

INSTALLATION INSTRUCTIONS

PERSEUS RANGE

This working instruction leaflet covers the following ranges of switches:

PF/R61	Pressure Switch – Single Microswitch
PF/R62	Pressure Switch – Dual Microswitch
PF/R67	Pressure Switch – High Differential Micro Switch
VF/R61	Vacuum Switch – Single Microswitch
VF/R62	Vacuum Switch – Dual Microswitch
VF/R67	Vacuum Switch – High Differential Micro Switch
DPF/R61	Differential Pressure Switch – Single Micro Switch
DPF/R62	Differential Pressure Switch – Dual Micro Switch
DPF/R67	Differential Pressure Switch – High Differential Micro Switch
TF/R61/71	Temperature Switch - Single Micro Switch
TF/R62/72	Temperature Switch – Dual Micro Switch
LF60	Reed Level Switch
LF/R61	Level Switch - Single Micro Switch
LF/R62	Level Switch – Dual Micro Switch
LF/R67	Level Switch – High Differential Micro Switch
FF/R61	Flow Switch – Single Micro Switch
FF/R62	Flow Switch – Dual Micro Switch
FF/R67	Flow Switch – High Differential Micro Switch

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 should be specified, installed and operated by competent personnel, and their use must be limited to within the published specifications. (All hazardous area models must be installed in accordance with IEC/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, a suitable pressure snubber should be fitted.

FAILURE HAZARD

Element/primary seal failure.

Metal Diaphragm, Flush Mounted Diaphragm, Piston & Flow.
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, Low Pressure & Differential Pressure.
In the event of the above the process medium can potentially enter the main body, but should be vented by the Gore-tex® filter and blow-out disk located in the bottom of the adjustment chamber.

PROCESS CONNECTIONS

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.

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.

Temperature Switches

These are usually provided either with a thermowell having a male screwed connection or a flange to a recognised international standard or with a male screwed fitting allowing the bare sensing probe to come in contact with the process medium.

Flush Mounted & Flow Switches

These are supplied with mounting holes and flange to a specified standard, it is recommended that a suitable flange gasket is used.

Level Switches

These are usually supplied with a bonded seal for parallel threads and it is recommended that PTFE tape is used upon tapered threads.

MATERIALS

The materials of construction are as follows:

Main Body: Black anodised aluminium or 316 stainless steel
Terminal Cover: Black anodised aluminium or 316 stainless steel.
Wetted Parts: 316 stainless steel or Monel 400.

Diaphragm: Viton®, Nitrile, 316 stainless steel 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 -40°C to +85°C

Ambient (*Tamb' values as certified for hazardous areas) ATEX, IECEx & AEx Certified.

INTRINSICALLY SAFE

ATEX Certificate No: ITS12ATEX27501X
IECEx Certificate No: IECEx ITS 12.0014X
AEx Certificate No:
Without resistors:
IIG Exia IIC T6...T2 Ga
T5...T5 Tamb -50°C to +78°C
T5...T4 Tamb -50°C to +93°C
T4...T2 Tamb -50°C to +128°C

Ambient Temperature Range	Permitted Process Temperature	Temperature Class
-50°C to +78°C	-50°C to +78°C	T6
	-50°C to +95°C	T5
-50°C to +93°C	-50°C to +93°C	T5
	-50°C to +130°C	T4
-50°C to +128°C	-50°C to +128°C	T4
	-50°C to +195°C	T3
	-50°C to +280°C	T2

With resistors:
IIG Exia IIC T5...T2 Ga
T5...T3 Tamb -50°C to +72°C
T4...T2 Tamb -50°C to +122°C

Ambient Temperature Range	Permitted Process Temperature	Temperature Class
-50°C to +72°C	-50°C to +72°C	T5
	-50°C to +130°C	T4
	-50°C to +150°C	T3
-50°C to +122°C	-50°C to +122°C	T4 & T3
	-50°C to +280°C	T2

FLAMEPROOF

ATEX Certificate No: ITS12ATEX17511X
IECEx Certificate No: IECEx ITS 12.0007X
AEx Certificate No:
IIG Exd IIC Gb.
With or without resistors:
T6 Tamb -50°C to +74°C
T5 Tamb -50°C to +89°C

Storage:
Recommended : -40°C to +85°C

Process:

PF/R61, PF/R62, DPF/R61 & DPF/R62:
Viton® -20°C to +150°C
Nitrile -30°C to +100°C
LF/R61, LF/R62, FF/R61 & FF/R62:
0°C to +100°C

TF/R61 & TF/R62:
Refer to temperature range specification.

Special versions available. Please contact Pyropress Engineering Sales department for any assistance.

MOUNTING INSTRUCTIONS

Pressure, Vacuum, Differential Pressure and Capillary Temperature Switches

Surface mounting models have the conduit entry to the right, process connection at the bottom with terminal and adjustment access to the front.

All switches (*except the "B" Differential Pressure and "4" Low Pressure) can be mounted in any orientation to suit, without effecting accuracy, set point or operation. "B" Differential Pressure and "4" Low Pressure, should be mounted with the switch case beneath the pressure plates.

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.

Rigid Stem Temperature Switches

Rigid stem temperature switches are supplied with either a thermowell or stem head. The stem head is supplied to allow the sensing stem to be inserted directly into the process medium.

Level Switches

Level switches are supplied with either a parallel or tapered thread for direct mounting via the level head assembly.

Flush Mounted & Flow Switches

These products are designed to be mounted directly via their mounting flange connection.

ELECTRICAL INSTALLATION

All models are supplied with a M20 or 1/2" NPT 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 a removable front cover, although 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.C. / N.C. terminal numbers vary dependant on whether the switch setting is rising or falling.

Terminals are suitable for cables, single or multi-strand, up to 2.5mm².
Terminals for dual micro switches are only suitable for cables, single or multi-strand, up to 1.5mm².

Options of 1 or 2 SPDT micro switches are available.

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.

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.

All wiring is to have a minimum of 0.5mm of insulation on each core and maintain a Dielectric Strength >500V ac.

The Perseus range is certified for installation in a CAT1 (Zone 0) environment, when supplied from an approved Intrinsically Safe Interface that is compatible with the following electrical parameters:

Ui: 28Vdc
Ii: 93mA
Pi: 0.65W

AEx Note: Field wiring should be installed in accordance with Article 504 of the electrical code (ANSI/NFPA70), as required by Clause 30.1 of UL 60079-1:2013.

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

SETTING & CALIBRATION

Prior to despatch, switches are subjected to a specified maximum static pressure and operation check and set to mid range. They can be pre-set at a specified value against a calibrated test instrument.

The switch has tamperproof adjustment accessed by removal of the adjustment chamber cover.

Turning the adjustment nut to the left to raise the set point or to the right to lower it carries out adjustment to the set point.

The PERSEUS range of switches complies with the following standards:

HAZARDOUS AREA CERTIFICATION

ATEX/IECEx Intrinsically Safe Exia.

EN60079-0:2012, EN60079-11:2012
EN60079-26:2007
IEC60079-0:2011
IEC60079-11:2011, IEC60079-26:2006

ATEX/IECEx Flameproof Exd.

IEC 60079-0:2011 & EN 60079-0:2012.
IEC 60079-1:2007 & EN 60079-1:2007.

AEx Intrinsically Safe Exia (tri-certified only)

UL 60079-0:2013
UL 60079-11:2013

AEx Flameproof Exd (tri-certified only)

UL 60079-0:2013
UL 60079-1:2009

Safe Area (tri-certified only)

UL 353:2011

The equipment is designed to satisfy the requirements of Clause 1.2.7 of the Essential Health and Safety Requirements ANNEX II of directive 2014/34/EU.

Conditions of certification apply:

Appropriate overload protection must be provided during installation.

It is the responsibility of the installer to ensure that the Perseus is suitably earthed in accordance with IEC/EN60079-14.

For Intrinsically Safe installations; the internal earth point within the terminal chamber must not be connected directly or indirectly to the Barrier Earth.

Special Conditions for safe use:

Intrinsically Safe Exia

Aluminium housing may only be used when the ignition hazard assessment shows that there is no risk of ignition from incandescence, impact or abrasion sparks. This assessment is to be performed by a qualified person, legally responsible for the site/company safety.

This equipment satisfies the requirements of IEC60079-11: 2011, Clause 6.3.13 Dielectric Strength 500V ac.

It is the Installer's responsibility to ensure that installation of this equipment in a chemically aggressive atmosphere is avoided.

Flameproof Exd

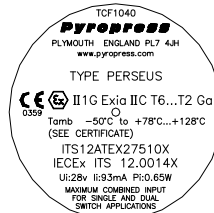
The cable selected shall be capable of being used in temperatures up to 100°C.

Covers / Labels titled TYPE PERSEUS shall only be fitted to enclosures housing terminals

Covers / Labels titled TYPE PERSEUS/R shall only be fitted to enclosures housing resistors.

ATEX & IECEx INTRINSICALLY SAFE LABEL

Without resistors fitted.



ATEX & IECEx INTRINSICALLY SAFE LABEL

With resistors fitted.



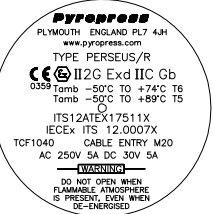
ATEX & IECEx FLAMEPROOF LABEL

Without resistors fitted.



ATEX & IECEx FLAMEPROOF LABEL

With resistors fitted.



AEx INTRINSICALLY SAFE LABEL

Without resistors fitted.



AEx INTRINSICALLY SAFE LABEL

With resistors fitted.



AEx FLAMEPROOF LABEL



PRESSURE EQUIPMENT DIRECTIVE

Pressure Equipment Directive (PED)

It is 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

ROUTINE MAINTENANCE

overload and protect as necessary.

WARNING

To prevent ignition of explosive atmospheres, disconnect power before servicing.

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 dependent upon equipment usage.

Gore-tex® filters fitted to the 3" and 4" low-pressure housings

FAULT DIAGNOSIS

should be checked periodically for potential damage.

If the Perseus series 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 microswitch assemblies and diaphragm kits are available.
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.

Procedures for replacement of spare parts are supplied with the relevant parts kits.

Note: After replacement of spare parts it is advised to connect the switch to a suitable test device & check

For:
(i) Leakage via a pressure test to the switches max working pressure.

(ii) The change over state of the microswitch contacts & if necessary re-adjust the main adjuster to obtain the original set point using a calibrated test gauge.

The following spares kits are available; please contact the sales department for assistance:

Single micro switch assembly
Double micro switch assembly
Low pressure Ø3" & Ø4" Rubber diaphragm
Medium pressure rubber diaphragm
High pressure metal diaphragm
High pressure piston 'O' ring
Differential pressure diaphragm & Bellofram®
Vacuum diaphragm & Bellofram®
Low pressure diaphragm & Bellofram®
Flow switch – metal flange material

PF/R61 & PF/R62 Flush Mounted Diaphragm.
TF61, TF62, TF71 & TF72 Temperature.
LF61 Level.

FF61 Flow switch – Tufnol® flange material
Due to the complexity of these assemblies, it is recommended that these products be returned to Pyropress for overhaul.

Pyropress Engineering
Sales Office: +44 (0) 1752 333933
Fax: +44 (0) 1752 336681
E-mail: sales@pyropress.com
Website: www.pyropress.com

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