





Unmatched precision and quality



TEMPERATURE
SENSORS



PRESSURE
SENSORS



HUMIDITY
SENSORS



AIR QUALITY
SENSORS



TEST
INSTRUMENTS

BAPI IS CHANGING THE WAY YOU THINK ABOUT SENSORS



New in 2022

Building Automation Products B.V.






- Shipping from Dutch Logistics Center starting FEB2022



Air Quality



BAPI Air Quality Products

	Quantum	Quantum Prime	BAPI-Stat 4	Duct	Rough Service
					
VOC	yes	yes	no	yes	yes
CO2	yes	yes	no	yes	yes
CO	no	no	yes	yes	yes
NO2	no	no	no	yes	yes
Particulate	yes	no	no	yes	no
Refrigerants	no	no	no	no	yes

BAPI VOC Sensor Overview

	Quantum	Quantum Prime	Duct	Rough Service
TVOC	option	no	option	option
CO2e	option	option	option	option
Display	no	option	no	no
LEDs	option	option	option	option
60mm Base	option	option	n/a	n/a
Temperature	no	option	no	no
Humidity	no	option	no	no
Setpoint	no	option	n/a	n/a
Override	no	option	n/a	n/a

Quantum



Duct



Quantum Prime



Rough Service



VOC

- Volatile Organic Compounds (VOCs) consist of a wide variety of gases
- Some are toxic in very small concentrations (carbon monoxide) and some are only a health concern in very high concentrations (butyl acetate – decomposing apples).



What are VOCs and Where Do They Come From?

Table 1 Typical Indoor Contaminants (VOCs) and Their Source

Contamination Source	Emission Source	VOC
Human Being	Breath	Acetone, Ethanol, Isoprene, CO ₂
	Skin Respiration & Perspiration	Nonanal, Decanal, alpha-Pinene
	Flatulence	Methane, Hydrogen,
	Cosmetics	Limonene, Eucalyptol
Consumer Products	Household Supplies	Alcohols, Esters, Limonene
Office Equipment	Printers, Copiers, Computers	Benzene, Styrene, Phonole
Combustion	Engines, Appliances, Smoke	Unburnt Hydrocarbons, CO, CO ₂
Building Materials	Paints, Adhesives, Solvents, Carpets	Formaldehyde, Alkanes, Alcohols, Aldehydes, Ketones, Siloxanes
Furniture	Poly Vinyl Chloride (PVC)	Toluene, Xylene, Decane

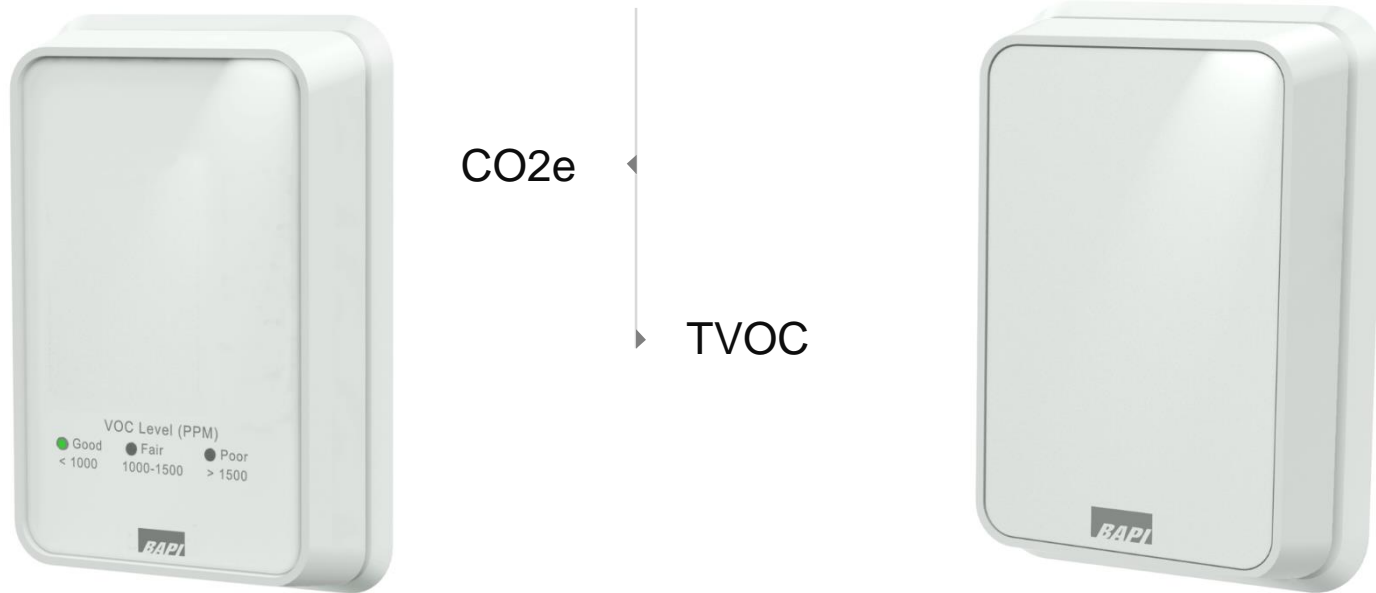
TVOC

- Total Volatile Organic Compounds (TVOC)
 - The sum of the concentration of all VOCs present in the space
 - A relative concentration because different VOCs react differently with the sensor
 - Usually measured in $\mu\text{g}/\text{m}^3$ or in ppb



Which VOC sensor fits your exact needs?

5
YEAR
WARRANTY



CO2e

- Carbon Dioxide Equivalent (CO2e)
 - A correlation of the VOCs produced by humans to an equivalent amount of CO2 produced by the same number of humans
 - A relative concentration based on the sensing element manufacturer's algorithm
 - Measured in ppm, the same as actual CO2



BAPI CO2 Sensor Overview

	Quantum	Quantum Prime	Duct	Rough Service
ABC Logic	option	option	option	option
Dual Channel	option	option	option	option
Display	no	option	no	no
LEDs	option	option	option	option
60mm Base	option	option	n/a	n/a
Temperature	no	option	no	no
Humidity	no	option	no	no
Setpoint	no	option	n/a	n/a
Override	no	option	n/a	n/a

Quantum



Duct



Quantum Prime



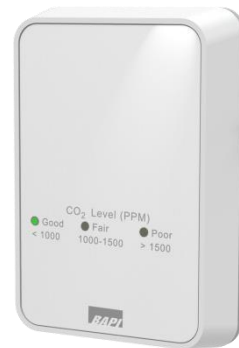
Rough Service



CO2Sensor

Our Award Winning “CO2 Sensor” with its unique Automatic Barometric Pressure and Temperature Compensation will work at any altitude, any weather conditions and is always accurate

- Wide Range Available from 2000 to 50,000ppm
- Field Selectable Output 0 to 5V or 0 to 10V
- Dual Channel: 3 Point Calibration Process
- LED Indication as Standard on All Units
- Wide Range of Sensors Available
- Operating Range 0 to 50°C and 0 to 95% RH

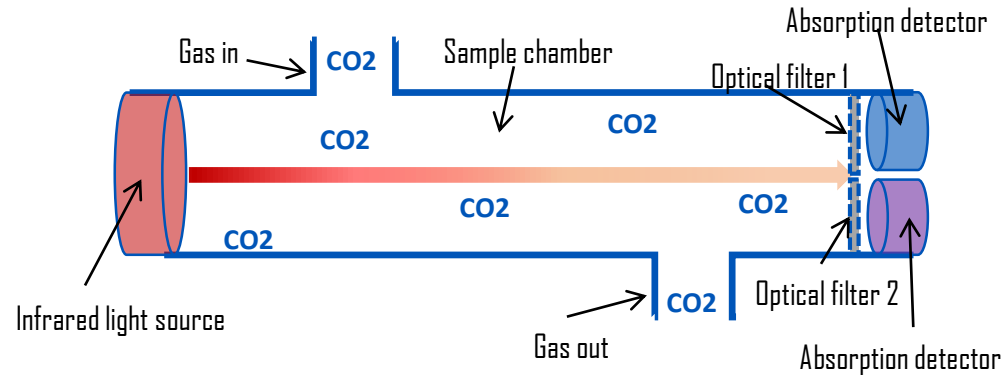
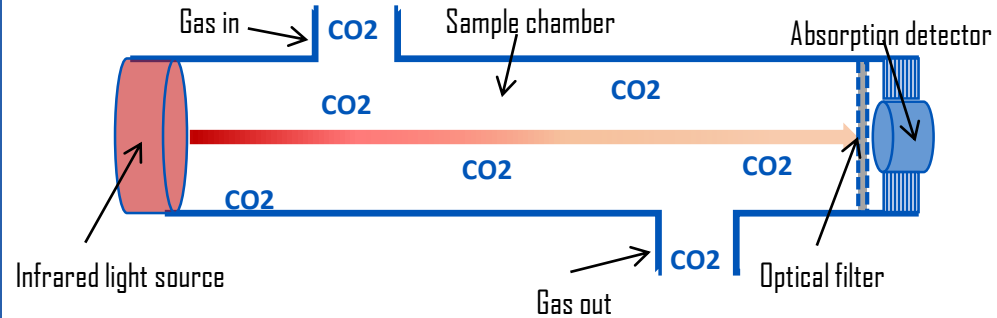


Single Channel

- Subject to drift
- Annual calibration
- Downtime 4-8 hours
- Not suitable for 24/7

Dual Channel

- Continuous Calibration
- 24/7 Occupancy



CO² Sensor Technology

Automatic Barometric Pressure &
Temperature Compensation

- Accurate at any altitude
- Accurate in any weather

▪ <https://youtu.be/SLcUALXZcLY>



BAPI PM Sensor Overview

Quantum



Duct



	Quantum	Duct
PM1.0	yes	yes
PM2.5	yes	yes
PM10	yes	yes
LED/Display	no	no
60mm Base	option	n/a

Particulate Sensor

- Similar to other air quality sensors, particulate sensors measure the concentration of the particles in the air
- Particulate sensors use $\mu\text{g}/\text{m}^3$

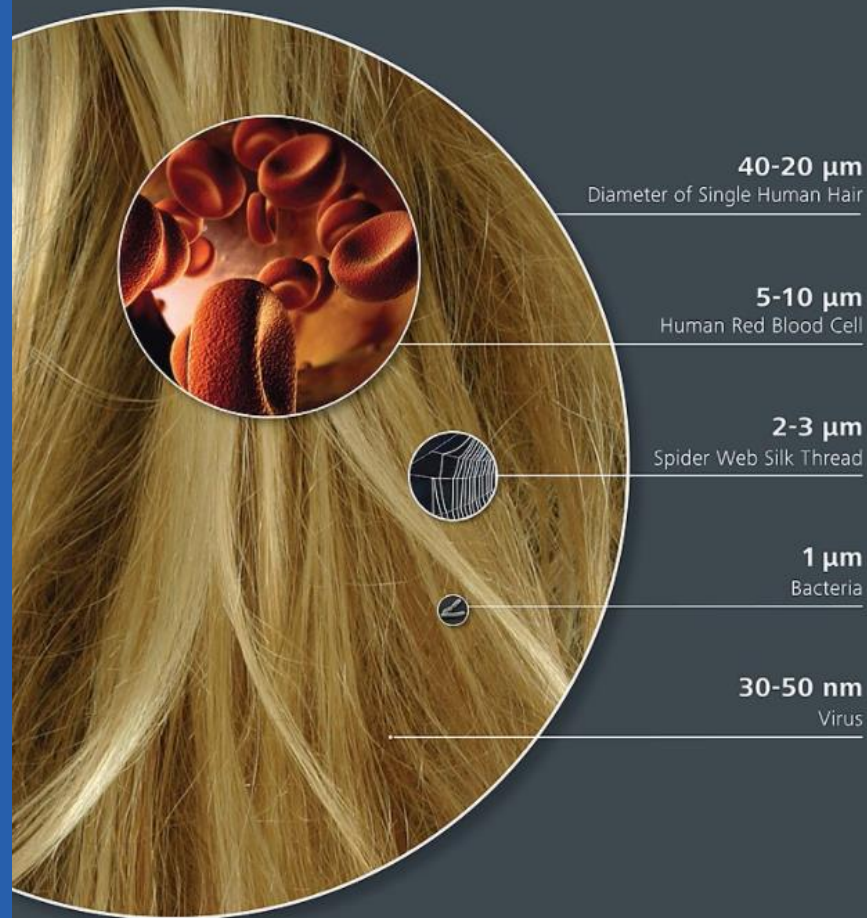
Air Quality Index	Air Pollution Level	PM2.5 24hr avg ($\mu\text{g}/\text{m}^3$)	PM10 24hr avg ($\mu\text{g}/\text{m}^3$)
0-50	Good	0 to 12	0 to 54
51-100	Moderate	12.1 to 35.4	55 to 154
101-150	Unhealthy for Sensitive Groups	35.5 to 55.4	155 to 254
151-200	Unhealthy	55.5 to 150.4	255 to 354
201-300	Very Unhealthy	150.5 to 250.4	355 to 424
301-500	Hazardous	250.5 to 500.4	425 to 604



Particulate Overview – Why Should You Care?

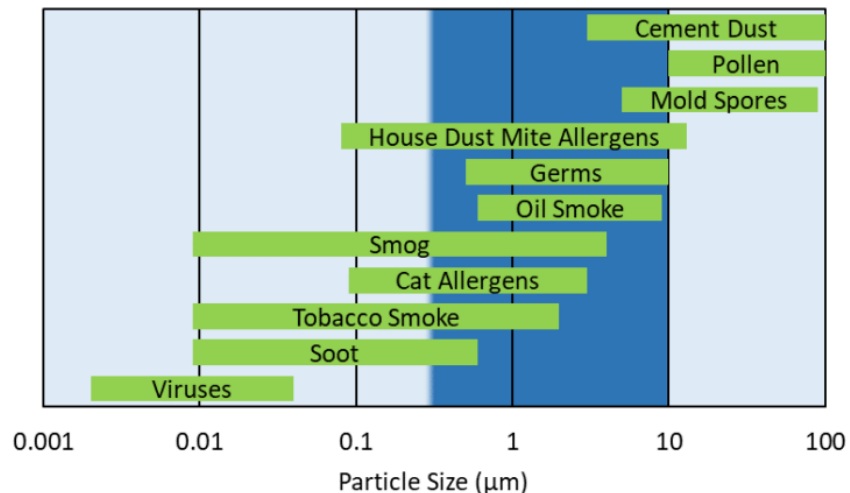
- Particulate Matter – Sometimes referred to as dust
- Any dust in large quantities is unhealthy...think of a sand storm
- But, we are talking about smaller size particles in smaller concentrations
 - Large particles ($>10\ \mu\text{m}$) are filtered out by your nose, mouth, and larynx before they reach your lungs
 - Particles $<10\ \mu\text{m}$ can reach your lungs, but can be expelled
 - Particles $<2.5\ \mu\text{m}$ often get absorbed into your bloodstream before they can be expelled
- Particulate matter can be made up of a variety of components including nitrates, sulfates, organic chemicals, metals, soil or dust particles, and allergens (such as fragments of pollen or mold spores)
- Eye, nose, and throat irritation
- Worsening of cardiovascular and respiratory diseases
- Viruses have the potential to piggy-back on particulates

How Big is $1\ \mu\text{m}$?



Particulate Overview

- PM10 is often produced by mechanical means such as airborne pollutants caused by factories, vehicles, and pollen.
- PM2.5 is often produced by chemical means...smoke
- Most commercial particulate sensors can only detect down to 0.3 μm ...BAPI's included
 - They will not detect viruses



Applications

- Indicator of the effectiveness of your air filtration system
- ASHRAE 62.1 requires MERV 8 or higher for PM10 mitigation and MERV 11 or higher for PM2.5

In General

- CO2 and VOC levels are reduced by exchanging inside air with outside air
- Particulate levels are reduced by improving the air filtration

Filter MERV Rating	Average Particle Size Efficiency (µm)	
6	3.0 to 10.0	49.9%
8	3.0 to 10.0	84.9%
10	1.0 to 3.0 3.0 to 10.0	50% to 64.9% 85% or greater
12	1.0 to 3.0 3.0 to 10.0	80% to 89.9% 90% or greater
14	0.3 to 1.0 1.0 to 3.0	75% to 84% 90% or greater
16	0.3 to 1.0	75% or greater
HEPA	0.3	99.97%

MERV – Minimum Efficiency Reporting Values



BAPI Refrigerant Leak Detector

Our “Refrigerant Leak Detector” is an area monitor that detects a wide range of refrigerants. It’s not intended for critical ppm measurements nor life safety applications.

- Temperature compensated for improved detection of leaks and spills
- The output voltage increases as the concentration of the refrigerant increases in the space
- Detects most modern Refrigerants
- Provides a voltage output







Refrigerants
R-22(A1)
R-32 (A2L)
R-125 (A1)
R-134a (A1)
R-1234yf (A2L)
R-1234ze (A2L)

Refrigerant Blends	
R-404a (A1)	R-452a (A1)
R-407c (A1)	R-452b (A2L)
R-407f (A1)	R-454a (A2L)
R-410a (A1)	R-454b (A2L)
R-424a (A1)	R-454c (A2L)
R-434a (A1)	R-455a (A2L)
R-447a (A2L)	R-466a (A1)
R-448a (A1)	R-507 (A1)
R-449a (A1)	R-513a (A1)
R-450a (A1)	

PRESSURE



BAPI Pressure Sensors

	FRP 	EZPS 	ZPM, IP44 	ZPM, IP66 
Transducer Options	-250 to 250pa -1250 to 1250pa	-250 to 250pa -1250 to 1250pa	-250 to 250pa -1250 to 1250pa 0 to 7400pa	-250 to 250pa -1250 to 1250pa 0 to 7400pa
Pressure Ranges	factory set	field select	field select	field select
Analog Output	factory set	field select	field select	field select
Accuracy	0.5% FS	0.25% FS	0.25% FS	0.25% FS
Display	no	optional*	optional	optional
NIST Cert	yes	yes	yes	yes
IP66	yes	no	no	yes

BAPI has perfected air pressure sensors

BAPI air pressure sensors give you the information you need to maintain proper building pressure, for:

- Environmental cleanliness and safety
- Occupant comfort
- HVAC performance



Pressure matters!

Maintaining the right pressure supports:

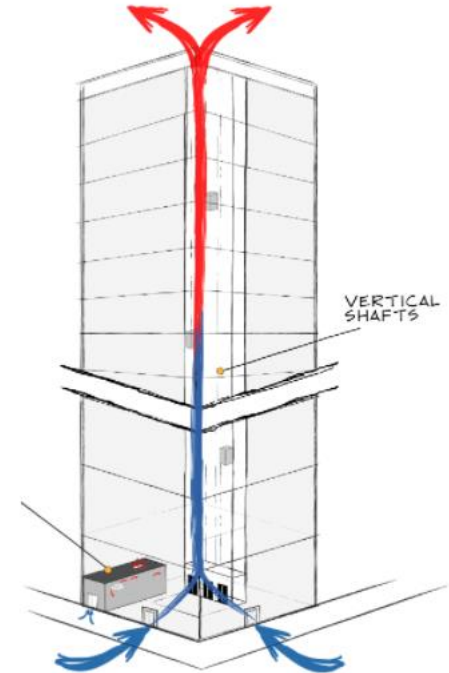
- ▶ Healthy, comfortable indoor air condition
- ▶ The right air quality in the right place
- ▶ Normal opening and closing of doors
- ▶ More efficient HVAC/R system performance
- ▶ Reduced maintenance costs



Pressure Applications – Building Pressure

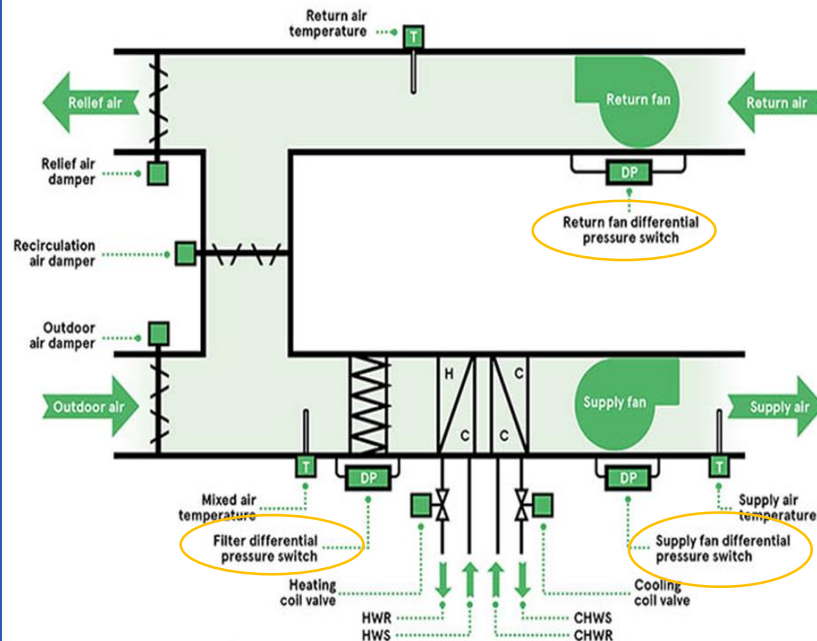
- Outside air pickup port to control the overall building pressure
 - Often, buildings have positive pressure to keep the outside air out (Temp/Hum/pollutants) - 7.5 to 12.4 Pa
 - Be aware of building stack effect
- Wall pickup ports to control room pressures
 - Operating room (positive pressure)
 - Cleanroom (positive pressure)
 - Infectious diseases lab (negative pressure)

What is Stack Effect?



Pressure Applications – System Operations

- Measuring pressure drop
- Measuring duct static pressure
- Calculating air velocity and flow rate by measuring velocity pressure
- How does the system control pressure?



BAPI ZPM sensors simplify pressure maintenance like never before

- 10 field-selectable pressure ranges and 5 field-selectable outputs with or without power
- LED indicators for easy line-of-sight troubleshooting
- LCD displays entire range of transducer and not just selected output
- Low, standard and high range models
- NIST Certificate of Calibration included
- CE certified: CE EN 61326-1:2013 EMC (Industrial Electromagnetic Environment), UL, RoHS



ZPM pressure sensor output options

- ▶ 0-5 volts
- ▶ 1-5 volts
- ▶ 0-10 volts
- ▶ 2-10 volts
- ▶ 4-20mA



ZPM pressure sensor range options

Standard Ranges

<u>Inches WC</u>	<u>Pascals</u>
0 to 1.00.....	0 to 250
0 to 2.00.....	0 to 300
0 to 2.50.....	0 to 500
0 to 3.00.....	0 to 1,000
0 to 5.00.....	0 to 1,250

All 5 ranges available as
unidirectional or bidirectional



ZPM pressure sensor range options

Standard Ranges

Inches WC	Pascals
0 to 1.00.....	0 to 250
0 to 2.00.....	0 to 300
0 to 2.50.....	0 to 500
0 to 3.00.....	0 to 1,000
0 to 5.00.....	0 to 1,250

All 5 ranges available as
unidirectional or bidirectional

Low Ranges

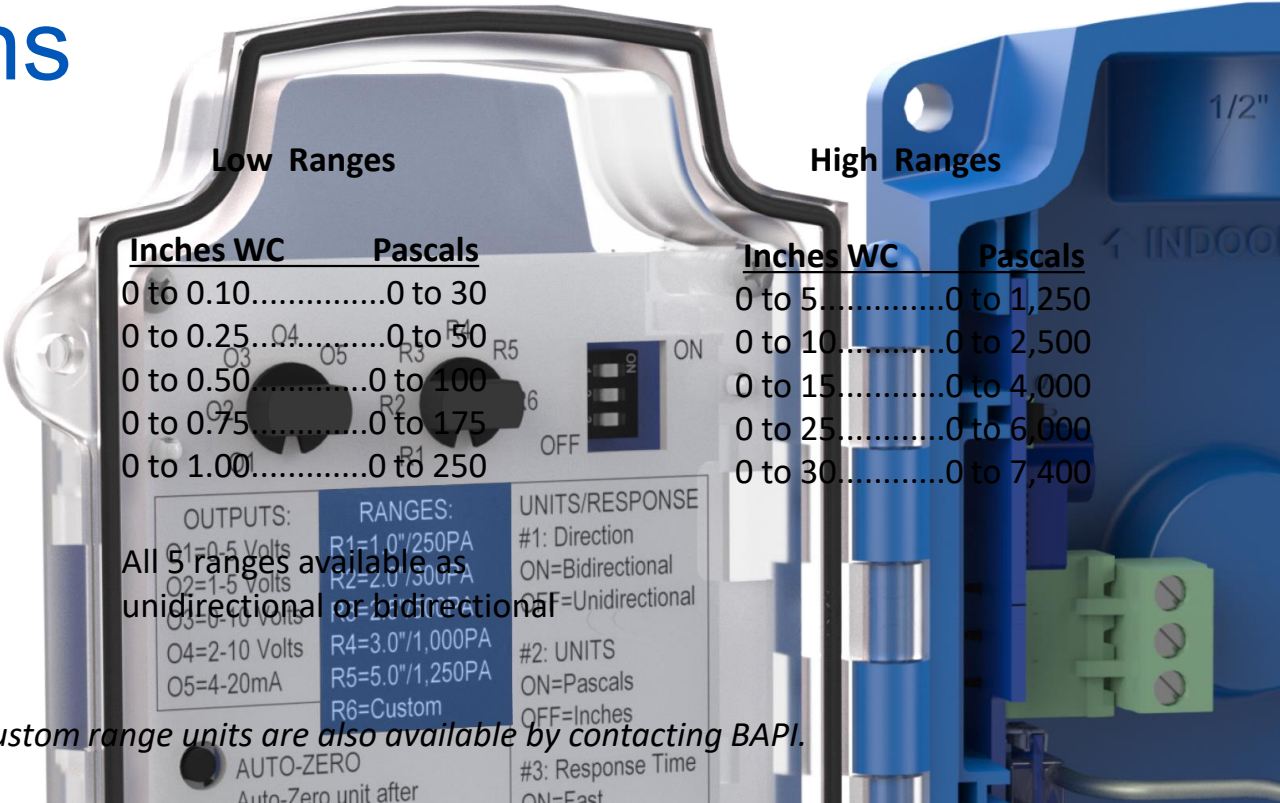
Inches WC	Pascals
0 to 0.10.....	0 to 30
0 to 0.25.....	0 to 50
0 to 0.50.....	0 to 100
0 to 0.75.....	0 to 175
0 to 1.00.....	0 to 250

All 5 ranges available as
unidirectional or bidirectional

High Ranges

Inches WC	Pascals
0 to 5.....	0 to 1,250
0 to 10.....	0 to 2,500
0 to 15.....	0 to 4,000
0 to 25.....	0 to 6,000
0 to 30.....	0 to 7,400

Custom range units are also available by contacting BAPI.



Our “Pressure Pickup Ports” are available as a Quantum, Ceiling Mount, Low Profile Port and Outside Air.

- Quantum – Wall Mounted Pickup Port
- Ceiling Mount – Fits Suspended Ceiling Tile
- Low Profile – Discreet Wall Mounted Port
- Outside Air – Rooftop, Wall, and Vertical Mount
- UV Resistant & Flame Retardant Enclosure
- Wide Range of Pressure Probes & Accessories



BAPI Water Leak



Water Leak Detector

Water Leak Options – Today

- LDT1: One 0.5A relay
- LDT2: Two 0.5A relays
- LDT3: One 5A relay
- LDT4: Two 5A relays



Water Leak Options – 01FEB2022

- LDT4: Two 5A relays
(Price Update next week)



Detector with
Attached Sensor

Detector with
Remote Sensor



Detector with
Rope Sensor



Sensors for HVAC/R



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