

## WORKING INSTRUCTIONS

### PERSEUS RANGE

This working instruction leaflet covers the following ranges of switches:-  
 PF61 Pressure Switch  
 PF62 Pressure Switch  
 PR61 Pressure Switch with resistors  
 PR62 Pressure Switch with resistors

## INSTALLATION

### HEALTH AND SAFETY AT WORK ACT 1974

#### WARNING

Your attention is drawn to the electrical potential that will be present if the terminal cover is removed while the switch is connected to a live supply. The electrical supply must be isolated prior to removal of the terminal housing cover.

Similarly, on pressurised process systems, prior to removal of an instrument it should be isolated from the pressurised medium or the system pressure should be relieved.

Precautions must be taken with regard to the possible operating temperatures present when performing adjustment.

The units must be specified, installed and operated by competent personnel, and their use be limited to within the published specifications. (All hazardous area models must be installed in accordance with BS EN 60079-14).

Unauthorised modification, repair or operation outside the specified limits may invalidate the warranty. Servicing should be carried out by qualified personnel only.

On pressure devices, should pulsation or surges be anticipated, then a suitable pressure snubber should be fitted.

## FAILURE HAZARD

#### Pressure switches.

Element/primary seal failure.

Metal Diaphragm & Piston.

In the event of the above the process medium will be prevented from entering and pressurising the main body by a secondary seal and will be vented to atmosphere via a vent hole.

Rubber Diaphragm.

In the event of the above the process medium can potentially enter the main body, but should be vented by the bleed hole and Gortex® filter located in the bottom of the adjustment chamber.

The process medium temperature should not be allowed to exceed that stated in the product data and under the "OPERATING TEMPERATURES" section in this document. If process temperatures in excess of those stated are possible, then the switch should be remote mounted via a length of tubing or pipe to ensure dissipation of heat.

## PROCESS CONNECTIONS

#### Pressure Switches

Various process entries are available, and the installation will vary dependent upon exact type. It is recommended that PTFE tape is used on tapered fittings and the use of the correct size bonded seal on parallel fittings.

Suitable pipe sealant or flange gasket should be incorporated when installing to ensure a good leak free fit.

## MATERIALS

The materials of construction are as follows:-

Main Body – Black anodised aluminium  
 Terminal Cover – Black anodised aluminium  
 Adjustment Cover – 316 Stainless steel  
 Wetted Parts - 316 stainless steel, monel or inconel  
 Pressure Seals – Viton® or Nitrile  
 Environmental Seals - Nitrile  
 External Fasteners - Stainless steel  
 Internal Fasteners & Springs – Zinc plated carbon steel

## OPERATING TEMPERATURES

The operating temperatures restrictions for the Perseus series are as follows:-

**Ambient:**  
 Operational -50°C to +85°C

**Ambient ('T' values as certified for hazardous areas).**

ATEX II1G Exia IIC certified.

Without resistors: -50°C to +78°C T6  
 -50°C to +93°C T5  
 -50°C to +128°C T4  
 With resistors: -50°C to +72°C T5  
 -50°C to +122°C T4

ATEX II1D ExiaD 20 IP67 T200°C certified.

With or without resistors:  
 -50°C to +70°C

ATEX II2GD Exd IIC certified:

-50°C to +74°C T6  
 -50°C to +89°C T5

ATEX ExtD A21 IP67 T115°C certified.

With or without resistors:  
 -50°C to +74°C

**Storage:** -50°C to +85°C

**Process:**

PF61 & PF62  
 Viton® -20°C to +150°C  
 Nitrile -40°C to +120°C

## MOUNTING INSTRUCTIONS

All switches can be mounted in any orientation to suit, without affecting accuracy or operation.

The Perseus can be mounted from fixings in the body and this can be accomplished using 2 M5 screws passing through the case into a panel or bracket. Alternatively they can be mounted from the process entry via optional male swivel connections.

When installing direct mounting pressure switches, particular care should be taken to ensure the internal 1/4" nipple is not loosened during the positioning or tightening procedure. If the unit is likely to be subjected to high shock levels or physical loads then additional supports should be incorporated.

## ELECTRICAL INSTALLATION

All models are supplied with a M20 conduit entry and this can be fitted with either a suitable gland or directly with conduit, to suit the installation.

Access to the terminals is via the removable round front cover, though the electrical supply must be isolated prior to this activity. Switch connection details are provided on the inside of the cover. This should be referred to when connecting to the terminal strip as the N.O. / N.C. terminal numbers vary dependant on whether the switch setting is rising or falling. Options of 1 or 2 SPDT micro switches are available. Terminals are suitable for cables, single or multi-strand, up to 2.5mm<sup>2</sup>. Dual microswitch option up to 1.5mm<sup>2</sup>.

Note: Dual switches if required are mechanically linked to give a DPDT switching action, reset of the switches could be up to 3% apart.

**For specific wiring details please refer to product drawings on reverse.**

#### Wiring Designation

1 - Common  
 2 - Normally closed 1&3 make rising  
 3 - Normally open 1&2 break rising

**It is the responsibility of the installer to ensure that the Perseus is not subjected to electrical parameters outside those stated and that suitable overload protection is provided.**

The Perseus range is certified to be installed in a Zone 0 environment, when supplied from an approved Intrinsically Safe Interface that is compatible with the following electrical parameters:

Ui : 28Vdc, li : 93mA, Pi : 0.65W  
 Ci : 0 nF, Li : 0mH

## SETTING & CALIBRATION

**Adjustment of the switch set point may be carried out without isolating the electrical supply.**

Prior to despatch, switches are subjected to a specified maximum static pressure and operation check and set either to mid range or to actual set point requested by customer. They are then pre-set to that value against calibrated test instruments.

With the adjuster access cover removed the setting can be adjusted by rotating the set point adjuster using the supplied Tommy bar stowed to the right of the scale.

The setting is read from the centre of the set point adjuster against the calibrated scale. Rotation to the left will increase the set point and to the right will decrease the set point.

## ATEX CERTIFICATION

The PERSEUS range of switches comply with the following standards:

Intrinsically Safe.  
 EN60079-0:2000, EN60079-11:2007,  
 EN60079-26:2004, EN61241-0:2006,  
 EN61241-11:2006.

Flameproof.

EN60079-0:2000, EN60079-1:2004,  
 EN61241-0:2006, EN61241-1:2006.

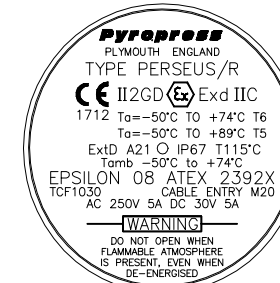
The equipment is designed to satisfy the requirements of Clause 1.2.7 of the Essential Health and Safety Requirements ANNEX II of directive 94/9/EC.

**Note: Exia CAT1 Applications.**  
 ATEX certification for CAT1 environments to the Non-electrical standard BS EN 13463-1:2001. Clause 8.2 states that:  
**Equipment manufactured from aluminium of greater than 10% by mass, are only suitable for CAT1 environments if, 'the ignition assessment shows that there is no risk from incendive friction, impact or abrasion sparks' reference to BS EN 1127-1:1998 Clause 6.4.4.**  
**This product has been certified with an 'X' suffix, indicating it is the responsibility of the end user to carry out an assessment of the equipment and installation to establish that "no hazards due to mechanically generated sparks have been identified". This assessment to be performed by a qualified person, legally responsible for the site/company safety.**

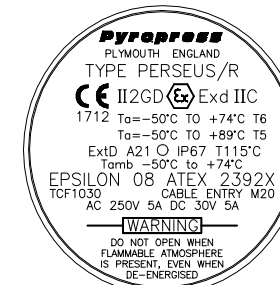
INTRINSICALLY SAFE LABEL  
 Gas & Dust without resistors fitted.



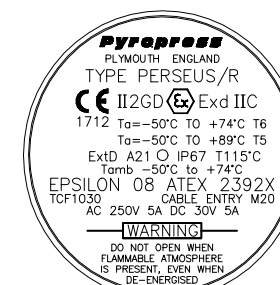
Gas & Dust with resistors fitted.



FLAMEPROOF LABEL  
 Gas & Dust without resistors fitted.



FLAMEPROOF LABEL  
 Gas & Dust with resistors fitted.



## PRESSURE EQUIPMENT DIRECTIVE

#### Pressure Equipment Directive (PED)

It is now a requirement that all items of pressure equipment and assemblies with a maximum allowable pressure of over 0.5 bar be assessed under the PED. Installers should be aware and address the following sections of the PED.

**These switches are classified as pressure accessories and are manufactured to Sound Engineering Practice (SEP) Art.3 (3). The CE mark is for compliance to the ATEX Directive or Low Voltage Directive.**

#### Handling

Notice is drawn to the installation warnings with respect to: Closures and openings, access to the process entry when pressurised, and surface temperature.

#### Operation

In the case of fluids, which may become unstable and/or over-pressure (including surge), and/or over-temperature it is the installer's responsibility to ensure the device is operated within the published specifications.

#### Misuse

Notice is drawn to the installation warnings with respect to: Operation outside the specified limits in terms of over pressure or temperature.

#### Degradation of materials, Erosion

Notice is drawn to the requirements of routine maintenance and the expected working life of elastomeric materials.

#### Corrosion/Chemical attack

It is the installer's responsibility to ensure the selection of construction materials from the published specification is compatible with the operating medium.

#### Mounting, Piping

Provide adequate support, constraint, anchoring, alignment and pre-tensioning to prevent free movement and over-stressing of connections and flanges.

Consider condensation within piping and the means of drainage.

Consider potential damage from turbulence and vortices and make allowances for wear if appropriate.

Consider fatigue due to vibration.

Keep appropriate records for maintenance, inspection and repair.

#### Toxic, Flammable fluids

For group 1 gas and fluids (explosive or toxic nature) provide means to isolate and assess size for significant risk, protect as necessary.

#### Mechanical damage

Consider potential damage from objects such as vehicles, falling bodies or adjacent machinery and house or protect as necessary.

#### Fire

Consider potential damage in the event of external fire and house or protect as necessary.

#### Supply Fault

Consider the consequence of a power supply fault, failure or overload and protect as necessary.

## ROUTINE MAINTENANCE

Routine inspection of the installation should take place at regular intervals. It is recommended that the switch is checked and operated every 6 months. Electrical connections and covers should be checked periodically to tightness.

It is recommended that the 'O' rings and diaphragms (on pressure and flow switches) be renewed every 3-5 years, and micro switch assemblies every 5-10 years dependant upon equipment usage.

## FAULT DIAGNOSIS

If the switch fails to operate, the following should be checked:-  
 The installation of the switch.  
 Electrical terminals are secure and tight.  
 The micro switch function is correct.  
 The mechanical function of the pushrod.  
 Investigate for signs of process leakage.  
 Investigate for signs of diaphragm failure (on pressure & differential pressure).

## SPARES & REPLACEMENT PARTS

**Maintenance and overhaul of any type, should only be carried out by qualified personnel, in accordance with current health and safety requirements.**

Replacement micro switch assemblies and diaphragm kits are available.

Procedures for replacement of spare parts are as follows:-

#### PF610 & PF620 Diaphragm kit.

There are four diaphragm kits available, either Viton®, Nitrile, 316 stainless steel or Inconel. Each kit contains a diaphragm and 'O' ring set (Nitrile & Viton®), specialist 'O' rings to be ordered separately.

The process entry can be unscrewed from the body, this will require a 33mm A/F spanner or socket. Once removed the diaphragm and 'O' ring can be removed revealing the silicon insert. The silicon insert should be replaced, ensuring that it is located correctly within the counter bore of the diaphragm ring. The diaphragm can be inserted on top of the silicon insert and is also located within a counter bore of the diaphragm ring. The correct 'O' ring to suit the medium should be located within the same counter bore as the diaphragm and the process entry can now be reassembled to the body. It is recommended that the process entry is secured with a suitable locking compound (Loctite 242) and torque to the correct setting of 20Nm. (15lb.ft).

#### Micro switch assemblies

Micro switch replacement for standard pressure switches is usually straight forward and can be achieved using standard calibration equipment.

#### Single or double micro switch assemblies.

1. Remove 3 M3 cap head screws from PCB terminal mounting board and retain for reuse. Remove 2 M3 cap head screws from micro switch angle bracket and retain for reuse.
2. Withdraw micro switch assembly complete and discard.
3. Slide in replacement assembly and secure.
4. Connect micro switch to a suitable circuit tester to monitor change over state of the micro switch contacts.
5. Readjust main adjuster to the original set point using a calibrated test gauge and appropriate test equipment.