Ceramic Cell Pressure Transmitters

Low Pressure Industrial Degree (Flushing)

HAWK ®
Since 1971

P-2A

ISO 9001 CERTIFIED

- **Accuracy 0.5%, 1.0%**
- **Front Ceramic Diaphragm to minimize the dead space**
- **Non-Metallic Wetted Parts for Excellent Corrosion Resistance**
- **Low Pressure Range from 1000 mmH_2O to 6000 mmH_2O**
- **Zero and Span Adjustments (4-20mA)**
- **False System Shutdown Prevention**

PT 9 Series

HAWK PT9 series flush front diaphragm pressure transmitters and transducers have been designed to measure low pressure from 1000 mmH2O (100mbar) to 6000 mmH2O (600mbar) of viscous and contaminated fluids at high quality performance and precision accuracy requirement.
The semi-flush front ceramic diaphragm design minimizes the dead space in order to avoid the highly viscous medium to clog the pressure sensing element. It's good ideal for the system to require flushing to prevent contamination when changing pressure medium. The non-metallic wetted parts (the parts contacted with the media directly) design let it use for applications where a typical metallic components could not withstand the process media such as acids, chlorine and etc.

Typical Applications

- Pharmaceutical Industry
- Chemical Fluid Level Measurement
- Chemical Tank Level Measurement
- Chemical Industries

Specifications

PERFORMANCE

Accuracy at 25 C° (Linearity, Hysteresis, Repeatability):
< ±0.5% F.S....Typical (PT94)
< ±1.5% F.S....Max (PT94)
< ±1.0% F.S....Typical (PT95)
< ±2.0% F.S....Max (PT95)

Stability at 25 C°:
< ±0.2% F.S.(PT13)
< ±0.4% F.S.(PT14)

Thermal Zero Shift:
< ±0.02% F.S./ C°.....PT13
< ±0.04% F.S./ C°.....PT14

Thermal Span Shift:
< ±0.03% F.S./ C°

ENVIRONMENTAL

Operating Temperature Range:
-25.....85 C°

Storage Temperature Range:
-25.....100 C°

Compensated Range:
-40.....135 C°

Weatherproof Rating (Enclosure):
IP65, NEMA4/4X or better

PHYSICAL DATA

Housing(Case):
304 Stainless Steel (316SS Option)

Fitting Materials:
304SS, 316SS, 316LSS, Monel or Hast'C

Ceramic Sensor:
Aluminum Oxide Al_2O_3 (96%)

Seal Material:
FPM(Viton), NBR(Buna Rubber), MVQ (Silicone Rubber), CR(Neoprene), EPDM(Ethylene Propylene), FFKM
Note: The wetted parts including fitting, ceramic sensor and sealing will be contacted with the media directly, please choose the appropriate material complied to your application.

Process Fitting (Connection):
1/2" NPT, 1/4" NPT, G1/2, G1/4, R1/2, R1/4, 7/16-20UNF, M20*1.5, M14*1.0, 9/16-18UNF,
Others on request

Electrical Connector:
Terminal Box to DIN43650 A-PG9 (IP 65)
Shutter Type Cable (IP 65)
Flexible Cable (IP 65)
Terminal Box to DIN43650 A-G ½ (IP 65)
M12 Cable (IP 65)

ELECTRICAL DATA

Voltage Output
Output Signal (Voltage, 3 Wires):
0-10V, 0-5V, 0.5-4.5V, 1-5V, 1-6V

Power Requirement (Voltage):
15-32VDC (Normal 24VDC, Voltage)

Load Resistance (Voltage):
>10K Ohms

Current Output
Output Signal(Current, 2 Wires):
4-20 mA

Power Requirement (Current):
10-32VDC(Normal 24VDC, Current)

Load Resistance (Current):
≦(Supply Voltage -10V) / (0.02A)Ohms

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Electrical Compatibility

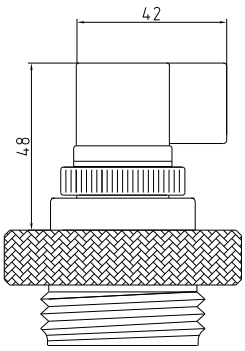
CE-Conformity

■ 2014/30/EU(EMC) EN 61326-1:2013

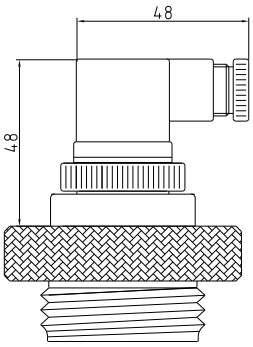
Dimensions (mm)

1 1/2"NPT or G 1 1/2 Process Connection

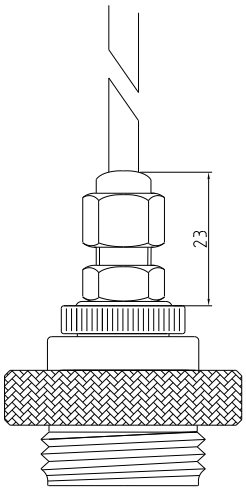
DIN 1/2" Female



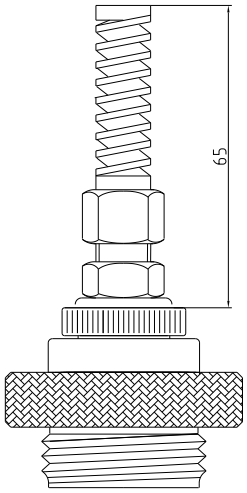
DIN 43650 A



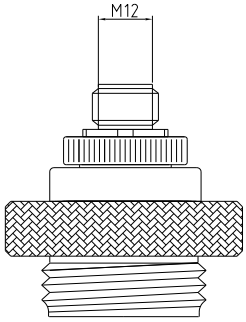
Shutter Cable



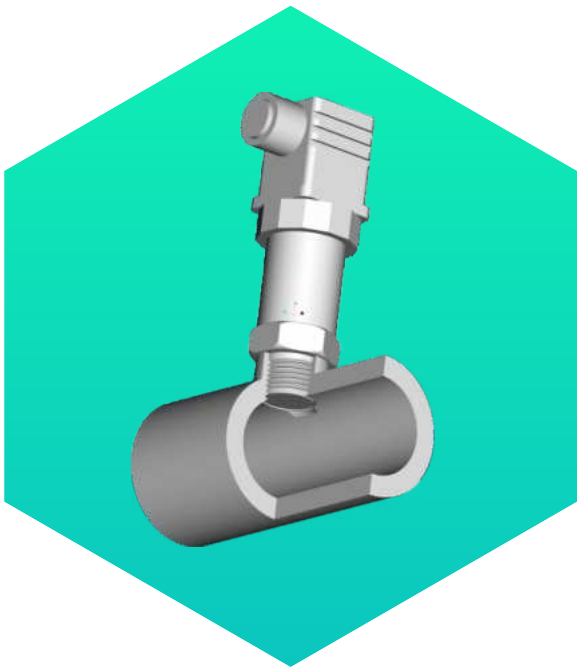
Flexible Cable



M12 Conduit



Flushing Design



The flushing front diaphragm design let the measuring point closed to the process line in order to minimize the dead space happened.

Media Compatibility and Applications

Media compatibility must be considered when purchasing a pressure transducers and transmitters, Improper selection and application of the pressure transmitters and transducers could possible cause sensor failure and lead to possible damage or personal injury. The media to which the pressure sensors are going to be in contact with, must have compatibility with the Al_2O_3. In particular the data of weight loss found after a dipping of 80 hours at room temperature in some media have shown a good resistance to HCl (at 30% wt) and HNO_3 (at 60% wt). Therefore the ceramic cell has a very good chemical resistance. But the alumina is instead easily etched by even 1% solution of Fluorine acid (HF). For such applications, you can use HAWK ceramic pressure sensor combined diaphragm seal or the other HAWK Pressure sensors such as stainless steel thin film sensor or diaphragm micro-machined silicon sensor instead. The wetted parts of the transmitter including pressure fitting, ceramic cell and sealing will contact with the media directly. Selecting the suitable pressure fitting material and sealing material is very important.
Please refer to HAWK Corrosion table for detailed information.

Sealing Materials vs Common Applications

Sealing Materials 1=Recommended, 2=Satisfactory, 3=Poor, 4=Marginal, 5=Not Recommended A=Available N/N=Not Available	Common Application Conditions															
	Gasoline, Naphtha	Benzene, Toluene	Aliphatic Hydrocarbon	Alcohol	Ester	Ketones (MEK)	Ethyl Acetate	Water	Organic Acid	Animal/Vegetable Oil	Aromatic Solvent	Oxidized Solvent	High Consistency Alkali	Low Consistency Alkali	High Consistency Inorganic Acid	Low Consistency Organic Acid
Buna N(Nitile), NBR	1	3	5	1	4	4	4	1	4	1	3	5	2	2	4	2
Fluorocarbon(Viton), FPM	1	1	2	1	4	2	5	1	5	1	1	5	5	4	1	1
Ethylene-Propylene(EPDM), P.C	5	3	5	1	2	1	1	1	5	2	5	1	1	1	2	1
Fluorosilicone, VMQ	4	4	3	1	4	2	3	2	2	3	5	4	1	1	4	2
Neoprene, CR	2	5	5	1	4	3	5	1	4	2	4	5	1	1	2	1

The materials and applications listed are the most commonly used. There are a lot of compound variations designed for specific applications.
For demanding applications, please supply all detailed to our application engineers for a recommendation or go to:
www.efunda.com

Sealing Materials 1=Recommended, 2=Satisfactory, 3=Poor, 4=Marginal, 5=Not Recommended A=Available N/N=Not Available	Common Application Conditions																		
	High Temp Limit CO	Low Temp Limit CO	Steam< 250 (C°)	Steam< 120 (C°)	Permeation/Vacuum	Fluorescent/Sunlight	Weathering/Ozone	Refrigerant/Freon(most)	Wear/Abrasion	Compression Set	Brake Fluids	Transmission Fluids	Steering Fluids	Fuels/Gasline(most)	Chemicals/Solvents(most)	Petroleum Oils(most)	Dynamic Applications	FDA Compliant	NFS61(Drinking Water)
Buna N(Nitile), NBR	120	-40	5	4	2	4	4	4	2	2	5	2	5	3	4	3	2	A	A
Fluorocarbon(Viton), FPM	200	-15	4	3	1	1	1	3	2	1	4	3	2	2	2	1	1	A	N/A
Ethylene-Propylene(EPDM), P.C	150	-55	4	1	2	1	1	5	2	2	1	3	5	5	2	5	1	A	A
Fluorosilicone, VMQ	180	-60	5	5	4	1	1	1	4	3	3	3	2	1	3	3	3	N/A	N/A
Neoprene, CR	120	-35	5	5	2	2	2	2	2	3	5	3	3	5	5	2	1	N/A	N/A

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Pressure Range

Scale:inH_2O

Code	I15	I16	I17	I18	IV15	IV16	IV17	IV18	IC16	IC78	IC18	IC19	IC20	IC21
Range	50	100	150	200	-50	-100	-150	-200	+-50	+-80	+-100	+-150	+-200	+-250
Overload	100	200	300	400	-100	-200	-300	-400	+-100	+-160	+-200	+-300	+-400	+-250

Scale:mbar

Code	B24	B25	B26	B27	B28	B29	B30	B31	B32	BV24	BV25	BV26	BV27	BV28	BV29	BV30	BV31	BV32	BC20
Range	100	150	160	200	250	300	400	500	600	-100	-150	-160	-200	-250	-300	-400	-500	-600	+-80
Overload	100	300	320	400	500	600	800	1000	1200	-200	-300	-320	-400	-500	-600	-800	-1000	-1200	+-160

Code	BC21	BC22	BC23	BC24	BC25
Range	+-100	+-125	+-200	+-250	+-300
Overload	+-200	+-250	+-400	+-500	+-600

Scale:mmH_2O

Code	O26	O27	O28	O29	O30	O32	O33	O34	OV27	OV28	OV29	OV30	OV32	OV33	OV34	OC19	OC20	OC21	OC22
Range	1000	1600	2000	2500	3000	4000	5000	6000	-1600	-2000	-2500	-3000	-4000	-5000	-6000	+-800	+-1000	+-1250	+-2000
Overload	2000	3200	4000	5000	6000	8000	10000	12000	-3200	-4000	-5000	-6000	-8000	-10000	-12000	+-1600	+-2000	+-2500	+-4000

Code	OC23	OC24
Range	+-2500	+-3000
Overload	+-5000	+-6000

Note: If you need the other ranges not listed, please contact with our distributors.
Plastic coating for high pressure application.

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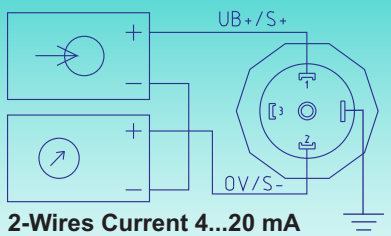
Electrical Connection

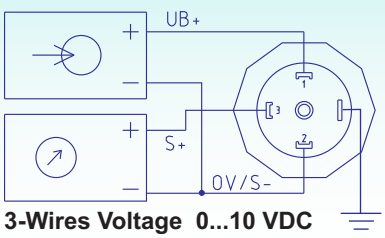
Note: If you need the other electrical connections not listed, please contact with our distributors.

Writing

DIN Connection

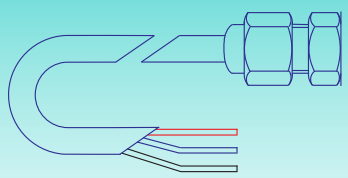


2-Wires Current 4...20 mA



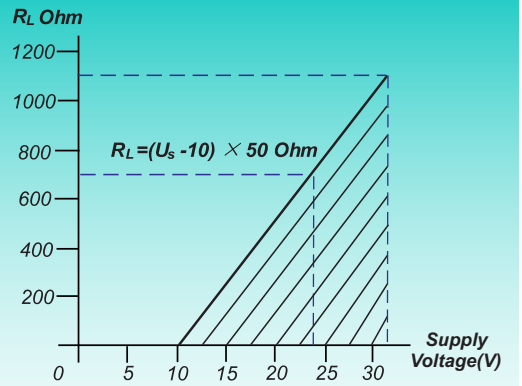
3-Wires Voltage 0...10 VDC

Cable Connection



RED-SEE TABLE
WHITE-SEE TABLE
BLACK-SEE TABLE

Output	Red	Black	White
Voltage	+ V Supply	- V Supply	Output
Current	+ V Supply	- V Supply	Grounding



The diagram shows the optimum ratio between the load and supply voltage of the 4-20mA transmitter.

For a correct use, any combination of load resistance and supply voltage, choose the slant line area.

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Order Information

Example:

	Accuracy	Reference	Wetted Parts	Process Connection Style	Process Connection Size	Electrical Connection	Cable Length	Output Signal	Pressure Range	Seal Material	Option	
P-2A-PT9	4	R	D	M	2	A	000	F	026	V	H-	Z X

P-2A-PT94RDM2A000FO26VH-ZX

Accuracy

3	0.25%
4	0.5%

Reference

R	Relative
A	Absolute

Wetted Parts

S	316SS	M	Monel	H	Hast'C	W	316LSS
A	304SS	D	PVDF	P	PP	L	Others

Process Connection Style

M	Male	F	Female	W	Weld

Process Connection Size

2	1/2"NPT	3	3/8"NPT	4	1/4"NPT
D	G1/2	H	G3/8	E	G1/4
G	R3/8	B	R1/4	J	M20*1.5
K	M14*1.0	9	9/16"-18UNF	7	7/16"-20UNF
0L	Others				

Electrical Connection

A	DIN 43650	D	1/2" Female DIN	F	Gland Cable
P	Flexible Cable	M	M12 Cable	L	Others

Cable Length

000	No Wire	0M1	0.1m	1M1	1.1m
05M	5m	10M	10m	01F	1 Feet
10F	10 Feet	25F	25 Feet		.....and so on.

Output Signal

A	0...10 VDC	B	0...5 VDC	C	1...5 VDC		
D	0.5..4.5 VDC	E	1...6 VDC	F	4...20 mA	L	Others

Pressure Range

Please refer to the range table and write down the code you need.

Vacuum Compound Pressure

Seal Material

B	NBR (Buna Rubber)	V	FPM (Viton)	S	MVQ (Silicone Rubber)		
N	CR (Neoprene)	E	EPDM(Ethylene Propylene)	K	FFKM	L	Others

Option

ZX	Cleaned for Oxygen Service	ZC	Certificate of Accuracy (Factory)	ZE	Certificate of Accuracy (TAF)
ZN	NACE-MR0175-2002 Heat Treatment	PH	Extra High Purity Treatment	ZI	Certificate of Accuracy (NIST)
ZY	Stainless Steel Tag Plate	Z3	316SS Housing	0Q	Customized Laser Mark

4 R D M 2 A 000 F O26 V H- Z X

Option

Certificate of Accuracy (NIST) ZI

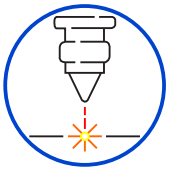
ZC Certificate of Accuracy (Factory)

Certificate of Accuracy (TAF) ZE

316SS Housing Z3

Stainless Steel Tag Plate ZY

0Q Customized Laser Mark



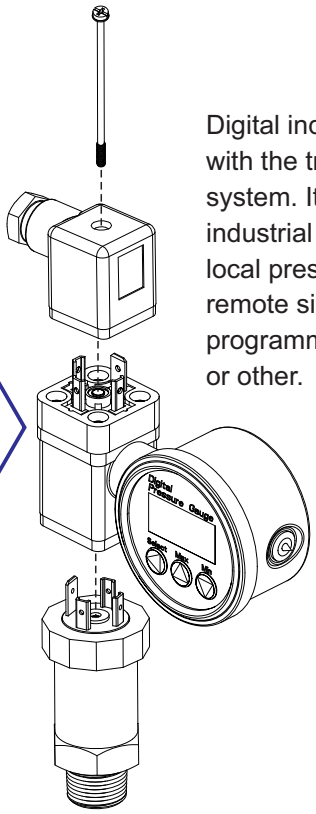
PH Extra High Purity Treatment

NACE-MR0175-2002 Heat Treatment ZN

ZX Cleaned for Oxygen Service

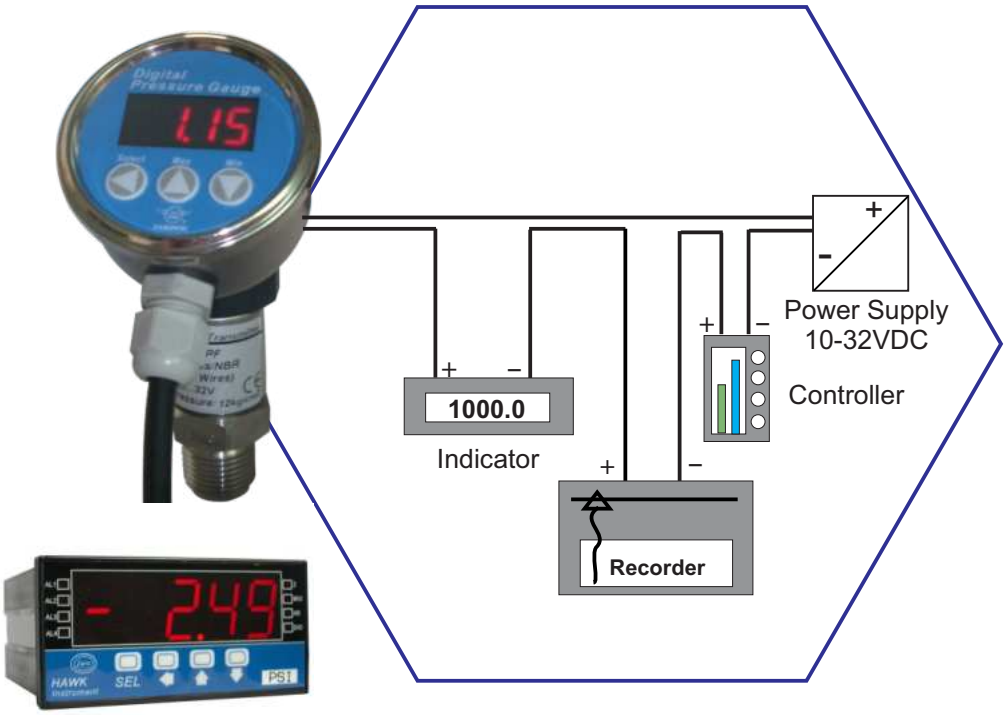
Accessories

Plug-in Digital Indicator



Digital indicating can be used with the transmitter for your system. It is ideal for all industrial applications when a local pressure reading and a remote signal transmitter to a programmable logic controller or other.

High Level Current Wiring Connecting (4-20 mA 2 wires Loop Power)



The pressure transmitter 4-20mA output units are designed to have current flow in one direction only. The maximum supply voltage for 4-20mA current output transmitter is 32VDC. The minimum supply voltage is dependent upon the loop resistance of the circuit. The load limitation chart shows the minimum supply voltage required for given loop resistance. We suggest that the electrical shield should be connected to the system loop circuit ground to improve electrical noise rejection. For minimum noise susceptibility, avoid installing the transducer and transmitter's cable in a conduit that may contains a high current AC power cables. If possible, avoid installing the cable near inductive equipments.

Limited Warranty and Liability

HAWK GAUGE CO.,LTD warrants all its mechanical instruments to be free from defects in materials and workmanship. HAWK agrees to repair or replace any thermometers if returned to our factory, transportation charges prepaid, and after which examination reveals is to be defective due to faculty workmanship or material.
This warrant should not apply to subject to the following terms and conditions:

A. The product has not been subjected to misuse, neglect, abuse , accident, incorrect mounting, improper use or misapplication such as negligence, accident, vandalism, shock or vibration.

B. The performance of any system of which HAWK's products are a component part.

C. The product has not been exposed to any other service, range or environment of greater severity than that for which the products were designed.

D. The product has not been altered or repaired by anyone except HAWK GAUGE or its authorized service agencies.

E. The serial number or date code has not been removed, defaced or changed.

F. The actual pressure&temperature occurring exceed the values specified for HAWK Thermometer.

Unless otherwise specified in a manual or warranty card, or agree to in a writing signed by HAWK GAUGE office, HAWK Thermometer products shall be warranted for one years from the date of sale.

This warranty is in lieu of all other warranties expressed or implied, and of all obligations or liabilities on its part for damages including but not limited to consequential damages, following the use of misuse of instruments sold by it. No agent is authorized to assume for it any liability except as set forth above.

Note

HAWK GAUGE CO.,LTD reserves the right to make product improvements and change its specifications at any time stated throughout this brochure without notification. Please contact the factory on all critical dimensions and specifications for verification.
HAWK GAUGE is not expert in the customer's technical field and therefore doesn't warrant suitability of it's product for the application selected by customer.

Data Sheet No: MKDP2APT9A1-E