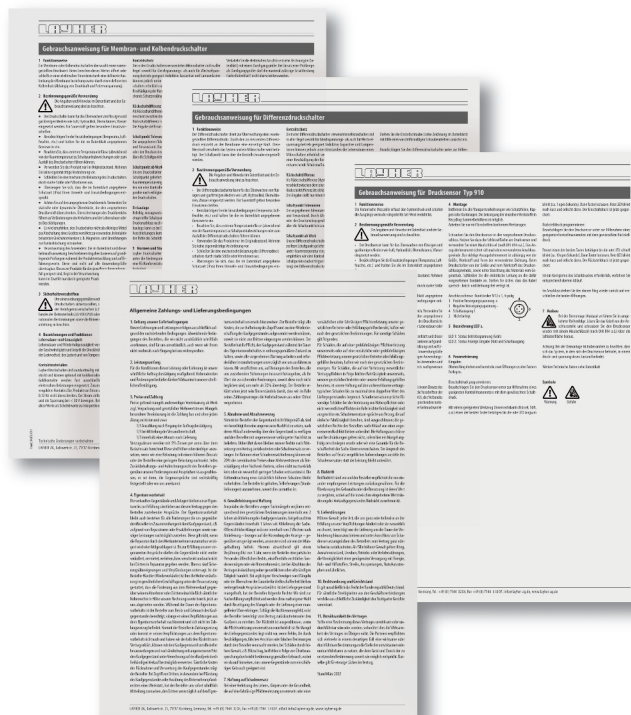


OPERATING INSTRUCTIONS INFORMATION Pressure Switch



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5-7	Operating instructions for Pressure Sensor Type 930
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Operating instructions for Differential Pressure Switch

1 Operation

The differential pressure switch is used to monitor a preset differential pressure. A one-sided force develops at the membrane as a result of the differential pressure to be measured. This measuring force offsets the system and a microswitch is activated. The switch-point can be set using the adjustment screw.

2 Intended use



Observe the specifications and information in the data sheet and the operating instructions.

- The differential pressure switch can be used for monitoring liquids and gaseous media such as air, hydraulic oil, oil emulsions and water. Special regulations apply for oxygen.
- Take into account the operating conditions (temperature, humidity, etc.) and comply with the limit values specified in the data sheet.
- Note that extreme temperature influences (differing to room temperature) can lead to switch-point deviations or failure of the differential pressure switch.
- Only use the product in the original condition. Do not make any unauthorised changes.
- Eliminate mechanical loading of the differential pressure switch due to heavy knocks or vibrations.
- Make sure that the protection class (IPxx) specified in the data sheet corresponds with your environmental and operating conditions.
- Observe the specified pressure range. Avoid static or dynamic overpressures that exceed the specified pressure range. Exceeding the pressure range causes changes to the behaviour and service life or damage.
- It is recommended not to use the differential pressure switch as the only means of switching off a device from the mains supply. Equipment for spark quenching is to be provided in inductively loaded DC circuits, e.g. magnets.
- Responsibility of the user: The specifications described in the data sheet and these operating instructions are based on basic tests during product development and empirical values. These can not be applied to all applications. It is the responsibility of the user to determine whether our products are suitable for the respective application and in case of doubt can only be verified by suitable practical tests.

3 Safety regulations



To ensure proper and safe use of the differential pressure switch, the regulations of the government safety organisations (e.g. BGV A3), the Association of Electrical Engineering (e.g. VDE 0702) or the relevant national regulations as well as these operating instructions must be observed.

4 Designations and functions

Service life and accuracy

The service life and repeat accuracy are affected by the speed and number of pressure changes, the number of load changes, the load type and the influences of temperature.

Contact materials

Layher differential pressure switches are fitted with silver contacts as standard and can be delivered with gold contacts as an option. Gold contacts are almost exclusively used for low electrical loads. In summary, the following applies for gold-plated contacts: The

product of current and voltage should not exceed 0.12 VA. The current flow should have a current < 400 mA and a voltage < 30 V. These values are to be interpreted as peak values for alternating current.

Contact protection

The microswitches used in the differential pressure switches are generally suitable for direct current as well as alternating current operation. However inductive, capacitive and lamp loads can significantly reduce the service life of a microswitch in certain circumstances and in extreme cases cause damage to the contacts. In such cases, appropriate protective measures are required.

Switch-back difference

The switch-back difference (hysteresis) is designated as the pressure difference between the upper and lower switch-point. The switch-back difference depends on the set switch-point. The specification only represents a typical average value.

Switch-point tolerances

The specified tolerances refer to room temperature and a new condition. These can change even beyond the switch-point tolerance due to ageing, the influence of temperature, media or the speed of pressure increase.

Switch-point set at the factory

Our differential pressure switches can be delivered with a switch-point that has already been set at the factory. These switch-points are set at room temperature. For critical applications, we recommend a check and, if necessary, a correction of the switch-points after final assembly (including cabling) of the differential pressure switch

Installation position

Any, preferably horizontal. Switch-points set at the factory are set for a horizontal installation position. Changing the installation position can lead to displacements for switch-points at the start of the pressure range. Ideally switch-points should lie in the middle of the switch-point range.

5 Norms and standards

Layher differential pressure switches with a rated voltage of 250 Volt are covered by the Low Voltage Directive. An EC declaration of conformity has been issued for these pressure switches and is kept at our office.

6 Assembly

Remove all transportation provisions such as protective films, caps or cardboard boxes. The individual materials can be disposed of in recycling collection containers. Only work with tools that comply with regulations.

Connect the connection lines on the media side. The pressure connections are labelled with "+" and "-" symbols on the device. The connection lines have to be connected according to this labelling. + higher pressure - lower pressure Connect the electrical line to the contacts provided. (See drawing in data sheet). Make sure that the cable is not crushed, bent or stretched when laid.

Caution: Improper procedures can destroy or damage the pressure switch.

7 Commissioning



The regulations of the government safety organisations and the relevant national regulations must be observed when commissioning the differential pressure switch.

Cable the electrical connections (see drawing in data sheet) with a continuity checker. The maximum permitted switching power (see data sheet) may not be exceeded when using a test lamp as a continuity tester.

First screw in the adjustment screw (see drawing in data sheet) with the aid of an approved screwdriver.



Apply the desired switching pressure to the differential pressure switch with the aid of a suitable inspection gauge.

Unscrew the adjustment screw until the continuity tester responds and the differential pressure switch switches.

Turn the adjustment screw accordingly if the switching pressure needs to be corrected.

8 Maintenance



The device is maintenance free and a check of the switch-points is at the discretion of the user. The usual preventative maintenance work must be performed in each case.

Large and continuous switch-point deviations can indicate that the switch is not used according to regulations, the limit values are exceeded or the device is too old.

9 Disassembly

Proceed in the reverse order for disassembly. Remove the cable from the connection point and unscrew the pressure lines.

Caution: When disassembling, make sure that the system in which the differential pressure switch is situated is in a depressurised state and disconnected from the power supply.

10 Technical data

Temperature resistance of the membranes and sealant.

Membranes

NBR	-25°C bis +85°C
FKM (Viton)	-5°C bis +120°C
EPDM	-25°C bis +120°C

Gasket

UR	-25°C bis +85°C
FKM (Viton)	-25°C bis +120°C

For additional technical data see data sheet

Symbols



Information



Warning



Hazard

Operating instructions for Pressure Sensor Type 900

1 Operation

The ceramic measuring cell records the system pressure and transmits it in the form of a voltage.

2 Intended use



Observe the specifications and information in the data sheet and the operating instructions.

- The pressure switch can be used for monitoring liquids and gaseous media such as air, hydraulic oil, oil emulsions and water. gasförmigen Medien wie Luft, Hydrauliköl, Ölemulsionen, Wasser eingesetzt werden.
- Take into account the operating conditions (temperature, humidity, etc.) and comply with the limit values specified in the data sheet.
- Only use the product in the original condition. Do not make any unauthorised changes.
- Eliminate mechanical loading due to heavy knocks or vibrations.
- Make sure that the protection class (IPxx) specified in the data sheet corresponds with your environmental and operating conditions.
- Observe the specified pressure range. Avoid static or dynamic overpressures that exceed the specified pressure range. Exceeding the pressure range causes changes to the behaviour and service life or damage.
- Responsibility of the user: The specifications described in the data sheet and these operating instructions are based on basic tests during product development and empirical values

These can not be applied to all applications. It is the responsibility of the user to determine whether our products are suitable for the respective application and in case of doubt can only be verified by suitable practical tests.

3 Safety regulations



To ensure proper and safe use of the pressure sensor, the regulations of the government safety organisations (e.g. BGV A3), the Association of Electrical Engineering (e.g. VDE 0702) or the relevant national regulations as well as these operating instructions must be observed.

4 Assembly

Remove all transportation provisions such as protective films, caps or cardboard boxes. The individual materials can be disposed of in recycling collection containers. Only work with tools that comply with regulations.

Screw the pressure sensor in the pressure connection provided. For this purpose, use the spanner flat at the pressure sensor and use a spanner (acc. to DIN 894 or similar). The tightening torque complies with the connection thread used. The correct tightening torque depends on the size, material and form of the seal used. For the pressure switch, it is dependent on the size and the material of the pressure connection thread as well taking into consideration the material of the counterpart. Connect the electrical line to the contacts provided. Make sure that the cable is not crushed, bent or stretched when laid.

Connection diagram of plug DIN EN 175301-803

- 1: Positive power supply + Uv
- 2: Negative power supply - Gnd
- 3: Output Uout



Caution: Improper procedures can destroy or damage the pressure switch.

5 Disassembly



Proceed in the reverse order for disassembly. Remove the cable from the connection point and unscrew the pressure sensor using a spanner (acc. to DIN 894 or similar) over the spanner flat attachment.

Caution: When disassembling, make sure that the system in which the pressure sensor is situated is in a depressurised state and disconnected from the power supply.

For additional technical data see data sheet

For additional technical data see data sheet

Symbols



Warning



Hazard

Operating instructions for Pressure Sensor Type 910

1 Operation

The ceramic measuring cell records the system pressure and switches the outputs when the set value is reached.

2 Intended use



Observe the specifications and information in the data sheet and the operating instructions.

- The pressure sensor can be used for monitoring liquids and gaseous media such as air, hydraulic oil, oil emulsions and water.
- Take into account the operating conditions (temperature, humidity, etc.) and comply with the limit values specified in the data sheet.
- Only use the product in the original condition. Do not make any unauthorised changes.
- Eliminate mechanical loading due to heavy knocks or vibrations.
- Make sure that the protection class (IPxx) specified in the data sheet corresponds with your environmental and operating conditions.
- Observe the specified pressure range. Avoid static or dynamic overpressures that exceed the specified pressure range. Exceeding the pressure range causes changes to the behaviour and service life or damage.
- Responsibility of the user: The specifications described in the data sheet and these operating instructions are based on basic tests during product development and empirical values. These can not be applied to all applications. It is the responsibility of the user to determine whether our products are suitable for the respective application and in case of doubt can only be verified by suitable practical tests.

3 Safety regulations



To ensure proper and safe use of the pressure sensor, the regulations of the government safety organisations (e.g. BGV A3), the Association of Electrical Engineering (e.g. VDE 0702) or the relevant national regulations as well as these operating instructions must be observed.

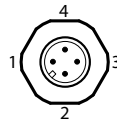
4 Assembly

Remove all transportation provisions such as protective films, caps or cardboard boxes. The individual materials can be disposed of in recycling collection containers. Only work with tools that comply with regulations.

Screw the pressure sensor in the pressure connection provided. For this purpose, use the spanner flat at the pressure sensor and use a spanner (acc. to DIN 894 or similar). The tightening torque complies with the connection thread used. The correct tightening torque depends on the size, material and form of the seal used. For the pressure switch, it is dependent on the size and the material of the pressure connection thread as well taking into consideration the material of the counterpart. Connect the electrical line to the contacts provided. Make sure that the cable is not crushed, bent or stretched when laid.

Connection diagram: Circular connector M12 x 1.4-pin

- 1 Positive power supply +
- 3 Negative power supply -
- 4 Switch output 1
- 2 Not reserved



5 Designation of LEDs.

- LED 1: Operating voltage status (green)
- LED 2: Status display of input (red) and switching output

6 Configuration of parameters

Input:

Turn upper ring and thus expose the two openings for the buttons.

Program switch-on pressure:

Apply the desired switching pressure to the pressure sensor with the aid of a suitable inspection gauge.

Press one of the two buttons until the red LED flashes slowly (approx. once every second) using a suitable tool (Allen key, pin, or

similar). Now release the button. Red LED still flashes briefly and then goes out. The switch-on pressure is now saved.

Program reset pressure:

Apply the desired reset pressure to the pressure sensor with the aid of a suitable inspection gauge.

Press one of the two buttons again until the red LED slowly quickly (approx. 10 x every second). Now release the button. Red LED still flashes briefly and then goes out. The reset pressure is now saved. Proceed with the sequence above if the switching pressure needs to be corrected.

Afterwards turn the upper ring back and close both openings.

7 Disassembly



Proceed in the reverse order for disassembly. Remove the cable from the connection point and unscrew the pressure sensor using a spanner (acc. to DIN 894 or similar) over the spanner flat attachment.

Caution: When disassembling, make sure that the system in which the pressure sensor is situated is in a depressurised state and disconnected from the power supply.

For additional technical data see data sheet

Symbols

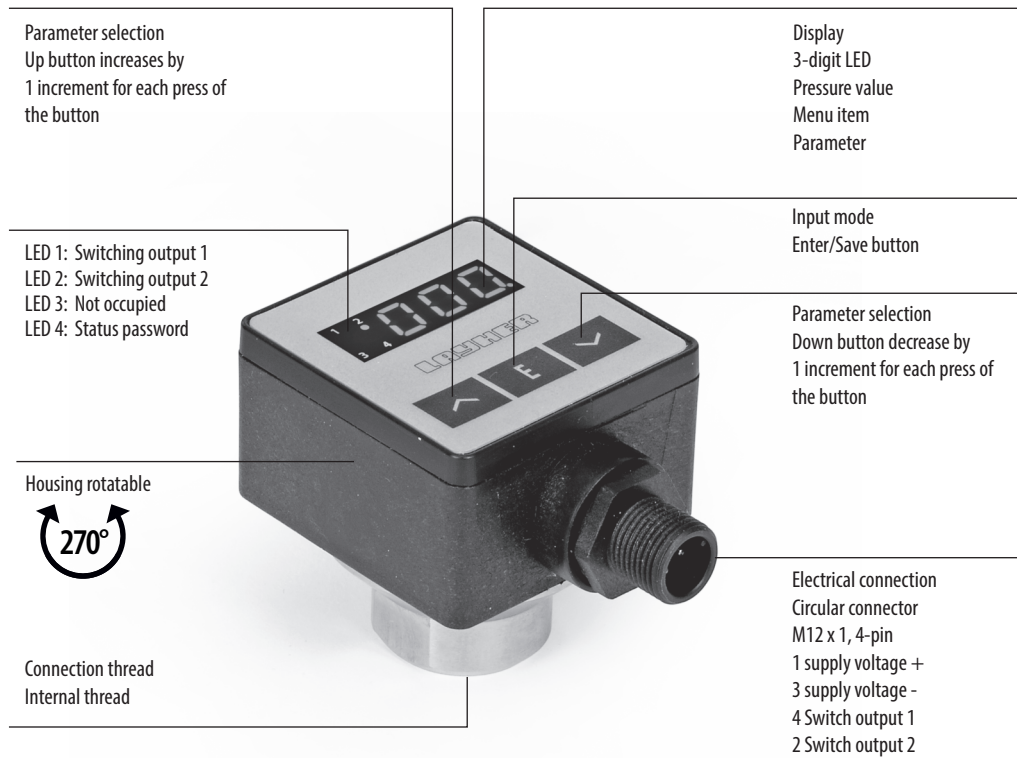


Warning



Hazard

Operating instructions for Pressure Sensor Type 930



1 Operation

The ceramic measuring cell records the system pressure and switches the outputs when the set value is reached.

2 Intended use



Observe the specifications and information in the data sheet and the operating instructions.

- The pressure sensor can be used for monitoring liquids and gaseous media such as air, hydraulic oil, oil emulsions and water.
- Take into account the operating conditions (temperature, humidity, etc.) and comply with the limit values specified in the data sheet.
- Only use the product in the original condition. Do not make any unauthorised changes.
- Eliminate mechanical loading due to heavy knocks or vibrations.
- Make sure that the protection class (IPxx) specified in the data sheet corresponds with your environmental and operating conditions.
- Observe the specified pressure range. Avoid static or dynamic overpressures that exceed the specified pressure range. Exceeding the pressure range causes changes to the behaviour and service life or damage.

ding the pressure range causes changes to the behaviour and service life or damage.

- Responsibility of the user: The specifications described in the data sheet and these operating instructions are based on basic tests during product development and empirical values. These can not be applied to all applications. It is the responsibility of the user to determine whether our products are suitable for the respective application and in case of doubt can only be verified by suitable practical tests.

3 Safety regulations



To ensure proper and safe use of the pressure sensor, the regulations of the government safety organisations (e.g. BGV A3), the Association of Electrical Engineering (e.g. VDE 0702) or the relevant national regulations as well as these operating instructions must be observed.

4 Assembly

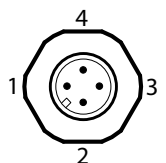
Remove all transportation provisions such as protective films, caps or cardboard boxes. The individual materials can be dispo-

sed of in recycling collection containers. Only work with tools that comply with regulations.

Screw the pressure sensor in the pressure connection provided. For this purpose, use the spanner flat at the pressure sensor and use a spanner (acc. to DIN 894 or similar). The tightening torque complies with the connection thread used. The correct tightening torque depends on the size, material and form of the seal used. For the pressure switch, it is dependent on the size and the material of the pressure connection thread as well taking into consideration the material of the counterpart. Connect the electrical line to the contacts provided. Make sure that the cable is not crushed, bent or stretched when laid.

Connection diagram: Circular connector M12 x 1, 4-pin

- 1 Positive power supply +
- 3 Negative power supply -
- 4 Switch output 1
- 2 Switch output 2





5 Designation of LEDs

- LED 1: Status of switching output 1
- LED 2: Status of switching output 2
- LED 3: Not reserved Password
- LED 4: Status Password



6 Configuration of parameters

Three keys are used for operation:

"^" The selected parameter increases by 1 each time the key is pressed. The value increases automatically when the key is pressed for longer than 2 seconds.

"E" The set value is applied.

"v" The selected parameter decreases by 1 each time the key is pressed. The value decreases automatically when the key is pressed for longer than 2 seconds.

Input:

If the "E" key is pressed from the basic state, input mode is accessed. This is indicated by the flashing display. The desired menu item is selected using the "Up" / "Down" keys and confirmed with "E". The value to be changed is then shown flashing on the display and can be entered using the "Up" / "Down" keys. When the desired value is displayed, it can be permanently transferred to the memory using the "E" key.

7 Removal

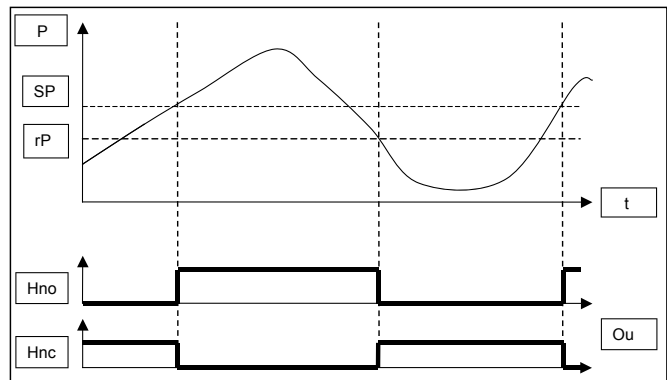
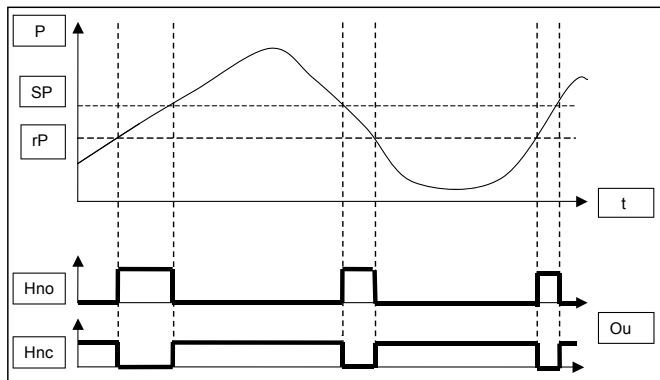


Proceed in the reverse order for disassembly. Remove the cable from the connection point and unscrew the pressure sensor using a spanner (acc. to DIN 894 or similar) over the spanner flat attachment.

Caution: When disassembling, make sure that the system in which the pressure sensor is situated is in a depressurised state and disconnected from the power supply.

For additional technical data see data sheet

8 Switching functions



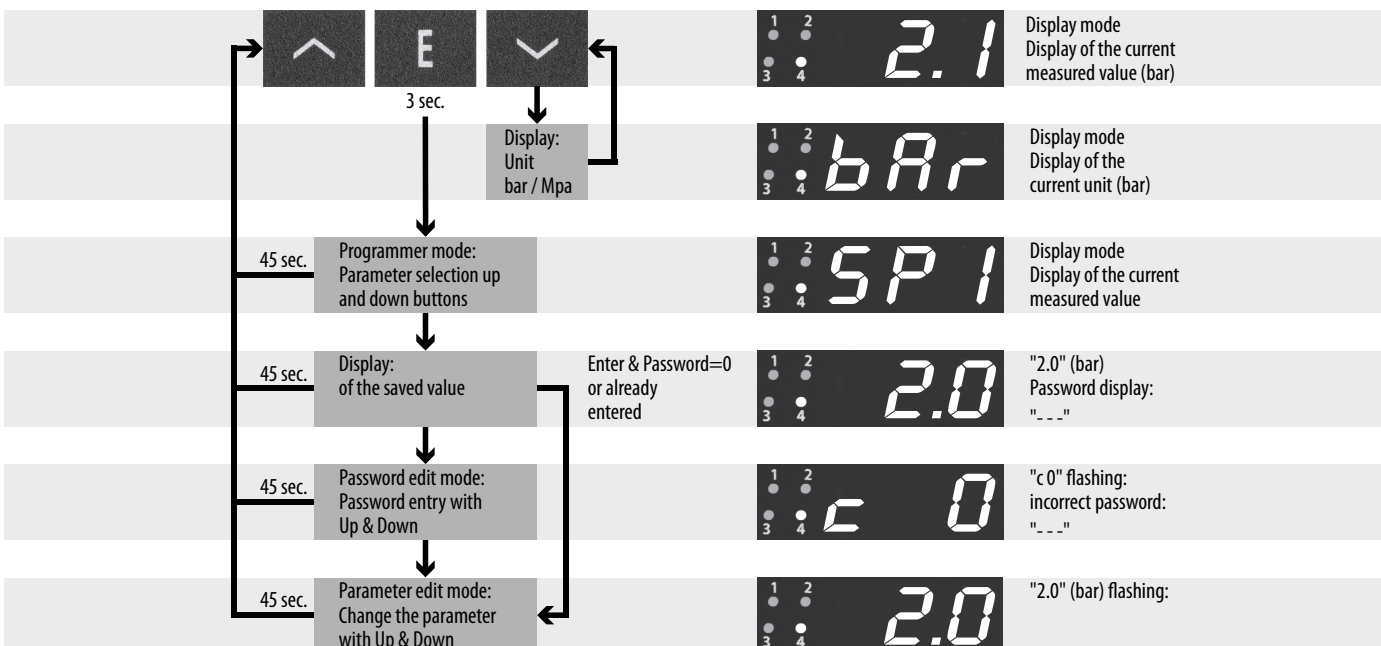
Window function:

The output changes for the input and output of the switching window (parameter SP. and rP.). Switch-on and switch-off times can be delayed (parameter dS. or dr.).

Hysteresis function:

The output (Ou..) changes when exceeding the switching point (parameter: SP.) and exceeding the reset point (parameter rP.). Switch-on and switch-off times can be delayed (parameter dS. or dr.).

9 Commissioning, operation, menu, programming



First menu level	Second menu level	Parameter Function	Quantization	Minimum value	Maximum value	Factory settings	Information
SP1		Switch-point 1	0.1 bar 0.01 Mpa	[rP1] [rP1]	[P11] [P11]	2.0 bar 0.2 Mpa	Function VDMA 24574-1 Hysteresis function: SP1 Window function: FH1
rP1		Reset-point 1	0.1 bar 0.01 Mpa	[P01] [P01]	[P11] [P11]	1.0 bar 0.1 Mpa	Function VDMA 24574-1 Hysteresis function: RP1 Window function: FL1
SP2		Switch-point 2	0.1 bar 0.01 Mpa	[rP2] [rP2]	[P11] [P11]	3.0 bar 0.3 Mpa	Function VDMA 24574-1 Hysteresis function: SP2 Window function: FH2
rP2		Reset-point 2	0.1 bar 0.01 Mpa	[P01] [P01]	[P11] [P11]	2.5 bar 0.25 Mpa	Function VDMA 24574-1 Hysteresis function: RP2 Window function: FL2
EF	rES	Factory settings	no yes	-	-	-	Function VDMA 24574-1
	dS1	Switch-on delay 1	0.1s	0s	30s	0s	Function VDMA 24574-1
	dr1	Switch-off delay 1	0.1s	0s	30s	0s	Function VDMA 24574-1
	dS2	Switch-on delay 2	0.1s	0s	30s	0s	Function VDMA 24574-1
	dr2	Switch-off delay 2	0.1s	0s	30s	0s	Function VDMA 24574-1
	Ou1	Configuration Output 1	Hno hysteresis normally closed Hnc hysteresis normally open	-	-	Hno	Function VDMA 24574-1 Normally closed: active high Normally open: Active low
	Ou2	Configuration Output 2	Hno hysteresis normally closed Hnc hysteresis normally open	-	-	Hno	Function VDMA 24574-1 Normally closed: active high Normally open: Active low
	uni	Mode	bar MPa Roll text Diagnostics function	-	-	bar	Function VDMA 24574-1 Pressure Presentation Diagnostics function
	dis	Display contrast	20%	20%	100%	80%	Function VDMA 24574-1
	cod	Password	1	0	99	0	0: no password and delivery state. Password expires after 60s of inactivity.
	P00 *	Measuring point 0	Increments of the analogue system 1023 Inc = 5.000V 1 Inc = 0.005V	0 Inc (0 Volt)	999 Inc (4.883 Volt)	102 Inc (0.498 Volt)	only for pressure mode P00=0: Reference input active P00<>0: Reference input inactive
	P01 *	Display point 0	0.1 bar 0.01MPa	0.0 bar 0.00 MPa	25 bar 2.50 MPa	0.0 bar 0.00 MPa	only for pressure mode
	P10 *	Measuring point 1	Increments of the analogue system 1023 Inc = 5.000V 1 Inc = 0.005V	0 Inc (0 Volt)	999 Inc (4.883 Volt)	920 Inc (4.497 Volt)	only for pressure mode
	P11 *	Display point 1	0.1 bar 0.01 MPa	0.0 bar 0.00 MPa	25 bar 2.50 MPa	10.0 bar 1.00 MPa	only for pressure mode
	P20 *	Sensor selection	10 bar 25 bar 100 bar 250 bar	-	-	-	Sensor selection

*P00 – P20: Functions for calibration at the factory. Calibration is lost if operated improperly!

Technical data subject to change without notice.

LAYHER AG, Kalkwerkstr. 23, 71737 Kirchberg, Germany, Tel. +49 (0) 7144 3204, Fax +49 (0) 7144 3 43 07, info@layher-ag.de, www.layher-ag.de

Operating instruction for Membrane and Piston Pressure Switch

1 Operation

A membrane or piston pressure switch monitors a preset pressure value. It opens or closes an electrical circuit as a result of a defined deflection of the membrane or a defined piston stroke when this value is reached (depending on the compressive force and spring preload).

2 Intended use



Observe the specifications and information in the data sheet and the operating instructions.

- The pressure switch can be used for monitoring liquids and gaseous media such as air, hydraulic oil, oil emulsions and water. Special regulations apply for oxygen.
- Take into account the operating conditions (temperature, humidity, etc.) and comply with the limit values specified in the data sheet.
- Note that extreme temperature influences (differing to room temperature) can lead to switch-point deviations or failure of the pressure switch.
- Only use the product in the original condition. Do not make any unauthorised changes.
- Eliminate mechanical loading of the pressure switch due to heavy knocks or vibrations.
- Make sure that the protection class (IPxx) specified in the data sheet corresponds with your environmental and operating conditions.
- Observe the specified pressure range. Avoid static or dynamic overpressures that exceed the specified pressure range. Exceeding the pressure range causes changes to the behaviour and service life or damage.
- It is recommended not to use the pressure switch as the only means of switching off a device from the mains supply. Equipment for spark quenching is to be provided in inductively loaded DC circuits, e.g. magnets.
- Responsibility of the user: The specifications described in the data sheet and these operating instructions are based on basic tests during product development and empirical values. These can not be applied to all applications. It is the responsibility of the user to determine whether our products are suitable for the respective application and in case of doubt can only be verified by suitable practical tests.

3 Safety regulations



To ensure proper and safe use of the pressure switch, the regulations of the government safety organisations (e.g. BGV A3), the Association of Electrical Engineering (e.g. VDE 0702) or the relevant national regulations as well as these operating instructions must be observed.

4 Designations and functions

Service life and accuracy

The service life and repeat accuracy are affected by the speed and number of pressure changes, the number of load changes, the load type and the influences of temperature.

Contact materials

Layher pressure switches are fitted with silver contacts as standard and can be delivered with gold contacts as an option. Gold contacts are almost exclusively used for low electrical loads. In summary, the following applies for gold-plated contacts: The product of cur-

rent and voltage should not exceed 0.12 VA. The current flow should have a current < 400 mA and a voltage < 30V. These values are to be interpreted as peak values for alternating current.

Contact protection

The microswitches used in the pressure switches are generally suitable for direct current as well as alternating current operation. However inductive, capacitive and lamp loads can significantly reduce the service life of a microswitch in certain circumstances and in extreme cases cause damage to the contacts. In such cases, appropriate protective measures are required.

Switch-back difference

The switch-back difference (hysteresis) is designated as the pressure difference between the upper and lower switch-point. The switch-back difference depends on the set switch-point. The specification only represents a typical average value.

Switch-point tolerances

The specified tolerances refer to room temperature and a new condition. These can change even beyond the switch-point tolerance due to ageing, the influence of temperature, media or the speed of pressure increase.

Switch-point set at the factory

Our pressure switches can be delivered with a switch-point that has already been set at the factory. These switch-points are set at room temperature. For critical applications, we recommend a check and, if necessary, a correction of the switch-points after final assembly (including cabling) of the pressure switch.

Installation position

Any, preferably with pressure connection below. Switch-points set at the factory have the pressure connection below for vertical installation positions. Changing the installation position can lead to displacements for switch-points at the start of the pressure range. Ideally switch-points should lie in the middle of the switch-point range.

5 Norms and standards

Layher pressure switches with a rated voltage of 250 Volt are covered by the Low Voltage Directive. An EC declaration of conformity has been issued for these pressure switches and is kept at our office.

6 Assembly

Remove all transportation provisions such as protective films, caps or cardboard boxes. The individual materials can be disposed of in recycling collection containers. Only work with tools that comply with regulations.

Screw the pressure switch in the pressure connection provided. For this purpose, use the hexagonal shaped attachment at the pressure switch and use a spanner (acc. to DIN 894 or similar). The tightening torque complies with the connection thread used. The correct tightening torque depends on the size, material and form of the seal used. For the pressure switch, it is dependent on the size and the material of the pressure connection thread as well taking into consideration the material of the counterpart. Connect the electrical line to the contacts provided. (See drawing in data sheet). Make sure that the cable is not crushed, bent or stretched when laid.

Caution: Improper procedures can destroy or damage the pressure switch.

7 Commissioning



The regulations of the government safety organisations and the relevant national regulations must be observed when commissioning the pressure switch.

Cable the electrical connections (see drawing in data sheet) with a continuity checker. The maximum permitted switching power (see data sheet) may not be exceeded when using a test lamp as a continuity tester.

First screw in the adjustment screw (see drawing in data sheet) with the aid of an approved screwdriver.

Apply the desired switching pressure to the pressure switch with the aid of a suitable inspection gauge.

Unscrew the adjustment screw until the continuity tester responds and the pressure switch switches.

Turn the adjustment screw accordingly if the switching pressure needs to be corrected.

8 Maintenance



The device is maintenance free and a check of the switch-points is at the discretion of the user. The usual preventative maintenance work must be performed in each case.

Large and continuous switch-point deviations can indicate that the switch is not used according to regulations, the limit values are exceeded or the device is too old.

9 Disassembly



Proceed in the reverse order for disassembly. Remove the cable from the connection point and unscrew the pressure switch using a spanner (acc. to DIN 894 or similar) over the hexagonal shaped attachment.

Caution: When disassembling, make sure that the system in which the pressure switch is situated is in a depressurised state and disconnected from the power supply.

10 Technical data

Temperature resistance of the membranes and sealant.

Membranes

NBR	-25°C bis +85°C
FKM (Viton)	-5°C bis +120°C
EPDM	-25°C bis +120°C
HNBR	-30°C bis +120°C

Gasket

UR	-25°C bis +85°C
FKM (Viton)	-25°C bis +120°C

For additional technical data see data sheet

Symbols



Information



Warning



Hazard

Operating instructions for Vacuum Switch

1 Operation

A vacuum switch monitors a preset vacuum value. It opens or closes an electrical circuit as a result of a defined deflection of the membranes or a defined piston stroke when this value is reached (depending on the compressive force and spring preload).

2 Intended use



Observe the specifications and information in the data sheet and the operating instructions.

- The vacuum switch can be used for monitoring liquids and gaseous media such as air, hydraulic oil, oil emulsions and water. Special regulations apply for oxygen.
- Take into account the operating conditions (temperature, humidity, etc.) and comply with the limit values specified in the data sheet.
- Note that extreme temperature influences (differing to room temperature) can lead to switch-point deviations or failure of the vacuum switch.
- Only use the product in the original condition. Do not make any unauthorised changes.
- Eliminate mechanical loading of the vacuum switch due to heavy knocks or vibrations.
- Make sure that the protection class (IPxx) specified in the data sheet corresponds with your environmental and operating conditions.
- Observe the specified vacuum range. Avoid static or dynamic overpressures that exceed the specified vacuum range. Exceeding the vacuum range causes changes to the behaviour and service life or damage.
- It is recommended not to use the vacuum switch as the only means of switching off a device from the mains supply. Equipment for spark quenching is to be provided in inductively loaded DC circuits, e.g. magnets.
- Responsibility of the user: The specifications described in the data sheet and these operating instructions are based on basic tests during product development and empirical values. These can not be applied to all applications. It is the responsibility of the user to determine whether our products are suitable for the respective application and in case of doubt can only be verified by suitable practical tests.

3 Safety regulations



To ensure proper and safe use of the vacuum sensor, the regulations of the government safety organisations (e.g. BGV A3), the Association of Electrical Engineering (e.g. VDE 0702) or the relevant national regulations as well as these operating instructions must be observed.

4 Designations and functions

Service life and accuracy

The service life and repeat accuracy are affected by the speed and number of vacuum changes, the number of load changes, the load type and the influences of temperature.

Contact materials

Layher vacuum switches are fitted with silver contacts as standard and can be delivered with gold contacts as an option. Gold contacts are almost exclusively used for low electrical loads. In summary, the following applies for gold-plated contacts: The product of current and voltage should not exceed 0.12 VA. The current flow

should have a current < 400 mA and a voltage < 30 V. These values are to be interpreted as peak values for alternating current.

Contact protection

The microswitches used in the vacuum pressure switches are generally suitable for direct current as well as alternating current operation. However inductive, capacitive and lamp loads can significantly reduce the service life of a microswitch in certain circumstances and in extreme cases cause damage to the contacts. In such cases, appropriate protective measures are required.

Switch-back difference

The switch-back difference (hysteresis) is designated as the vacuum difference between the upper and lower switch-point. The switch-back difference depends on the set switch-point. The specification only represents a typical average value.

Switch-point tolerances

The specified tolerances refer to room temperature and a new condition. These can change even beyond the switch-point tolerance due to ageing, the influence of temperature, media or the speed of vacuum increase.

Switch-point set at the factory

Our vacuum switches can be delivered with a switch-point that has already been set at the factory. These switch-points are set at room temperature. For critical applications, we recommend a check and, if necessary, a correction of the switch-points after final assembly (including cabling) of the vacuum switch.

Installation position

Any, preferably with vacuum connection below. Switch-points set at the factory have the vacuum connection below for vertical installation positions. Changing the installation position can lead to displacements for switch-points at the start of the vacuum range. Ideally switch-points should lie in the middle of the switch-point range.

5 Norms and standards

Layher vacuum switches with a rated voltage of 250 Volt are covered by the Low Voltage Directive. An EC declaration of conformity has been issued for these vacuum switches and is kept at our office.

6 Assembly

Remove all transportation provisions such as protective films, caps or cardboard boxes. The individual materials can be disposed of in recycling collection containers. Only work with tools that comply with regulations.

Screw the vacuum switch in the pressure connection provided. For this purpose, use the hexagonal shaped attachment at the vacuum switch and use a spanner (acc. to DIN 894 or similar). The tightening torque complies with the connection thread used. The correct tightening torque depends on the size, material and form of the seal used. For the vacuum switch, it is dependent on the size and the material of the vacuum connection thread as well taking into consideration the material of the counterpart. Connect the electrical line to the contacts provided. (See drawing in data sheet). Make sure that the cable is not crushed, bent or stretched when laid.

Caution: Improper procedures can destroy or damage the vacuum switch.

7 Commissioning



The regulations of the government safety organisations and the relevant national regulations must be observed when commissioning the vacuum switch.

Cable the electrical connections (see drawing in data sheet) with a continuity checker. The maximum permitted switching power (see data sheet) may not be exceeded when using a test lamp as a continuity tester.

First screw in the adjustment screw (see drawing in data sheet) with the aid of an approved screwdriver.

Apply the desired switching pressure to the vacuum switch with the aid of a suitable inspection gauge.

Unscrew the adjustment screw until the continuity tester responds and the differential vacuum switch switches.

Turn the adjustment screw accordingly if the switching pressure needs to be corrected.

8 Maintenance



The device is maintenance free and a check of the switch-points is at the discretion of the user. The usual preventative maintenance work must be performed in each case.

Large and continuous switch-point deviations can indicate that the switch is not used according to regulations, the limit values are exceeded or the device is too old.

9 Disassembly



Proceed in the reverse order for disassembly. Remove the cable from the connection point and unscrew the vacuum switch using a spanner (acc. to DIN 894 or similar) over the hexagonal shaped attachment.

Caution: When disassembling, make sure that the system in which the vacuum switch is situated is in a depressurised state and disconnected from the power supply.

state and disconnected from the power supply.

10 Technical data

Temperature resistance of the membranes and sealant.

NBR	-25°C bis +85°C
FKM (Viton)	-5°C bis +120°C
EPDM	-25°C bis +120°C

For additional technical data see data sheet

Symbols



Information



Warning



Hazard