



# D5601

## Intrinsically Safe

## Wireless Differential Pressure Transducer

- Atex Certified for Class 1, Div 1
- True Wet/Wet Differential Connections
- Bluetooth 4.2 Wireless Communication
- Pairing Mode or Advertising (Beaconing) Mode
- 32-Bit Digital Pressure Data Output
- 16-Bit Digital Temperature Data Output
- Weatherproof IP65 Rating
- Variety of Pressure Ports
- CR2032/CR2050W Battery Compatible

### Features

- Heavy Industrial CE Approved
- As low as  $\pm 0.1\%$  Pressure Non-Linearity
- $\pm 1.0\%$  Total Error Band (TEB)
- 0 to 60°C Compensated Temperature
- Operating Temperature (Battery):
  - -20 to 70°C (Sony/MuRata CR2032)
  - -20 to 85°C (Murata CR2050W)
- Withstands 50g shock and maximal 10g vibration
- Excellent Long-term Stability

### Applications

- Gas and Liquid Flow Measurements
- Tank Liquid Level Measurements
- Liquid and Gas Filter Monitoring
- Corrosive Gases and Liquids
- Remote and Hard to Reach Locations
- Factory Process Control
- Walk-around Condition Monitoring

The D5601 series from TE Connectivity's Sensors Business Unit sets the price and performance standard for wireless differential pressure transducers used in demanding industrial and smart factory applications.

The modular D5601 wireless pressure transducer uses our Ultrastable MEMS sensing element enclosed in a stainless steel and PBT housing. The high accuracy 24-bit Bluetooth 4.2 connection eliminates hard wiring and enables remote process control and monitoring. This series is suitable for the measurement of gas or liquid pressures including harsh media such as contaminated water, steam, and mildly corrosive fluids.

The wetted surfaces of the pressure ports are made from 316L stainless steel. The port design uses no internal O-rings or organics exposed to the pressure media which provides excellent durability and long-term performance.

The D5601 is FM certified for Intrinsic Safety:

IS Class I, Div1, Groups A, B, C, and D;

Class I Zone 0, AEx ia IIC T4 Ga;

Ex ia IIC T4 Ga;

II 1 G Ex ia IIC T4 Ga

FCC, ISED and RED compliant

### Absolute Maximum Ratings <sup>(1)</sup>

Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Supply voltage	Vdd	2.3		3.6	V	
Storage temperature	TS	-40		120	°C	Battery removed
Operating temperature	TO	-20		70	°C	CR2032 (Sony/MuRata)
		-20		85	°C	CR2050W (MuRata)
Proof pressure (Low side)	Plproof			3X	Rated	Or 150 psid, whichever is less
Proof pressure (High side)	Phproof			3X	Rated	Or 1000 psid, whichever is less
Burst pressure (Low side)	Plburst			4X	Rated	Or 150 psid, whichever is less
Burst pressure (High side)	Phburst			4X	Rated	Or 1000 psid, whichever is less
Line pressure	Pline			1000	PSIG	Common line pressure
ESD				4	kV	Contact
				8	kV	Air

(1) Maximum limits the device will withstand without damage. Damage can be incurred even with short exposures outside of absolute ratings.

### Standard Pressure Ranges

PSID	BarD
0 to 5	0 to 0.35
0 to 15	0 to 1
0 to 30	0 to 2
0 to 50	0 to 3.5
0 to 100	0 to 7
0 to 300	0 to 20
0 to 500	0 to 35

### Electrical Specifications

(Unless otherwise specified, all parameters are measured at 25°C @ 3.3V applied)

Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Supply voltage (Vsupply)	Vdd	2.3		3.6	V	
Low battery warning voltage			2.5		V	
Battery Life		1		5	Years	Battery life depends on use case

### Pressure Operating Specifications

(Unless otherwise specified, all parameters are measured at 25°C @ 3.0V applied)

Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Accuracy		-0.25		+0.25	%FS	5psid range
		-0.1		+0.1	%FS	≥15 psid range
Total error band		-1.0		+1.0	%FS	
Resolution			0.00005		%FS	
Line pressure effect on zero offset			0.0008		%span/psi	5psid range
			0.0005		%span/psi	≥15 psid range
Cycle life		106				0 to full scale cycles
A/D resolution			24		Bits	

### Environmental Specifications



(Unless otherwise specified, all parameters are measured at 25°C @ 3.0V applied)

Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Compensated temperature range	Tc	0		60	°C	
Operating temperature range	To	-20		70	°C	CR2032 (Sony/MuRata)
				85	°C	CR2050W (MuRata)
Storage temperature	Ts	-40		120	°C	Battery removed
Ambient humidity		0		95	%RH	Non-condensing
Vibration		10Hz to 55Hz, double amplitude 1.52mm, EIA-364-28F, Condition I				
Shock		50g, 11msec Half Sine, MIL-STD-202G, Method 213B, Condition A				
EMI/RFI/ESD protection		See Compliance section below				
Ingress protection	IP	IP65				
Media compatibility		316L stainless steel Wetted Surface				
All exposed materials		316L stainless steel & PBT				
Weight		205g				

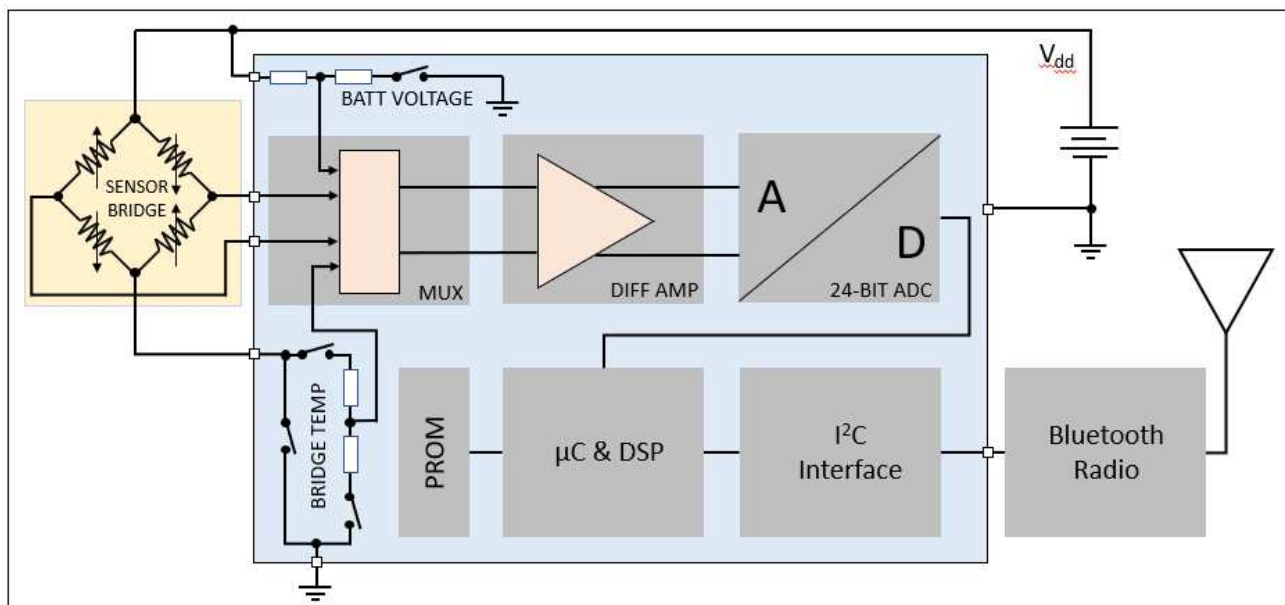
### Compliance

- ATEX Intrinsic Safety for Explosive Atmospheres EU type approval
- IECEx Intrinsic Safety for Explosive Atmospheres international certification
- CSA Intrinsic Safety for Hazardous Locations for US and Canada
- EC 55032 Emissions Class A & B
- IEC 61000-4-2 Electrostatic Discharge Immunity (4kV contact/8kV air discharge)
- IEC 61000-4-3 Radiated Radio-Frequency Electromagnetic Field Immunity (10V/m, 80M-1GHz), Shift <1.5% FS
- FCC Part 15 Subpart B Unintentional Radiators (US)
- ICES-003 Unintentional Radiators (Canada)
- RED ETSI EN 301 489-1 V2.1.1 & ETSI 301 480-17 V3.2.1 (Europe)

### COMMUNICATION SPECIFICATIONS

Parameter	Symbol	Min	Typ	Max	Unit	Notes/Conditions
Wireless protocol		BLE 4.2				
Operating frequency			2.4		GHz	BLE carrier frequency

## Block Diagram



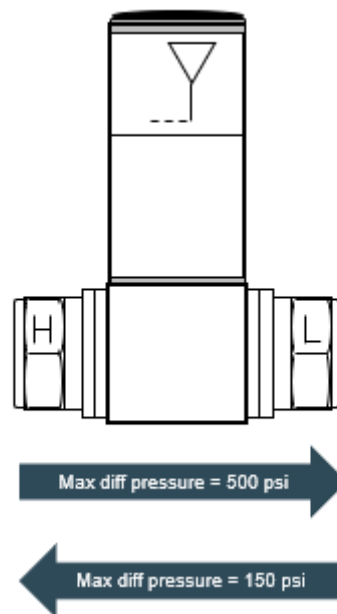
### Specific conditions of use

1. The non-metallic parts incorporated in the enclosure may generate an ignition-capable level of electrostatic charge. Upon installation, care shall be taken to avoid locations where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. Additionally, the equipment shall only be cleaned with a damp cloth.
2. The Bluetooth Pressure Transducers do not have an earth ground terminal. The transducers shall be earth grounded as part of the final installation.
3. The Model D5601-00x2xx-xD Pressure Transducer shall use only the CR2032 Sony/Murata cell. The ambient range is  $T_a = -20^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ .
4. The Model D5601-00x3xx-xD Pressure Transducer shall use only the CR2050W Murata cell. The ambient range is  $T_a = -20^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .

## D5601 - Differential Operation

Differential pressure transducers require special attention to ensure proper operation and avoid damage:

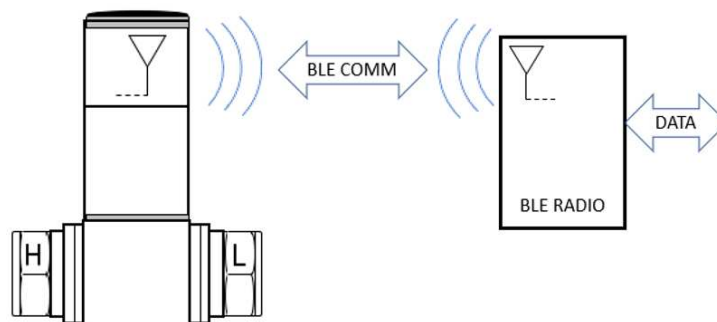
- The transducer can measure both positive and negative pressures at the limits stated on the data sheet.
- The ports are marked with an “H” (high) and “L” (low). The highest positive differential pressure can be applied to the “L” port is +150 psi (+10 bar) greater than “H” port.
- The full specified differential pressure of +500 psi (35 bar) can be applied to the “H” port.
- The line pressure (common mode pressure) limit is 1000 psi (70 bar). This is the highest pressure above ambient that’s applied equally to both “H” and “L” ports without causing damage.



## Communication Protocols

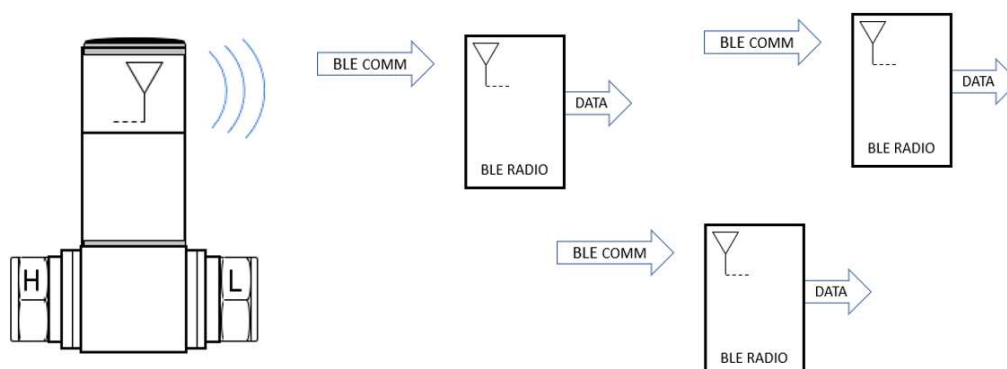
Pairing mode (Model D5601 – xx0):

- The device is set up to be both discoverable and connectable.
- The device is constantly listening for a signal from any other Bluetooth device within range that might send out an inquiry for connection (connection request).
- Once a signal is received and acknowledged, a single two-way communication channel is established, and the two devices will only communicate with each other or be paired.



Advertising (Beaconing) mode (Model D5601 – xx1):

- When power is first applied (insert battery), the device enters the configuration mode (six hours long) which facilitate pairing so updates and software changes can be made. The device is set up to be discoverable but connectable for configuration.
- Six hours after the last pairing, the transducer will switch to low power advertising mode and begin transmitting data. The device is constantly transmitting data (advertising) at higher intervals to save battery. Any other Bluetooth device within range can receive the data and may establish a two-way connection for configuration.





### Ordering Information

**Part Number**  
**D5601 - 0 0 0 2 - 005P D**

**Certification**

<b>1</b>	1 RoHS, FCC, ISED, RED, CE HazLoc/ATEX certified: IS Class I, Div1, Groups A, B, C, and D; Class I Zone 0, AEx ia IIC T4 Ga; Ex ia IIC T4 Ga; II 1 G Ex ia IIC T4 Ga RU
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**Full Scale Differential Pressure Range**

PSI	BAR
005P	.35B
015P	001B
030P	002B
050P	3.5B
100P	007B
300P	020B
500P	035B

**Port material**

<b>0</b>	316L
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**Communication Protocol**

<b>0</b>	Standard
<b>1</b>	Advertising (Beaconing) mode

**Pressure Port**

<b>2</b>	1/4-19 BSPP Male
<b>5</b>	1/4-18 NPT Male
<b>F</b>	1/4-19 BSPP Female
<b>G</b>	M14 X 1.5 mm ISO6149-2

**Battery Type for Operating Temperature Range**

<b>2</b>	CR2032 (Sony, MuRata) for -20to 70°C
<b>3</b>	CR2050W (MuRata) for -20 to 85°C

Notes:  
 Designations relate to product label and operating temp range  
 No battery is shipped with the sensor

### Standard in Stock Models\*

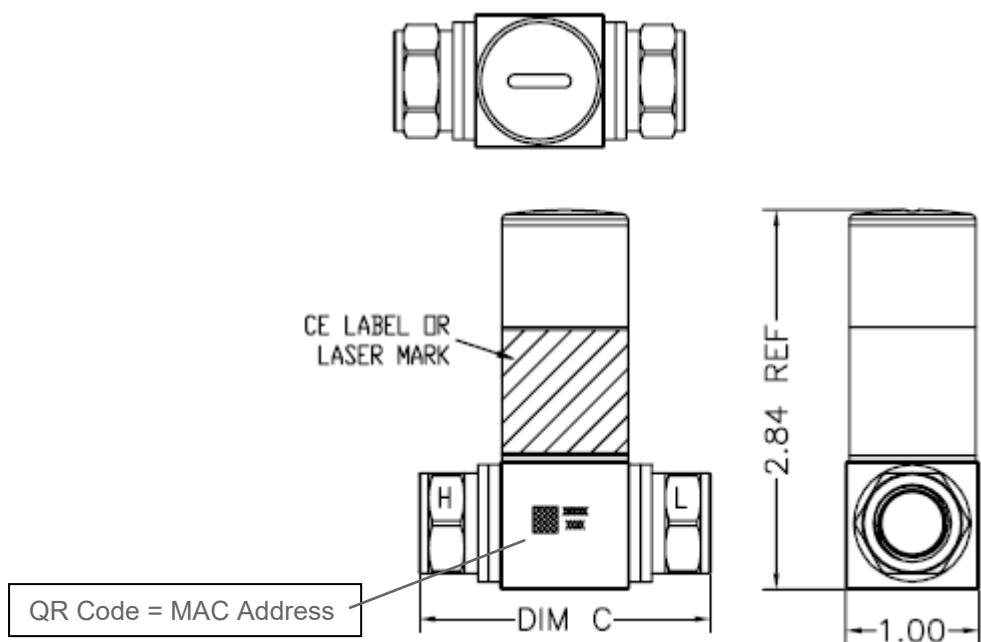
0 – Standard Output Protocol	1 – Advertising Output Protocol
D5601-000205-005PD	D5601-001205-005PD
D5601-000205-050PD	D5601-001205-050PD
D5601-000205-500PD	D5601-001205-500PD
	D5601-001305-005PD

\*Additional certified customizations available pending business case review, contact factory for customizations





Outline Drawing and Dimensions



Model number code	Port Configuration	Dim C In [mm]
2	1/4-19 BSPP Male	3.08 [78.23]
5	1/4-18 NPT Male	3.18 [80.77]
F	1/4-19 BSPP Female	2.18 [55.37]
G	M14 X 1.5 mm ISO6149-2	3.05 [77.40]

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