

Operating instructions

Pressure switches for air DL..A, DL..K



Cert. version 03.94

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Safety

Please read and keep in a safe place



Please read through these instructions carefully before installing or operating. Following the installation, pass the instructions on to the operator. This unit must be installed and commissioned in accordance with the regulations and standards in force. These instructions can also be found at www.docuthek.com.

Explanation of symbols

■, **1**, **2**, **3**... = Action
 ▷ = Instruction

Liability

We will not be held liable for damage resulting from non-observance of the instructions and non-compliant use.

Safety instructions

Information that is relevant for safety is indicated in the instructions as follows:

DANGER

Indicates potentially fatal situations.

WARNING

Indicates possible danger to life and limb.

! CAUTION

Indicates possible material damage.

All interventions may only be carried out by qualified gas technicians. Electrical interventions may only be carried out by qualified electricians.

Conversion, spare parts

All technical changes are prohibited. Only use OEM spare parts.

Changes to edition 01.16

The following chapters have been changed:

- Accessories

Checking the usage

DL 1,5–3A, DL 3K, DL 5–150A, DL 5–150K

For monitoring positive, negative or differential air or flue gas pressures.

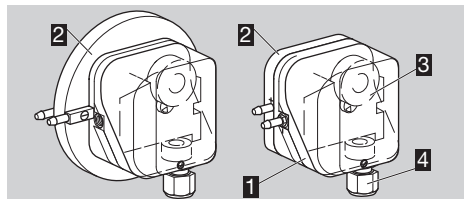
This function is only guaranteed when used within the specified limits – see page 7 (Technical data).

Any other use is considered as non-compliant.

Type code

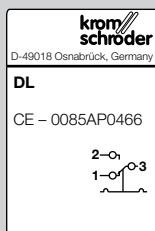
Code	Description
DL	Pressure switch for air
1,5 – 150	Max. setting in mbar
K	With tube connection and hand wheel
A	Additionally with Rp ¼ connection (optional: Rp ⅙)
T	T-product
	Electrical connection
-3	via screw terminals
-4	via screw terminals, IP 65
-5	4-pin plug, without socket
-6	4-pin plug, with socket
-9	4-pin plug, with socket, IP 65
K2	Red/green pilot LED for 24 V DC/AC
T	Blue pilot lamp for 230 V AC
T2	Red/green pilot LED for 230 V AC
N	Blue pilot lamp for 120 V AC
A	External adjustment
W	Z-angle bracket

Part designations



- 1** Upper housing section with cover
- 2** Lower housing section
- 3** Hand wheel
- 4** M16 cable gland

Type label



Max. inlet pressure = withstand pressure, mains voltage, ambient temperature, enclosure: see type label.

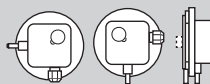
Installation

! CAUTION

Please observe the following to ensure that the DL is not damaged during installation and operation:

- Use approved sealing material only.
- Note the max. medium and ambient temperatures, see page 7 (Technical data).
- Condensation must not be allowed to get into the housing (if possible, install pipework with an ascending gradient). Otherwise, there is a risk of icing of condensation at subzero temperatures, the switching point shifting or corrosion in the device which can lead to malfunctions.
- Protect the connections against dirt or moisture in the medium to be measured or the surrounding air. If necessary, install a filter.
- In case of highly fluctuating pressures, install a damping nozzle/restrictor orifice.
- When installing outdoors, place the DL in a roofed area and protect from direct sunlight (even IP 65 version). To avoid condensation, the cover with pressure equalization element can be used on some types.
- In the case of an uneven mounting surface, secure the pressure switch to the mounting plate or air duct with only two screws on the same side in order to avoid subjecting the pressure switch to mechanical stress.
- When using silicone tubes, only use silicone tubes which have been sufficiently cured. Vapours containing silicone can adversely affect the functioning of electrical contacts.
- In the case of high humidity or aggressive gas components, we recommend using a pressure switch with gold contact due to its higher resistance to corrosion. Closed-circuit current monitoring is recommended under difficult operating conditions.

- ▷ The DL must not be in contact with masonry. Minimum clearance 20 mm.
- ▷ Ensure that there is sufficient installation space.
- ▷ Ensure unobstructed view of the hand wheel.
- ▷ Installation in the vertical or horizontal position, or upside down, preferably with vertical diaphragm. If installed in a vertical position, the switching point p_S will correspond to the scale value SK.

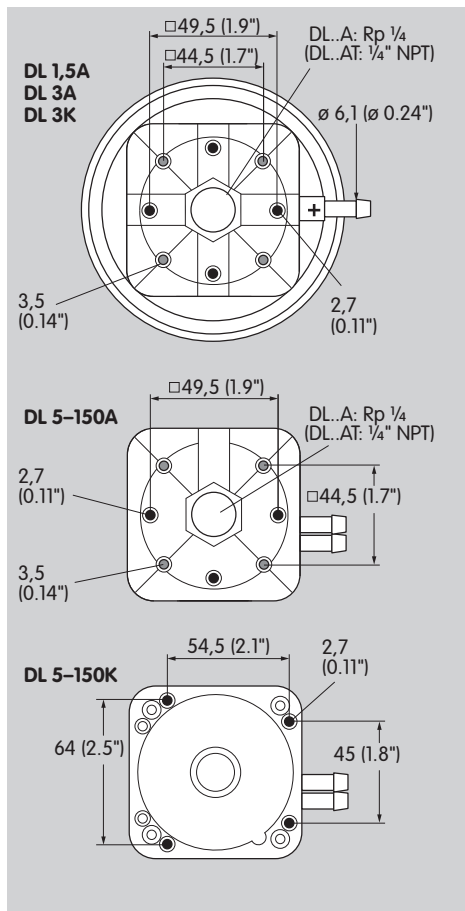


- ▷ If installed in another position, the switching point p_S will change and no longer correspond to the set scale value SK. Switching point p_S must be checked.

	SK + 0.18 mbar [+ 0.071 "WC]	SK - 0.18 mbar [- 0.071 "WC]
DL 1,5A	 e.g. SK = -0.5: $p_S = -0.5 + 0.18$ $p_S = -0.32$ mbar	
DL 3K, DL 3A		
DL 5-150A, DL 5-150K		

- ▷ Installation using self-tapping screws for 1 mm-thick sheets:
 DL..A, DL 3K: $\varnothing$ 3.5 x 8 mm or $\varnothing$ 4 x 8 mm.
 DL 5-150K: $\varnothing$ 3.5 x 16 mm.

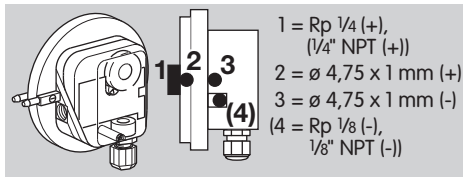
1 Fit the DL.



2 Connect the pressure line.

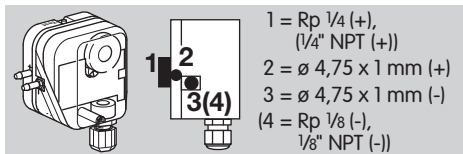
- ▷ DL..A: upon delivery, port 2 is closed off by a rubber cap.

DL 1,5A, DL 3A



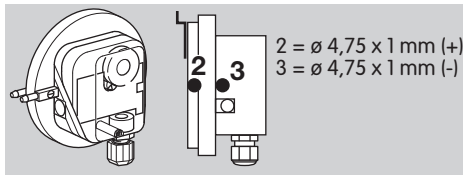
- ▷ Positive pressure: port 1 or 2
- ▷ Negative pressure: port 3
- ▷ Special version DL 3A-3Z: port 4

DL 5-150A



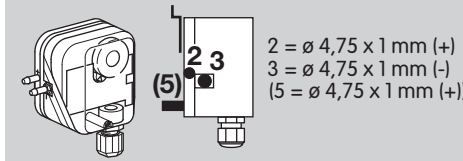
- ▷ Positive pressure: port 1 or 2
- ▷ Negative pressure: port 3; after unscrewing port 3 also port 4

DL 3K



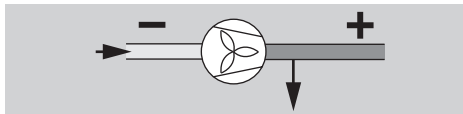
- ▷ Positive pressure: port 2
- ▷ Negative pressure: port 3

DL 5-150K



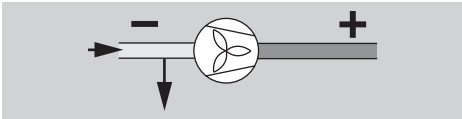
- ▷ Positive pressure: port 2
- ▷ Negative pressure: port 3
- ▷ Optional test point for positive pressure: port 5

Positive pressure measurement



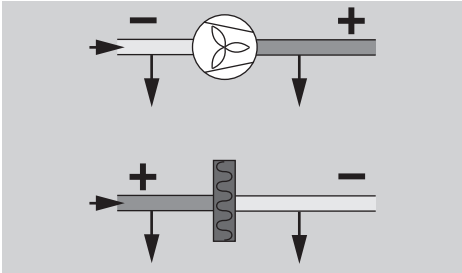
- ▷ 1 or 2 = positive pressure port (+).
- ▷ If port 2 is used, close off port 1.
- ▷ 3 or 4 = remains open to ventilate the upper diaphragm chamber.

Negative pressure measurement



- ▷ 3 or 4 = negative pressure port (-).
- ▷ 1 or 2 = remains open to ventilate the upper diaphragm chamber.

Differential pressure measurement



- ▷ 1 or 2 = port for the higher positive pressure or lower negative pressure (+).
- ▷ 3 or 4 = port for the lower positive pressure or higher negative pressure (-).
- 3** Seal the ports that are not in use.

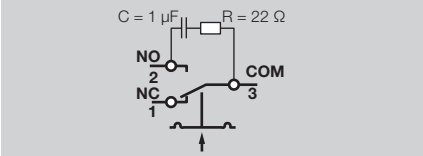
Wiring

- ▷ If the DL..G (DL..TG) has switched a voltage > 24 V (> 30 V) and a current > 0.1 A at $\cos \varphi = 1$ or > 0.05 A at $\cos \varphi = 0.6$ once, the gold plating on the contacts will have been burnt through. It can then only be operated at this power rating or higher power rating.

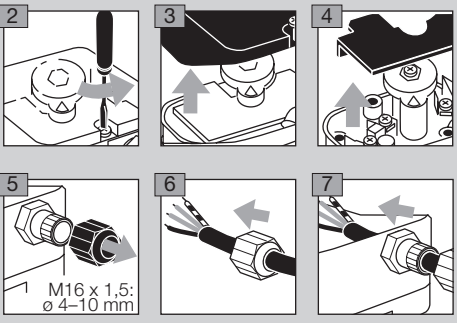
! CAUTION

To ensure that the DL is not damaged during operation, note the switching capacity, see page 7 (Technical data).

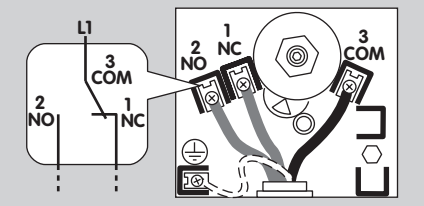
- ▷ In the case of low switching capacities, such as 24 V, 8 mA, for example, we recommend using an RC module (22Ω , $1 \mu\text{F}$) in air containing silicone or oil.



- 1** Disconnect the system from the electrical power supply.

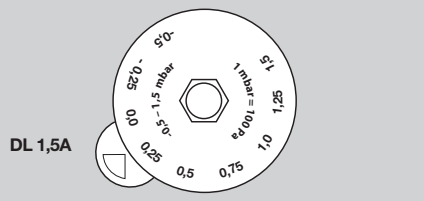


- ▷ Contacts **3** and **2** close when subject to increasing pressure. Contacts **1** and **3** close when subject to falling pressure. With the NO contact, the NC contact is omitted.

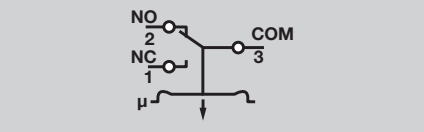


DL 1,5A

- ▷ The connection depends on the positive or negative adjusting range.



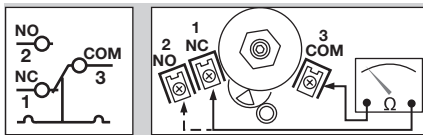
- ▷ Negative adjusting range 0 to -0.5 mbar: contacts 3 and 1 close when subject to increasing negative pressure. Contacts 2 and 3 close when subject to falling negative pressure.



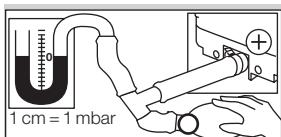
Adjustment

▷ The switching point is adjustable via hand wheel.

- 1** Disconnect the system from the electrical power supply.
- 2** Detach the housing cover, see page 7 (Technical data).
- 3** Connect an ohmmeter.



- 4** Set the switching point using the hand wheel.
- 5** Connect a pressure gauge.



- 6** Apply pressure. In doing so, monitor the switching point on the ohmmeter and the pressure gauge.

▷ Max. inlet pressure = withstand pressure

Type	Adjusting range* mbar		Max. inlet pressure mbar	Switching differential** mbar	
	min.	max.		min.	max.
DL 1,5A	-0.5	1.5	50	0.1	0.16
DL 3A, ..3K	0.2	3	50	0.1	0.16
DL 3AT, ..3KT	0.3	3	150	0.1	0.16
DL 5A, ..5K	0.4	6	300	0.2	0.3
DL 5AT, ..5KT	0.5	5	300	0.2	0.3
DL 10A, ..10K, ..10AT, ..10KT	1	10	300	0.25	0.4
DL 30A, ..30K	2.5	30	300	0.35	0.9
DL 50A, ..50K, ..50AT, ..50KT	2.5	50	300	0.8	1.5
DL 150A, ..150K	30	150	300	3	5

Type	Adjusting range* "WC		Max. inlet pressure "WC	Switching differential** "WC	
	min.	max.		min.	max.
DL 3AT, ..3KT	0.12	1.2	58.5	0.04	0.06
DL 5AT, ..5KT	0.2	2	117	0.08	0.12
DL 10AT, ..10KT	0.4	4	117	0.1	0.16
DL 50AT, ..50KT	1	20	117	0.3	0.6

* Adjusting tolerance $\pm 15\%$ of the scale value, but min. ± 4 Pa

** Mean switching differential at min. and max. setting

▷ Deviation from the switching point during testing pursuant to EN 1854:

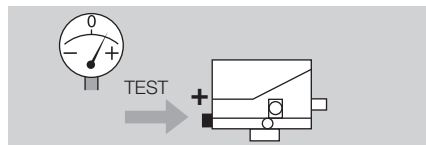
Air pressure switches:

	Deviation
DL 5–150A, DL 5–150K	$\pm 15\%$
DL 1,5A	$\pm 15\%$ or ± 6 Pa
DL 3A, DL 3K	$\pm 15\%$ or ± 6 Pa

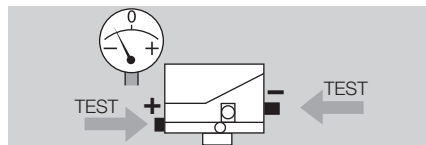
▷ If the DL does not trip at the desired switching point, correct the adjusting range using the hand wheel. Relieve the pressure and repeat the process.

Function check

- ▷ We recommend a function check once a year.
- ▷ Press the test key during operation – the pressure switch switches.



▷ In case of differential pressure, press both keys simultaneously.

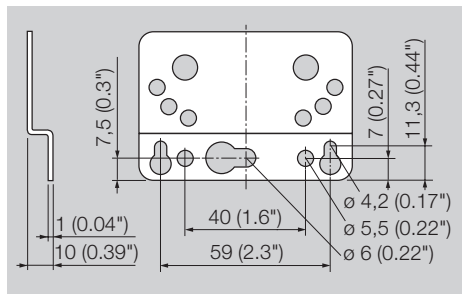


Accessories

Z-angle bracket

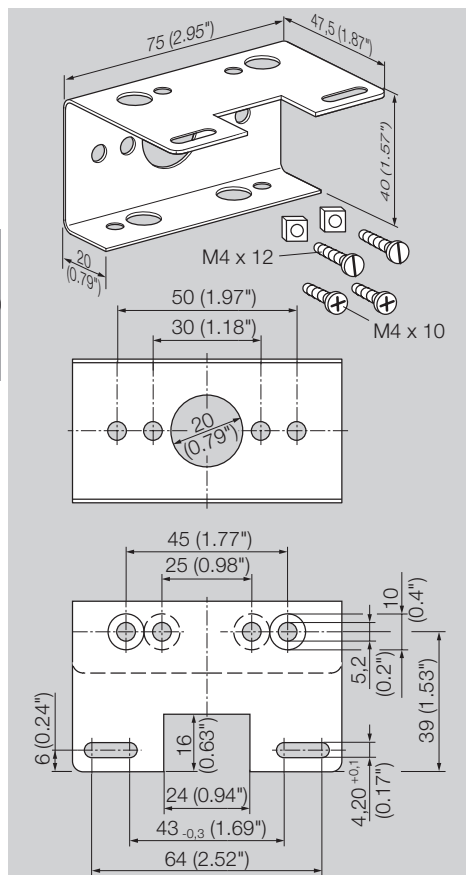
DL 5–150K: Order No.: 74916158

DL 3–150A, DL 3K: Order No.: 74913661



U-angle bracket

DL 1,5–150A, DL 3–150K: Order No.: 74916185



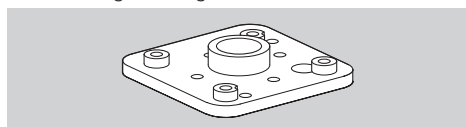
Standard coupler plug



Order No.: 74916159

Motor flange adapter

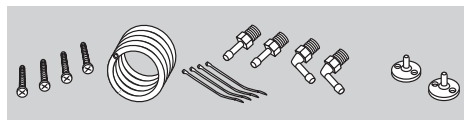
Set including retaining screws



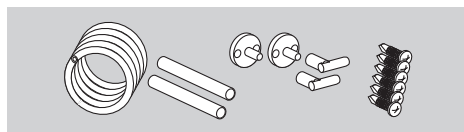
DL..A, DL 3–5K: Order No.: 74916157,
DL 5–150K: Order No.: 74916156.

Tube set

To be used with air only.



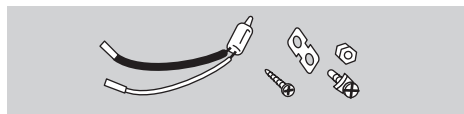
Order No.: 74912952



Order No.: 74919272

Pilot lamp set, red or blue

DL..T, DL..N



Pilot lamp, red:

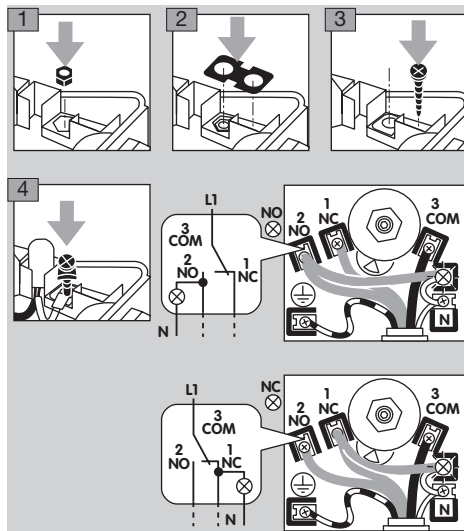
110/120 V AC, I = 1.2 mA, Order No.: 74920430;

220/250 V AC, I = 0.6 mA, Order No.: 74920429.

Pilot lamp, blue:

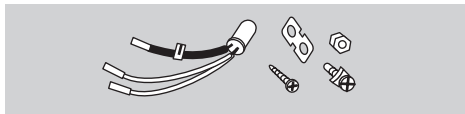
110/120 V AC, I = 1.2 mA, Order No.: 74916121;

220/250 V AC, I = 0.6 mA, Order No.: 74916122.

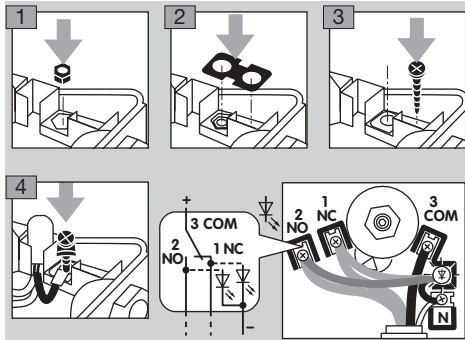


LED set, red/green

DL..K2, DL..T2



24 V DC, $I = 16 \text{ mA}$; 24 V AC, $I = 8 \text{ mA}$,
Order No.: 74921089;
230 V AC, $I = 0.6 \text{ mA}$, Order No.: 74923275.

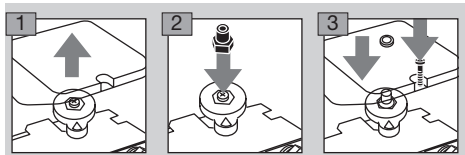


External adjustment

In order to set the switching pressure from the outside, the cover for external adjustment (6 mm Allen key) for DL..A, DL 5–150K can be retrofitted.



Order No.: 74916155



Technical data

Gas type: air or flue gas, no flammable gases, no aggressive gases.

Max. inlet pressure = withstand pressure: see type label or page 5 (Adjustment).

Micro switch to EN 61058-1.

Switching capacity:

DL..: 24 V (min. 0.05 A) to 250 V AC

(max. 5 A, at $\cos \phi 0.6 = 1 \text{ A}$),

max. 6 A, temporarily ($< 1 \text{ s}$) 20 A.

DL..G: 5 V (min. 0.01 A) to 250 V AC

(max. 5 A, at $\cos \phi 0.6 = 1 \text{ A}$),

5 V (min. 0.01 A) to 48 V DC (max. 1 A),

DL..T: 30 – 240 V AC, 50/60 Hz,

5 A resistive or

0.5 A inductive ($\cos \phi = 0.6$),

DL..TG: $< 30 \text{ V AC/DC}$,

0.1 A resistive or

0.05 A inductive ($\cos \phi = 0.6$).

Contact gap $< 3 \text{ mm}$ (μ).

Safety class II to VDE 0106-1.

Max. medium and ambient temperatures:

DL: -20 to $+80^\circ\text{C}$ (-4 to $+176^\circ\text{F}$),

DL..T: -40 to $+60^\circ\text{C}$ (-40 to $+140^\circ\text{F}$).

Long-term use in the upper ambient temperature range accelerates the ageing of the elastomer materials and reduces the service life (please contact manufacturer).

Storage temperature:

-20 to $+40^\circ\text{C}$ (-4 to $+104^\circ\text{F}$).

Diaphragm pressure switch, NBR, silicone-free.

Housing: glass fibre reinforced PBT plastic with low gas release.

Enclosure to IEC 60529: IP 54, IP 65.

Line entrance: M16 x 1.5 (1/2" NPT conduit),
clamping range: diameters of 4 to 10 mm.

Type of connection: screw terminals.

Weight: DL..A: 190 g (6.7 oz), DL..K: 220 g (7.8 oz).

Designed lifetime

This information on the designed lifetime is based on using the product in accordance with these operating instructions. Once the designed lifetime has been reached, safety-relevant products must be replaced. Designed lifetime (based on date of manufacture) in accordance with EN 13611, EN 1854 for pressure switches: 10 years.

You can find further explanations in the applicable rules and regulations and on the afecor website (www.afecor.org).

This procedure applies to heating systems. For thermoprocessing equipment, observe local regulations.

Logistics

Transport

Protect the unit from external forces (blows, shocks, vibration). On receipt of the product, check that the delivery is complete, see page 2 (Part designations). Report any transport damage immediately.

Storage

Store the product in a dry and clean place.
Storage temperature: see page 7 (Technical data).
Storage time: 6 months before using for the first time. If stored for longer than this, the overall service life will be reduced by the corresponding amount of extra storage time.

Packaging

The packaging material is to be disposed of in accordance with local regulations.

Disposal

Components are to be disposed of separately in accordance with local regulations.

Certification

Declaration of conformity



We, the manufacturer, hereby declare that the product DL, marked with product ID No. CE-0085AP0466, complies with the requirements of the listed Directives.

- 2009/142/EC
- 2006/95/EC

The relevant product corresponds to the type tested by the notified body 0085.

The production is subject to the surveillance procedure pursuant to Directive 2009/142/EC Annex II paragraph 3 and pursuant to DIN EN ISO 9001:2008. Elster GmbH

Scan of the Declaration of conformity (D, GB) – see www.docuthek.com

Contact

If you have any technical questions, please contact your local branch office/agent. The addresses are available on the Internet or from Elster GmbH.

We reserve the right to make technical modifications in the interests of progress.

FM approval



Factory Mutual Research Class: 3510 Flow and pressure safety switches.
Designed for applications pursuant to NFPA 85 and NFPA 86.

UL approval



UL 353 Limit control

AGA approval

Australian Gas Association, Approval No.: 5484



Eurasian Customs Union



The product DL meets the technical specifications of the Eurasian Customs Union.

RoHS compliant



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krom/
schroder

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