FEATURES

- Brass & Polysulfone (FDA compliant) Pressure Connections
- Compact Size
- Complies with Enclosure Type 4 with watertight conduit fitting
- Terminal block wiring
- Optional red status light
- Adjustable Ranges:
  Pressure: 30" Hg Vac to 90 psi (-1 to 6.2 bar)
  Differential Pressure: 1 to 45 psid (68.9 mbar to 3.1 bar)
**OVERVIEW**

The cost-effective 24 Series Delta-Pro™ pressure, vacuum, and differential pressure switches offer a unique blend of compact size, excellent performance, and environmental protection. Available with brass or polysulfone pressure connections the Delta-Pro is ideal for applications involving hot or cool air, water, gas or oil. The precision snap-acting switch and sensitive diaphragms combine to provide a narrow deadband and repeatability of approximately ±1% of full scale range. A convenient, externally accessible adjustment screw is multi-turn to provide easy set point adjustability. The force-balanced design gives the Delta-Pro excellent vibration resistance.

**FEATURES**

- UL listed and cUL certified. CE compliant to low voltage directive and pressure equipment directive
- Vacuum, Pressure or Differential pressure measurement
- 5 A @ 125/250 VAC SPDT snap-acting switch
- External stainless steel multi-turn adjusting screw
- OEM capabilities include external adjustment knob with or without reference scale
APPLICATIONS

Typical applications include filter monitoring and proof-of-flow. The 24 Series is used within the water & wastewater, bioprocessing, food & beverage, HVAC and gas processing industries.

The 24 Series (Delta Pro™) was designed to be a compact, cost-effective differential pressure switch for applications such as proof-of-flow, filter monitoring, etc. It depends upon two opposing diaphragms to sense pressure on the "High" and "Low" pressure outputs of a system. The resulting pressure differential is transmitted through a linkage to a snap-action electrical switch, providing an output when a pre-set difference is exceeded. This set point can be easily modified while under pressure via an external adjusting screw. This adjustment "pre-loads" the actuation mechanism, which results in excellent vibration-resistance. Straight pressure and vacuum versions, with a single diaphragm, are also available.
SPECIFICATIONS

STORAGE TEMPERATURE  
-20° to 180°F (-29° to 82°C)

AMBIENT TEMPERATURE  
30° to 160°F (-1° to 71°C). Set point typically shifts less than ±0.6% of range for a 50°F (28°C) ambient temperature change; consult factory for special ratings

MAX MEDIA TEMPERATURE  
200°F (93°C) at 100 psi working pressure

SHOCK  
Set point repeats after 15G, 10 millisecond duration

VIBRATION  
Set point repeats after 2.5G, 5-500 Hz

ENCLOSURE CLASSIFICATION  
Complies with enclosure type 4 requirements with optional water tight conduit connector. Reinforced polyester body, stainless steel cover with gasket.

SET POINT REPEATABILITY  
Typically ± 1% of full scale range.

SWITCH OUTPUT  
One SPDT precision snap-acting micro-switch with mechanical contact life of 10 million cycles. Actual life depends on electrical load and cycle frequency

ELECTRICAL RATING  
Rated to 5 A resistive and 5 A inductive (75% PF) at 125 VAC and 250 VAC, 1/4 HP; 5 A resistive and 3 A inductive at 30 VDC and 0.5 A resistive and 0.25 inductive at 125 VDC. Gold flash over silver contacts for minimum loads of 5 mA at 6 VDC, 2 mA at 12 VDC and 1 mA at 24 VDC

WEIGHT  
6.5 oz.

ELECTRICAL CONNECTION  
7/8" hole for optional 1/2" NPT conduit connector. Terminal block with screw terminals. Max wire size 16 AWG

PRESSURE CONNECTION  
Models 013-014, 019-022: 1/4" NPT (female) brass; models 011-012, 015-018: 1/4" NPS (female) FDA compliant* Udell® polysulfone, non-tapered to minimize connection stress with 1/4" NPT (male) fittings - max torque is 2-ft.lbs.

MOUNTING & INSTALLATION  
Surface mount with two screws through clearance holes, or mount by pressure connections

*Udell® is a registered trademark of Solvay Advanced Polymers
*The U.S. Food & Drug Administration (FDA) has approved polysulfone resins as compliant with the specifications of the FDA 21CFR177.1655 for repeated use and selected single use in contact with food under conditions of use as specified in the citation.

APPROVALS

UNITED STATES AND CANADA  
UL Listed, cUL Certified  
Pressure: UL 508; CSA C22.2 No. 14, File #E42272

EUROPEAN UNION  
Low Voltage Directive (LVD) 2006/95/EC  
UEC Compliant to LVD  
Products rated lower than 50 VAC and 75 VDC are outside the scope of the LVD  
The Low Voltage Directive does not apply to products for use in hazardous locations

Pressure Equipment Directive (PED) 97/23/EC  
Pressure models only  
Compliant to PED  
Products rated below 7.5 psi are outside of the scope of the PED
### Differential Pressure Model Chart

<table>
<thead>
<tr>
<th>Model</th>
<th>Adjustable Range</th>
<th>Typical Deadband</th>
<th>***Max. Working Pressure</th>
<th>**Proof Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>psi (unless noted)</td>
<td>bar (unless noted)</td>
<td>psi</td>
<td>mbar</td>
</tr>
<tr>
<td>011</td>
<td>1 to 10</td>
<td>68,9 mbar to 0,7</td>
<td>0,75</td>
<td>51,7</td>
</tr>
<tr>
<td>012</td>
<td>4 to 45</td>
<td>0,3 to 3,1</td>
<td>1</td>
<td>68,9</td>
</tr>
</tbody>
</table>

Polyurethane (polyether) diaphragm and polysulfone® 1/4" NPS (female) (mechanical) pressure connection

<table>
<thead>
<tr>
<th>Model</th>
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Polyurethane (polyether) diaphragm and brass 1/4" NPT (female) pressure connection

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<td>mbar</td>
</tr>
<tr>
<td>015</td>
<td>30&quot; to 2&quot; Hg VAC</td>
<td>-1 bar to -68,9 mbar</td>
<td>2.5&quot; Hg</td>
<td>84,7</td>
</tr>
<tr>
<td>016</td>
<td>1 to 10</td>
<td>68,9 mbar to 0,7</td>
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<td>1</td>
<td>68,9</td>
</tr>
<tr>
<td>018</td>
<td>10 to 90</td>
<td>0,7 to 6,2</td>
<td>3</td>
<td>0,2 bar</td>
</tr>
</tbody>
</table>

### Vacuum and Pressure Model Chart

<table>
<thead>
<tr>
<th>Model</th>
<th>Adjustable Range</th>
<th>Typical Deadband</th>
<th>*Over Range Pressure</th>
<th>**Proof Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>psi (unless noted)</td>
<td>bar (unless noted)</td>
<td>psi</td>
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<td>30&quot; to 2&quot; Hg VAC</td>
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<td>0,3 to 3,1</td>
<td>1</td>
<td>68,9</td>
</tr>
<tr>
<td>018</td>
<td>10 to 90</td>
<td>0,7 to 6,2</td>
<td>3</td>
<td>0,2 bar</td>
</tr>
</tbody>
</table>

Polyurethane (polyether) diaphragm and polysulfone®, 1/4" NPS (female) (mechanical) pressure connection

<table>
<thead>
<tr>
<th>Model</th>
<th>Adjustable Range</th>
<th>Typical Deadband</th>
<th>*Over Range Pressure</th>
<th>**Proof Pressure</th>
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<tr>
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<td>mbar</td>
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<td>30&quot; to 2&quot; Hg VAC</td>
<td>-1 bar to -68,9 mbar</td>
<td>2.5&quot; Hg</td>
<td>84,7</td>
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<tr>
<td>020</td>
<td>1 to 10</td>
<td>68,9 mbar to 0,7</td>
<td>0,75</td>
<td>51,7</td>
</tr>
<tr>
<td>021</td>
<td>4 to 45</td>
<td>0,3 to 3,1</td>
<td>1</td>
<td>68,9</td>
</tr>
<tr>
<td>022</td>
<td>10 to 90</td>
<td>0,7 to 6,2</td>
<td>3</td>
<td>0,2 bar</td>
</tr>
</tbody>
</table>

Polyurethane (polyether) diaphragm and brass 1/4" NPT (female) pressure connection

*Over Range Pressure: The maximum pressure that may be applied continuously without causing damage and maintaining set point repeatability.
**Proof Pressure: The maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. The unit may require calibration (e.g. start-up, testing).
***Working Pressure: The pressure range within which two opposing sensors can be safely operated and still maintain set point adjustability.
HOW TO ORDER

Build a part number by selecting a model and options. Choose the Sensor Type and the Range from the Model Chart. If options are required, add the code from the option list below. Example: 24-013 * M900.

<table>
<thead>
<tr>
<th>COMPONENTS CODE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SERIES DESIGNATION</td>
<td>Designation for 24 Series product line</td>
</tr>
<tr>
<td>DIFFERENTIAL PRESSURE MODELS *</td>
<td></td>
</tr>
<tr>
<td>011, 012</td>
<td>Polyurethane (polyether) diaphragm and 1/4&quot; NPS (female) (mechanical) polysulfone pressure connection</td>
</tr>
<tr>
<td>013, 014</td>
<td>Polyurethane (polyether) diaphragm and 1/4&quot; NPT (female) brass pressure connection</td>
</tr>
<tr>
<td>VACUUM AND PRESSURE MODELS *</td>
<td></td>
</tr>
<tr>
<td>015, 016, 017, 018</td>
<td>Polyurethane (polyether) diaphragm and 1/4&quot; NPS (female) (mechanical) polysulfone pressure connection</td>
</tr>
<tr>
<td>019, 020, 021, 022</td>
<td>Polyurethane (polyether) diaphragm and 1/4&quot; NPT (female) brass pressure connection</td>
</tr>
<tr>
<td>OPTIONS</td>
<td></td>
</tr>
<tr>
<td>M020</td>
<td>Red status light, 115 VAC only. Specify whether light turns on or off with increasing or decreasing pressure</td>
</tr>
<tr>
<td>M201</td>
<td>Factory set one switch; specify set point on increasing or decreasing pressure</td>
</tr>
<tr>
<td>M260</td>
<td>Self-contained battery-operated audible alarm</td>
</tr>
<tr>
<td>M262</td>
<td>Buna-N diaphragm</td>
</tr>
<tr>
<td>M277</td>
<td>Range indicated on nameplate in kPa or MPa, factory selected</td>
</tr>
<tr>
<td>M278</td>
<td>Range indicated on nameplate in Kg/cm²</td>
</tr>
<tr>
<td>M540</td>
<td>Viton® construction (deadband and low end of range may increase slightly. Consult factory.) Wetted parts include Viton® diaphragm plus standard connection material.</td>
</tr>
<tr>
<td>M900</td>
<td>Water tight conduit fitting; converts 7/8&quot; hole to 1/2&quot; NPT fitting; must specify for Enclosure Type 4 compliance</td>
</tr>
</tbody>
</table>

Viton® is a registered trademark of E.I. duPont de Nemours and Company.
DIMENSIONAL DRAWINGS

Dimensional drawings for all models may be found at www.ueonline.com
All dimensions stated in inches (millimeters)

<table>
<thead>
<tr>
<th>Model</th>
<th>DIMENSION A</th>
<th>Pressure Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>011, 012</td>
<td>2.75&quot; (69.9 mm)</td>
<td>1/4&quot; * NPS (F) Polysulfone</td>
</tr>
<tr>
<td>013, 014</td>
<td>3.13&quot; (79.5 mm)</td>
<td>1/4&quot; NPT (F) Brass</td>
</tr>
<tr>
<td>015, 016, 017, 018</td>
<td>1.44&quot; (36.6 mm)</td>
<td>1/4&quot; NPS (F) Polysulfone</td>
</tr>
<tr>
<td>019, 020, 021, 022</td>
<td>1.56&quot; (39.6 mm)</td>
<td>1/4&quot; * NPT (F) Brass</td>
</tr>
</tbody>
</table>

Models 011, 012, 013 & 014

Models 015 & 019

Models 016, 017, 018, 020, 021 & 022
**RECOMMENDED PRACTICES AND WARNINGS**

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- **To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.**

- **A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.**

- **The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.**

- **Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.**

- **Unit must not be altered or modified after shipment. Consult UE if modification is necessary.**

- **Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.**

- **Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.**

- **Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.**

- **Do not mount unit in ambient temp. exceeding published limits.**

**LIMITED WARRANTY**

Sellers warrant that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts, INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller’s representatives. **EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.**

**LIMITATION OF SELLER’S LIABILITY**

**SELLER’S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER, EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLECTIVE ACT OR ACTS (OR NEGLIGENCE FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE IMPUTED TO SELLER, IS LIMITED TO THE "LIMITED WARRANTY" OF REPAIR AND/OR REPLACEMENT AS STATED IN OUR WARRANTY OF PRODUCT. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.**

**UE specifications subject to change without notice.**

---

**U.S. SALES OFFICES**

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: northeastsales@ueonline.com

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 60132  
Phone: 815-341-2588  
email: midwestsales@ueonline.com

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: southeastsales@ueonline.com

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: midatlanticsales@ueonline.com

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: westcoastsales@ueonline.com

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: eastemsales@ueonline.com

United Electric Controls  
33018 Weatherby Court  
Fulshear, Texas 77441  
Phone: 832-457-6138  
email: southwestsales@ueonline.com

**INTERNATIONAL OFFICES**

**CHINA**

United Electric Controls, Shanghai Office  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Rennmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: chinasmilesales@ueonline.com

United Electric Controls, Beijing Office  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone & Fax: +86-10-5893-0551  
email: beijingsales@ueonline.com

**EUROPE**

United Electric Controls  
05-806 Komorow  
Kujawska S, Poland  
Phone: +48 22 499 4804  
email: easterneuropesales@ueonline.com

**INDIA**

United Electric  
#402, Aries Avenue - 1  
United Colony, Sama, Baroda  
Baroda (Gujarat), India  
Phone: +91 (-265) -2788654  
email: indiasales@ueonline.com

**ASIA-PACIFIC**

United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: asiapacific@ueonline.com

**MEXICO**

United Electric Controls  
Privada Fernando San Pedro 305  
Col El Naranic 89349  
Tampico, Tamaulipas Mexico  
Phone: +52 833-116-7637  
email: latinamerica@ueonline.com

**RUSSIA & SCANDINAVIA**

United Electric Controls, Moscow  
Elninskaya str., 15-140  
Moscow, 121552  
Russia  
Phone: +7 (495) 792-88-06  
email: russia@ueonline.com

**CANADA**

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6V 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

**MEXICO**

United Electric Controls  
Privada Fernando San Pedro 305  
Col El Naranic 89349  
Tampico, Tamaulipas Mexico  
Phone: +52 833-116-7637  
email: latinamerica@ueonline.com

**RUSSIA & SCANDINAVIA**

United Electric Controls, Moscow  
Elninskaya str., 15-140  
Moscow, 121552  
Russia  
Phone: +7 (495) 792-88-06  
email: russia@ueonline.com

**UNITED ELECTRIC CONTROLS**

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143  
USA  
Telephone: 617 926-1000  
Fax: 617 926-2568  
http://www.ueonline.com

Be sure to visit www.ueonline.com for the latest information.