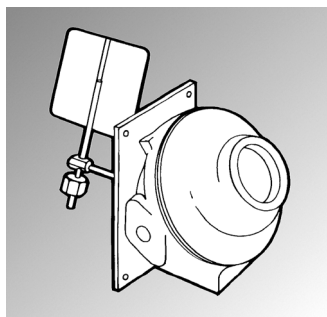


Installation, Operation & Maintenance Instructions



Performance Series
Model 131 (Flow Switch)

General

The unit is manufactured, checked and supplied in accordance with our published specification, and when installed and used in normal or prescribed applications, with the lid in place and within the parameters set for mechanical and electrical performance, will not cause danger or hazard to life or limb.



THE USERS ATTENTION IS DRAWN TO THE FACT THAT, WHEN THE UNIT IS 'LIVE' WITH RESPECT TO ELECTRICAL OR PRESSURE SUPPLIES, A HAZARD MAY EXIST IF THE UNIT IS OPENED OR DISMANTLED.



UNITS MUST BE SELECTED AND INSTALLED BY SUITABLY TRAINED AND QUALIFIED PERSONNEL IN ACCORDANCE WITH APPROPRIATE CODES OF PRACTICE SO THAT THE POSSIBILITY OF FAILURE RESULTING IN INJURY OR DAMAGE CAUSED BY MISUSE OR MISAPPLICATION IS AVOIDED.



ATEX

PURCHASER SHOULD ENSURE THE EQUIPMENT IS SUITABLE FOR USE IN THE APPLICATION WITH AGGRESSIVE SUBSTANCE.

Operating principles

Flow Switch 131 is vane actuated switch.

The sensing element is a pivoted, counter-weighted vane, which at its rest position lies at right angles to the direction of flow. The vane is mounted on a shaft, which carries two cams that operate one or two microswitches when the shaft is rotated. When the nominated flow velocity is reached the vane turns the shaft enough to operate the switch(es).

Two springs constrain the shaft movement. One compensates for any gravitational effects on the vane and for the internal spring setting of the switch (es). The other determines the amount of flow on the vane to operate the switch(es).

CERTIFICATIONS

ATEX & IECEx

For Zone 1 (Enclosure code H/K, see Table 1 of TDS)

II 2 GD Ex db IIC T4 Gb (Tamb -60°C to +80°C)
Ex tb IIIC T135°C Db IP66

II 2 GD Ex db IIC T6 Gb (Tamb -60°C to +40°C)
Ex tb IIIC T85°C Db IP66

For Zone 2 (Enclosure code N/O, see Table 1 of TDS)

II 3 GD Ex tD A22 T23°C
EEx nC II T6 (Tamb -20°C to +60°C)

INSTALLATION

Mounting (All models)

The instruments may be used on flow in any direction with the operating shaft horizontal or vertical. The instrument is supplied with the microswitch set to operate correctly in relation to rotation of the operating shaft. Vane and counter weight are supplied separately. Select the mounting point so as to avoid excessive shock, vibration or temperature fluctuations. Install far enough away from bends, tees or obstructions to avoid non-steady flow. Instruments should be mounted to avoid excessive heat transfer from adjacent plant.

Provide aperture in duct large enough to accept counterweight / vane (refer to fig 1). Position the vane assembly axially along the operating shaft which may be adjusted to a maximum of 100 mm from the mounting plate to the vane centre line by tightening the M3 socket set-screw provided, ensuring that the screws locate on flat of shaft.

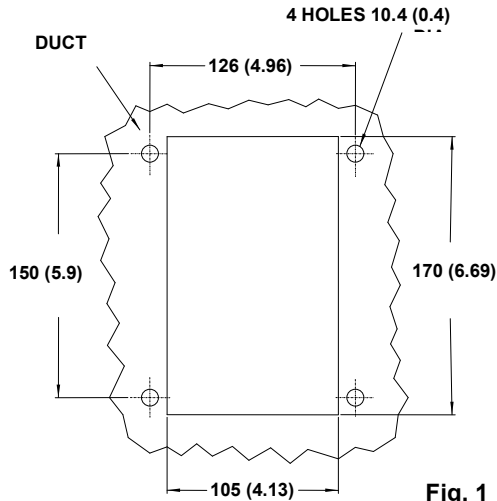


Fig. 1

Installation of electrical adaptors and cable glands to the electrical entry

Either one or two electrical entries can be provided. The standard entry is a single ISO M20 x 1.5 thread. Other non-ISO and tapered threads will have their size and type stamped on the enclosure next to the entry.



ATEX

TAKE CARE TO SELECT AND INSTALL ADAPTORS THAT DO NOT REDUCE THE ENCLOSURE'S DEGREE OF PROTECTION WHEN IN USE IN ZONE 1 HAZARDOUS AREAS.



ATEX

UNUSED ENTRIES MUST BE FITTED WITH SUITABLY CERTIFIED FLAME-PROOF STOPPING PLUGS.



ATEX

IT IS A SAFETY REQUIREMENT THAT AT LEAST 5 FULL THREADS ARE ENGAGED BETWEEN THE ADAPTER, CABLE GLAND OR STOPPING PLUG, AND THE ELECTRICAL ENTRY WHEN THE UNIT IS IN OPERATION. NEVER OPERATE THE UNIT UNLESS THIS CONDITION IS MET.

Alternative electrical entry threads

One or two electrical entries can be supplied with the following optional thread types:

- ISO to BS 3643 (1981) medium fit 6H up to M25 x 1.5
- DIN 40430 (1971) up to Pg21.

- USAS B2.1 (1968) gauging to clauses 36 & 37 up to 3/4" NPT.
- BS conduit to BS31 (1940) table 'A' up to 1"
- BSP to BS21(1985) standard threads only as clause 5.4 gauging to clause 5.2 system 'A' up to Rp3/4 (medium fit or better).

Wiring



DISCONNECT ALL SUPPLY CIRCUITS BEFORE WIRING

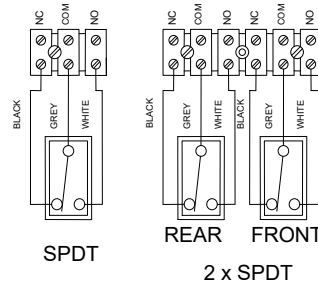


WIRE IN ACCORDANCE WITH LOCAL AND NATIONAL CODES. USE CABLES NO LARGER THAN 2.5 MM² (14 AWG)



DO NOT EXCEED ELECTRICAL RATINGS STATED IN LITERATURE AND ON NAMEPLATES.

The three switch terminals are clearly marked "NORMALLY CLOSED", "NORMALLY OPEN" and "COMMON". The following diagram can be used as a guide for wiring.



2 x SPDT

NC = NORMALLY CLOSED
COM = COMMON
NO = NORMALLY OPEN

Fig. 2

Insert bare wires fully into the terminal block and tighten securely. Keep wiring tails to a minimum and check that wires do not interfere with the operating mechanism. Use the earthing / grounding points provided.

End of line resistors

Some products may be supplied to order fitted with end of line resistors. Resistors in use may generate a heat source. The type, quantity, configuration, fitment method and allowable electrical loads are limited by the scope of the certification.



ATEX

NEVER FIT END OF LINE RESISTORS OR MODIFY WITHOUT REFERENCE TO DELTA CONTROLS

Replacing cover / lid on Flameproof enclosures



BEFORE CLOSING THE LID:

- ENSURE WIRE IS CLEAR OF ALL MOVING PARTS.
- ENSURE THAT WIRES DO NOT TOUCH THE LID AS IT IS CLOSED.

Thread, seal and contact surfaces may be lightly lubricated using a non-setting non-corrosive grease compatible with the lid seal.



DO NOT USE COPPER BEARING GREASE ON ALUMINIUM.

ATEX

Before connecting to electrical power, screw on cover/lid hand tight making sure that mating surfaces of the lid and enclosure are in contact. Use the locking screw provided to prevent casual and unauthorised removal of the cover/lid.



IT IS A SAFETY REQUIREMENT THAT AT LEAST 5 FULL THREADS ARE ENGAGED BETWEEN THE COVER / LID AND THE ENCLOSURE WHEN THE UNIT IS IN OPERATION. NEVER OPERATE THE UNIT UNLESS THIS CONDITION IS MET.

ATEX

OPERATION



ATEX

THIS UNIT CONTAINS POTENTIALLY SPARKING CONTACTS. DO NOT REMOVE THE COVER / LID WHILE ELECTRICAL POWER IS CONNECTED TO THE SWITCH AND / OR WHEN A FLAMMABLE GAS ATMOSPHERE IS PRESENT.

Each vane assembly is supplied factory counter weighted and requires no site adjustment. However, the vane assembly is supplied loose and will require fitting to the instrument before setting. The instrument is supplied with the microswitch(es) set to operate correctly in relation to rotation of the operating shaft and red springs fitted to give maximum sensitivity to low flow.

Set point adjustments (Model 131) (See fig. 4):

Fig 3 gives an indication of flow rates covered by the 2 vane sizes. Reference to this will help select which vane to fit before setting.

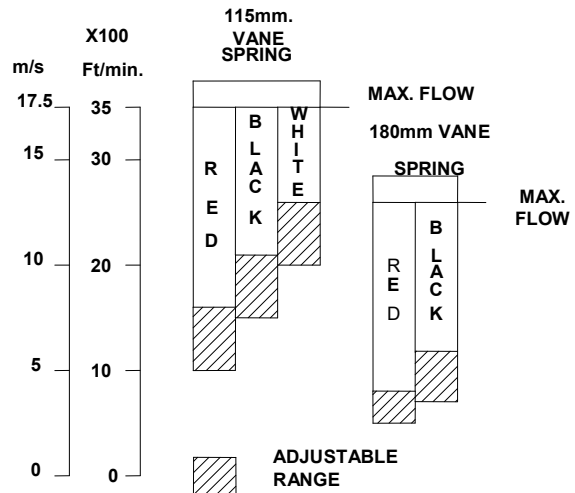


Fig. 3

1. Isolate the instrument from supply.
2. Remove the instrument lid.
3. Adjust springs as required by rotating the M4 hexagon screws: turn clockwise to increase the setting and counter-clockwise to reduce setting. A 7mm A/F spanner will fit these screws
4. Alternative springs are supplied to cover the full range of operation from 2.5 to 12.5 metres/second (fig 3). These may be used singly or in pairs as the user desires, provided the lowest setting is sufficient to return the vane safely on no flow. Each spring may be adjusted via an M4 hexagon screw, rotating clockwise to increase tension and thus reducing flow sensitivity.

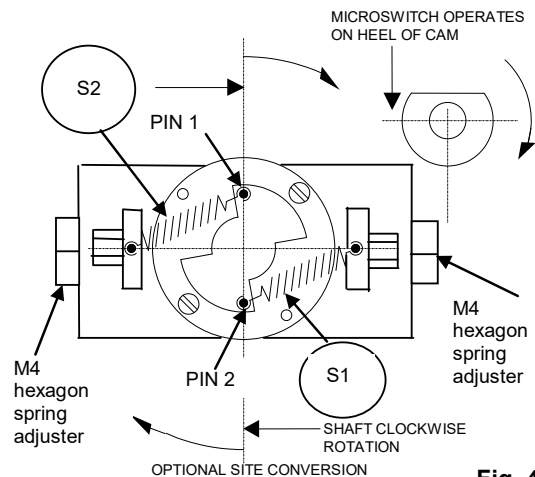


Fig. 4

Changing direction of flow (Model 131) (See fig. 4, 5):

If when installed the direction of operation is wrong this can be reversed in situ as follows (refer to figs 4 & 5):

1. Remove springs S1, S2
2. Remove two M3 screws and reassemble plate P as shown in fig 4.
3. Replace two M3 screws.
4. Replace spring S1 on pin 2.
5. Replace spring S2 on pin 1.

2xSPDT

Both cams are accessible with the enclosure cover removed and may be adjusted by slackening two M3 hexagon headed screws. Normally the cams are set to operate each microswitch simultaneously at approximately 15° from the vertical. This may be altered in situ if desired to offset the operation of each microswitch individually or position the operation of both microswitches for a different vane angle. However, it is recommended that at least 5° clearance between operation of microswitches and stops is allowed for safety. After changing flow direction, it may be necessary to alter the cam position, to prevent the cam adjustment screw heads from hitting the microswitch bodies before the stop pins hit the stop plate.

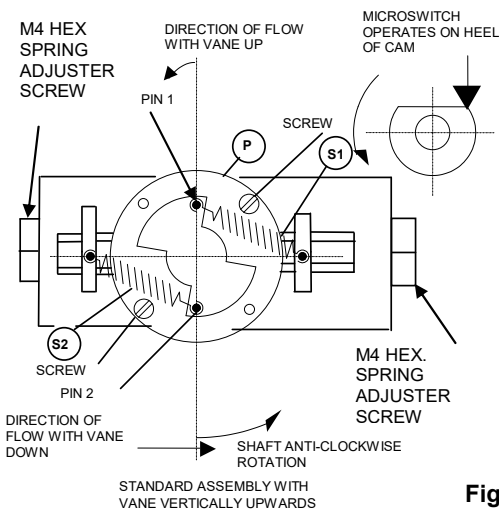


Fig. 5

MAINTENANCE

Inspections should be carried out at quarterly to yearly intervals depending upon operating conditions. Isolate the unit from process and power and remove the lid. Check all terminals for tightness. Check that cable tails are not fouled or chafed. Check for internal condensation. Rectify as necessary. It is recommended that instruments used to provide an alarm are operated periodically to ensure they are functioning correctly. If further maintenance is required seek advice from DELTA CONTROLS before attempting repair or replacement of parts.

SPECIAL CONDITIONS FOR SAFE USE

This note relates to flameproof models with ATEX certification number BAS01ATEX2426X.

The apparatus has a specified flamepath with a diametrical clearance of 0.1 mm maximum associated with the push rod and bush assembly passing through the enclosure wall, which is less than the maximum permitted by the standard EN 60079-1 to which the certification is issued. The user shall ensure that, in service, the diametrical clearance of this flamepath does not exceed 0.1 mm.

NOTE: Under normal operating conditions where the process is not continually cycling above and below the set point, the wear will be minimal. To examine for wear remove the pressure sensor from the bottom of the enclosure and examine the rod and bush assembly for obvious wear. Do not attempt to remove the assembly and if in doubt seek assistance from Delta Controls.



ONLY OPERATION, MAINTENANCE OR REPAIR PROCEDURES. EITHER CONTAINED HEREIN OR APPROVED BY DELTA CONTROLS MAY BE USED, TO AVOID RENDERING THE EQUIPMENT UNSAFE IN OPERATION AND/OR NULLIFYING THE CERTIFICATION. NO MODIFICATIONS ARE PERMITTED.

DIMENSIONS

Model 131 (Flow Pressure Switches)

