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Operating instructions
Betriebsanleitung
Mode d'emploi
Manual de instrucciones

PSD-30

**Pressure switch /
Druckschalter /
Pressostat /
Interruptor automático por
aumento de presión**



PSD-30

WIKI

Part of your business

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Read these operating instructions **without fail** before installing and starting the pressure transmitter.

1. Important details for your information

Keep the operating instructions in a place that is accessible to all users at any time.

The following installation and operating instructions have been compiled by us with great care but it is not feasible to take all possible applications into consideration. These installation and operation instructions should meet the needs of most pressure measurement applications. If questions remain regarding a specific application, you can obtain further information:

- Via our Internet address www.wika.de / www.wika.com
- The product data sheet is designated as PE 81.67
- Contact WIKA for additional technical support (+49) 9372 / 132-295

With special model number, e.g. PSD-30000, please note specifications in the delivery note. If the serial number gets illegible (e.g. by mechanical damage or repainting), the retraceability of the instrument is not possible any more

WIKA pressure switches are carefully designed and manufactured using state-of-the-art technology. Every component undergoes strict quality and environmental inspection before assembly and each instrument is fully tested prior to shipment. Our environmental management system is certified to DIN EN ISO 14001.

Use of the product in accordance with the intended use PSD-30:

Use the pressure switch (indoor and outdoor) transform the pressure into an electrical signal.

Knowledge required

Install and start the pressure switch only if you are familiar with the relevant regulations and directives of your country and if you have the qualification required. You have to be acquainted with the rules and regulations on measurement and control technology and electric circuits, since this pressure switch is „electrical equipment“ as defined by EN 50178. Depending on the operating conditions of your application you have to have the corresponding knowledge, e.g. of aggressive media.

2. A quick overview for you

If you want to get a quick overview, read **Chapters 3, 5, 7 and 10**. There you will get some short safety instructions and important information on your product and its starting. **Read these chapters in any case.**

3. Signs, symbols and abbreviations



Potential danger of life or of severe injuries.



Potential danger of life or of severe injuries due to catapulting parts.



Potential danger of burns due to hot surfaces.



Notice, important information, malfunction.



The product complies with the applicable European directives.

- U+ Positive supply connection
- U- Negative supply connection
- SP1 Switching point 1
- SP2 Switching point 2
- S+ Analogue output
- 3-wire Two connection lines are intended for the voltage supply.
One connection line is intended for the measurement signal.

4. Function

The pressure prevailing within the application is transformed into a switching output or standardised electrical signal through the deflection of the diaphragm, which acts on the sensor element with the power supply fed to the transmitter. This electric signal changes in proportion to the pressure and can be evaluated correspondingly.

5. For your safety



- Select the appropriate pressure switch with regard to scale range, performance and specific measurement conditions prior to installing and starting the instrument.
- Observe the relevant national regulations (e.g.: EN 50178) and observe the applicable standards and directives for special applications (e.g. with dangerous media such as acetylene, flammable gases or liquids and toxic gases or liquids and with refrigeration plants or compressors). **If you do not observe the appropriate regulations, serious injuries and/or damage can occur!**
- **Open pressure connections only after the system is without pressure!**
- Please make sure that the pressure switch is only used within the overload threshold limit all the time!
- Observe the ambient and working conditions outlined in section 7 „Technical data”.
- Observe the technical data for the use of the pressure switch in connection with aggressive / corrosive media and for the avoidance of mechanical hazards.
- Ensure that the pressure switch is only operated in accordance with the provisions i.e. as described in the following instructions.
- Do not interfere with or change the pressure transmitter in any other way than described in these operating instructions.
- Remove the pressure switch from service and mark it to prevent it from being used again accidentally, if it becomes damaged or unsafe for operation
- **Take precautions with regard to remaining media in removed pressure transmitter. Remaining media in the pressure port may be hazardous or toxic!**
- Have repairs performed by the manufacturer only.
- Open circuit before removing connector.

6. Packaging

Has everything been supplied?



Check the scope of supply:

- Completely assembled pressure switches
- Ordered accessories

- Inspect the pressure switch for possible damage during transportation. Should there be any obvious damage, inform the transport company and WIKA without delay.
- Keep the packaging, as it offers optimal protection during transportation (e.g. changing installation location, shipment for repair).
- Ensure that the pressure connection thread and the connection contacts will not be damaged.

7. Starting, operation



Required tools: wrench (flats 27), screw driver

Diaphragm test for your safety

It is necessary that before starting the pressure switch you test the instrument visual, as the diaphragm is a **safety-relevant component**.

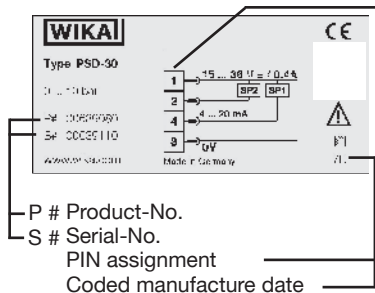


- Pay attention to any liquid leaking out, for this points to a diaphragm damage.
- Use the pressure switch only if the diaphragm is undamaged.
- Use the pressure switch only if it is in a faultless condition as far as the safety-relevant features are concerned.

Mechanical connection



Product label (example)



- Please refer to our data sheet “Pressure gauge sealing washers AC 09.08” in WIKA's product catalog Pressure and Temperature Measurement or our website www.wika.de for details about sealing washers.
- When mounting the instrument, ensure that the sealing faces of the instrument and the measuring point are clean and undamaged.
- Screw in or unscrew the instrument only via the flats using a suitable tool and the prescribed torque. The appropriate torque depends on the dimension of the pressure connection and on the sealing element used (form/material). Do not use the case as working surface for screwing in or unscrewing the instrument.
- When screwing the transmitter in, ensure that the threads are not jammed.
- For tapped holes and welding sockets please see Technical Information IN 00.14 for download at www.wika.de - Download

Electrical connection

- Connect the instrument to earth via the pressure connection.
- For power supply, use a circuit with energy limitation (EN/UL/IEC 61010-1, section 9.3) with the following maximum values for the current: with $U_B = 30\text{ V (DC)}$: 5 A. Provide a separate switch for the external power supply.
Alternative for North America: The connection may also be made to „Class 2 Circuits“ or „Class 2 Power Units“ according to CEC (Canadian Electrical Code) or NEC (National Electrical Code).

Wiring details

Circular connector M12x1, 4-pin



2 switching outputs or
1 switching output +
1 analogue output

$U_+ = 1$	$U_- = 3$	$SP\ 1 = 4$	$SP2 = 2 /$ $S_+ = 2$
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Circular connector M12x1, 5-pin



2 switching outputs + 1 analogue output

$U_+ = 1$	$U_- = 3$	$SP1 = 4$	$SP2 = 2$	$S_+ = 5$
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Ingress Protection per
IEC 60 529

IP 65 and IP 67

IP 65 and IP 67

The ingress protection classes specified only apply while the pressure transmitter is connected with female connectors that provide the corresponding ingress protection.

Specifications

Model PSD-30

Pressure ranges	bar	1	1.6	2.5	4	6	10	16	25
Over pressure safety	bar	2	3.2	5	8	12	20	32	50
Burst pressure	bar	5	10	10	17	34	34	100	100
Pressure ranges	bar	40	60	100	160	250	400	600	
Over pressure safety	bar	80	120	200	320	500	800	1200	
Burst pressure	bar	400	550	800	1000	1200	1700	2400	

MPa and kg/cm² are available

{Absolute pressure: 0 ... 1 bar bis 0 ... 25 bar}

{Vakuumdruck: -1 ... 0 bar bis -1 ... 24 bar}

Pressure ranges	psi	15	25	30	50	100	160	200	300
Over pressure safety	psi	30	60	60	100	200	290	400	600
Burst pressure	psi	75	150	150	250	500	500	1500	1500
Pressure ranges	psi	500	1000	1500	2000	3000	5000	8000	
Over pressure safety	psi	1000	1740	2900	4000	6000	10000	17400	
Burst pressure	psi	2500	7975	11600	14500	17400	24650	34800	

{Absolute pressure: 0 ... 15 psi bis 0 ... 300 psi}

Fatigue life 10 Mio. max. load cycles

Materials

■ Wetted parts

» Pressure connection

316 L

» Pressure sensor

316 L (up to 0 ... 10 bar rel 13-8 PH)

■ Case

» Lower body

316 L

» Plastic head

Highly resistive, fibreglass-enforced plastic (PBT)

» Keyboard

TPE-E

» Display disc

PC

Specifications

Model PSD-30

■ Internal transmission fluid		Synthetic Oil (only for pressure ranges < 0 ... 10 bar and ≤ 0 ... 25 bar abs)
Power supply U+	U+ in VDC	15 ... 36
Signal output and maximum ohmic load R _A	RA in Ohm	4 ... 20 mA, 3-wire RA ≤ 0,5 k 0 ... 10 V, 3-wire RA > 10 k
		Adjustment zero point offset, max. 3 % of span
Setting time (Analogue signal)	ms	3
Current consumption	mA	≤ 100
Switch points		Individually adjustable via external control keys
■ Type		Transistor switching output PNP or NPN
■ Number		1 or 2
■ Function		normally open / normally closed; windows- and hysteresis function freely adjustable
■ Contact rating	VDC	Supply voltage U+ - 1 V
■ Switching current	mA	250
■ Response time	ms	≤ 10
■ Accuracy	% of span	≤ 0.5 (setting accuracy)
Insulation voltage	VDC	500
Display		
■ Design		14-Segment-LED, red 4-digits, height 9 mm
■ Range		-1999 ... 9999, electronic 180° rotatable
■ Accuracy	% of span	≤ 1.0 ± 1 Digit
■ Update	ms	1000, 500, 200, 100 (adjustable)
Accuracy	% of span	≤ 1.0 *)
		*) Including non-linearity, hysteresis, zero point and full scale error (corresponds to error of measurement per IEC 61298-2)
Non-linearity	% of span	≤ ± 0.5 (BFSL) according to IEC 61298-2
Long-term drift	% of span	≤ 0.2 according to IEC 61298-2

Specifications

Model PSD-30





Permissible temperature of			
■ Medium **)		-20 ... +85 °C	-4 ... +185 °F
■ Ambience **)		-20 ... +80 °C	-4 ... +176 °F
■ Storage **)		-20 ... +80 °C	-4 ... +176 °F
	**) Also complies with EN 50178, Tab. 7, Operation (C) 4K4H, Storage		
Rated temperature range		0 ... +80 °C	+32 ... +176 °F
Temperature error within rated temperature range	% of span	≤ 1.0 typ., ≤ 2.5 max.	
Temperature coefficients within rated temperature range			
■ Mean TC of zero	% of span	≤ 0.2 / 10 K	
■ Mean TC of span	% of span	≤ 0.2 / 10 K	
Relative humidity	%	< 90	
RoHS-conformity		Yes	
CE-conformity			
■ Pressure equipment directive		This instrument is a pressure accessory as defined by the directive 97/23/EC	
■ EMC directive		2004/108/EEC, EN 61 326 Emission (Group 1, Class B) and Immunity (industrial locations)	
Shock resistance	g	50 according to IEC 60068-2-27 (mechanical shock)	
Vibration resistance	g	10 according to IEC 60068-2-6 (vibration under resonance)	
Wiring protection			
■ Overvoltage protection	VDC	40	
■ Short-circuit proofness		S+/SP1/SP2 towards U-	
■ Reverse polarity protection		U+ towards U-	
Weight	kg	Approx. 0.2	

{ } Items in curved brackets are optional extras for additional price.



When designing your plant, take into account that the stated values (e.g. burst pressure, over pressure safety) apply depending on the material, thread and sealing element used.

Keys and functions

	Display-Mode	Programming-Mode
	<p><i>short press:</i> Display units</p> <p><i>long press:</i> <i>Run-through Parameter Info</i></p> <ol style="list-style-type: none"> 1. UNIT + unit 2. SP1 / FH1 + value 3. RP1 / FL1 + value 4. SP2 / FH2 + value (optional) 5. RP2 / FL2 + value (optional) 6. LOW + value 7. HIGH + value 8. TAG + value (Only display when value set) 	<p><i>short press:</i> - Menu up - Increase parameter value</p> <p><i>long press:</i> - Menu up - Increase parameter value</p>
	<p><i>short press:</i> display units</p> <p><i>long press:</i> Switch to Programming Mode If the password is set to <> 0000, a password will be requested. If authentication is successful, then it enters the Programme Mode, otherwise it reverts to Display Mode.</p>	<p><i>short press:</i> - Menu down - Decrease parameter value</p> <p><i>long press:</i> - Menu down - Decrease parameter value (Increment rate is time dependent) long press (during Restart, keep pressed)</p>
	<p><i>short press:</i> display units</p>	<p><i>short press:</i> - Select Menu Item - Confirmation of the entry (Parameter value)</p>
	-	<p><i>short press (both keys at the same time):</i> Return to Display Mode</p>

- 4-digit LED display
- Display system pressure
 - Display Menu Item
 - Display Parameter
1. LED (red)
- Status Switch Output 1
2. LED (red)
- Status Switch Output 2 (Optional)

Operating Modes

- System start
- Display is fully activated for 2s
 - When the pressure switch is powered up within the range of the hysteresis, the output switch is set to „not active“ by default
- Display Mode
- normal operation, displays system pressure
- Programming Mode
- Setting Parameters

Parameter

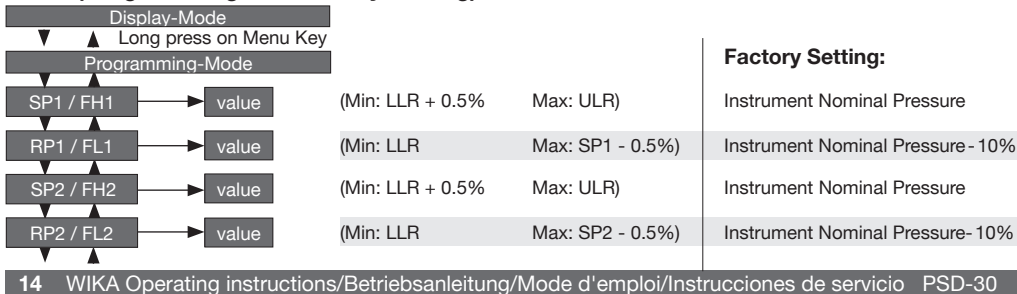
Parameter	Description
SP1 / SP2	Hysteresis function: Switch point Switch output (1 or 2)
FH1 / FH2	Window function: Window high switch output (1 or 2)
RP1 / RP2	Hysteresis function: Reset point switch output (1 or 2)
FL1 / FL2	Window function: Window Low switch output (1 or 2)
EF	Enhanced Programming Functions
RES	Return the set parameter to the Factory Settings
DS1	Switch Delay Time, which must occur without interruption before any electrical signal change occurs (SP1 or SP2)
DS2	
DR1	Switch Delay Time, which must occur without interruption before any electrical signal change occurs (RP1 or RP2)
DR2	
OU1	Switching Function Switching Output (1 or 2)
OU2	HNO = Hysteresis Function, normally open HNC = Hysteresis Function, normally closed FNO = Window Function, normally open FNC = Window Function, normally closed
UNIT	Changing Units (If the pressure range is higher than the display range, no change of the unit is possible and the parameter UNIT is not shown)

Parameter	Description
OSET	Zero Point adjustment (+ 3% of Nominal Pressure)
DISM	Display value in Display Mode ACT = Current System Pressure LOW, HIGH = Minimum, Maximum System Pressure OFF = Display off
DISU	Display-Update 1, 2, 5, 10 Updates/Second
DISR	Display rotate 180°
RHL	Clear the Min- and Max-value memory
PAS	Password input, 0000 = no password Password input Digit by Digit
TAG	Input of a 16-digit alphanumeric Measuring Point number

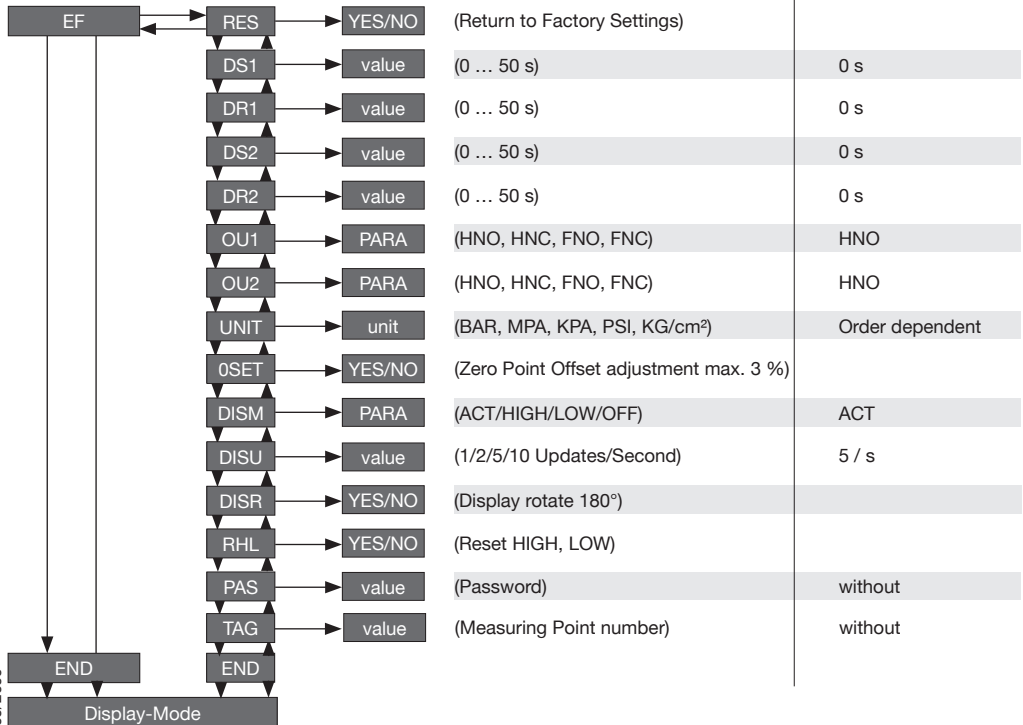
Error display Acknowledgement of an Error Display by pressing the „Enter“ key.

Error	Description
ATT1	On changing the Switch Point the system automatically reduces the Reset Point
ATT2	Zero Point adjustment error, current pressure is outside the limits
ATT3	Password entered for Menu access is incorrect
ERR	Internal error
OL	Overpressure, measuring range exceeded > approx. 5% (Display blinks)
UL	Underpressure, under measuring range < approx. 5% (Display blinks)

Menu (Programming and Factory Setting)



Factory Setting:



Legend:

LLR = lower limit of range

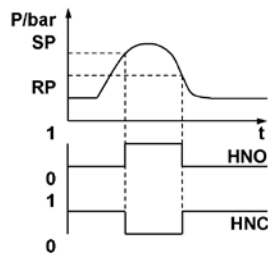
ULR = upper limit of range

Switch function

Hysteresis function

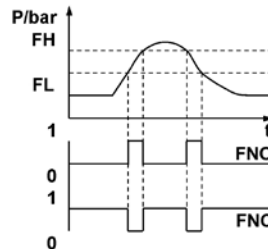
If the system pressure fluctuates around the nominal value, the hysteresis keeps the switch status of the outputs stable. When the system pressure is rising, the output switches when it reaches the respective set point (SP); if the pressure falls again, the output switches back only if the reset point (RP) is reached.

Application example: loading an accumulator. The shut-off valve loads up to 80 bar and then shuts off. When 70 bar is reached again, it switches on once more.



Window function

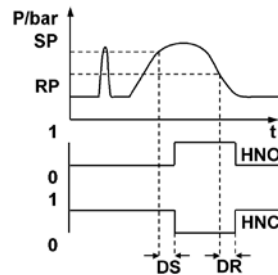
The window function allows the monitoring of a defined range. If the system pressure is between the window high (FH) and the window low (FL), the output is activated (NO) respective deactivated (NC).



Delay times (0.00 to 50 s):

By this means unwanted pressure peaks of short duration or high frequency can be filtered out.

The pressure must remain for at least this time to enable the switch to operate. The switching output does not immediately change its status when it reaches the switching event, but only after the delay time has elapsed. If the switching event no longer pertains when the delay time has elapsed, the switching output does not change.



Functional test

The output signal must be proportional to the pressure. If not, this might point to a damage of the diaphragm. In that case refer to chapter 9 „Trouble shooting“.



- Open pressure connections only after the system is without pressure!
- Observe the ambient and working conditions outlined in section 7 „Technical data.“
- Please make sure that the pressure switch is only used within the overload threshold limit at all times!



When touching the pressure switch, keep in mind that the surfaces of the instrument components might get hot during operation.

8. Maintenance, accessories

- WIKA pressure switches require no maintenance.
- Have repairs performed by the manufacturer only.

Accessories: Mounting clamp (Order No. 11467887)

For details about the accessories (e. g. connectors), please refer to WIKA's price list or contact our sales department.

9. Trouble shooting

Open pressure connections only after the system is without pressure!



- Take precautions with regard to remaining media in removed pressure switches. Remaining media in the pressure port may be hazardous or toxic!
- Remove the pressure switch from service and mark it to prevent it from being used again accidentally, if it becomes damaged or unsafe for operation.
- Have repairs performed by the manufacturer only.



Do not insert any pointed or hard objects into the pressure port for cleaning to prevent damage to the diaphragm of the pressure connection.

Please verify in advance if pressure is being applied (valves/ ball valve etc. open) and if the right voltage supply and the right type of wiring (3-wire) has been chosen?

Failure	Possible cause	Procedure
No output signal	Cable break	Check connections and cable
No output signal	No/incorrect voltage supply	Adjust the voltage supply to correspond with the Operating Instructions *)
No/False output signal	Incorrectly wired	Follow pin assignment (see Instrument Label / Operating Instructions)
Output signal unchanged after change in pressure	Mechanical overload through over-pressure	Replace instrument; if failure reoccurs, consult the manufacturer
Abnormal zero point signal	Overload limits exceeded	Ensure permissible overload limits are observed (see Operating Instructions)
Signal span too small	Mechanical overload through over-pressure	Replace instrument; if failure reoccurs, consult the manufacturer
Signal span too small	Power supply too high/too low	Correct the power supply in line with the Operating Instructions
Signal span drops off	Moisture present (e.g. at the cable tail)	Install the cable correctly
Signal span dropping off/too small	Diaphragm is damaged, e.g. through impact, abrasive/aggressive media; corrosion of diaphragm/pressure connector; transmission fluid missing.	Contact the manufacturer and replace the instrument

In case of unjustified reclamation we charge the reclamation handling expenses.

If the problem persists, contact our sales department.

Process material certificate (Contamination declaration for returned goods)

Purge / clean dismantled instruments before returning them in order to protect our employees and the environment from any hazard caused by adherent remaining media.

Service of instruments can only take place safely when a Product Return Form has been submitted and fully filled-in. This Return Form contains information on all materials with which the instrument has come into contact, either through installation, test purposes, or cleaning. You can find the Product Return Form on our internet site (www.wika.de / www.wika.com).

10. Storage, disposal



When storing or disposing of the pressure switch, take precautions with regard to remaining media in removed pressure transmitters. We recommend cleaning the transmitter properly and carefully. Remaining media in the pressure port may be hazardous or toxic!

Disposal



Dispose of instrument components and packaging materials in accordance with the respective waste treatment and disposal regulations of the region or country to which the instrument is supplied.

WIKA reserves the right to alter these technical specifications.