

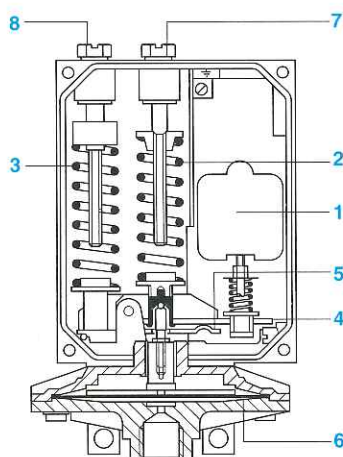
Pressure and vacuum switches

for control circuits

Type XMG for regulation between 2 thresholds (adjustable differential)

Description, operating principle, setting

Description



1 Snap action contact block

2 Adjustment spring for the actuation point on rising pressure (PH)

3 Adjustment spring for the reset point on falling pressure (PB)

4 Actuation point operating lever

5 Reset point operating lever

6 Pressure transducer (diaphragm, piston or metal bellows) which transforms the pressure into an actuating force

7 Adjustment screw for setting actuation point (PH)

8 Adjustment screw for setting reset point (PB)

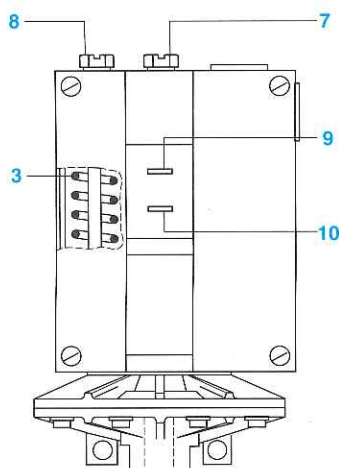
Operating principle

Actuation point

As the fluid pressure rises, a force is transmitted through the transducer 6 which pushes against the spring 2. When this force is strong enough to overcome the spring pressure (as set by compressing it, using adjustment screw 7), lever 4 moves upwards and operates the electrical contact 1. We have thus obtained tripping of the contact 1 at the upper switching point which corresponds to a greater or lesser pressure value related to the compression of the spring as set by adjustment screw 7.

Reset point

As the fluid pressure falls enough for spring 2 to push back on the transducer, its associated lever 4 moves downwards and engages on lever 5, which transmits the opposing effort of reset spring 3 to it. This opposing effort is set by adjusting the compression of spring 3 with the reset point adjustment screw 8 and is effectively added to the force created by the decreasing pressure thus helping to prevent the switch resetting. It is only when the combined efforts of spring 3 + the system pressure are finally overcome by spring 2 that the electrical contact 1 of the switch will reset (as lever 4 descends).



Setting

Example of setting a pressure switch (required setting between 8 and 10 bar)

- Before adjustment, decompress the spring 3 by slackening screw 8. The green index point 10 will move upwards to its maximum.
- Setting the actuation point : Turn screw 7, which will move the scale on which the setting values are marked. Move the maximum pressure value required, in this case 10 bar, to coincide with the red index point 9 (the scale moves, the index point remains fixed).
- Setting the reset point : Compress spring 3 by tightening screw 8 which will move the green index point 10. Move this to coincide with the minimum pressure required, in this case 8 bar (the index point moves, the scale remains fixed). Do not carry out this operation if the differential required (actuation point - reset point) corresponds to the minimum differential of the pressure switch.

For more accurate setting, it is recommended that a pressure gauge be used to calibrate the pressure switch.

Example of setting a vacuum switch (required setting -0.6 and -0.8 bar)

- Before adjustment, decompress the spring 3 by slackening screw 8. The green index point 10 will move upwards to its maximum.
- Setting the actuation point : Turn screw 7, which will move the scale on which the setting values are marked. Move the minimum vacuum value required, in this case -0.6 bar, to coincide with the red index point 9 (the scale moves, the index point remains fixed).
- Setting the reset point : Compress spring 3 by tightening screw 8 which will move the green index point 10. Move this to coincide with the value of the maximum vacuum required, in this case -0.8 bar (the index point moves, the scale remains fixed). Do not carry out this operation if the differential required (actuation point - reset point) corresponds to the minimum differential of the vacuum switch.

For more accurate setting, it is recommended that a vacuum gauge be used to calibrate the vacuum switch.

Notes

- For a pressure switch, the maximum pressure required is set (red index point 9) then the minimum pressure required (green index point 10).
- For a vacuum switch, the minimum vacuum required is set (red index point 9) then the maximum vacuum required (green index point 10).

Pressure and vacuum switches

for control circuits

Type XMG for regulation between 2 thresholds (adjustable differential)

Characteristics

Environment

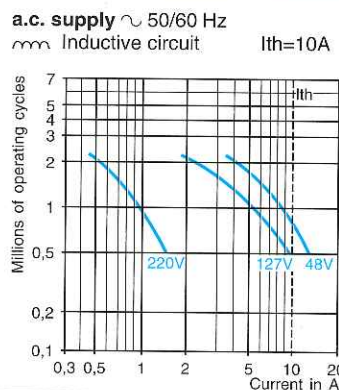
Model		All XMG switches except XMG-B120	XMG-B120
Conforming to standards		IEC 337-1, NF C 63-140, VDE 0660-200, CSA C22-2 n° 14	
Approvals		Standard version : DEMKO, NEMKO, ASE, BV, DNV, USSR, LROS, GL, CSA 300 V (~), HD (—) 60W Special version : CSA, fitted with NPT conduit adaptor	—
Protective treatment		Standard version "TC". Special version "TH".	
Ambient air temperature	° C	Operation : - 25... + 70. Storage : - 40... + 70	
Fluids or products controlled		Hydraulic oils, air, fresh water, sea water : (0 ...+ 160 °C) Steam, corrosive fluids, viscous products : (0...+ 160 °C)	Hydraulic oils, air, water : (0 ...+ 70 °C) Corrosive fluids on request
Operating position		All positions	
Vibration resistance		5 g (30...500 Hz) conforming to IEC 68-2-6	5 g (10...500 Hz) to IEC 68-2-6
Shock resistance		55 g conforming to IEC 68-2-27	100 g conforming to IEC 68-2-27
Electric shock protection		Class I conforming to IEC 536 and NF C 20-030	
Degree of protection		IP 65 conforming to IEC 529 ; IP 655 conforming to NF C 20-010	IP 65 conforming to IEC 529. IP 655 conforming to NF C 20-010
Operating rate	operating cycles/min	≤ 30	≤ 60
Mechanical durability	operating cycles	3 million (average value for switch set at 2/3 of its operating range)	Dependent on pressure See curve below
Repeat accuracy		< 2 %	Lower point: ± 1.5%. Upper point ± 0.5%
Fluid connections		3/8" BSP female except : XMG-B0●●6 : 1"1/4 BSP female, XMG-B0●●8 : 1/4" BSP female	1/4" BSP female
Cable entry		2 tapped entries for N° 13 cable glands (capacity 9 to 12 mm)	

Contact block characteristics

Rated thermal current	A	10 conforming to IEC 337-1, NF C 63-140, VDE 0660-200, CSA C22-2 n° 14.
Rated insulation voltage	V	~ 500 and — 600 to IEC 158-1, NF C 20-040 and VDE 0110, ~ and — 300 to CSA C 22-2 n° 14
Insulation category		Group C conforming to NF C 20-040 and VDE 0110
Contact operation		1 or 2 C/O single-pole (4 terminal) snap action contacts
Resistance across terminals	mΩ	≤ 25 conforming to NF C 93-050 method A or IEC 255-7 category 3
Terminal referencing		Conforming to CENELEC EN 50013
Short-circuit protection		10 A cartridge fuse type gG (gl) conforming to IEC 337-1B, VDE 0660-200
Cabling		Screw and captive cable clamp terminals. Capacity : minimum 1 x 0.2 mm ² , maximum 2 x 2.5 mm ² .

Rated power
conforming to IEC 337-1
Utilisation categories AC-11 and DC-11

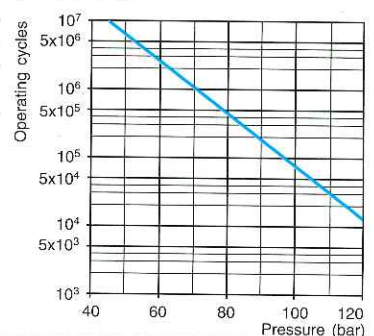
Operating rate : 3600 operating cycles
per hour
Load factor : 0.5



d.c. supply —
Power broken in W
for 1 million operating cycles

Voltage V	24	48	120
W	31	29	26

Mechanical durability
(XMG-B120)



Pressure and vacuum switches

for control circuits

Type XMG for regulation between 2 thresholds (adjustable differential)

Complete switches with 1 C/O single-pole snap action contact (1)

Diaphragm type pressure switches

Operating range		Possible differential			Max. permissible pressure		Reference	Weight
low	high	minimum at low setting	minimum at high setting	max. at high setting	per cycle (2)	occasional surge		
bar	bar	bar	bar	bar	bar	bar		kg

Hydraulic oils, air, fresh water, sea water : 0 to + 70 °C (3)

0.06	0.35	0.02	0.05	0.28	3	8	XMG-B001	1.730
0.15	1.4	0.05	0.12	1.12	5	10	XMG-B002	1.730
0.4	3.5	0.1	0.4	2.8	5	10	XMG-B003	1.730
0.8	8	0.3	1	6.4	14	20	XMG-B008	1.420
2	14	0.6	1.6	11.2	18	30	XMG-B014	1.420
3.5	28	1.5	4	22.4	35	50	XMG-B028	1.420

Hydraulic oils, air, fresh water, sea water, steam : 0 to + 160 °C (3)

0.06	0.35	0.02	0.05	0.28	3	8	XMG-B0011	1.730
0.15	1.4	0.05	0.12	1.12	5	10	XMG-B0021	1.730
0.4	3.5	0.1	0.4	2.8	5	10	XMG-B0031	1.730
0.8	8	0.3	1	6.4	14	20	XMG-B0081	1.420
2	14	0.6	1.6	11.2	18	30	XMG-B0141	1.420
3.5	28	1.5	4	22.4	35	50	XMG-B0281	1.420

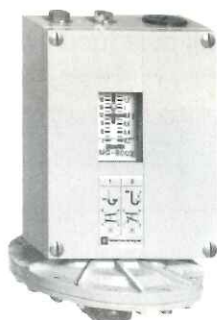
Corrosive fluids : 0 to + 160 °C (3)

0.06	0.35	0.02	0.05	0.28	3	8	XMG-B0017	1.800
0.15	1.4	0.05	0.12	1.12	5	10	XMG-B0027	1.800
0.4	3.5	0.1	0.4	2.8	5	10	XMG-B0037	1.800
0.8	8	0.3	1	6.4	14	20	XMG-B0087	1.480
2	14	0.6	1.6	11.2	18	30	XMG-B0147	1.480
3.5	28	1.5	4	22.4	35	50	XMG-B0287	1.480

Viscous products : 0 to + 160 °C (3)

0.06	0.35	0.02	0.05	0.28	3	8	XMG-B0016	1.950
0.15	1.4	0.05	0.12	1.12	5	10	XMG-B0026	1.950
0.4	3.5	0.1	0.4	2.8	5	10	XMG-B0036	1.950
0.8	8	0.3	1	6.4	14	20	XMG-B0086	1.510
2	14	0.6	1.6	11.2	18	30	XMG-B0146	1.510
3.5	28	1.5	4	22.4	35	50	XMG-B0286	1.510

- (1) For diaphragm type pressure switches with 2 C/O single-pole snap action contacts : add the suffix "2" to the references stated above. Example : XMG-B001 becomes XMG-B0012.
 (2) Diaphragm type pressure switches for maximum permissible pressure of 30 bars, see page 16.
 (3) Materials in contact with the fluid : see pages 12 and 13.



XMG-B002



XMG-B0021



XMG-B0087



XMG-B0026

Other versions

Pressure switches for specific fluids : oxygen, food products.
 Pressure switches for use in corrosive environments.
 Please consult your Regional Sales Office.

Pressure and vacuum switches

for control circuits

Type XMG for regulation between 2 thresholds (adjustable differential)

Complete switches with 1 C/O single-pole snap action contact (1)

Piston type pressure switches

Operating range		Possible differential			Max. permissible pressure		Reference	Weight
low	high	minimum at low setting	minimum at high setting	max. at high setting	per cycle	occasional surge		
bar	bar	bar	bar	bar	bar	bar		kg

Hydraulic oils : 0 to + 70 °C (2)

10	70	6	10	56	100	150	XMG-B070	1.450
20	140	12	20	112	180	300	XMG-B140	1.450
30	280	15	35	224	330	500	XMG-B280	1.450
40	500	20	45	400	580	700	XMG-B500	1.450

Fresh water, sea water : 0 to + 70 °C (2)

10	70	6	10	56	100	150	XMG-B0704	1.450
20	140	12	20	112	180	300	XMG-B1404	1.450
30	280	15	35	224	330	500	XMG-B2804	1.450
40	500	20	45	400	580	700	XMG-B5004	1.450

Air : 0 to + 70 °C (2)

10	70	6	10	56	100	150	XMG-B0708	1.450
20	140	12	20	112	180	300	XMG-B1408	1.450
30	280	15	35	224	330	500	XMG-B2808	1.450
40	500	20	45	400	580	700	XMG-B5008	1.450

Hydraulic oils, fresh water, sea water, steam : 0 to + 160 °C (2)

10	70	6	10	56	100	150	XMG-B0701	1.450
20	140	12	20	112	180	300	XMG-B1401	1.450
30	280	15	35	224	330	500	XMG-B2801	1.450
40	500	20	45	400	580	700	XMG-B5001	1.450

Corrosive fluids : 0 to + 160 °C (2)

10	70	6	10	56	100	150	XMG-B0707	1.450
20	140	12	20	112	180	300	XMG-B1407	1.450
30	280	15	35	224	330	500	XMG-B2807	1.450
40	500	20	45	400	580	700	XMG-B5007	1.450

(1) For piston type pressure switches with 2 C/O single-pole snap action contacts :

add the suffix "2" to the references stated above. Example : XMG-B070 becomes XMG-B0702.

(2) Materials in contact with the fluid : see pages 12 and 13.



XMG-B140



XMG-B1404



XMG-B1401

Other versions

Pressure switches with reduced differential and other ratings (up to 900 bar). Please consult your Regional Sales Office.

Pressure and vacuum switches

for control circuits

Type XMG for regulation between 2 thresholds (adjustable differential)

Complete switches with 1 C/O single-pole snap action contact (1)

Diaphragm type pressure switches for maximum permissible pressure of 30 bar

Operating range		Possible differential			Maximum permissible pressure per cycle	Reference	Weight
low	high	minimum at low setting	minimum at high setting	max. at high setting			
bar	bar	bar	bar	bar	bar		kg

Air, fresh water, steam : 0 to + 160 °C (2)

0.06	0.35	0.02	0.05	0.28	30	XMG-B0018	2.990
0.15	1.4	0.05	0.12	1.12	30	XMG-B0028	2.990
0.4	3.5	0.1	0.4	2.8	30	XMG-B0038	2.990
0.8	8	0.3	1	6.4	30	XMG-B0088	2.990
2	14	0.6	1.6	11.2	30	XMG-B0148	2.990

Metal bellows type pressure switches

Operating range		Possible differential			Max. permissible pressure		Reference	Weight
low	high	minimum at low setting	minimum at high setting	max. at high setting	per cycle	occasional surge		
bar	bar	bar	bar	bar	bar	bar		kg

Hydraulic oils, air, fresh water, sea water : 0 to + 70 °C (2)

15	120	4	10	108	138	270	XMG-B120	1.520
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Diaphragm type vacuum switches

Operating range		Possible differential			Maximum permissible pressure per cycle	Reference	Weight
low	high	minimum at low setting	minimum at high setting	max. See curve			
bar	bar	bar	bar	bar	bar		kg

Hydraulic oils, air, fresh water, sea water : 0 to + 70 °C (2)

-0.01	-0.9	-0.05	-0.1	-0.9	-0.1	XMG-B091	1.720
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-0.01	-0.9	-0.05	-0.1	-0.9	10	XMG-B092	1.720
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For maximum pressure of 10 bar

-0.01	-0.6	-0.08	-0.1	-0.9	-	XMG-B093	1.720
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For very slow vacuum changes

Example : vacuum pumps

Hydraulic oils, air, fresh water, sea water, steam : 0 to + 160 °C (2)

-0.01	-0.9	-0.05	-0.1	-0.9	0.1	XMG-B0911	1.720
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-0.01	-0.9	-0.05	-0.1	-0.9	10	XMG-B0921	1.720
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For maximum pressure of 10 bar

Corrosive fluids : 0 to + 160 °C (2)

-0.01	-0.9	-0.05	-0.1	-0.9	0.1	XMG-B0917	1.790
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-0.01	-0.9	-0.05	-0.1	-0.9	10	XMG-B0927	1.790
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For maximum pressure of 10 bar

(1) For pressure or vacuum switches with 2 C/O single-pole snap action contacts : add the suffix "2" to the references stated above. Example : XMG-B091 becomes XMG-B0912.

(2) Materials in contact with the fluid : see pages 12 and 13.

Other versions

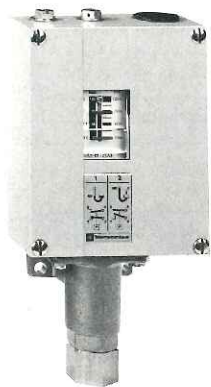
Pressure switches and vacuum switches for specific fluids.

Pressure switches and vacuum switches for use in corrosive environments.

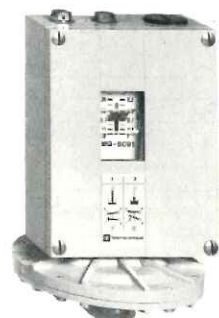
Please consult your Regional Sales Office.



XMG-B0028



XMG-B120



XMG-B091



XMG-B0911

Pressure and vacuum switches

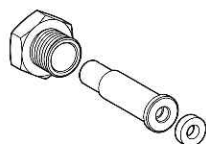
for control circuits

Type XMG for regulation between 2 thresholds (adjustable differential)

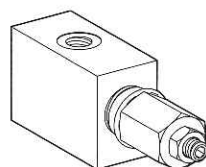
Accessories and spare parts



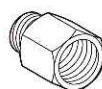
XMB-Z02



XMG-Z12



XMG-Z08



XMG-Z02



XMG-Z09

Description	Application	Reference	Weight kg
Connection adaptors	For threaded pipe 15/21 BSP	XMB-Z02	0.070
	For soldered pipe connections Ø 10 and Ø 12 mm sleeves	XMG-Z12	0.065
Isolating valve (1)	1/4" BSP female input and output threads. Isolating value 12 to 200 bar	XMG-Z08	0.590
Non-return valve (2)	For vacuum switch XMG-B091, XMG-B092 and XMG-B093	XMG-Z02	0.070
Locking device for adjustment screws (3)	All XMG pressure and vacuum switches	XMG-Z09	0.010
Diaphragms	XMG-B001	XMG-Z911	0.060
	XMG-B002	XMG-Z916	0.060
	XMG-B003	XMG-Z912	0.060
	XMG-B008	XMG-Z913	0.060
	XMG-B014	XMG-Z914	0.060
	XMG-B028	XMG-Z903	0.060
	XMG-B091, B092	XMG-Z915	0.060
Description	XMG-B093	XMG-Z917	0.060
	Connections	Reference	Weight kg
Male/male adaptors	Male	Male	
	3/8" BSP	1/4" NPT	XMG-Z13 0.120
		3/8" BSP	XMG-Z14 0.120
		1/2" BSP	XMG-Z15 0.120
		R 1/4" (BSP conical)	XMG-Z16 0.120
		R 3/8" (BSP conical)	XMG-Z17 0.120
		R 1/2" (BSP conical)	XMG-Z18 0.120
			XMG-Z19 0.130
			XMG-Z20 0.130
Description	Connections	Reference	Weight kg
	Male	Female	
Male/female adaptors	3/8" BSP	Rp 1/8" (for tube 5 x 10)	XMG-Z19 0.130
		Rp 1/4" (for tube 8 x 13)	XMG-Z20 0.130
		Rp 1/2" (for tube 15 x 21)	XMG-Z21 0.130
		Rc 1/8" (BSP conical)	XMG-Z22 0.130
		1/8" NPT	XMG-Z23 0.130
		1/4" NPT	XMG-Z24 0.130
		3/8" NPT	XMG-Z25 0.130
		1/2" NPT	XMG-Z26 0.130

(1) Fitted into the pipe upstream of the pressure switch, the isolating valve will effectively isolate the switch as soon as the pressure rises to an adjustable preset value. The isolating valve is adjusted to close at a pressure within the tolerance of the switch and will reopen as the pressure falls back below this value. Maximum pressure : 250 bar. Settings between 25 - 200 bar are recommended for rapidly changing pressures and between 40 - 200 bar for slow pressure changes.

(2) For use with vacuum switches subject to positive pressure. The non-return valve is only open when a vacuum exists and closes when a positive pressure is sensed.

(3) Locks setting screws to protect against the effects of excessive vibration. The screws are also pre-drilled to facilitate lead sealing by wire (not supplied) to prevent unauthorised adjustment to the settings.

Pressure and vacuum switches

for control circuits

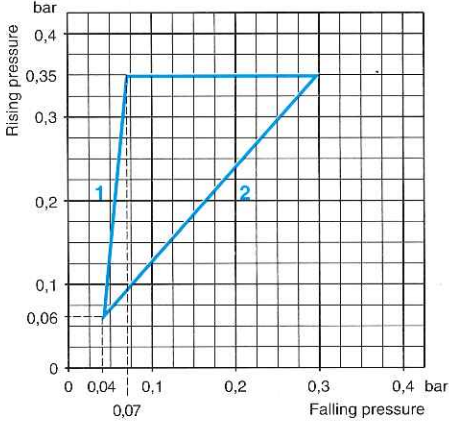
Type XMG for regulation between 2 thresholds (adjustable differential)

Operating curves

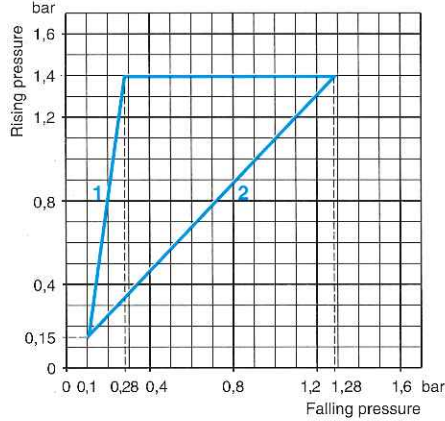
These curves have been established following arduous dynamic testing (average values)

Diaphragm type pressure switches

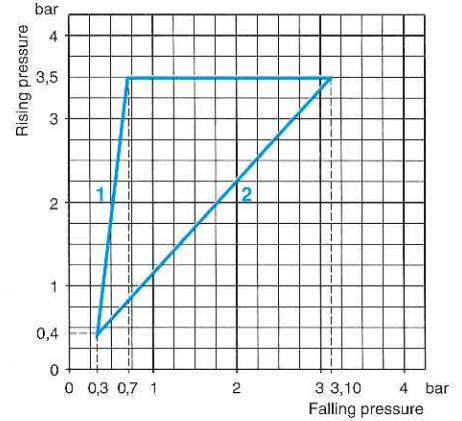
XMG-B001 and XMG-B001●



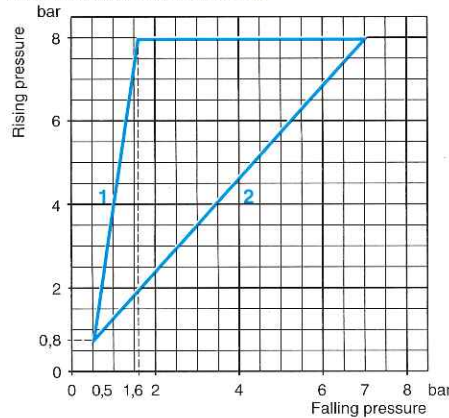
XMG-B002 and XMG-B002●



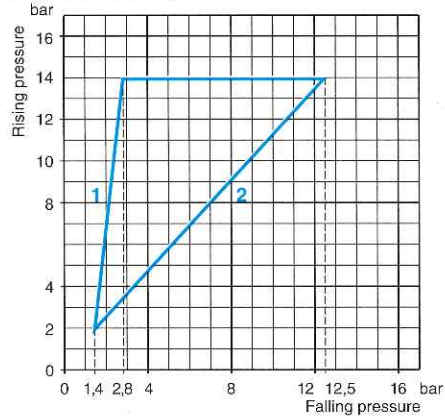
XMG-B003 and XMG-B003●



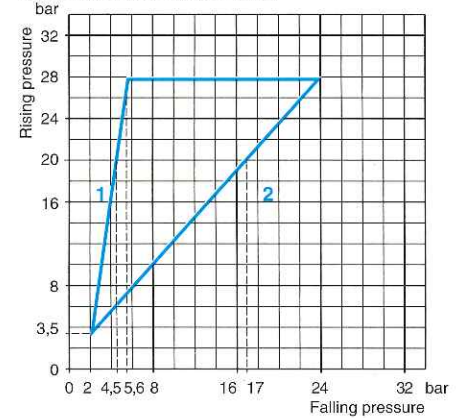
XMG-B008 and XMG-B008●



XMG-B014 and XMG-B014●

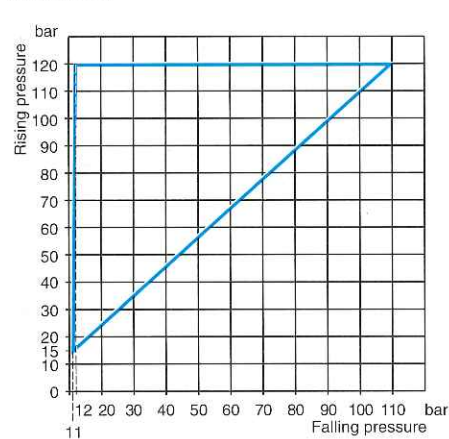


XMG-B028 and XMG-B028●



Bellows type pressure switch

XMG-B120



Example of information which may be read from a typical curve, for pressure switch XMG-B028

Assume an actuation pressure of 20 bar is required for this example. PH is therefore 20 bar, on rising pressure.

By looking at the curve, it can be seen that the reset pressure (PB) on falling pressure may be set anywhere between 4.5 and 17 bar. This is the value at which the electrical contact will return to its original state.

Conclusion : Maximum possible differential is $20 - 4.5 = 15.5$ bar
Minimum possible differential is $20 - 17 = 3$ bar

Pressure and vacuum switches

for control circuits

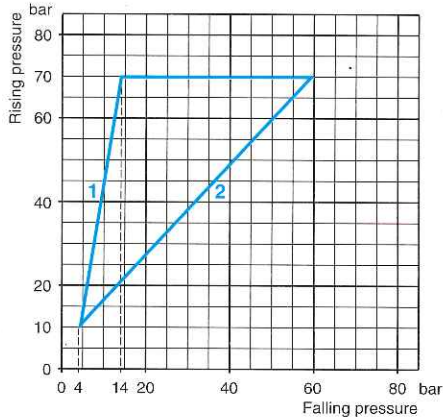
Type XMG for regulation between 2 thresholds (adjustable differential)

Operating curves

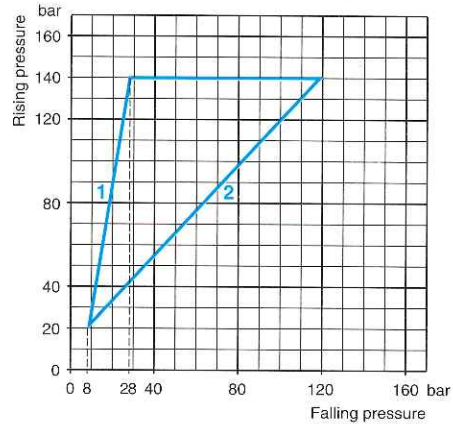
These curves have been established following arduous dynamic testing (average values)

Piston type pressure switches

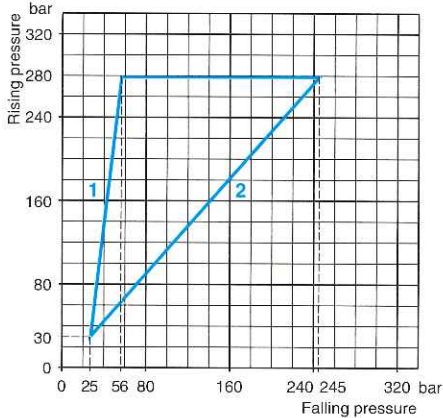
XMG-B070 and XMG-B070 ●



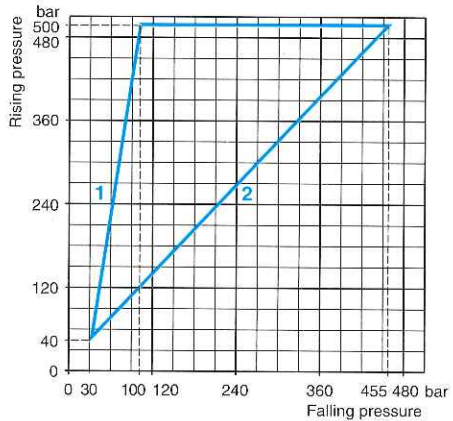
XMG-B140 and XMG-B140 ●



XMG-B280 and XMG-B280 ●



XMG-B500 and XMG-B500 ●

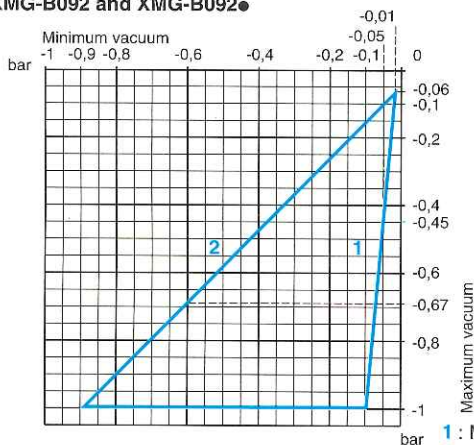


1 : Maximum differentials
2 : Minimum differentials

Diaphragm type vacuum switches

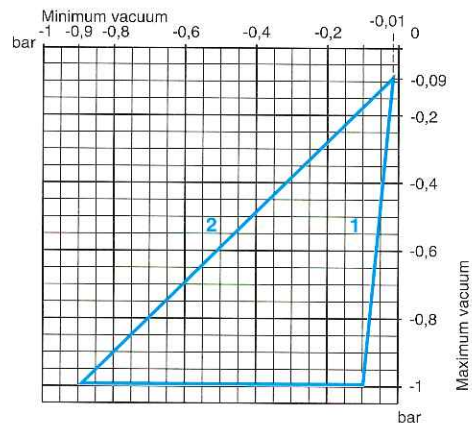
XMG-B091 and XMG-B091 ●

XMG-B092 and XMG-B092 ●



1 : Maximum differentials
2 : Minimum differentials

XMG-B093



Example of information which may be read from a typical curve, for vacuum switch XMG-B091

Example 1 : regulation between -0.05 and -0.20 bar

Take as reference point the minimum vacuum -0.05 bar.

The reset point can be between -0.1 bar (minimum differential $= -0.05$ bar) and -0.45 bar (maximum differential $= -0.40$ bar).

Regulation can therefore be achieved between -0.05 and -0.20 bar, the differential being -0.15 bar.

Example 2 : regulation between -0.6 and -0.8 bar.

Take as reference point the minimum vacuum -0.6 bar.

The reset point can be between -0.67 bar (minimum differential $= -0.07$ bar) and -1 bar (maximum differential $= -0.40$ bar).

Regulation can therefore be achieved between -0.6 and -0.8 bar, the differential being -0.20 bar.

Pressure and vacuum switches

for control circuits

Type XMG for regulation between 2 thresholds (adjustable differential)

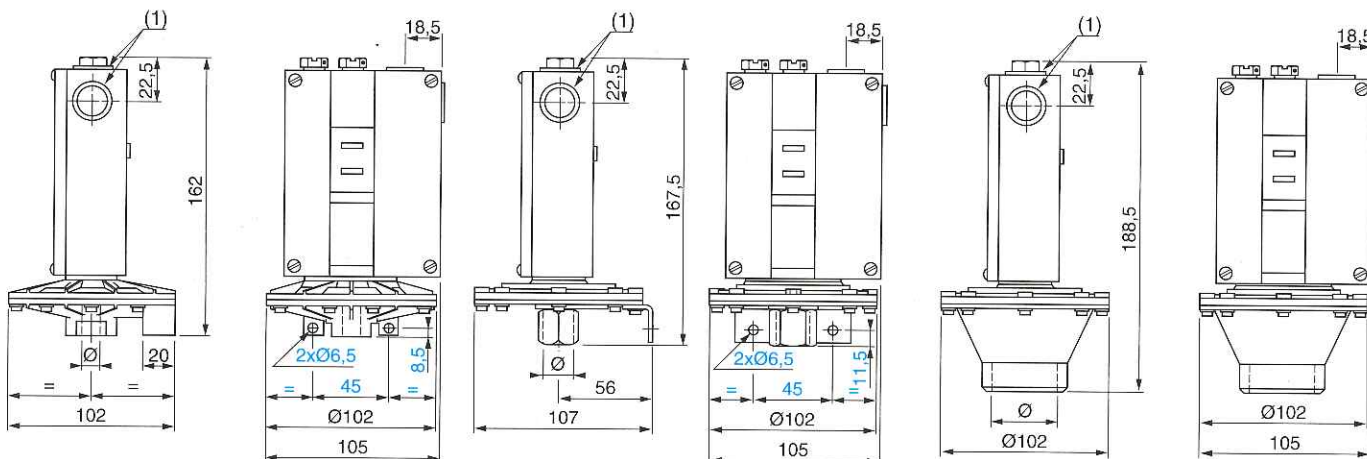
Dimensions

Diaphragm type pressure switches (up to 3.5 bar) and vacuum switches

For hydraulic oils, air, fresh water, sea water
XMG-B001, B002, B003, B0011, B0021, B0031
XMG-B091, B092, B093, B0911, B0921

For corrosive fluids
XMG-B0017, B0027, B0037
XMG-B0917, B0927

For viscous products
XMG-B0016, B0026, B0036



Ø : 3/8" BSP

(1) 2 tapped cable entries for N° 13 cable glands

Ø : 3/8" BSP

(1) 2 tapped cable entries for N° 13 cable glands

Ø : 1" 1/4 BSP

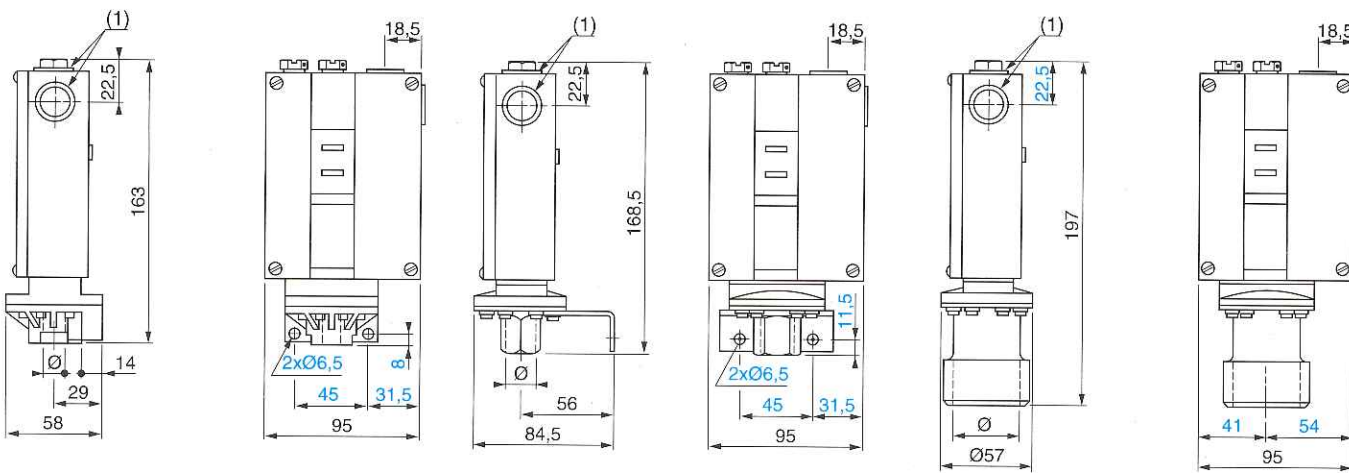
(1) 2 tapped cable entries for N° 13 cable glands

Diaphragm type pressure switches, 8 to 28 bar

For hydraulic oils, air, fresh water, sea water
XMG-B008, B014, B028, B0081, B0141, B0281

For corrosive fluids
XMG-B0087, B0147, B0287

For viscous products
XMG-B0086, B0146, B0286



Ø : 3/8" BSP

(1) 2 tapped cable entries for N° 13 cable glands

Ø : 3/8" BSP

(1) 2 tapped cable entries for N° 13 cable glands

Ø : 1" 1/4 BSP

(1) 2 tapped cable entries for N° 13 cable glands

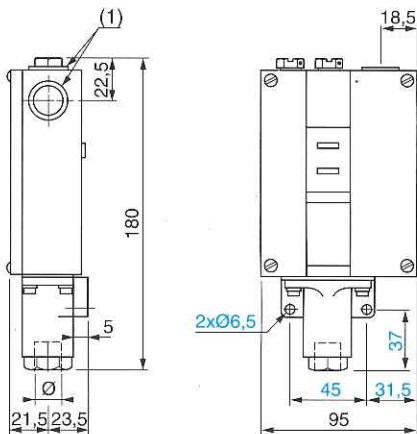
Pressure and vacuum switches

for control circuits

Type XMG for regulation between 2 thresholds (adjustable differential)

Dimensions, schemes

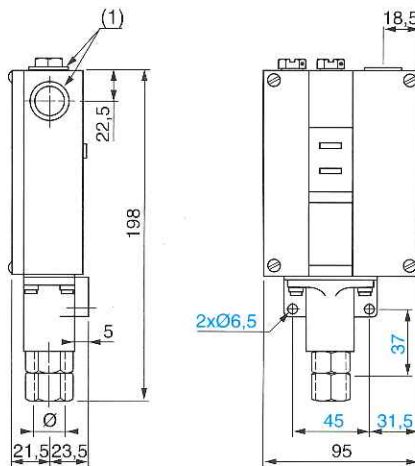
Piston type pressure switches
XMG-B070, B140, B280, B500
XMG-B070●, B140●, B280●, B500●



Ø : 3/8" BSP

(1) 2 tapped cable entries for N° 13 cable glands

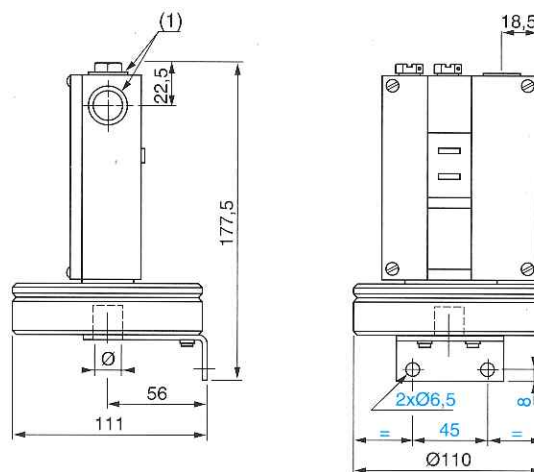
Metal bellows type pressure switch
XMG-B120



Ø : 1/4" BSP

(1) 2 tapped cable entries for N° 13 cable glands

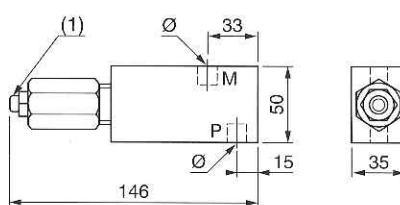
Diaphragm type pressure switches for maximum permissible pressure of 30 bar
XMG-B0018, B0028, B0038, B0088, B0148



Ø : 1/4" BSP

(1) 2 tapped cable entries for N° 13 cable glands

Isolating valve
XMG-Z08



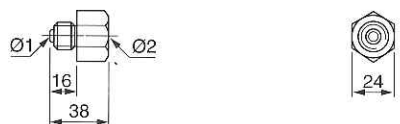
Ø : 1/4" BSP

P : pressure connection

M : operating connection (pressure switch)

(1) Setting adjustment screw

Non-return valve
XMG-Z02



Ø 1 : 3/8" BSP male

Ø 2 : 3/8" BSP female

Schemes

Switches with 1 C/O contact
Pressure switches

Vacuum switches (1)

Switches with 2 C/O contacts
Pressure switches

Vacuum switches (1)



(1) At rest, at atmospheric pressure, the contact is actuated