## Pressure Switches

This series of pressure switches can be used for all applications where an electrical circuit is required to close or open at a required pressure.
The robustness of this series of pressure switches enables all applications in all industries to be satisfied.

- Robust \& Reliable
- Diaphragm Operated <42 bar
- Piston Operated >42 bar
- Proven Performance
- Wetted parts for use with all Fluids
- Fully Adjustable
- Easily Customised
- Enclosure Rating IP65
- CE marked for all Directives that apply
- LPCB Approved
- UL 508 Certified


## Pressure Ranges

| TYPE No. | PRESSURE RANGE | HYSTERESIS TYPICAL |
| :--- | :--- | :--- |
| 1381 | -1 to +1 bar | 0.04 bar |
| 1381 | 0.2 to 4 bar | 0.07 bar |
| 1381 | 0.5 to 11 bar | 0.3 bar |
| 1381 | 0.7 to 14 bar | 0.4 bar |
| 1381 | 2 to 28 bar | 0.6 bar |
| 1381 | 2 to 42 bar | 0.8 bar |
| 1481 | 5 to 125 mbar | 2.5 mbar |
| 1481 | 15 to 250 mbar | 4 mbar |
| 1481 | 25 to 400 mbar | 10 mbar |
| 1581 | 9 to 100 bar | 10 bar* $^{*}$ |
| 1581 | 14 to 200 bar | 18 bar $^{*}$ |
| 1581 | 20 to 400 bar | 25 bar* $^{*}$ |

*Typical for mid-range set point

## Maximum Pressure

To ensure long service life select the pressure range as follows:
Dynamic pressure applications Pmax $=75 \%$ of Range
Static pressure applications Pmax $=100 \%$ of Range
Maximum pressure that can be applied is $125 \%$ of pressure range (see option Q page 8 for higher pressures.)

## Electrical Ratings

10 amp at 250 V 50 Hz Inductive load
1 amp at 30 V dc Inductive load
For other voltages and currents please consult our technical department.

## Setting Accuracy $\pm 2 \%$ <br> Temperature Range <br> $\qquad$ -10 to $+85^{\circ} \mathrm{C}$ (Process fluid must not solidify)

## Temperature Coefflcient

$\qquad$ .0.05\% of range per ${ }^{\circ} \mathrm{C}$ from $20^{\circ} \mathrm{C}$


## Installation

These pressure switches can be mounted directly on the connecting thread. Sealing groves are machined onto the end face of parallel threads for use with sealing washers. A Mounting Bracket is available if required.

## Vacuum Setting

At ambient pressure the switches will be in the operated condition consequently the wiring should be reversed i.e. NO becomes NC.

## Connecting Threads

All connecting treads used in industry are available including British, American and metric. Please state the connection thread when ordering.

## Flanges \& Hygienic Fittings

(see page 5 for alternative connections)
Flanged fittings are available and all types of Hygienic fittings can be supplied assembled directly onto the pressure switch.
If flush diaphragms are required please consult our Technical Department

Materials of Construction Types 1381 \& 1481
Diaphragm..................Beryllium Copper
Se
Seal ............................G
Glass filled PTFE <11 bar Nitrile rubber >11 bar
Base .Brass
Housing ......................Aluminium / Zinc diecast
Cover. .Glass Filled Nylon with Nitrile seal

| Material of Construction Type 1581 |
| :---: |
| Piston .....................Stainless Steel |
| Seal $\qquad$ Nitrile rubber with PTFE anti-extrusion rings |
| Base .......................Stainless Steel |
| Housing ....................Aluminium / Zinc diecast |
| Cover.......................Glass Filled Nylon with Nitrile se |



Types 1381 \& 1581
Type 1481

Alternative Wetted Parts
(see page 9 for abbreviated chemical compatibility chart)

Switches with standard wetted parts above are suitable for applications using air, nitrogen, inert gasses, oils, water \& steam.

Alternatives for use with fluids other than these are shown opposite.

Please contact our Technical Department for further information.

| MATERIAL | BASE | DIAPHRAGM | PROTECTION DISC |
| :--- | :---: | :---: | :---: |
| 316 Stainless Steel | Yes | No | Yes |
| 17/7 Stainless Steel | No | Yes | No |
| Carbon Steel | Yes | No | No |
| UPVC | Yes | No | No |
| PTFE | Yes | No | Yes |
| PVDF | Yes | No | No |
| Silver Plate | No | No | Yes |
| Pure Silver | No | Yes | Yes |
| Halar Lined | Yes | No | No |
| Dykor coated | No | Yes | No |
| Rubber Lined | Yes | No | No |
| Chrome Plated | Yes | Yes | No |

## Varients To Series 1000 Pressure Switches Type 2381, 2481 \& 2581 Twin Circuit Pressure Switches



- Two independently operating Micro-switches.
- External Dimensions are the same as the Standard Switches.
- Reset Differentials are approx. twice those given for standard switches.
- Electrical Rating 5 amp at 250 V 50 Hz
- For Pressure ranges see page 2


## Applications

Both micro-switches are SPDT and can be used to give two independent opening or closing contacts at different switch points. The two micro-switches cannot be set to give a switch at the same pressure. A DPDT micro-switch must be used for this function see page 10.
These switches can be set to give High/High, Low/Low or High/Low set points.

## Type 1391,1491 \& 1591 <br> Single Visual Setting Pressure Switches <br> Type 2391, 2491 \& 2591 Twin Visual Setting Pressure Switches



## Cooling Coil Transmitter

- For temperatures up to $300^{\circ} \mathrm{C}$
- For viscous or corrosive fluids

The pressure switch body is isolated from the heat source via a secondary diaphragm and coiled copper tube allowing the heat to be dissipated.
The flange clamping bolts must not be un-tightened as this will break the pressure seal and render the switch in-operative.

- Accurate Visual Setting Scale
- One or Two independently operating Micro-switches depending on type
- External adjustment
- Scale calibrated to $\pm 2 \%$ of range


## Applications

Visual setting pressure switches are particularly suitable for application where frequent alteration of the pressure setting is required.

Pressure Ranges

| TYPE No. | PRESSURE RANGE | HYSTERESIS TYPICAL |
| :---: | :---: | :---: |
| 1391 \& 2391 | 1 to 0 bar vacuum | Hysteresis as the standard for single visual setting |
| 1391 \& 2391 | 0 to 1 bar |  |
| 1391 \& 2391 | 0.2 to 4 bar |  |
| 1391 \& 2391 | 0.5 to 10 bar |  |
| 1391 \& 2391 | 2 to 30 bar |  |
| 1391 \& 2391 | 2 to 40 bar | Hysteresis approx. twice the standard for twin visual setting. |
| 1491 \& 2491 | 5 to 125 mbar |  |
| 1491 \& 2491 | 15 to 250 mbar |  |
| 1491 \& 2491 | 25 to 400 mbar |  |
| 1591 \& 2591 | 9 to 100 bar |  |
| 1591 \& 2591 | 14 to 200 bar | See p2. |
| 1591 \& 2591 | 20 to 400 bar |  |



## Throttled Transmitter

- Stops pressure pulses giving false switching

In many applications where pressure switches are used it is not possible to provide protection against pulsating pressures by means of a snubber involving small orifices. The Bailey \& Mackey solution to this problem is integral hydraulic damping, allowing a mean switch point to be achieved irrespective of the severity of the pressure pulses.


## Alternative Base Fittings suitable for adding to 1000 Series \& 3000 series



HYGENIC FITTING
BASE MATERIAL - ST. STEEL


50 mm PIPE FLANGE TO BS EN 1092-1 PN16


SMALL BASE CONNECTION


25 mm PIPE FLANGE ADAPTOR TO BS EN 1092-1 PN16


FEMALE CONNECTION

## To make series 1000 Pressure Switches more suitable for many applications there are several standard options available.

## Option D - Degreased for oxygen use

Pressure switches for use on oxygen have to be free from all traces of oil or grease. Diaphragm pressure switches have the diaphragm, pressure chamber and seal specially cleaned and handled during assembly and are marked with the 'Use no oil' symbol.

## Option G - Gold plated Micro-switches

Micro-switches with Gold plated contacts are used in low power circuits where the contact resistance of standard silver contacts is to high. For electrical loads below 6 V at 0.1 A dc.

## Option H - Low leak assembly

A modified design of pressure switch is available for use on extinguishers, switchgear, transformers or other sealed pressure systems. Special machining and assembly gives freedom from leaks greater than $10^{-5} \mathrm{Nccs} / \mathrm{sec}$.

## Option M - For mining applications No aluminium parts used.

## Option P - With plug \& socket

Fitted with 4 - pin plug and socket for SPDT micro-switch version. Fitted with 7 - pin plug and socket for twin SPDT or DPDT microswitch versions.

## Option Q - Overload Protection

Pressures above the adjustable range shown in the table should not be applied to the switches. Overload will strain the diaphragm, either causing distortion that will alter the set point of the pressure switch or reduce the diaphragm life through fatigue failure. Normally, the pressure range should be chosen to cover the highest pressures likely to develop in the system; Series 1000 switches can be constructed to accept higher pressures than the adjustable range by fully supporting the diaphragm above its normal operating deflection. Maximum temperature is $60^{\circ} \mathrm{C}$.

| MAXIMUM <br> ADJUSTABLE RANGE | OVERLOAD <br> PRESSURE ALT. 1 | OVERLOAD <br> PRESSURE ALT. 2 |
| :--- | :--- | :--- |
| $\mathbf{4 0 0}$ mbar | $\mathbf{7}$ bar | - |
| 1 bar | $\mathbf{2 8}$ bar | - |
| 2 bar to 42 bar | $\mathbf{7 0}$ bar | $\mathbf{2 0 0}$ bar |

## Option R \& RF - Manual Reset

On some applications, for safety reasons, a manual reset is required e.g. after changing a filter element or for alarm purposes.

R = Manual Reset above the set point
RF = Manual Reset Below the set point.

## Option V - Adjustable Hysteresis

This option enables the hysteresis to be increased and can be varied between approximately $5 \%$ and $95 \%$ of the adjustable pressure range.

## Option X

In some applications a higher electrical rating is required this option is fitted with a micro-switch for 15amps at 250 V 50 Hz .

