



INDUSTRIALHUB BD

RELIABILITY & ENGINEERING SERVICE PARTNER

PRESSURE SENSOR AND SWITCH

Choose, fit and check pressure transmitters and switches.



How to use this guide

For engineers who select, fit and check pressure transmitters and pressure switches on hydraulic and process plant.

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HOW TO USE IT

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Transmitter, plug connection



Transmitter, compact series



Transmitter, cable version

Data status

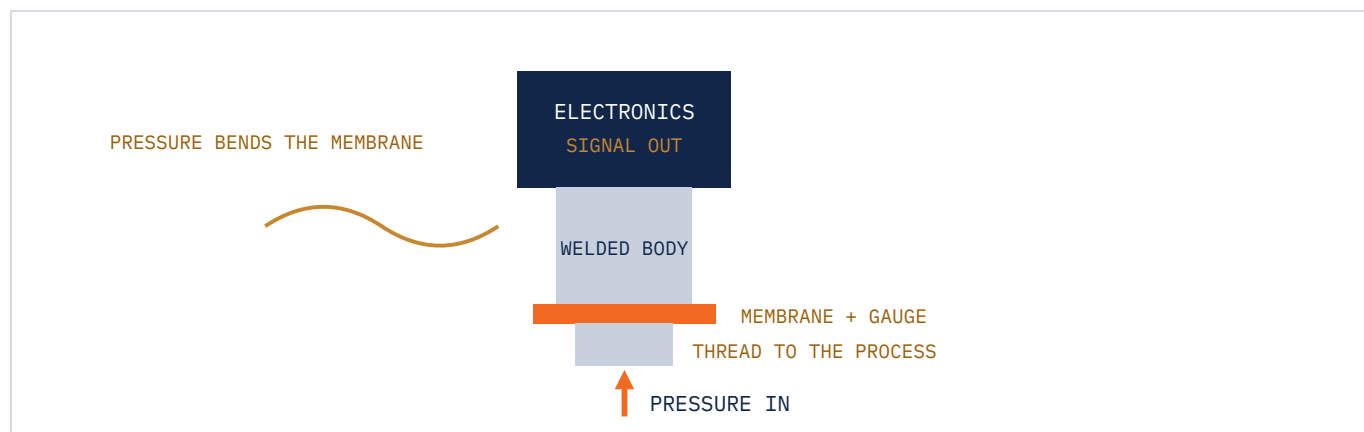
Values are typical catalogue data and general practice. Confirm range, output and limits against the datasheet of your own sensor. Not stated means the documents we reviewed do not list it. Photos come from those documents; confirm usage rights before external use.

Read this first: most sensor failures come from the wrong range, a pressure spike or a wiring error. Check these three first.

How a pressure sensor works

A pressure sensor turns pressure into an electrical signal. A transmitter gives a continuous value. A switch gives on or off.

THE SIGNAL CHAIN



Transmitter

Continuous output: 4–20 mA, 0–10 V or ratiometric. For controls and monitoring.

Pressure switch

Switches at a set point. A display shows pressure and switch state.

IO-Link switch

Switching plus digital data: remote set-up, diagnosis and device temperature.

COMMON OUTPUT SIGNALS

4–20 mA	0–10 V	0–5 V	1–6 V
0.5–4.5 V ratiometric	PNP / NPN switching	IO-Link	

0.125–0.5 %

typical accuracy, full scale

1 to 2 ms

rise time, transmitters

> 10 million

load cycles, typical

KEY NOTE • HOW IT WORKS

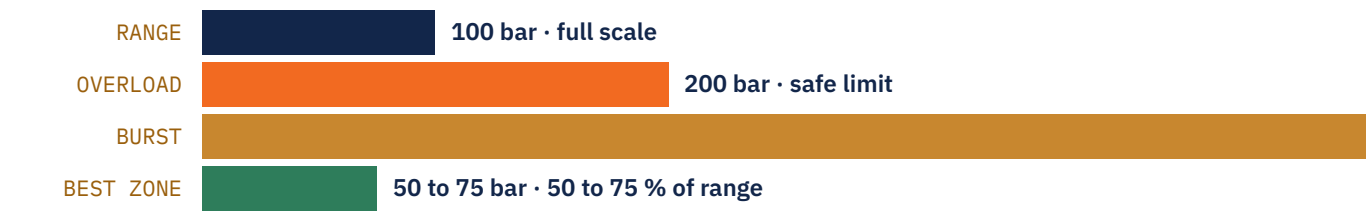
Inside the sensor, pressure pushes on a thin steel membrane and bends it by a tiny amount. A strain gauge on the membrane changes its electrical resistance as it bends, and the electronics turn that change into a clean signal. The sensing cell is the same in every type; what differs is the electronics, so pick the output your PLC or controller expects.

Same sensing cell, different electronics. Choose the output that your controller or PLC expects.

Pressure basics and ratings

Know the range, the overload and the burst pressure. The range is not the limit.

RANGE, OVERLOAD AND BURST, EXAMPLE 100 BAR SENSOR



THREE PRESSURE TYPES

Gauge (relative) Measured against the air around. Most hydraulic and pneumatic sensors.	Absolute Measured against a vacuum. Used for vacuum and weather-stable readings.	Differential The difference between two ports. Filters, flow and level.
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UNIT CONVERSION

Bar	psi	MPa	kPa
1 bar	14.5	0.1	100
10 bar	145	1	1,000
100 bar	1,450	10	10,000
250 bar	3,626	25	25,000
600 bar	8,702	60	60,000

KEY NOTE · HOW IT WORKS

Three numbers protect the sensor. Range is where it measures accurately. Overload is the highest pressure it can see and still come back to normal. Burst is where it breaks. Spikes from valves and pumps can be far above the normal pressure, so size the range for normal pressure and protect against the spikes with an orifice or snubber.

Do not size for the peak. Keep normal pressure at 50 to 75 % of range and spikes below the overload value.

Choose the right sensor

Eight checks pick the right sensor. Work through them in order.

1 Pressure range

Normal pressure at 50 to 75 % of full scale.

2 Overload and burst

Peaks must stay below overload.

3 Medium

Oil, water, gas or aggressive fluid. Check seal and body material.

4 Output signal

4–20 mA, 0–10 V, ratiometric, switching or IO-Link.

5 Process connection

Thread type, size and sealing, for example G1/4.

6 Accuracy

Typical 0.125 to 0.5 % full scale.

7 Temperature

Fluid and ambient, plus drift over temperature.

8 Environment

Vibration, EMC, IP rating and approvals.



General purpose



Compact



High precision



Switch with display

KEY NOTE • HOW IT WORKS

Work down the list in order, because each check narrows the next. Range and overload decide the cell. The medium decides the body and seal. Only then do output, thread and environment pick the exact model. Skipping the medium check is how a good sensor ends up with the wrong seal and a leak.

Rule of thumb: transmitter for control and trending, switch for limits and protection, IO-Link for networked machines.

Transmitters in detail

Four typical transmitter types. All use a stainless steel sensor cell with a thin-film strain gauge.



TYPICAL CATALOGUE DATA

Item	General purpose	Compact	Series, mobile	High precision
Accuracy, typical	0.5 % FS	0.5 % FS	0.25 % FS	0.125 % FS
Ranges	–1 to 2,000 bar	10 to 1,000 bar	25 to 600 bar	16 to 1,000 bar
Output	4–20 mA, 2-wire	4–20 mA, 2-wire	4–20 mA, 0–5 V, 1–6 V, 0–10 V, ratiometric	4–20 mA, 2-wire
Rise time	≤ 1 ms	≤ 2 ms	≤ 1.5 ms	≤ 1 ms
Fluid temperature	–40 to +100 °C	–40 to +100 °C	–40 to +125 °C	–40 to +100 °C
Protection	IP65 / IP67	IP67	IP65 to IP6K9K	IP67 / IP68 cable
Weight	About 150 g	About 60 g	About 55 g	About 180 g

High precision type

Very low temperature error and excellent EMC. Built for steel works and rolling mills.

Series and mobile type

Many plugs and signals. Road approval available for vehicles.

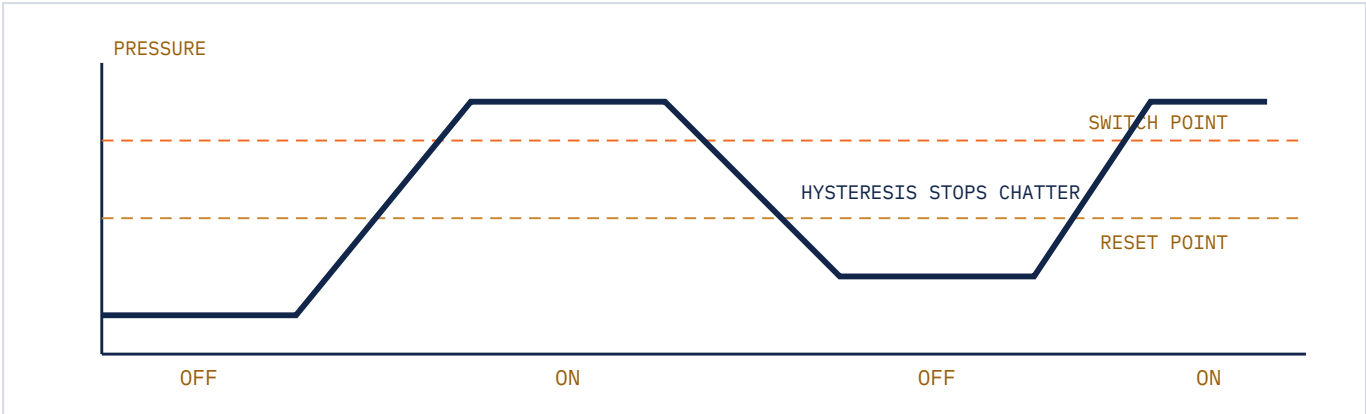
KEY NOTE · HOW IT WORKS

FS means full scale, the top of the measuring range. An accuracy of 0.5 % FS on a 100 bar sensor means up to 0.5 bar of error, wherever you read it on the scale. That is why a sensor with a range far above the working pressure reads poorly: the same error is a bigger share of a small reading.

FS means full scale. Accuracy is a typical value. Total error also includes temperature and long-term drift.

Pressure switches

A pressure switch turns an output on and off at set pressures. The display shows the value and the switch state.



TYPICAL CATALOGUE DATA

Item	Display	Series	IO-Link
Outputs	1 or 2 PNP, plus analogue option	1 or 2, PNP or NPN	2 switching, or 1 + analogue
Ranges	–1 to 1,000 bar	1 to 600 bar	–1 to 1,000 bar
Display	4-digit LED, turns 2 ways	None	4-digit, colour
Reaction	< 10 ms	Delay 8 to 2,000 ms	< 10 ms
Supply	9 to 35 V DC	8 to 42 V DC	9 to 35 V DC
Protection	IP67	IP65 / IP67	IP67
Interface	Switching, analogue	Switching	IO-Link V1.1

Switch point
Pressure at which the output turns on.

Hysteresis
Gap that keeps the output from chattering.

N/O or N/C
Choose the output state in alarm.

Delay
Ignore short spikes before switching.

KEY NOTE · HOW IT WORKS

A switch turns on at one pressure and off at a lower one. The gap between them is the hysteresis, and it stops the output from flicking on and off when pressure hovers around the set point. Add a delay if short spikes should be ignored. The switch point is the number; the hysteresis is what makes it behave.

Lock the settings. Use the programming lock so nobody changes a safety switch point by accident.

Install and wire

Six steps give a safe, leak-free and stable installation.

1 Make it safe

Isolate and release the pressure first.

2 Check the thread

Clean thread and sealing face.
Check the seal material.

3 Fit and torque

G1/4: 20 Nm. G1/2: 45 Nm. Do not over-tighten.

4 Protect it

Use an orifice or snubber against spikes. Keep away from heat.

5 Wire it

Follow the pin plan. Shielded cable, away from power cables.

6 Power up

Check zero at 0 bar, then watch the first cycle.

THREAD, TORQUE AND SEAL

Thread	Torque	Seal
G1/4 A, ISO 1179-2	20 Nm	FKM or copper
G1/2 A, ISO 1179-2	45 Nm	NBR or copper
M14x1.5 or 9/16-18 UNF	Per drawing	FKM

TWO-WIRE CURRENT LOOP



One loop: the same current flows through all three.

Check the load

Maximum load = (supply – 10 V) ÷ 20 mA. At 24 V that is 700 Ω.

Protection built in

Typical sensors resist reverse polarity, over-voltage and short circuit.

KEY NOTE • HOW IT WORKS

A two-wire sensor shares one pair of wires for power and signal. It uses between 4 and 20 mA to report pressure, and needs at least about 10 V across it to work. What is left of the supply voltage is the room for the input card, so a long cable or a high load resistance can starve the sensor. Check the load before you wire it.

Never loosen a sensor under pressure. Release the pressure and confirm zero on a gauge before you open the connection.

Check, scale and fix

Check zero and one known point. Compare the signal with the pressure it should show.

MEASURING RANGE ON THE 4–20 mA SIGNAL

Fault	4 mA	8 mA	12 mA	16 mA	20 mA
below 3.6 mA	0 %	25 %	50 %	75 %	100 %

$$\text{PRESSURE} = (\text{CURRENT} - 4 \text{ mA}) \div 16 \text{ mA} \times \text{FULL SCALE}$$

EXAMPLE: 0 TO 100 BAR

Share	Current	Voltage	Pressure
0 %	4 mA	0 V	0 bar
25 %	8 mA	2.5 V	25 bar
50 %	12 mA	5 V	50 bar
75 %	16 mA	7.5 V	75 bar
100 %	20 mA	10 V	100 bar

CHECK ONCE A YEAR

- Zero at 0 bar
- One point against a test gauge
- Seal and thread dry
- Connector tight
- Cable undamaged

FIND THE FAULT

Symptom	Likely cause	Fix
Reads below 4 mA	Open loop or loose wire	Check cable, plug and polarity
Stuck at 4 mA	No pressure, or blocked port	Clear the orifice; test with a gauge
Reading drifts	Heat, or zero shifted	Check temperature; re-zero at 0 bar
Noisy signal	EMC or a poor shield	Shielded cable; earth one end
Reads high at rest	Trapped pressure or damage	Release pressure; test at 0 bar
Switch chatters	Hysteresis or delay too low	Raise hysteresis; add delay

KEY NOTE · HOW IT WORKS

The 4 mA floor is deliberate: a live zero. A reading of 4 mA means zero pressure, while 0 mA means the loop is broken. That lets the controller tell an empty line from a dead sensor. To check scaling, apply a known pressure and compare the current with the table above.

Still wrong? Test with a known gauge. If the gauge agrees with the sensor, the fault is in the controller or the range set-up.

Global brands and cross-reference

IndustrialHub BD helps engineering teams choose pressure transmitters and switches by range, medium, output, connection and environment.

Hydac

TRANSMITTERS • SWITCHES

Brand marking is visible on the sensors in the source photos. Model data not stated.

WIKA

TRANSMITTERS • GAUGES

Global maker of pressure and temperature instruments. Model data not stated.

Endress+Hauser

PROCESS PRESSURE

Global maker of process instrumentation. Model data not stated.

Siemens

PROCESS PRESSURE

Global maker of process instrumentation and automation. Model data not stated.

VEGA

PRESSURE • LEVEL

Global maker of sensors for pressure and level. Model data not stated.

ifm

SENSORS • IO-LINK

Global maker of industrial sensors with IO-Link. Model data not stated.

CROSS-REFERENCE RULE

Never mix connectors, seals or cables between brands. Match these points against the maker's own data first, then compare the offers.

Pressure range	Overload and burst	Output signal	Accuracy, % FS	Process thread
Seal and wetted parts	Medium temperature	Protection class, IP	Connector and cable	Approvals

Maintenance team

Start from the job: range, medium, output and thread. Cross out the sensors that miss one of these, then shortlist on page 11.

We support solutions from recognized brands including Hydac, WIKA, Endress+Hauser, Siemens, VEGA and ifm, subject to technical suitability, product availability and specific customer requirements.

Global brand comparison statement

Four transmitter types and three switch types on the points that decide most selections. Use it to shortlist, then ask each supplier for the full data sheet.

MAJOR KEY POINTS • TRANSMITTERS

	General purpose	Compact	Series, mobile	High precision
Accuracy	0.5 % FS	0.5 % FS	0.25 % FS	0.125 % FS
Ranges	–1 to 2,000 bar	10 to 1,000 bar	25 to 600 bar	16 to 1,000 bar
Output	4–20 mA	4–20 mA	4–20 mA, 0–5 V, 1–6 V, 0–10 V	4–20 mA
Temperature	–40 to +100 °C	–40 to +100 °C	–40 to +125 °C	–40 to +100 °C
Protection	IP65 / IP67	IP67	IP65 to IP6K9K	IP67 / IP68
Best for	General plant use	Tight space	Mobile and vehicles	Rolling mills, precision

MAJOR KEY POINTS • SWITCHES

	Display switch	Series switch	IO-Link switch
Outputs	1 or 2 PNP, analogue option	1 or 2, PNP or NPN	2 switching, or 1 + analogue
Reaction	< 10 ms	Delay 8 to 2,000 ms	< 10 ms
Supply	9 to 35 V DC	8 to 42 V DC	9 to 35 V DC
Interface	Switching, analogue	Switching	IO-Link V1.1

How maintenance and procurement use this page

Maintenance picks the type by range, medium and output. Procurement then asks every supplier for the model and revision, thread and seal, connector and cable, calibration certificate, approvals, warranty and delivery time. Brand data for Hydac, WIKA, Endress+Hauser, Siemens, VEGA and ifm were not in the documents we reviewed; ask for current data sheets.

Not stated means the document we used does not list it. Ask for the current data sheet before you order. We support solutions from recognized brands including Hydac, WIKA, Endress+Hauser, Siemens, VEGA and ifm, subject to technical suitability, product availability and specific customer requirements.



REQUEST A QUOTATION

Send the pressure range, medium and temperature, output signal, thread and quantity. We reply with the right sensor, price and delivery time.

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WHO LEADS US

- Erect, commission and revamp mills
- Operation, maintenance & shutdowns
- Troubleshoot and spares

WHAT WE SUPPLY AND SUPPORT

PARTS

- Pressure transmitters
- Pressure switches, IO-Link
- Fittings, seals, cables
- Test gauges, calibrators

SUPPORT

- Pick the right sensor
- Range and output advice
- Install and wiring advice
- Quotation and delivery follow-up