Selection guide

Sensors for pressure control

OsiSense XM

Electromechanical pressure and vacuum switches

Applications	Type of installation	**Control circuits**		
	Fluids controlled	**Air, water, hydraulic oils, corrosive fluids, viscous products**		
	Type of operation	**Detection of a single threshold (fixed differential)**	**Regulation between 2 thresholds (adjustable differential)**	
				
Fluid characteristics		Air, fresh water, corrosive fluids, viscous products, up to 160°C, depending on model		
Sizes		- 1 bar…500 bar (- 14.5 psi…7250 psi)		
Dimensions of case (mm)	Width x height x depth	35 x 68 x 75	46 x 68 x 85	
Type of contacts		1 CO single-pole, snap action	2 CO single-pole, simultaneous, snap action	
Degree of protection		IP 66: switches with terminal connections IP 65: switches with connector	IP 66: switches with terminal connections	
Electrical connection		Screw terminals: 1 entry tapped M20 x 1.5 mm for ISO cable gland or tapped for n° 13 cable gland		
Fluid connection		G 1/4 (female) G 1¼" (female) for viscous products		
Type reference		**XMLA**	**XMLB**	**XMLC**
Pages		18 to 69		
Other versions		Electromechanical pressure and vacuum switches with alternative tapped cable entries and/or fluid entries: NPT etc. Please consult our Customer Care Centre.		

Control circuits				
Air, water, hydraulic oils, corrosive fluids, viscous products		**Air, hydraulic oils, corrosive fluids**		
Dual stage switches **Detection at each threshold (fixed differential)**		**Regulation between 2 thresholds (adjustable differential)**		
				
Air, fresh water, corrosive fluids, viscous products, up to 160°C depending on model		Air, oils and other non corrosive fluids (- 73…+ 125°C)		Oils and other fluids (- 30…+ 125°C) Only oils, including synthetic oils, for certain models
- 1 bar…500 bar (- 14.5 psi…7250 psi)		0.7 bar…131 bar (10.15 psi…1900 psi)		69 bar…340 bar (1000 psi…4930 psi)
45 x 68 x 85		88 x 88 x 68		
2 CO single-pole, staggered, snap action		1 CO or 2 CO single-pole, snap action		
IP 66: switches with terminal connections		IP 65		
Screw terminals: 1 entry tapped M20 x 1.5 mm for ISO cable gland or tapped for n° 13 cable gland		Screw terminals: 1 entry tapped for n° 13 cable gland		
G 1/4 (female) G 1¼" (female) for viscous products				G 3/8 (female)
XMLD		**ACW**		**ADW**
18 to 69		80		82

Selection guide

Sensors for pressure control

OsiSense XM

Electromechanical pressure switches

Applications	Type of installation	**Control circuits**			**Power circuits**			
	Fluids controlled	**Air, water**			**Water**			**Air, water**
	Type of operation	**Regulation between 2 thresholds (adjustable differential)**			**Detection of a single threshold (fixed differential)**	**Regulation between 2 thresholds (adjustable differential)**		
								
Fluid characteristics		Air, fresh water, sea water (0…+ 70°C)			Fresh water, sea water (0…+ 70°C)			Air, fresh water, sea water (0…+ 70°C)
Sizes		6 bar, 12 bar and 25 bar (87 psi, 174 psi and 362.5 psi)			4.6 bar (66.7 psi)	7 bar (101.5 psi)	10.5 bar (152.3 psi)	6 bar, 12 bar and 25 bar (87 psi, 174 psi and 362.5 psi)
Dimensions of case (mm)	Width x height x depth	57 x 78 x 97.5			73 x 73 x 102	72 x 77 x 106	72 x 73 x 102	57 x 78 x 97.5
Setting of switching points		Internal screws	External screws		Internal screws			
Type of contacts		1 CO single-pole, snap action			2 NC snap action			2 NC or 3 NC snap action
Degree of protection		IP 54			IP 20/IP 65			IP 54 or IP 65 depending on model
Electrical connection		Screw terminals: 2 entries tapped for n° 13 cable gland, one fitted with n° 13 cable gland, one fitted with blanking plug			Screw terminals: 2 cable entries with grommet or 2 cable entries with n° 13 cable gland			Screw terminals: 2 entries incorporating n° 13 cable gland or without cable gland, depending on model
Fluid connection		G 1/4 or 4 x G 1/4 (female) depending on model			G 1/4 or R 1/4 (female or male)			G 1/4, G 3/8 or 4 x G 1/4 (female) depending on model
Type reference		**XMX**	**XMA**		**FTG•, FTG•NE**	**FSG•, FSG•NE**	**FYG22, FYG22NE**	**FYG32, FYG32NE**	**XMP**
Pages		88	89		94 to 96				98 to 107

Other versions

Electromechanical pressure switches with alternative tapped cable entries and/or fluid entries: ISO, NPT, etc. Please consult our Customer Care Centre.

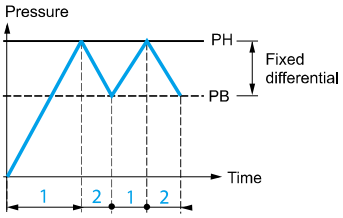
Electromechanical pressure and vacuum switches
OsiSense XM

Function
The function of pressure and vacuum switches is the control or regulation of pressure or vacuum levels in hydraulic or pneumatic systems.
They transform the pressure change into a digital electrical signal when the preset switching points are reached.

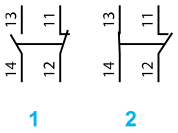
Switches for power circuits
Switches with power electrical contacts, either 2-pole or 3-pole, designed for direct switching of single-phase or 3-phase motors (pumps, compressors, etc.).

Switches for control circuits
Switches with standard electrical contacts, designed for control of contactors, relays, power valves, PLC inputs, etc.

Pressure switch operating principle
Detection of a single threshold
The switches for detection of a single threshold (fixed differential) have a single adjustable setting point (PH). The differential between the high and low points (PH - PB) depends upon the natural characteristics of the switch. It is not adjustable.



Example: contact schematics of XMLA

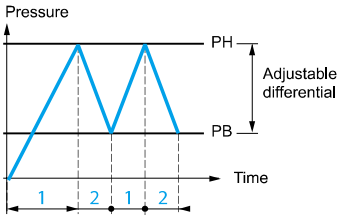


1 2

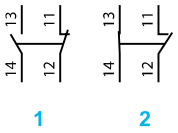
— Adjustable value
--- Non adjustable value

PH = High point
PB = Low point

Regulation between 2 thresholds
The switches for regulation between 2 thresholds (adjustable differential) have both a high point setting (PH) and a low point setting (PB). Both of these points can be independently adjusted.



Example: contact schematics of XMLB

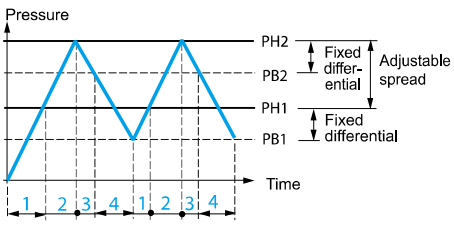


1 2

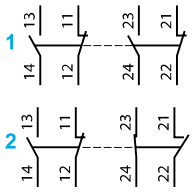
— Adjustable value

PH = High point
PB = Low point

Detection of 2 thresholds
The dual stage switches, for detection at each threshold, have an adjustable high point setting for each stage (PH1 and PH2). Both of these points can be independently adjusted. For both stages, the differential between the high point and the low point (PH1 - PB1 and PH2 - PB2) depends upon the natural characteristics of the switch. It is not adjustable.

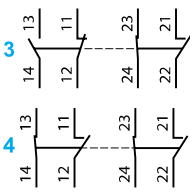


Example: contact schematics of XMLD



— Adjustable value
--- Non adjustable value

PH = High point
PB = Low point

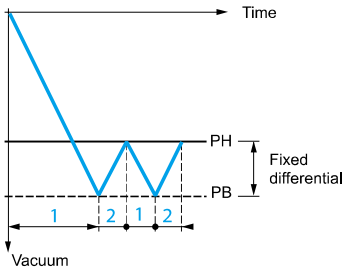


Electromechanical pressure and vacuum switches
OsiSense XM

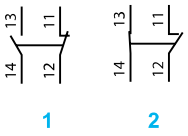
Vacuum switch operating principle

Detection of a single threshold

The switches for detection of a single threshold (fixed differential) have a single adjustable setting point (PH). The differential between the high and low points (PH - PB) depends upon the natural characteristics of the switch. It is not adjustable.



Example: contact schematics of XMLA

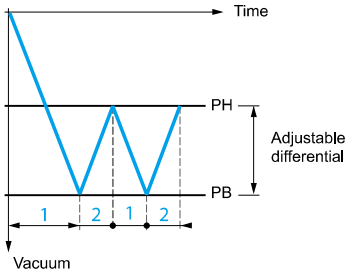


— Adjustable value
--- Non adjustable value

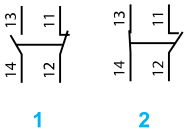
PH = High point
PB = Low point

Regulation between 2 thresholds

The switches for regulation between 2 thresholds (adjustable differential) have both a high point setting (PH) and a low point setting (PB). Both of these points can be independently adjusted.



Example: contact schematics of XMLB

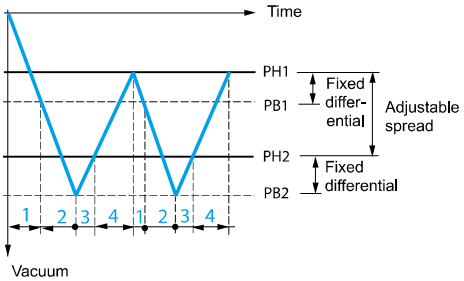


— Adjustable value

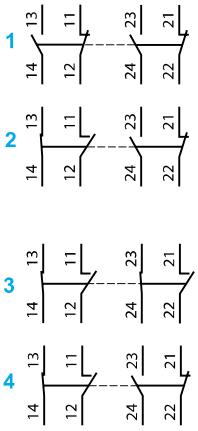
PH = High point
PB = Low point

Detection of 2 thresholds

The dual stage switches, for detection at each threshold, have an adjustable high point setting for each stage (PH1 and PH2). Both of these points can be independently adjusted.
For both stages, the differential between the high point and the low point (PH1 - PB1 and PH2 - PB2) depends upon the natural characteristics of the switch. It is not adjustable.



Example: contact schematics of XMLD



— Adjustable value
--- Non adjustable value

PH = High point
PB = Low point

Electromechanical pressure and vacuum switches
OsiSense XM

Terminology

Operating range
The difference between the minimum low point (PB) and the maximum high point (PH) setting values.

Size
Pressure switches and vacuum-pressure switches (vacu-pressure switches)
Maximum value of the operating range.

Vacuum switches
Minimum value of the operating range.

Switching point on rising pressure (PH)
Pressure switches
The upper pressure setting at which the pressure switch will actuate the contacts on rising pressure.

Vacuum switches
The lower vacuum setting at which the vacuum switch will reset the contacts on rising pressure.

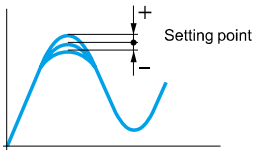
Switching point on falling pressure (PB)
The pressure at which the switch output changes state on falling pressure.

Switches with fixed differential
The lower point (PB) is not adjustable and is entirely dependent on the high point setting (PH) and the natural differential of the switch.

Switches with adjustable differential
The adjustable differential enables the independent setting of the lower point (PB).

Differential
The difference between the switching point on rising pressure (PH) and the switching point on falling pressure (PB).

Spread
For dual stage switches, the spread indicates the difference between the 2 switching points on rising pressure (PH2 and PH1) and, for vacuum switches, the difference between the 2 switching points on falling pressure (PB2 and PB1).

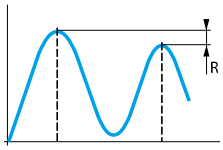
Accuracy (switches with setting scale)


The tolerance between the point at which the switch actuates its contacts and the value indicated on the setting scale. Where very high setting accuracy is required (initial installation of the product), it is recommended to use separate measuring equipment (pressure gauge, etc.).

Electromechanical pressure and vacuum switches
OsiSense XM

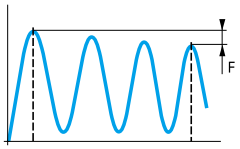
Terminology (continued)

Repeat accuracy (R)



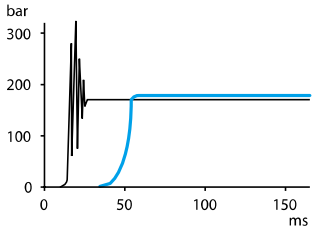
The tolerance between two consecutive switching operations.

Drift (F)

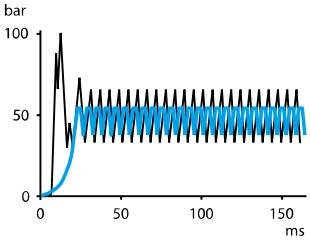


The tolerance of the switching point throughout the entire service life of the switch.

Accidental overpressure



Example 1: with destructive pressure level.



Example 2: with destructive pressure level and destructive pressure oscillations.
— Without damping device
— With damping device

This is an accidental pressure surge of very short duration (a few milliseconds).

If accidental overpressures occur and their duration is less than 50 milliseconds, the pressure damping device incorporated in the XML switches (sizes 10 bar and greater) will diminish the effect.

Maximum permissible pressure per cycle (Ps)

A pressure switch can withstand this pressure, without detrimental effect, on each cycle throughout its service life.

Its minimum value is at least equal to 1.25 times the switch size.

Maximum permissible accidental pressure

The maximum accidental pressure is at least equal to 2.25 times the switch size.

Destruction pressure

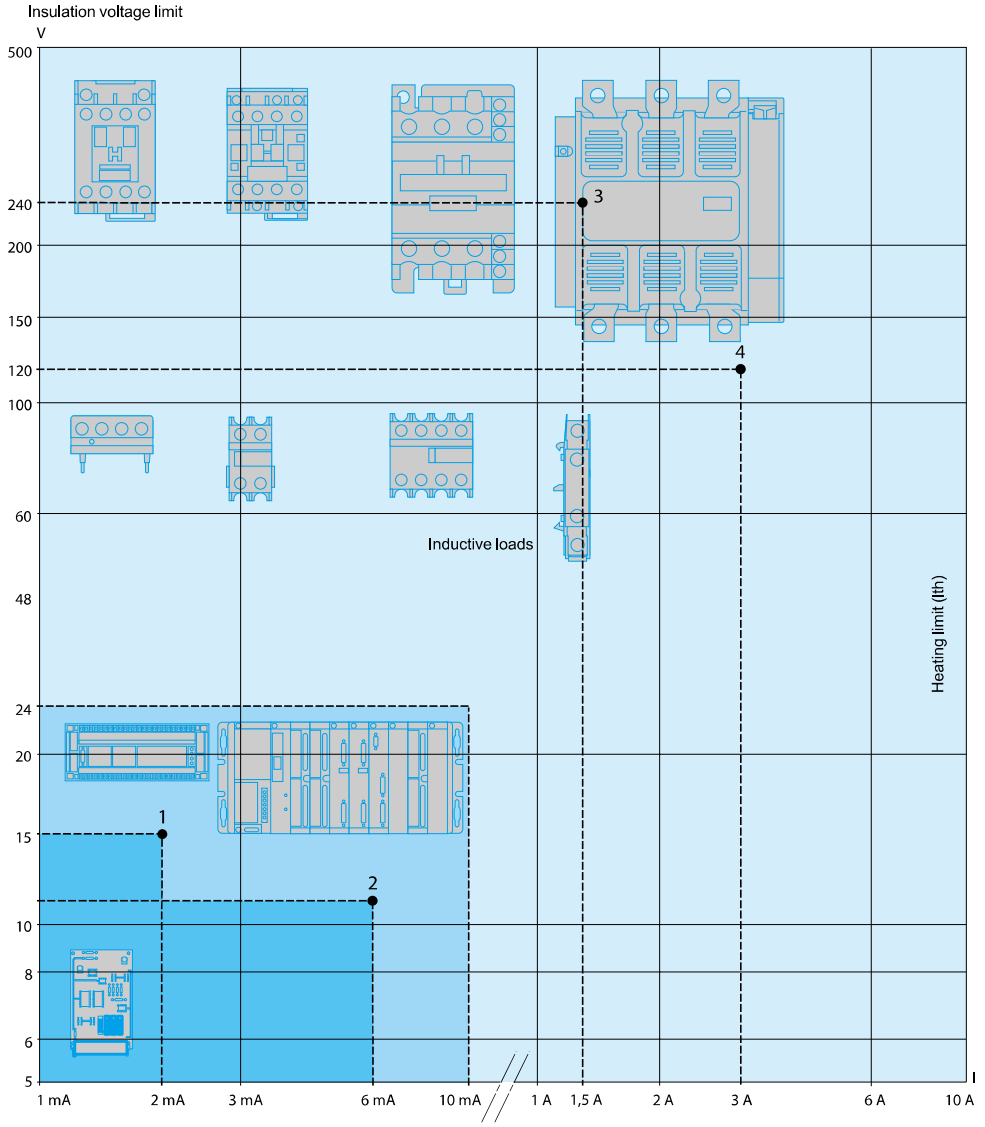
The maximum guaranteed pressure that the switch will withstand before its destruction, i.e. bursting, rupturing, component failure, etc.

Its value is at least equal to 4.5 times the switch size.

Electromechanical pressure and vacuum switches
OsiSense XM

Application range of pressure and vacuum switches XML, XMA and XMX, for control circuits

On standard loads
Continuous duty, frequent switching.



1 Standard PLC input, type 1
2 Standard PLC input, type 2
3 Switching capacity conforming to IEC 60947-5-1, utilisation category AC-15, DC-13
B300 240 V 1.5 A
R300 250 V 0.1 A
4 Switching capacity conforming to IEC 60947-5-1, utilisation category AC-15, DC-13
B300 120 V 3 A
R300 125 V 0.22 A
PLC: Programmable Logic Controller

Pressure switches	Application range
XMLA XMLB XMLC XMLD XMX, XMA	
XMLG XMLK	

On small loads
The use of electromechanical pressure and vacuum switches with programmable logic controllers is becoming more predominant.
On small loads, the reliability of the switches maintain a failure rate of less than 1 for 100 million operating cycles.

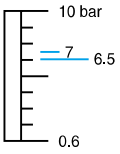
Electromechanical pressure and vacuum switches
OsiSense XM

Selection of switch size

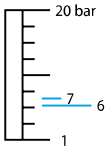
After establishing the type of switch required for the application (single threshold detection or regulation between 2 thresholds), the selection of its size will depend on the following criteria:
- the differential: difference between the high point (PH) and the low point (PB),
- the maximum pressure permissible per cycle,
- repeat accuracy, precision and minimum drift.

Examples of a fixed differential pressure switch selection, for detection of a single threshold

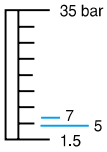
Main criterion: minimum differential
Example: for a selected high point (PH) of 7 bar



XMLA010●●●●●
Differential = 0.5 bar



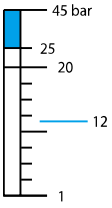
XMLA020●●●●●
Differential = 1 bar



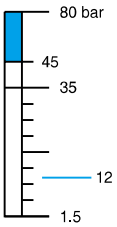
XMLA035●●●●●
Differential = 2 bar

Select an XMLA010●●●●● (the lowest size)

Main criterion: tolerance to overpressures
Example: for a selected high point (PH) of 12 bar



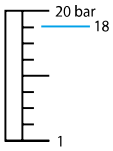
XMLA020●●●●●
Permissible accidental overpressure = 45 bar



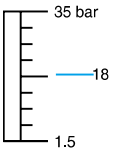
XMLA035●●●●●
Permissible accidental overpressure = 80 bar

Select an XMLA035●●●●● (the highest size)

Main criterion: repeat accuracy, precision and minimum drift
Example: for a selected high point (PH) of 18 bar



XMLA020●●●●●
Adjustable from 1 to 20 bar



XMLA035●●●●●
Adjustable from 1.5 to 35 bar

Select an XMLA035●●●●●

As a general rule, working at the upper or lower limits of the operating range should be avoided.

Units of pressure conversion table

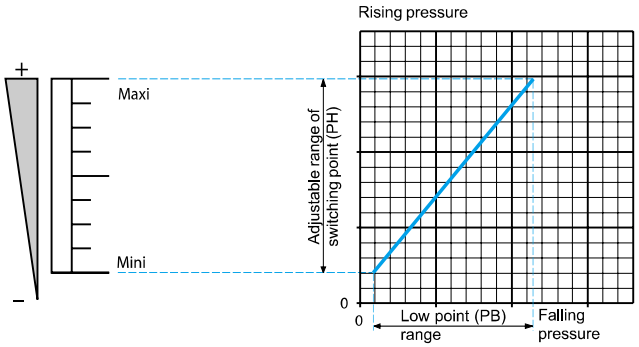
	psi	kg/cm²	bar	atm	mm Hg (Torr)	mm H_2O	Pa
1 psi =	1	0.07031	0.06895	0.06805	51.71	703.7	6895
1 kg/cm² =	14.22	1	0.98066	0.96784	735.55	10 000	98 066
1 bar =	14.50	1.0197	1	0.98695	750.06	10 197	10^5
1 atm =	14.70	1.0333	1.0132	1	760.0	10 333	101 325
1 mm Hg (Torr) =	0.01934	1.360×10^{-3}	1.333×10^{-3}	1.316×10^{-3}	1	13.59	133.3
1 mm H_2O =	1.421×10^{-3}	10^{-4}	$\sim 10^{-4}$	$\sim 10^{-4}$	0.07361	1	~ 9.80
1 Pa =	1.45×10^{-4}	1.0197×10^{-5}	10^{-5}	9.8695×10^{-6}	7.5×10^{-3}	0.10197	1

Example: 1 bar = 14.50 psi = 10^5 Pa

Electromechanical pressure and vacuum switches

Fixed differential switches, for detection of a single threshold

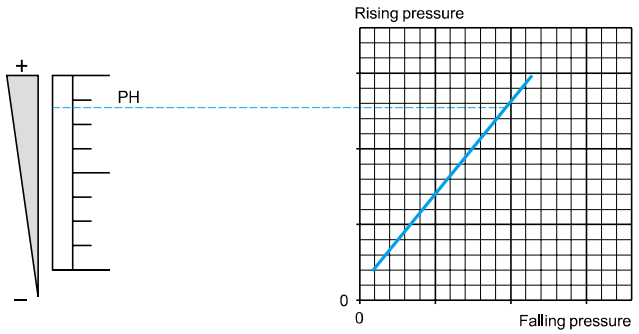
Adjustment range of the high point



Defined by the difference between the minimum and maximum high point (PH) setting values.

For a high set point (PH), the lower point (PB) is fixed and cannot be adjusted.
For a low set point (PB1 or PB2), the higher point (PH1 or PH2) is fixed and cannot be adjusted.

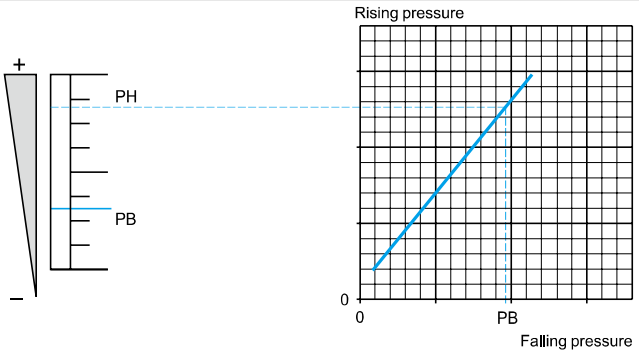
Switching point on rising pressure (PH)



The upper pressure setting at which the pressure or vacuum switch will actuate the contacts on rising pressure.

Adjustable throughout the range on rising pressure.

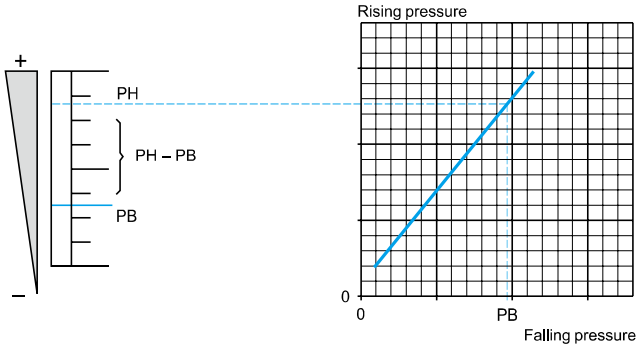
Switching point on falling pressure (PB)



The pressure at which the switch contact changes state on falling pressure.

The lower point (PB) is not adjustable and is entirely dependent on the high point setting (PH) and the natural differential of the switch.

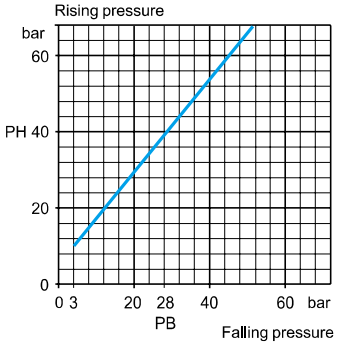
Differential



PH - PB = natural differential
The difference between the switching point on rising pressure (PH) and the switching point on falling pressure (PB).

This point is not adjustable and therefore, the value of the differential is fixed.
It is the natural differential of the switch (contact differential, friction, etc.).

Example

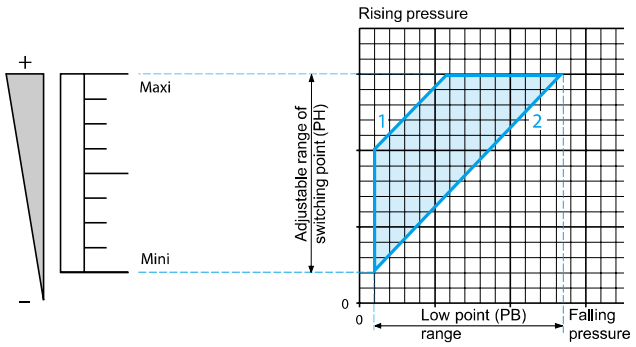


■ Consider a switching point on rising pressure (PH) of 40 bar (set value at which the contact will change state on rising pressure).
■ It can be seen that the switching point on falling pressure (PB) is 28 bar (fixed value at which the contact will return to its original state).
Conclusion:
□ the differential will be 40 - 28 = 12 bar.

Electromechanical pressure and vacuum switches

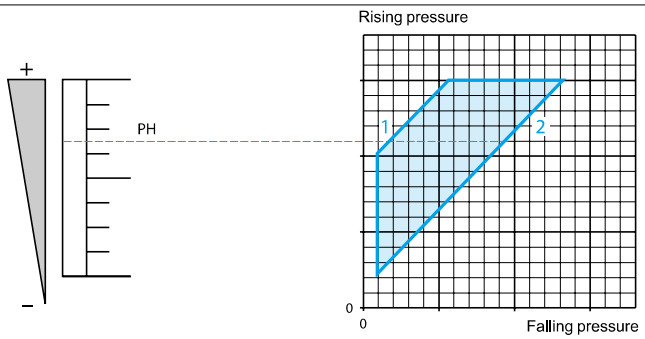
Adjustable differential switches, for regulation between 2 thresholds

Adjustment range of the high point



Defined by the difference between the minimum and maximum high point (PH) setting values.

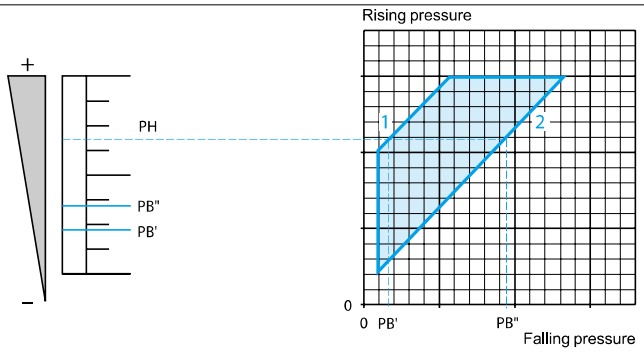
Switching point on rising pressure (PH)



The upper pressure setting at which the pressure or vacuum switch will actuate the contacts on rising pressure.

Adjustable throughout the range on rising pressure.

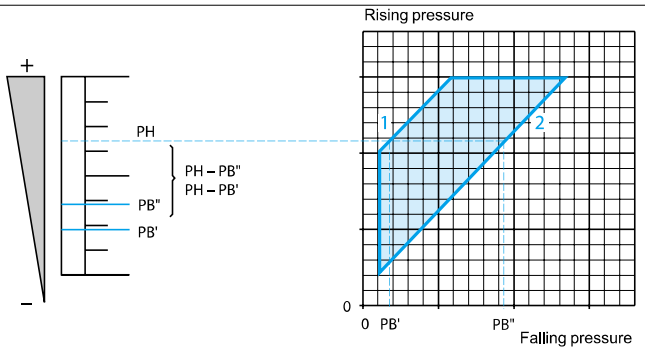
Switching point on falling pressure (PB)



The pressure at which the switch contact changes state on falling pressure.

The adjustable differential enables the independent setting of the lower point (PB).

Differential

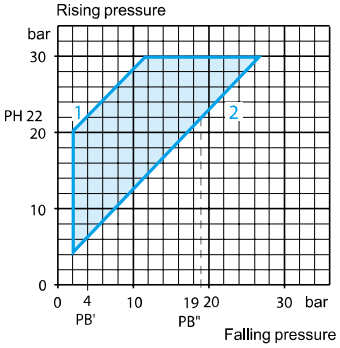


Low point < High point
PH - PB' = natural differential
PH - PB" = minimum differential

The difference between the switching point on rising pressure (PH) and the switching point on falling pressure (PB).

Note: *the low point can be set at any value between PB' and PB".*

Example



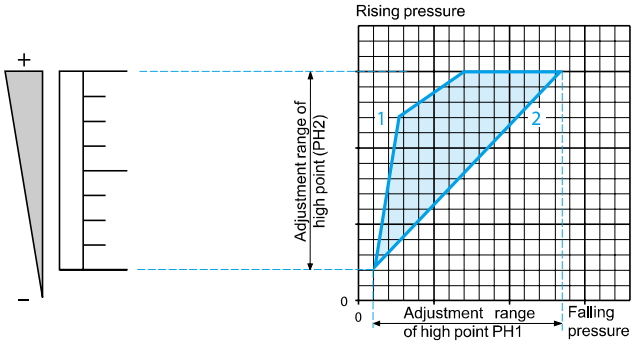
1 Maximum differential
2 Minimum differential

■ Consider a switching point on rising pressure (PH) of 22 bar (set value at which the contact will change state on rising pressure).
■ It can be seen that the switching point on falling pressure (PB) can be between 4 and 19 bar inclusive (set value at which the contact will return to its original state).
Conclusion:
□ the maximum differential will be: 22 - 4 = 18 bar,
□ the minimum differential will be: 22 - 19 = 3 bar.

Electromechanical pressure and vacuum switches

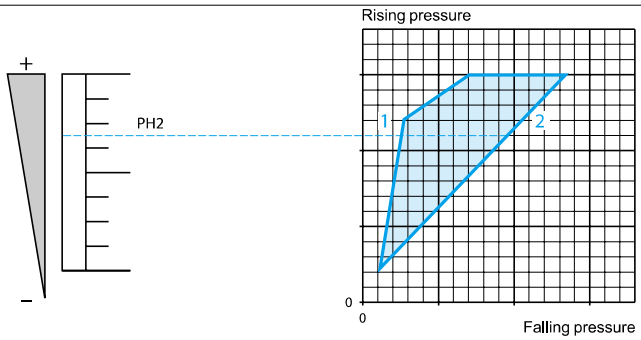
Dual stage, fixed differential switches, for detection at each threshold

Adjustment ranges of the switching points PH1 and PH2 on rising pressure



Defined by the difference between the minimum and maximum high point setting values of each stage (PH1 and PH2).

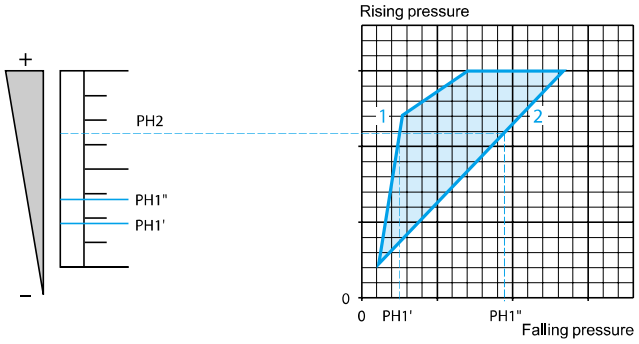
Switching point PH2 on rising pressure



The upper pressure setting at which the pressure or vacuum switch will actuate the contacts on rising pressure.

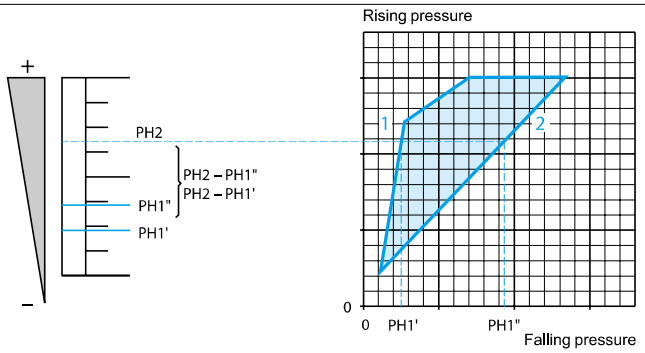
Adjustable throughout the range on rising pressure.

Switching point PH1 on rising pressure



The upper pressure setting at which the pressure or vacuum switch will actuate contact 1 on rising pressure.

Spread

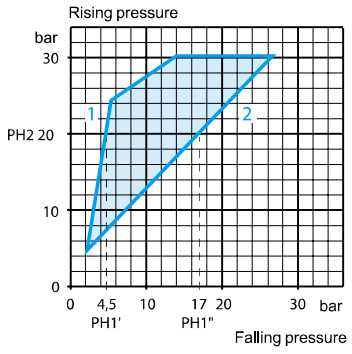


PH1 < PH2
PH2 - PH1' = maximum spread
PH2 - PH1" = minimum spread

The difference between switching points PH2 and PH1 on rising pressure.

Note: *switching point PH1 can be set at any value between PH1' and PH1".*

Example: Determining switching points on rising pressure for the 2 stages



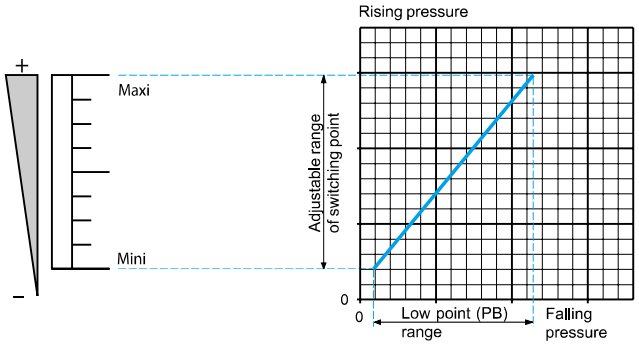
1 Maximum spread
2 Minimum spread

■ Consider a 2nd stage switching point on rising pressure (PH2) of 20 bar (set value at which contact 2 will change state on rising pressure).
■ It can be seen that the 1st stage switching point (PH1) can be set between 4.5 and 17 bar on rising pressure.
Conclusion:
□ the maximum spread will be:
20 - 4.5 = 15.5 bar,
□ the minimum spread will be:
20 - 17 = 3 bar.

Electromechanical pressure and vacuum switches

Dual stage, fixed differential switches, for detection at each threshold

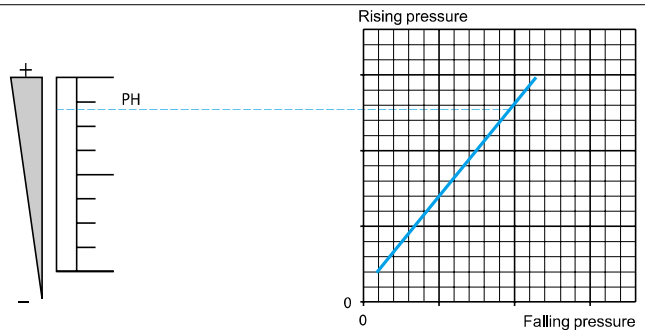
Adjustment range of high point (PH1 or PH2)



Defined by the difference between the minimum and maximum high point (PH1 or PH2) setting values for each stage.

For a high set point (PH), the lower point (PB) is fixed and cannot be adjusted.
For a low set point (PB1 or PB2), the higher point (PH1 or PH2) is fixed and cannot be adjusted.

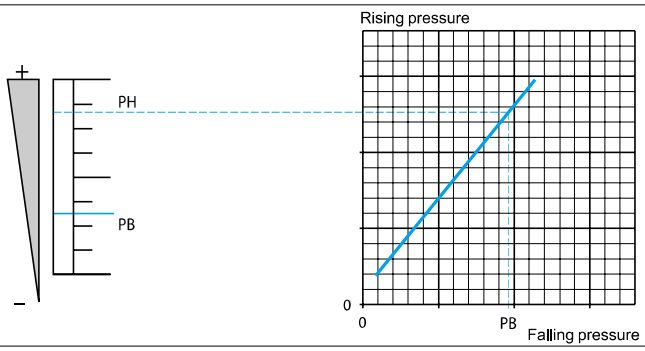
Switching point on rising pressure (PH1 or PH2)



The upper pressure setting at which the pressure or vacuum switch will actuate the contact, for each stage, on rising pressure.

Adjustable throughout the range on rising pressure.

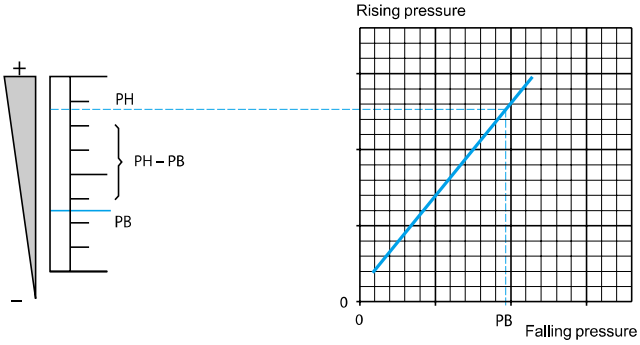
Switching point on falling pressure (PB1 or PB2)



The pressure at which the switch contact changes state, for each stage, on falling pressure.

The lower point (PB) is not adjustable and is entirely dependent on the high point setting (PH) and the natural differential of the switch.

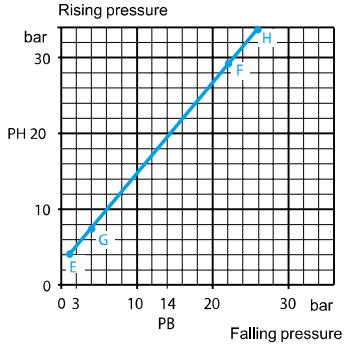
Differential



PH - PB = natural differential
The difference between the switching point on rising pressure (PH) and the switching point on falling pressure (PB), for each stage.

This point is not adjustable and therefore, the value of the differential is fixed.
It is the natural differential of the switch (contact differential, friction, etc.), for each of its 2 stages.

Example: stage 1 = segment EF stage 2 = segment GH



1 Maximum spread
2 Minimum spread

For stage 2 (segment GH):
- Consider a switching point on rising pressure (PH2) of 20 bar (set value at which contact 2 will change state on rising pressure).
- It can be seen that the switching point on falling pressure (PB2) is 14 bar (fixed value at which contact 2 will return to its original state).

Conclusion:
for stage 2, the differential will be:
20 - 14 = 6 bar.
Repeat the same procedure for stage 1 (segment EF).

Electromechanical pressure and vacuum switches

OsiSense XM

For control circuits, OsiSense XML

Presentation

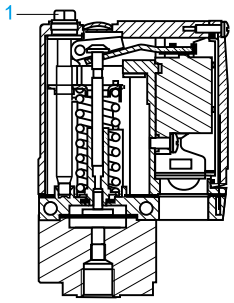
Pressure and vacuum switches OsiSense **XML** are switches for control circuits. They are used to control the pressure of hydraulic oils, fresh water, sea water, air, steam, corrosive fluids or viscous products, up to 500 bar.

XMLA pressure and vacuum switches have a fixed differential and are for detection of a single threshold. They incorporate a 1 CO single-pole contact.
XMLB pressure and vacuum switches have an adjustable differential and are for regulation between 2 thresholds. They incorporate a 1 CO single-pole contact.
XMLC pressure and vacuum switches have an adjustable differential and are for regulation between 2 thresholds. They incorporate 2 CO single-pole contacts.
XMLD pressure and vacuum switches are dual stage switches, each stage with a fixed differential, and are for detection at each threshold. They incorporate 2 CO single-pole contacts (one per stage).

Setting

When setting pressure and vacuum switches XML, adjust the switching point on rising pressure (PH) first and then the switching point on falling pressure (PB).

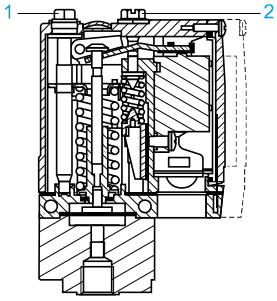
Pressure and vacuum switches with fixed differential, OsiSense XMLA



Switching point on rising pressure
The switching point on rising pressure (PH) is set by adjusting the red screw 1.

Switching point on falling pressure
The switching point on falling pressure (PB) is not adjustable.
The difference between the tripping and resetting points of the contact is the natural differential of the switch (contact differential, friction, etc.).

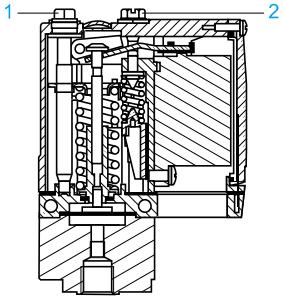
Pressure and vacuum switches with adjustable differential, OsiSense XMLB and XMLC



Switching point on rising pressure
The switching point on rising pressure (PH) is set by adjusting the red screw 1.

Switching point on falling pressure
The switching point on falling pressure (PB) is set by adjusting the green screw 2.

Dual stage pressure and vacuum switches with fixed differential for each threshold, OsiSense XMLD



Switching point on rising pressure of stage 1 and stage 2
The first stage switching point on rising pressure (PH1) is set by adjusting the red screw 1.
The second stage switching point on rising pressure (PH2) is set by adjusting the blue screw 2.

Switching point on falling pressure
The switching points on falling pressure (PB1 and PB2) are not adjustable.
The difference between the tripping and resetting points of each contact is the natural differential of the switch (contact differential, friction, etc.).

Electromechanical pressure and vacuum switches

OsiSense XM

For control circuits, OsiSense XML

Environment characteristics

Conformity to standards		CE, IEC/EN 60947-5-1, UL 508, CSA C22-2 n° 14
Product certifications		All products: UL, CSA XMLA and XMLB: CCC, BV, LROS, RINA, GOST
Protective treatment		Standard version "TC". Special version "TH"
Ambient air temperature	**°C**	For operation: - 25...+ 70. For storage: - 40...+ 70
Fluids or products controlled		Hydraulic oils, air, fresh water, sea water (0…+ 160°C), depending on model Steam, corrosive fluids, viscous products (0…+ 160°C), depending on model
Materials		Case: zinc alloy Component materials in contact with fluid: see pages 76 and 77
Operating position		All positions
Vibration resistance		4 gn (30...500 Hz) conforming to IEC 60068-2-6 except **XMLeL35eeeee**, **XMLe001eeeee** and **XMLBM03eeeee**: 2 gn
Shock resistance		50 gn conforming to IEC 60068-2-27 except **XMLeL35eeeee**, **XMLe001eeeee** and **XMLBM03eeeee**: 30 gn
Electric shock protection		Class I conforming to IEC 1140, IEC 536 and NF C 20-030
Degree of protection		Screw terminal models: IP 66 conforming to IEC/EN 60529 Connector models: IP 65 conforming to IEC/EN 60529
Operating rate	**Op. cycles/ min**	Piston version switches: ⩽ 60 (for temperature > 0°C) Diaphragm version switches: ⩽ 120 (for temperature > 0°C)
Repeat accuracy		< 2%
Fluid connection		G 1/4 (female) conforming to NF E 03-005 for standard models, ISO 228 or 1/4" NPTF on request: please consult our Customer Care Centre. For sizes ⩾ 300 bar, use the gasket delivered with the product. The gasket is also available as spare part: reference **XMLZL010**.
Electrical connection		Screw terminal models: ISO M20 x 1.5 tapped entry For an entry tapped for n° 13 (DIN Pg 13.5) cable gland, replace the last number of the reference by 1 (example: **XMLA010A2S12** becomes **XMLA010A2S11**) For an entry tapped 1/2" NPT, please consult our Customer Care Centre Connector models (either type EN 175301-803-A (ex-DIN 43650A) or M12): please consult our Customer Care Centre

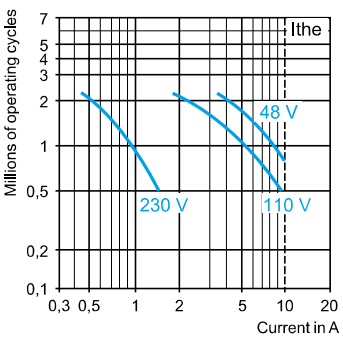
Contact block characteristics

Rated operational characteristics		~ AC-15; B300 (Ue = 240 V, Ie = 1.5 A - Ue = 120 V, Ie = 3 A) ⎓ DC-13; R300 (Ue = 250 V, Ie = 0.1 A) conforming to IEC 60947-5-1 Appendix A, EN 60 947-5-1
Rated insulation voltage		Ui = 500 V conforming to IEC/EN 60947-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14
Rated impulse withstand voltage		U imp = 6 kV conforming to IEC/EN 60947-1
Type of contacts		Silver tipped contacts **XMLA** and **XMLB**: 1 CO single-pole contact (4 terminal), snap action **XMLC**: 2 CO single-pole contacts (8 terminal), simultaneous, snap action **XMLD**: 2 CO single-pole contacts (8 terminal), staggered, snap action
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 (gI)
Connection		Screw clamp terminals. Minimum clamping capacity: 1 x 0.2 mm²/AWG 24, max: 2 x 2.5 mm²/AWG 14

Electrical durability
Conforming to IEC/EN 60947-5-1 Appendix C
Utilisation categories AC-15 and DC-13

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

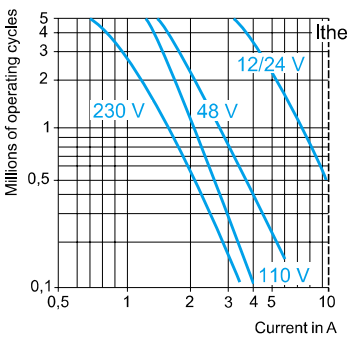
XMLA and **XMLB**
AC supply ~ 50/60 Hz
⎓ Inductive circuit, Ithe = 10 A



DC supply ⎓
Power broken in W
for 1 million operating cycles

Voltage	V	24	48	120
⎓	W	31	29	26

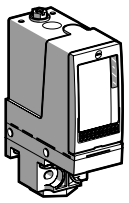
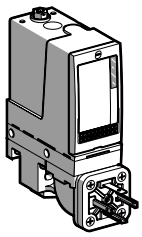
XMLC and **XMLD**
AC supply ~ 50/60 Hz
⎓ Inductive circuit, Ithe = 10 A



DC supply ⎓
Power broken in W
for 5 million operating cycles

Voltage	V	24	48	120
⎓	W	10	7	4

Electromechanical vacuum switches
OsiSense XML
Size - 1 bar (- 14.5 psi)
Fixed differential, for detection of a single threshold
Switches with 1 CO single-pole contact
Fluid connection G 1/4 (female)

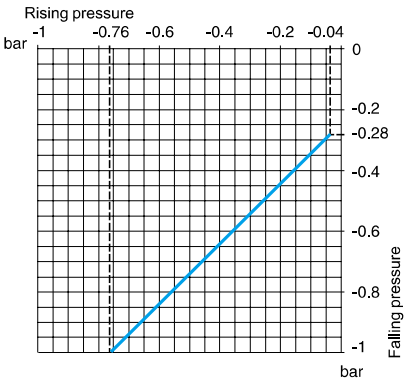
Vacuum switches OsiSense XMLA		**With setting scale**	
			
Adjustable range of switching point (PB) (Falling pressure)		**- 0.28…- 1 bar (- 4.06…- 14.5 psi)**	
Electrical connection		Terminals	DIN connector
References *(1)*			
Fluids controlled *(2)*	Hydraulic oils, fresh water, air, up to +70°C	**XMLAM01V2S12**	**XMLAM01V2C11**
	Hydraulic oils, fresh water, air, corrosive fluids, up to + 160°C	**XMLAM01T2S12**	**XMLAM01T2C11**
Weight (kg)		0.685	0.715

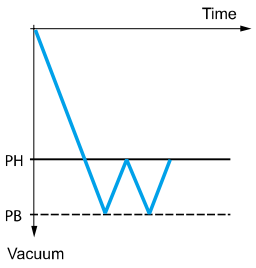
Complementary characteristics not shown under general characteristics (page 17)

Natural differential (add to PB to give PH)	At low setting *(3)*	0.24 bar (3.48 psi)
	At high setting *(3)*	0.24 bar (3.48 psi)
Maximum permissible pressure	Per cycle	5 bar (72.5 psi)
	Accidental	9 bar (130.5 psi)
Destruction pressure		18 bar (261 psi)
Mechanical life		3 x 10^6 operating cycles
Cable entry for terminal models		1 entry tapped M20 x 1.5 mm for ISO cable gland, clamping capacity 7 to 13 mm
Connector type for connector models		EN 175301-803-A (ex-DIN 43650A), 4-pin male. For suitable female connector, see page 70
Vacuum switch type		Diaphragm

(1) For 1 entry tapped for n° 13 cable gland, replace ***S12*** *by* ***S11*** *(example:* ***XMLAM01V2S12*** *becomes* ***XMLAM01V2S11****).*
(2) Component materials of units in contact with the fluid, see pages 76 and 77.
(3) Deviation of the differential at low and high setting points for switches of the same size: ± 0.05 bar (± 0.72 psi).

Operating curves





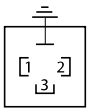
— Adjustable value
--- Non adjustable value

Connection

Terminal model

Connector model

Vacuum switch connector pin view



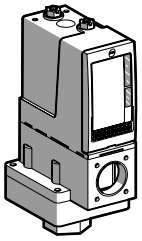
1 → 11 and 13
2 → 12
3 → 14

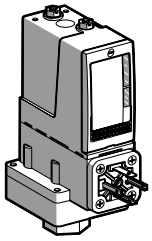
Other versions	Vacuum switches with alternative tapped cable entries: NPT etc. Please consult our Customer Care Centre.

Accessories: page 70
Dimensions: pages 71 to 73

Electromechanical vacuum switches
OsiSense XML
Size - 1 bar (- 14.5 psi)
Adjustable differential, for regulation between 2 thresholds
Switches with 1 CO single-pole contact
Fluid connection G 1/4 (female)

Vacuum switches OsiSense XMLB | **With setting scale**





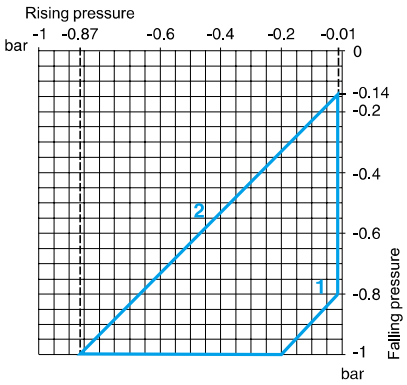
Adjustable range of switching point (PB) (Falling pressure)		**- 0.14…- 1 bar (- 2.03…- 14.5 psi)**	
Electrical connection		Terminals	DIN connector
References *(1)*			
Fluids controlled *(2)*	Hydraulic oils, fresh water, air, up to +70°C	**XMLBM02V2S12**	**XMLBM02V2C11**
	Hydraulic oils, fresh water, air, corrosive fluids, up to + 160°C	**XMLBM02T2S12**	**XMLBM02T2C11**
Weight (kg)		1.015	1.030

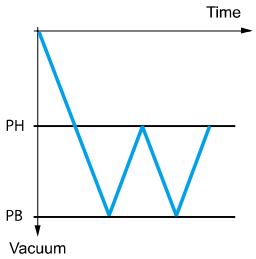
Complementary characteristics not shown under general characteristics (page 17)

Possible differential (add to PB to give PH)	Min. at low setting *(3)*	0.13 bar (1.88 psi)
	Min. at high setting *(3)*	0.13 bar (1.88 psi)
	Max. at high setting	0.8 bar (11.6 psi)
Maximum permissible pressure	Per cycle	5 bar (72.5 psi)
	Accidental	9 bar (130.5 psi)
Destruction pressure		18 bar (261 psi)
Mechanical life		3 x 10^6 operating cycles
Cable entry for terminal models		1 entry tapped M20 x 1.5 mm for ISO cable gland, clamping capacity 7 to 13 mm
Connector type for connector models		EN 175301-803-A (ex-DIN 43650A), 4-pin male. For suitable female connector, see page 70
Vacuum switch type		Diaphragm

*(1) For 1 entry tapped for n° 13 cable gland, replace **S12** by **S11** (example: **XMLBM02V2S12** becomes **XMLBM02V2S11**).*
(2) Component materials of units in contact with the fluid, see pages 76 and 77.
(3) Deviation of the differential at low and high setting points for switches of the same size: ± 0.02 bar (± 0.29 psi).

Operating curves





1 Maximum differential
2 Minimum differential

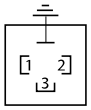
— Adjustable value

Connection

Terminal model

Connector model

Vacuum switch connector pin view



1 → 11 and 13
2 → 12
3 → 14

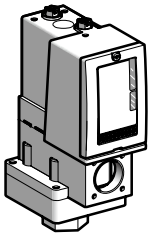
Other versions

Vacuum switches with alternative tapped cable entries: NPT, etc. Please consult our Customer Care Centre.

Accessories: page 70
Dimensions: pages 71 to 73

Electromechanical vacuum switches
OsiSense XML
Size - 1 bar (- 14.5 psi)
Adjustable differential, for regulation between 2 thresholds
Switches with 2 CO single-pole contacts
Fluid connection G 1/4 (female)

Vacuum switches OsiSense XMLC	**With setting scale**



Adjustable range of switching point (PB) (Falling pressure)		**- 0.14…- 1 bar (- 2.03…- 14.5 psi)**
Electrical connection		Terminals

References *(1)*

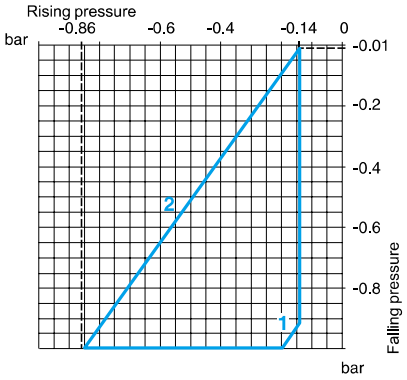
Fluids controlled *(2)*	Hydraulic oils, fresh water, air, up to +70°C	**XMLCM02V2S12**
	Hydraulic oils, fresh water, air, corrosive fluids, up to + 160°C	**XMLCM02T2S12**
Weight (kg)		1.015

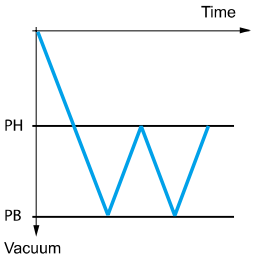
Complementary characteristics not shown under general characteristics (page 17)

Possible differential (add to PB to give PH)	Min. at low setting *(3)*	0.13 bar (1.89 psi)
	Min. at high setting *(3)*	0.14 bar (2.03 psi)
	Max. at high setting	0.8 bar (11.6 psi)
Maximum permissible pressure	Per cycle	5 bar (72.5 psi)
	Accidental	9 bar (130.5 psi)
Destruction pressure		18 bar (261 psi)
Mechanical life		3 x 10^6 operating cycles
Cable entry for terminal models		1 entry tapped M20 x 1.5 mm for ISO cable gland, clamping capacity 7 to 13 mm
Vacuum switch type		Diaphragm

*(1) For 1 entry tapped for n° 13 cable gland, replace **S12** by **S11** (example: **XMLCM02V2S12** becomes **XMLCM02V2S11**).*
(2) Component materials of units in contact with the fluid, see pages 76 and 77.
(3) Deviation of the differential at low and high setting points for switches of the same size: ± 0.02 bar (± 0.29 psi).

Operating curves



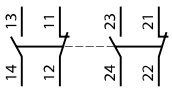


1 Maximum differential
2 Minimum differential

— Adjustable value

Connection

Terminal model



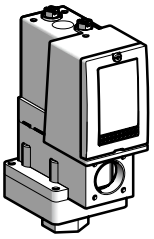
Other versions

Vacuum switches with alternative tapped cable entries: NPT, etc. Please consult our Customer Care Centre.

Accessories: page 70
Dimensions: pages 71 to 73

Electromechanical vacuum switches
OsiSense XML
Size - 1 bar (- 14.5 psi)
Dual stage, fixed differential, for detection at each threshold
Switches with 2 CO single-pole contacts (one per stage)
Fluid connection G 1/4 (female)

Vacuum switches OsiSense XMLD | **Without setting scale**



Adjustable range of each switching point (Falling pressure)	2nd stage switching point (PB2)	**- 0.12…- 1 bar (- 1.74…- 14.5 psi)**
	1st stage switching point (PB1)	**- 0.10…- 0.98 bar (- 1.45…- 14.21 psi)**
Spread between 2 stages (PB2 - PB1)		**0.02…0.88 bar (0.29…12.76 psi)**
Electrical connection		Terminals

References *(1)*

Fluids controlled *(2)*	Hydraulic oils, fresh water, air, up to +70°C	**XMLDM02V1S12**
	Hydraulic oils, fresh water, air, corrosive fluids, up to + 160°C	**XMLDM02T1S12**
Weight (kg)		1.015

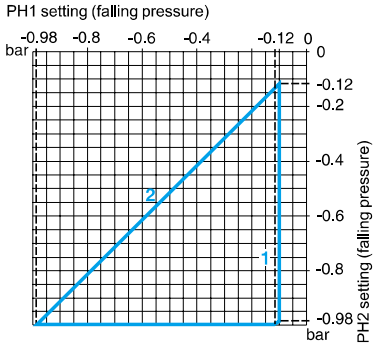
Complementary characteristics not shown under general characteristics (page 17)

Natural differential (add to PB1/PB2 to give PH1/PH2)	At low setting *(3)*	0.1 bar (1.45 psi)
	At high setting *(4)*	0.1 bar (1.45 psi)
Maximum permissible pressure	Per cycle	5 bar (72.5 psi)
	Accidental	9 bar (130.5 psi)
Destruction pressure		18 bar (261 psi)
Mechanical life		3 x 10^6 operating cycles
Cable entry for terminal models		1 entry tapped M20 x 1.5 mm for ISO cable gland, clamping capacity 7 to 13 mm
Vacuum switch type		Diaphragm

*(1) For 1 entry tapped for n° 13 cable gland, replace **S12** by **S11** (example: **XMLDM02V1S12** becomes **XMLDM02V1S11**).*
(2) Component materials of units in contact with the fluid, see pages 76 and 77.
(3) Deviation of the differential at low setting point for switches of the same size: ± 0.035 bar (± 0.51 psi).
(4) Deviation of the differential at high setting point for switches of the same size: ± 0.02 bar (± 0.29 psi).

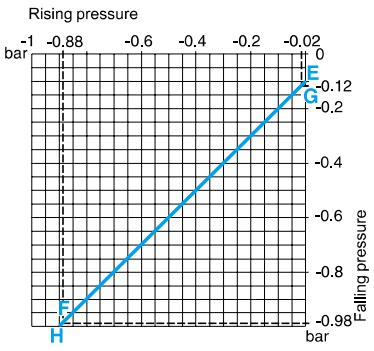
Operating curves

High setting tripping points of contacts 1 and 2

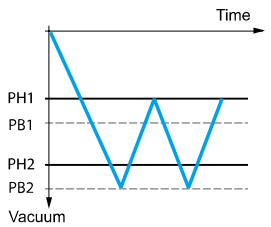


1 Maximum differential
2 Minimum differential

Natural differential of contacts 1 and 2



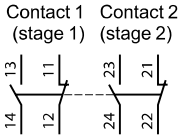
EF Contact 1 (stage 1)
GH Contact 2 (stage 2)



— Adjustable value
--- Non adjustable value

Connection

Terminal model



Other versions	Vacuum switches with alternative tapped cable entries: NPT, etc. Please consult our Customer Care Centre.

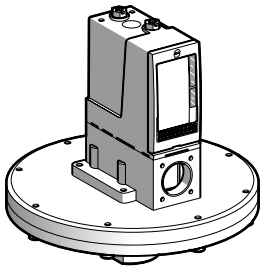
Accessories: page 70
Dimensions: pages 71 to 73

Electromechanical vacuum switches

OsiSense XML

Size - 200 mbar (- 2.9 psi)
Adjustable differential, for regulation between 2 thresholds
Switches with 1 CO single-pole contact
Fluid connection G 1/4 (female)

Vacuum switches OsiSense XMLB	**With setting scale**



Adjustable range of switching point (PB) (Falling pressure)		**- 20…- 200 mbar (- 0.29…- 2.9 psi)**
Electrical connection		Terminals

References *(1)*

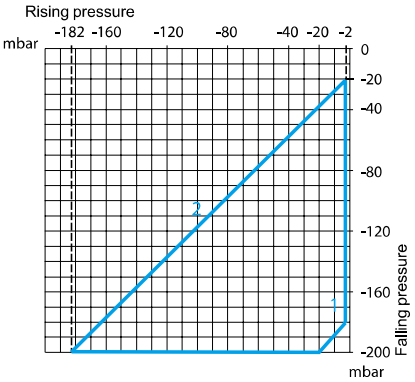
Fluids controlled *(2)*	Hydraulic oils, air, up to + 160°C	**XMLBM03R2S12**
	Fresh water, corrosive fluids, up to + 160°C	**XMLBM03S2S12**
Weight (kg)		3.310

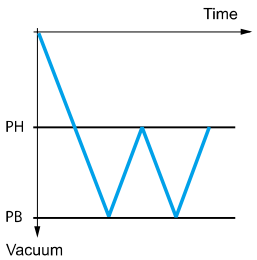
Complementary characteristics not shown under general characteristics (page 17)

Possible differential (add to PB to give PH)	Min. at low setting *(3)*	18 mbar (0.26 psi)
	Min. at high setting *(3)*	18 mbar (0.26 psi)
	Max. at high setting	180 mbar (2.6 psi)
Maximum permissible pressure	Per cycle	1 bar (14.5 psi)
	Accidental	2 bar (29 psi)
Destruction pressure		3.5 bar (50.75 psi)
Mechanical life		3 x 10^6 operating cycles
Cable entry for terminal models		1 entry tapped M20 x 1.5 mm for ISO cable gland, clamping capacity 7 to 13 mm
Vacuum switch type		Diaphragm

*(1) For 1 entry tapped for n° 13 cable gland, replace **S12** by **S11** (example: **XMLBM03R2S12** becomes **XMLBM03R2S11**).*
(2) Component materials of units in contact with the fluid, see pages 76 and 77.
(3) Deviation of the differential at low and high setting points for switches of the same size: ± 2 mbar (± 0.29 psi).

Operating curves





1 Maximum differential
2 Minimum differential

— Adjustable value

Connection

Terminal model

Other versions	Vacuum switches with alternative tapped cable entries: NPT, etc. Please consult our Customer Care Centre.

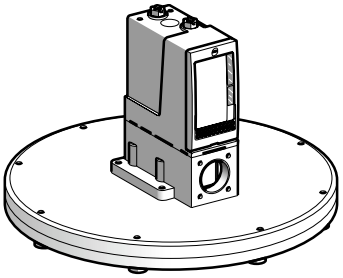
Accessories: page 70
Dimensions: pages 71 to 73

Electromechanical pressure switches

OsiSense XML

Size 50 mbar (0.72 psi)
Adjustable differential, for regulation between 2 thresholds
Switches with 1 CO single-pole contact
Fluid connection G 1/4 (female)

Pressure switches OsiSense XMLB	**With setting scale**



Adjustable range of switching point (PH) (Rising pressure)		**2.6…50 mbar (0.038…0.72 psi)**
Electrical connection		Terminals

References *(1)*

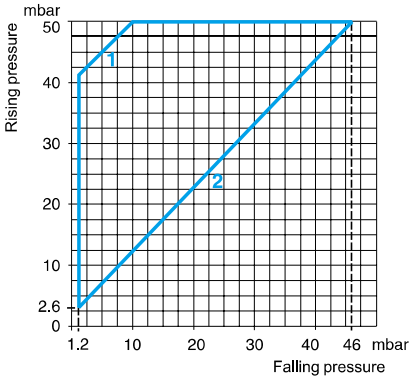
Fluids controlled *(2)*	Hydraulic oils, air, up to + 160°C	**XMLBL05R2S12**
	Fresh water, corrosive fluids, up to + 160°C	**XMLBL05S2S12**
Weight (kg)		2.420

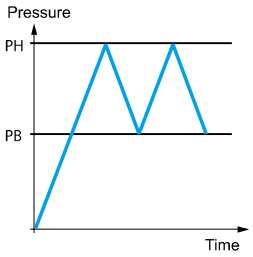
Complementary characteristics not shown under general characteristics (page 17)

Possible differential (subtract from PH to give PB)	Min. at low setting *(3)*	1.4 mbar (0.02 psi)
	Min. at high setting *(4)*	4 mbar (0.06 psi)
	Max. at high setting	40 mbar (0.58 psi)
Maximum permissible pressure	Per cycle	62.5 mbar (0.90 psi)
	Accidental	112.5 mbar (1.63 psi)
Destruction pressure		225 mbar (3.26 psi)
Mechanical life		6 x 10^6 operating cycles
Cable entry for terminal models		1 entry tapped M20 x 1.5 mm for ISO cable gland, clamping capacity 7 to 13 mm
Pressure switch type		Diaphragm

*(1) For 1 entry tapped for n° 13 cable gland, replace **S12** by **S11** (example: **XMLBL05R2S12** becomes **XMLBL05R2S11**).*
(2) Component materials of units in contact with the fluid, see pages 76 and 77.
(3) Deviation of the differential at low setting point for switches of the same size: - 0.8 mbar, + 1.1 mbar (- 0.01 psi, + 0.02 psi).
(4) Deviation of the differential at high setting point for switches of the same size: ± 1.4 mbar, (+ 0.02 psi).

Operating curves





1 Maximum differential
2 Minimum differential

— Adjustable value

Connection

Terminal model

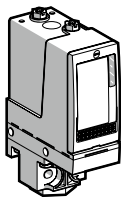
Other versions	Pressure switches with EN 175301-803-A (ex-DIN 43650A) connector or with alternative tapped cable entries: NPT, etc. Please consult our Customer Care Centre.

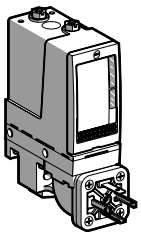
Accessories: page 70
Dimensions: pages 71 to 73

Electromechanical vacu-pressure switches

OsiSense XML. Size 5 bar (72.5 psi).
Adjustable differential, for regulation between 2 thresholds.
Switches with 1 CO single-pole contact.
Fluid connection G 1/4 (female)

Vacu-pressure switches OsiSense XMLB	**With setting scale**





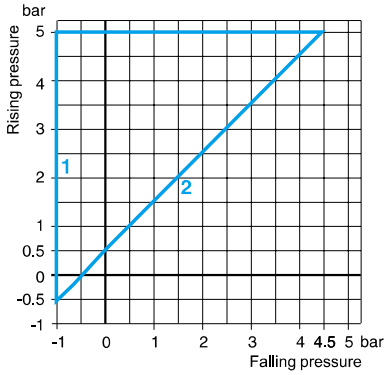
Adjustable range of switching point (PH) (Rising pressure)		**- 0.5…5 bar (- 7.25…72.5 psi)**	
Electrical connection		Terminals	DIN connector
References *(1)*			
Fluids controlled *(2)*	Hydraulic oils, fresh water, air, up to +70°C	**XMLBM05A2S12**	**XMLBM05A2C11**
	Hydraulic oils, fresh water, air, up to 160°C	**XMLBM05B2S12**	**XMLBM05B2C11**
	Corrosive fluids, up to + 160°C	**XMLBM05C2S12**	**XMLBM05C2C11**
	Viscous products, up to + 160°C (G 1¼" fluid connection)	**XMLBM05P2S12**	**XMLBM05P2C11**
Weight (kg)		0.685	0.715

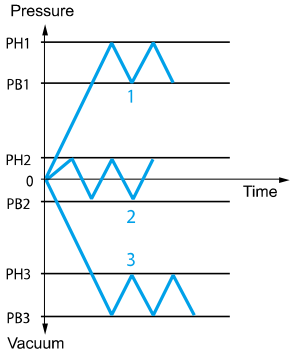
Complementary characteristics not shown under general characteristics (page 17)

Possible differential (subtract from PH to give PB)	Min. at low setting *(3)*	0.5 bar (7.25 psi)
	Min. at high setting *(3)*	0.5 bar (7.25 psi)
	Max. at high setting	6 bar (87 psi)
Maximum permissible pressure	Per cycle	6.25 bar (90.62 psi)
	Accidental	11.25 bar (163.12 psi)
Destruction pressure		23 bar (333.5 psi)
Mechanical life		3 x 10^6 operating cycles
Cable entry for terminal models		1 entry tapped M20 x 1.5 mm for ISO cable gland, clamping capacity 7 to 13 mm
Connector type for connector models		EN 175301-803-A (ex-DIN 43650A), 4-pin male. For suitable female connector, see page 70
Vacu-pressure switch type		Diaphragm

*(1) For 1 entry tapped for n° 13 cable gland, replace **S12** by **S11** (example: **XMLBM05A2S12** becomes **XMLBM05A2S11**).*
(2) Component materials of units in contact with the fluid, see pages 76 and 77.
(3) Deviation of the differential at low and high setting points for switches of the same size: ± 0.05 bar (± 0.72 psi).

Operating curves





1 Maximum differential
2 Minimum differential

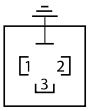
— Adjustable value

Connection

Terminal model

Connector model

Vacu-pressure switch pin view



1 → 11 and 13
2 → 12
3 → 14

Other versions

Vacu-pressure switches with alternative tapped cable entries: NPT, etc. Please consult our Customer Care Centre.

Accessories: page 70
Dimensions: pages 71 to 73