 Readings

CE



Adjust boilers for optimum efficiency and conform to emission levels with Model 1207 Handheld Flue Gas Analyzer. The unit quickly measures and calculates all the parameters for accurate flue gas analysis. Simultaneously display eight different measurements in user selectable language. Model 1207 Analyzer can store up to 150 time/date stamped combustion tests and can transfer the data to a printer or IBM compatible PC for later analysis. Analyzer features 11 preprogrammed fuels, self calibration, and CO alarm preset at 1000 ppm. Measure Nitric Oxide with the optional NOx sensor. Unit includes probe, protective sleeve, 110 VAC power adapter, carrying case and manual.

Model Number 1207, Flue Gas Analyzer

Model Number 1207-NOx, Flue Gas Analyzer with NOx sensor

ACCESSORIES

No. 1206-1, Infrared Printer

No. 1207-6, 220 VAC Adapter

No. 1206-71, Replacement Filter

Windows® is a registered trademark of Microsoft Corporation.

SPECIFICATIONS

Ranges: O₂: 0-21%; CO: 0-4000 ppm;
CO₂: 0-99.9%; NO: 0 to 5000 ppm;
Temp. (Flue and nett): 32-1112°F (0-
600°C); Efficiency: 0-99.9%; Poison
Index: 0-99.9%; Excess Air: 0-2885%.

Accuracy: O₂: ±0.2%; CO: ±20
ppm < 400ppm, ±5% > 400ppm; CO₂:
±0.3% of rdg.; NO: ±5ppm < 100ppm,
±5% > 100ppm; Temp.: ±5°F (±2°C),
0.3% of rdg.; Efficiency: ±1.0% of rdg.;
Poison Index: ±0.01; Excess Air:
±0.2%.

Resolution: O₂: 0.1%; CO: 1 ppm;
CO₂: 0.1%; NO: 1ppm; Temp.: 1.0°F/C;
Efficiency and Excess Air: 0.1%; Poison
Index: 0.01%.

Ambient Operating Temperature: 32
to 104°F (0 to 40°C).

Power Requirements: 110 VAC
adapter (220 VAC optional).

Computer Requirements: IBM com-
patible 386 or above and Windows® 3.1
or later with 2 MB RAM and 2 MB hard
drive disk space, one serial port.

Pre-Programmed Fuels: Natural gas,
Town gas, Light oil, Heavy Oil, Coke,
Coal, Anthracite, Propane, Butane,
Kinsale gas, and Gascor.

Probe: 11-1/4" (28.6 cm) length, stain-
less steel, Type K thermocouple, 9 ft (3
m) neoprene hose.

Weight: 2.2 lb (1 kg).

Agency Approvals: CE.

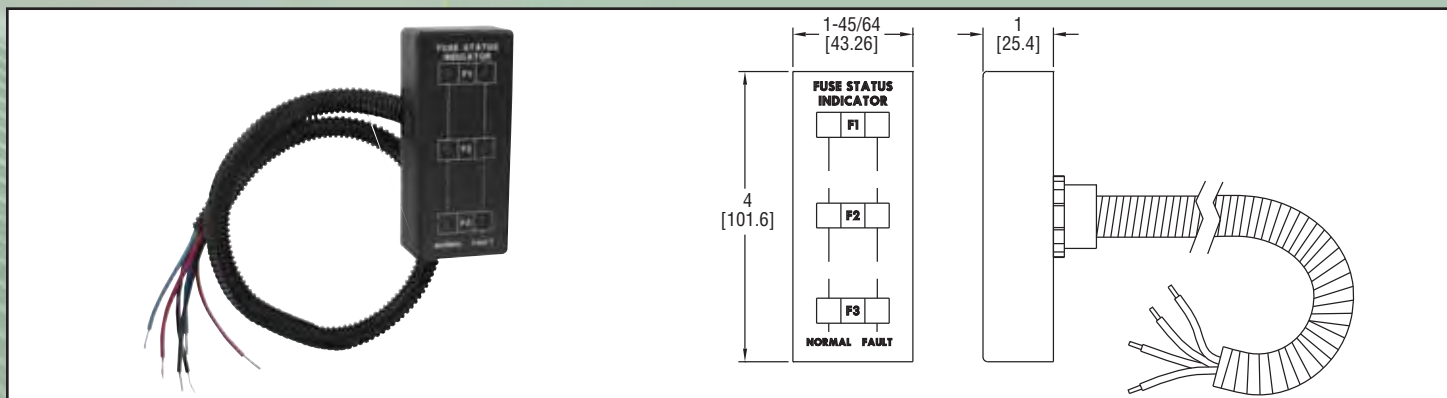
TEST
EQUIPMENT

Model
BFA

Fuse Status Indicator

Indicates Normal or Open Fuse Status

UL[®] US



The BFA Fuse Status Indicator shows normal or open fuse and also reports connection integrity. With a nominal 3-phase line voltage applied, the BFA Fuse Status Indicator flashes a normal LED green light that gives positive indication of a good fuse and integrity of the wire connection to each side of the fuse. The indicator flashes a red fault LED when a fuse is unconnected or open, if there is a lost connection to either side of the fuse, and if mismatched line and load wires are present. When phase loss occurs both fault and normal LED's will extinguish. The indicator will continue to indicate the status of the fuse during a phase loss if a regenerated voltage is produced on the open phase from a rotating motor. The BFA Fuse Status Indicator mounts externally to a panel and can be mounted vertically or horizontally. It can be used for all UL Fuses Class H, J, K, R, RK. It can be viewed from a distance and has a universal input of 208-600 VAC.

SPECIFICATIONS

Nominal Voltage: 208-600 VAC $\pm 10\%$, Phase-to-Phase, 50/60 Hz.

Max Continuous Voltage: 660 VAC, Phase-to-Phase.

Rev. Connection Protected: Yes.

Detection Threshold: 10-15 VAC Across Open Fuse.

Maximum Detector Leakage Current: 0.5 mA @ 600 VAC (Approx).

Indicators: Normal- (3) Green LEDs, 2 Flashes/Sec, Fault- (3) Red LEDs, 2 Flashes/Sec.

Maximum Rated Voltage: 750 VAC/1000 VDC (LINE-TO-LINE or LINE-TO-GND).

Detection Thresholds: 29 VAC 3-Phase, 40 VAC SINGLE-phase, 27 VDC (TYP CUTOFF).

Power Required: 2.5 VA @ 208 VAC and 5.5 VA @ 480 VAC.

Temperature Ratings: Operate: 32 to 131°F (0 to 55°C), Storage: -40 to 185°F (-40 to 85°C).

Enclosure: 94 V-0 Flame Retardant Black ABS Plastic, Panel Mount with 1/2" Plastic, Electrical Conduit Adaptor; Encapsulated for Environmental Protection.

Electrical Connections: (6) 2', 18 AWG, 600V, 105°C PVC Stranded Wire w/Wire Pin. Terminations, Jacketed with 18" Silt Nylon Corrugated Tubing, .556" OD.

Weight: NET: 3.52 oz (99.8 g) SHIPPING: 5.12 oz (145.1 g).

Agency Approvals: UL

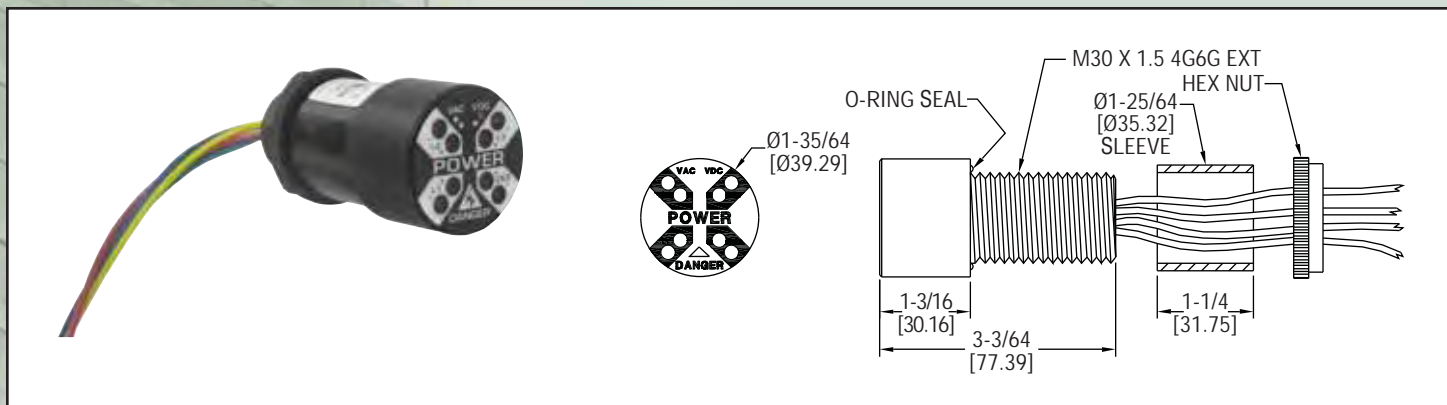
Model BFA-100

Model
UPA-130

Universal Power Alert

Indicates the Presence of Stored Energy in Control Panels

UL[®]
LISTED



The Model UPA-130 Power Alert reduces the risk of electrical arc flash by pre-verifying the electrical isolation from the outside of a control panel. The Universal Power Alert is hardwired to the circuit breaker or main disconnect and has an LED indication whenever voltage is present. It is engineered with redundant circuitry, which allows it to be powered by the same voltage that it indicates. The eight detector UPA-130 visually alerts to the presence of any dangerous AC or DC (stored energy) potentials occurring between any combination of the four input lines (L1, L2, L3, GND). The UPA-130 Universal Power Alert is designed to fit a 30mm knockout.

SPECIFICATIONS

Operational Range: AC Single or 3-Phase: 40 to 750 VAC 50/60/400 Hz, (Line-To-Line or Line-To-GND [UL approved 50/60 Hz]). DC or Stored Energy: 30 to 1000 VDC, (Line-To-Line or Line-To-GND).

Maximum Rated Voltage: 750 VAC/1000 VDC (Line-To-Line or Line-To-GND).

Detection Thresholds: 29 VAC 3-Phase, 40 VAC SINGLE-Phase, 27 VDC (TYP CUTOFF).

Power Consumption: 1.2 Watts at 750 VAC.

Temperature Rating: Operate: -4 to 131°F (-20 to 55°C) Storage: -40 to 185°F (-40 to 85°C).

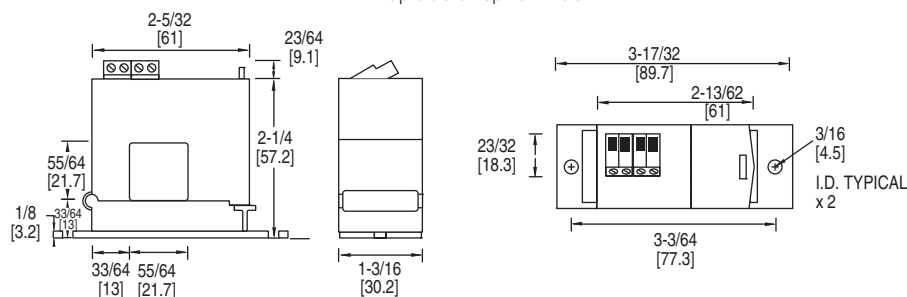
Enclosure: Totally Encapsulated for Environment Protection. NEMA 4X (IP66).

Electrical Connections: (4) 6 ft, 18 AWG 1000V, UL-1452.

Weight: 7 oz (198.45 g).

Agency Approvals: UL.

Model UPA-130



Series CT40/50 combine current transformer and signal conditioner into a single package. Transformers feature jumper selectable ranges and split core case. Units are designed for applications on linear or sinusoidal AC loads.

Model Number	Range	Output	Power Requirements
CT40-100	10/20/50 A	4-20 mA	12-40 VDC, Loop Powered
CT40-102	10/20/50 A	0-5 VDC	Self Powered
CT50-100	100/150/200 A	4-20 mA	12-40 VDC, Loop Powered
CT50-102	100/150/200 A	0-5 VDC	Self Powered

SPECIFICATIONS

Output Signal: 0-5 VDC or 4-20 mA, depending on model.

Power Requirements: See Table.

Accuracy: CT40/50-102: 1.0% FS; CT40/50-100: 0.5% FS.

Temperature Limits: -4 to 122°F (-20 to 50°C).

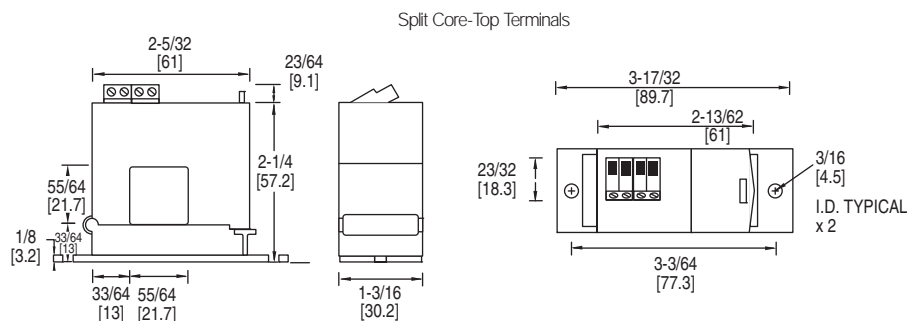
Response Time: CT40/50-102: 100 ms; CT40/50-100: 300 ms.

Isolation Voltage: 1270 VAC.

Frequency: CT40/50-102: 50-60 Hz; CT40/50-100: 20-100 Hz (Sinusoidal waveforms only).

Enclosure Rating: UL 94V-0 flammability rated.

Agency Approval: CE.



Series CT60/70 Current Transformers provide true RMS output on distorted AC waveforms — ideal for nonlinear loads or noisy environments. Each model offers three jumper selectable ranges and 1270 VAC isolation. Split core case allows easy installation.

Model Number	Range
CT60-100	10/20/50 A
CT70-100	100/150/200 A

SPECIFICATIONS

Output Signal: 4-20 mA, loop powered, true RMS.

Power Requirements: 24 VDC nominal.

Accuracy: 0.8% FS.

Temperature Limits: -4 to 122°F (-20 to 50°C).

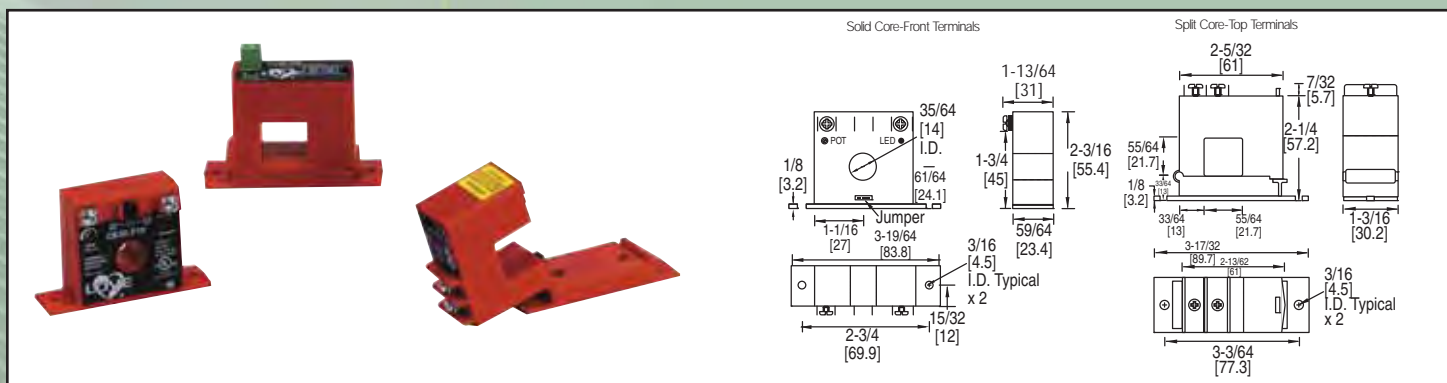
Response Time: 600 ms to 90%.

Isolation Voltage: 1270 VAC.

Frequency: 10-400 Hz.

Enclosure Rating: UL 94V-0 flammability rated.

Agency Approval: CE.



The CS Series Current Switches combine a current transformer, signal conditioner and limit alarm into a single package. The CS series has an extended current input range, universal solid-state outputs and a wide frequency response. Available in a split core or a solid core case. Switches feature LED indication for local display or switch status.

Model Number	Setpoint Range	Core	Voltage
CS20-100	Adj. 1.75-150 A	Split	240 VAC/DC
CS20-220	Adj. 1-150 A	Solid	240 VAC/DC
CS40-220	Selectable 1-6, 6-40, & 40-175 A	Solid	240 VAC
CS50-100	Selectable 1-6, 6-40, & 40-175 A	Split	240 VDC

SPECIFICATIONS

Output: Isolated, normally open.

Power Requirements: None, self powered.

Temperature Limits: -58 to 149°F (-50 to 65°C).

Hysteresis: 5% of output.

Response Time: CS20: 0.120 sec; CS40/50: 0.04 to .120 sec.

Isolation Voltage: 1270 VAC.

Frequency: 6-100 Hz.

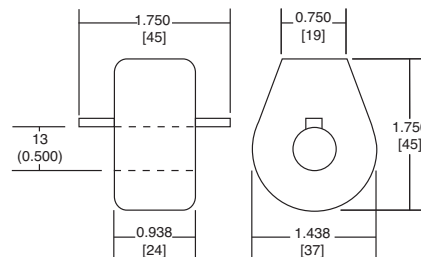
Enclosure Rating: UL, V-O flammability rated, ABS plastic housing.

Agency Approvals: CE.

Tell Tale Jr.™

Open Heater Detector

Low Cost Current Indication, Easy Installation



The Tell Tale Jr.™ is designed to indicate an open heater or other resistive load. Several models are available for various applications. The LED models light an LED when current is flowing in the circuit. If current stops flowing, the LED turns off. Solid state switch models provide either a logic output for DC applications or a triac output for AC applications. These models will satisfy those applications that need to send heater data to PLC or computer having an appropriate power supply. They are provided with 4 foot leads. If the triac output model is used to drive an inductive load (relay coil, etc.) then the 3138-0412 snubber network is required. While the Tell Tale Jr.™ is self-powered there is no power loss in the monitored load circuit when installed.

Model Number	Description
3868-0150	Internal, Red LED, Indication Only
3868-0180	Internal, Green LED, Indication Only
3868-0160	External, Red LED, 4 ft (1.2 m) Cable, Indication Only
3868-0170	External, Green LED, 4 ft (1.2 m) Cable, Indication Only
3868-0140	Logic Output, No LED, 4 ft (1.2 m) Cable
3868-0130	Triac Output, No LED, 4 ft (1.2 m) Cable

FEATURES

- Low cost current indication
- Easy installation
- Indicator or switch action
- Draws no power from process
- Compact size
- Isolated - no direct contact with power lines

APPLICATIONS

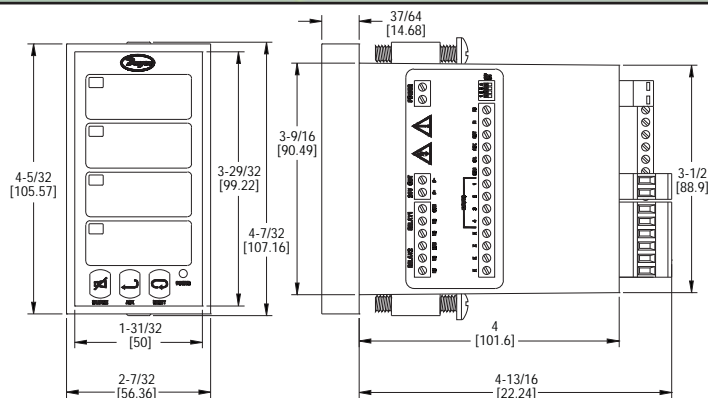
- Indicates open heater
- Signal to PLC indicating loss of HVAC or other devices

ACCESSORY

Model 3138-0412, Network Snubber

Indicating Alarm Annunciator

Up to 8 Inputs, Integral Power Supply



The Series AN2 Indicating Alarm Annunciator provides visible and audible alarms for up to eight inputs. The annunciator also has two SPDT relay outputs that can be used to initiate external alarms, buzzers, or paging devices. The Integral 24 VDC power supply can power most level, temperature, pressure, and flow switches. Audible alarm conditions can be acknowledged, reset, or silenced either via the front panel push buttons or the rear terminal block. The Series AN2 can be set to any common ISA sequences including First-Out.

Model Number	Number of Outputs	Power Supply
AN24-1	4	85 to 265 VAC
AN24-2	4	12 to 36 VDC
AN28-1	8	85 to 265 VAC
AN28-2	8	12 to 36 VDC

SPECIFICATIONS

Inputs: NO or NC switches, Open Collector Transistor (Open circuit voltage = 3.3 VDC); Logic Levels: LO = 0 to 0.9 VDC, HI = 2.4 to 28 VDC (100 K Ω input impedance).

Outputs: Two SPDT relay (3 A @ 250 VAC or 30 VDC, resistive; 1/14 HP @ 125/250 VAC, inductive).

Ambient Operating Temperature: -40 to 149°F (-40 to 65°C).

Power Requirements: 85 to 265 VAC 50/60 Hz, 90 to 265 VDC; 12 to 36 VDC, 12 to 24 VAC (Depending on model).

Power Consumption: 20 W (6 W on low voltage models).

Mounting: 1/8 DIN.

Housing Material: UL rated 94V-0 high impact plastic.

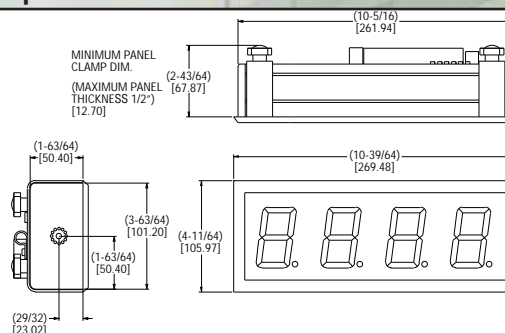
Enclosure Rating: NEMA 4X (IP65) Front Panel.

Weight: 9.6 oz (272 g).

Agency Approval: CE, UL.

Extra Large Digital Panel Meter

3-1/2 Digit LED Display, 2.3" Segment Height, Process Inputs



The Series DPMX Digital Panel Meter can easily be viewed from across a room or in dark areas. The 2.3" LED segments are available in red, green, or blue. These panel meters come equipped with a universal power supply and user selectable process inputs to fit most applications. The Series DPMX includes a mounting bracket that can be adjusted up to 180°.

Model No.	LED Segment Display
DPMX-1	Blue
DPMX-2	Green
DPMX-3	Red
DPMX-1-LV	Blue
DPMX-2-LV	Green
DPMX-3-LV	Red

SPECIFICATIONS

Inputs Ranges: Set Voltage: ± 200 mVDC, ± 2 VDC, ± 20 VDC. Adjustable Voltage: 200 mVDC, 5 VDC, 10 VDC. Adjustable Current: 0(4) to 20 mA DC.

Inputs Impedance: Set Voltage: > 1 M Ω (> 10 M Ω on 200 mV range). Adjustable Voltage: 392 k Ω . Adjustable Current: 300 Ω nominal.

Accuracy: $\pm (1\% \text{ F.S.} + 1 \text{ count})$.

Power Supply: 90 to 250 VAC @ 12 VA or 10.5 to 30 VAC/DC @ 6VA (depending on model).

Display: 3-1/2 digits, 2.3" height, 7 segment LED.

Sampling Rate: 3 readings per second.

Operating Temperature: 14 to 122°F (-10 to 50°C).

Storage Range: -40 to 167°F (-40 to 75°C).

Warm Up: 10 minutes.

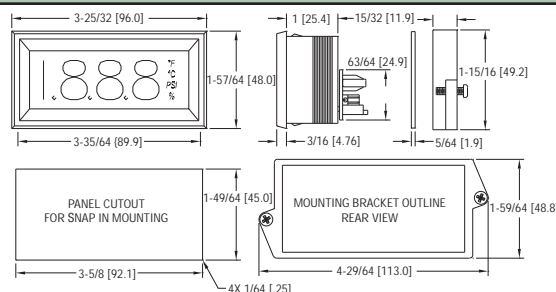
Mounting: 180° gimbal mounting with 30° stops or bezel mount.

APPLICATION

Used to display process values from pressure, humidity or temperature transmitters

Adjustable LCD Digital Panel Meters

1/8 DIN, Loop Powered, Large 3-1/2 Digit Display



Series DPMA Adjustable LCD Digital Panel Meter offers a 3-1/2 digit display for easy viewing in a standard 1/8 DIN package. Unit accepts 4-20 mA, 0 to 5 VDC, or 0 to 10 VDC inputs with a wide bipolar zero and span adjustment. Standard features include field selectable engineering units and decimal point positions. Choose from red, amber, or green segments for easy viewing at a distance. A 24 VDC power supply is required for the operation of the backlight.

Model Number	Input	Backlighting
DPMA-401	Current	Amber Segments
DPMA-402	Current	Red Segments
DPMA-404	Current	Green Segments
DPMA-501	Voltage	Amber Segments
DPMA-502	Voltage	Red Segments
DPMA-504	Voltage	Green Segments

ACCESSORIES

DPM-12P, Regulated 120 VAC to 12 VDC Power Supply

DPM-24P, Regulated 120 VAC to 24 VDC Power Supply

SPECIFICATIONS

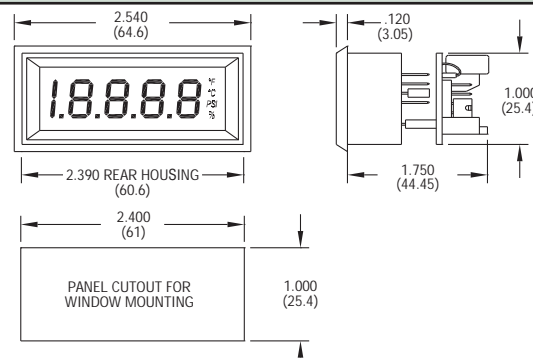
Input: 4-20 mA, 0-5 VDC, or 0-10 VDC.**Input Impedance:** 300Ω nominal.**Accuracy:** ±(0.05% FS + 1 count).**Power Supply:** 24 VDC or 12 VDC (DPMA-5XX).**Current Consumption:** 35 mA DC. 10 mA DC. backlight: 35 mA.**Span and Zero:** Adjustable. (±1999 counts).**Display:** 3-1/2 digits, 7 segments, 1" (25.4 mm) H.**Decimal Points:** 3-position, user selectable.**Engineering Units:** °F, °C, %, psi.**Polarity:** Automatic, "-" displayed.**Operating Temperature:** 14 to 122°F (-10 to 50°C).**Storage Temperature:** -40 to 167°F (-40 to 75°C).**Mounting:** Snap-in panel mount or clamp (gasket included).**Connection:** Screw terminals.**Weight:** 4 oz (113.4 g).

APPLICATION

Used to display process values from pressure, humidity or temperature transmitters

LCD Digital Panel Meters
4-1/2 Digit LCD, Selectable Engineering Units

DPML-401



The **Series DPML LCD Digital Panel Meter** offers a large 4-1/2 digit LCD display with a choice of red, amber or green segments for easy viewing at a distance. The meter accepts loop powered 4-20 mA DC input, 0 to 5 VDC, or 0 to 10 VDC voltage input. Standard features include field engineering units and decimal point positions. A 24 VDC power supply is required for the operation of the back light.

Model Number	Input	Backlighting
DPML-401	Current	Amber Segments
DPML-402	Current	Green Segments
DPML-403	Current	Red Segments
DPML-501	Voltage	Amber Segments
DPML-502	Voltage	Green Segments
DPML-503	Voltage	Red Segments

SPECIFICATIONS

Inputs: 4-20 mA DC, 0-5 VDC, 0-10 VDC.**Input Impedance:** 300Ω nominal.**Accuracy:** ±(0.1% FS + 2 count).**Power Supply:** 24 VDC or 12 VDC (DPML-5XX)@ 35 mA typical.**Span and Zero:** Adjustable (±1999 counts).**Display:** 4-1/2 digits, 7 segments, 0.45" (11.4 mm) H.**Decimal Points:** 4-position, user selectable.**Annunciator:** °F, °C, %, psi.**Polarity:** Automatic, "-" displayed.**Operating Temperature:** 32 to 122°F (0 to 50°C).**Mounting:** Snap-in bezel mount.**Connection:** Screw terminals.**Weight:** 2 oz (56.7 g).

APPLICATION

Used to display process values from pressure, humidity or temperature transmitters

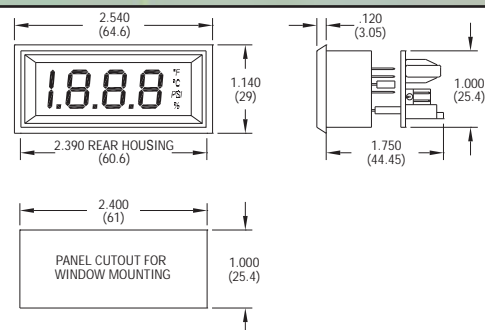
ACCESSORIES

DPM-12P, Regulated 120 VAC to 12 VDC Power Supply

DPM-24P, Regulated 120 VAC to 24 VDC Power Supply

LCD Digital Process Meters

3-1/2 Digit, User Selectable Engineering Units, Panel Mount



The Series DPMP LCD Digital Process Meter provides easy viewing on the 3-1/2 digit LCD display. The display segments are available in a choice of amber, red or green. The meter features user-selectable engineering units, adjustable zero and span and field-selectable decimal point position. The snap-in bezel mount eliminates mounting hardware for quick installation. A 24 VDC power supply is required for the operation of the backlight.

Model Number	Input	Backlighting
DPMP-401	Current	Amber Segments
DPMP-402	Current	Green Segments
DPMP-403	Current	Red Segments
DPMP-501	Voltage	Amber Segments
DPMP-502	Voltage	Green Segments
DPMP-503	Voltage	Red Segments

SPECIFICATIONS

Inputs: 4-20 mA DC, 0-5 VDC or 0-10 VDC.

Input Impedance: 300Ω nominal.

Accuracy: ±(0.1% FS + 2 count).

Power Supply: 24 VDC or 12 VDC (DPMP-5XX) @ 35 mA typical.

Span and Zero: Adjustable. (±1999 Counts).

Display: 3-1/2 digits, 7 segments, 0.45" (11.4 mm) H.

Decimal Points: 3-position, user selectable.

Annunciator: °F, °C, %, psi.

Polarity: Automatic, "-" displayed.

Operating Temperature: 32 to 122°F (0 to 50°C).

Mounting: Snap-in bezel mount.

Connection: Screw terminals.

Weight: 2 oz (56.7 g).

ACCESSORIES

DPM-12P, Regulated 120 VAC to 12 VDC Power Supply

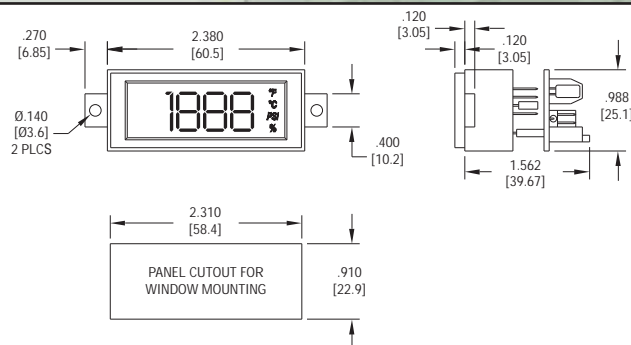
DPM-24P, Regulated 120 VAC to 24 VDC Power Supply

APPLICATION

Used to display process values from pressure, humidity or temperature transmitters

LCD Digital Panel Meters

3-1/2 Digits, Window Mount



The Series DPMW LCD Digital Panel Meter is designed with a 3-1/2 digit, high contrast LCD display. The colored segments are available in red, amber, or green - ideal for viewing at a distance. The Series DPMW features user selectable engineering units, selectable decimal point position and adjustable zero and span. The meter accepts a 4 to 20 mA input signal for pressure, level, flow, and temperature transmitter. A 24 VDC power supply is required to illuminate the colored segments. The Series DPMW can be quickly installed in a window cutout.

Model Number	Backlighting
DPMW-401	Amber Segments
DPMW-402	Green Segments
DPMW-404	Red Segments

SPECIFICATIONS

Inputs: 4-20 mA DC.

Input Impedance: 300Ω nominal.

Accuracy: ±(0.1% FS + 2 count).

Power Supply: 24 VDC @ 35 mA typical.

Span and Zero: Adjustable. (± 1999).

Display: 3-1/2 digits, 7 segments, 0.45" (11.4 mm) H.

Decimal Points: 3-position, user selectable.

Annunciator: °F, °C, %, psi.

Polarity: Automatic, "-" displayed.

Operating Temperature: 32 to 122°F (0 to 50°C).

Storage Temperature: -4 to 158°F (-20 to 70°C).

Mounting: Window mount.

Connection: Screw terminals.

Weight: 2 oz (56.7 g).

Conversion Rate: 3 per second.

Warm-Up: 10 minutes typical.

APPLICATION

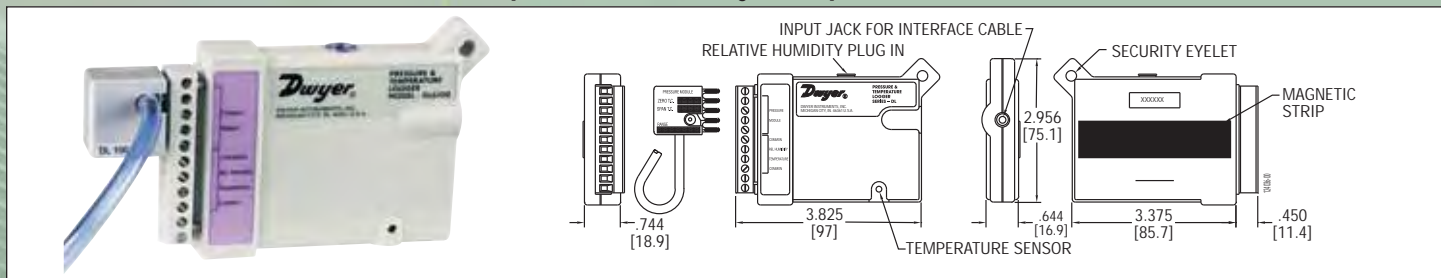
Used to display process values from pressure, humidity or temperature transmitters

Series
DL6

Pressure/Temperature/RH Data Logger

Self-Powered, 5-Channel, Store up to 32,768 Readings, Compact

CE



Monitor and troubleshoot HVAC systems, verify energy management systems, or track performance of pneumatically controlled valves with Series DL6 Pressure/Temperature/RH Data Logger. Units include an on-board thermistor for ambient temperature measurement and pressure module. Remote humidity/temperature sensor and plug-in humidity sensor are sold separately. Loggers can store up to 32,768 readings and operate independently from any external power supply with built-in lithium battery. Use Model DL200 Windows® software (sold separately) to quickly program the logger or upload data to a computer.

Model Number	Pressure Range
DL6005	0 to 5 psig (30 kPa)
DL6030	0 to 30 psig (200 kPa)
DL6100	0 to 100 psig (700 kPa)

ACCESSORIES

DL200, Windows® Software and Connecting Cable
DL690, Remote Humidity/Temperature Sensor
DL691, Plug-in Humidity Sensor

Windows® is a registered trademark of Microsoft Corporation.

SPECIFICATIONS

No. of Channels: Five; internal thermistor, pressure module (included), plug-in humidity sensor, remote humidity/temperature sensor.

Internal Thermistor Range: -40 to 158°F (-40 to 70°C).

Compensated Temperature Range: 32 to 158°F (0 to 70°C).

Memory Size: 32,768 readings.

Accuracy: ±1% FS.

Clock Accuracy: ±8 sec/day plus one sampling interval.

Thermal Accuracy: ±1% FS.

Drift: ±0.2% FS/yr.

Internal Thermistor Resolution: 0.7°F (0.4°C), R25 value equal to 10,000Ω.

Resolution: 8 bits (1 in 256).

Sampling Methods: Continuous (First-in, First-out) or Stop when full (Fill-then-stop).

Sampling Rates: Selectable from 8 seconds to once every 5 days.

Ambient Operating Temperature/RH: -50 to 160°F (-45 to 70°C), 0 to 95% RH, non-condensing.

Connection: Removable screw terminal.

Computer Requirements: IBM compatible 386 or above and Windows® 3.1 or later with 2 MB RAM and 2 MB hard drive disk space, one serial port.

Power Requirements: Built-in 3.6V Lithium battery.

Power Consumption: 5-10 µA.

Service: Air and noncorrosive gases.

Max. Pressure Rating: 4x rated pressure.

Housing Material: Polyphenylene Ether and Polystyrene.

Weight: 5 oz (110 g).

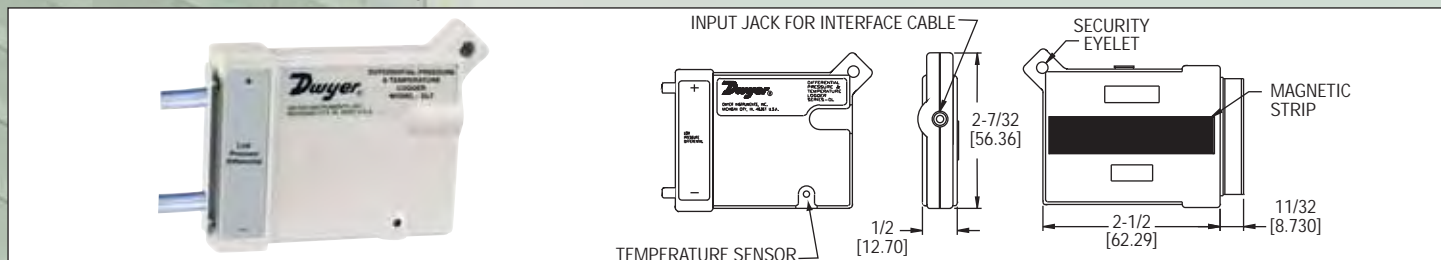
Agency Approvals: CE.

Series
DL7

Differential Pressure Data Logger

Also Measures and Logs Temperature, Self-Powered, 2-Channel, Compact

CE



Monitor and Record low differential pressures and temperature with the Model DL7 Differential Pressure Data Logger. Unit includes an on-board thermistor for ambient temperature measurement. Sampling rates are user selectable from 0.04 seconds to 8 hours with First-in first-out or Fill-then-stop sampling options. Loggers can store up to 21,500 readings and operate totally independently from any external power supply with built-in lithium battery. Use Model DL200 Windows® software (sold separately) to quickly program the logger or upload data to a computer. The Series DL7 logger is ideal for monitoring air duct velocity, testing and balancing HVAC systems, or verifying room pressure.

Model Number	Pressure Range
DL70	±0.5" w.c. (1.2 mbar)
DL71	±1" w.c. (2.5 mbar)
DL72	±2.0" w.c. (5.0 mbar)
DL75	±5" w.c. (12.4 mbar)
DL710	±10" w.c. (24.9 mbar)

ACCESSORIES

DL200, Windows® Software and Connecting Cable

Windows® is a registered trademark of Microsoft Corporation.

SPECIFICATIONS

No. of Channels: Two; internal thermistor, and a differential pressure sensor.

Internal Thermistor Range: -40 to 158°F (-40 to 70°C).

Compensated Temp Range: 32 to 158°F (0 to 70°C).

Memory Size: 21,500 readings.

Accuracy: ±0.05 w.c. (up to 2" range) ±1" (5" and 10" range).

Thermal Accuracy: ±0.5% FS.

Clock Accuracy: ±2 sec/day plus one sampling interval.

Resolution: ±0.01" w.c.

Internal Thermistor Resolution: 0.7°F (0.4°C), R25 value equal to 10,000Ω [10kΩ @ 25°C (77°F)].

Resolution: 12 bits (1 in 4096).

Nonlinearity: ±0.05% FS (BFS).

Hysteresis and Repeatability: ±0.05% FS.

Drift: ±0.5% FS/yr.

Sampling Methods: Continuous (first-in, first-out: not available from 40 ms to 8 sec.), stop when full (fill-then-stop), or delayed start.

Sampling Rates: Selectable from 0.04 seconds to 8 hours.

Ambient Operating Temperature/RH: -40 to 158°F (-40 to 70°C), 0 to 95% RH, non-condensing.

Connection: Two 1/8" I.D. permanent protective tubing.

Computer Requirements: IBM compatible 386 or above and Windows® 3.1 or later with 2 MB RAM and 2 MB hard drive disk space, one serial port.

Service: Dry air and noncorrosive gases.

Max. Pressure Rating: 4X rated pressure.

Power Requirements: Built-in 3.6V Lithium battery.

Power Consumption: 5-10 µA.

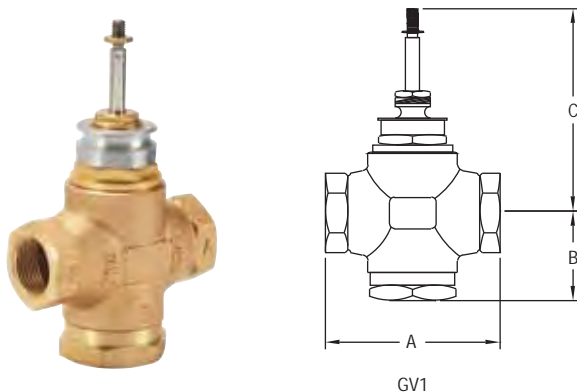
Housing Material: Polyphenylene Ether and Polystyrene PPE & PS.

Weight: 4 oz (110 g).

Agency Approvals: CE.

Globe Control Valve

Low Cost, 1" to 2" Sizes, 2-Way or 3-Way



DIMENSIONS

Model	A	B	C
GV121	4-11/32" (110 mm)	2-3/8" (60 mm)	4-3/8" (111 mm)
GV122	4-47/64" (120 mm)	2-39/64" (66 mm)	4-3/8" (111 mm)
GV123	5-1/8" (130 mm)	2-11/16" (68 mm)	4-1/2" (114 mm)
GV124	5-23/32" (145 mm)	2-27/32" (72 mm)	4-31/32" (126 mm)
GV131	4-11/32" (110 mm)	3-5/64" (78 mm)	4-3/8" (111 mm)
GV132	4-47/64" (120 mm)	3-15/64" (82 mm)	4-3/8" (111 mm)
GV133	5-1/8" (130 mm)	3-15/64" (82 mm)	4-1/2" (114 mm)
GV134	5-23/32" (145 mm)	3-19/32" (91 mm)	4-31/32" (126 mm)

The Series GV1 globe valves can be conveniently paired with the Series EVA1 electric actuators, creating a low cost and compact control valve package. The globe design allows for exceptional throttling control in a wide range of applications, including central heating and air conditioning, water handling, and industrial manufacturing systems. Valves are manufactured in a variety of sizes, and are available in either two-way or three-way body styles. The forged brass body and equal percentage flow characteristic are ideal for many flow control systems.

FEATURES

- Low leakage rate (less than 0.05% of Cv)
- Equal percentage flow characteristic for excellent low flow control
- Forged brass construction
- Direct mounting actuator (Series EVA1) for compact control valve package

SPECIFICATIONS

Service: Compatible liquids and gases.

Line Size: 1" to 2".

Body Style: 2-way, push to open globe; 3-way globe.

End Connections: Female NPT.

Pressure Limit: 232 psi (16 bar).

Wetted Materials:

Body Material: Brass.

Stem: 302 SS.

Disc: Brass with Nitrile Gasket.

Packing: Fluon® filler with Nitrile O-ring.

Temperature Limits: 35 to 201°F (2 to 94°C).

Flow Characteristic: Equal percentage.

Flow Leakage: Less than 0.05% of Cv factor.

Stem Connection: M8 thread.

APPLICATIONS

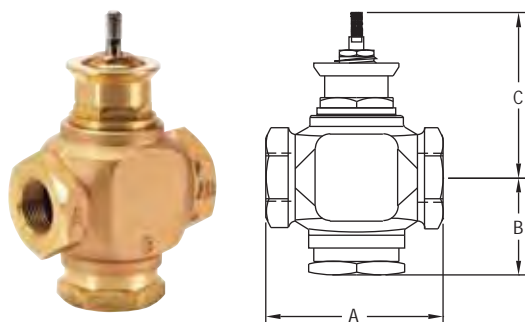
- Mixing or diverting services with three way models
- Control water flow in heating or cooling processes
- HVAC zone management

Model	Type	Pipe Size	Cv	Max. Diff. Pres. Fit with EVA1-	Stroke in. (mm)
GV121	2-Way	1"	9.3	87 psi (6 bar)	19/32" (15)
GV122		1-1/4"	17.4	58 psi (4 bar)	3/4" (19)
GV123		1-1/2"	25.5	43 psi (3 bar)	3/4" (19)
GV124		2"	40.6	29 psi (2 bar)	3/4" (19)
GV131	3-Way	1"	9.3	87 psi (6 bar)	19/32" (15)
GV132		1-1/4"	17.4	58 psi (4 bar)	3/4" (19)
GV133		1-1/2"	25.5	43 psi (3 bar)	3/4" (19)
GV134		2"	40.6	29 psi (2 bar)	3/4" (19)

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Globe Control Valves

Low Cost, 1" to 2-1/2" Sizes, 2-Way or 3-Way



DIMENSIONS

Model	A	B	C
GV221/321	4-11/32" (110 mm)	2-31/64" (63 mm)	4-17/64" (108 mm)
GV222/322	4-47/64" (120 mm)	2-23/32" (69 mm)	4-17/64" (108 mm)
GV223/323	5-1/8" (130 mm)	2-13/16" (71 mm)	4-3/8" (111 mm)
GV224/324	5-23/32" (145 mm)	3-3/64" (77 mm)	4-1/2" (114 mm)
GV225/325	4-11/32" (110 mm)	3-9/32" (83 mm)	4-25/32" (121 mm)
GV231/331	4-47/64" (120 mm)	3-13/64" (81 mm)	4-17/64" (108 mm)
GV232/332	5-1/8" (130 mm)	3-23/64" (85 mm)	4-17/64" (108 mm)
GV233/333	5-23/32" (145 mm)	3-23/64" (85 mm)	4-3/8" (111 mm)
GV234/334	5-1/8" (145 mm)	3-51/64" (96 mm)	4-1/2" (114 mm)
GV235/335	6-29/32" (175 mm)	4-7/64" (104 mm)	4-25/32" (121 mm)

The Series GV2 and GV3 globe valves can be conveniently paired with the Series EVA2 and EVA3 electric actuators, creating a low cost and compact control valve package. The globe design allows for exceptional throttling control in a wide range of applications, including central heating and air conditioning, water handling, and industrial manufacturing systems. Valves are manufactured in a variety of sizes, and are available in either two-way or three-way body styles. The forged brass body and equal percentage flow characteristic are ideal for many flow control systems. Series GV3 models incorporate a high intensity body casting for high temperature applications, including steam service.

APPLICATIONS

- Mixing or diverting services with three way models
- Control water flow in heating or cooling processes
- HVAC zone management

FEATURES

- Low leakage rate (less than 0.05% of Cv)
- Equal percentage flow characteristic for excellent low flow control
- Forged brass construction
- Direct mounting actuator (Series EVA2 and EVA3) for compact control valve package
- GV3: Higher temperature rating, capable of steam service
- Control flow in heating or cooling processes

SERIES GV2

Model	Type	Pipe Size	Cv	Max. Diff. Pres.		Stroke in (mm)
				Fit with EVA2-	Fit with EVA3-	
GV221	2-Way	1"	9.3	145 psi (10 bar)	203 psi (14 bar)	19/32" (15)
GV222		1-1/4"	18.6	109 psi (7.5 bar)	160 psi (11 bar)	3/4" (19)
GV223		1-1/2"	29.0	72 psi (5 bar)	116 psi (8 bar)	3/4" (19)
GV224		2"	46.4	43 psi (3 bar)	72 psi (5 bar)	7/8" (22)
GV225		2-1/2"	73.1	29 psi (2 bar)	50 psi (3.5 bar)	7/8" (22)
GV231	3-Way	1"	9.3	145 psi (10 bar)	203 psi (14 bar)	19/32" (15)
GV232		1-1/4"	18.6	109 psi (7.5 bar)	160 psi (11 bar)	3/4" (19)
GV233		1-1/2"	29.0	72 psi (5 bar)	116 psi (8 bar)	3/4" (19)
GV234		2"	46.4	43 psi (3 bar)	72 psi (5 bar)	7/8" (22)
GV235		2-1/2"	73.1	29 psi (2 bar)	50 psi (3.5 bar)	7/8" (22)

SPECIFICATIONS

Service: GV2: Compatible liquids and gases.

GV3: Compatible liquids, gases, and steam.

Line Size: 1" to 2-1/2".

Body Style: 2-way, push to open globe; 3-way globe.

End Connections: Female NPT.

Pressure Limit: 232 psi (16 bar) WOG;

GV3: 130 psi SWP (9.0 bar).

Wetted Materials:

Body Material: Brass.

Stem: SS (1Cr18Ni9).

Disc: GV2: Brass with Nitrile gasket.

GV3: Brass with Fluon® gasket.

Packing: GV2: Fluon® filler with Nitrile O-ring.

GV3: Fluon® filler with Fluorine O-ring.

Temperature Limits: GV2: 35 to 201°F (2 to 94°C), GV3: 35 to 356°F (2 to 180°C).

Flow Characteristic: Equal percentage.

Flow Leakage: Less than 0.05% of Cv factor.

Stem Connection: M8 thread.

SERIES GV3

Model	Type	Pipe Size	Cv	Max. Diff. Pres.		Stroke in (mm)
				Fit with EVA2-	Fit with EVA3-	
GV321	2-Way	1"	9.3	116 psi (8 bar)	174 psi (12 bar)	19/32" (15)
GV322		1-1/4"	18.6	87 psi (6 bar)	145 psi (10 bar)	3/4" (19)
GV323		1-1/2"	29.0	58 psi (4 bar)	102 psi (7 bar)	3/4" (19)
GV324		2"	46.4	29 psi (2 bar)	58 psi (4 bar)	7/8" (22)
GV325		2-1/2"	73.1	29 psi (2 bar)	50 psi (3.5 bar)	7/8" (22)
GV331	3-Way	1"	9.3	116 psi (8 bar)	174 psi (12 bar)	19/32" (15)
GV332		1-1/4"	18.6	87 psi (6 bar)	145 psi (10 bar)	3/4" (19)
GV333		1-1/2"	29.0	58 psi (4 bar)	102 psi (7 bar)	3/4" (19)
GV334		2"	46.4	29 psi (2 bar)	58 psi (4 bar)	7/8" (22)
GV335		2-1/2"	73.1	29 psi (2 bar)	50 psi (3.5 bar)	7/8" (22)

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Electric Actuator

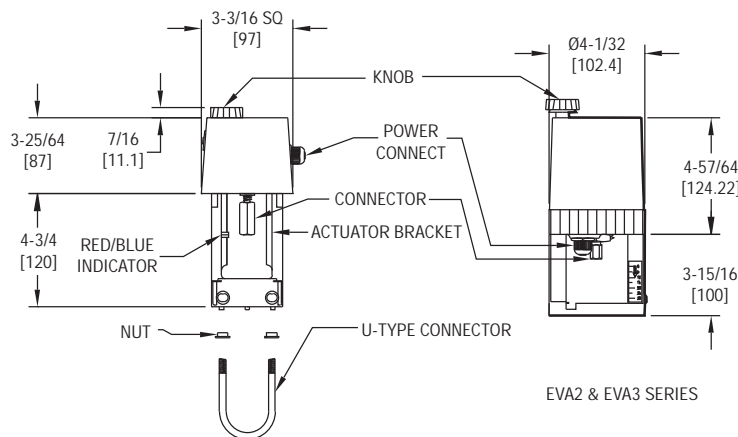
Easily Installs Onto a Series GV Valve



EVA1



EVA2/EVA3



EVA1 SERIES

EVA2 & EVA3 SERIES

The Series EVA Electric Actuators are designed to mount directly onto the Series GV globe valves, creating a complete, low cost, and compact control valve package. Floating or modulating control inputs are available, and the 24 VAC synchronic motor includes a magnetic clutch to protect the motor in stall conditions. Actuators are ruggedly constructed with a fire-proof ABS housing and robust aluminum bracket. Features include a visual position indicator and manual override to make this actuator an excellent choice for any size area, large or small.

FEATURES

- Manual Override
- Compact Size
- Floating Control or Selectable 0-10 VDC or 4-20 mA Proportional Control
- Reversible Direction on Proportional Models
- Magnetic Clutch Protects Motor in Stall Conditions

SPECIFICATIONS

SERIES EVA1

Output Force: 112 lb (500 N).

Power Requirements: 24 VAC.

Power Consumption: EVA1F: 2.5 VA; EVA1M: 4.5 VA.

Cycle Time: 262 sec/in. (10.3 sec/mm).

Enclosure Rating: IP54.

Housing Material: Fire-proof ABS plastic (UL94V-0).

Bracket Material: Aluminum.

Operating Temperature: 36 to 131°F (2 to 55°C).

Storage Temperature: -4 to 149°F (-20 to 65°C).

Humidity Limit: <90%, non-condensing.

Electrical Connection: Screw terminal.

Modulating Input: 0 to 10 VDC or 4 to 20 mA.

Weight: EVA1F: 1.81 lb (0.8 kg); EVA1M: 1.92 lb (0.9 kg).

SERIES EVA2, EVA3

Output Force: EVA2: 225 lb (1000 N); EVA3: 337 lb (1500 N).

Power Requirements: 24 VAC.

Power Consumption: EVA2F (EVA3F): 5.5 VA; EVA2M (EVA3M): 7.5 VA.

Cycle Time: EVA2F (EVA2M): 97 sec/in. (3.8 sec/mm); EVA3F (EVA3M): 164 sec/in. (6.45 sec/mm).

Enclosure Rating: IP40.

Housing Material: Fire-proof ABS plastic (UL94V-0).

Bracket Material: Aluminum.

Operating Temperature: 36 to 131°F (2 to 55°C).

Storage Temperature: -4 to 149°F (-20 to 65°C).

Humidity Limit: <90%, non-condensing.

Electrical Connection: Screw terminal.

Modulating Input: 0 to 10 VDC or 4 to 20 mA.

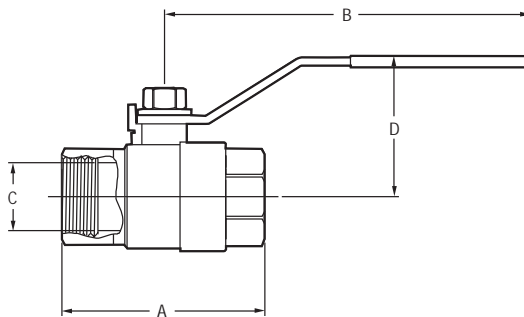
Weight: EVA2F (EVA3F): 2.43 lb (1.1 kg); EVA2M (EVA3M): 3.31 lb (1.15 kg).

MODEL	ACTUATOR ACTION	OUTPUT FORCE	VALVE SIZE	COMPATIBLE VALVE TYPE
EVA1F	Floating	112 lb (500 N)	1" to 2"	GV1__
EVA1M	Modulating	112 lb (500 N)	1" to 2"	GV1__
EVA2F	Floating	225 lb (1000 N)	1" to 2-1/2"	GV2__ or GV3__
EVA2M	Modulating	225 lb (1000 N)	1" to 2-1/2"	GV2__ or GV3__
EVA3F	Floating	337 lb (1500 N)	1" to 2-1/2"	GV2__ or GV3__
EVA3M	Modulating	337 lb (1500 N)	1" to 2-1/2"	GV2__ or GV3__

Series
BV2MB

Two-Piece Hand Lever Brass Ball Valve

Full Port, Economical, Blowout-Proof Stem



DIMENSIONS (inches)

Size	A (Ref)	B (Ref)	C (Ref)	D (Ref)
1/4"	1.800	3.800	.393	1.250
3/8"	2.000	3.800	.393	1.250
1/2"	2.070	3.800	.551	1.830
3/4"	2.360	3.800	.748	1.950
1"	2.950	4.350	.944	2.170
1-1/4"	3.370	5.470	1.181	2.800
1-1/2"	3.740	5.470	1.496	3.030
2"	4.290	6.380	1.850	3.330
2-1/2"	5.650	8.720	2.440	4.000
3"	6.180	8.720	2.990	4.310

The Series BV2MB is an economical hand lever ball valve for commercial and general industrial use. The Series BV2MB is perfect as a manual shutoff valve for hot and cold water systems. Valve body, body cap, and ball are made of quality brass. Seats and stem packing are constructed of TFE for long lasting service. Blowout-proof stem provides safety in the event of overpressure. Full port design allows for maximum Cv and minimal pressure drop.

Size	Model	Cv	Size	Model	Cv
1/4"	BV2MB00	7.5	1-1/4"	BV2MB05	105
3/8"	BV2MB01	7.5	1-1/2"	BV2MB06	160
1/2"	BV2MB02	16	2"	BV2MB07	325
3/4"	BV2MB03	43	2-1/2"	BV2MB08	475
1"	BV2MB04	58	3"	BV2MB09	780

SPECIFICATIONS

End Connections: 1/4" to 3" female NPT.

Pressure Limit: 1/4" to 1": 600 psi (41.4 bar), 1-1/4" to 2": 400 psi (27.6 bar), 2-1/2" to 3": 200 psi (13.8 bar) WOG.

Wetted Materials: Body and body cap: forged brass (ASTM B283-C37700); ball and stem: brass; seat and packing: TFE.

Temperature Limit: 10 to 200°F (-12 to 93°C).

Other Materials: Body seal: rubber; handle: plated steel; nut and gasket: brass.

Series
BV2L

Low Cost Electric Actuated Ball Valve

Two-Piece Stainless Steel, Full Port



BV2LT

BV2LQ, L9, LR, L7

BV2LS

The Series BV2L is an economical electric actuator combined with our durable two-piece stainless steel ball valve to make a compact, low cost, automated valve package. The ball valve is a full port design allowing maximum Cv with minimal pressure drop. Constructed of stainless steel and PTFE materials the ball valve has exceptional corrosion resistance, and high temperature and pressure capability. Electric actuators are available in either 24 VAC/DC or 120 VAC supply voltage. Spring return models return the valve to its fail safe position upon loss of power and are factory supplied to return to the closed position upon failure. The BV2L is an ideal valve package for HVAC applications and OEM's such as boiler manufacturers. Ideal shutoff valve for hot or cold water systems such as hot water heaters, boilers, and chillers.

SPECIFICATIONS

Body: 2- piece.

Line Size: 1/4" to 2".

End Connections: Female NPT.

Pressure Limit: 1000 psi (69 bar) WOG, 150 psi (10.3 bar) SWP.

Wetted Materials:

Body, Ball, End Cap: CF8M SS (316 SS).

Stem: 316 SS.

Seat, Thrust Washer: RTFE.

End Gasket, Stem Packing: PTFE.

Temperature Limits: -20 to 450°F (-29 to 232°C).

Electric "L" Series

Power Requirements: L9, LQ: 120 VAC $\pm 10\%$ 50/60 Hz; L1, L7, LR, LS, LT: 24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $\pm 10\%$.

Power Consumption: LS: 2 W, LT: 2.5 W, L1: 3 W, L7, LR: 5W, LQ: 5.5 W, L9: 6 W.

Cycle Time (per 90°): LQ, LR:

Motor <40 to 75 sec., Spring Return <25 sec. (<60 sec. under -4°F

(-20°C); L9, L7: Motor 150 sec., Spring Return < 20 sec.; LS: 110 sec. Maximum; LT: 150 sec.

Maximum; L1: 140 sec. Maximum.

Duty Rating: Continuous.

Enclosure Rating: NEMA 2.

Temperature Limits: -22 to 122° F (-30 to 50° C).

Electrical Connection: 3 ft, 18 GA cable and 1/2" Conduit Connector (Except LS).

Weight: LS: 1.2 lb (.55 kg), LT: 2.8 lb (1.3 kg), LR: 3.1 lb (1.4 kg), LQ: 3.4 lb (1.54 kg), L1: 4.0 lb (1.8 kg), L7: 6.0 lb (2.7 kg), L9: 6.9 lb (3.1 kg).

Agency Approvals: UL 873, CE (except L1), CSA.

Features: Position Indicator.

Size	Cv	Model Number	Supply Voltage	Spring Return
1/4"	6	BV2LQ00	120 VAC	Yes
3/8"	7	BV2LQ01	120 VAC	Yes
1/2"	10	BV2LQ02	120 VAC	Yes
3/4"	24	BV2LQ03	120 VAC	Yes
1"	45	BV2LQ04	120 VAC	Yes
1/4"	6	BV2LR00	24 VAC/DC	Yes
3/8"	7	BV2LR01	24 VAC/DC	Yes
1/2"	10	BV2LR02	24 VAC/DC	Yes
3/4"	24	BV2LR03	24 VAC/DC	Yes
1"	45	BV2LR04	24 VAC/DC	Yes
1/4"	6	BV2LS00	24 VAC/DC	No
3/8"	7	BV2LS01	24 VAC/DC	No
1/2"	10	BV2LT02	24 VAC/DC	No
3/4"	24	BV2LT03	24 VAC/DC	No
1"	45	BV2LT04	24 VAC/DC	No
1-1/4"	90	BV2L105	24 VAC/DC	No

Automated Butterfly Valve

Resilient Seated, Direct Mount Actuators



Pneumatic



Electric

*Please see website for dimensional drawings

The ABFV Series is offered with standard 316 SS disc, a through shaft that does not come in contact with the media, and choices of EPDM, BUNA-N, or fluoroelastomer liners for great chemical compatibility. Valve design has integral ISO mounting for direct mount actuators creating a more compact automated package. Body is epoxy coated for durable and attractive finish. Liner fully covers the body and assures tight seal with mating flanges without additional gaskets. One-piece shaft ensures positive valve positioning and is an anti-blowout design. Series ABFV is perfect for flow control of water in chillers, cooling towers, and thermal storage systems.

ABFV valves come in two-way and three-way packages. Three-way assemblies include valves and actuators mounted onto a 125# cast iron tee. When ordering you have the choice of valve arrangement for mixing or diverting applications. Valves come in lug or wafer style and wafer models have guide holes for bolts.

ABFV is an economical automated valve package with either an electric or pneumatic actuator. Electrically actuated models are weatherproof, NEMA 4, powered by standard 115 VAC supply, and are available in either two-position or proportional control. Two-position actuators use the 115 VAC input to drive each of the valve ports open or closed, while the modulating actuator accepts a 4 to 20 mA input for infinite valve positioning. Actuator features include thermal overload protection to withstand stall conditions, visual position indication and a permanently lubricated gear train.

The pneumatic double acting actuator uses an air supply to drive each of the actuator ports. Spring return pneumatic actuators use the air supply to drive the valve stem one direction, and internally loaded springs return the valve to its original position. Also available is the SV3 solenoid valve to electrically switch the supply pressure between the air supply ports. Actuators are constructed of anodized aluminum and are epoxy coated for years of corrosion free service.

Cv Values

Valve Size	10°	20°	30°	40°	50°	60°	70°	80°	90°
2"	0.1	5	12	24	45	64	90	125	135
2-1/2"	0.7	8	20	37	65	98	144	204	220
3"	0.3	12	22	39	70	116	183	275	302
4"	0.5	17	36	78	139	230	364	546	600
5"	0.8	29	61	133	237	392	620	930	1022
6"	2	45	95	205	366	605	958	1437	1539
8"	3	89	188	408	727	1202	1903	2854	3136
10"	4	151	320	694	1237	2034	3240	4859	5340
12"	5	234	495	1072	1911	3162	5005	7507	8250

SPECIFICATIONS

Valve Body

Service: Compatible liquids and gases.

Body: 2-way or 3-way.

Line Size: 2" to 12".

End Connections: Wafer or lug pattern designed for flanges to ANSI B16.1, BS4504, DIN 2501.

Pressure Limits: Up to 8": 225 psi (15.5 bar); 10" - 12": 150 psi (10.3 bar).

Wetted Materials: Disc: 316 SS; Liner: EPDM BUNA-N, or Fluoroelastomer.

Temperature Limits: EPDM: -30 to 275°F (-34 to 135°C); BUNA-N: 10 to 180°F (-12.2 to 82.2°C); Fluoroelastomer: 400°F (204°C).

Other Materials: Shaft: 316SS; Bottom/Top Bushing: bronze; Body: cast iron; Shaft Seal: EPDM.

ACTUATORS

Electric "U" and "V" Series

Power Requirements: 115 VAC, 50/60 Hz, single phase. Optional 220 VAC, 24 VAC, 12 VDC, and 24 VDC.

Power Consumption: (Locked Rotor Current): U_1, V_1: .55A; U_2, 3, 4, V_2, 3, 4: 0.75A; U_5, 6, 7, V_5, 6, 7: 1.1A; U_8, V_8: 2.6A; U_9, V_9: 2.9A. (Only for 115 VAC, for other voltages contact the factory).

Cycle Time: (sec. per 90°): U_1, V_1: 2.5; U_2, 3, V_2, 3: 5; U_4, V_4: 10; U_5, 6, V_5, 6: 15; U_7, V_7: 30; U_8, V_8: 12; U_9, V_9: 14. (Only for 115 VAC, for other voltages contact the factory).

Duty Cycle: U_1: 75%; U_2 to 7: 25%; U_8, 9: 100%; V_1 to 7: 75%; V_8, 9: 100%.

Enclosure Rating: NEMA 4.

Optional NEMA 7 (Class 1, Div. II Groups A, B, C, D).

Housing Material: Aluminum with thermal bonding polyester powder finish.

Temperature Limit: 0 to 150°F (-18 to 65°C).

Conduit Connection: 1/2" female NPT.

Modulating Input (V Series): 4 to 20 mA.

Standard Features: Manual override and visual position indicator except modulating units.

Pneumatic "DA" and "SR" Series

Type: DA series is double acting and SR series is spring return (rack and pinion).

Normal Supply Pressure: 80 psi (5.5 bar).

Maximum Supply Pressure: 120 psig (8 bar).

Air Connections: DA1 to 5 and SR2 to 5: 1/8" female NPT, all others: 1/4" female NPT.

Air Consumption: (cu. in. per stroke)

DA1: 2.32, DA2: 6.59, DA3: 12.14, DA4: 16.32, DA5: 30.2, DA6: 45.3, DA7: 61.0, DA8: 106.9, DA9: 137.9, DAA: 220.1, DAB: 348.1, DAC: 915.4, SR2: 7.7, SR3: 14.2, SR4: 17.2, SR5: 32.4, SR6: 54.4, SR7: 85.4, SR8: 122.1, SR9: 146.5, SRA: 215.1, SRB: 462.6, SRC: 945.9.

Cycle Time: (sec. per 90°): DA1: .03, DA2: .04, DA3: .08, DA4: .12, DA5: .19, DA6: 0.27, DA7: .47, DA8: .66, DA9: .93, DAA: 1.1, DAB: 1.7, DAC: 4.5, SR2: .09, SR3: .14, SR4: .22, SR5: .33, SR6: .46, SR7: .78, SR8: .90, SR9: .97, SRA: 1.34, SRB: 2.19, SRC: 6.20.

Housing Material: Anodized aluminum body and epoxy coated aluminum end caps.


Temperature Limit: -4 to 180°F (-20 to 82°C).

Accessory Mounting: NAMUR standard.

Standard Features: Visual position indicator.

Series ABFV Automated Butterfly Valve

Complete Model Chart - See next page for built model numbers

Example	ABFV	3	03	WFB	3	3	1	DA3	E	SV	ABFV303WFB331DA3E-SV
Construction	ABFV										Automated Butterfly Valve
Configuration		2 3									Two-Way Three-Way
Size			02 25 03 04 05 06 08 10 12								2" 2-1/2" 3" 4" 5" 6" 8" 10" 12"
Body				WFB LTB							Wafer Lug
Stem					3						316 SS
Disc						3					316 SS
Liner							1 2 3				EPDM Buna-N Fluoroelastomer
Actuator Type							DA1 DA2 DA3 DA4 DA5 DA6 DA7 DA8 DA9 DAA DAB DAC SR2 SR3 SR4 SR5 SR6 SR7 SR8 SR9 SRA SRB SRC U_1 U_2 U_3 U_4 U_5 U_6 U_7 U_8 U_9 U_A V_1 V_2 V_3 V_4 V_5 V_6 V_7 V_8 V_9 V_A			Direct Acting Rack and Pinion Actuator, Size 32 Direct Acting Rack and Pinion Actuator, Size 52 Direct Acting Rack and Pinion Actuator, Size 63 Direct Acting Rack and Pinion Actuator, Size 75 Direct Acting Rack and Pinion Actuator, Size 85 Direct Acting Rack and Pinion Actuator, Size 100 Direct Acting Rack and Pinion Actuator, Size 115 Direct Acting Rack and Pinion Actuator, Size 125 Direct Acting Rack and Pinion Actuator, Size 140 Direct Acting Rack and Pinion Actuator, Size 160 Direct Acting Rack and Pinion Actuator, Size 200 Direct Acting Rack and Pinion Actuator, Size 270 Spring Return Rack and Pinion Actuator, Size 52 Spring Return Rack and Pinion Actuator, Size 63 Spring Return Rack and Pinion Actuator, Size 75 Spring Return Rack and Pinion Actuator, Size 85 Spring Return Rack and Pinion Actuator, Size 100 Spring Return Rack and Pinion Actuator, Size 115 Spring Return Rack and Pinion Actuator, Size 125 Spring Return Rack and Pinion Actuator, Size 140 Spring Return Rack and Pinion Actuator, Size 160 Spring Return Rack and Pinion Actuator, Size 200 Spring Return Rack and Pinion Actuator, Size 270 Electric Two Position, Size 100 Electric Two Position, Size 200 Electric Two Position, Size 300 Electric Two Position, Size 400 Electric Two Position, Size 675 Electric Two Position, Size 1000 Electric Two Position, Size 1500 Electric Two Position, Size 2000 Electric Two Position, Size 3800 Electric Two Position, Size 5000 Electric Modulating, Size 100 Electric Modulating, Size 200 Electric Modulating, Size 300 Electric Modulating, Size 400 Electric Modulating, Size 675 Electric Modulating, Size 1000 Electric Modulating, Size 1500 Electric Modulating, Size 2000 Electric Modulating, Size 3800 Electric Modulating, Size 5000	
Arrangement								A C E G I K L M			2-Way, Normally Open 2-Way, Normally Closed 3-Way, Common/NO/NC 3-Way, Common/NC/NO 3-Way, NO/Common/NC 3-Way, NC/Common/NO 3-Way, NO/NC/Common 3-Way, NC/NO/Common <div><div>Example: 3-way top view (Common/NO/NC)</div><div>CommonNO</div></div>
Options									SV EX		Factory Mounted Solenoid Valve (Pneumatic Only) Explosion-Proof Electric Actuator (Electric Only)

For Electric U and V actuators middle term, V_1, is the power supply required. Model Code 1 is for 120 VAC, 2 is for 220 VAC, 3 is for 24 VAC and 4 is for 24 VDC. Example, U11, is 120 VAC two position. Consult factory for pricing.

For your convenience, sample model configurations are listed with the proper sized actuators. Models listed have cast iron body, 316 SS disc, and EPDM liner and o-rings. The 2-way models have a valve arrangement shown of normally closed, while the 3-way models have no valve arrangement code shown, please specify when ordering. All electric actuators shown are 115 VAC and NEMA 4. All pneumatic actuators are sized with an air supply pressure of 80 psi. Consult the factory for model number changes for electric actuator options of explosion-proof and other supply voltages.

2-Way, Lug Style, EPDM Liner

Size	Double Acting Pneumatic	Spring Return Pneumatic	Two Position Electric	Modulating Electric
	Model	Model	Model	Model
2"	ABFV202LTB331DA2C	ABFV202LTB331SR4C	ABFV202LTB331U12C	ABFV202LTB331V12C
2-1/2"	ABFV225LTB331DA2C	ABFV225LTB331SR4C	ABFV225LTB331U12C	ABFV225LTB331V12C
3"	ABFV203LTB331DA3C	ABFV203LTB331SR5C	ABFV203LTB331U13C	ABFV203LTB331V13C
4"	ABFV204LTB331DA3C	ABFV204LTB331SR6C	ABFV204LTB331U14C	ABFV204LTB331V14C
5"	ABFV205LTB331DA5C	ABFV205LTB331SR6C	ABFV205LTB331U16C	ABFV205LTB331V16C
6"	ABFV206LTB331DA5C	ABFV206LTB331SR8C	ABFV206LTB331U16C	ABFV206LTB331V16C
8"	ABFV208LTB331DA6C	ABFV208LTB331SR8C	ABFV208LTB331U17C	ABFV208LTB331V17C
10"	ABFV210LTB331DA8C	ABFV210LTB331SR9C	ABFV210LTB331U19C	ABFV210LTB331V19C
12"	ABFV212LTB331DAAC	ABFV212LTB331SRBC	ABFV212LTB331U19C	ABFV212LTB331V19C

Model Numbers shown are normally closed, change the model code at the end from "C" to "A" for normally open.

2-Way, Wafer Style, EPDM Liner

Size	Double Acting Pneumatic	Spring Return Pneumatic	Two Position Electric	Modulating Electric
	Model	Model	Model	Model
2"	ABFV202WFB331DA2C	ABFV202WFB331SR4C	ABFV202WFB331U12C	ABFV202WFB331V12C
2-1/2"	ABFV225WFB331DA2C	ABFV225WFB331SR4C	ABFV225WFB331U12C	ABFV225WFB331V12C
3"	ABFV203WFB331DA3C	ABFV203WFB331SR5C	ABFV203WFB331U13C	ABFV203WFB331V13C
4"	ABFV204WFB331DA3C	ABFV204WFB331SR6C	ABFV204WFB331U14C	ABFV204WFB331V14C
5"	ABFV205WFB331DA5C	ABFV205WFB331SR6C	ABFV205WFB331U16C	ABFV205WFB331V16C
6"	ABFV206WFB331DA5C	ABFV206WFB331SR8C	ABFV206WFB331U16C	ABFV206WFB331V16C
8"	ABFV208WFB331DA6C	ABFV208WFB331SR8C	ABFV208WFB331U17C	ABFV208WFB331V17C
10"	ABFV210WFB331DA8C	ABFV210WFB331SR9C	ABFV210WFB331U19C	ABFV210WFB331V19C
12"	ABFV212WFB331DAAC	ABFV212WFB331SRBC	ABFV212WFB331U19C	ABFV212WFB331V19C

Model Numbers shown are normally closed, change the model code at the end from "C" to "A" for normally open.

3-Way, Lug Style, EPDM Liner

Size	Double Acting Pneumatic	Spring Return Pneumatic	Two Position Electric	Modulating Electric
	Model*	Model*	Model*	Model*
2"	ABFV302LTB331DA3_	ABFV302LTB331SR5_	ABFV302LTB331U13_	ABFV302LTB331V13_
2-1/2"	ABFV325LTB331DA3_	ABFV325LTB331SR6_	ABFV325LTB331U14_	ABFV325LTB331V14_
3"	ABFV303LTB331DA4_	ABFV303LTB331SR6_	ABFV303LTB331U15_	ABFV303LTB331V15_
4"	ABFV304LTB331DA5_	ABFV304LTB331SR7_	ABFV304LTB331U16_	ABFV304LTB331V16_
5"	ABFV305LTB331DA6_	ABFV305LTB331SR9_	ABFV305LTB331U16_	ABFV305LTB331V16_
6"	ABFV306LTB331DA7_	ABFV306LTB331SR9_	ABFV306LTB331U17_	ABFV306LTB331V17_
8"	ABFV308LTB331DA9_	ABFV308LTB331SR9_	ABFV308LTB331U19_	ABFV308LTB331V19_
10"	ABFV310LTB331DAA_	ABFV310LTB331SRB_	ABFV310LTB331U19_	ABFV310LTB331V19_
12"	ABFV312LTB331DAB_	ABFV312LTB331SRC_	ABFV312LTB331U1A_	ABFV312LTB331V1A_

*Complete model includes Valve Arrangement - see Model Chart on previous page.

Options:

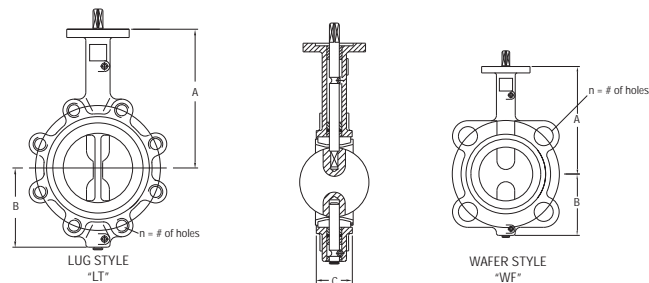
Explosion Proof Electric Actuators
-add "-EX" to model number

Optional Electric Actuator Supply Voltages
-Contact factory for model number change

Solenoid Valve - Add suffix -SV

Butterfly Valve

Low Cost, Lever Operated, Lug or Wafer Pattern, 225 psig



DIMENSIONS (in)

Size	A	B	C	n, WF	n, LT	Cv	Weight	Size	A	B	C	n, WF	n, LT	Cv	Weight
2"	6.34	3.15	1-3/4	4	4	135	5.5	6"	8.9	5.47	2-1/4	8	8	1579	17.2
2-1/2"	6.89	3.5	1-7/8	4	4	220	7.05	8"	10.24	6.89	2-1/2	8	8	3136	29.1
3"	7.13	3.74	1-7/8	4	4	302	7.93	10"	11.5	7.99	2-3/4	12	12	5340	42.33
4"	7.87	4.49	2-1/8	4	8	600	10.8	12"	13.27	9.53	3-1/8	12	12	8250	71.65
5"	8.39	5	2-1/4	8	8	1022	15.43								

Series BFV Butterfly Valves

- Phenolic backed cartridge seat design for extended service and ease of replacement. Can be used for vacuum service.
- Extended neck for insulation - no fabricated extensions required.
- Machined flats attach disc/stem - no pins.
- Valve features a retainer lip for dead end service.
- Triple seal reduces possibility of external leakage.
- Silicone free from the factory - no aftermarket cleaning required.

The most critical aspect of the Series BFV Butterfly Valves is the cartridge seat design, which alleviates installation problems associated with common "dove tail design" seats. Valve torque is lower and more consistent because the seat dynamics do not rely on being mated between two flanges. Precision machining of the disc and body allow the cartridge design to maintain a tighter disc to seat tolerance, providing a perfect low torque seal each and every time the valve is cycled. Seat to disc seal is independent of flange support and capable of full rated dead end service. Select from wafer or lug patterns with either a 10-position locking handle lever or manual gear operator. Standard valves provide bubble tight sealing to 225 psi (15.5 bar) and are designed to comply with MSS-SP-67 and API-609.

Cv VALUES

Size	DEGREE OPENING								FULL OPEN
	10°	20°	30°	40°	50°	60°	70°	80°	90°
2"	0.1	5	12	24	45	64	90	125	135
2-1/2"	0.2	8	20	37	65	98	144	204	220
3"	0.3	12	22	39	70	116	183	275	302
4"	0.5	17	36	78	139	230	364	546	600
5"	0.8	29	61	133	237	392	620	930	1022
6"	2	45	95	205	366	605	958	1437	1579
8"	3	89	188	408	727	1202	1903	2854	3136
10"	4	151	320	694	1237	2047	3240	4859	5340
12"	5	234	495	1072	1911	3162	5005	7505	8250

Cv is the number of U.S. GPM of 60°F water that will pass through the valve with a 1 PSI pressure drop.

SPECIFICATIONS

VALVE BODY

Service: Compatible liquids, gases, and steam.

Line Size: 2" to 12".

Body Style: 2-way, wafer or lug butterfly.

End Connections: Flange, to be used with flanges that are ANSI Class 125 (B16.1) and ANSI Class 150 (B16.5) dimensions.

Pressure Limit: 225 psi (15.5 bar) WOG.

Body Material: Ductile iron.

Disc: 316 SS.

Seat and O-ring: EPDM or PTFE.

Stem: 410 SS.

Temperature Limits: Disc: EPDM: -50 to 250°F (-46 to 121°C). PTFE: 0 to 300°F (-18 to 149°C).

Bearings: Nylatron.

Flow Rate: See Cv chart.

Operator: 2 to 6": 10-position locking hand lever. 8 to 12": manual gear.

Wetted Materials:

APPLICATIONS

- Perfect for on-off or throttling service
- Ideal for shut-off of water in chillers, cooling towers, and thermal storage systems
- Air dampers

OPERATING TORQUE VALUES (INCH LB)

EPDM Seats		Size (inches)									
Service Pressure	2	2-1/2	3	4	5	6	8	10	12		
50 psi	86	126	179	295	540	750	1440	2466	3510		
100 psi	108	144	195	310	610	780	1490	2910	4100		
150 psi	126	150	210	335	699	847	1549	3360	5560		
200 psi	150	198	297	400	725	940	1800	3890	7558		

PTFE Seats		Size (inches)									
Service Pressure	2	2-1/2	3	4	5	6	8	10	12		
50 psi	125	130	195	390	650	890	1690	3699	5265		
100 psi	130	145	210	430	690	940	1710	4365	6150		
150 psi	142	160	248	443	720	974	1770	5040	8340		
200 psi	180	220	340	490	795	1020	1890	5835	11367		

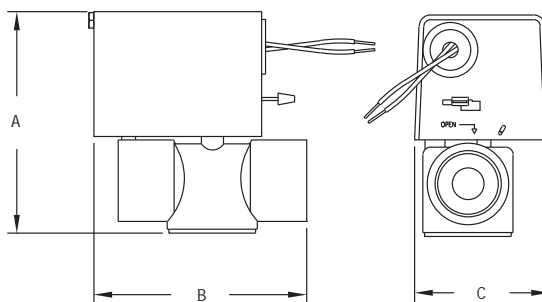
Size	Liner	Model	Size	Liner	Model
2"	EPDM	BFV202WFB311HL0	5"	EPDM	BFV205LTB311HL0
	PTFE	BFV202WFB341HL0		PTFE	BFV205LTB341HL0
	EPDM	BFV202LTB311HL0		EPDM	BFV206WFB311HL0
	PTFE	BFV202LTB341HL0		PTFE	BFV206WFB341HL0
2-1/2"	EPDM	BFV225WFB311HL0	6"	EPDM	BFV206LTB311HL0
	PTFE	BFV225WFB341HL0		PTFE	BFV206LTB341HL0
	EPDM	BFV225LTB311HL0		EPDM	BFV208WFB312MG0
	PTFE	BFV225LTB341HL0		PTFE	BFV208WFB342MG0
3"	EPDM	BFV203WFB311HL0	8"	EPDM	BFV208LTB312MG0
	PTFE	BFV203WFB341HL0		PTFE	BFV208LTB342MG0
	EPDM	BFV203LTB311HL0		EPDM	BFV210WFB312MG0
	PTFE	BFV203LTB341HL0		PTFE	BFV210WFB342MG0
4"	EPDM	BFV204WFB311HL0	10"	EPDM	BFV210LTB312MG0
	PTFE	BFV204WFB341HL0		PTFE	BFV210LTB342MG0
	EPDM	BFV204LTB311HL0		EPDM	BFV212WFB312MG0
	PTFE	BFV204LTB341HL0		PTFE	BFV212WFB342MG0
5"	EPDM	BFV205WFB311HL0	12"	EPDM	BFV212LTB312MG0
	PTFE	BFV205WFB341HL0		PTFE	BFV212LTB342MG0

BFV202WFB311HL0 WF=Wafer Pattern LT=Lug Pattern

Series
ZV1

Two-Way Zone Valve

Economical, Manual Override



Size	A [in (mm)]	C [in (mm)]	B [in (mm)]
1/2"	4.15 (105.5)	2.48 (63)	3.54 (90)
3/4"	4.15 (105.5)	2.48 (63)	3.66 (93)
1"	4.31 (109.5)	2.48 (63)	3.74 (95)

ZV1 Series Zone Valves are ideal for flow control in hot and cold water HVAC systems. Zone valves are typically used in conjunction with a thermostat to control room temperature. The ZV1 is electrically driven to open and spring to close. Units are available in 1/2", 3/4", and 1" sizes with 24 or 120 VAC power supply. Easy to install these units are direct replacements for competitor units. Manual override lever is easily accessible externally. Consult factory for 220 VAC power supply, optional auxiliary switches, and BSP or sweat connections.

Model	Cv	Size	Supply Voltage
ZV1022	3.78	1/2"	120 VAC
ZV1024	3.78	1/2"	24 VAC
ZV1032	3.78	3/4"	120 VAC
ZV1034	3.78	3/4"	24 VAC
ZV1042	8.02	1"	120 VAC
ZV1044	8.02	1"	24 VAC

SPECIFICATIONS

Service: Compatible fluids.

Body: 2-way, normally closed.

Line Size: 1/2" to 1".

End Connections: Female NPT (optional BSP, sweat connections).

Pressure Limits: Maximum: 300 psi (20.7 bar); Close-off: 1/2" to 3/4": 22 psi (1.5 bar), 1": 14.5 psi (1 bar).

Temperature Limits: Ambient: 32 to 104°F (0 to 40°C); Process: 32 to 201°F (0 to 94°C).

Wetted Materials: Brass, stainless steel, NBR.

Flow Characteristic: Quick opening.

Power Requirements: 120 VAC or 24 VAC, ±10%, 50/60 Hz. (Optional 220 VAC).

Power Consumption: 6.5 W.

Input: On/off.

Electrical Connection: 22 AWG, 5' (127 mm) long.

Cycle Time: Opening time: 11 seconds; Closing time: 5 seconds.

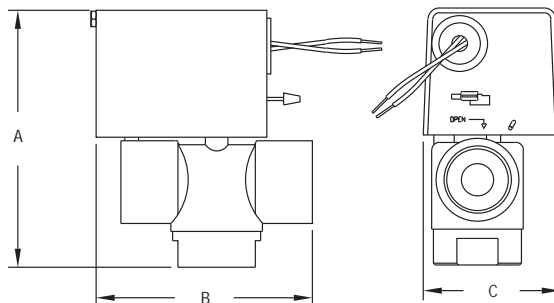
Enclosure Rating: General purpose.

Housing Material: Aluminum.

Series
3ZV1

Three-Way Zone Valve

Economical, Manual Override



Size	A [in (mm)]	C [in (mm)]	B [in (mm)]
1/2"	4.57 (116)	2.48 (63)	3.54 (90)
3/4"	4.69 (119)	2.48 (63)	3.66 (93)
1"	4.92 (125)	2.48 (63)	3.74 (95)

3ZV1 Series Zone Valves are ideal for flow control in hot and cold water HVAC systems. The 3ZV1 is electrically driven to open and spring to close. Units are available in 1/2", 3/4", and 1" sizes with 24 or 120 VAC power supply. Easy to install these units are direct replacements for competitor units. Manual override lever is easily accessible externally. Consult factory for 220 VAC power supply, optional auxiliary switches, and BSP or sweat connections.

Model	Cv	Size	Supply Voltage	Close-off Pressure psi (bar)
3ZV1022	3.78	1/2"	120 VAC	22 (1.5)
3ZV1024	3.78	1/2"	24 VAC	22 (1.5)
3ZV1032	3.78	3/4"	120 VAC	14.5 (1.0)
3ZV1034	3.78	3/4"	24 VAC	14.5 (1.0)
3ZV1042	8.02	1"	120 VAC	10 (.70)
3ZV1044	8.02	1"	24 VAC	10 (.70)

SPECIFICATIONS

Service: Compatible fluids.

Body: 3-way.

Line Size: 1/2" to 1".

End Connections: Female NPT (optional BSP, sweat connections).

Pressure Limits: Maximum: 300 psi (20.7 bar); Close-off: see model chart.

Temperature Limits: Ambient: 32 to 104°F (0 to 40°C); Process: 32 to 201°F (0 to 94°C).

Wetted Materials: Brass, stainless steel, NBR.

Flow Characteristic: Quick opening.

Power Requirements: 120 VAC or 24 VAC, ±10%, 50/60 Hz. (optional 220 VAC).

Power Consumption: 6.5 W.

Input: On/off.

Electrical Connection: 22 AWG, 5' (127 mm) long.

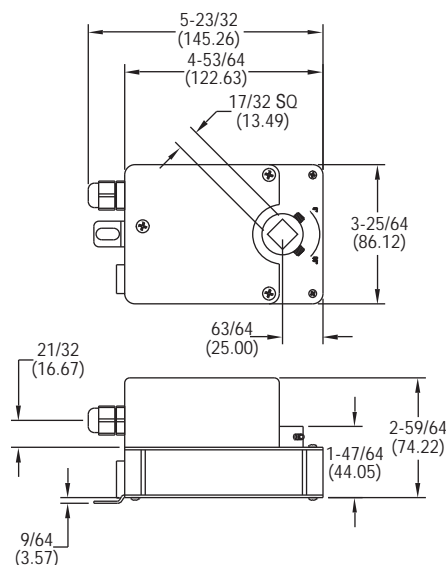
Cycle Time: Opening time: 11 seconds; Closing time: 5 seconds.

Enclosure Rating: General purpose.

Housing Material: Aluminum.

Non-Spring Return Direct Coupled Actuators

Low Cost, Two-Position or Modulating



DDA and DDC Series Direct Coupled Actuators are non-spring return actuators that are perfect for positioning of dampers and valves in HVAC systems. DDA actuators are designed to accept floating control signals and come in a variety of power supplies. DDC actuators are designed to accept 4 to 20 mA or 0 to 10 VDC modulating control signals and are 24 VAC powered. DDC units feature a 0 to 10 VDC feedback signal of damper position. Actuators produce 17 to 70 in-lb (2 to 8 Nm) of torque. Contact factory for optional internal auxiliary switch on DDA.

FEATURES

- Direct mount.
- Actuator travel indicator.
- Overload protection.
- Manual override.
- Floating control signal on DDA.
- Modulating 4 to 20 mA or 0 to 10 VDC control signal on DDC.
- Position feedback signal on DDC.
- 60,000 cycles nominal.

Model Number	Size/Torque	Supply Voltage	Input
DDA11	17 in-lb [2 Nm]	110 VAC	Floating
DDA13	17 in-lb [2 Nm]	24 VAC	Floating
DDA21	35 in-lb [4 Nm]	110 VAC	Floating
DDA23	35 in-lb [4 Nm]	24 VAC	Floating
DDA31	53 in-lb [6 Nm]	110 VAC	Floating
DDA33	53 in-lb [6 Nm]	24 VAC	Floating
DDA41	70 in-lb [8 Nm]	110 VAC	Floating
DDA43	70 in-lb [8 Nm]	24 VAC	Floating
DDC13	17 in-lb [2 Nm]	24 VAC	Modulating
DDC23	35 in-lb [4 Nm]	24 VAC	Modulating
DDC33	53 in-lb [6 Nm]	24 VAC	Modulating
DDC43	70 in-lb [8 Nm]	24 VAC	Modulating

SPECIFICATIONS

Power Requirements: DDA: 110 VAC, 24 VAC, $\pm 10\%$, 50/60 Hz, single phase. Optional 230 VAC; DDC: 24 VAC, $\pm 10\%$, 50/60 Hz, single phase.

Power Consumption: DDA: 110 VAC models: 5 VA, 230 VAC models: 5 VA, 24 VAC models: 3 VA; DDC: 4 VA.

Control Input: DDA: Two-position, floating;
DDC: 4-20 mA or 0-10 VDC.

Overload Protection: Magnetic clutch.

Angle of Rotation: 95° (mechanically adjustable).

Fits Shaft Diameter: 0.4" (10 mm) or 0.5" (13 mm).

Position Indication: Visual indicator.

Direction of Rotation: CW/CCW.

Running Time: 17 in-lb, 35 in-lb, 53 in-lb: 110 sec.;
70 in-lb: 160 sec.

Electrical Connection: Terminal block, 18 AWG.

Manual Override: Push button.

Temperature Limit: -22 to 122°F (-30 to 50°C).

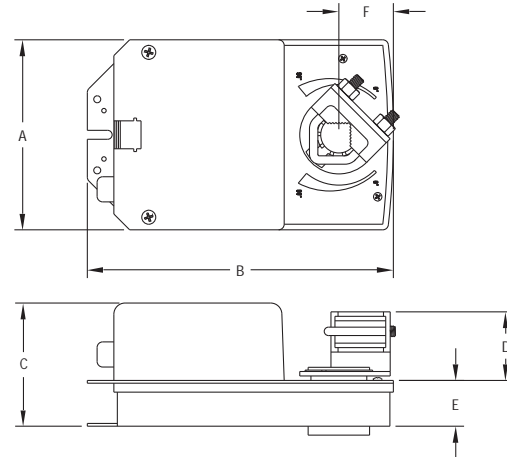
Sound: <45 dB.

Life Expectancy: 60000 full cycles.

Housing: NEMA 2 (IP40).

Standard Accessories: (2) imitative baffles, (2) baffle setscrews, (1) actuator body setscrew, and (1) aluminum gasket.

Weight: 1.72 lb (0.78 kg).



Size	A	B	C	D	E	F
88 in-lb (10 Nm) & 132 in-lb (15 Nm)	4-17/64 (108.35)	6-55/64 (174.23)	2-49/64 (70.25)	1-35/32 (39.19)	1-1/32 (26.19)	1-15/64 (31.35)
177 in-lb (20 Nm) & 265 in-lb (30 Nm)	4-57/64 (124.22)	7-23/32 (196.06)	2-23/32 (69.06)			1-25/64 (35.32)

DDB and DDD Series Direct Coupled Actuators are non-spring return actuators that are perfect for positioning of dampers and valves in HVAC systems. DDB actuators are designed to accept floating control signals and come in a variety of power supplies. DDD Actuators are designed to accept 4 to 20 mA or 0 to 10 VDC modulating control signals and are 24 VAC powered. DDD units feature a 0 to 10 VDC feedback signal of damper position. Actuators produce 88 to 265 in-lb (10 to 30 Nm) of torque. Contact factory for optional internal auxiliary switches on DDB.

FEATURES

- Direct mount.
- Actuator travel indicator.
- Overload protection.
- Manual override.
- Floating control signal on DDB.
- Modulating 4 to 20 mA or 0 to 10 VDC control signal on DDD.
- Position feedback signal on DDD.
- 60,000 cycles nominal.

SPECIFICATIONS

Power Requirements: DDB: 110 VAC, 24 VAC, $\pm 10\%$, 50/60 Hz, single phase. Optional 230 VAC. DDD: 24 VAC, $\pm 10\%$, 50/60 Hz, single phase.

Power Consumption: DDB: 5.5 VA. DDD: 7.5 VA.

Control Input: DDB: Two-position or floating.

DDD: 4-20 mA or 0-10 VDC.

Overload Protection: Magnetic clutch.

Angle of Rotation: 95° (mechanically adjustable).

Accuracy: DDD: $\pm 5\%$.

Fits Shaft Diameter: 0.4" - 0.75" (10-20 mm).

Position Indication: Visual indicator.

Direction of Rotation: CW/CCW.

Running Time: 88 in-lb: 66 sec., 132 in-lb: 90 sec., 177 in-lb: 110 sec.; 265 in-lb: 143 sec.

Electrical Connection: Terminal block, 18 AWG.

Manual Override: Push button.

Temperature Limit: -22 to 122°F (-30 to 50°C).

Sound: <45 dB.

Life Expectancy: 60000 full cycles.

Housing: NEMA 2 (IP42).

Standard Accessories: (2) imitative baffles, (2) baffle setscrews, (1) setting bracket.

Weight: DDB: 2.87 lb (1.3 kg) 88, 132 in-lb models; 3.68 lb (1.67 kg) 177, 265 in-lb models; DDD: 2.98 lb (1.35 kg) 88, 132 in-lb models; 3.79 lb (1.72 kg) 177, 265 in-lb models.

Agency Approvals: CE.

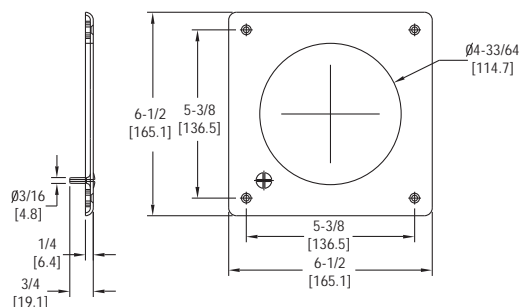
Model Number	Size/Torque	Supply Voltage	Input
DDB51	88 in-lb [10 Nm]	110 VAC	Floating
DDB53	88 in-lb [10 Nm]	24 VAC	Floating
DDB61	132 in-lb [15 Nm]	110 VAC	Floating
DDB63	132 in-lb [15 Nm]	24 VAC	Floating
DDB71	177 in-lb [20 Nm]	110 VAC	Floating
DDB73	177 in-lb [20 Nm]	24 VAC	Floating
DDB81	265 in-lb [30 Nm]	110 VAC	Floating
DDB83	265 in-lb [30 Nm]	24 VAC	Floating
DDD53	88 in-lb [10 Nm]	24 VAC	Modulating
DDD63	132 in-lb [15 Nm]	24 VAC	Modulating
DDD73	177 in-lb [20 Nm]	24 VAC	Modulating
DDD83	265 in-lb [30 Nm]	24 VAC	Modulating

Model
A-464

Flush Mount Kit for Magnehelic® Gages

Ideal for Clean Rooms & Control Panels

Pressure
Reference
Port



The A-464 Mounting Kit provides a flush mounting solution for Magnehelic® gage installations for applications such as clean rooms and mechanical equipment rooms. The A-464 can also be used as an alternative means to flush mount Magnehelic® gages on control panel enclosures. The space pressure reference port eliminates the need to drill separate holes and run tubing long distances. Utilizing the A-464 for Magnehelic® gage installations reduces installation time while also producing an aesthetically pleasing result.



A-464 Back View
Shown with A-465

Advantages and Specifications of the A-464 Kit

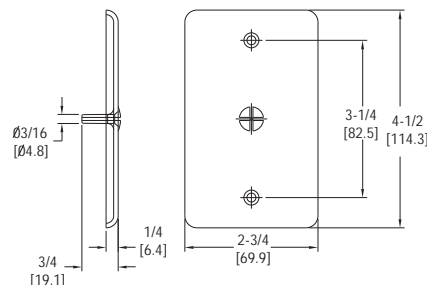
- Provides an innovative solution for flush mounting Magnehelic® gages.
- Space pressure reference integral to mounting plate.
- Mounting applications include: Sheetrock walls, control panel enclosures and air handling equipment.
- Eliminates the need for special hole saws.
- Creates a professional look.
- Saves installation time and money.
- Outside dimensions: 6-1/2 x 6-1/2 x 1/4 inches (16.5 x 16.5 x 0.6 cm).
- Material: White ABS plastic.

Model A-464

Model
A-465

Flush Mount Space Pressure Sensor

Ideal for Clean Rooms



The A-465 Space Pressure Sensor Kit provides a clean solution for sensing space pressure. Typical applications include: sensing the pressure in clean rooms, laboratories and building lobbies. The kink resistant tubing provided in the kit is connected to the tubing running to a pressure transducer, Magnehelic® Gage, VAV unit or any other types of pressure sensing devices. The sensor can be mounted on sheetrock walls, single gang electrical boxes or on ceiling tiles. The block free pressure reference opening along with the kink resistant tubing ensure accurate readings at all times.

Advantages and Specifications of the A-465 Kit

- The professional way to sense space pressure.
- Mounting options include: Sheetrock walls, ceiling tiles or single gang electrical boxes.
- Non block reference opening prevents plugging.
- Saves time and money.
- Outside dimensions: 2-3/4 x 4-1/2 x 1/4 inches (6.9 x 11.4 x 0.6 cm).
- Attractive design blends in with building decor.
- Materials: White ABS plastic.

Model A-465

Static Pressure Accessories



A-417



A-418



A-419



A-420



A-421



Surge Damper

A-417, Static Pressure Pickup. For use in clean rooms, 100 micron filter picks up static pressure. Stainless steel wall plate fits 2" x 4" electrical box. Sealed with foam gasket, screws included. Barbed brass fitting holds 1/8" to 5/32" I.D. tubing.

A-418, Static Pressure Pickup. Room mount with Delta Style plastic enclosure fits 2" x 4" electrical box. Fine mesh screen hides static pressure pickup port. Clean connection to 1/8" to 5/32" I.D. tubing and pressure sensor. Sealed with foam gasket, screws included.

A-419, Static Pressure Pickup Ceiling Mount. Plate rests on top of standard 3/4" thick ceiling tile while 100 micron filter faces down through 5/8" hole in tile. Filter is barely noticeable in room being monitored. Screws included for optional mounting to junction box. Barbed brass fitting holds 1/8" to 5/32" I.D. tubing.

A-420, Static Pressure Pickup for Roof or Outside Wall Mount. Port especially reduces effects of wind gusts to keep pressure readings stable when plate is parallel to ground. NEMA 4X (IP66) rated structure withstands harsh environmental elements. Structure is 3-5/8" across and 2-1/2" deep. EMT Conduit fitting is 1/2". Pressure connection is brass barbed fitting for 1/4" tubing.



A-420 Typical outdoor mounting



A-421, Static Pressure Tip measures duct static air pressure. Assembly includes 6" probe, silicon rubber hose, and screws. Built-in surge damper ensures stable readings on pressure sensor. Pressure spike reducer can be added to end of tube to further smooth over pressure fluctuations.

Static Pressure Sensors



These sensors are for use with manometers, Magnehelic® gages, pressure switches and other controllers to pick up or sense static pressure drop across air filters and cooling coils, blower input and discharge pressures, etc. The angled tips shown have 4" insertion depth. Each has four radially drilled .040" sensing holes. All except Model A-303 mount in 3/8" hole in duct. For portable use, a magnet holds No. A-303 in place. No. A-305 is used where a very low actuation or sensing point is required on a pressure switch or gage or where response time is critical. No. A-307 and A-308 are suitable for use in low velocity systems or where the need for accuracy is less critical.

A-301, Static Pressure Tip, for 1/4" metal tubing connection.

A-301-A, Static Pressure Tip, same as A-301 with 6" insertion depth.

A-301-B, Static Pressure Tip, same as A-301 with 8" insertion depth.

A-301-C, Static Pressure Tip, same as A-301 with 12" insertion depth.

A-301-SS, same as A-301 in Stainless Steel.

A-302, Static Pressure Tip, for 3/16" and 1/8" I.D. plastic or rubber tubing.

A-302-A, Static Pressure Tip, same as A-302 with 6" insertion depth.

A-303, Portable Static Pressure Tip, for 3/16" I.D. rubber or plastic tubing with 4" insertion.

A-304, Duct Connector.

A-305, Static Pressure Tip, low resistance application, furnished with two (2) hex jam nuts and two (2) mounting washers for duct mounting and with 1/8" NPT pipe thread for pressure connection.

A-305-SS, same as A-305 in Stainless Steel.

A-306, Outdoor static pressure sensor. Provides average outdoor pressure signal for reference in building pressurization applications. Includes sensor, 50 ft. vinyl tubing, mounting bracket and hardware.

A-307, Static Pressure Fitting, for 1/4" metal tubing connection.

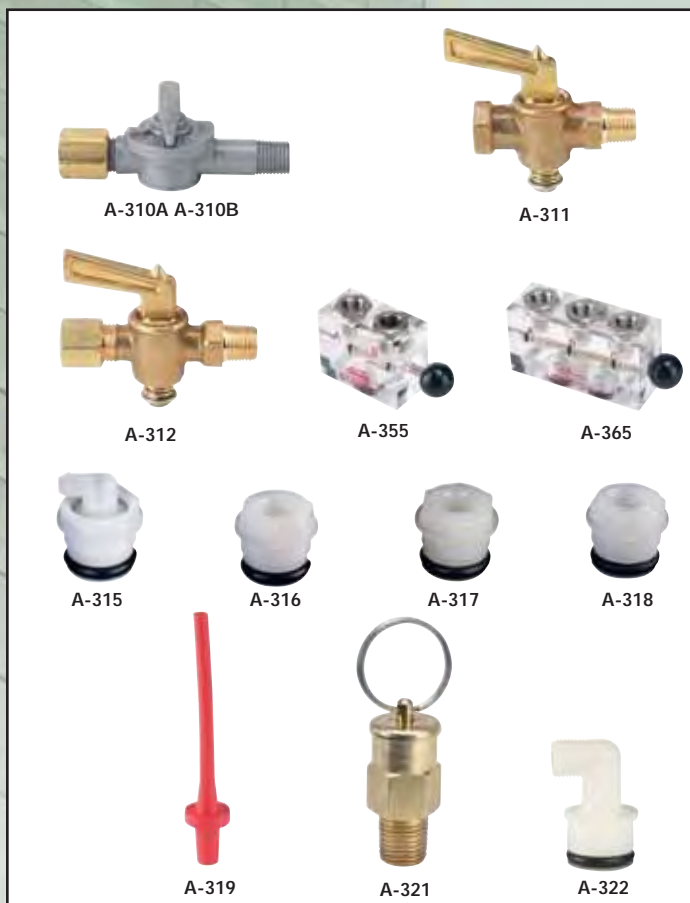
A-307-SS, as above in Stainless Steel.

A-308, Static Pressure Fitting, for 3/16" and 1/8" I.D. plastic or rubber tubing.

A-345, Flange for mounting A-301, A-302, A-307, A-308 or 1/8" dia. Pitot Tubes with compression fitting when interior of duct is not accessible. Aluminum, with gasket and sheet metal screws.

A-414, 316 SS Clean Room Pressure Sensor.

Valves – Connectors



Instrument valves for permanent installation. They mount in part A-316, A-317, type C manometer connections or Magnehelic® gage and connect to metal tubing or 1/8" pipe.

A-310A, 3-Way Vent Valve, plastic, 1/8" NPT to 1/4" metal tubing.

Positions are: (1) Line: Gage connected to pressure source. (2) Off: Both gage and connection to pressure source closed. (3) Vent: Gage vented to atmosphere and connection to pressure source closed. 80 PSI rating. Replaces former model A310 (brass).

A-310B, same as A-310A but with 10 psi rating.

A-311, Shut Off Valve, brass, 1/8" NPT to 1/8" NPT.

A-312, Shut Off Valve, brass, 1/8" NPT to 1/4" metal tubing.

A-355, Porting Valve, acrylic plastic, 1/8" NPT inserts. Used for convenient indication of pressure at two points with a single gage.

A-365, Dual Porting Valve, acrylic plastic, 1/8" NPT fittings. For monitoring three pressures, two at a time, with one gage.

Gage Connectors for Manometers. Molded nylon construction, threaded .786 x 27 N.S., with O ring seal.

A-315, Gage connector, Shut off type, for 3/16" rubber tubing.

A-316, Gage connector, bushing, 1/8" pipe thread opening.

A-317, Gage connector, 1/8" pipe thread opening, less O.D. thd., for slip fit in 3/4" dia. opening in 250 series A.F. gages.

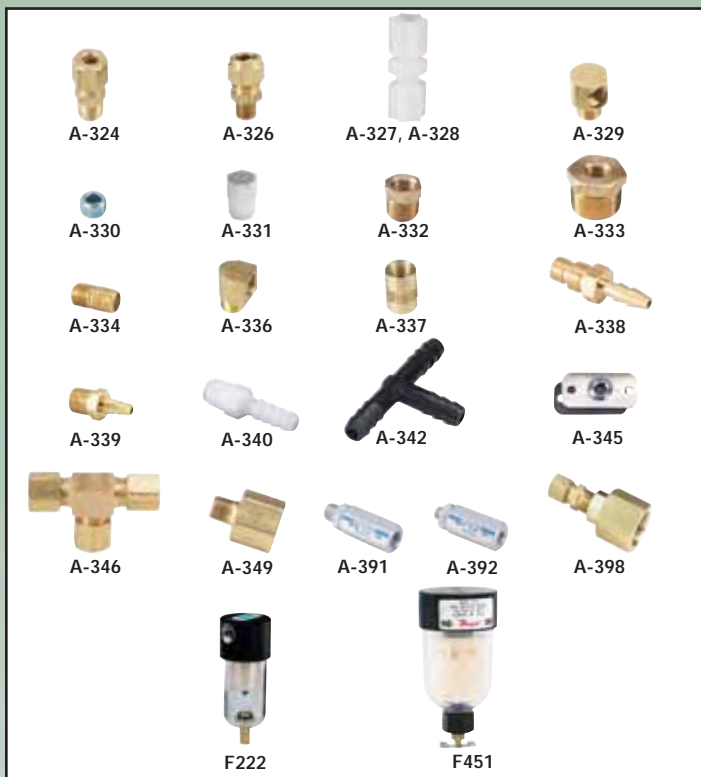
A-318, Gage connector 1/4" pipe thread opening.

A-319, Flexible Red P.V.C. connector, 3/16" I.D. Rubber Tubing to 1/4" I.D. Plastic Tube for 1221, 1222 and 1227 Manometers.

A-321, Brass Safety Relief Valve Protects Magnehelic® or Photohelic® Gage against over pressure due to regulator failure etc. Opens at 10 psi. Mounts in tee fitting in sensing line or in unused gage port with addition of A-349 reducer. 1/4" male NPT (Use two for D.P. application).

A-322, Gage connector for 1/4" tubing. Slip fits in 3/4" opening in 250 series A.F. gages (Compression nut and ferrule not included).

Fittings – Filters



- A-170**, Stainless Steel Pigtail Siphon.
A-323, Elbow Compression Fitting, brass 1/8" NPT to 1/4" metal tubing.
A-324, Compression Fitting, brass 1/8" NPT to 1/4" metal tubing.
A-326, Compression Fitting, brass 1/8" NPT to 3/8" tubing.
A-327, 5/16" Nylon Tube Union.
A-328, 1/4" Nylon Tube Union.
A-329, 1/8" NPT Close Coupled Street Ell, Brass.
A-330, 1/8" Pipe Plug, socket hex, plated steel.
A-331, 1/8" NPT Filter Vent Plug, nylon and sintered metal.
A-332, Bushing, brass, 1/8" to 1/4" NPT.
A-333, Bushing, brass, 1/8" to 1/2" NPT.
A-334, Close Nipple, brass, 1/8" NPT.
A-336, 90° Street L, brass, 1/8" NPT.
A-337, Coupling, brass, 1/8" NPT.
A-338, Servel Adapter, brass 3/8" and 5/16" N.F. Threads for gas appliances to 1/8" and 3/16" I.D. rubber or plastic tubing.
A-339, Adapter, brass, 1/8" NPT to 3/16" rubber and 1/8" I.D. plastic tubing.
A-340, Adapter, nylon, 1/8" NPT to 3/16" I.D. rubber or 1/4" plastic tubing.
A-342, "T" Assembly, plastic, for 3/16" I.D. rubber or 1/4" plastic tubing.
A-343, "T" Assembly, plastic, for 3/16" plastic tubing.
A-343-1, "T" Assembly, plastic, for 1/8" I.D. plastic tubing.
A-344, Terminal Tube, Brass 1/4" diameter tube, 8" length (not shown).
A-345, Flange, aluminum with gasket and sheet metal screws, 1/8" NPT.
A-346, "T" Compression Fitting, brass, 1/4" metal tubing.
A-349, Reducer, brass, 1/4" female NPT to 1/8" male NPT.
A-385, 1/2" Plastic Hole Plugs 20/bag.
A-386, 5/16" Metal Hole Plugs 20/bag.
A-391, Line Filter for Capsuhelic® gage, 1/4" female NPT x 1/4" male NPT.
A-392, Line Filter for Magnehelic® gage, 1/8" female NPT x 1/8" male NPT.
A-398, Probe Extension Adapter for series 640 air velocity transmitter. Brass, 1/2" female NPT x 5/16" compression.
F222, Liquid/Particle Filter for compressed air. Removes dirt, water and oil. 22 scfm maximum flow, 1/4" female NPT inlet and outlet.
1201-2, Replacement Filter Element for F222 filter, package of 3.
F451, Liquid/Particle Filter for compressed air. Removes dirt, water and oil. 45 scfm maximum flow, 1/4" female NPT inlet and outlet.
1201-3, Replacement Filter Element for F451 filter, package of 3.

Miscellaneous



- A-298**, Flat Aluminum Bracket for flush mounting Capsuhelic® gage, 603A, 605, and 3000MR.
A-299, Mounting Bracket, flush mount Magnehelic® gage in bracket. Bracket is then surface mounted. Steel with gray hammertone epoxy finish.
A-300, Flat Aluminum Bracket for flush mounting Magnehelic® gage.
A-351, Pinch Clamp to seal rubber tubing, as in a leakage test.
A-352, Magneclip, slip on magnetic holder for acrylic plastic gages. Per pair.
A-353, Magnetic Mounting. Flat style, secures to flowmeter, etc. with 6-32 machine screw and boots insert.
A-354, Magnetic Mounting, Edge style, secures edge of acrylic mano-meter with 10-32 machine screw and boots insert.
A-356, Gage plug with retainer loop, polyethylene plastic. For 1/4" I.D. tubing. Slip loop over tubing O.D. and insert plug for seal.
A-357, Thermometer and terminal tube holder. Stainless steel wire.
A-362, Stand-Hang bracket, aluminum, for Minihelic II gage.
A-363, Scale Clamp Bar for 1221 Manometer.
A-364, Magnet Assembly for 1222 Manometers, 2 required (3 required for 1222-36 and M-1000).
A-366, Manometer Cleaning Brush 1/4" O.D. x 2-1/8" Long. Attach to wire for use.
A-368, Surface mounting plate, aluminum, for Magnehelic® gage.
A-369, Stand-Hang Bracket, aluminum, for Magnehelic® gage.
A-370, Mounting Bracket, Flush mount Capsuhelic® gage or Series 600 Transmitter in bracket. Bracket is then surface mounted. Steel with gray hammertone epoxy finish.
A-371, Surface Mounting Bracket. Use with Photohelic® gage on horizontal or vertical surfaces. Also for Capsu-Photohelic® gages on Vertical only.
A-395, Surface Mounting Bracket for Series 602/603 transmitters and Series 4000 Capsuhelic® gages. Steel with gray hammertone epoxy finish.
A-397, Step Drill. Rugged Step Drill quickly provides true round holes in thin materials. Ideal for installation of Dwyer Pitot Tubes in sheet metal duct. No centerpunch needed to steel. Drills 3/16" through 1/2" holes in 1/16" increments. (Net Price, No Discount Allowed).
A-464, Flush Mount Kit for Magnehelics® gages.
A-465, Flush Mount Space Pressure Sensor.
A-497, Surface Mounting Bracket for Minihelic® II gage. Steel with satin black finish.

Pumps



A-350, Aspirator Bulb. Used as pressure source in calibration and leakage tests, to draw gas sample into CO₂ Indicator or smoke gage

A-394, Electric Air Pump. Provides convenient source of purge air in bubbler type liquid level systems. Dual diaphragm design allows operation of two systems simultaneously

A-396A, Calibration pump. Serves as pressure source to calibrate gages and transmitters or to set pressure switches. Use with manometer or other pressure standard. Includes volume adjuster enabling fine pressure control and bleed valve. Generates pressures from a fraction of an inch w.c. to 72 psig (5 bar). Includes barbed fitting, tee connector and three 36" lengths of vinyl tubing



Model A-700 Power Supply

Economical and reliable power supply is suitable for powering all Dwyer pressure, temperature or air velocity transmitters. Inexpensive, open-frame design allows convenient access to input/output solder terminals. Auxiliary inputs are selectable for operation from power sources found worldwide. Compact size eases enclosure installations: 4-7/8" H x 4" W x 1-5/8" D.

SPECIFICATIONS

AC Input: 100/120/220/230-240 VAC $\pm 10\%$, 47-63 Hz.

DC Output: 24-28 VDC regulated.

Maximum Current Output: 500 mA (derated to 450 mA @ 50 Hz. operation)

Operating Temperature: 32 to 122°F (0 to 50°C).

External Fuse Required: 0.5 Amp for 100-120 VAC, 0.25 Amp for 220-240 VAC.

Weight: 2 lb.

A-700 (0.5 Amp)

A-700-2 (2 Amp)

A-700-4 (4.8 Amp)

Thermometers, Psychrometer, Slide Charts



A-502, Dial Thermometer, 0 to 250°F and -20 to 120°C

A-503, Dial Thermometer, 200 to 1000° F and 100 to 540°C

A-510, Pocket Thermometer, mercury in glass, 5 1/2" length, 1/4" dia. stem. In metal carrying case. Range -30 to +120°F, 2° divisions

A-511, Refill only

A-512, Pocket Thermometer. Same as No. A-510 except range 0 to 220°F, 2° divisions

A-513, Refill only

A-525, Pocket type sling Psychrometer. Furnished complete with Psychrometric charts. Psychrometric slide chart, and carrying case

A-526, Replacement Thermometers for above Psychrometer, range 20° to 110°F.

A-527, Replacement Wick for Psychrometer

A 530, Psychrometric Slide Chart

A-531, Oil Burner Efficiency Slide Chart

A-532, Air Velocity Calculator Slide Chart

A-533, Metric English Pressure and Flow Conversion Slide Chart

A-534, International L.H.V. Combustion Efficiency Slide Chart

A-536, Metric Air Velocity Calculator Slide Chart



A-2018



A-2019



A-2020

Stainless Steel Fittings

Our stainless steel fittings and pipe nipples are made from 304 or 316 SS and are rated at 150 psi.

Series A-2019 Cap: Female Pipe Thread

Model No.	Female NPT
A-2019-1	1/8"
A-2019-2	1/4"
A-2019-3	3/8"
A-2019-4	1/2"
A-2019-5	3/4"
A-2019-6	1"

Series A-2018 316 SS Hose Barb: Male Pipe Thread

Model No.	Male NPT x HB
A-2018-1	1/4" x 1/4"
A-2018-2	1/4" x 3/8"

Series A-2020 Cross: Female Pipe Thread

Model No.	Female NPT
A-2020-1	1/8"
A-2020-2	1/4"
A-2020-3	3/8"
A-2020-4	1/2"
A-2020-5	3/4"
A-2020-6	1"



A-2021



A-2022



A-2023



A-2024

Series A-2021 Coupling: Female Pipe Thread

Model No.	Female NPT
A-2021-1	1/8" x 1/8"
A-2021-2	1/4" x 1/4"
A-2021-3	3/8" x 3/8"
A-2021-4	1/2" x 1/2"
A-2021-5	3/4" x 3/4"
A-2021-6	1" x 1"
A-2021-7	1-1/4" x 1-1/4"
A-2021-8	1-1/2" x 1-1/2"
A-2021-9	2" x 2"
A-2021-10	3" x 3"

Series A-2022 Elbow: Female Pipe Thread, 90°

Model No.	Female NPT
A-2022-1	1/8" x 1/8"
A-2022-2	1/4" x 1/4"
A-2022-3	3/8" x 3/8"
A-2022-4	1/2" x 1/2"
A-2022-5	3/4" x 3/4"
A-2022-6	1" x 1"
A-2022-7	1-1/4" x 1-1/4"
A-2022-8	1-1/2" x 1-1/2"
A-2022-9	2" x 2"
A-2022-10	3" x 3"

Series A-2023 Elbow: Female Pipe Thread, 45°

Model No.	Female NPT
A-2023-1	1/8" x 1/8"
A-2023-2	1/4" x 1/4"
A-2023-3	3/8" x 3/8"
A-2023-4	1/2" x 1/2"
A-2023-5	3/4" x 3/4"
A-2023-6	1" x 1"
A-2023-7	1-1/4" x 1-1/4"
A-2023-8	1-1/2" x 1-1/2"
A-2023-9	2" x 2"
A-2023-10	3" x 3"

Series A-2024 Reducer Bushings

Model No.	Male NPT x Female NPT
A-2024-1	1/4" x 1/8"
A-2024-2	3/8" x 1/4"
A-2024-3	1/2" x 1/4"
A-2024-4	1/2" x 3/8"
A-2024-5	3/4" x 1/4"
A-2024-6	3/4" x 1/2"
A-2024-7	1" x 1/2"
A-2024-8	1" x 3/4"
A-2024-9	1-1/4" x 3/4"
A-2024-10	1-1/4" x 1"
A-2024-11	1-1/2" x 3/4"
A-2024-12	1-1/2" x 1"
A-2024-13	1-1/2" x 1-1/4"
A-2024-14	2" x 1"
A-2024-15	2" x 1-1/4"
A-2024-16	2" x 1-1/2"
A-2024-17	3" x 2"



**Series A-2025 Street Elbow: Female
Pipe Thread by Male Pipe Thread**

Model No.	Female NPT x Male NPT
A-2025-1	1/8" x 1/8"
A-2025-2	1/4" x 1/4"
A-2025-3	3/8" x 3/8"
A-2025-4	1/2" x 1/2"
A-2025-5	3/4" x 3/4"
A-2025-6	1" x 1"
A-2025-7	1-1/4" x 1-1/4"
A-2025-8	1-1/2" x 1-1/2"
A-2025-9	2" x 2"
A-2025-10	3" x 3"

**Series A-2026 Tee: Female Pipe
Thread**

Model No.	Female NPT
A-2026-1	1/8"
A-2026-2	1/4"
A-2026-3	3/8"
A-2026-4	1/2"
A-2026-5	3/4"
A-2026-6	1"
A-2026-7	1-1/4"
A-2026-8	1-1/2"
A-2026-9	2"
A-2026-10	3"

**Series A-2027 Union: Female Pipe
Thread**

Model No.	Female NPT
A-2027-1	1/8"
A-2027-2	1/4"
A-2027-3	3/8"
A-2027-4	1/2"
A-2027-5	3/4"
A-2027-6	1"
A-2027-7	1-1/4"
A-2027-8	1-1/2"
A-2027-9	2"
A-2027-10	3"

**Series A-2028 Nipple: Male Pipe
Thread**

Model No.	Male NPT x Length	Model No.	Male NPT x Length
A-2028-1	1/8" x 3/4"	A-2028-15	3/4" x 2"
A-2028-2	1/8" x 1-1/2"	A-2028-16	1" x 1-1/2"
A-2028-3	1/8" x 2"	A-2028-17	1" x 2"
A-2028-4	1/4" x 7/8"	A-2028-18	1-1/4" x 1-5/8"
A-2028-5	1/4" x 1-1/2"	A-2028-19	1-1/4" x 2"
A-2028-6	1/4" x 2"	A-2028-20	1-1/2" x 1-3/4"
A-2028-7	3/8" x 1"	A-2028-21	1-1/2" x 2"
A-2028-8	3/8" x 1-1/2"	A-2028-22	2" x 2"
A-2028-9	3/8" x 2"	A-2028-23	2" x 2-1/2"
A-2028-10	1/2" x 1-1/8"	A-2028-24	3" x 2-5/8"
A-2028-11	1/2" x 1-1/2"	A-2028-25	3" x 3"
A-2028-12	1/2" x 2"	A-2028-26	4" x 2-7/8"
A-2028-13	3/4" x 1-3/8"	A-2028-27	4" x 4"
A-2028-14	3/4" x 1-1/2"		

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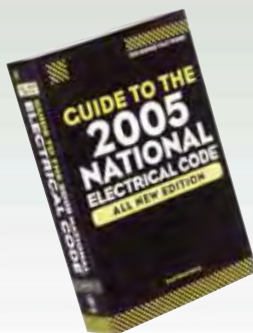
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Pressure Conversion Chart

in/H ₂ O	P.S.I.	in/Hg	mm/H ₂ O	mm/Hg	kg/cm ²	bar	mbar	Pa	kPa
.1	.0036	.0073	2.534	.1863	.0002	.0002	.2482	24.82	.0248
.2	.0072	.0146	5.067	.3726	.0005	.0005	.4964	49.64	.0496
.4	.0144	.0293	10.13	.7452	.0010	.0010	.9928	99.28	.0993
.6	.0216	.0440	15.20	1.118	.0015	.0015	1.489	148.9	.1489
.8	.0289	.0588	20.34	1.496	.0020	.0020	1.992	199.2	.1992
1.0	.0361	.0735	25.41	1.868	.0025	.0025	2.489	248.9	.2489
2	.0722	.1470	50.81	3.736	.0051	.0050	4.978	497.8	.4978
3	.1083	.2205	76.22	5.604	.0076	.0075	7.467	746.7	.7476
4	.1444	.2940	101.62	7.472	.0102	.0099	9.956	995.6	.9956
5	.1804	.3673	127.0	9.335	.0127	.0124	12.44	1244	1.244
6	.2165	.4408	152.4	11.203	.0152	.0149	14.93	1493	1.493
7	.2526	.5143	177.8	13.072	.0178	.0174	17.42	1742	1.742
8	.2887	.5878	203.2	14.940	.0203	.0199	19.90	1990	1.990
9	.3248	.6613	228.6	16.808	.0228	.0224	22.39	2239	2.239
10	.3609	.7348	254.0	18.676	.0254	.0249	24.88	2488	2.488
11	.3970	.8083	279.4	20.544	.0279	.0274	27.37	2737	2.737
12	.4331	.8818	304.8	22.412	.0304	.0299	29.86	2986	2.986
13	.4692	.9553	330.2	24.280	.0330	.0324	32.35	3235	3.235
14	.5053	1.029	355.6	26.148	.0355	.0348	34.84	3484	3.484
15	.5414	1.102	381.0	28.016	.0381	.0373	37.33	3733	3.733
16	.5774	1.176	406.4	29.879	.0406	.0398	39.81	3981	3.981
17	.6136	1.249	431.8	31.752	.0431	.0423	42.31	4231	4.231
18	.6496	1.322	457.2	33.616	.0457	.0448	44.79	4479	4.479
19	.6857	1.396	482.6	35.484	.0482	.0473	47.28	4728	4.728
20	.7218	1.470	508.0	37.352	.0507	.0498	49.77	4977	4.977
21	.7579	1.543	533.4	39.22	.0533	.0523	52.26	5226	5.226
22	.7940	1.616	558.8	41.09	.0558	.0547	54.74	5474	5.474
23	.8301	1.690	584.2	42.96	.0584	.0572	57.23	5723	5.723
24	.8662	1.764	609.6	44.82	.0609	.0597	59.72	5972	5.972
25	.9023	1.837	635.0	46.69	.0634	.0622	62.21	6221	6.221
26	.9384	1.910	660.4	48.56	.0660	.0647	64.70	6470	6.470
27	.9745	1.984	685.8	50.43	.0685	.0672	67.19	6719	6.719
28	1.010	2.056	710.8	52.26	.0710	.0696	69.64	6964	6.964
29	1.047	2.132	736.8	54.18	.0736	.0722	72.19	7219	7.219
30	1.083	2.205	762.2	56.04	.0761	.0747	74.67	7467	7.467
31	1.119	2.278	787.5	57.91	.0787	.0772	77.15	7715	7.715
32	1.155	2.352	812.8	59.77	.0812	.0796	79.63	7963	7.963
33	1.191	2.425	836.2	61.63	.0837	.0821	82.12	8212	8.212
34	1.227	2.498	863.5	63.49	.0862	.0846	84.60	8460	8.460
35	1.263	2.571	888.9	65.36	.0888	.0871	87.08	8708	8.708
36	1.299	2.645	914.2	67.22	.0913	.0896	89.56	8956	8.956
37	1.335	2.718	939.5	69.08	.0938	.0920	92.04	9204	9.204
38	1.371	2.791	964.9	70.95	.0964	.0945	94.53	9453	9.453
39	1.408	2.876	990.9	72.86	.0990	.0971	97.08	9708	9.708
40	1.444	2.940	1016	74.72	.1015	.0996	99.56	9956	9.956
41	1.480	3.013	1042	76.59	.1040	.1020	102.0	10204	10.20
42	1.516	3.086	1067	78.45	.1066	.1045	104.5	10452	10.45
43	1.552	3.160	1092	80.31	.1091	.1070	107.0	10701	10.70
44	1.588	3.233	1118	82.18	.1116	.1095	109.5	10949	10.95
45	1.624	3.306	1143	84.04	.1142	.1120	112.0	11197	11.20
46	1.660	3.378	1168	85.90	.1167	.1144	114.5	11445	11.44
47	1.696	3.453	1194	87.76	.1192	.1169	116.9	11694	11.69
48	1.732	3.526	1219	89.63	.1218	.1194	119.4	11942	11.94
49	1.768	3.600	1244	91.49	.1243	.1219	121.9	12190	12.19
50	1.804	3.673	1270	93.35	.1268	.1244	124.4	12438	12.44
51	1.841	3.748	1296	95.27	.1294	.1269	126.9	12693	12.69
52	1.877	3.822	1321	97.13	.1320	.1294	129.4	12941	12.94
53	1.913	3.895	1346	98.99	.1345	.1319	131.9	13190	13.19
54	1.949	3.968	1372	100.8	.1370	.1344	134.4	13438	13.44
55	1.985	4.041	1397	102.7	.1395	.1369	136.9	13686	13.69
56	2.021	4.115	1422	104.6	.1421	.1393	139.3	13934	13.93
57	2.057	4.188	1448	106.4	.1446	.1418	141.8	14182	14.18
58	2.093	4.261	1473	108.3	.1471	.1443	144.3	14431	14.43
59	2.129	4.335	1498	110.2	.1497	.1468	146.8	14679	14.68
60	2.165	4.408	1524	112.0	.1522	.1493	149.3	14927	14.93
61	2.202	4.483	1550	113.9	.1548	.1518	151.8	15182	15.18
62	2.238	4.556	1575	115.8	.1573	.1543	154.3	15430	15.43
63	2.274	4.630	1600	117.7	.1599	.1568	156.8	15679	15.68
64	2.310	4.703	1626	119.5	.1624	.1593	159.3	15927	15.93
65	2.346	4.776	1651	121.4	.1649	.1618	161.8	16175	16.18
66	2.382	4.850	1676	123.3	.1674	.1642	164.2	16423	16.42
67	2.418	4.923	1702	125.1	.1700	.1667	166.7	16672	16.67
68	2.454	4.996	1727	127.0	.1725	.1692	169.2	16920	16.92
69	2.490	5.070	1752	128.8	.1750	.1717	171.7	17168	17.17
70	2.526	5.143	1778	130.7	.1776	.1742	174.2	17416	17.42
71	2.562	5.216	1803	132.6	.1801	.1766	176.6	17664	17.66
72	2.598	5.290	1828	134.4	.1826	.1791	179.1	17912	17.91
73	2.635	5.365	1854	136.4	.1852	.1817	181.7	18168	18.17
74	2.671	5.438	1880	138.2	.1878	.1842	184.2	18416	18.42
75	2.707	5.511	1905	140.1	.1903	.1866	186.6	18664	18.66
76	2.743	5.585	1930	141.9	.1928	.1891	189.1	18912	18.91
77	2.779	5.658	1956	143.8	.1954	.1916	191.6	19160	19.16
78	2.815	5.731	1981	145.7	.1979	.1941	194.1	19409	19.41
79	2.851	5.805	2006	147.5	.2004	.1966	196.6	19657	19.66
80	2.887	5.878	2032	149.4	.2030	.1991	199.1	19905	19.90
81	2.923	5.951	2057	151.2	.2055	.2015	201.5	20153	20.15
82	2.959	6.024	2082	153.1	.2080	.2040	204.0	20402	20.40
83	2.996	6.100	2108	155.0	.2106	.2066	206.6	20657	20.66
84	3.032	6.173	2134	156.9	.2131	.2091	209.1	20905	20.90
85	3.068	6.246	2159	158.8	.2157	.2115	211.5	21153	21.15
86	3.104	6.320	2184	160.6	.2182	.2140	214.0	21401	21.40
87	3.140	6.393	2210	162.5	.2207	.2165	216.5	21650	21.65
88	3.176	6.466	2235	164.4	.2233	.2190	219.0	21898	21.90
89	3.212	6.540	2260	166.2	.2258	.2215	221.5	22146	22.15
90	3.248	6.613	2286	168.1	.2283	.2239	223.9	22394	22.39
91	3.284	6.686	2311	169.9	.2309	.2264	226.4	22642	22.64
92	3.320	6.760	2336	171.8	.2334	.2289	228.9	22890	22.89
93	3.356	6.833	2362	173.7	.2359	.2314	231.4	23139	23.14
94	3.392	6.906	2387	175.5	.2384	.2339	233.9	23387	23.39
95	3.429	6.981	2413	177.4	.2410	.2364	236.4	23642	23.64
96	3.465	7.055	2438	179.3	.2436	.2389	238.9	23890	23.89
97	3.501	7.128	2464	181.2	.2461	.2414	241.4	24138	24.14
98	3.537	7.201	2489	183.0	.2486	.2439	243.9	24387	24.39
99	3.573	7.275	2514	184.9	.2512	.2464	246.4	24635	24.64
100	3.609	7.348	2540	186.8	.2537	.2488	248.8	24883	24.88

P.S.I.	in/H ₂ O	in/Hg	mm/H ₂ O	mm/Hg	kg/cm ²	bar	mbar	Pa	kPa
1.0	27.71	2.036	703.1	51.75	.0703	.0689	68.95	6895	6.895
1.1	30.45	2.240	773.4	56.89	.0773	.0758	75.84	7584	7.584
1.2	33.22	2.443	843.7	62.06	.0844	.0827	82.74	8274	8.274
1.3	35.98	2.647	914.0	67.23	.0914	.0896	89.63	8963	8.963
1.4	38.75	2.850	984.3	72.40	.0984	.0965	96.52	9652	9.652
1.5	41.52	3.054	1055	77.57	.1055	.1034	103.4	10340	10.34
1.6	44.29	3.258	1125	82.74	.1125	.1103	110.3	11030	11.03
1.7	47.06	3.461	1195	87.92	.1195	.1172	117.2	11720	11.72
1.8	49.82	3.665	1266	93.09	.1266	.1241	124.1	12410	12.41
1.9	52.59	3.868	1336	98.26	.1336	.1310	131.0	13100	13.10
2.0	55.36	4.072	1406	103.4	.1406	.1379	137.9	13790	13.79
2.1	58.13	4.276	1476	108.6	.1476	.1448	144.8	14480	14.48
2.2	60.90	4.479	1547	113.8	.1547	.1517	151.7	15170	15.17
2.3	63.67	4.683	1617	118.9	.1617	.1586	158.6	15860	15.86
2.4	66.43	4.886	1687	124.1	.1687	.1655	165.5	16550	16.55
2.5	69.20	5.090	1758	129.3	.1758	.1724	172.4	17240	17.24
2.6	71.97	5.294	1828	134.5	.1828	.1793	179.3	17930	17.93
2.7	74.74	5.497	1898	139.6	.1898	.1862	186.2	18620	18.62
2.8	77.51	5.701	1969	144.8	.1968	.1930	193.0	19300	19.30
2.9	80.27	5.904	2039	150.0	.2039	.1999	199.9	19990	19.99
3.0	83.04	6.108	2109	155.1	.2109	.2068	206.8	20680	20.68
3.1	85.81	6.312	2180	160.3	.2180	.2137	213.7	21370	21.37
3.2	88.58	6.515	2250	165.5	.2250	.2206	220.6	22060	22.06
3.3	91.35	6.719	2320	170.7	.2320	.2275	227.5	22750	22.75
3.4	94.11	6.922	2390	175.8	.2390	.2344	234.4	23440	23.44
3.5	96.88	7.126	2461	181.0	.2461	.2413	241.3	24130	24.13
3.6	99.65	7.330	2531	186.2	.2531	.2482	248.2	24820	24.82
3.7	102.4	7.535	2601	191.3	.2601	.2551	255.1	25510	25.51
3.8	105.2	7.737	2672	196.5	.2672	.2620	262.0	26200	26.20
3.9	108.0	7.940	2742	201.7	.2742	.2689	268.9	26890	26.89
4.0	110.7	8.144	2812	206.9	.2812	.2758	275.8	27580	27.58
4.1	113.5	8.348	2883	212.0	.2883	.2827	282.7	28270	28.27
4.2	116.3	8.551	2953	217.2	.2953	.2896	289.6	28960	28.96
4.3	119.0	8.775	3023	222.4	.3023	.2965	296.5	29650	29.65
4.4	121.8	8.958	3094	227.5	.3094	.3034	303.4	30338	30.34
4.5	124.6	9.162	3164	232.7	.3164	.3103	310.3	31030	31.03
4.6	127.3	9.366	3234	237.9	.3234	.3172	317.2	31720	31.72
4.7	130.1	9.569	3304	243.1	.3304	.3240	324.0	32400	32.40
4.8	132.9	9.773	3375	248.2	.3375	.3310	331.0	33100	33.10
4.9	135.6	9.976	3445	253.4	.3445	.3378	337.8	33780	33.78
5.0	138.4	10.18	3515	258.6	.3515	.3447	344.7	34470	34.47
5.1	141.2	10.38	3586	263.7	.3586	.3516	351.6	35160	35.16
5.2	143.9	10.59	3656	268.9	.3656	.3585	358.5	35850	35.85
5.3	146.7	10.79	3726	274.1	.3726	.3654	365.4	36540	36.54
5.4	149.5	10.99	3797	279.3	.3797	.3723	372.3	37230	37.23
5.5	152.2	11.20	3876	284.4	.3867	.3792	379.2	37920	37.92
5.6	155.0	11.40	3973	289.6	.3937	.3861	386.1	38610	38.61
5.7	157.8	11.60	4008	294.8	.4007	.3930	393.0	39300	39.30
5.8	160.5	11.81	4078	299.9	.4078	.3999	399.9	39990	39.99
5.9	163.3	12.01	4148	305.1	.4148	.4068	406.8	40680	40.68
6.0	166.1	12.22	4218	310.3	.4218	.4137	413.7	41370	41.37
6.1	168.8	12.42	4289	315.5	.4289	.4206	420.6	42060	42.06
6.2	171.6	12.62	4359	320.6	.4359	.4275	427.5	42750	42.75
6.3	174.4	12.83	4429	325.8	.4429	.4344	434.4	43440	43.44
6.4	177.2	13.03	4500	331.0	.4500	.4413	441.3	44130	44.13
6.5	179.9	13.23	4570	336.1	.4570	.4482	448.2	44820	44.82
6.6	182.7	13.44	4640	341.3	.4640	.4550	455.0	45500	45.50
6.7	185.5	13.64	4711	346.5	.4710	.4619	461.9	46190	46.19
6.8	188.2	13.84	4781	351.7	.4781	.4688	468.8	46880	46.88
6.9	191.0	14.05	4851	356.8	.4851	.4757	475.7	47570	47.57
7.0	193.8	14.25	4922	362.0	.4921	.4826	482.6	48260	48.26
7.1	196.5	14.46	4992	367.2	.4992	.4895	489.5	48950	48.95
7.2	199.3	14.66	5062	372.3	.5062	.4964	496.4	49640	49.64
7.3	202.1	14.86	5132	377.5	.5132	.5033	503.3	50330	50.33
7.4	204.8	15.07	5203	382.7	.5203	.5102	510.2	51020	51.02
7.5	207.6	15.27	5273	387.9	.5273	.5171	517.1	51710	51.71
7.6	210.4	15.47	5343	393.0	.5343	.5240	524.0	52400	52.40
7.8	215.9	15.88	5484	403.4	.5484	.5378	537.8	53780	53.78
8.0	221.4	16.29	5625	413.7	.5625	.5516	551.6	55160	55.16
8.2	227.0	16.70	5765	424.1	.5765	.5654	565.4	56540	56.54
8.4	232.5	17.10	5906	434.4	.5906	.5792	579.2	57920	57.92
8.6	238.0	17.51	6047	444.7	.6046	.5929	592.9	59290	59.29
8.8	243.6	17.92	6187	455.1	.6187	.6067	606.7	60670	60.67
9.0	249.1	18.32	6328	465.4	.6328	.6205	620.5	62050	62.05
9.2	254.7	18.73	6468	475.8	.6468	.6343	634.3	63430	63.43
9.4	260.2	19.14	6609	486.1	.6609	.6481	648.1	64810	64.81
9.6	265.7	19.54	6750	496.5	.6749	.6619	661.9	66190	66.19
9.8	271.3	19.95	6890	506.8	.6890	.6757	675.7	67570	67.57
10.0	276.8	20.36	7031	517.1	.7031	.6895	689.5	68950	68.95
11.0	304.5	22.40	7734	568.9	.7734	.7584	758.4	75840	75.84
12.0	332.2	24.43	8437	620.6	.8437	.8274	827.4	82740	82.74
13.0	359.8	26.47	9140	672.3	.9140	.8963	896.3	89630	89.63
14.0	387.5	28.50	9843	724.0	.9843	.9652	965.2	96520	96.52
14.7	406.9	29.93	10340	760.2	1.033	1.014	1014.0	10140	101.4
15.0	415.2	30.54	10550	775.7	1.055	1.034	1034.0	10340	103.4
16.0	442.9	32.58	11250	827.4	1.125	1.103	1103.0	11030	110.3
17.0	470.6	34.61	11950	879.1	1.195	1.172	1172.0	11720	117.2
18.0	498.2	36.65	12650	930.9	1.265	1.241	1241.0	12410	124.1
19.0	525.9	36.68	13360	982.6	1.336	1.310	1310.0	13100	131.0
20.0	553.6	40.72	14060	1034	1.406	1.379	1379.0	13790	137.9
21.0	581.3	42.76	14770	1086	1.476	1.448	1448.0	14480	144.8
22.0	609.0	44.79	15470	1138	1.547	1.517	1517.0	15170	151.7
23.0	636.7	46.83	16170	1189	1.617	1.586	1586.0	15860	158.6
24.0	664.3	48.86	16870	1241	1.687	1.655	1655.0	16550	165.5
25.0	692.0	50.90	17580	1293	1.758	1.724	1724.0	17240	172.4



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