SE SERIES

Electronic instrumentation

The operation of this instruments is based on the sensor deflection on which surface a resistance circuit is fixed. The deflection caused by process fluid pressure produces a resistances circuit unbalance, which due to such effect causes a variation of electrical signal proportional to the applied pressure.

CE PED 2014/68/EU

SE 398

Pressure transmitter

- **Sensor**
  - thick film on ceramic for ranges -1 ÷ 40 bar;
  - thin film on AISI 630 stainless steel for ranges 100 ÷ 400 bar.

- **Ranges (unit of measurement in bar)**
  - 0÷1; 0÷2,5; 0÷4; 0÷6; 0÷10; 0÷16; 0÷25; 0÷40; 0÷100; 0÷160; 0÷250; 0÷400; -1÷0; -1÷3.
  (others ranges and unit of measurement)
  - on request.

- **Over-pressure**
  - 200% of full scale deflection.

- **Output / Supply voltage**
  - 4÷20 mA / 9÷30 V DC, 2 wires;
  - 0÷5 V CC / 10÷30 V DC, 3 wires;
  - 0÷10 V CC / 15÷30 V DC, 3 wires;

- **Accuracy**
  - ± 0,3% of full scale deflection.

- **Housing**
  - AISI 304 stainless steel.

- **Housing protection degree**
  - IP 65.

- **Wetted parts**
  - AISI 316L stainless steel for ranges -1 ÷ 40 bar;
  - AISI 304 stainless steel for ranges 100 ÷ 400 bar.

- **Pressure connection**
  o thread:
  - G 1/4 B (1/4 Gas or BSP male);
  - G 1/2 B (1/2 Gas or BSP male), on request;
  - 1/4 - 18 NPT EXT (1/4 NPT), on request.
  o others, on request.

- **Electrical wiring**
  - junction box DIN 43650A for ranges -1 ÷ 40 bar;
  - junction box DIN 43650C for ranges 100 ÷ 400 bar;
  - junction box M12X1 (on request);
  - cable (son request).

- **Ambient temperature**
  - -25 ÷ +85 °C.

- **Operating temperature**
  - -25 ÷ +125 °C.

APPLICATIONS

- **Diaphragm seal (see FP series)**
  in this case the instrument can be identified by the number of the chosen model, adding the reference of the suitable diaphragm seal among those of FP series.
  (identification FP...)

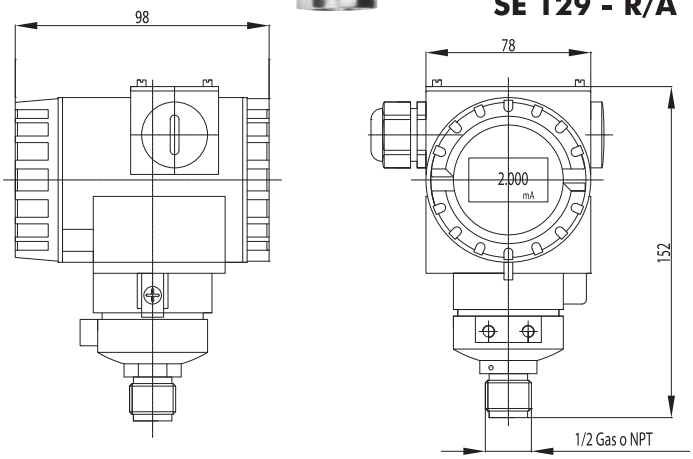
- **Display digital display**
  suitable for direct installation on pressure transmitter with output 4 ÷ 20 mA;
  o general features:
  - no additional power supply required;
  - high contrast 4-digit LCD display;
  - to connect junction box DIN 43650A;
  o setting:
  - zero point;
  - span;
  - decimal point;
  - damping;
  - switching point;
  - direction of switching.

SE 129 - R/A

Smart pressure transmitter with HART ® protocol

- **Execution**
  - R relative pressure;
  - A absolute pressure.
- **Sensors range**
  - see table SE 1.
- **Over-pressure**
  - two times of full sensor range (70 MPa for range 0/35÷60 MPa).
- **Output signal**
  - 4 ÷ 20 mA, withHART ® digital signal superimposed.
- **Supply voltage**
  - 14 ÷ 36 V DC, 2 wires.
- **Accuracy**
  - ± 0,1% of sensor range (± 0,25% for range 0/3÷10 kPa), standard;
  - ± 0,075% of sensor range, on request.
- **Housing**
  - die cast aluminium alloy painted with epoxy resin - 90° revolving.
- **Housing protection degree**
  - IP 65.
- **Display**
  - LCD.
- **Window**
  - laminated safety glass.
- **Sensor**
  - silicon.
- **Wetted parts**
  - AISI 316L stainless steel;
  - exotic materials on request.
- **Pressure connection**
  - G 1/2 B (1/2 Gas or BSP male) or 1/2 - 14 NPT EXT (1/2 NPT male) thread
  - others on request.
- **Ambient temperature**
  - -20 ÷ +85 °C.
- **Operating temperature**
  - -25 ÷ +100 °C.
- **Ambient humidity**
  - 5 ÷ 95% RH.
- **Weight**
  - ~1,050 kg.

SE 129 - R/A



Tablese SE 1
Sensor range

Code	kPa	Code	MPa
01	0/3 ÷ 10	06	0/0,7 ÷ 1,7
02	0/10 ÷ 35	07	0/1,7 ÷ 3,5
03	0/35 ÷ 100	08	0/3,5 ÷ 7
04	0/100 ÷ 200	09	0/7 ÷ 35
05	0/200 ÷ 700	10	0/35 ÷ 60

APPLICATIONS

- **Diaphragm seal**
  (see FP series)
  in this case the instrument can be identified by the number of the chosen model, adding the reference of the suitable diaphragm seal among those of FP series.
  (identification FP...)
- **2" pipe mounting clamp**
- **PC software**
- **PC connection cable RS 232**
- **PC connection cable USB**

note: informations shown in this series may be changed at any time without prior notice.

SE 129 - D

Smart differential pressure transmitter with HART ® protocol

- **Sensor range**
  - see table SE 2.
- **Static pressures**
  - see table SE 2.
- **Output signal**
  - 4 ÷ 20 mA, with HART ® digital signal superimposed.
- **Supply voltage**
  - 16 ÷ 48 V DC, 2 wires.
- **Housing**
  - die cast aluminium alloy painted with epoxy resin - 90° revolving.
- **Housing protection degree**
  - IP 65.
- **Display**
  - LCD.
- **Window**
  - laminated safety glass.
- **Sensor**
  - capacitive.
- **Wetted parts**
  - AISI 316L stainless steel.;
  - exotic materials.
- **Differential element filling liquid**
  - silicone fluid.
- **Bolt and nut fastenings**
  - carbon steel plated with cadmium.
- **Pressure connections**
  - 1/4 - 18 NPT (1/4 NPT female) thread.
- **Mounting**
  - 2" pipe clamp, standard;
  - surface bracket, on request.
- **Ambient temperature**
  - -20 ÷ +85 °C.
- **Operating temperature**
  - -20 ÷ +80 °C.
- **Ambient humidity**
  - 5 ÷ 95% RH.
- **Weight**
  - ~ 2,650 kg

SE 129 - D

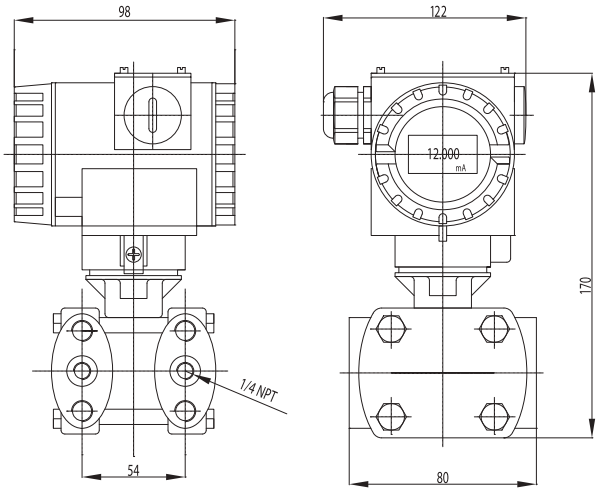


Table SE 2
Sensors range and static pressure

Sensor range		Static pressure	Sensor range		Static pressure
Code	kPa	MPa	Code	kPa	MPa
1	0/0,06 ÷ 0,3	0,4	6	0/160 ÷ 1000	40
2	0/0,25 ÷ 1,5	0,4	7	0/400 ÷ 2500	40
3	0/1,2 ÷ 10	40	8	0/1600 ÷ 8000	40
4	0/6 ÷ 40	40	9	0/4000 ÷ 25000	40
5	0/30 ÷ 180	40	0	0/7000 ÷ 40000	40

APPLICATIONS

- **Diaphragm seal (see FP series)**
  in this case the instrument can be identified by the number of the chosen model, adding the reference of the suitable diaphragm seal among those of FP series.
  (identification FP...)
- **PC Software**
- **PC connection cable RS 232**
- **PC connection cable USB**

note: informations shown in this series may be changed at any time without prior notice.

HART® PROTOCOL PRESSURE TRANSMITTERS SE 129 SERIES

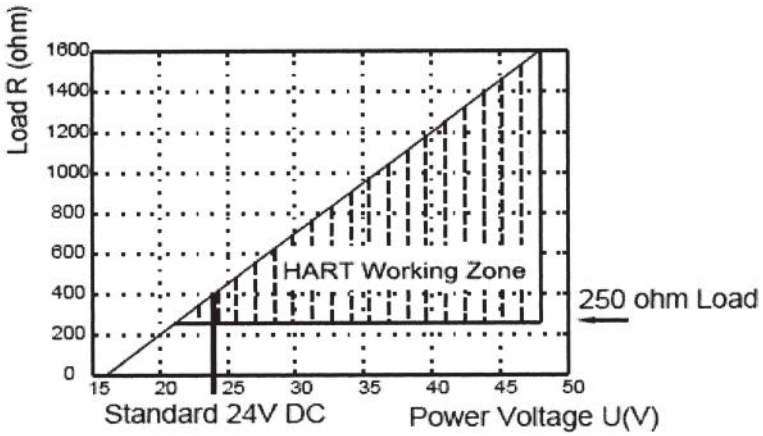
SE 129 Series Digital *Intelligent Pressure/Differential Pressure Transmitter is a multipurpose digitalized intelligent instrument developed by Fantinelli srl , including capacitance pressure /differential pressure transmitter and directcoupled pressure/ level transmitter.
It is made on the basis of the mature and dependable sensing technology, combining the advanced single-chip computer technology and sensor digital convert technology. 16-bit single chip is adopted as its core element, with its powerful function and high-speed calculation capacity ensuring the excellent quality of the transmitter. The whole design frame focuses on its dependability, stability and high precision and intelligentization, meeting the growing demand in on-site industrial use. To get this goal, digitalized signal processing technology is used in the software to ensure its disturbance capacity and zero point stability. Meanwhile, it has the Zero Stability Capacity (ZSC) and Temperature Supplementing Capacity (TSC). The powerful interface functions guarantees an excellent interactivity with no need of manual operator. Its digitalized meter head can display 3 physical parameters including pressure, temperature and current, and 0-100% analogue indications. Keystroke operation can finish the basic settings of zero shift, range setting, damping setting under the circumstance of no standard pressure, greatly convenient for the onsite debugging.
Note: the users are recommended to use in the above ranges, and adopt 100:1 in the extreme state.
The compressed range adopts the following formula to calculate its precision:

$$0.05 + \left(0.05 \times \frac{\text{Rating Range}}{\text{Setting Range - Zero Point Transfer Amount}}\right) \% \text{ FS}$$

1 Functional indices

1.1 Technical indices of SE 129 Series Digital•Intelligent Pressure/Differential Pressure Transmitter

Functional specifications:
(Reference conditions: no-transfer state, silicone oil fill fluid, 316L isolating diaphragm)
Output signal: 4-20mA DC/HART protocol digital communications
Transmission mode: 2-wire



Precision:
Linear output: ±0.075 - ±0.1% (rangeability is 1:1), including the linear, differential and repeated errors).
Square root output: at the output pressure of 4 - 100%, the value is ±(0.2% marked range + the upper limit of 0.05%).
Stability: for DP code 3, 4 and 5, it is ±0.2% of the maximum range, for other codes, ±0.25% of the maximum range.
Humidity: relative humidity 0 - 100%.
Startup time: at the minimum damping, within 2 sec.
Cubage absorbing amount: less than 0.16 cm^3.
Damping: electrical damping is 0-32 sec.
In addition, the sensor has an extra 0.2 sec invariable damping time (0.4 sec for range code 3).

Static pressure effect (DP transmitter):
Zero error: as for 14 MPa, it is ±0.25% in the maximum; for the range code 3, ±0.5% of the maximum. It can be calibrated through zero point adjustment.
Range error: it can be calibrated to ±0.25% of the input reading for each 6 Mpa; or for range code 3, it is ±0.5%. This error can be eliminated before mounting.

Static pressure effect (HP transmitter):
Zero error: as for 32 MPa, it is ±1.0% in the maximum; it can be calibrated through zero point adjustment.

Temperature effect:
Zero point error at the maximum range:
For each 56 °C, it is ± 0.5% of the range. The overall effect includes range error and zero point error: for each 56°C , it is ±1.0% of the range.
For range code 3, the effect is doubled.
Zero point error at the minimum range:
For each 56 °C , it is ±3.0% of the range. The overall effect includes range error and zero point error: for each 56 °C, it is ±3.5% of the range.
For range code 3, the effect is doubled.

Vibration effect:
At a frequency of 0 - 200 Hz, each g on any directions is the upper limit value of ±0.05%.

Power effect:
Less than 0.005%/V of marked range

Mounting position effect:
Zero point excursion not more than (0.25 kPa); this error can be eliminated with no influence on the range.

Electromagnetic disturbance/radioactive frequency effect:
Test is done according to SAMA PMC33.1 in the range of 20÷1000 MHz, the magnetic strength can be as high as 30 V/m.

Structural specifications:
Materials touching agents:
Isolating diaphragm: 316L stainless steel, Hastelloy C276, Monel or tantalum (optional).
Vent/drain valve: 316 stainless steel, Hastelloy C276, Monel or tantalum.
Flange and connector:
316 stainless steel, Hastelloy C276, Monel alloy or tantalum.
- O-ring touching agents: fluorine rubber, Buna-N rubber (optional).
- Fill fluid: silicone oil.
- Bolt: carbon steel plated with cadmium.
- O-ring sealing: Buna-N rubber, fluorine rubber (optional).
- Painting: polyurethane.

Connector:
For the transmitters with range code 3, 4 and 5, the center connection holes distance between two flanges is 54 mm, with the upper hole part of NPT 1/4-18; for the transmitters with range 6 and 7, they 56 mm and NPT 1/4-18; for range code 8, they are 57.2 mm and NPT 1/4-18.
For the transmitters with range code 3, 4 and 5, pressure-introducing hole of the 2 connectors is NPT 1/4-14, the flange connector can be turn over to have the center distances of respective 50.8 mm, 54 mm or 57.2 mm.
Electrical connectors: with the terminals for on-site test weight: excluding optional pieces, AP, DP, GP and HP weighs respectively 2,650 kg.

1.2 Usage conditions:

Power supply:
16 -48 V DC intrinsically safety type explosion-proof products are
required to get a power supply from the corresponding safe barrier (Standard 24 V DC)
Using environment of product:
Using temperature: -20 - +80 °C
Storage temperature: -40 - +104 °C
Humidity: 0 - 90%
Using environment conditions for explosion-proof product:
Using temperature: -20 - +40 °C
Relative humidity: 5 - 95%
Atmosphere pressure: 86 - 106 kPa

Parameters for intrinsically safety type outsourcing safe barrier:
U0 ≤ 28 V DC,
I0 ≤ 30 mA,
PO ≤ 0.84 W

2 Accessories
Our digital intelligent transmitter is attached with the following accessories for the user's convenience.
User's manual 1 copy
Mounting bracket 1 set *
M10 bolt 4 pieces*
*(Note: direct-coupled is not attached with mounting bracket and M10 bolts).

3 Precautions
1) Correctly wiring as per the requirements described in the instructions.
2) This product is precise measuring instrument. Do not beat it, strike it, or forcedly bind it, nor dismantle it, thrust the pressure introducing hole or metal diaphragm with sharp articles.
3) The transmitter should be mounted in a place where is ventilated, dry, free from corrosion and cool.
4) If the measurement agent is a viscid fluid or the one with floating granules, avoid the diaphragm being struck and the probe being jammed.
5) It is prohibited that the system is overloaded, exceeding the limitation stipulated in the instruction.
6) Keep the cable connector being sealed to avoid letting in the water or humidity, which may affect the integral performance and longevity.
7) In the case of abnormal output, shut down the transmitter for a check. If it is due to the product quality problem, please bring the product with the qualification certificate back to our company for a maintenance or change.
8) With the constant improvement of the product technology, no separate notice will be given concerning the alternation of product performance.

4 Additional declarations to SE 129 transmitter

4.1 Keys functions

1) The external key is used to calibrate the transmitter at no differential pressure. So when press down this key, the differential pressure to the transmitter must be zero.
2) If press down "DOWN" buttons for at least 5 sec, zero setting will be performed.
3) If press down "MOVE" and "DOWN" buttons for at least 5 sec, setting of lower range value will be performed.
4) If press down "UP" buttons for at least 5 sec, the setting of upper range value will be performed.

4.2 Engineering units

Our transmitter supports up to 18 units. These units are: "kPa", "MPa", "mA", "%", " ? ", "inH2O" "inHg" "ftH2O" "mmH2O" "mmHg" "psi" "bar" "mbar" "g/cm2" "kg/cm2" "Pa" "torr", "atm". But the latter 13 units can't be display on the LCD, so the LCD only displays the code.
According to HART protocol, followings are the pairs of code and unit :
1—"inH2O", 2—"inHg", 3—"ftH2O", 4—"mmH2O", 5—"mmHg", 6—"psi", 7—"bar", 8—"mbar", 9—"g/cm2", 10—"kg/cm2", 11- "Pa", 13—"torr", 14—"atm".
When changing unit, the corresponding unit will occur on the LCD, except for that the unit is one of the latter 13 units. In case of that, the HART unit code will be displayed on the LCD.
When unit has been changed for pressure, the range values of transmitter will be changed correspondingly.