OBSOLETE DOCUMENT
Technical Reference Only

Fluidtronic Pressure Switches for Hydraulic and High Pressure Applications

- **Reset point independent of adjusted switching point**
- **Adjustment of switching points without applied system pressure (independent of mounting location)**
- **Switching status indicated by LED**
- **User-friendly**
- **Display of system pressure**
- **Special version available with additional analog output**
- **Flange connection**
- **Adjustable damping time**
- **Adjustable hysteresis**
- **Adjustable switching window (window mode)**
- **Vibration resistant to 25g**

Technical Data

Fluid:
Gaseous, liquid, aggressive and neutral fluids, compatible with material 1.4548 (st. st.)
Mounting:
Any
Electrical Connection:
DIN 43650, DIN 43651, M12x1
Operating Pressure:
0 to 700 bar
Operating Temperature:
-10˚C to 60˚C
Fluid Temperature:
-10˚C to 80˚C
Temperature sensitivity (zero point):
0.4% of final value/10 K
Temperature sensitivity (range):
0.3% of final value/10 K
Switching point:
Adjustable between 0 and 100% of final value
Reset point:
Adjustable between 0 and 100% of final value
Display format:
3 1/2 digit
Linearity:
<0.5 % of final ± 1 digit
Degree of protection to DIN 40050:
IP65
Materials:
Viton 0-ring seal

Ordering Information

To order, quote model number from table overleaf, e.g. an encodable switch with a pressure range of 0-40 bar and DIN 43650 electrical connection is VH 0875010.

The Fluidtronic 32 D pressure switch is an electronic device for pressure monitoring and open- and closed-loop control functions. The switch consists essentially of a pressure input with a built-in pressure sensor, an integral electronic evaluation unit and an electrical connection in accordance with DIN 43650, or DIN 43651 in the case of the version with an analog output.

HERION

General Information

Part No.	Switching Pressure (bar) *	Over bursting Pressure (bar)	Electrical Connection	Version Encodable	Version Not Encodable	Analog Output 0–10V 4–20mA	Step Size of Display
VH 0875100	0 – 100	200/300	DIN 43650		x		0,5
VH 0875110	0 – 100	200/300	DIN 43650	x			0,5
VH 0875130	0 – 100	200/300	DIN 43651		x	x	0,5
VH 0875131	0 – 100	200/300	DIN 43651	x		x	0,5
VH 0875160	0 – 100	200/300	M12		x		0,5
VH 0875161	0 – 100	200/300	M12	x			0,5
VH 0875200	0 – 160	300/400	DIN 43650		x		0,8
VH 0875210	0 – 160	300/400	DIN 43650	x			0,8
VH 0875230	0 – 160	300/400	DIN 43651		x	x	0,8
VH 0875231	0 – 160	300/400	DIN 43651	x		x	0,8
VH 0875260	0 – 160	300/400	M12		x		0,8
VH 0875261	0 – 160	300/400	M12	x			0,8
VH 0875300	0 – 250	500/750	DIN 43650		x		1–2
VH 0875310	0 – 250	500/750	DIN 43650	x			1–2
VH 0875330	0 – 250	500/750	DIN 43651		x	x	1–2
VH 0875331	0 – 250	500/750	DIN 43651	x		x	1–2
VH 0875360	0 – 250	500/750	M12		x		1–2
VH 0875361	0 – 250	500/750	M12	x			1–2
VH 0875400	0 – 250	500/750	DIN 43650		x		1–2
VH 0875410	0 – 250	500/750	DIN 43650	x			1–2
VH 0875430	0 – 350	500/750	DIN 43651		x	x	1–2
VH 0875431	0 – 350	500/750	DIN 43651	x		x	1–2
VH 0875460	0 – 350	500/750	M12		x		1–2
VH 0875461	0 – 350	500/750	M12	x			1–2
VH 0875500	0 – 350	750/1000	DIN 43650		x		2–3
VH 0875510	0 – 350	750/1000	DIN 43650	x			2–3
VH 0875530	0 – 350	750/1000	DIN 43651		x	x	2–3
VH 0875531	0 – 350	750/1000	DIN 43651	x		x	2–3
VH 0875560	0 – 350	750/1000	M12		x		2–3
VH 0875561	0 – 350	750/1000	M12	x			2–3
VH 0875600	0 – 700	1000/1200	DIN 43650		x		3–4
VH 0875610	0 – 700	1000/1200	DIN 43650	x			3–4
VH 0875630	0 – 700	1000/1200	DIN 43651		x	x	3–4
VH 0875631	0 – 700	1000/1200	DIN 43651	x		x	3–4
VH 0875660	0 – 700	1000/1200	M12		x		3–4
VH 0875661	0 – 700	1000/1200	M12	x			3–4

Important Note:

*** In case of pressure peaks exceeding the corresponding indication, the installation of our damping subplate 0520626 is highly recommended.**

Warning

These products are intended for use in industrial systems only. Do not use these products where *pressures* and *temperatures* can exceed those listed under **'Technical Data'.**

Before using these products with fluids other than those specified, for non-industrial applications, life-support systems, or other applications not within published specifications, consult Norgren.

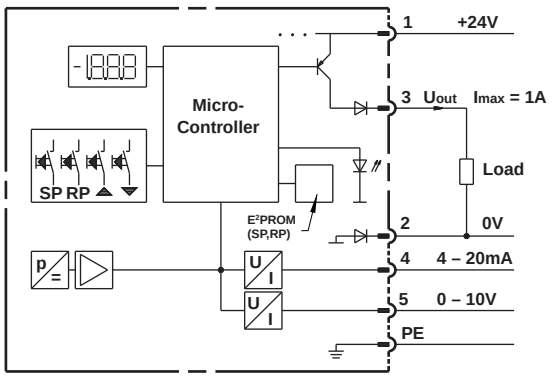
Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes. The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such a failure. **System designers must provide a warning to end users in the system instruction manual if protection against a failure mode cannot be adequately provided.**

System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products where applicable.

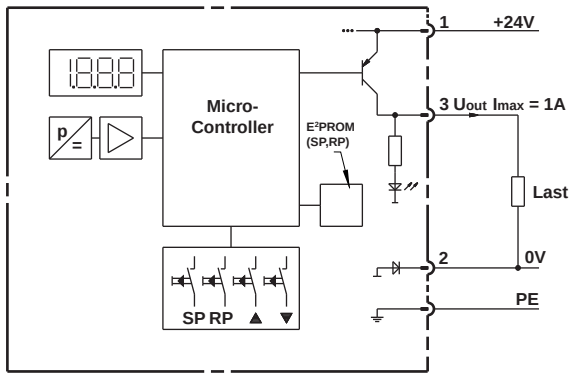
Electrical parameters

Electrical connection	3-pin + PE to DIN 43650, without analog output 6-pin + PE to DIN 43651, without analog output
Power supply (polarity safe)	18 to 32V dc
Permissible residual ripple:	10% (within 18 to 32V)
Current consumption:	<50 mA (plus load current)

DIN 43651 with analog output



DIN 43650 without analog output



Electromagnetic compatibility

Interference emission	Acc. to EN 50081. Part 1
Interference immunity	Acc. to EN 50082. Part 2

*SP = Switching point
*RP = Reset point

Switching output

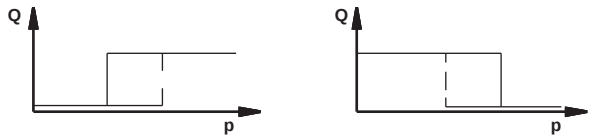
Switching mode	Potential-bound open collector switching to U_B, suited for inductive load
Output voltage	Supply voltage -1.5V
Analog output	O to l0V and 4 to 20mA
Contact rating	I_{max} = 1 A (short-circuit proof)
Switching time	< 5ms
Service life	100 million switching cycles
Switching logic	Signal with rising pressure, if SP* > RP* Signal with falling pressure, if SP < RP

Adjusting the switching points (SP) and reset (RP) points

a) Adjusting the switching point.

Press the **SP** button and hold this down. The display will show the previous switch-on pressure setting, and the dotted bar will flash as long as the button is pressed down (case 1).

Case 1 or Case 2

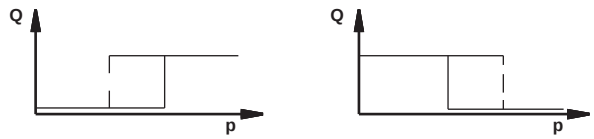


You can now use the cursor keys to adjust the switching point upwards or downwards. If a cursor key is held down, the values will change faster. When the cursor key is released again, the switch-on pressure setting will cease to change. This setting is stored and activated when the **SP** button is released, after which the display will show the current pressure value and the bar will cease to flash.

b) Adjusting the reset point.

Press the **RP** button and hold this down. The display will show the previous switch-off pressure setting, and the dotted bar will flash as long as the button is pressed down.

Case 3 or Case4



You can now use the cursor keys to adjust the reset point in the same way as described above.

During both adjustment operations, it may occur that the hysteresis graph changes from one state to another at the time a transition is made through the point "Switch-on pressure = Switch-off pressure". When both switching points are correctly set, the hysteresis graph will also be correct (cases 2 and 4). You can change between **SP** and **RP** as often as you wish until the settings are correct.

c) Adjusting the access protection.

Encoding.
The pressure switch can be protected against unauthorised access by means of a code. In order to reach the encoding mode, the two buttons **SP** and **RP** must be pressed simultaneously before the power supply is switched on. Release these buttons again after the power supply has been switched on and the display test has run. The display will then flash "Cod".

The code consists of 4 digits, each produced by a combination of 1 to 4 buttons. The individual digits should be entered in succession. Each time a digit is entered, "-" will appear in the display. When the display shows "----", this indicates that the complete code has been entered and can then be stored by means of the **SP** button. The switching and reset pressures can now be adjusted only after the code has been entered.

Once the access protection has been activated, the switching or reset points will still be shown in the display when the relevant button is pressed, but if an attempt is made to change the setting (by means of a cursor key), the display will show "Cod", and the access code must then be entered. Assuming that the code has been input correctly, it is now possible to adjust the two switching points as desired in the way described above.

d) Deactivating the access protection.

In order to delete a code, the buttons **SP** and ▲ must be pressed at the same time before the power supply is switched on.

Release these buttons again after the power supply has been switched on and the display test has run. The display will then show "CLC". Any existing code must now be entered and confirmed by pressing SP. After this has been done, the pressure switch will no longer be protected against unauthorised access.

e) Setting a buffering time.

In order to prevent every single pressure change from being evaluated, a buffering time can be entered. The effect of this is that pressure changes are then evaluated only if the pressure signal in question is present for longer than the preset buffering time. In order to set a buffering time, press the button **SP** before the power supply is switched on. Release this button again after the power supply has been switched on. The display will then show the buffering time in milliseconds (e.g. 03) or seconds. The cursor buttons ▼, ▲ can be used to set the buffering time to 03, 06,12, 24 or 50 ms or 0.1, 0.2 or 0.4 seconds. When this has been done, press **SP** to store the setting.

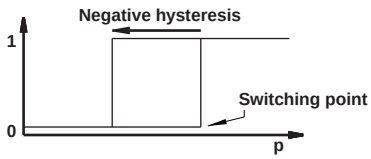
f) Setting the pressure switch to ambient pressure = 0.

Press the button **RP** before the power supply is switched on. Release this button again after the power supply has been switched on and the display test has run. The display will then show "OFS". The cursor buttons ▼, ▲ can be used to set the pressure display to 0. When this has been done, press **SP** to store the setting.

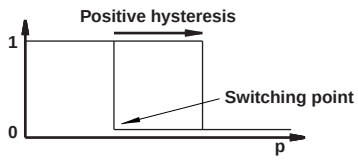
g) Hysteresis mode

If it is desired to operate with a fixed hysteresis value instead of the reset point, this value can be selected as desired.
In order to set a hysteresis value, the two buttons **SP** and ▼ must be pressed simultaneously before the power supply is switched on.
Release these buttons again after the power supply has been switched on and the display test has run. The display will then show the operating mode. The cursor buttons ▼, ▲ can now be used to change the operating mode until "HYS" appears in the display. When this has been done, press **SP** to store the setting.
The **SP** button can be used to display the switching-point setting, which can be modified by means of the cursor buttons ▼, ▲.
The button **RP** can be used to display the hysteresis setting, which can also be modified by means of the cursor buttons ▼, ▲.
Negative hysteresis means: Signal with rising pressure (case 1).
Positive hysteresis means: Signal with falling pressure (case 2).
If the switching point is modified, this will automatically also result in a change in the reset point by a value equal to the hysteresis setting.

Case 1



Case 2

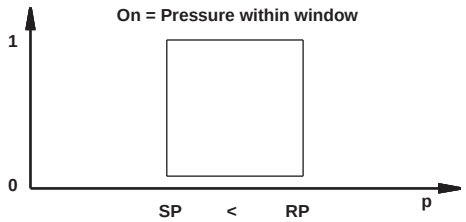


h) Window mode

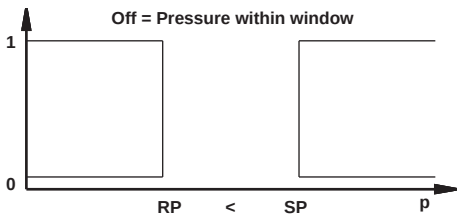
If it is desired to monitor whether the pressure lies within a certain range, a switching window can be created for this purpose. The pressure switch will then indicate cases in which the actual pressure lies above or below this area. In order to set a switching window, the two buttons **SP** and ▼ must be pressed simultaneously before the power supply is switched on.
Release these buttons again after the power supply has been switched on and the display test has run. The display will then show the operating mode.
The cursor buttons ▼, ▲ can now be used to change the operating mode until "FEn" (standing for "Window") in the display. When this has been done, press **SP** to store the setting. The button **SP** can be used to display the switching-point setting, which can be modified by means of the cursor buttons ▼, ▲.

The distance between the switching point and reset point is the switching window. If the switching point is lower than the reset point, a signal will be output as long as the pressure lies within the preset window (case 1, rising pressure). If the switching point is higher than the reset point, a signal will be output as long as the pressure lies outside the preset window (case 2, rising pressure). In the case of falling pressure, the signal is inverted.

Case 1



Case 2



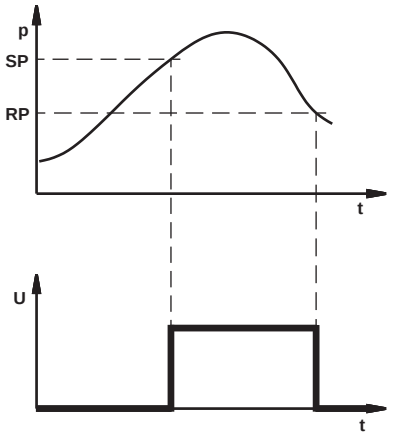
i) Analog output signal.

The electronic pressure provides 2 different analog output signals, 0 - 10V and 4 - 20mA.
One of these can be selected as required.
Before switching on the power supply buttons **RP** and ▲ must be pressed at the same time.
Release these buttons again after the power supply has been switched on and the display test has run. The display will then show U - C or I - C. The cursor buttons ▼, ▲ can now be used to select an output of either 0-l0V (U-C) or 4-20mA (I-C).
When this has been done, press **SP** to store the setting.

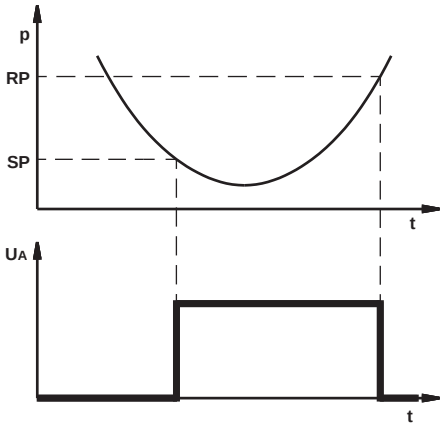
Std = Standard mode, switching and reset points adjustable
HYS = Hysteresis mode, switching point and hysteresis adjustable
FEn = Window mode, switching window adjustable

Pressure-current curves

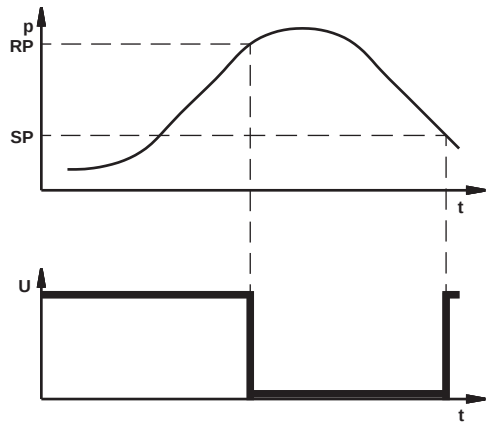
Signal with rising pressure
Setting SP> RP



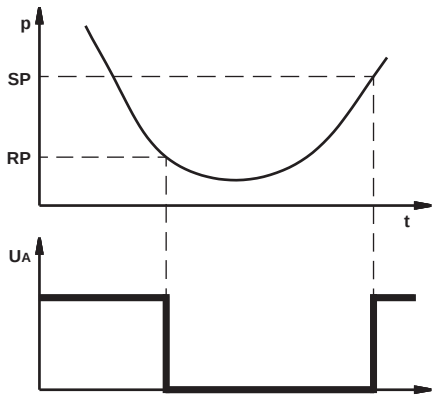
Signal with falling pressure
Setting SP < RP



Inverted signal with rising pressure
Setting RP> SP

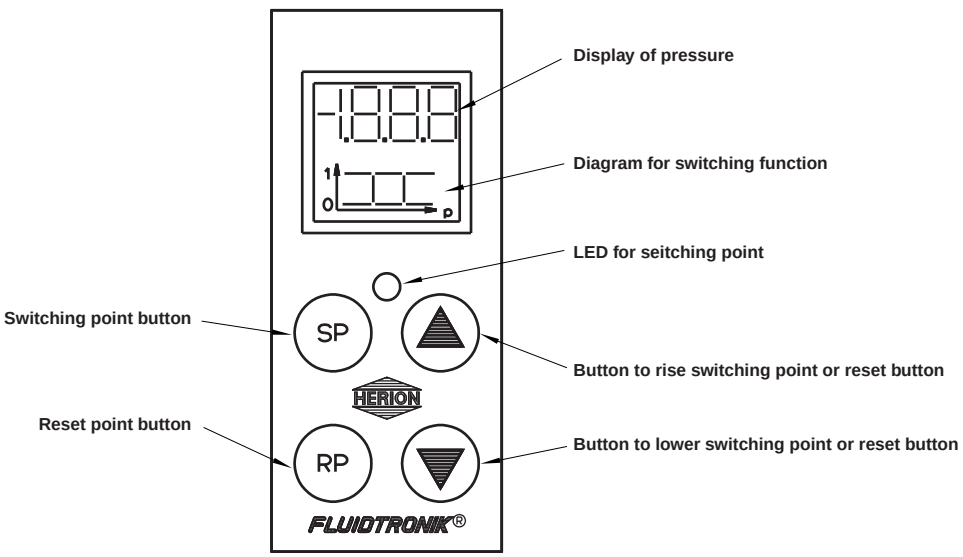


Inverted signal with falling pressure
Setting RP < SP

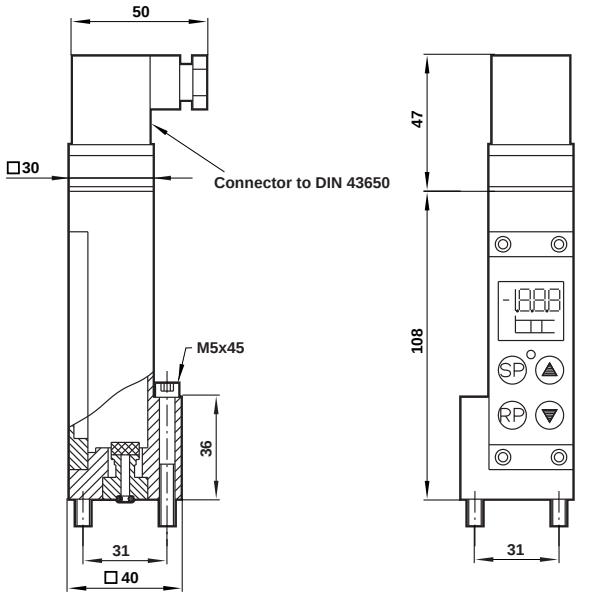


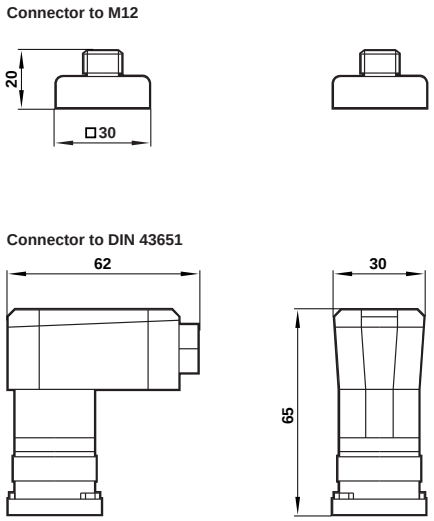
Position of operating elements

Fluidtronic pressure switch 32 D



Dimensional drawing

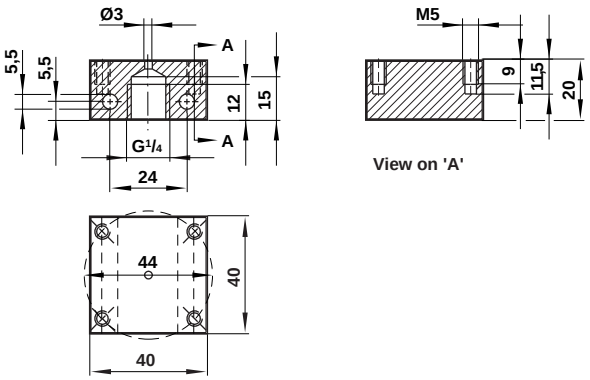




Accessories

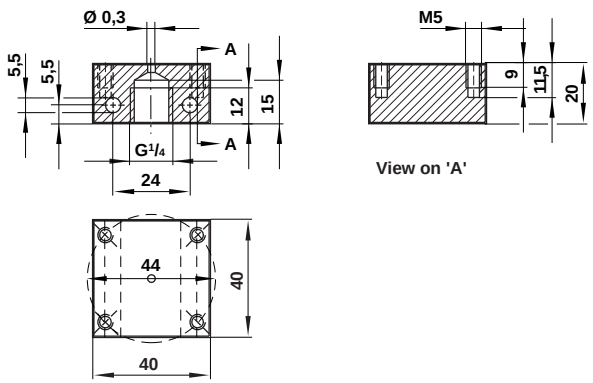
Subplate G 1/4

Part No.0522259 Material 3.1645 (aluminium)
Part No.0522233 Material 1.4301 (stainless steel)



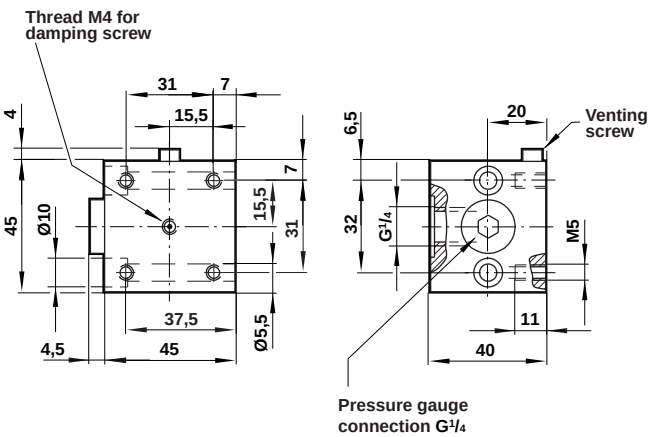
Damping Subplate G 1/4

Part No.0520626



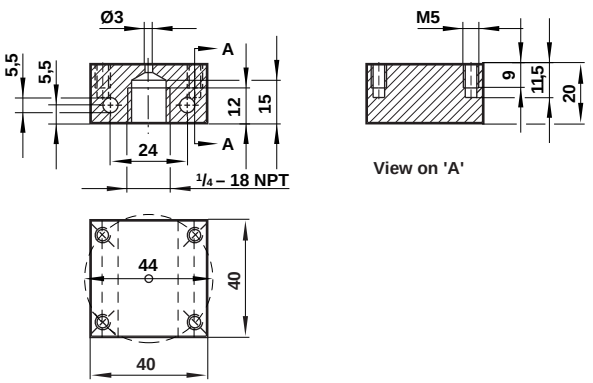
Subplate G 1/4 with pressure gauge connection

Part No.2840115



Subplate 1/4 NPT

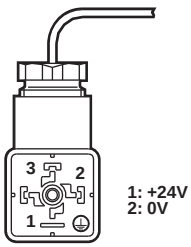
Part No.0522260 Material 3.1645 (aluminium)
Part No.0522232 Material 1.4301 (stainless steel)



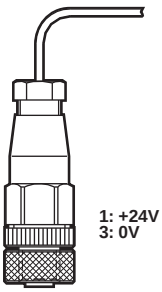
Dimensions in mm

Connector power supply for demonstration

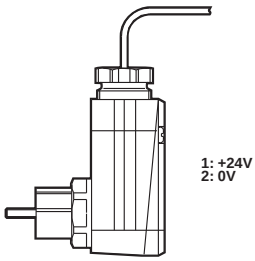
DIN 43650
Part No.0796151

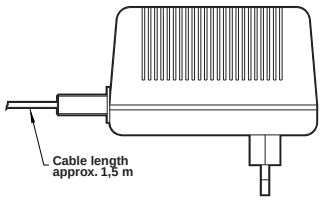


M12
Part No.0796540



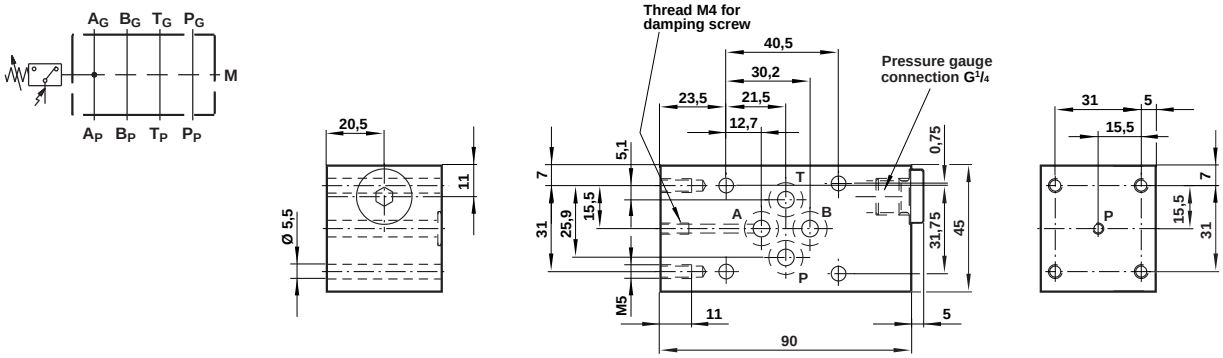
DIN 43651
Part No.0796535



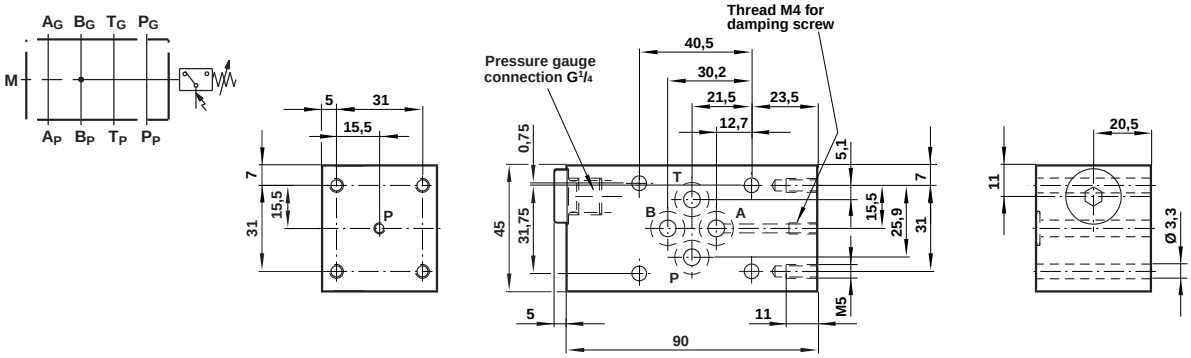


Intermediate plates for hydraulic directional control valves, size 6, for connection of pressure switch 32 D and pressure gauge, G 1/4

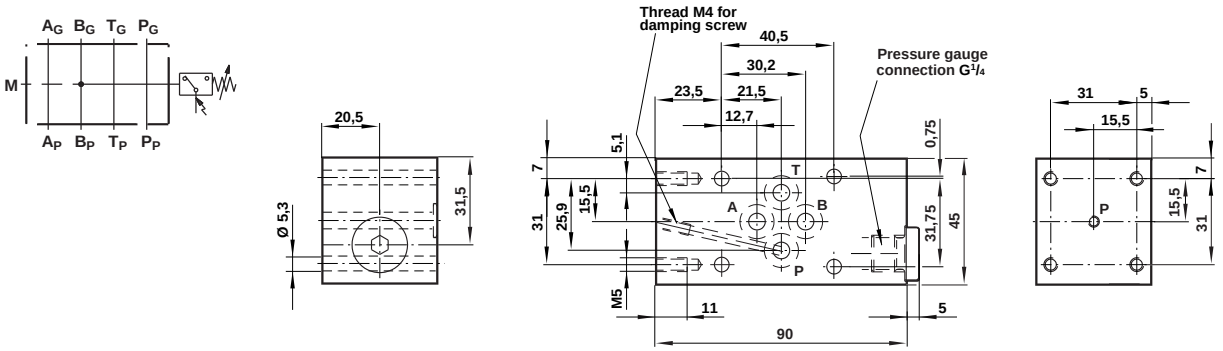
Pressure switch in port "A" Part No.2840116



Pressure switch in port "B" Part No.2840117



Pressure switch in port "P" Part No. 2840118

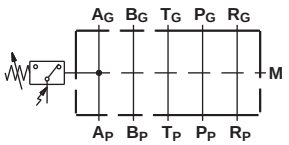


Dimensions in mm

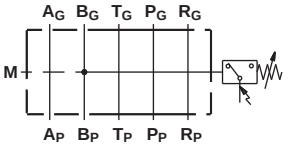
Intermediate plates for hydraulic directional control valves, size 10, for connection of pressure switch 32 D and pressure gauge, G 1/4

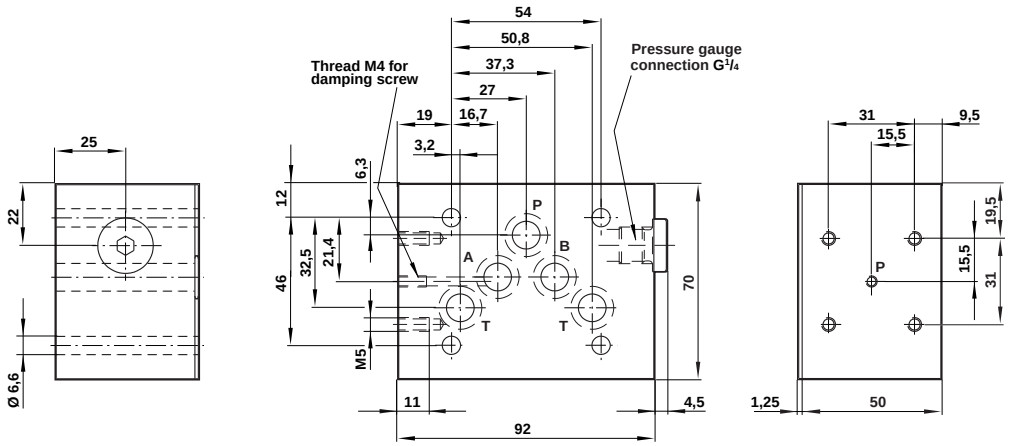
Pressure switch in connection "A" or "B" Part No. 2840119

Pressure switch in A

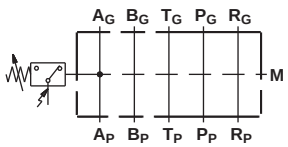


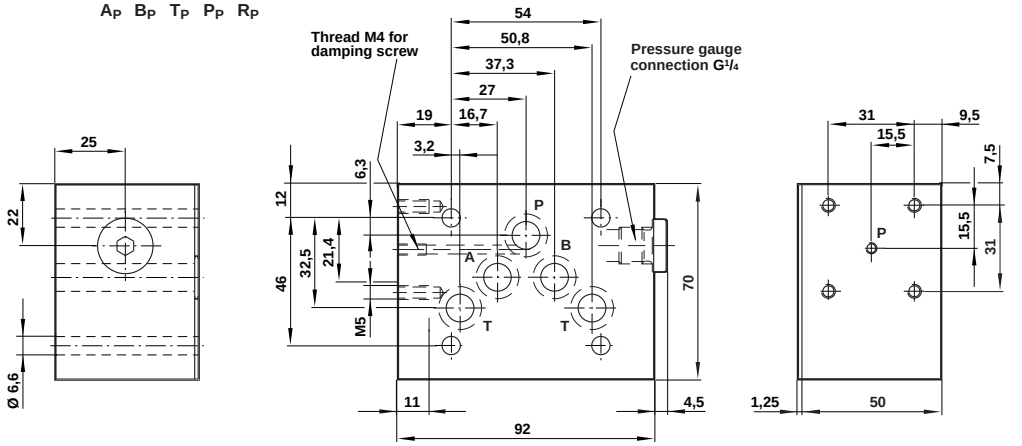
Pressure switch in B





Pressure switch in port "P", Part No. 2840120





Dimensions in mm

Mounting material for intermediate plates, size 6

Part No.	Designation	Effective length (mm)
0662315	Socket head screw	62
0661664	Socket head screw	102
0727358	Stud bolt	142
0721154	Stud bolt	182
0720701	Stud bolt	203
0725517	Stud bolt	234
0725519	Stud bolt	274
0727359	Stud bolt	243
0750653	Nut M 5	-

Mounting material for intermediate plates, size 10

Part No.	Designation	Effective length (mm)
0659221	Socket head screw	100
0722090	Stud bolt	150
0721156	Stud bolt	200
0724260	Stud bolt	225
0725521	Stud bolt	251
0725522	Stud bolt	282
0725523	Stud bolt	307
0750654	Nut M 6	-

Error messages

Display of hardware errors or malfunctions

Display	Meaning	Cause / Remedy
O.Er	Output error	Error at switching output: Circuit-breaker defective, feedback loop to processor open circuit. Repair necessary.
E.Er	E^2PROM error	E^2PROM module defective or connection to processor faulty. Repair necessary.
I.Er	Initialisation error	Checksum of initialisation data incorrect. Remedy: Call up any SETUP function and acknowledge the setting with SP. This error message is caused by a data error. All setup values should therefore be checked and corrected if necessary .
C.Er	Calibration error	Checksum of calibration data incorrect. Recalibration necessary.
SC.L	Short-circuit low	Short-circuit between output and ground. Check wiring: Power supply may be too weak for connected load (leading to collapse of voltage, particularly with loads with a high switch-on current such as incandescent lamps or capacitances).
UFL	Underflow	The applied pressure is below the measuring range: Increase pressure until it is within the measuring range.
OFL	Overflow	The applied pressure is above the measuring range: Decrease pressure until it is within the measuring range.

Display of hardware errors or malfunctions (can be switched off)

Display	Meaning	Cause / Remedy
SC.H	Short-circuit high	Short-circuit between output and power supply. Check wiring. If the switching line from the load (e.g. electrical control device, PLC or similar) is being maintained at an open-circuit potential of > 3V, or if several pressure switches are being operated in parallel, this function should be switched off. Disconnection: ▼ during display test, then adjust with ▼ or ▲
U.Lo	Voltage low	Power supply voltage too low (Vcc <17V). Check power supply: Load may be too large. Disconnection: ▲ during display test, then adjust with ▼ or ▲

Messages generated by calling SETUP functions

Cod	Meaning	Requested code or code programming
CLC	Clear code	Deletion of current code
txx	Delay time	Setting of filter time constant
		xx = Switching output delay
		xx ∈ {03, 06,12, 24, 50} in ms and
		xx ∈ {0.1, 0.2, 0.4} in s.
OFS	Offset	Request for offset adjustment using ▼ and ▲ buttons.
SC.H	Short-circuit high	Short-circuit monitoring activated
U. LO	Voltage low	Voltage monitoring activated
OFF	Off	Short-circuit or voltage monitoring deactivated.
Std	Standard mode	Standard mode activated
HYS	Hysteresis mode	Hysteresis mode activated
FEn	Window mode	Window mode activated
U-C	Voltage calibration	Voltage output selected
I-C	Current calibration	Current output selected