

PERSEUS

This User Guide is applicable to the following switch types:

- Ultra low pressure
- P_6 Low pressure
- P_6
- Medium pressure
- Medium pressure flush diaphragm
- High pressure metal diaphragm
- P_6 High pressure piston
- D_6 Differential pressure
- T_6 Rigid stem temperature
- T 6 Capillary temperature
- L 61 Horizontal level
- Vertical level L 62
- Reed level • R 6
- F_6 Flow
 - **General precautions**
- Products should be specified, installed, set and maintained by competent personnel in line relevant health and safety regulations.
- They must not be used outside their stated specifications as this may affect safety and/or performance.
- Any unauthorised modification, repair or use outside the stated specifications may invalidate a product's warranty.
- The installation of products that are certified Ex db or Ex ia must be in accordance with IEC/EN 60079-14.
- It is the responsibility of the end-user to ensure that the product's materials of construction are compatible with the process media and the surrounding atmosphere.
- If products are being fitted to a system where fluid flow can become unstable and cause pressure to pulsate or surge rapidly, it is imperative that a means of protecting the sensing element be provided; by adding a pressure snubber for example.
- If products are being fitted to a system where the process temperature could exceed the limits stated for that particular configuration (please consult "Temperature limitations"), they must be remotemounted so as to allow for sufficient heat dissipation.
- Products should always be mounted such that any free movement is minimal. Those mounted via process connections must be properly supported so as to avoid damage from vibration or accidental impact.
- The end-user is advised to utilise PTFE tape on tapered process connections and appropriately sized bonded seals on parallel process connections.
- All compression fittings must be sufficiently tightened so as to prevent leakage.
- When removing the top cover, end-users must first loosen the M3 locking set screw by means of a 1.5mm A/F hexagon socket drive. After replacing the top cover, the locking set screw must be re-tightened to guarantee retention

Materials of construction

Please see overleaf for a full list covering switch outer case and covers, external parts, internal parts, wetted parts, diaphragms and pressure seals, environmental seals, fasteners, electrical entry adaptors and cable.

CE marking

Hazardous area products carry a CE mark to signify conformity with Directive 2014/34/FU (ATEX)

Industrial products carry a CE mark to signify conformity with Directive 2014/35/EU (Low Voltage)

All Perseus switch types are deemed to fall within the sound engineering practice (SEP) category, as defined by Chapter 1, Article 4, paragraph 3 of Directive 2014/68/EU (Pressure Equipment). As such, CE marks borne by Perseus products do not signify conformance with Directive 2014/68/EU, but rather with Directive 2014/34/EU or Directive 2014/35/EU

Hazardous area use

Ex db certified products satisfy the applicable essential health and safety requirements contained in Annex II of European Directive 2014/34/EU through compliance with the following standards

- BS FN 60079-0:2012+A11:2013
- BS FN 60079-1:2014

In addition they comply with IEC standards

- IFC 60079-0:2011
- IEC 60079-1:2014

These dual ATEX/IECEx certified products are thus marked as shown in the "Certification labels" section overleaf.

The end-user must adhere to the special conditions for safe use laid down on the ATEX/IECEx Ex db certificates:

- Under rated conditions, the cable temperature can reach 9K above ambient temperature. Ensure selection of correctly rated cable for the application.
- Flameproof joints not intended for repai

Ex ia certified products satisfy the applicable essential health and safety requirements contained in Annex II of European Directive 2014/34/EU through compliance with the following standards:

- BS EN 60079-0:2012+A11:2013
- BS EN 60079-11:2012
- BS FN 60079-26:2015

In addition, they comply with IEC standards:

- IEC 60079-0:2011
- IEC 60079-11:2011
- IEC 60079-26:2014

Please see overleaf for all label information.

The end-user must adhere to the special conditions for safe use laid down on the ATEX/IECEx Ex ia certificates:

• For Ga installations - The equipment may be constructed using aluminium for the housing and internal parts and may only be used when the ignition hazard assessment shows there is no risk of ignition from incendive impact or abrasion sparks.

WARNING: End-users are advised to carry out assessments in accordance with the requirements of appropriate. recognised standards. The person or persons undertaking this task must be suitably qualified and legally responsible for site/company safety

Pressure limitations

Maximum process media pressures are as follows;

V_6, P 6 and D 6:

Stem head/sliding gland:

Various: Please refer to relevant datasheets and labels for maximum pressures.

35 barg max.

Standard thermowell: High pressure thermowell:	35 barg max. 420 barg max.	
L_61;	3.5 barg max.	
L_62;	0 barg	

10 barg max

F_6;

Metallic plates: 8 barg max. Non-metallic plates: 12 barg max

Temperature limitations

Products can be stored and operated between the following temperatures;

-40°C to +85°C except for:

T 6 types with Viton® seals: -20°C to +85°C

Operational ambient:

T_6 (rigid	200°C to 240°C range	-40°C to +75°C
stem)	175°C to 225°C range	-40 C to +75 C
types	150°C to 200°C range	-40°C to +80°C
All c	ther types and ranges	-40°C to +85°C

Upper ambient temperatures will be further restricted if

Ex II 2 G Ex db IIC certified; with or without resistors;

and installed in a T6 environment: -50°C to +75°C

Ex II 1 G Ex ia IIC certified:

without resistors: and installed in a T6 environment: -50°C to +78°C

or

Ex II 1 G Ex ia IIC certified;

with resistors: and installed in a T5 environment:

-50°C to +72°C

Ex II 1 D Ex ia IIIC certified: -50°C to +70°C

Process media temperatures are limited to:

For all vacuum, pressure and differential pressure types:

Viton®: -20°C to +150°C Nitrile: -30°C to +100°C Neoprene®: -25°C to +95°C EPDM (high pressure piston only): -35°C to +100°C PTFE (high pressure piston only): -40°C to +150°C

Various - Please refer to applicable datasheets and adhesive labels for details.

L_61 and L_62;

Viton® 0°C to +100°C Nitrile: 0°C to +100°C R 6; 0°C to +100°C F 6: -30°C to +100°C

All Ex II 1 D Ex ia IIIC certified products: *°C to +70°C *see minimum temperatures stated above

WARNING: Upper temperature limits for process media can be further restricted for Ex db and Ex ia certified products. If the applicable temperature on the Ex db or Ex ia certificate is lower than one given in this User Guide, the one on the certificate prevails. Please refer to the relevant certificate for details.

Other limitations

Ex db certified. Ex ia certified, and Industrial products maintain a versatile rating of IP66/IP67

End-users requiring information about shock and vibration limits should contact Pyropress.

Mechanical installation

Products can be mounted in any orientation without affecting function or performance (except the 8" V_6, P_6 and D_6 types which must only be mounted inverted)

When mounting via the switch outer case

Feed two M5 screws through the clearance holes in the switch outer case and tighten to secure the product in place. If the product is being attached to a moving/vibrating piece of equipment, anti-vibration fixings should be used.

WARNING: If blow-out disc is fitted, ensure there is a gap of at least 6mm between the back of the switch outer case and adjacent surfaces. This allows room for the blow-out disc to detach itself and relieve any over-pressure in the event of process media leaking past diaphragms/pressure seals and into the switch outer case.

When mounting via a male process connection

Screw the stem head or thermowell directly into the associated female thread and tighten with a spanner (utilise a suitable seal in conjunction with parallel threads, whilst for tapered threads the use of PTFE tape is recommended). Rotate the switch to the desired position then tighten the coupling nut to secure firmly in place. Please note that care should be taken when rotating and tightening so as not to loosen the internal nipple

When mounting via a flange connection

Having ensured that all mating surfaces are clean, feed the correct number of appropriately sized bolts through the clearance holes in the flange (and gasket) then tighten to clamp the product in place. The end-user should verify that gasket materials are compatible with the process media likely to be encountered. If utilising a liquid gasket, liberally coat mating faces and allow sufficient time to cure before use.

When mounting via a bracket:

'C'. 'I' and 'R' code brackets:

Feed two M6 screws though the clearance holes/slots/standoffs and tighten to secure product in

'M', 'N' and 'S' code brackets:

Feed two M8 screws though the clearance holes/ standoffs and tighten to secure product in place.

Ø52mm (2") pipe bracket:

Unscrew the two M8 full nuts from the 'U' bolt. Separate the saddle and 'U' bolt from the mounting bracket then from each other. Place the 'U' bolt around the pipe and slide the saddle into place. Feed the 'U' bolt back through the clearance holes in the mounting bracket. Evenly tighten the M8 full nuts until the product is clamped firmly to the pipe.

8" V 6. P 6 and D 6 types' integral bracket:

Feed four M8 screws through the Ø8.5mm clearance holes in the mounting bracket and tighten to secure the product in place. Please note that this build must always be mounted inverted.

To mount L 61 horizontal level types:

Loosen the 5/16" BSW nut then unscrew the float. Unscrew and remove the 1.3" A/F locknut but leave the bonded seal in place. Feed the remaining assembly through the hole (Ø27mm) in the tank, replace the 1.3" A/F locknut then tighten it with a spanner to clamp the product firmly in place. Reattach the float and lock in place by re-tightening the 5/16" BSW nut with a spanner

To mount L 62 vertical level types.

Loosen the set screw in the lower adjusting collar with a 2.5mm A/F hex tool. Remove the split pin at the end of the float guide tube, the plain washer, the lower adjusting collar and the float. Unscrew and remove the 1.3" A/F locknut but leave the bonded seal in place. Feed the remaining assembly through the hole (Ø27mm) in the tank, replace the 1.3" A/F locknut then tighten it with a spanner to clamp the product firmly in place. Replace the float, the lower adjusting collar, the plain washer and the solit pin. Align the set screw in the lower adjusting collar with the hole in the float guide tube and then re-

To mount R_6 reed level types,

Screw the product into the associated female thread and tighten with a spanner (leave bonded seal in place if thread is parallel). Rotate the switch to the desired position then tighten the coupling nut to secure firmly in place. Care must be taken when rotating and tightening so as not to loosen the internal nipple. Do not rotate the switch more than 270° as this will damage the internal wiring.

Electrical connections

The Perseus comes with one or two M20 x 1.5 female threaded electrical entries

 Products with a single microswitch are fitted with a 3 or 4-way terminal block capable of accepting conductors with cross-sectional areas of up to 2.5mm² solid or up to

- Products with dual microswitches are fitted with a 6way terminal block capable of accepting conductors with cross-sectional areas of up to 2.5mm² solid or up to 1.5mm2 flexible.
- Reed level types are fitted with either a 2, 3, 4 or 6-way terminal block capable of accepting conductors with cross-sectional areas of up to 2.5mm² solid or up to 1.5mm² flexible

All terminal blocks utilise screw terminations.

WARNING: Terminals must not be accessed unless the product has been electrically isolated. A suitable sealing device must be used in conjunction with electrical conduit or armoured cable in order to maintain the product's IP rating. Electrical entry adaptors and plugs must be Ex db IIC certified when fitted to flameproof products

Wiring details (excluding L 61, L 62 and R 6 types):

	Microswitch 1	Microswitch 2
Common	Terminal 1	Terminal 4
Normally Open	Terminal 2	Terminal 5
Normally Closed	Terminal 3	Terminal 6

Note: Wiring details relating specifically to the functions of L_61, L_62 and R_6 level types can be found overleaf.

WARNING: The end-user must ensure that all products are properly earthed in accordance with IEC/EN 60079-14.

The Perseus is suitable for use in CAT 1 (Zone 0) environments when supplied from an approved intrinsically safe interface with the following limits:

Ui: 28Vdc Ii: 93mA Pi: 0.65W Ci: 0F Li: 0H

Set-point adjustment

Products supplied by Pyropress are always calibrated but, if necessary, can be reset once installed. To alter a product's setting(s), follow this procedure:

- Remove the adjustment cover
- 2. Using a Ø3mm tommy bar, rotate the adjuster screw - clockwise (anti-clockwise if the switch is inverted) to increase the set-point or anti-clockwise (clockwise if the switch is inverted) to decrease the set-point – until its indication line sits opposite the desired setting on the scale, or, in the case of rigid stem temperature products until the requ setting on the scale aligns with the central axis of the
- switch. Replace the adjustment cover.

NOTE: As L 61, L 62 and R 6 types cannot be adjusted, the end-user should refrain from altering the position of the

Differential adjustment

WARNING: Ex db certified products can only be adjusted once they have been de-energized and when there is no flammable atmosphere present.

Ex ia certified products can be adjusted whilst energized and with a flammable atmosphere present WARNING: Industrial products can only be adjusted once

they have been de-energized To alter a product's differential or second set-point, follow

this procedure:

- 1. Unscrew the top cover. 2. Using a 7mm A/F nut spinner, rotate the adjustment screw clockwise (to increase the differential/gap between set-points) or anti-clockwise (to reduce the differential/gap between set-points) until the requisite switching behaviour is attained.
- 3. Screw the top cover back into the switch outer case.

Routine maintenance

to avoid injury.

Pyropress recommends that all products be inspected and operated at least once every 6 months. Process and electrical connections should be checked to ensure they remain tight.

In addition, the ePTFE vents should be visually checked for signs of damage

O-rings, bonded seals, gaskets and diaphragms should be renewed every 3 to 5 years. Microswitch assemblies should be renewed every 5 to 10 years, depending on usage.

Fault diagnosis

In the event that a product fails to operate correctly, please check that:

- All process entry connections are screwed/clamped tight and there is no discernible leakage of the
- Electrical wires are terminated correctly and held tightly in place.
- There are no foreign objects inside the switch outer case impeding operation The pushrod moves freely in response to changes in
- pressure, temperature, level or flow. Microswitches are functioning correctly by observing a change in contacts, both when they operate and when they reset.

If after taking these steps the problem still persists, please contact Pyropress.

Spares

Diaphragm, pressure seal and environmental seal kits are available for the following switch types:

- Vacuum
- Ultra low pressure P 6
- P 6 Low Pressure Medium pressure P 6
- Medium pressure flush diaphragm Differential pressure D 6

In addition, a complete high pressure metal diaphragm assembly is also available

A pressure seal and environmental seal kit is available for: • P_6 High pressure piston

Pyropress for overhaul.

service

can be supplied if required The complex nature of the rigid stem and capillary temperature, horizontal, vertical and reed level and flow switch types is such that they should be returned to

Alternatively, a complete, pressure-tested piston assembly

Standard single and dual microswitch assemblies are available. However, if the product has resistors fitted, an adjustable differential or two set points, it should be returned to Pyropress for overhaul.

Pyropress recommends that the end-user thoroughly tests refurbished products before re-introducing them into

Contact details

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WARNING: The end-user must ensure that products are deenergized and isolated from pressurised media prior to disconnecting them from the system. Ex db certified products must not have their top covers removed when a flammable atmosphere is present. Temperatures of exposed surfaces should be checked before handling so as



SWITCH OUTER CASE AND COVERS:

- 316 STAINLESS STEEL
 ALUMINIUM
 304 STAINLESS STEEL (ADJUSTMENT COVER ON ALUMINIUM HOUSING ONLY)

OTHER EXTERNAL PARTS:

- 304 AND 316 STAINLESS STEELS
 NYLON
- NYLUN
 GLASS REINFORCED EPOXY RESIN
 PHOSPHOR BRONZE (F_6 TYPES ONLY)

INTERNAL PARTS:

- 303, 304 AND 316 STAINLESS STEELS
 SPRING STEEL
 NYLON
 ALUMINIUM
 PPS

- ALCOMINUOM
 PPS
 POLYESTER
 CHROME STEEL
 POLYOLEFIN
 SILICONE
 PTFE
 GLASS REINFORCED EPOXY LAMINATE

WETTED PARTS:

- WELTED PARTS:

 316 AND 321 STAINLESS STEELS
 303 AND 304 STAINLESS STEELS
 (T_6 TYPES WITHOUT THERMOWELL ONLY)
 MONEL® 400
 INCONEL
 POLYPROPYLENE (L_6 TYPES ONLY)
 NITRILE (R_6 TYPES ONLY)
 GUNMETAL (F_6 TYPES ONLY)
 COTTON FABRIC REINFORCED EPOXY RESIN
 (F_6 TYPES ONLY)
 ACETAL C (F_6 TYPES ONLY)
 BRASS (F_6 TYPES ONLY)
 POLYWINY CHLORIDE (F_6 TYPES ONLY)
 NYLON (8" V_6, P_6 AND D_6, P_6 FLUSH DIAPHRAGM AND F_6 TYPES ONLY)
- DIAPHRAGM AND F_6 TYPES ONLY)
 ALUMINIUM (T_6 TYPES WITH SLIDING GLAND

DIAPHRAGMS AND PRESSURE SEALS:

- VITON®
 NITRILE
 SILICONE
 NEOPRENE
- MEOFRENE

 PTFE (P_6 HIGH PRESSURE PISTON ONLY)

 EPDM (P_6 HIGH PRESSURE PISTON ONLY)

 NEOPRENE CORK (F_6 TYPES ONLY)

 KALREZ®

ENVIRONMENTAL SEALS:

- FASTENERS:

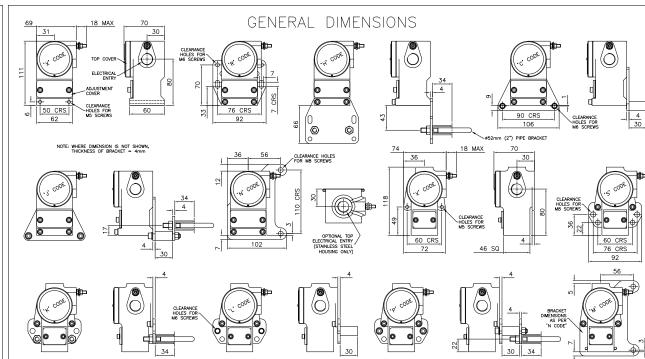
A2 AND A4 STAINLESS STEELS NYLON

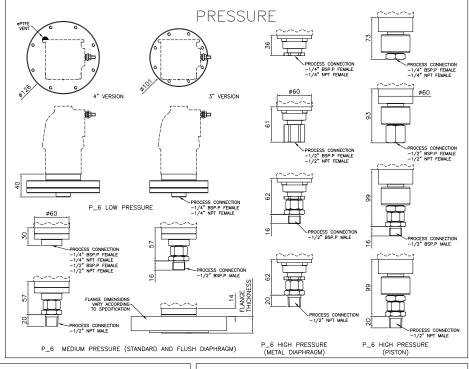
ELECTRICAL ENTRY ADAPTORS:

316 STAINLESS STEEL
 BRASS

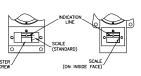
CABLE:

MECHANICAL INSTALLATION 6 MINIMUM CLEARANCE

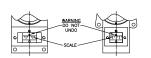






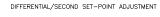


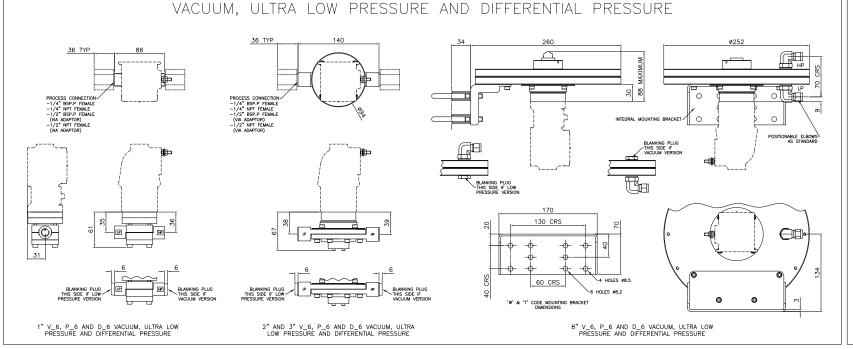
SET-POINT ADJUSTMENT (STANDARD)

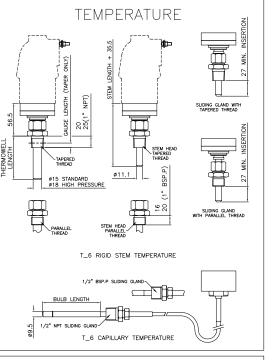


SET-POINT ADJUSTMENT (RIGID STEM TEMPERATURE)









MICROSWITCH DETAILS

SINGLE MICROSWITCH STANDARD

DUAL MICROSWITCHES TWO SET POINTS

1 & 3 BREAK RISING 1 & 2 MAKE RISING 1 & 3 BREAK RISING 1 & 2 MAKE RISING

DUAL MICROSWITCHES STANDARD



MICROSWITCH A: MICROSWITCH B:

1 & 3 BREAK RISING 1 & 2 MAKE RISING 4 & 6 BREAK RISING 4 & 5 MAKE RISING

DETAILS FOR HORIZONTAL AND VERTICAL LEVEL TYPES CAN BE FOUND IN THE "LEVEL" SECTION

CERTIFICATION LABELS

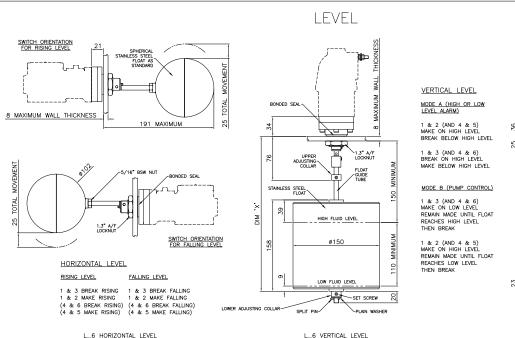


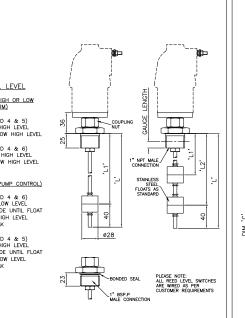




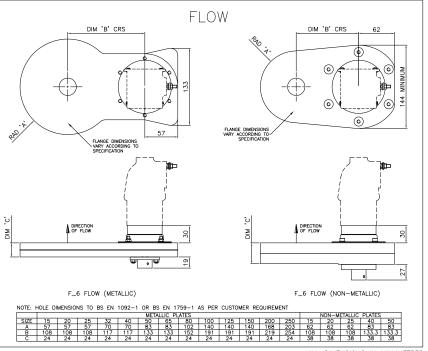








R_6 REED LEVEL



ALL DIMENSIONS IN MILLIMETRES