Compact Diaphragm Operated Pressure Switches **GR Series**

- Compact and rugged design.
- Hermetically sealed snap switch UL and CSA listed.
- ATEX - Flameproof CENELEC EEx d IIC option.
- ATEX – Intrinsically Safe ATEX Ex ia IIC option.
- Weatherproof IP66/NEMA 4.
- Stainless steel body option NEMA 4X rating.
- High over-range models up to 1000 bar / 15,000 psi.
- Ranges available between 0.25 – 700 bar (4 – 10,000 psi).
- Variety of wetted parts including NACE MR-01-75 compatibility option.
- Optional weatherproof, ATEX EEx e, ATEX Ex ia or ATEX Flameproof EEx d IIC terminal enclosures.
- Field adjustable.
- Accuracy 1%

**Performance characteristics**

**Enclosure options**
- IP66 Protection. Nema 4 (Standard)
- Option Nema 4X

**Wetted parts options**
- 316 Stainless Steel (Viton or Nitrile O-ring seals). NACE
- Nickel alloy (Monel) with Viton O-ring. NACE
- All welded construction

**Standard Electrical ratings – Refer to Table 6**
- 11 Amps silver contacts
- 5 Amps silver contacts
- 1 Amp gold contacts

**Process connection**
- Rc ¼ (BSP), ¼ NPT Internal, ½ NPT Internal, ½ NPT External

**Unit weight**
- Between 0.6 kg – 2kg (1.32lb – 4.4lb) see end of datasheet for different instrument weights.

**Accuracy**
- Set point repeatability ±1% of span at 20 °C / 68 °F ambient.

**Product applications**

The GR series is suitable for a wide range of applications in many Industry sectors:
- Oil & Gas
- Chemical
- Petrochemical
- OEM

The choice of models available ensures that the GR Series is suitable for use in:
- Corrosive atmospheres
- Resistant to chemical attack

**How can we help you?**

Delta Controls’ range of reliable pressure and temperature measurement instruments can be customised to meet individual requirements. For technical advice or to discuss your application please contact us on +44 (0)1252 729 140
WEATHERPROOF ENCLOSURES

Aluminium General Purpose Weatherproof
For outdoor industrial use IP66/NEMA 4.  

Stainless Steel Weatherproof
For outdoor aggressive atmospheres e.g. marine NEMA type 4X/IP66

FLAMEPROOF ENCLOSURES

Aluminium Weatherproof/Explosionproof IP66/NEMA 4
With CENELEC approval EEx d IIC. II 2 G for Zone 1
See approvals.

Stainless Steel Weatherproof/Explosionproof IP66/NEMA 4X
For use in aggressive atmospheres e.g. marine.
With CENELEC approval EEx d IIC. II 2 G for Zone 1
See approvals.

INTRINSICALLY SAFE ENCLOSURES

Aluminium Weatherproof/Explosionproof IP66/NEMA 4
With ATEX approval Ex ia IIC. II 1 G/D for Zone 0
See approvals.

Stainless Steel Weatherproof/Explosionproof IP66/NEMA 4X
For use in aggressive atmospheres e.g. marine.
With ATEX approval Ex ia IIC. II 1 G/D for Zone 0
See approvals.

FINISH
Enclosures W and H are clear anodised aluminium; Epoxy paint is optional see Code 50 in Table 8.  A and R are natural finish stainless steel.

All are suitable for use in hazardous areas as defined by NEC Article 500, Class 1 Groups A, B, C, D Class II Groups E, F, G Division 1 and 2.  See Table 3 Code A.

Models

Fixed Switching Differential
For applications up to 100 bar/1500 psi.
Over-range up to 155 bar/2250 psi
Refer to Table 5.

Fixed Switching Differential
For applications up to 100 bar/1500 psi.
Over-range up to 600 bar/8700 psi
Refer to Table 5.

Fixed Switching Differential
For applications up to 700 bar/10000 psi.
Over-range up to 1000 bar/15000 psi
Refer to Table 5.
**Electrical Entry**

See TECHNICAL DATA and DIMENSIONS fig 1 to 4.

**NOTE 1:**
Other lengths available – please contact sales for engineering codes

**NOTE 2:**
Weatherproof terminal enclosure Code C can only be combined with Table 1 Enclosure Codes W and A.

**NOTE 3:**
Intrinsically Safe terminal enclosure Code V and W can only be combined with Table 1 Enclosure Codes 4 and 5.

### TABLE 3

<table>
<thead>
<tr>
<th><strong>Code</strong></th>
<th><strong>Description</strong></th>
<th><strong>Code</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Factory Sealed Flying Lead. See fig 1. Class I, Groups A, B, C, D. Class II Groups E, F, G. 0.45m/18in. long flying lead (Note 1). With 1/2-14 NPT external conduit thread.</td>
<td>U</td>
</tr>
<tr>
<td>C</td>
<td>Integral Weatherproof Terminal Enclosure. See fig 2. Glass filled polyester with weather protection to IP66/NEMA 4. Conduit entry tapped M20 x 1.5 (Note 2) Ambient temperature –20° to 86°C.</td>
<td>K</td>
</tr>
<tr>
<td>D</td>
<td>Integral 'Increased Safety' Terminal Enclosure. See fig 2. EEx e IIC T6 (-20 to +40°C) Glass filled polyester certified to CENELEC EN50 014/EN50 019, with weather protection not less than IP66/NEMA 4.</td>
<td>I 1 G D</td>
</tr>
<tr>
<td>J</td>
<td>Integral 'Increased Safety' Terminal Enclosure. See fig 3. EEx e IIC T6 (-20 to +40°C) Glass filled polyester certified to CENELEC EN50 014/EN50 019, with weather protection not less than IP66/NEMA 4.</td>
<td>I 1 G D</td>
</tr>
<tr>
<td>K</td>
<td>Explosionproof Terminal Enclosure. See fig 4. CENELEC EExd IIC T6 (-20 to +40°C) Diecast aluminium alloy. Conduit entry tapped 1/2-14 NPT. Weather protection not less than IP65/NEMA 4</td>
<td>II 2 G</td>
</tr>
</tbody>
</table>

### TABLE 4

<table>
<thead>
<tr>
<th><strong>Code</strong></th>
<th><strong>WELDED CONSTRUCTION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>316 stainless steel diaphragm, process connection and Viton O-ring seal.</td>
</tr>
<tr>
<td>G</td>
<td>316 stainless steel diaphragm, process connection and nitrile (Buna-N) O-ring seal</td>
</tr>
<tr>
<td>K</td>
<td>Nickel alloy (Monel) diaphragm, 316 stainless steel process connection and Viton O-ring seal for applications as laid down in NACE MR 01-75.</td>
</tr>
<tr>
<td>P</td>
<td>Nickel alloy (Monel) diaphragm, 316 stainless steel process connection and Nitrile (Buna-N) O-ring seal.</td>
</tr>
<tr>
<td>S</td>
<td>316 Stainless steel diaphragm and process connection. All welded construction.</td>
</tr>
<tr>
<td>T</td>
<td>Nickel alloy (Monel) diaphragm and process connection. All welded construction (suitable for NACE MR 01-75).</td>
</tr>
</tbody>
</table>

**Material of Wetted Parts**

**WELDED CONSTRUCTION**

Codes S and T
For reduced risk against leakage under extreme or unusual conditions, the diaphragm may be welded directly to the process connection, eliminating the O-ring.
### 5A: SI Units

Due to manufacturing tolerances, the figures quoted in these tables are for guidance only. Should the switching differential be critical for specific applications, our engineers should be consulted prior to ordering.

#### TABLE 5

<table>
<thead>
<tr>
<th>Model</th>
<th>Range Code</th>
<th>$P_{\text{max}}$ Bar</th>
<th>Range bar</th>
<th>SWITCHING DIFFERENTIAL – Refer to table 6 mbar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HS</td>
</tr>
<tr>
<td>DB</td>
<td>27</td>
<td>0.25 to 1.8</td>
<td>200</td>
<td>260</td>
</tr>
<tr>
<td>DC</td>
<td>0.4 to 2.5</td>
<td>320</td>
<td>416</td>
<td>128</td>
</tr>
<tr>
<td>DE</td>
<td>1 to 6</td>
<td>280</td>
<td>364</td>
<td>206</td>
</tr>
<tr>
<td>EB</td>
<td>70</td>
<td>1.6 to 10</td>
<td>430</td>
<td>450</td>
</tr>
<tr>
<td>EA</td>
<td>70</td>
<td>2.5 to 16</td>
<td>570</td>
<td>741</td>
</tr>
<tr>
<td>EC</td>
<td>112</td>
<td>4 to 25</td>
<td>1200</td>
<td>1560</td>
</tr>
<tr>
<td>ED</td>
<td>10 to 40</td>
<td>2700</td>
<td>3500</td>
<td>1200</td>
</tr>
<tr>
<td>EH</td>
<td>16 to 75</td>
<td>3200</td>
<td>4160</td>
<td>1250</td>
</tr>
<tr>
<td>FA</td>
<td>155</td>
<td>10 to 100</td>
<td>4300</td>
<td>5600</td>
</tr>
</tbody>
</table>

#### 5B: PSI Units

#### TABLE 5

<table>
<thead>
<tr>
<th>Model</th>
<th>Range Code</th>
<th>$P_{\text{max}}$ psi</th>
<th>Range psi</th>
<th>SWITCHING DIFFERENTIAL – Refer to table 6 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HS</td>
</tr>
<tr>
<td>DK</td>
<td>400</td>
<td>4 to 25</td>
<td>2.9</td>
<td>3.8</td>
</tr>
<tr>
<td>DP</td>
<td>400</td>
<td>6 to 40</td>
<td>4.6</td>
<td>6</td>
</tr>
<tr>
<td>DZ</td>
<td>16 to 100</td>
<td>4.1</td>
<td>5.3</td>
<td>3</td>
</tr>
<tr>
<td>EM</td>
<td>1000</td>
<td>25 to 160</td>
<td>6.2</td>
<td>6</td>
</tr>
<tr>
<td>ER</td>
<td>1000</td>
<td>40 to 250</td>
<td>8.3</td>
<td>10.8</td>
</tr>
<tr>
<td>EW</td>
<td>1600</td>
<td>60 to 400</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>EE</td>
<td>1600</td>
<td>160 to 600</td>
<td>39</td>
<td>51</td>
</tr>
<tr>
<td>F6</td>
<td>2250</td>
<td>46 to 1000</td>
<td>62</td>
<td>81</td>
</tr>
<tr>
<td>F6</td>
<td>2250</td>
<td>160 to 1700</td>
<td>136</td>
<td>177</td>
</tr>
<tr>
<td>F6</td>
<td>2250</td>
<td>350 to 1500</td>
<td>232</td>
<td>302</td>
</tr>
<tr>
<td>UK</td>
<td>15000</td>
<td>100 to 2300</td>
<td>319</td>
<td>415</td>
</tr>
<tr>
<td>VA</td>
<td>8000 to 6000</td>
<td>1600 to 10000</td>
<td>543</td>
<td>705</td>
</tr>
</tbody>
</table>
Switching Options

TABLE 6

<table>
<thead>
<tr>
<th>IEC 947-5-1/EN 60947-5-1 Rating</th>
<th>UL/CSA Rating</th>
<th>VA Rating</th>
<th>Contact</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>U_i</td>
<td>U_imp</td>
<td>Make</td>
</tr>
<tr>
<td>11 Amps @ 110/250V AC &amp;</td>
<td>AC14 D300</td>
<td>0.6/0.3A @ 120/240V AC</td>
<td>250V</td>
<td>800V</td>
</tr>
<tr>
<td>5/0.5 Amps @ 30/125V DC</td>
<td>DC13 R300</td>
<td>0.22/0.1A @ 125/250V DC</td>
<td>250V</td>
<td>432</td>
</tr>
<tr>
<td>Silver contacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Amps @ 250V AC &amp;</td>
<td>AC14 D300</td>
<td>0.6/0.3A @ 120/240V AC</td>
<td>250V</td>
<td>500V</td>
</tr>
<tr>
<td>2 Amps @ 30V DC</td>
<td>DC13 R300</td>
<td>0.22/0.1A @ 125/250V DC</td>
<td>250V</td>
<td>28</td>
</tr>
<tr>
<td>Silver contacts with gold flash</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Amp @ 125V AC &amp;</td>
<td>AC14 E150</td>
<td>0.3A @ 120VAC</td>
<td>125V</td>
<td>500V</td>
</tr>
<tr>
<td>1 Amp @ 30V DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

† 2 Single pole, double throw, simultaneous falling under pressure
‡ 2 Single pole, double throw, simultaneous rising under pressure.

NOTE: For low energy circuits e.g. 30V and up to 100mA, we recommend using gold alloy contact switches.

NOTE: For Enclosure codes 4 and 5, HS, HD and HR switching codes are unsuitable. Use gold contact switches.

U_i = rated insulation voltage   U_imp = rated impulse withstand voltage across contacts.

Process Connection

TABLE 7

Other thread specifications and sizes are available without using adaptors.

Adaptors are available for applications where their use is permitted. Apply for details.

Options & Treatments

TABLE 8

Combinations available, apply for details.

**Not recommended for use over 600 bar/8700 psi. Refer to Table 5A & 5B.

Tropicalisation High humidity environment
Marine and Offshore Saline atmosphere or salt spray
Ammonia Process (wetted) parts and construction suitable for atmospheric ammonia.
Oxygen Service Process (wetted) parts are cleaned for oxygen and are oil free.
Pipe Mounting Bracket permits local 2" pipework to be utilised for mounting the instrument. Details on application.
Tag Stainless steel fixed to enclosure.
Tag Stainless steel tied to enclosure.
No options or Treatments Use this code when Special Engineering is required without options and treatments
Epoxy Paint for aluminium enclosures W, H in Table 1

### TABLE 6

The switch contacts are hermetically sealed inside a stainless steel enclosure for protection against aggressive and corrosive atmospheres. UL & CSA listing applies to the explosionproof hermetically sealed switch which is suitable for use in hazardous areas as defined by NEC Article 500, Class I Groups A,B,C,D Class II Groups E,F,G Division 1 and 2.
**Unit Weights**

(Aprox.) – Refer to Table 1 and Table 3

<table>
<thead>
<tr>
<th>Enclosure Code</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘H’, ‘W’, ‘S’</td>
<td>0.6kg/1.32lb</td>
</tr>
<tr>
<td>‘R’, ‘A’, ‘4’</td>
<td>0.9kg/1.98lb</td>
</tr>
<tr>
<td>‘C’, ‘D’, ‘V’, ‘W’</td>
<td>Add 0.3kg/0.66lb</td>
</tr>
<tr>
<td>‘J’</td>
<td>Add 1.1kg/2.42lb</td>
</tr>
<tr>
<td>‘K’</td>
<td>Add 0.5kg/1.1lb</td>
</tr>
</tbody>
</table>

**Technical Specifications**

**ACCURACY**
Set point repeatability ± 1% of span at 20°C/68°F ambient.

**AMBIENT TEMPERATURE RANGE**
Certified enclosures
Refer to Approvals and Tables 1 & 3 for limitations of ambient use.

**OPERATING AMBIENT**
Model GR2 and GR4 (Ranges DB to FA/DK to F6.) Suitable for operating within a range of ambient temperatures from -40°C to +85°C (-40°F to +185°F).

Model GR4 (Ranges U7 to Y4/UK to YF) limited by materials used in sensing element but suitable for operating within a range of ambient temperatures from -25°C to +60°C (-13°F to +140°F).

**ELECTRICAL CONNECTIONS**

**Flying Lead – Table 3 Code A**
High Duty PVC insulated 1.19mm²/18 AWG factory sealed flying leads. Rated insulation voltage UL/CSA 600 V.

**Terminal Enclosures – Table 3 Code C, D, J, K, V & W**
Suitable for conductor sizes up to 2.5mm²/14AWG non-pinching, clamped.

**Dielectric Strength**
The electrical assembly is capable of withstanding *1.5kV between live parts and earth/ground and 500V between open contacts.

**Earthing/Grounding**
Flying lead versions have separate earth/ground conductor. Terminal enclosures have additional internal earthing/grounding facility.

**Isolation**
These products are not suitable for electrical isolation. Always isolate circuit separately to carry out any electrical work.

**Pollution Degree**
All switches rated IP66 are suitable for use in pollution degree 3.
Ref IEC 947-5-1

**OPTIONAL EXTRAS**

**Chemical Seals**
Chemical seals of our own or proprietary manufacture can be fitted when required.

**Mounting**
Position/Location/Installation
(Vertical as shown) Avoid sitting in locations that transmit excessive shock or vibration. For further advice contact our engineers.

**Pipe Mounting Bracket**
See Table 8.

**Tagging**
See Table 8.
**INTRINSIC SAFETY**

Because of the low voltages and currents of intrinsically safe circuits, we recommend using gold contacts. Refer to Table 6.

**CENELEC/BASEEFA**

Certified to CENELEC EN50 014 and EN50 018.

For use in Zone 1 hazardous areas EEEx d IIC T6 (-40° to +60°C)

T4 (-40° to +85°C)

Enclosure Codes H and R and all models (see Table 1)

Certificate number BASEEFA ATEX0214X

**CENELEC/BASEEFA**


For use in Zone 0 hazardous areas Ex ia IIC T6 (-40° to +60°C)

T4 (-40° to +85°C)

Ex iaD 20 T85 (-40° to +60°C)

T135 (-40° to +85°C)

Enclosure Codes 4 and 5 and all models (see Table 1)

Certificate number BASEEFA06ATEX0091X

**UNDERWRITER LABORATORIES INC.**

Snap switches for use in Hazardous Locations.

Class 1, Groups A, B, C, D Class II, Groups E, F, G Division 1 and 2

E105842

**CANADIAN STANDARDS ASSOCIATION**

Snap switches for use in Hazardous Locations.

Class 1, Groups A, B, C, D Class II, Groups E, F, G Division 1 and 2

LR67110-5

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**Dimensions**

**Wiring Diagram**

[Diagram description is not provided in the text.]

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**INDICATES NUMBER WHEN TERMINAL BOX IS FITTED**
### ENCLOSURES CODES H,R TABLE 1 WITH TERMINAL ENCLOSURE CODE J TABLE 3

<table>
<thead>
<tr>
<th>ENCLOSURES</th>
<th>CODES</th>
<th>TABLE</th>
<th>1</th>
<th>WITH</th>
<th>TERMINAL</th>
<th>ENCLOSURE</th>
<th>CODE</th>
<th>J</th>
<th>TABLE</th>
<th>3</th>
</tr>
</thead>
</table>

### ENCLOSURES CODES W,A,H,R,4 & 5 TABLE 1 WITH TERMINAL CODE C,D,V,W TABLE 3

<table>
<thead>
<tr>
<th>ENCLOSURES</th>
<th>CODES</th>
<th>W,A,H,R,4 &amp; 5</th>
<th>TABLE</th>
<th>1</th>
<th>WITH</th>
<th>TERMINAL</th>
<th>CODE</th>
<th>C,D,V,W</th>
<th>TABLE</th>
<th>3</th>
</tr>
</thead>
</table>

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