

Pressure switch FF 4

0,11 up to 250 bar, ample wiring room, easy to adjust,
high repeatability of set switchpoints, easily read scale



Applications

Air compressors, water pumps, booster pumps, firefighting equipment, or oil supply equipment.

TIVAL pressure switches of the FF 4 series are suitable for a wide range of applications.

For example they can be utilized for:

- Monitoring and controlling the pressure of liquid or gaseous media in pipelines, tanks, vats, pressure vessels and apparatus.
- Applications in process control, cooling, pneumatics and hydraulics.
- Pressure monitoring of cooling circuits and lubrication systems on various types of machinery.
- Automatic switching of pump and compressor motors for supplying water to dwellings, booster pumps, firefighting equipment and on compressed air systems.

Description

The pressure of the monitored medium operates against a flat diaphragm, bellows or plunger (depending on pressure range). A system of levers and springs work on a snapaction cascade switch of high vibration resistance, ensuring flutterfree switching. With no pressure on the diaphragm contact 1-2 is closed. This can be used as an „ON“ signal for a pump or compressor motor. If pressure exceeds the upper switchingpoint, contact 1-2 opens and contact 1-4 closes. The connected motor will be switched off. Contact 1-4 is often used to indicate the „off“ condition.

Contact 1-2 will close again, when the pressure on the diaphragm has dropped below the set lower switchpoint. Upper and lower switch points can be adjusted independently of each other using a screwdriver. The two switch points are indicated on the scale inside the unit.

Change-over contact with manual reset min.:

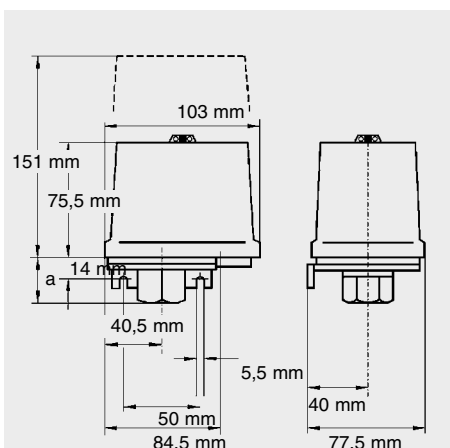
If the pressure drops below the set value, contact 1-4 opens and contact 1-2 closes and locks. When the pressure has risen above the set value, the contact can be unlocked with the manual reset button.

Change-over contact with manual reset max.:

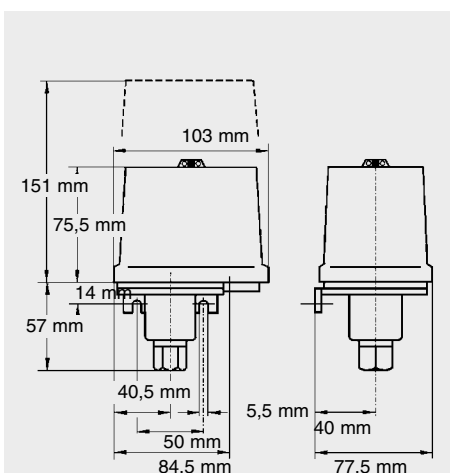
If the pressure rises above the set value, contact 1-2 opens and contact 1-4 closes and locks. When the pressure has dropped below the set value, the contact can be unlocked with the manual reset button.

Pressure connection, pressure sensing element, switch mechanism and electrical terminals are fitted on a die-cast aluminum-alloy base. The scale and switch are protected against environmental effects by an impact-resistant, transparent polycarbonate cover, (CTI 200-225) and can be lead-sealed.

Included in standard units: Rubber grommet with orifice for cable entry, pressure connector „Y“, made out of plastic for demineralised water applications.



FF 4-2, FF 4-4, FF 4-8,
FF 4-16, FF 4-32



FF 4-12, FF 4-30, FF 4-60,
FF 4-120, FF 4-250

Options upon request:

- Gold flashed contacts
- Cable gland M 20 for protection IP 65
- Viton diaphragm for aggressive media
- Manual reset

- GL - approved version
- UL/CSA - approved version
- ATEX - approved version
- VdS - approved version

Pressure switch FF 4

0,11 up to 250 bar, ample wiring room, easy to adjust,
high repeatability of set switchpoints, easily read scale

Types

Pressure switch with perbunan diaphragm for mineral oils, water and air. Additional type **G** = **gold flashed contacts**

Pressure connector: H (G 3/8" Female thread, DIN 1725/2), ALSi 12. VDE 0660, IEC 337-1, IEC 553-1

| Order reference | Upper switch pt. adjustable (bar) | Lower switch pt. adjustable (bar) | Smallest diff.* (bar) | Max. operating pressure (bar) | Max. test pressure (bar) | Standard setting (bar) | Part No. |
|-----------------|-----------------------------------|-----------------------------------|-----------------------|-------------------------------|--------------------------|------------------------|----------|
| FF 4-2 DAH | 0,11 ... 2 | 0,04 ... 1,89 | 0,07 0,11 | 20 | 40 | 0,5 / 1,5 | 1010061 |
| FF 4-2 DAH G | 0,11 ... 2 | 0,04 ... 1,89 | 0,07 0,11 | 20 | 40 | 0,5 / 1,5 | 1010109 |
| FF 4-4 DAH | 0,22 ... 4 | 0,07 ... 3,75 | 0,15 0,25 | 24 | 40 | 1 / 3 | 1010062 |
| FF 4-4 DAH G | 0,22 ... 4 | 0,07 ... 3,75 | 0,15 0,25 | 24 | 40 | 1 / 3 | 1010012 |
| FF 4-8 DAH | 0,5 ... 8 | 0,2 ... 7,5 | 0,3 0,5 | 30 | 40 | 2 / 6 | 1010078 |
| FF 4-8 DAH G | 0,5 ... 8 | 0,2 ... 7,5 | 0,3 0,5 | 30 | 40 | 2 / 6 | 1010096 |
| FF 4-16 DAH | 1 ... 16 | 0,4 ... 15 | 0,6 1 | 36 | 48 | 4 / 12 | 1010081 |
| FF 4-16 DAH G | 1 ... 16 | 0,4 ... 15 | 0,6 1 | 36 | 48 | 4 / 12 | 1010102 |
| FF 4-32 DAH | 2 ... 32 | 0,8 ... 30 | 1,2 2 | 52 | 64 | 10 / 20 | 1010076 |
| FF 4-32 DAH G | 2 ... 32 | 0,8 ... 30 | 1,2 2 | 52 | 64 | 10 / 20 | 1010003 |

* at lower ... higher end of range

Types

Pressure switch with perbunan diaphragm and plastic pressure connector suitable i.e. for demineralised water.

Pressure connector: Y (G 3/8" Female thread, DIN 1725/2), polyamid. VDE 0660, IEC 337-1, IEC 553-1



Control pressure switch FF 4-... DAY

| Order reference | Upper switch pt. adjustable (bar) | Lower switch pt. adjustable (bar) | Smallest diff.* (bar) | Max. operating pressure (bar) | Max. test pressure (bar) | Standard setting (bar) | Part No. |
|-----------------|-----------------------------------|-----------------------------------|-----------------------|-------------------------------|--------------------------|------------------------|----------|
| FF 4-2 DAY | 0,11 ... 2 | 0,04 ... 1,89 | 0,07 0,11 | 6 | 12 | 0,5 / 1,5 | 1010077 |
| FF 4-4 DAY | 0,22 ... 4 | 0,07 ... 3,75 | 0,15 0,25 | 8 | 12 | 1 / 3 | 1010063 |
| FF 4-8 DAY | 0,5 ... 8 | 0,2 ... 7,5 | 0,3 0,5 | 12 | 16 | 2 / 6 | 1010084 |
| FF 4-10 DAY | 0,7 ... 10 | 0,3 ... 9,2 | 0,4 0,8 | 12 | 16 | 4 / 5 | 1010073 |
| FF 4-16 DAY | 1 ... 16 | 0,4 ... 15 | 0,6 1 | 20 | 24 | 4 / 12 | 1010082 |

* at lower ... higher end of range

Pressure switch FF 4

0,11 up to 250 bar, ample wiring room, easy to adjust,
high repeatability of set switchpoints, easily read scale

Types

**Pressure switch with stainless steel bellows Declaration of Conformity in acc. with PED,
media temperature up to +200° C, de-ionised water**

Pressure connector: G (G 1/4" Female thread DIN 1725/2), stainless steel. VDE 0660, IEC 337-1, IEC 553-1



Control pressure switch FF 4-... AAG / PAH

| Order reference | Upper switch pt. adjustable (bar) | Lower switch pt. adjustable (bar) | Smallest diff.* (bar) | Max. operating pressure (bar) | Max. test pressure (bar) | Standard setting (bar) | Part No. |
|--------------------|-----------------------------------|-----------------------------------|-----------------------|-------------------------------|--------------------------|------------------------|----------|
| FF 4-12 AAG | 1 ... 12 | 0,5 ... 11,2 | 0,5 0,8 | 12 | 16 | 6 / 7 | 1010074 |
| FF 4-30 AAG | 4 ... 30 | 1 ... 26,4 | 1,8 3,6 | 30 | 42 | 16 / 20 | 1010066 |

* at lower ... higher end of range

Types

High pressure switch with plastic plunger.

Throttle is fitted as standard on these units. This must be removed for use with viscous media.

Pressure connector: H (G 3/8" Female thread, DIN 1725/2), stainless steel. VDE 0660, IEC 337-1, IEC 553-1

| Order reference | Upper switch pt. adjustable (bar) | Lower switch pt. adjustable (bar) | Smallest diff.* (bar) | Max. operating pressure (bar) | Max. test pressure (bar) | Standard setting (bar) | Part No. |
|---------------------|-----------------------------------|-----------------------------------|-----------------------|-------------------------------|--------------------------|------------------------|----------|
| FF 4-60 PAH | 8 ... 60 | 4 ... 52 | 4 8 | 100 | 120 | 20 / 40 | 1010064 |
| FF 4-120 PAH | 16 ... 120 | 8 ... 104 | 8 16 | 200 | 240 | 20 / 80 | 1010079 |
| FF 4-250 PAH | 30 ... 250 | 14 ... 226 | 12 24 | 400 | 500 | 100 / 200 | 1010072 |

* at lower ... higher end of range

Pressure switch FF 4

0,11 up to 250 bar, ample wiring room, easy to adjust,
high repeatability of set switchpoints, easily read scale

Types

Pressure switch with manual reset DDH = reset min., DRH = reset max.

Pressure connector: H (G 3/8" Female thread, DIN 1725/2), ALSi 12. VDE 0660, IEC 337-1, IEC 553-1



Control pressure switch FF 4-... with manual reset

| Order reference | Upper switch pt. adjustable (bar) | Lower switch pt. adjustable (bar) | Smallest diff. (bar) | Max. operating pressure (bar) | Max. test pressure (bar) | Standard setting (bar) | Part No. |
|-----------------|-----------------------------------|-----------------------------------|----------------------|-------------------------------|--------------------------|------------------------|----------|
| FF 4-2 DRH | 0,11 ... 2 | | 0,2 | 20 | 40 | 0,5 / 1,5 | 1010106 |
| FF 4-2 DDH | | 0,04 ... 1,89 | 0,1 | 20 | 40 | 0,5 / 1,5 | 1010107 |
| FF 4-4 DRH | 0,22 ... 4 | | 0,5 | 24 | 40 | 1 / 3 | 1010016 |
| FF 4-4 DDH | | 0,07 ... 3,75 | 0,2 | 24 | 40 | 1 / 3 | 1010100 |
| FF 4-8 DRH | 0,5 ... 8 | | 1,0 | 30 | 40 | 2 / 6 | 1010069 |
| FF 4-8 DDH | | 0,2 ... 7,5 | 0,4 | 30 | 40 | 2 / 6 | 1010094 |
| FF 4-16 DRH | 1 ... 16 | | 2,0 | 36 | 48 | 4 / 12 | 1010110 |
| FF 4-16 DDH | | 0,4 ... 15 | 0,8 | 36 | 48 | 4 / 12 | 1010101 |
| FF 4-32 DRH | 2 ... 32 | | 4,0 | 52 | 64 | 10 / 20 | 1010057 |
| FF 4-32 DDH | | 0,8 ... 30 | 1,6 | 52 | 64 | 10 / 20 | 1010087 |

Pressure switch FF 4

0,11 up to 250 bar, ample wiring room, easy to adjust,
high repeatability of set switchpoints, easily read scale

Types

Pressure switch with UL / CSA-approval IP 65 for mineral oils, water and air.

Pressure connector: F (1/4"18 NPTF), silumin. Cable gland 1/2" 14 NPTF is fitted as standard on these units.

VDE 0170/0171/0660, IEC 337-1, IEC 553-1



Control pressure switch FF 444-... with UL / CSA-approval

| Order reference | Upper switch pt. adjustable (psi) | Lower switch pt. adjustable (psi) | Smallest diff.* (psi) | Max. operating pressure (psi) | Max. test pressure (psi) | Standard setting (psi) | Part No. |
|---------------------|-----------------------------------|-----------------------------------|-----------------------|-------------------------------|--------------------------|------------------------|----------|
| FF444-V2 DAF | 3 ... 58 | 1 ... 54 | 2 4 | 348 | 580 | 14 / 44 | 1010309 |
| FF444-V4 DAF | 15 ... 232 | 6 ... 217 | 9 14 | 522 | 696 | 58 / 174 | 1010311 |
| FF444-V6 PAF | 116 ... 870 | 58 ... 754 | 58 116 | 1450 | 1740 | 290 / 580 | 1010299 |

* at lower ... higher end of range

| Technical data | | | | | | |
|---|--------------------------------------|-------------|-------------|--------------|--------------|--------------|
| Rated operating current at | 12 V | 24 V | 60 V | 110 V | 230 V | 400 V |
| AC 1 | | | | | 16 A | 10 A |
| AC 15 | | | | | 6 A | 4 A |
| DC 13 | 6 A | 1 A | 0,5 A | 0,2 A | 0,1 A | |
| Permissible motor power 1 ~ 230 V | 0,55 kW | | | | | |
| Resistance to vibration 10 to 1000 Hz | 4 g | | | | | |
| Protection acc. to DIN 40 050 / IEC 529 with rubber grommet | IP54 | | | | | |
| Protection acc. to DIN 40 050 / IEC 529 with cable glands PG 13.5 / M20 | IP65 | | | | | |
| Ambient temperature range | -20 ... +70° C | | | | | |
| Perm. media temperature (... DAH, PAH, DAF) | +70° C | | | | | |
| (...DAY) | +50° C | | | | | |
| (...AAG) | +200° C | | | | | |
| Repeatability | < 2 % FS | | | | | |
| Electrical lifespan | AC 15 – at least 1 * 10 ⁶ | | | | | |
| Max. switching frequency | 30 * min ⁻¹ | | | | | |

Pressure switch FF 4

0,11 up to 250 bar, ample wiring room, easy to adjust,
high repeatability of set switchpoints, easily read scale

Media compatibility guide

| Medium name | Chemical Formula | Stainless steel | Perbunan | Viton | Plastic |
|-------------------------|--|-----------------|----------|-------|---------|
| Acetone | CH ₃ COCH ₃ | X | | | |
| Acetylene | HC = CH | X | X | X | X |
| Air | - | X | X | X | X |
| Benzene | Sulphur-free | X | | X | |
| Butane | C ₄ H ₁₀ | X | X | X | X |
| Butyl acetate | CH ₃ COOC ₄ H ₉ | X | | | |
| Butyl alcohol | CH ₃ -CH ₂ -CH ₂ -CH ₂ -OH | X | | | |
| Carbon dioxide | CO ₂ | X | X | X | X |
| Carbonic acid | H ₂ CO ₃ | X | X | X | X |
| Chlorine | Cl ₂ | | | X | |
| Crude oil | - | X | X | X | X |
| Diesel oil | See fuels | X | X | X | X |
| Ethyl acetate | CH ₃ OOOC ₂ H ₅ | X | | | |
| Fuels | Diesel oil, | X | X | X | X |
| | Leaded petrol | X | X | X | X |
| | Benzene | X | | X | |
| Glycerine | CH ₂ OH-CHOH-CH ₂ OH | X | X | X | X |
| Glycol | CH ₂ OH-CH ₂ OH | X | X | X | X |
| Heating fuel oil | See also oils | X | X | X | X |
| Hydrogen | H ₂ | X | X | | X |
| Inert gases | - | X | | | |
| Methanol | CH ₃ OH | X | | | |
| Methyl chloride | CH ₃ Cl | X | | | |
| Natural gas | - | X | X | X | X |
| Nitrogen | N ₂ | X | X | X | X |
| Oils | Mineral | X | X | X | X |
| Oils | Vaetable | X | X | X | |
| Oxygen | O ₂ | X | | X | |
| Ozone | - | X | | X | |
| Perchlorethylene | CCl ₂ =CCl ₂ | X | | X | |
| Petrol | All types | X | | X | |
| Phenolic acid | C ₆ H ₅ (OH) | X | | | |
| Sulphar dioxide | SO ₂ | X | | d | |
| Toluene (Metyl benzene) | C ₆ H ₅ CH ₃ | X | | X | |
| Trichlorethene | CHCl=CCl ₂ | X | | X | |
| Water | Steam / vapor | X | X | X | |
| Water | Destilled, de-aerated | X | X | X | X |
| Water | Sea water | X | X | | |
| Xylene | C ₆ H ₄ (CH ₃) ₂ | X | | X | |

X = recommended, d = dry

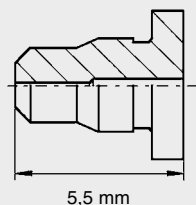
Accessories

| Order reference | Description | Weight (g) | Part No. |
|--------------------------------|--|------------|----------|
| Throttle FF4-2 ... 32 | Throttles Throttle for series FF4-2 up to 32 | 3 | 1011002 |
| Throttle FF4-60 ... 250 | Throttle for series FF4-12/30/60/120/250 (stainless steel) | 3 | 1011003 |
| H 124-114 | Glands Steel gauge fitting, G 3/8" - G 1/2" | 180 | 1071004 |
| Gland M 20 | Glands FF4 | - | 1011004 |
| Nut M 20 | Nut FF4 | - | 1011007 |
| Cover FF4 | Cover Cover FF4 | - | 1011001 |

Pressure switch FF 4

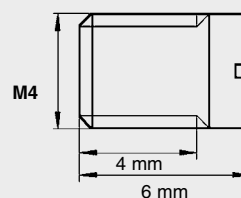
0,11 up to 250 bar, ample wiring room, easy to adjust,
high repeatability of set switchpoints, easily read scale

Dimensions



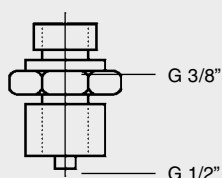
Throttle for FF 4-2 up to 32

weight: ~ 3 g
Order No.: 1011002



Throttle screw for FF 4-12/30/60/120/250

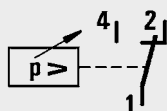
weight: ~ 3 g (stainless steel)
Order No.: 1011003



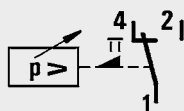
Gauge fitting

Steel, G 3/8" - G 1/2", Type: H 124-114
weight: ~ 18 g
Order No.: 1071004

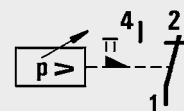
Circuit diagrams



Change-over contact



**Change-over contact
with manual reset min.**



**Change-over contact
with manual reset max.**

Pressure switch FF 4

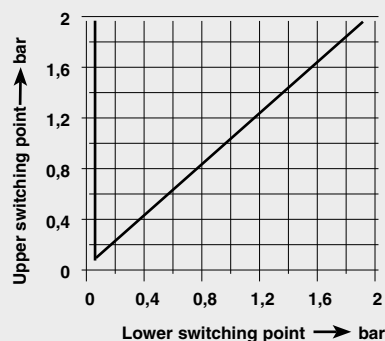
0,11 up to 250 bar, ample wiring room, easy to adjust,
high repeatability of set switchpoints, easily read scale

Pressure diagrams

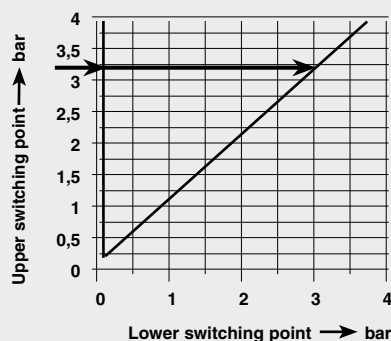
Charts show the smallest adjustable differential.

Example per figure FF 4-4: If upper setting is at 3.25 bar, lower setting can be adjusted between 0.07 and 3.0 bar (see arrows in the drawing).

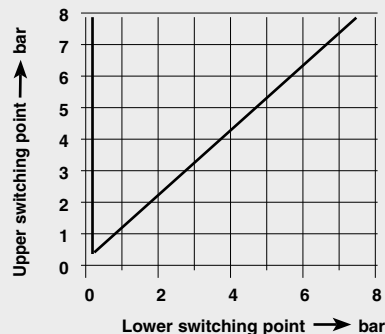
FF 4-2



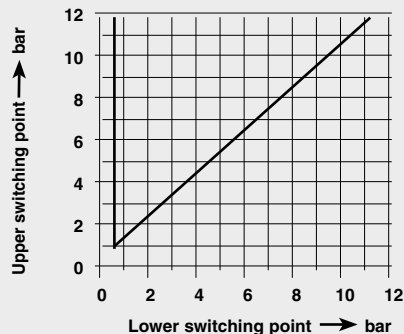
FF 4-4



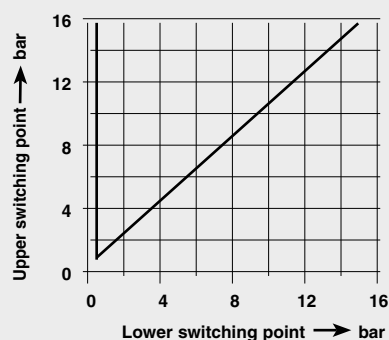
FF 4-8



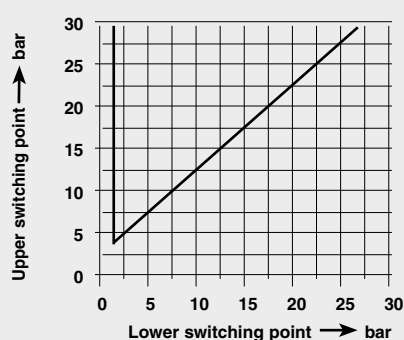
FF 4-12



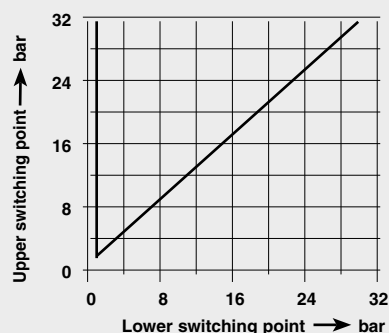
FF 4-16



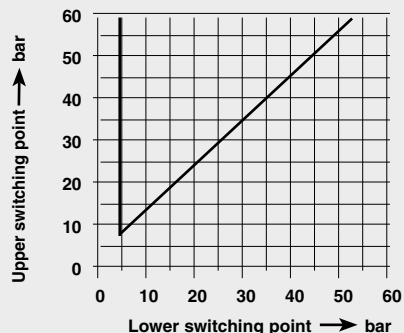
FF 4-30



FF 4-32



FF 4-60

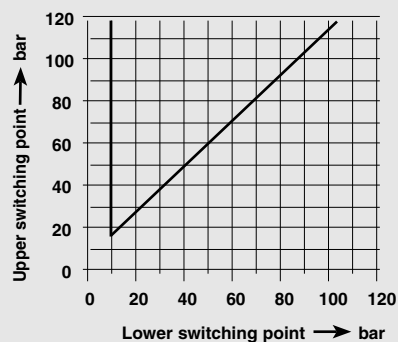


Pressure switch FF 4

0,11 up to 250 bar, ample wiring room, easy to adjust,
high repeatability of set switchpoints, easily read scale

Pressure diagrams

FF 4-120



FF 4-250

