



SINCE 1893



CONTROLS & SOLUTIONS

PRESSURE TECHNOLOGY

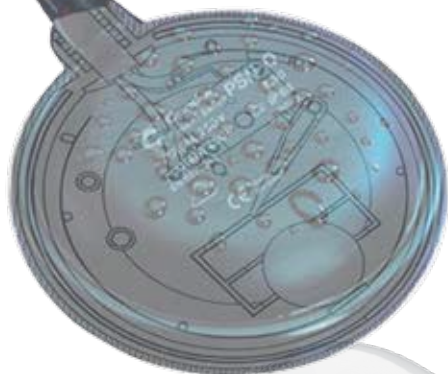
WATER TECHNOLOGY



www.condor-cpc.com

CONDOR - GUARANTOR

FOR TOP QUALITY



Over 120 years Condor

Enthusiasm and competence over four generations



The best of inspiration, innovation and craftsmanship

The company Condor was founded by August Frede in 1893, and first after its founding, it dealt with centrifuges, milking machines and also later pumps. With the issue of the world's first patent for a membrane pressure control for the automatic control of pumps in 1935, the era of Condor switching devices began.

Also the brand name MDR dates back to this time.

As the years continued, the product portfolio expanded constantly. Alongside motor protection relays and float switches, CPC offers through their own switch design and also customer-specified switching solutions of all types, for example pump and compressor controls, motor start-up controls or customer-specified special solutions.

As the "inventors of the pressure switch", all employees feel committed to the long and successful tradition of the company. Without a continuous, innovative and qualitative further development of our products, this persistently successful track record would not have been imaginable.

Condor itself was already certified according DIN ISO 9003 in 1993 and according to DIN ISO 9001 in 1995. This likewise has applied for CPC since its founding as an independent limited company. The basis for all of our handling and thoughts are these high demands for quality, which are to be optimized daily.

As customers of ours, you can consult our excellently qualified employees at any time. It does not matter whether your concerns are of a technical or commercial nature.

A symbol for quality since 1893.





Condor - our strengths

Competence · Efficiency · Reliability · Flexibility



Competent

Industrial pressure technology from 0.9 bar up to 250 bar

Condor has both in terms of price and technology the most suitable pressure switch:

- OEM or high-end product
- Standard product or customer-specified solution

Value for money

Pressure technology at its highest level

The concentration on pressure switches as components has led to an extraordinary efficiency and a perfect value-for-money ratio.

Reliability

Predictable delivery times and consistently meeting scheduling requirements

For short delivery times and binding delivery schedules, also for special designs, Condor is your predictable partner.

Condor reduces as a result your storage needs and increases your productivity.

Flexible

Solutions for your individual requirements

We solve your problems in industrial pressure technology quickly and cost-consciously, not only for mass-produced series, but also for small and mid-sized quantities.

Whether you need technical support, quick service help or rush orders, flexibility at Condor is an advantage for you.



Condor Certificates and approvals



Certified according to ISO 9001 : 2008

Condor is certified in ISO 9001 : 2008 and works together with various accredited laboratories.

As of August 5, 2014 Condor Pressure Control has reached the status of an AEO-C (Authorized Economic Operator) with the certificate no. DE AEOC 119710 for simplified customs processes.

You will find the certificate itself as a PDF-file in our Download Center - www.condor-cpc.com.

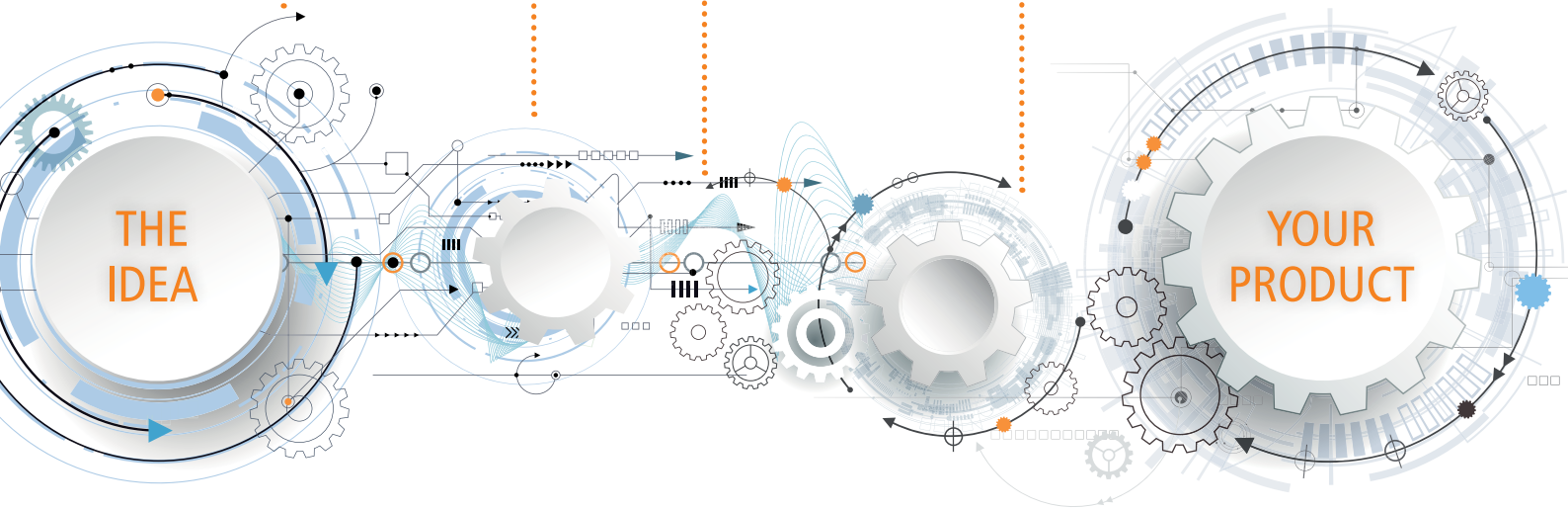




The **Condor** Solution system

From the idea to the finished product

IDEA..... specification design implementation & tests production & logistics PRODUCT



OUR SERVICE

Process support and system adjustments for efficient production and long-term availability

Finding the solution for your problems is our top priority

Our team can advise competently about all possibilities for a solution for your existing problems as well as delivery dates, times and prices. Simply contact us. We support you purposefully and professionally with realization

of your project according to your requirements. Individual solutions for the field electronic controls are a further component in our service programme.



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Operating under the slogan, CONTROLS & SOLUTIONS ...

customers can get everything from a single source – from switching devices to system solutions – completely tailored to their needs. Already during the development of new product range and variations, prototypes are subjected to early intensive, mechanical and electric lifetime tests on our own testing stations. Even during the product life cycle, all of our products are continuously tested to ensure that your performance requirements are being met.

Many of the needed parts are produced in our own production and, therefore, are subject to our quality monitoring all the way through the whole supply chain.

Design changes and optimization of the needed tools can be quickly and efficiently realized in our own tool-making department. Furthermore, we only work together with long-standing and sought-after suppliers.

A certification is for us the most fundamental requirement in the selection of suppliers.



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Our team can advise competently about all possibilities for a solution for your existing problems as well as delivery dates, times and prices. Simply contact us.

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Condor

Industries and applications



Your individual wishes

You will benefit from our long-standing experience in various industries, which is also reflected in our products. Therefore, we are the right partner for your individual wishes.

With our long-term know how of below-mentioned example fields of application, we will gladly find the optimal solution also for you and your special application area.



Compressors

- In the field of pressure controls and switches, Condor offers the complete assortment and has been number 1 in Germany as well as in Europe for a long time. The tried and tested MDR series as well as the electronic pressure controls represent reliability and competence.
- The high quality of pressure controls is continuously confirmed in extensive tests, for example lifetime and vibration tests.
- For use with direct, alternating and rotary current application up to 15 kW.
- For a coordinated cooperation between several compressors, Condor offers standardized compressor controls and as well as customer-specified special solutions.
- Continuous further development and even newer customer-specified solutions help you in the completion of new projects.
- Switches possess various approvals, for example VDE, VDS, ATEX, GL, KEMA, CSA or UL.



Condor products

- individual and versatile

Industries



Water management / pumps level control

- For the field of water technology, Condor is the problem solver. We point out possible solutions and build customer-specified complete solutions for you and in line with your demands.
- Electronic level control as well as electronic pump controls (in connection with float switches for pumps) guarantee the highest possible degree of certainty in monitoring fill levels or in filling up and pumping dry.
- Along with electronic devices, we offer a wide range of electro-mechanical pressure switches with the most various choice of membranes, connector materials and higher IP protection types.
- With our pump controls, we can offer you standardized devices for the field of wastewater management, for example in wastewater pump systems, ducts and pumping stations.
- Controls possess various approvals, for example VDE, VDS, ATEX, GL, KEMA, CSA or UL



Motor technology

Our entire motor-protection switch programme for use in all industrial areas becomes a successful complete range through its versatile accessories.

Beyond that, we are able to offer customer-specified motor start-up controls by using our own internal control system design.



Fire protection extinguishing systems

- VdS pressure controls are designed primarily for use in stationary water-based extinguishing systems.
- The high quality of pressure switches is constantly proven through demanding tests, for example salt-spray corrosion tests or water hammer tests.
- Pressure switches have been approved by VdS Schadenverhütung GmbH under the approval numbers G4090032 and G4090008. Following pressure ranges can be used: 0.35-1 bar, 0.7-10 bar, 1 – 12.5 bar and 1.0 – 16 bar.
- As VdS recognized production sites, we are able to manufacture a variety of possible customer-specified variations, for example with a reset function, with plastic flanges or with Viton membranes.
- Upon request, customer-specific circuit boards with specified wiring and LED displays in an integrated design are available and realizable.



Industries



Shipbuilding / offshore

- GL pressure controls, with a pressure range up to 250 bar, have been approved by Germanischer Lloyd, one of the largest classification societies, under the approval number 86884-10 HH.
- All GL pressure switches can be equipped with a reset function in order to ensure the realization of maintenance work.
- Monitoring pressure of fluids and gases in pipelines, boilers, pressure tanks and devices. In addition for automatic operation of compressor and pump motors, for example for water supply, with addition pumps, fireextinguishing systems and air pressure systems.
- The high quality of pressure switches is constantly proven through demanding tests, for example salt-spray corrosion tests or vibration tests.
- High long-term stability under extreme climates and temperature changes.
- For use with direct, alternating and rotary current application up to 15 kW.



Mining / chemistry

- As ATEX recognized production sites, we are able to manufacture a variety of possible customer-specified variations, for example with a reset function, with impact-resistant zinc or aluminium covers or with blue M20 cable glands.
- ATEX pressure controls, with a pressure range up to 250 bar, have been approved by TÜV Nord under the approval number TÜV 11 ATEX 079696. Control switches in the explosion protection type are used.



I M2 Ex ia I Mb Mining
(firedamp-susceptible mines)



II 2G Ex ia IIA, IIB, IIC T6 Gb Industry
(explosive gas atmospheres)



II 2D Ex ia IIC T85°C Db Industry
(explosive dust atmospheres, except mines)

- Monitoring pressure of fluids and gases in pipelines, boilers, pressure tanks and devices, as well as level control over fluids and gases explosive areas.
- The high quality of pressure switches is constantly proven through demanding tests.
- With our switches, reliable devices are also available for use in vacuum applications for explosive areas.
- With ceramic measuring cells, shielded cable and an especially developed stainless steel casings, Condor offers high-precision fill-level probes with ATEX approval for the most diverse applications, for example wastewater.



Railway technology / vehicles

- For applications in the field of railway technology, Condor offers special pressure switches in customer-specified variations.
- Monitoring pressure of fluids and gases in pipelines, boilers, pressure tanks and devices. In addition, in process controls, cooling and pressure technology as well as hydraulic applications.
- The high quality of pressure switches is constantly proven through demanding tests, for example salt-spray corrosion tests, vibration and shock or low temperature tests.
- High long-term stability under extreme climates and temperature changes.
- For use with direct, alternating and rotary current application up to 15 kW.
- The right choice of material for good fire protection.
- Connection available via electric, heavy-duty connector, for example via a rectangular industrial connector according to DIN EN 175301 (DIN 43650) or via a bayonet connector according to ISO 15170-1 (DIN 72585-1).

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High performance pressure switches for AC currents

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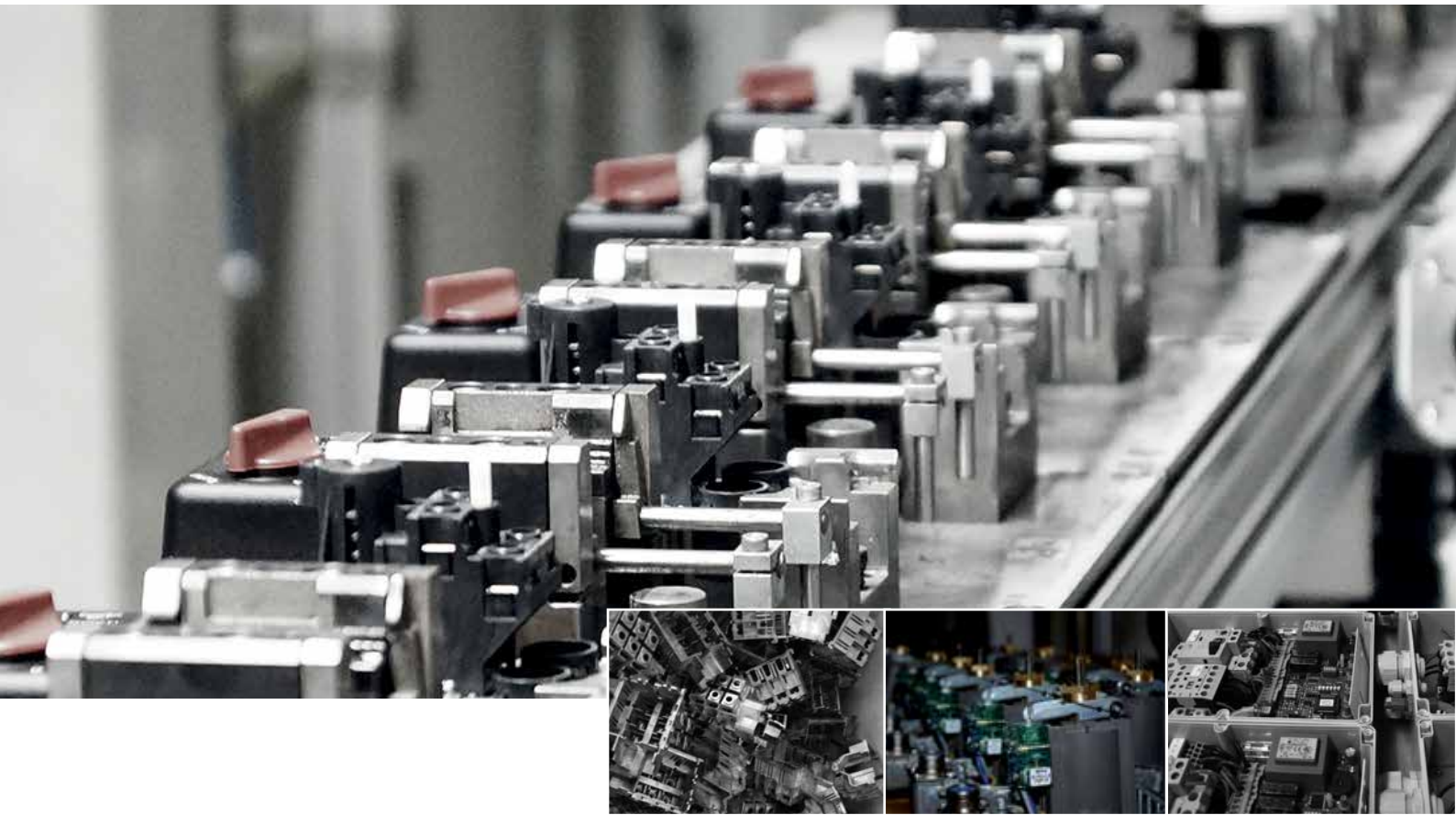
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Pressure switch setting references

Pressure switches

Pressure switches are typically used to maintain pressure in a tank (or similar closed system) between a pre-set upper and lower pressure value. In a "standard action" or Normally Closed (NC) pressure switch application, the upper pressure value at which a pressure switch breaks an electric circuit is called the cut-out pressure. The lower pressure value by which the pressure switch makes an electric circuit is called the cut-in pressure. Both cut-out and cut-in pressures within a given range can be adjusted on the pressure switch. In a "reverse action" or Normally Open (NO) pressure switch application, the upper setting point makes an electric circuit and the lower setting point breaks the electric circuit. The pressure switch related difference between cut-in and cut-out pressures is called "hysteresis". Every pressure switch allows the natural differential or hysteresis to be increased by a differential adjustment screw. An easy two-point control with a pressure switch is thus feasible.

Control pressure switches

Control pressure switches represent a special group within pressure switches. These devices are especially suitable for monitoring and controlling purposes. Depending on the model, SPDT's with or without gold flashed contacts, for example, for PLC applications or isolated NO and NC contacts are available. Depending on the pressure switch type, loads with a max. power consumption of 1.1 kW can be started directly.

Unloader valves- (EV) and delayed unloader valves (AEV)

Air compressor applications particularly reciprocating compressors, often use what is called an unloader valve. The function of the unloader valve is to remove the pressure from the piston of a compressor so that when it re-starts it can move freely and prevent the motor from stalling. The delayed unloader valve, on the other hand, additionally assists the motor when starting in that it remains open until a certain pressure (approx. 2 bars) is reached, thus giving the motor additional time to reach its full speed and torque.

The Installation instructions for our unloader valves, containing all the technical data and variations, are available for download on our homepage.

Pressure switch settings

Please make sure all power is disconnected before attempting to adjust pressure settings! When calibrating the pressure switch it will be necessary to apply pressure to the device. Use a calibrated pressure gage to adjust the switches set points.

When the main pressure spring is adjusted, the cut-in and cut-out value of all pressure switches change proportionally. In other words, the differential pressure remains the same. If the range between cut-in and cut-out value is to be increased, the differential pressure screw must be used.

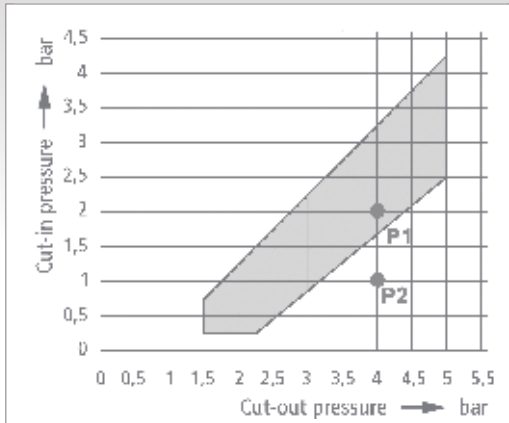
When carrying out a differential pressure adjustment on the pressure switch types MDR 1, MDR 11, MDR 2 and MDR 21 the cut-out pressure value changes and the cut-in pressure value remains constant. For all other pressure switch types the cut-in pressure value changes and the cut-out pressure value remains constant.

In the pressure diagram, each pair of cut-in and cut-values are represented by a point. If the point is within the shaded area of the diagram, then these pair of values can be set on the pressure switch. If the point is outside the shaded area, then these pair of values cannot be set on the pressure switch.

On **YouTube** you will find instructions for pressure adjustment as well as other information videos - QR-Code.



Example of a pressure setting using the MDR 5 pressure diagram



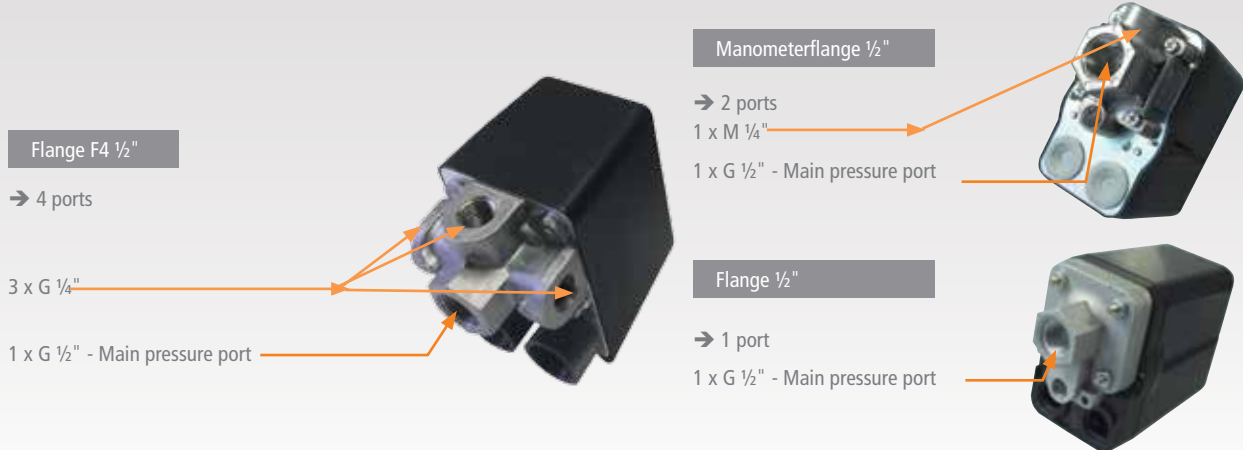
The coordinates of a cut-out pressure of 4 bar and a cut-in pressure of 2 bar intersect at a point P1 which lies within the shaded pressure range (pressure diagram of the respective pressure switch).

These two values can be adjusted on the pressure switch MDR 5/5. The coordinates of a cut-out pressure of 4 bar and a cut-in pressure of 1 bar intersect at a point P2 which lies outside the shaded pressure range of the diagram. Accordingly, this pair of pressure values cannot be adjusted on the pressure switch MDR 5/5.

Flange versions

Many pressure switches are available with different flanges. The (first) dimension refers always to the main pressure port. All other ports are always 1/4" ports.

The name F4 1/2" means that there is a flange with 4 ports, in which the main pressure port is 1/2" female and the remaining 3 ports are 1/4" female. The example illustrates this fact:



Repeatability

The permissible tolerance of the switching values (repeatability) is < 3% less than the upper range value.

Service

Our service offers you the possibility of carrying out pressure settings depending on your requirements.

Of course, we can also mount any accessories you may need on demand, profiting at the same time from a complete warranty.

High performance pressure switches for AC currents

Overview



Type designation	MDR 1	MDR 1	MDR 11	MDR 11	MDR 2	MDR 21
Media *1	air	water	air	water	air / water	air / water
No. of poles	2 pole	2 pole	2 pole	2 pole	2 pole	2 pole
Contact function	2 N.C.	2 N.C.	2 N.C.	2 N.C.	2 N.C.	2 N.C.
Voltage	230 V	230 V	230 V	230 V	230 V	230 V
Motor switching capacity	4,0 kW	4,0 kW	4,0 kW	4,0 kW	2,2 kW	2,2 kW
Rated current	20 A	20 A	20 A	20 A	16 A	24 A
Flange types *2	G 1/4" F4 1/4" F4 3/8" F4 1/4" NPT Innerthread (Die-cast aluminium)	G 1/4" steel G 1/4" steel Ü	G 1/4" F4 1/4" F4 3/8" F4 1/4" NPT Innerthread (Die-cast aluminium)	G 1/4" steel G 1/4" steel Ü	G 1/4" F4 1/4" F4 3/8" F4 1/2" Innerthread (Die-cast aluminium)	G 1/4" F4 1/4" F4 3/8" F4 1/2" NPT
Pressure ranges (bar) Cut-out pressure from - to	1 2,5 - 11	1 2,5 - 6	1 2,5 - 11	1 2,5 - 6	2 1,5 - 12	2 1,5 - 12
Degree of Protection	IP 44	IP 44	IP 41/44	IP 41/44	IP 44	IP 41/44
Permissible media temperature: Air	-5...80 °C		-5...80 °C		-5...80 °C	-5...80 °C
Permissible media temperature: Water		70 °C		70 °C		
Max. cross-section (fine stranded)	2,5 mm ²	2,5 mm ²	2,5 mm ²	2,5 mm ² *	2,5 mm ²	2,5 mm ²
Standard Cable glands	with PG 11 Z/ZK	with PG 11 Z/ZK	with PG 13,5 Z/ZK	with PG 13,5 Z/ZK	with 2 x WN *4 (Accessory PG11 – 13,5)	with 2 x WN *4 (Accessory PG11 – 13,5)
Standard On / Off lever	with/without EA	with/without EA	with EA	with EA	with/without EA	with/without EA
Standard Differential setting	with differential setting	with differential setting	with differential setting	with differential setting	with differential setting	with differential setting
Standard Delayed (AEV) Unloader valve (EV)	with AEV (Accessory EV)	without	with AEV (Accessory EV)	without	without (Accessory EV, AEV)	without (Accessory EV, AEV)
Type designation	KEMA	KEMA	CSA / UL / KEMA	CSA / UL / KEMA	KEMA	CSA / UL / KEMA

* Table refers to catalogue product

*1 Preferred / most used media, further media, see table on page 22 or on demand

*2 e.g. four-way flange F4 3/8" (main connection G3/8", additionally 3 x G 1/4" ports)

*3 Ü = switch need not be turned, use swivel nut for mounting

*4 WN = grommet

Overview



Type designation	MDR 3	MDR 4	MDR 4 SD	MDR 4 SU	MDR 5
Media ^{*1}	Air and water	Air and water	Air and water	Air and water	Air and water
No. of poles	3 pole	3 pole	3 pole	3 pole	3 pole
Contact function	3 NC	3 NC	3 NC	3 NO	3 NC
Voltage ^{*3}	400 V	400 V	400 V	400 V	400 V
Motor switching capacity	7,5 kW (11 kW ^{*6})	5,5 kW	5,5 kW	4 kW	5,5 kW
Rated current	24 A	20 A	20 A	16 A	16 A
Flange types ^{*2}	G 1/2" G 1/4" F4 1/2" F4 3/8" F4 1/4" F4 1/4" NPT Innerthread - Die-cast aluminium	G 1/2" G 1/4" G 1/2" + G 1/4" F4 1/2" F4 3/8" F4 1/4" Innerthread - Die-cast aluminium	G 1/2" G 1/4" Innerthread - Die-cast aluminium	G 1/2" Innerthread - Die-cast aluminium	G 1/2" G 1/2" + G 1/4" Innerthread - Die-cast aluminium - Stainless steel - brass
Pressure ranges (bar)	5	3	2	3	5
Cut-out pressure from - to	1,3 - 35	1,5 - 16	1,5 - 11	1,5 - 16	1,5 - 45
Degree of protection	IP 54	IP 44	IP 44	IP 44	IP 54 / IP 65 ^{*5}
Permissible media temperature: Air	-5...80 °C	-5...80 °C	-5...80 °C	-5...80 °C	-5...80 °C
Permissible media temperature: Water	80 °C	80 °C	80 °C	80 °C	80 °C
max. cross-section (fine stranded)	4,0 mm ²	2,5 mm ²	2,5 mm ²	2,5 mm ²	2,5 mm ²
Standard Cable glands	with 2 x WN ^{*4} (Accessory PG11 - 16)	with 2 x WN ^{*4} (Accessory PG11 - 13,5)	with 2 x WN ^{*4} (Accessory PG11 - 13,5)	with 2 x WN ^{*4} (Accessory PG11 - 13,5)	without (Accessory M 20)
Standard On / Off lever	with/without EA	with/without EA	without EA	without EA	with/without EA
Standard Differential setting	with differential setting with	with differential setting	with differential setting	with differential setting	with differential setting
Type designation	CSA / UL / KEMA	KEMA			KEMA
Standard delayed (AEV) – unloader valve (EV)	without (Accessory EV, AEV)	without (Accessory EV, AEV)	without (Accessory EV, AEV)	without (Accessory EV, AEV)	without (Accessory EV, AEV)

* Table refers to catalogue product

^{*1} Preferred / most used media, further media, see table on page 22 or on demand

^{*2} e.g. four-way flange F4 3/8" (main connection G3/8", additionally 3 x G 1/4" ports)

^{*3} Higher voltages on demand

^{*4} WN = grommets

^{*5} Special execution without on / off switch

^{*6} 11 kW on request

Overview



Type designation	MDR F..H Die-cast aluminum	MDR-F..Y Plastic	MDR-F..HE Stainless steel	MDR-F..HH High pressure	MDR-F.. Reset function
Contact function	1 SPDT*1	1 SPDT*1	1 SPDT*1	1 SPDT*1	1 SPDT*1
Voltage	230 V	230 V	230 V	230 V	230 V
Motor switching capacity	0,55 kW	0,55 kW	0,55 kW	0,55 kW	0,55 kW
Current AC 15	4 A	4 A	4 A	4 A	4 A
Flange types Standard (bold)	G 3/8" G 1/2" G 1/4" 1/4" NPT Inner thread (Die-cast aluminum)	G 3/8" Inner thread (plastic)	G 1/4" Inner thread (Stainless steel)	G 3/8" Inner thread (Stainless steel + throttle)	Flanges on demand
Pressure ranges (bar) Cut-out pressure from - to	6 0,11 - 32	5 0,11 - 16	2 1 - 30	3 8 - 250	Pressure ranges on demand
Degree of Protection	IP 54 / IP 65	IP 54 / IP 65	IP 54 / IP 65	IP 54 / IP 65	IP 54 / IP 65
Cable glands	WN / M 20	WN / M 20	WN / M 20	WN / M 20	WN / M 20
Permissible media temperature *2	- 25 .. + 70 °C	- 20 .. + 50 °C	200 °C	70 °C	according to selection
Type designation	VdS to 16 bar UL/GL Atex	VdS to 10 bar GL to 12,5 bar Atex	- - Atex	UL / GL Atex	- GL on request Atex on request

*1 = SPDT with gold-flashed contacts / 2 SPDT / NC + NO for special applications - on request

*2 = Other diaphragms and further temperature ranges on request

Connection system



Industrial screw version
(standard)



Industrial clamp version
(upon request)



Connector according to
ISO 15170-1 (DIN 72585-1)
-on request



Connector according to
DIN EN 175301 (DIN 43650)
-on request



Connector according to
M 12 x 1 DIN EN 61076
-on request

Overview



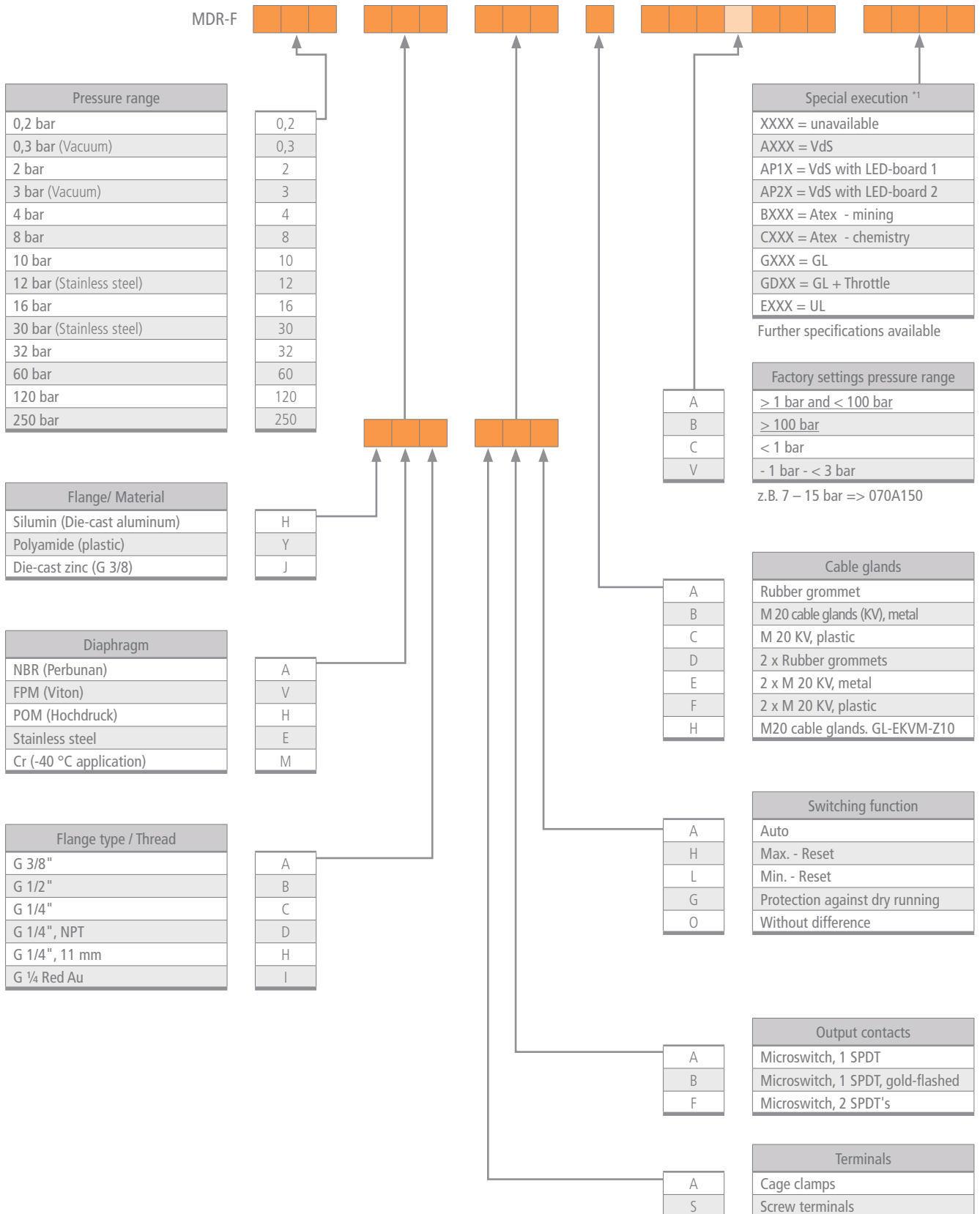
Type designation	MDR – F Vacuum	MDR - P	MDR - K	MDR 43	MDR 53
Contact function	1 SPDT ^{*1} / 2 SPDT's	1 SPDT ^{*1}	2 SPDT's	1 N:C: 1 N.O.	1 SPDT
Voltage	230 V	230 V	230 V	230 V	230 V
Motor switching capacity	0,55 kW	0,55 kW	0,55 kW	1,1 kW	0,55 kW
Current AC 15	4 A	4 A	4 A	8 A	4 A
Flange types Standard (bold)	G 1/4" Inner thread	G 1/4" Outer thread	G 1/4" Outer thread	G 1/2" G 1/4" Inner thread (Die-cast aluminium)	G 1/2" Inner thread (Die-cast aluminium)
Pressure ranges Cut-out pressure from ... to	2 - 0,7 - 3 bar	optional 0,3 - 16 bar	3 0,5 - 11 bar	4 0,5 - 16 bar	4 0,3 - 16 bar
Degree of Protection	IP 54 / IP 65	IP 65	IP 67	IP 44	IP 54
Cable glands	WN / M 20	Coupling	Coupling	optional	optional
Permissible media temperature ^{*2}	- 25 .. + 70 °C	- 25 .. + 70 °C	- 40 .. + 70 °C	- 30 .. + 80 °C	- 30 .. + 80 °C
Type designation	- - Atex				- - KEMA

^{*1} = SPDT with gold-flashed contacts for special applications on request

^{*2} = further temperature ranges on request

Type code for control pressure switch MDR-F

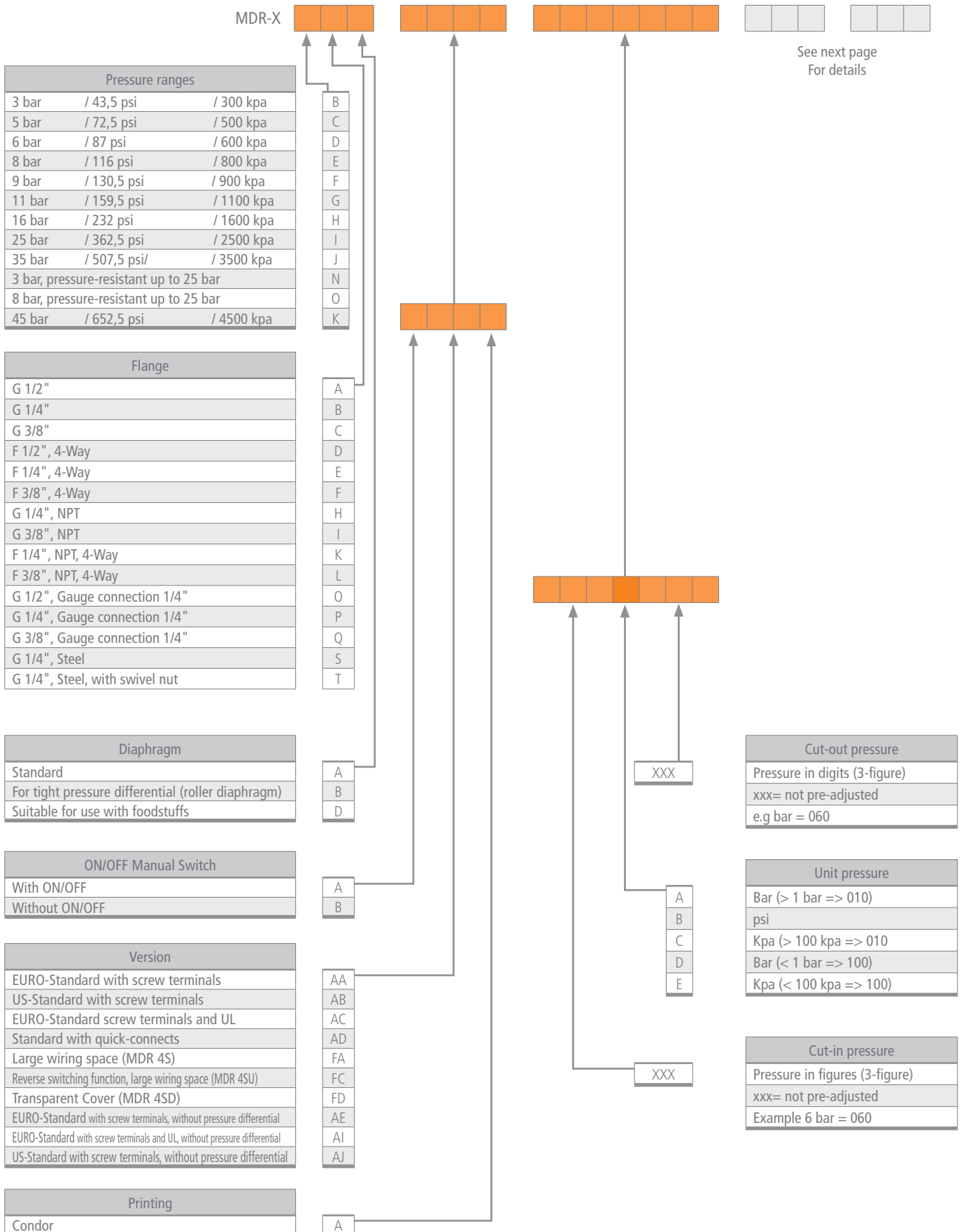
For decoding pressure switch types:
Standard settings, Accessories and Special Execution





Type code

For high performance pressure switches MDR 1 up to MDR 5 and control pressure switches MDR 43 and MDR 53 For decoding of pressure switch types: Standard settings



For high performance pressure switches MDR 1 up to MDR 5 and control pressure switches MDR 43 und MDR 53 For decoding of pressure switch types: Accessories

MDR-X



Valves
Without unloader valves
Unloader valves EV, screw fitting 6 mm
Unloader valves EV i, screw fitting 1/4"
Unloader valves EV S, quick-connect 6 mm
Unloader valves EV W, 90°, screw fitting 6 mm
Unloader valves EV Wi, 90°, screw fitting 1/4"
Unloader valves EV WS, 90°, quick-connect. 6 mm
Unloader valves EV M5, screw fitting 6 mm, port fitting M5
Unloader valves EVi M5, screw fitting 1/4", port fitting M5
Unloader valves EV WSi, 90°, quick-connect 1/4"
Unloader valves EV Ei, screw fitting 1/4"
Unloader valves EV H, screw fitting 6 mm
Unloader valves EV L, screw fitting 6 mm, port fitting 6 mm
Unloader valves EV Li, screw fitting 1/4", port fitting 6 mm
Unloader valves AEV, screw fitting 6 mm
Unloader valves AEV i, screw fitting 1/4"
Unloader valves AEV S, quick connect 6 mm
Unloader valves AEV W, 90°, screw fitting 6 mm
Unloader valves AEV Wi, 90°, screw fitting 1/4"
Unloader valves AEV WS90°, quick-connect 6 mm
Unloader valves AEV WSi, 90°, quick-connect 1/4"
Unloader valves EV E, screw fitting 6 mm for MDR 5, 6
Unloader valves EV 5, screw fitting 6 mm, port fitting 6 mm
Unloader valves EV Si, quick-connect 6 mm

Cable glands
Without cable glands
Cable grommets / blanking plug
PG 11 conduit
PG 11 complete
PG 11 Z with strain relief
PG 11 ZK with strain relief and cable support
PG 13.5 conduit
PG 13.5 complete
PG 13.5 Z with strain relief
PG 13.5 ZK with strain relief and cable support
PG 16 conduit
PG 16 complete
PG 16 Z with strain relief
PG 16 ZK with strain relief and cable support
PG 16/13,5 ZK with strain relief and cable support
PG 16/13,5 Z with strain relief
PG 16/11 complete

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D D
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J J
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L L
M M
N N
O O
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Special Accessories
Without special accessories
ST Mini Barb EV/AEV connector for plastic tubing
Terminal cover, VBG 4 MDR 2
Additional cable glands PG 9V MDR 3
Hourmeter kit 400 V / 50 Hz
Hourmeter kit 230 V / 50 Hz
Hourmeter kit / battery supplied
auxiliary switch
scale

Releases
Without release
Undervoltage release 230 V / 50 Hz
Undervoltage release 400 V / 50 Hz
Undervoltage release 480 V / 60 Hz
Undervoltage release 240 V / 60 Hz
Shunt release 24 V / 50 Hz
Shunt release 110 V / 50 Hz
Shunt release 230 V / 50 Hz
Undervoltage release 24 V / 50 Hz
Shunt release 400 V / 50 Hz
Undervoltage release 400 V / 50 Hz + phase monitoring board

Releases (Note: use off small/capital initial letters)
Without overload relay
Without contact block
Overload relay 0.63 – 1.0 A
Overload relay 1.0 – 1.6 A
Overload relay 1.6 – 2.5 A
Overload relay 2.5 – 4.0 A
Overload relay 4.0 – 6.3 A
Overload relay 6.3 – 10.0 A
Overload relay 10.0 – 16.0 A
Overload relay 16.0 – 20.0 A
Overload relay 20.0 – 24.0 A
Overload relay 20.0 – 30.0 A, 2 pole
Overload relay 10.0 – 16.0 A, for higher switching capacity
Overload relay 16.0 – 20.0 A, for higher switching capacity
Overload relay 20.0 – 24.0 A, for higher switching capacity
Overload relay 0,86 - 1,5 A
Overload relay 1,5 - 2,45 A
Overload relay 2,4 - 4,2 A
Overload relay 4,0 - 7,0 A
Overload relay 6,1 - 10,3 A
Overload relay 9,0 - 14,0 A
Overload relay 11,0 - 18,0 A
Overload relay 18,0 - 25,0 A, 2 pole

Overview of media resistance

Important NOTE

The combination of pressure connection and pressure transducer material is of fundamental importance in determining the media resistance. The following table shows the resistances of various media.

The data of a.m. table does not only result from laboratory tests but also from long-lasting experiences. These are reference points. As the chemical effect of a given media may be affected by additives, temperature differences and mixtures

amongst themselves, we recommend to carry out a media resistance test before using the product. Please pay special attention to the electrochemical corrosive effect in combination with other metals and existing and corrosive medium. The use must be in accordance with the appropriate standards.

The aforementioned details do not entitle for any legal claim. We definitely do neither take over any warranty nor liability.

Medium *	Diaphragm material / Membran								Pressure connection					
	CR	Stain- less steel	EPDM	FKM	NBR	NBR/ SBR	POM	TPE	Aluminium die-cast	Stainless steel	Stainless steel / brass	Brass	PA 66 +GF	Steel, galvanised
Aceton CH_3COCH_3 _{3Aceton}		1	1	X					1	1	1	1	1	
Acetylene $\text{HC} = \text{CH}$ Acetylen		1	1				1	1	1	1	1	1	1	1
Ammonia, liquid 100%		1		X						1			1	
Ammonia, 25 % (Salmiakgeist)	1	1							1	1			1	
Petrol (Benzin)	1	1	X	2	2		2	2	1	1	1	1	1	1
Benzene (Benzol)		1	X	2					1	1	1	1	1	
Butane (Butan) C_4H_{10} _{10Butan}	1	1	X	1	1		2	1	1	1	1	1	1	1
Butyl acetate (Butylacetat) $\text{CH}_3\text{COOC}_4\text{H}_9$ _{9Butylacetat}		1	X	X			2	2	2	1			1	
Butyl alcohol (Butylalkohol) $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-OH}$ Butylalkohol	1	1		2	2		2		1	1	1	1	1	
Chlorine (Chlor) Cl_2 Chlor		1	X	2						1				
Diesel		1	X	1	1	2	1		1	1			1	
Dimethylbenzene (Dimethylben- zol) $\text{C}_6\text{H}_4(\text{CH}_3)_2$ _{2Dimethylbenzol}		1	X	2					1	1				
Natural gas (Erdgas)	1	1	X	1	2		1		2	1			1	
Petroleum (Erdöl)	1	1	X	1			1		1	1			1	
Vinegar (Essig) 25 %		1	1				2		2	1				
Ethylene glycol (Ethylenglycol) $\text{CH}_2\text{OH-CH}_2\text{OH}$ _{Ethylenglycol}	1	1	1	1	1		1	1	2	1				
Ethyl acetate (Ethylacetat) $\text{CH}_3\text{COOC}_2\text{H}_5$ _{5Ethylacetat}		1	X				1	2	1	1				
Glycerol $\text{CH}_2\text{OH-CHOH-CH}_2\text{OH}$ _{Glycerol}	1	1		1	1		1							
Fuel oil (Heizöl)		1	X	1	1		1		1	1			1	
Urine (Harn /Urin)	1	1	1	1	1		1		2	1			1	
Carbone dioxide (Kohlendioxid) CO_2 _{2Kohlendioxid}	1	1	2	1	1		1	1		1			1	
Carbonic acid (Kohlensäure) H_2CO_3 _{3Kohlensäure}	1	1	2	1	1		1			1			2	
Cooling liquid (Kühlflüssigkeit)		1		1		2				1				
Air (Luft)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Methyl chloride (Methylchlorid) CH_3Cl		1	X				1			1				
Mineral oil (Mineralöle)	2	1	X	1	1	2	1	1	1	1			1	1
Ozone (Ozon)		1	1	1					2	1				

1 = resistant, 2 = limited resistance, x = not resistant, empty field = not tested

*) Made of corrosion-chemical point of view please note when installing the pressure switch (G-ALSi 12) on pipes, fittings or fittings material selection. The installation must be in accordance with the relevant standards - Flange.

Overview of media resistance

Medium*	Diaphragm material / Membran								Pressure connection					
	CR	Stain- less steel	EPDM	FKM	NBR	NBR/ SBR	POM	TPE	Aluminium die-cast	Stainless steel	Stainless steel / brass	Brass	PA 66 +GF	Steel, galvanised
Perchloroethylen $CCl_2=CCl_2$ <small>2Perchloroethylen</small> $CCl_2=CCl_2$		1	X							1				
Vegetable oil (Pflanzenöl)		1	X	1	1		2		1	1				
Phenolic acid (Phenolsäure) $C_6H_5(OH)$ <small>Phenolsäure</small> $C_6H_5(OH)$		1								1				
Propane (Propan) C_3H_8	1	1	X	1	1		1		1	1	1	1	1	
Oxygen (Sauerstoff) O		1	1	1			1		1	1	1	1	1	
Schielding gases (Schutzgase)		1								1				
Sulfur dioxide (Schwefeldioxid) SO_2		1	X	2						1				
Silicone oil (Silikonöl)	1	1	1	1	1		1		1	1	1	1	1	
Nitrogen (Stickstoff) N_2	1	1	1	1	1		1		1	1	1	1	1	
Synthetic oil (Synthetische Öle)		1		1	1	2	1		1	1			1	
Toulouene (Toluen /Phenylmet- han) $C_6H_5CH_3$		1	X						1	1	1	1	1	
Trichlorethene $CHCl=CCl_2$		1	X							1				
Water (Wasser) H_2O	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water Distilled, aired (Wasser Destilliert, entlüftet)	1	1	1	1	1		1	1	2	1			1	1
Hydrogem (Wasserstoff) H_2	1	1	1	1	1		1	1	1	1	1	1	2	
Water - Sea water (Wasser Meerwasser)	1	2	1	1	1		1	1	2	2			1	
Water - vapor (Wasserdampf)		1		1					1	1	2	2		

Pressure switches	Pressure connection	Diaphragm material / Membran							
	material	CR	Stain- less steel	EPDM	FKM	NBR	NBR / SBR	POM	TPE
MDR 1	Aluminium die-cast								X
MDR 11	Aluminium die-cast								X
MDR 1	Steel, galvanised								X
MDR 11	Steel, galvanised								X
MDR 2	Aluminium die-cast						X		
MDR 21	Aluminium die-cast						X		
MDR 3	Aluminium die-cast	X					X	X	
MDR 4	Aluminium die-cast						X		
MDR 43	Aluminium die-cast	X							
MDR 5	Aluminium die-cast			X			X		
MDR 5	Stainless steel / PA 66 + GF			X			X		
MDR 5	Brass / PA 66 + GF						X		
MDR 53	Aluminium die-cast	X							
MDR P	Brass	X			X	X			
MDR K	Aluminium die-cast					X			X
MDR F	Aluminium die-cast	X			X	X			
MDR F	PA 66 + GF	X			X	X			
MDR F (>32 bar)	Stainless steel / Brass							X	
MDR F	Stainless steel		X						X

1 = resistant, 2 = limited resistance, x = not resistant, empty field = not tested

*) Made of corrosion-chemical point of view please note when installing the pressure switch (G-AlSi 12) on pipes, fittings or fittings material selection. The installation must be in accordance with the relevant standards - Flange.



High performance pressure switches



MDR 1



MDR 11



MDR 2



MDR 21

High performance pressure switches for AC currents

Industries



MDR 1	AC current; switching capacity 4.0 kW Max. cut-out pressure 11 bar <i>Now with an operator hourmeter</i>	NEW!	P. 25	Compressors, pumps
MDR 11	AC current; switching capacity 4.0 kW Max. cut-out pressure 11 bar / 160 psi UL / CSA-approval optional		P. 28	Compressors, pumps
MDR 2	current; switching capacity 2.2 kW Max. cut-out pressure 12 bar <i>Now with an operator hourmeter</i>	NEW!	P. 31	Compressors, pumps
MDR 21	AC current; switching capacity 4.0 kW Max. cut-out pressure 12 bar / 175 psi UL / CSA-approval optional		P. 34	Compressors, pumps



MDR 3



MDR 4



MDR 5

High performance pressure switches for 3-phase currents

Industries



MDR 3	3-phase; switching capacity 7.5 (11) kW available with overload relays Max. cut-out pressure 35 bar UL / CSA-approval optional <i>Now with star/delta version</i>	NEW!	P. 37	Compressors, pumps
MDR 4	3-phase; switching capacity 4.0 / 5.5 kW Max. cut-out pressure 25 bar		P. 44	Compressors, pumps
MDR 5	3-phase; switching capacity 5.5 kW available with overload relays Max. cut-out pressure 45 bar	NEW!	P. 50	Compressors, pumps

Pressure switch MDR 1 / 6, Pump version



- Single phase
- Switching capacity 4.0 kW
- Max. cut-out pressure 6 bar
- Incl. s PG 11 Z/ZK
- 2-pole (N.C.)
- Steel flange
- Acc. to EN 60947
- Differential adjustment
- Flange = steel (Ü = with screw connection)



Steel flange ST-Ü

Order reference	Type code	ON / OFF Rotary knob	Pressure range P _{OFF} in bar	Flange	Weight (in g)	Part No.
MDR 1/6	MDR-1 DSD BAEA 017A030 XDE XXX	-	2,5 - 6	G 1/4" ST	220	212119
MDR 1/6	MDR-1 DTD BAEA 017A030 XDE XXX	-	2,5 - 6	G 1/4" ST-Ü	220	212126

Pressure switch MDR 1 / 11, Compressor version



- Single phase
- Switching capacity 4.0 kW
- Max. cut-out pressure 11 bar
- Incl. cable glands PG 11 Z/ZK and unloader valve AEV 1 S
- 2-pole (N.C.)
- Acc. to EN 60947
- Differential adjustment

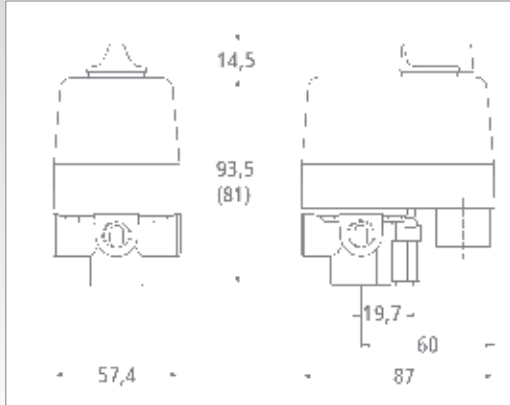
Order reference	Type code	ON / OFF Rotary knob	Pressure range P _{OFF} in bar	Flange	Weight (in g)	Part No.
MDR1/11-EA	MDR-1 GBA AAEA 060A080 QDE XXX	EA	2,5 - 11	G 1/4" Alu	220	212133
MDR1/11-EA	MDR-1 GEA AAEA 060A080 QDE XXX	EA	2,5 - 11	F4 1/4" Alu	220	212140
MDR1/11-EA	MDR-1 GFA AAEA 060A080 QDE XXX	EA	2,5 - 11	F4 3/8" Alu	220	212157
MDR1/11	MDR-1 GBA BAEA 060A080 QDE XXX	-	2,5 - 11	G 1/4" Alu	220	216049
MDR1/11	MDR-1 GEA BAEA 060A080 QDE XXX	-	2,5 - 11	F4 1/4" Alu	220	216025
MDR1/11	MDR-1 GFA BAEA 060A080 QDE XXX	-	2,5 - 11	F4 3/8" Alu	220	216063

Technical Data MDR 1	
Rated insulation voltage U _i	500 V
Motor switching capacity (AC 3) U _e =240 V (1~)	4,0 kW
Electrical life (AC 3) Cycles	> 1 x 10 ⁵
Mechanical life Cycles	> 5 x 10 ⁵
Max. electrical cycles Cycles/h	120
Max. mechanical cycles Cycles/h	600
Rated operational current I _e at 240 V AC	20 A
Bursting strength P _z	> 35 bar
Permissible medium temperature Air	- 5...+ 80 °C

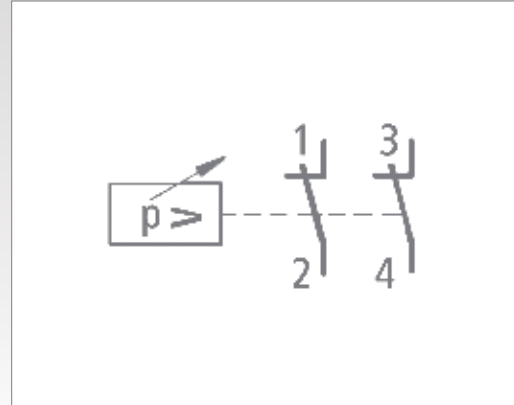
Technical Data MDR 1 acc. to 60947 UL/CSA	
Permissible medium temperature Water	+ 70 °C
Degree of Protection acc. to EN 60529	IP 44
Conductor cross-section 1 .. fine stranded cable 1 x / 2 x	2,5 / 2,5 mm ²
Conductor cross-section 1 rigid cable 1 x / 2 x	2,5 / 2,5 mm ²

Diaphragm media resistance MDR 1	
A detailed overview of diaphragm media resistance for all pressure switches can be found on page 22. Please read the information carefully.	

Dimensions / Circuit Diagrams MDR 1



Pressure switch MDR-1



Accessories MDR 1

Order reference	Description	Weight (in g)	Part No
	Unloader valves		
EV 15*	with quick-connect 6 mm for plastic unloader valves	25	226765
	Delayed unloader valves		
AEV 15*	with quick-connect 6 mm for plastic unloader valves	25	217541
	Cable glands		
WN	Grommet	6	200888
PG 11 G	Conduits for mounting of cable glands (inner thread)	6	255024
PG 11 Z		12	255031
PG 11 ZK	With strain relief and cable support	12	255048
	Cover		
H1 (Cover MDR 1)	Cover without On/Off lever (Neutral version, without marking)	40	230700
H1-EA (Cover MDR 1 + EA)	Cover with On/Off lever for manual On/Off (Neutral version, without marking)	40	227366
Cover MDR 1 + EA + lever	Conversion kit H1 to cover H1-EA	40	230717

*only for pneumatic tubes with outside tolerances according to e. g. Festo PAN 6x1mm

Unloader valves / Delayed unloader valves

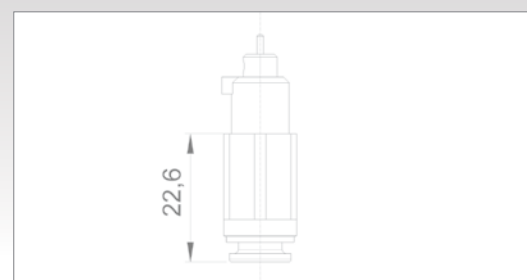
Dimensions unloader valves



EV 15



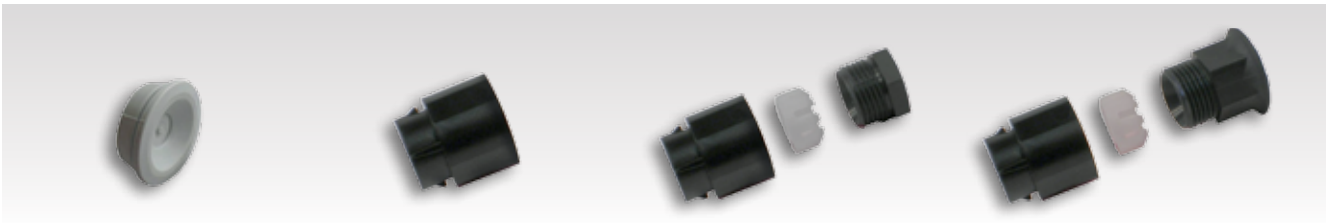
AEV 15



EV 15 / AEV 15

** Other valve types available on request!

Cable glands MDR 1



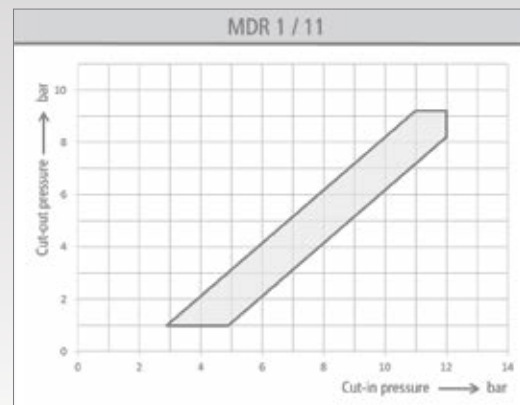
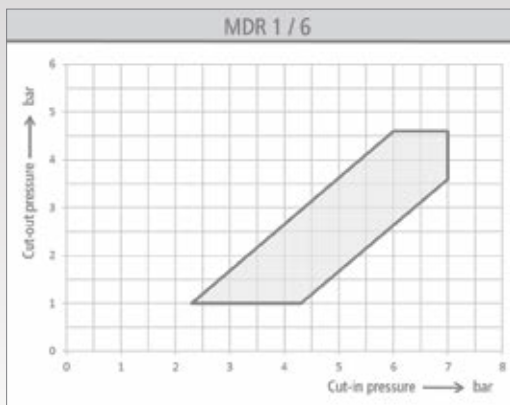
WN

PG 11 G

PG 11 Z

PG 11 ZK

Pressure Diagrams MDR 1



Explanation

Devices with differential pressure adjustment

An intersecting point is determined in the diagram by selecting a pair of cut-in and cut-out pressure values. If this point lies within the shaded area, this pair of values can be set on the pressure switch. If this point lies outside the shaded area, these values cannot be set.

Example: MDR 1/11 with differential pressure adjustment

With a preselected cut-in pressure of 4 bar, the cut-out pressure can be determined and set between 5.4 and 8 bar using the differential pressure adjustment.

Accessories Hourmeter kit MDR 1



Description

The MDR 1 can be equipped or retrofitted with an operating hourmeter to monitor the pump and compressor running time.

The hourmeter is available as a kit and can be attached to the cover in 4 different positions, each offset at an angle of 90°. This ensures optimum readability.

The kit consists of an operating hourmeter for either 230 V supplied and a perforated MDR 1 cover with or without ON/OFF lever.

Order reference	Description	Voltage	Packing (units)	Part No.
H1 - B 230	Hourmeter and Cover for MDR-1	230 V / 50 Hz	1	279297
H1-EA - B 230	Hourmeter and Cover for MDR-1+EA	230 V / 50 Hz	1	279303

can be used at 60 Hz with higher engine speed

Pressure switch MDR 11 / 6, Pump version



- Single phase
- Switching capacity 4.0 kW / 4 HP
- Max. cut-out pressure 6 bar / 87 psi
- Incl. cable glands PG13.5 Z/ZK
- 2-pole (N.C.)
- Steel flange
- Acc. to EN 60947
- UL / CSA-approval optional
- Differential adjustment
- Flange = steel (Ü = with screw connection)



Steel flange ST-Ü

Order reference	Type code	ON / OFF Rotary knob	Pressure range P _{OFF} in bar	Flange	Weight (in g)	Part No.
MDR 11/6-EA	MDR-11 DSD AAIA 017A030 XHI XXX	EA	2,5 - 6	G 1/4" ST	300	235712
MDR 11/6-EA	MDR-11 DTD AAIA 017A030 XHI XXX	EA	2,5 - 6	G 1/4" ST-Ü	320	235729

Cable glands for retrofitting, see accessories!

Pressure switch MDR 11 / 11, Compressor version



- Single phase
- Switching capacity 4.0 kW / 4 HP
- Max. cut-out pressure 11 bar / 160 psi
- Incl. cable glands PG13,5 Z/ZK
- With delayed unloader valve AEV 11 S
- 2-pole (N.C.)
- Acc. to EN 60947
- UL / CSA-approval optional
- Differential adjustment
- Flange = Die-cast aluminium

Order reference	Type code	ON / OFF Rotary knob	Pressure range P _{OFF} in bar	Flange	Weight (in g)	Part No.
MDR 11/11-EA	MDR-11 GBA AAIA 060A080 QHI XXX	EA	2,5 - 11	G 1/4" Alu	300	235736
MDR 11/11-EA	MDR-11 GEA AAIA 060A080 QHI XXX	EA	2,5 - 11	F4 1/4" Alu	320	235743

Unloader valves and cable glands for retrofitting, see accessories!

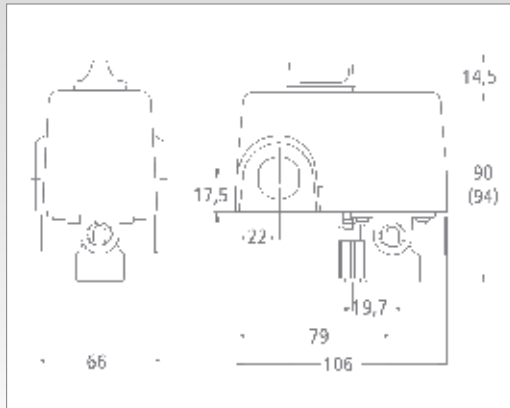
*) = with Flange F4 3/8" or F4 1/4" NPT on request

Technical Data MDR 11 acc. to 60947 UL/CSA	
Rated insulation voltage U _i	500 V
Motor switching capacity (AC 3) U _e =240 V (1~)	4,0 kW
Motor switching capacity (UL 508, CSA 22.2) U _e =240 V (1~) / U _e =120 V (1~)	3,0 HP/2,0 HP
Electrical life (UL 508, CSA 22.2) U _e =240 V dc; 2,7A	0,5 HP
Electrical life (AC 3) Cycles	> 1 x 10 ⁵
Mechanical life Cycles	> 5 x 10 ⁵
Max. electrical cycles Cycles/h	120
Max. mechanical cycles Cycles/h	600
Rated operational current I _e (EN 60947) at 240 V AC	20 A
Rated operational current I _e (UL/CSA) at 240 V AC	26 A
Bursting strength P _z	> 35 bar

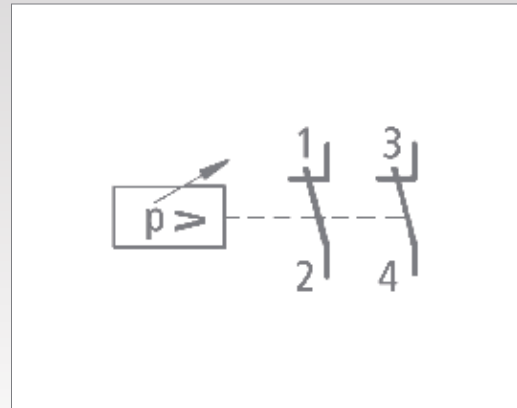
Technical Data MDR 11 acc. to 60947 UL/CSA	
Permissible medium temperature Air	- 5...+ 80 °C
Permissible medium temperature Water	+ 70 °C
Degree of Protection acc. to EN 60529	IP 44
Conductor cross-section 1 .. fine stranded cable 1 x / 2 x	2,5 / 2,5 mm ²
Conductor cross-section 1 rigid cable 1 x / 2 x	2,5 / 2,5 mm ²

Diaphragm media resistance MDR 11	
A detailed overview of diaphragm media resistance for all pressure switches can be found on page 22. Please read the information carefully.	

Dimensions / Circuit Diagrams MDR 11



Pressure switch MDR 11



Accessories MDR 11

Order reference	Description	Weight (in g)	Part No.
	Unloader valves		
EV 1 S*	with quick-connect 6 mm for plastic unloader valves	25	226765
EV 1 WSi	90° unloader valve with quick-connect for 1/4" plastic tubes, quick-connect can be rotated 360°	25	247593
	Delayed unloader valves		
AEV 1 S*	with quick-connect 6 mm for plastic unloader valves	25	217541
	Cable glands		
WN	Grommets	6	201243
PG 13,5 Z-21	With strain relief	12	201021
PG 13,5 ZK-21	With strain relief and cable support	12	201038

*only for pneumatic tubes with outside tolerances according to e. g. Festo PAN 6x1mm

Unloader valves / Delayed unloader valves



EV 1S

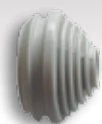


EV 1WSi



AEV 1S

Cable glands MDR 11



WN

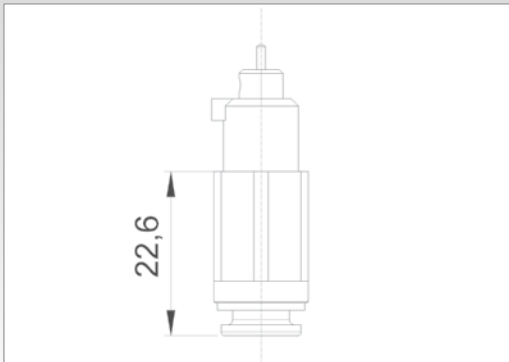


PG 13,5 Z-21

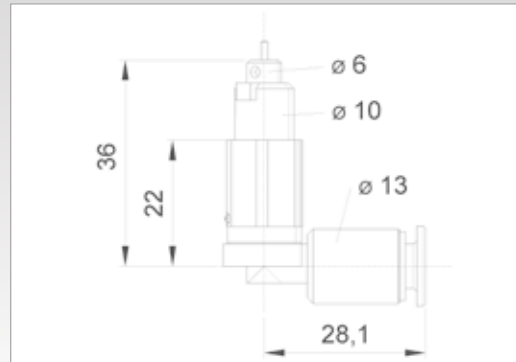


PG 13,5 ZK-21

Dimensions, Accessories MDR 11

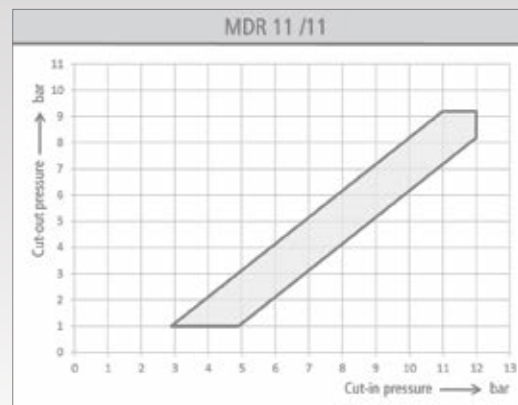
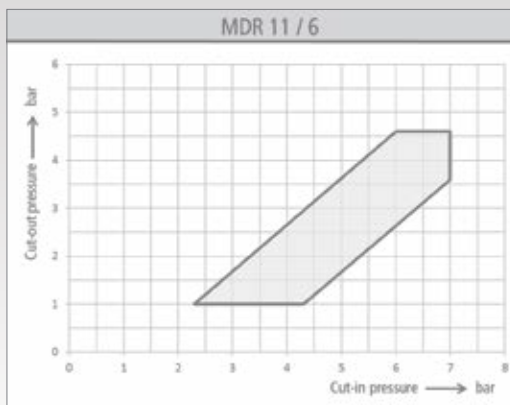


EV 1S / AEV 1S



EV 1WSi

Pressure Diagrams MDR 11



Explanation

Devices with differential pressure adjustment

An intersecting point is determined in the diagram by selecting a pair of cut-in and cut-out pressure values. If this point lies within the shaded area, this pair of values can be set on the pressure switch. If this point lies outside the shaded area, these values cannot be set.

Example: MDR 1/11 with differential pressure adjustment

With a preselected cut-in pressure of 4 bar, the cut-out pressure can be determined and set between 5.4 and 8 bar using the differential pressure adjustment.



Pressure switch MDR 2



- Single phase
- Switching capacity 2.2 kW
- Max. cut-out pressure 12 bar
- 2-pole (N.C.)
- Acc. to EN 60947
- Flange = Die-cast aluminium

Order reference	Type code	ON / OFF Rotary knob	Pressure range P _{OFF} in bar	Flange	Weight (in g)	Part No.
MDR 2/6-EA	MDR-2 DBA AAAAA 015A030 XAA XXX	EA	1,5 - 7	G 1/4" Alu	300	212164
MDR 2/11-EA	MDR-2 GBA AAAAA 070A090 XAA XXX	EA	4 - 12	G 1/4" Alu	300	212171
MDR 2/11-EA	MDR-2 GEA AAAAA 070A090 XAA XXX	EA	4 - 12	F4 1/4" Alu	320	212188
MDR 2/11-EA	MDR-2 GFA AAAAA 070A090 XAA XXX	EA	4 - 12	F4 3/8" Alu	320	212195
MDR 2/11-EA	MDR-2 GDA AAAAA 070A090 XAA XXX	EA	4 - 12	F4 1/2" Alu	320	212201
MDR 2/6	MDR-2 DBA BAAA 015A030 XAA XXX	-	1,5 - 7	G 1/4" Alu	300	217381
MDR 2/11	MDR-2 GBA BAAA 070A090 XAA XXX	-	4 - 12	G 1/4" Alu	300	217404
MDR 2/11	MDR-2 GEA BAAA 070A090 XAA XXX	-	4 - 12	F4 1/4" Alu	320	219408
MDR 2/11	MDR-2 GFA BAAA 070A090 XAA XXX	-	4 - 12	F4 3/8" Alu	320	226888
MDR 2/11	MDR-2 GDA BAAA 070A090 XAA XXX	-	4 - 12	F4 1/2" Alu	320	226895

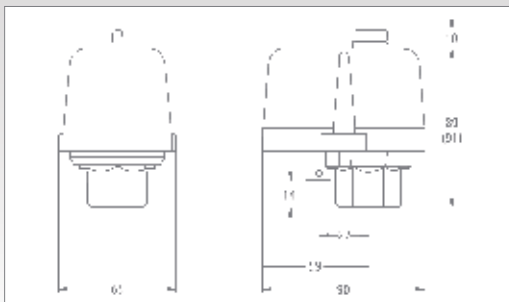
Unloader valves and cable glands for retrofitting, see accessories!

Technical Data MDR 2 acc. to 60947	
Rated insulation voltage U _i	500 V
Motor switching capacity (AC 3) U _e =240 V (1~)	2,2 kW
Electrical life (AC 3) Cycles	> 1 x 10 ⁵
Mechanical life Cycles	> 5 x 10 ⁵
Max. electrical cycles Cycles/h	120
Max. mechanical cycles Cycles/h	600
Rated operational current I _e at 240 V AC 3	16 A
Bursting strength P _z	> 35 bar
Permissible medium temperature Air	- 5...+ 80 °C

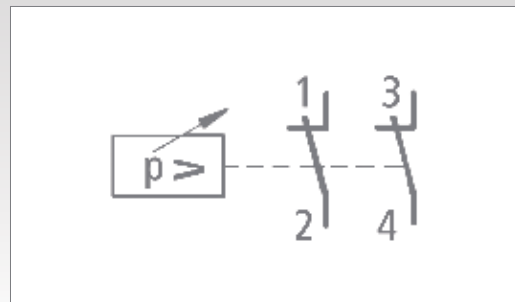
Technical Data MDR 2 acc. to 60947	
Permissible medium temperature Water	+ 80 °C
Degree of Protection acc. to EN 60529	IP 44
Conductor cross-section 1 .. fine stranded cable 1 x / 2 x	2,5 / 2,5 mm ²
Conductor cross-section 1 rigid cable 1 x / 2 x	2,5 / 2,5 mm ²

Diaphragm media resistance MDR 2
A detailed overview of diaphragm media resistance for all pressure switches can be found on page 22. Please read the information carefully.

Dimensions / Circuit Diagrams MDR 2



Pressure switch MDR-2



Accessories MDR 2

Order reference	Description	Weight (in g)	Part No
Unloader valves			
EV 2	With screw connection for 6 mm plastic or copper discharge tubes	25	200666
EV 2S*	With quick-connect for 6 mm plastic discharge tubes	25	200680
EV 2W	90° with screw connection for 6 mm plastic or discharge copper tubes	25	200697
EV 2Wi	90° with screw connection for 1/4" mm plastic or discharge copper tubes	15	200703
EV 2WS*	90° with quick-connect for 6 mm plastic discharge tubes	15	200710
Delayed unloader valves			
AEV 2	With screw connection for 6 mm plastic or copper discharge tubes	25	200727
AEV 2S*	With quick-connect for 6 mm plastic discharge tubes	25	200741
AEV 2W	90° with screw connection for 6 mm plastic or copper discharge tubes	15	200758
AEV 2Wi	90° with screw connection for 1/4" mm plastic or copper discharge tubes	15	200765
AEV 2WS*	90° with quick-connect for 6 mm plastic discharge tubes	15	200772
Cable glands			
WN	Grommet	6	200888
PG 11 G	Conduits for mounting of cable glands (Inner thread)	6	200895
PG 11 V	Cable gland complete	12	200901
PG 11 Z	With strain relief	12	200925
PG 11 ZK	With strain relief and cable support	12	200918
PG 13,5 G	Conduits for mounting of cable glands (Inner thread)	6	200963
PG 13,5 V	Cable gland complete	12	200932
PG 13,5 Z	With strain relief	12	200956
PG 13,5 ZK	With strain relief and cable support	12	200949
Cover			
H2 (Cover MDR 2)	Cover without On/Off lever	40	217510
H2-EA (Cover MDR 2+EA)	Cover with On/Off lever for manual On/Off	40	229445

*only for pneumatic tubes with outside tolerances according to e. g. Festo PAN 6x1mm

Unloader valves / Delayed unloader valves



Cable glands MDR 2



Pressure switch MDR 2

Accessories Hourmeter kit MDR 2



NEW!

Description

The MDR 2 can be equipped or retrofitted with an operating hourmeter to monitor the pump and compressor running time.

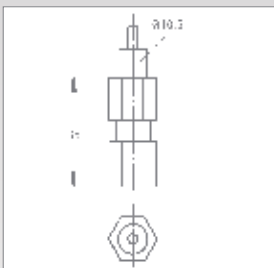
The kit consists of an operating hourmeter for either 230 V supplied and a perforated MDR 2 cover with or without ON/OFF lever.

The hourmeter is available as a kit and can be attached to the cover in 4 different positions, each offset at an angle of 90°. This ensures optimum readability.

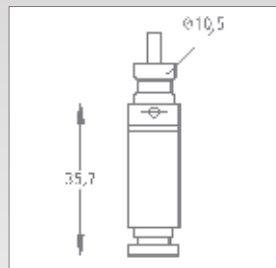
Order reference	Description	Voltage	Packing (units)	Part No.
H2 - B 230	Hourmeter and Cover for MDR-2	230 V / 50 Hz	1	279310
H2-EA - B 230	Hourmeter and Cover for MDR-2+EA	230 V / 50 Hz	1	279327

can be used at 60 Hz with higher engine speed

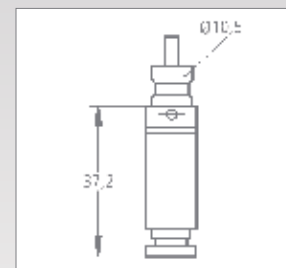
Dimensions, Accessories MDR 2



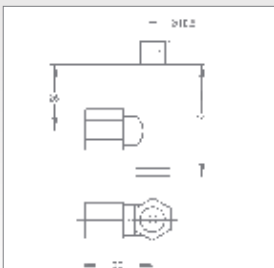
EV 2



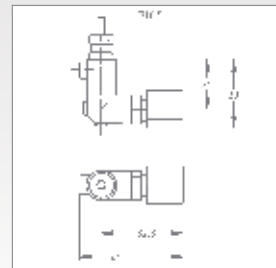
EV 2S



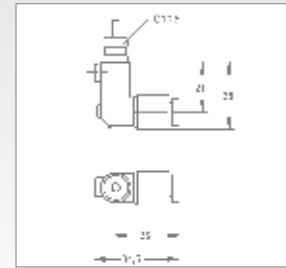
AEV 2S



AEV 2

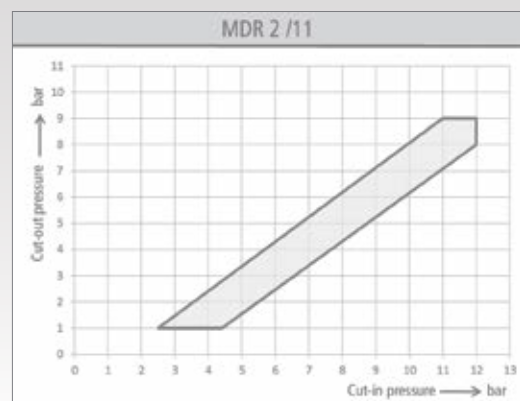
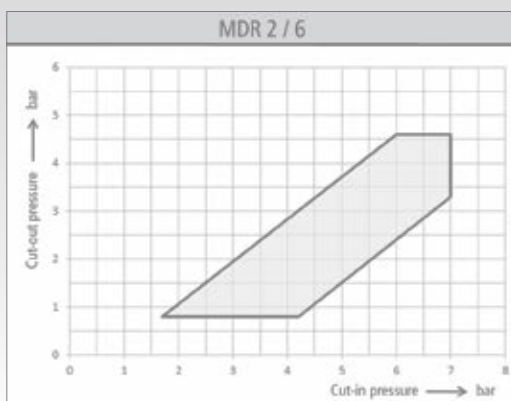


EV 2W / EV 2Wi
AEV 2W / AEV 2Wi



EV 2WS /
AEV 2WS

Pressure Diagrams



Pressure switch MDR 21



- Single phase
- Switching capacity 2.2 kW / 3 HP
- Max. cut-out pressure 12 bar / 175 psi
- 2-pole (N.C.)
- Acc. to EN 60947
- UL / CSA-approval
- Flange = Die-cast aluminium

Order reference	Type code	ON / OFF Rotary knob	Pressure range P _{OFF} in bar	Flange	Weight (in g)	Part No.
MDR 21/6-EA	MDR-21 DBA AACA 015A030 XAA XXX	EA	1,5 - 7	G 1/4" Alu	300	212218
MDR 21/6-EA	MDR-21 DEA AACA 015A030 XAA XXX	EA	1,5 - 7	F4 1/4" Alu	320	212225
MDR 21/11-EA	MDR-21 GBA AACA 070A090 XAA XXX	EA	4 - 12	G 1/4" Alu	300	212232
MDR 21/11-EA	MDR-21 GEA AACA 070A090 XAA XXX	EA	4 - 12	F4 1/4" Alu	320	212249
MDR 21/6	MDR-21 DBA BACA 015A030 XAA XXX	-	1,5 - 7	G1/4" Alu	300	219910
MDR 21/6	MDR-21 DEA BACA 015A030 XAA XXX	-	1,5 - 7	F4 1/4" Alu	320	226901
MDR 21/11	MDR-21 GBA BACA 070A090 XAA XXX	-	4 - 12	G1/4" Alu	300	226918
MDR 21/11	MDR-21 GEA BACA 070A090 XAA XXX	-	4 - 12	G F4 1/4" Alu	320	226925

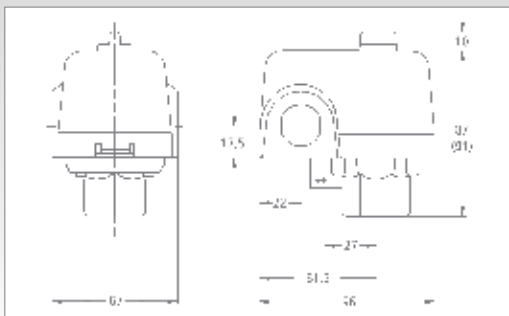
Unloader valves and cable glands for retrofitting, see accessories!

Technical Data MDR 21 nach EN 60947 UL/CSA	
Rated insulation voltage U _i	500 V
Motor switching capacity (UL 508, CSA 22.2) U _e =120 V (1~)	2 HP
Motor switching capacity (UL 508, CSA 22.2) U _e =240 V (1~)	3 HP
Motor switching capacity (AC 3) Cycles	2,2 kW
Electrical life (AC 3) Cycles	> 1 x 10 ⁵
Mechanical life Cycles	> 5 x 10 ⁶
Max. electrical cycles Cycles/h	120
Max. mechanical cycles Cycles/h	600
Rated operational current I _e (UL 508, CSA 22.2) at 240 V AC / 120 V AC	17 A / 24 A
Bursting strength P _z	> 35 bar

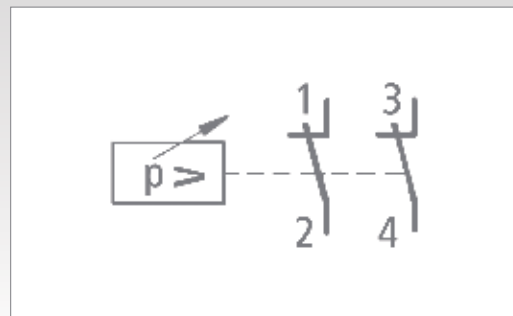
Technical Data MDR 21 nach EN 60947 UL/CSA	
Permissible medium temperature Air	- 5...+ 80 °C
Permissible medium temperature Water	+ 80 °C
Degree of Protection acc. to EN 60529	IP 44
Conductor cross-section 1 ... fine stranded cable 1 x / 2 x	2,5 / 2,5 mm ²
Conductor cross-section 1 ... rigid cable 1 x / 2 x	2,5 / 2,5 mm ²

Diaphragm media resistance MDR 21
A detailed overview of diaphragm media resistance for all pressure switches can be found on page 22. Please read the information carefully.

Dimensions / Circuit Diagrams MDR 21



Pressure switch MDR 21



Pressure switch MDR 21

Accessories MDR 21

Order reference	Description	Weight (in g)	Part No.
Unloader valves			
EV 2	With screw connection for 6 mm plastic or copper discharge tubes	25	200666
EV 2S*	With quick-connect for 6 mm plastic discharge tubes	25	200680
EV 2W	90° with screw connection for 6 mm plastic or discharge copper tubes	15	200697
EV 2Wi	90° with screw connection for 1/4" mm plastic or discharge copper tubes	15	200703
EV 2WS*	90° with quick-connect for 6 mm plastic discharge tubes	15	200710
Delayed unloader valves			
AEV 2	With screw connection for 6 mm plastic or copper discharge tubes	25	200727
AEV 2S*	With quick-connect for 6 mm plastic discharge tubes	25	200741
AEV 2W	90° with screw connection for 6 mm plastic or copper discharge tubes	15	200758
AEV 2Wi	90° with screw connection for 1/4" mm plastic or copper discharge tubes	15	200765
AEV 2WS*	90° with quick-connect for 6 mm plastic discharge tubes	15	200772
Cable glands			
WN	Grommet	6	201243
PG 13,5 Z-21	With strain relief	12	201021
PG 13,5 ZK-21	With strain relief and cable support	12	201038
Cover			
H 21 (Cover MDR 21)	Cover without On/Off lever (Neural version without marking)	40	229452
H 21-EA (Cover MDR 2+EA)	Cover with On/Off lever for manual On/Off (neutral version, without marking)	40	217503

* only for pneumatic tubes with outside tolerances according to e. g. Festo PAN 6x1mm

High performance
Pressure switches

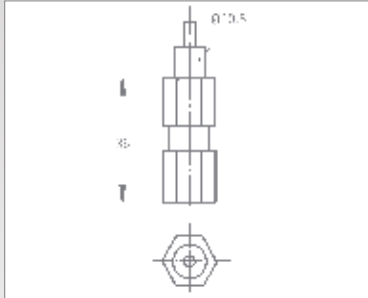
Unloader valves / Delayed unloader valves



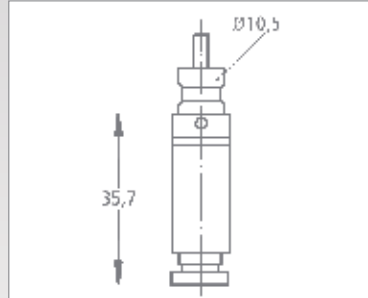
Cable glands MDR 21



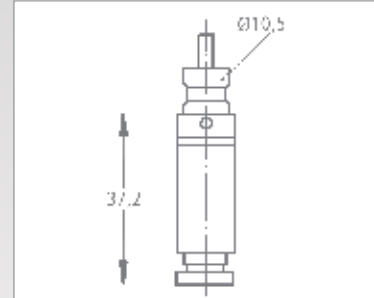
Dimensions, Accessories MDR 21



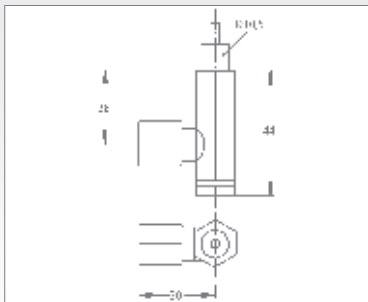
EV 2



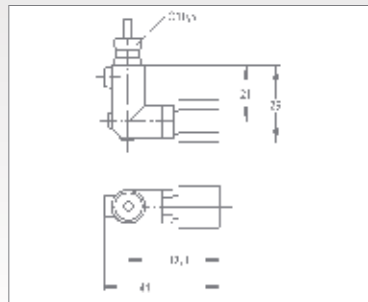
EV 2S



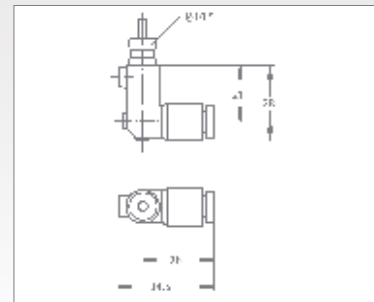
AEV 2S



AEV 2

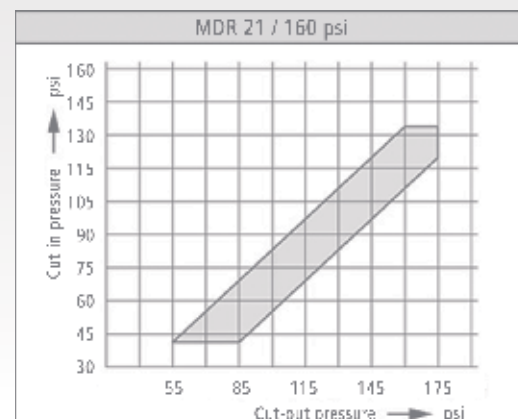
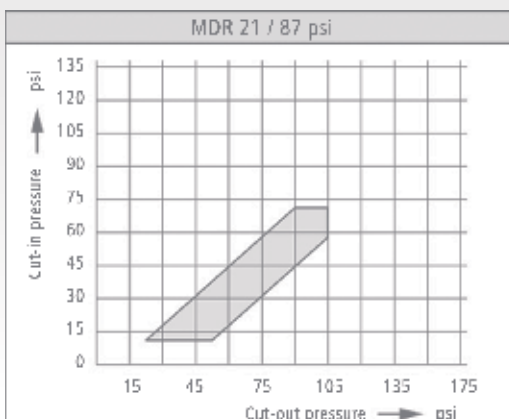
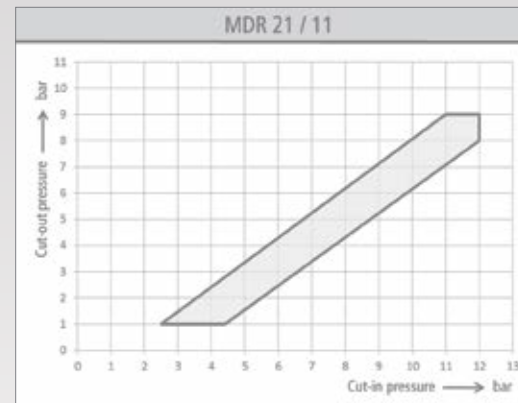
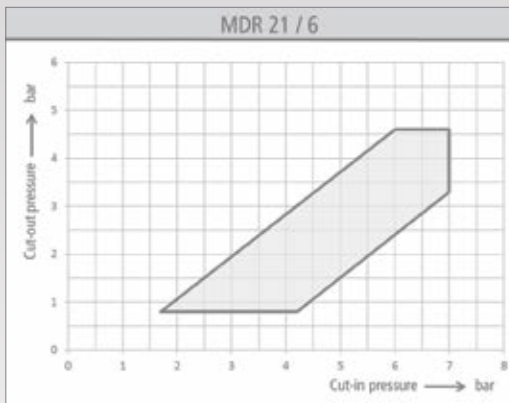


EV 2W / EV 2Wi
AEV 2W / AEV 2Wi



EV 2WS /
AEV 2WS

Pressure Diagrams



1 bar = 14,5 psi; 10 psi = ca. 0,7 bar

Pressure switch MDR 3

Pressure switch MDR 3



- 3-phase
- Switching capacity 7.5 (11) kW / 20 HP
- Available with overload relay
- Max. cut-out pressure 35 bar
- 3-pole (N.C.)
- Acc. to EN 60947
- UL / CSA-approval optional
- Flange = Die-cast aluminium
- Available with scale
- Available with auxiliary switch

Order reference	Type code	ON / OFF Rotary knob	Pressure range P _{OFF} in bar	Flange	Weight (in g)	Part No.
MDR 3/6-EA	MDR-3 DAA AAAA 045A060 XAA XXX	EA	1,3 - 6	G 1/2" Alu	610	212256
MDR 3/11-EA	MDR-3 GAA AAAA 090A110 XAA XXX	EA	4 - 11	G 1/2" Alu	610	212263
MDR 3/11-EA	MDR-3 GBA AAAA 090A110 XAA XXX	EA	4 - 11	G 1/4" Alu	610	212270
MDR 3/11-EA	MDR-3 GEA AAAA 090A110 XAA XXX	EA	4 - 11	F4 1/4" Alu	640	212287
MDR 3/11-EA	MDR-3 GDA AAAA 090A110 XAA XXX	EA	4 - 11	F4 1/2" Alu	640	212294
MDR 3/11-EA	MDR-3 GFA AAAA 090A110 XAA XXX	EA	4 - 11	F4 3/8" Alu	640	212300
MDR 3/16-EA	MDR-3 HAA AAAA 130A160 XAA XXX	EA	6 - 16	G 1/2" Alu	610	212317
MDR 3/16-EA	MDR-3 HBA AAAA 130A160 XAA XXX	EA	6 - 16	G 1/4" Alu	610	212324
MDR 3/16-EA	MDR-3 HEA AAAA 130A160 XAA XXX	EA	6 - 16	F4 1/4" Alu	640	212331
MDR 3/16-EA	MDR-3 HDA AAAA 130A160 XAA XXX	EA	6 - 16	F4 1/2" Alu	640	212348
MDR 3/16-EA	MDR-3 HFA AAAA 130A160 XAA XXX	EA	6 - 16	F4 3/8" Alu	640	212355
MDR 3/25-EA	MDR-3 IAA AAAA 215A250 XAA XXX	EA	7,5 - 25	G 1/2" Alu	610	212362
MDR 3/25-EA	MDR-3 IDA AAAA 215A250 XAA XXX	EA	7,5 - 25	F4 1/2" Alu	640	212379
MDR 3/35-EA	MDR-3 JAA AAAA 320A350 XAA XXX	EA	12 - 35	G 1/2" Alu	610	229711
MDR 3/35-EA	MDR-3 JDA AAAA 320A350 XAA XXX	EA	12 - 35	F4 1/2" Alu	640	229728
MDR 3/6	MDR-3 DAA BAAA 045A060 XAA XXX	-	1,3 - 6	G 1/2" Alu	590	226932
MDR 3/11	MDR-3 GAA BAAA 090A110 XAA XXX	-	4 - 11	G 1/2" Alu	590	226949
MDR 3/11	MDR-3 GBA BAAA 090A110 XAA XXX	-	4 - 11	G 1/4" Alu	590	226956
MDR 3/11	MDR-3 GEA BAAA 090A110 XAA XXX	-	4 - 11	F4 1/4" Alu	620	226963
MDR 3/11	MDR-3 GDA BAAA 090A110 XAA XXX	-	4 - 11	F4 1/2" Alu	620	226970
MDR 3/11	MDR-3 GFA BAAA 090A110 XAA XXX	-	4 - 11	F4 3/8" Alu	620	226987
MDR 3/16	MDR-3 HAA BAAA 130A160 XAA XXX	-	6 - 16	G 1/2" Alu	590	226994
MDR 3/16	MDR-3 HBA BAAA 130A160 XAA XXX	-	6 - 16	G 1/4" Alu	590	227007
MDR 3/16	MDR-3 HEA BAAA 130A160 XAA XXX	-	6 - 16	F4 1/4" Alu	620	227014
MDR 3/16	MDR-3 HDA BAAA 130A160 XAA XXX	-	6 - 16	F4 1/2" Alu	620	227021
MDR 3/16	MDR-3 HFA BAAA 130A160 XAA XXX	-	6 - 16	F4 3/8" Alu	620	227038
MDR 3/25	MDR-3 IAA BAAA 215A250 XAA XXX	-	7,5 - 25	G 1/2" Alu	590	227045
MDR 3/25	MDR-3 IDA BAAA 215A250 XAA XXX	-	7,5 - 25	F4 1/2" Alu	620	227052
MDR 3/35	MDR-3 JAA BAAA 320A350 XAA XXX	-	12 - 35	G 1/2" Alu	590	229698
MDR 3/35	MDR-3 JDA BAAA 320A350 XAA XXX	-	12 - 35	F4 1/2" Alu	620	229704

Unloader valves and cable glands for retrofitting, see accessories!

Type overview Pressure Switch MDR 3 RM versions, with roller diaphragm - tight pressure differential, extended medium resistance

Order reference	Type code	ON / OFF Rotary knob	Pressure range P _{OFF} in bar	Flange	Weight (in g)	Part No.
MDR 3/6-RM	MDR-3 DAB BAAA 028A035 XAA XXX	-	1 - 6	G 1/2" Alu	770	229674
MDR 3/10-RM	MDR-3 GAB BAAA 060A070 XAA XXX	-	3 - 10	G 1/2" Alu	770	227595
MDR 3/10-RM	MDR-3 GOB BAAA 060A070 XAA XXX	-	3 - 10	G1/2" + G 1/4" Alu	810	227601
MDR 3/10-RM-EA	MDR-3 GAB AAAA 060A070 XAA XXX	EA	3 - 10	G 1/2" Alu	800	227632
MDR 3/10-RM-EA	MDR-3 GOB AAAA 060A070 XAA XXX	EA	3 - 10	G 1/2" + G1/4" Alu	850	227649
MDR 3/16-RM	MDR-3 HAB BAAA 145A160 XAA XXX	-	5 - 16	G 1/2" Alu	770	227618
MDR 3/16-RM	MDR-3 HOB BAAA 145A160 XAA XXX	-	5 - 16	G 1/2" + G 1/4" Alu	810	227625
MDR 3/16-RM-EA	MDR-3 HAB AAAA 145A160 XAA XXX	EA	5 - 16	G 1/2" Alu	800	227656
MDR 3/16-RM-EA	MDR-3 HOB AAAA 145A160 XAA XXX	EA	5 - 16	G 1/2" + G1/4" Alu	850	227663

Unloader valves and cable glands for retrofitting, see accessories!

Technical Data MDR 3 acc. to EN 60947, UL / CSA	
Rated insulation voltage U_i	690 V
Motor switching capacity (UL 508, CSA 22.2) $U_g=120$ V (1~)	2 HP
Motor switching capacity (AC3) $U_g=240$ V (1~)	2,2 kW
Motor switching capacity (UL 508, CSA 22.2) $U_g=240$ V (1~)	3 HP
Motor switching capacity (AC 3) $U_g=240$ V (3~)	5,5 kW
Motor switching capacity (UL 508, CSA 22.2) $U_g=240$ V (3~)	7,5 HP
Motor switching capacity (AC 3) $U_g=400$ V (3~)	7,5/11* kW
Motor switching capacity (UL 508, CSA 22.2) $U_g=480$ V (3~)	15 HP
Motor switching capacity (AC 3) $U_g=500$ V (3~)	7,5/11* kW
Motor switching capacity (UL 508, CSA 22.2) $U_g=600$ V (3~)	20 HP
Motor switching capacity (AC 3) $U_g=690$ V (3~)	7,5/15* kW

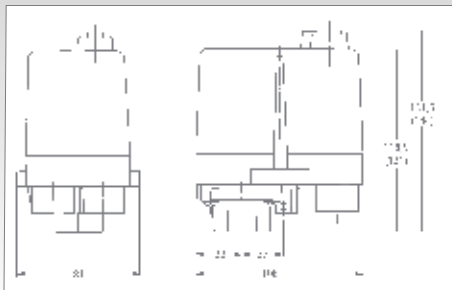
Technical Data MDR 3 acc. to EN 60947, UL / CSA	
Electrical life (AC 3) Cycles	$> 1 \times 10^5$
Mechanical life Cycles	$> 1 \times 10^6$
Max. electrical cycles cycles / h	120
Max. mechanical cycles cycles / h	600
Rated operational current I_e the bei 690 V AC 3	24 A
Bursting strength P_z	$\leq 16 > 40$ bar $\geq 25 > 60$ bar
Permissible medium temperature Air	-5...+ 80 °C
Permissible medium temperature Water	+ 80 °C
Degree of Protection acc to EN 60529	IP 54
Conductor cross-section 1 .. fine stranded cable 1 x / 2 x	4 / 2,5 mm ²
Conductor cross-section 1 .. rigid cable 1 x / 2 x	6 / 4 mm ²

Diaphragm media resistance MDR 3
A detailed overview of diaphragm media resistance for all pressure switches can be found on page 22. Please read the information carefully.

Diaphragm media resistance MDR 3 USA
A detailed overview of diaphragm media resistance for all pressure switches can be found on page 22. Please read the information carefully.

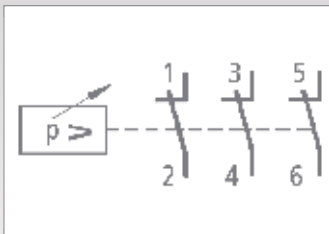
*) with Arc-chamber SK..H on request

Dimensions MDR 3

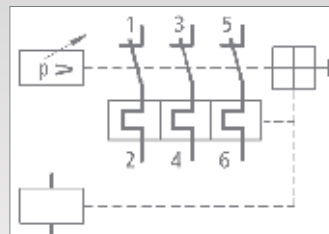


Pressure switch MDR-3

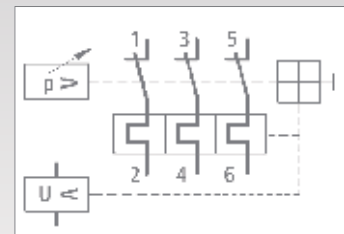
Circuit Diagrams MDR 3



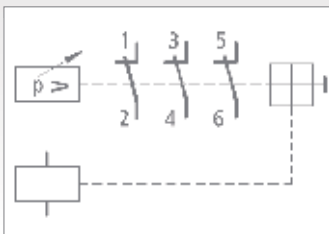
MDR 3



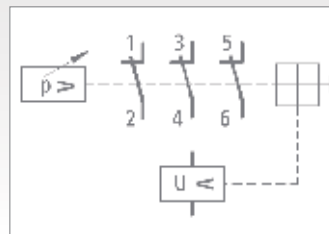
MDR 3 EA 3 R 3 RA 3



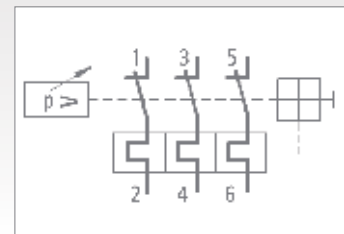
MDR 3 EA 3 R 3 RU 3



MDR 3 EA 3 RA 3



MDR 3 EA 3 RU 3



MDR 3 EA 3 R 3

Accessory DPA-Board for MDR 3

(Use only with MDR-3..E/A and RU 3/400-50; article-nr. 201557)



Description

Installing the DPA - circuit board onto MDR 3, the pressure switch offers the following additional functions:

- Phase sequence control
- Phase failure detection
- Supervision of an external opener possible, e. g. Klixon for temperature
- supervision (clamp tension < 230 V)
- Undervoltage release

For all functions the neutral conductor is not necessary. In case of malfunction the pressure switch will be switched off. Only upon solving the malfunction, the pressure switch can be switched on again.

Field of application: place-variable compressors, building site-area etc.

Order reference	Description	Voltage	Packing (units)	Part No.
DPA-Board	Phase sequence, phase drop protection board	400 V / 50 Hz	1	258520

Accessories Hourmeter kit MDR 3



Description

The MDR 3 can be equipped or retrofitted with an operating hourmeter to monitor the pump and compressor running time.

The hourmeter is available as a kit and can be attached to the cover in 4 different positions, each offset at an angle of 90°. This ensures optimum readability.

The kit consists of an operating hourmeter for either 230 V / 400 V or with battery supplied and a perforated MDR 3 cover with or without ON/OFF lever.

Order reference	Description	Voltage	Packing (units)	Part No.
H3 - B 230	Hourmeter and Cover for MDR-3	230 V / 50 Hz	1	237297
H3 - B 400	Hourmeter and Cover for MDR-3	400 V / 50 Hz	1	237303
H3-EA - B 230	Hourmeter and Cover for MDR-3+EA	230 V / 50 Hz	1	237310
H3-EA - B 400	Hourmeter and Cover for MDR-3+EA	400 V / 50 Hz	1	237327
H3-B	Hourmeter and Cover for MDR-3	battery supplied	1	274308
H3-EA-B	Hourmeter and Cover for MDR-3+EA	battery supplied	1	274315

can be used at 60 Hz with higher engine speed



Pressure switch MDR 3

Accessories MDR 3

Order reference	Description	Weight (in g)	Part No.
Unloader valves			
EV 3	With screw connection for 6 mm plastic or copper discharge tubes	25	201045
EV 3i	With screw connection for 1/4" plastic or copper discharge tubes	25	201052
EV 3S ^{1) 2)}	With quick-connect for 6 mm plastic discharge tubes	25	201069
EV 3W ¹⁾	90° unloader valve with screw connection for 6 mm plastic or copper discharge tubes	18	201076
EV 3Wi ¹⁾	90° unloader valve with screw connection for 1/4" plastic or copper discharge tubes	18	201083
EV 3WS ^{1) 2)}	90° unloader valve with quick-connect for 6 mm plastic discharge tubes	10	201090
EV 3L	With screw connection for 6 mm plastic or copper discharge tubes	30	201229
Delayed unloader valves			
AEV 3	With screw connection for 6 mm plastic or copper discharge tubes	25	201106
AEV 3S ^{1) 2)}	With quick-connect for 6 mm plastic discharge tubes	25	201120
AEV 3W ¹⁾	90° unloader valve with screw connection for 6 mm plastic or copper discharge tubes	18	201137
AEV 3Wi ¹⁾	90° unloader valve with screw connection for 1/4" plastic or copper discharge tubes	18	201144
AEV 3WS ^{1) 2)}	90° unloader valve with quick-connect for 6 mm plastic discharge tubes	10	201151
Cable glands			
PG 9 Z	With strain relief (for additional wiring)	12	201373
WN	Grommet	6	201243
PG 11 G	Conduits for mounting of cable glands (Inner thread)	6	201250
PG 11 V	Cable gland complete	12	201267
PG 11 Z	With strain relief	12	201274
PG 11 ZK	With strain relief and cable support	12	201281
PG 13,5 G	Conduits for mounting of cable glands (Inner thread)	6	201298
PG 13,5 V	Cable gland complete	12	201304
PG 13,5 Z	With strain relief	12	201311
PG 13,5 ZK	With strain relief and cable support	12	201328
PG 16 G	Conduits for mounting of cable glands (Inner thread)	6	201335
PG 16 V	Cable gland complete	12	201342
PG 16 Z	With strain relief	12	201359
PG 16 ZK	With strain relief and cable support	18	201366
MW 3	Mounting bracket for MDR 3	65	246138
SC	Scala (only factory)		
Cover			
H3 (Cover MDR 3)	Cover without rotary knob (Neutral version, without marking)	100	229490
H3-EA (Cover MDR 3+EA)	Cover with rotary knob for manual On/Off (Neutral version, without marking)	100	230007
Thermal, 3-pole overload relay			
SK 3	Arc-chamber without lock mechanism (supplied as standard with MDR 3...)	90	201380
SK 3-S	SK 3-S Arc-chamber with lock mechanism (supplied as standard with MDR 3...+EA)	110	201397
SK R3/ 1,0	0,63 – 1,00 A	145	201403
SK R3/ 1,6	1,00 – 1,60 A	145	201410
SK R3/ 2,5	1,60 – 2,50 A	145	201427
SK R3/ 4,0	2,50 – 4,00 A	145	201434
SK R3/ 6,3	4,00 – 6,30 A	145	201441
SK R3/ 10,0	6,30 – 10,00 A	145	201458
SK R3/ 16,0	10,00 – 16,00 A	145	201465
SK R3/ 20,0	16,00 – 20,00 A	145	201472
SK R3/ 24,0	20,00 – 24,00 A	145	201489
SK R3/ 30/2	22,00 – 30,00 A, 2-polig	145	201496
HI 3	Auxiliary switch - NC contact for tapping the position of the main switch contacts	10	274971
Undervoltage and shunt releases			
RU 3/24-50	Undervoltage release 24 V, 50 Hz	100	226857
RU 3/230-50	Undervoltage release 230 V, 50 Hz	100	201540
RU 3/400-50	Undervoltage release 400 V, 50 Hz	100	201557
RA 3/24-50	Shunt release 24 V, 50 Hz	100	201564
RA 3/110-50	Shunt release 110 V, 50 Hz	100	201571
RA 3/230-50	Shunt release 230 V, 50 Hz	100	201588
RA 3/240-60	Shunt release 240 V, 60 Hz	100	214113
RA 3/400-50	Shunt release 400 V, 50 Hz	100	225935
RA 3/480-60	Shunt release 480 V, 60 Hz	100	201595

¹⁾ up to ≤ 16 bar

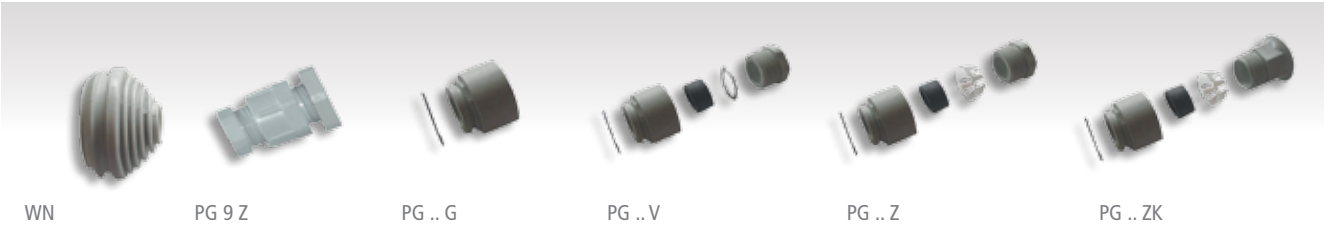
²⁾ only for pneumatic tubes with outside tolerances according to e. g. Festo PAN 6x1mm

Unloader valves / Delayed unloader valves



High performance
Pressure switches

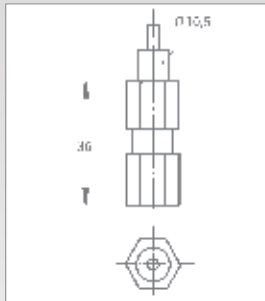
Cable glands MDR 3



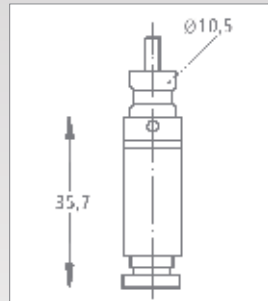
Wall-mounting bracket, 3-pole overload relay, undervoltage and shunt releases



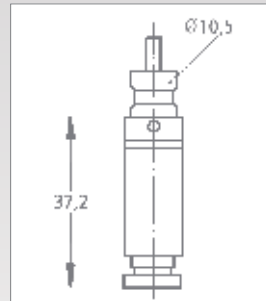
Dimensions, Accessories MDR 3



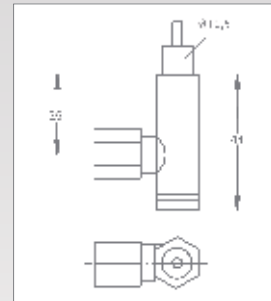
EV 3 / EV 3i



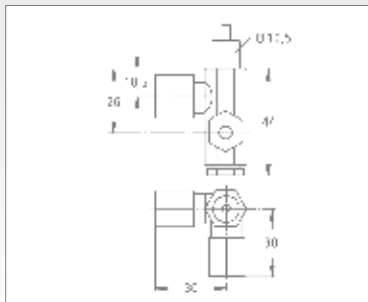
EV 3S



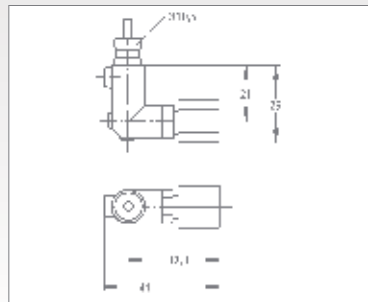
AEV 3S



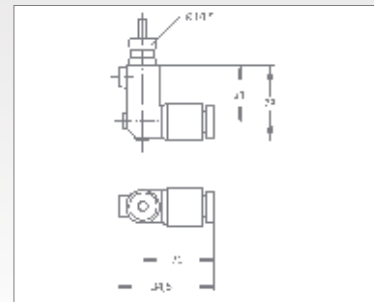
AEV 3



EV 3L

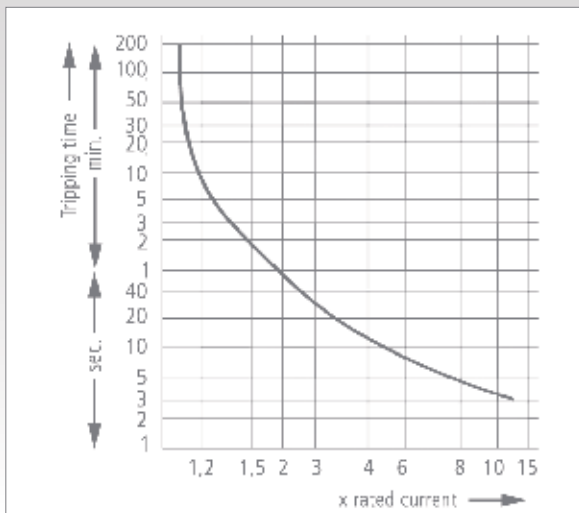


EV 3W / EV 3Wi
AEV 3W / AEV 3Wi

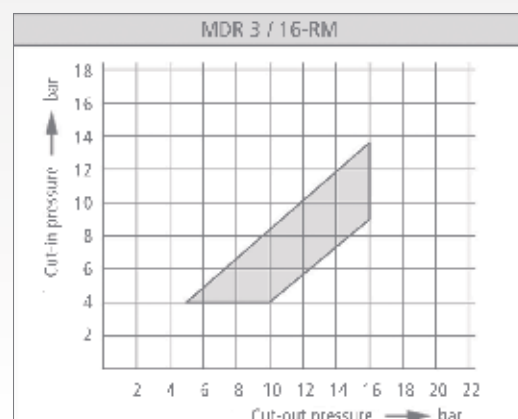
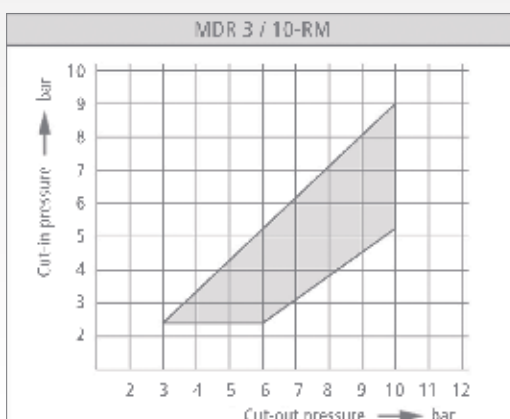
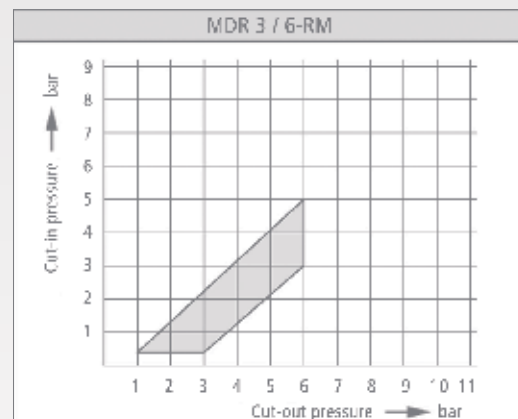
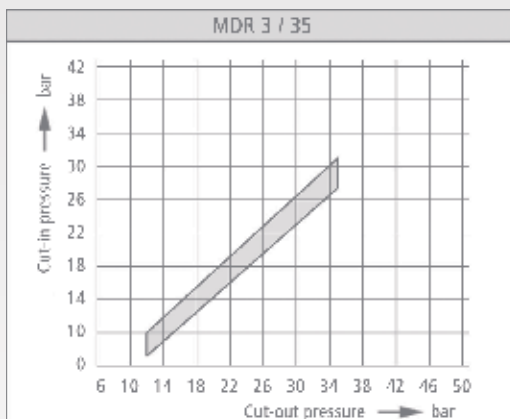
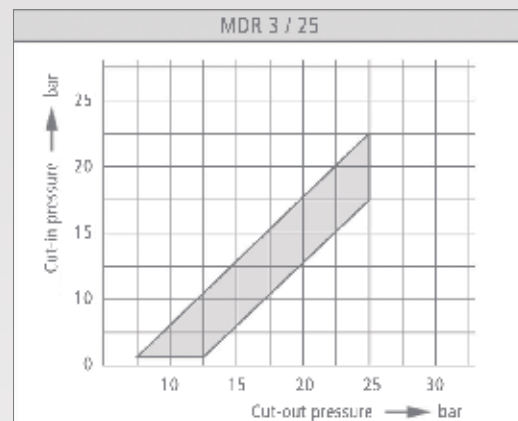
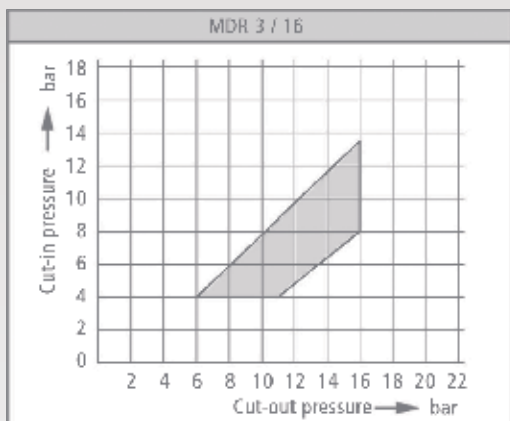
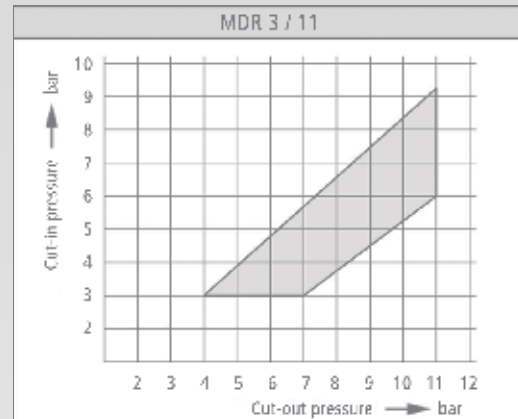
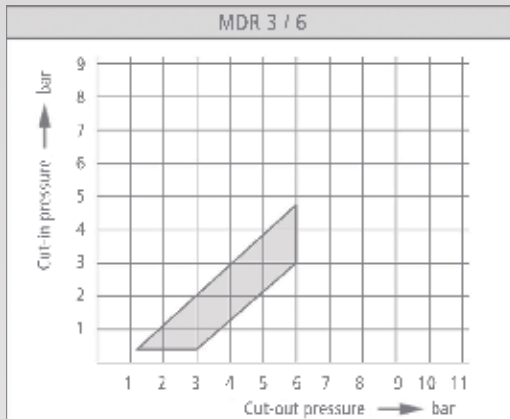


EV 3WS / AEV 3WS

Tripping curves R3 (average)



Pressure Diagrams MDR 3



Pressure switch MDR 4 S



- 3-phase
- Switching capacity 4.0 / 5.5 kW
- Max. cut-out pressure 16 bar
- 3-pole (N.C.)
- Acc. to EN 60947
- 4-way-flange (optional)
- Flange = Die-cast aluminium

Order reference	Type code	ON / OFF Rotary knob	Pressure range P _{OFF} in bar	Flange	Weight (in g)	Part No.
MDR 4S/6-EA	MDR-4 DBA AFAA 040A060 XAA XXX	EA	1,5 - 6	G 1/4" Alu	420	212584
MDR 4S/6-EA	MDR-4 DAA AFAA 040A060 XAA XXX	EA	1,5 - 6	G 1/2" Alu	420	212591
MDR 4S/6-EA	MDR-4 DOA AFAA 040A060 XAA XXX	EA	1,5 - 6	G 1/2" + G 1/4" Alu	460	212607
MDR 4S/6-EA	MDR-4 DEA AFAA 040A060 XAA XXX	EA	1,5 - 6	F4 1/4" Alu	460	257899
MDR 4S/6-EA	MDR-4 DDA AFAA 040A060 XAA XXX	EA	1,5 - 6	F4 1/2" Alu	460	257905
MDR 4S/6-EA	MDR-4 DFA AFAA 040A060 XAA XXX	EA	1,5 - 6	F4 3/8" Alu	460	257912
MDR 4S/11-EA	MDR-4 GBA AFAA 090A110 XAA XXX	EA	4 - 11	G 1/4" Alu	420	212614
MDR 4S/11-EA	MDR-4 GAA AFAA 090A110 XAA XXX	EA	4 - 11	G 1/2" Alu	420	212621
MDR 4S/11-EA	MDR-4 GOA AFAA 095A110 XAA XXX	EA	4 - 11	G 1/2" + G 1/4" Alu	460	212638
MDR 4S/11-EA	MDR-4 GEA AFAA 090A110 XAA XXX	EA	4 - 11	F4 1/4" Alu	460	257929
MDR 4S/11-EA	MDR-4 GDA AFAA 090A110 XAA XXX	EA	4 - 11	F4 1/2" Alu	460	257936
MDR 4S/11-EA	MDR-4 GFA AFAA 090A110 XAA XXX	EA	4 - 11	F4 3/8" Alu	460	257943
MDR 4S/16-EA	MDR-4 HBA AFAA 135A160 XAA XXX	EA	6 - 16	G 1/4" Alu	420	212645
MDR 4S/16-EA	MDR-4 HAA AFAA 135A160 XAA XXX	EA	6 - 16	G 1/2" Alu	420	212652
MDR 4S/16-EA	MDR-4 HOA AFAA 135A160 XAA XXX	EA	6 - 16	G 1/2" + G1/4" Alu	460	212669
MDR 4S/16-EA	MDR-4 HEA AFAA 135A160 XAA XXX	EA	6 - 16	F4 1/4" Alu	460	257950
MDR 4S/16-EA	MDR-4 HDA AFAA 135A160 XAA XXX	EA	6 - 16	F4 1/2" Alu	460	257967
MDR 4S/16-EA	MDR-4 HFA AFAA 135A160 XAA XXX	EA	6 - 16	F4 3/8" Alu	460	257974
MDR 4S/25-EA	MDR-4 IBA AFAA 210A250 XAA XXX	EA	8,5 - 25	G 1/4" Alu	420	212676
MDR 4S/25-EA	MDR-4 IAA AFAA 210A250 XAA XXX	EA	8,5 - 25	G 1/2" Alu	420	212683
MDR 4S/25-EA	MDR-4 IOA AFAA 210A250 XAA XXX	EA	8,5 - 25	G1/2" + G1/4" Alu	460	212690
MDR 4S/25-EA	MDR-4 IEA AFAA 210A250 XAA XXX	EA	8,5 - 25	F4 1/4" Alu	460	263883
MDR 4S/25-EA	MDR-4 IDA AFAA 210A250 XAA XXX	EA	8,5 - 25	F4 1/2" Alu	460	263890
MDR 4S/25-EA	MDR-4 IFA AFAA 210A250 XAA XXX	EA	8,5 - 25	F4 3/8" Alu	460	263906
MDR 4S/6	MDR-4 DBA BFAA 040A060 XAA XXX	-	1,5 - 6	G 1/4" Alu	420	220084
MDR 4S/6	MDR-4 DAA BFAA 040A060 XAA XXX	-	1,5 - 6	G 1/2" Alu	420	220077
MDR 4S/6	MDR-4 DOA BFAA 040A060 XAA XXX	-	1,5 - 6	G 1/2" + G1/4" Alu	460	220121
MDR 4S/6	MDR-4 DEA BFAA 040A060 XAA XXX	-	1,5 - 6	F4 1/4" Alu	460	257981
MDR 4S/6	MDR-4 DDA BFAA 040A060 XAA XXX	-	1,5 - 6	F4 1/2" Alu	460	257998
MDR 4S/6	MDR-4 DFA BFAA 040A060 XAA XXX	-	1,5 - 6	F4 3/8" Alu	460	258001
MDR 4S/11	MDR-4 GBA BFAA 090A110 XAA XXX	-	4 - 11	G 1/4" Alu	420	204251
MDR 4S/11	MDR-4 GAA BFAA 090A110 XAA XXX	-	4 - 11	G 1/2" Alu	420	206194
MDR 4S/11	MDR-4 GOA BFAA 095A110 XAA XXX	-	4 - 11	G 1/2" + G1/4" Alu	460	227069
MDR 4S/11	MDR-4 GEA BFAA 090A110 XAA XXX	-	4 - 11	F4 1/4" Alu	460	258018
MDR 4S/11	MDR-4 GDA BFAA 090A110 XAA XXX	-	4 - 11	F4 1/2" Alu	460	258025
MDR 4S/11	MDR-4 GFA BFAA 090A110 XAA XXX	-	4 - 11	F4 3/8" Alu	460	258032
MDR 4S/16	MDR-4 HBA BFAA 135A160 XAA XXX	-	6 - 16	G 1/4" Alu	420	204244
MDR 4S/16	MDR-4 HAA BFAA 135A160 XAA XXX	-	6 - 16	G 1/2" Alu	420	220107
MDR 4S/16	MDR-4 HOA BFAA 135A160 XAA XXX	-	6 - 16	G1/2" + G1/4" Alu	460	227076
MDR 4S/16	MDR-4 HEA BFAA 135A160 XAA XXX	-	6 - 16	F4 1/4" Alu	460	258049
MDR 4S/16	MDR-4 HDA BFAA 135A160 XAA XXX	-	6 - 16	F4 1/2" Alu	460	258056
MDR 4S/16	MDR-4 HFA BFAA 135A160 XAA XXX	-	6 - 16	F4 3/8" Alu	460	258063
MDR 4S/25	MDR-4 IBA BFAA 210A250 XAA XXX	-	8,5 - 25	G 1/4" Alu	420	227083
MDR 4S/25	MDR-4 IAA BFAA 210A250 XAA XXX	-	8,5 - 25	G 1/2" Alu	420	227090
MDR 4S/25	MDR-4 IOA BFAA 210A250 XAA XXX	-	8,5 - 25	G1/2" + G1/4" Alu	460	221210
MDR 4S/25	MDR-4 IEA BFAA 210A250 XAA XXX	-	8,5 - 25	F4 1/4" Alu	460	263913
MDR 4S/25	MDR-4 IDA BFAA 210A250 XAA XXX	-	8,5 - 25	F4 1/2" Alu	460	263920
MDR 4S/25	MDR-4 IFA BFAA 210A250 XAA XXX	-	8,5 - 25	F4 3/8" Alu	460	263937

Unloader valves and cable glands for retrofitting, see accessories!

Pressure switch MDR 4 SD



- 3-phase
- Switching capacity 4.0 / 5.5 kW
- Max. cut-out pressure 11 bar
- With scale and transparent cover
- 3-pole (N.C.)
- Acc. to EN 60947
- Flange = Die-cast aluminium

Order reference	Type code	ON / OFF Rotary knob	Pressure range P _{OFF} in bar	Flange	Weight (in g)	Part No.
MDR 4 SD/6	MDR-4 DAA BFDA 040A060 XAA XXX	-	1,5 - 6	G 1/2" Alu	420	212737
MDR 4 SD/6	MDR-4 DBA BFDA 040A060 XAA XXX	-	1,5 - 6	G 1/4" Alu	420	212744
MDR 4 SD/11	MDR-4 GAA BFDA 090A110 XAA XXX	-	4 - 11	G 1/2" Alu	420	212751
MDR 4 SD/11	MDR-4 GBA BFDA 090A110 XAA XXX	-	4 - 11	G 1/4" Alu	420	212768

Unloader valves and cable glands for retrofitting, see accessories!

Pressure switch MDR 4 SU



- 3-phase
- Switching capacity 2.5 / 4.0 kW
- Max. cut-out pressure 16 bar
- With reversed function
- 3-pole (N.O.)
- Acc. to EN 60947
- Flange = Die-cast aluminium

Order reference	Type code	ON / OFF Rotary knob	Pressure range P _{OFF} in bar	Flange	Weight (in g)	Part No.
MDR 4 SU/6	MDR-4 DAA BFCA 040A060 XAA XXX	-	1,5 - 6	G 1/2" Alu	420	212706
MDR 4 SU/11	MDR-4 GAA BFCA 090A110 XAA XXX	-	4 - 11	G 1/2" Alu	420	212713
MDR 4 SU/16	MDR-4 HAA BFCA 090A110 XAA XXX	-	6 - 16	G 1/2" Alu	420	212720

Unloader valves and cable glands for retrofitting, see accessories!

Technical Data MDR 4 S / MDR 4 SD acc. to EN 60947	
Rated insulation voltage U_i	500 V
Motor switching capacity (AC 3) $U_e=240$ V (1~)	2,5 kW
Motor switching capacity (AC 3) $U_e=230$ V (3~)	4,0 kW
Motor switching capacity (AC 3) $U_e=400$ V (3~)	5,5 kW
Motor switching capacity (AC 3) $U_e=500$ V (3~)	5,5 kW
Electrical life (AC 3) $U_e=240$ V (3~)	$> 1 \times 10^5$
Mechanical life Cycles	$> 5 \times 10^5$
Max. electrical cycles Cycles/h	120

Technical Data MDR 4 SU acc. to EN 60947	
Rated insulation voltage U_i	500 V
Motor switching capacity (AC 3) $U_e=240$ V (1~)	1,5 kW
Motor switching capacity (AC 3) $U_e=230$ V (3~)	2,5 kW
Motor switching capacity (AC 3) $U_e=400$ V (3~)	4,0 kW
Electrical life (AC 3) Cycles	$> 1 \times 10^5$
Mechanical life Cycles	$> 5 \times 10^5$
Max. electrical cycles Cycles/h	120
Max. mechanical cycles Cycles/h	600
Rated operational current I_e at 400 V AC	12 A
Bursting strength P_z	> 35 bar

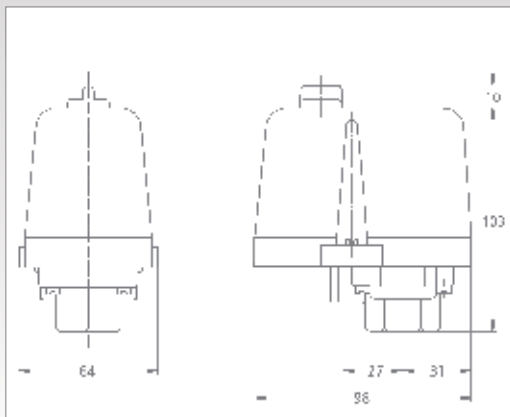
Technical Data MDR 4 S / MDR 4 SD acc. to EN 60947	
Max. mechanical cycles Cycles/h	600
Rated operational current I_e at 400 V AC/500 VAC 3	16 A / 9 A
Bursting strength P_z	> 35 bar
Permissible medium temperature Air	- 5...+ 80 °C
Permissible medium temperature Water	+ 80 °C
Degree of Protection acc. to EN 60529	IP 44
Conductor cross-section 1 ... fine stranded cable 1 x / 2 x	2,5 / 2,5mm ²
Conductor cross-section 1 ... rigid cable 1 x / 2 x	2,5 / 2,5mm ²

Technical Data MDR 4 SU acc. to EN 60947	
Permissible medium temperature Air	- 5...+ 80 °C
Permissible medium temperature Water	+ 80 °C
Degree of Protection acc. to EN 60529	IP 44
Conductor cross-section 1 ... fine stranded cable 1 x / 2 x	2,5 / 2,5mm ²
Conductor cross-section 1 ... rigid cable 1 x / 2 x	2,5 / 2,5mm ²

Diaphragm media resistance MDR 4	
Air, Water	resistant

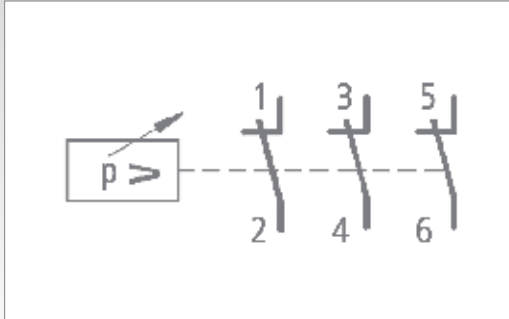
Diaphragm media resistance MDR 4	
A detailed overview of diaphragm media resistance for all pressure switches can be found on page 22. Please read the information carefully.	

Dimensions MDR 4

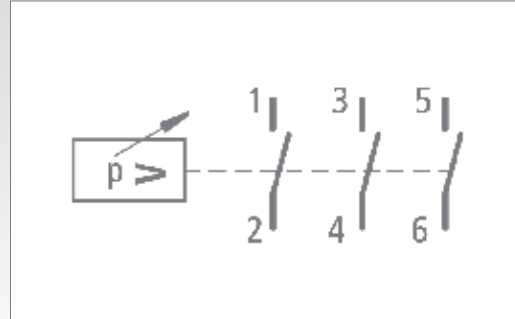


Pressure switch MDR 4

Circuit Diagrams MDR 4



MDR 4 S MDR 4 SD



MDR 4 SU

Accessories MDR 4

Order reference	Description	Weight (in g)	Part No
Unloader valves			
EV 4	With screw connection for 6 mm plastic or copper discharge tubes	25	201601
EV 4S ¹⁾²⁾	With quick-connect for 6 mm plastic discharge tubes	25	201625
EV 4W ¹⁾	90° with screw connection for 6 mm plastic or discharge copper tubes	15	255055
EV 4Wi ¹⁾	90° with screw connection for 1/4" mm plastic or discharge copper tubes	15	255062
EV 4WS ¹⁾²⁾	90° with quick-connect for 6 mm plastic discharge tubes	15	201656
Delayed unloader valves			
AEV 4	With screw connection for 6 mm plastic or copper discharge tubes	25	201663
AEV 4S ¹⁾²⁾	With quick-connect for 6 mm plastic discharge tubes	25	201687
AEV 4W ¹⁾	90° with screw connection for 6 mm plastic or copper discharge tubes	15	201694
AEV 4Wi ¹⁾	90° with screw connection for 1/4" mm plastic or copper discharge tubes	15	255079
AEV 4WS ¹⁾²⁾	90° with quick-connect for 6 mm plastic discharge tubes	15	255086
Cable glands			
WN	Grommet	6	200888
PG 11 G	Conduits for mounting of cable glands (Inner thread)	6	200895
PG 11 V	Cable gland complete	12	200901
PG 11 Z	With strain relief	12	200925
PG 11 ZK	With strain relief and cable support	12	200918
PG 13,5 G	Conduits for mounting of cable glands (Inner thread)	6	200963
PG 13,5 V	Cable gland complete	12	200932
PG 13,5 Z	With strain relief	12	200956
PG 13,5 ZK	With strain relief and cable support	12	200949
MW 4	Mounting bracket for MDR 4 and MDR 43	65	230021
Cover			
H4 (Cover MDR 4S)	Cover without rotary knob (Neutral version, without marking)	70	229469
H4S-EA (Cover MDR 4S+EA)	Cover with rotary knob for manual On/Off (Neutral version, without marking)	70	229476
H4SD (Cover MDR 4SD)	Cover without rotary knob for MDR 4 SD (transparent)	70	229483

1) up to ≤16 bar, 2) only for pneumatic tubes with outside tolerances according to e. g. Festo PAN 6x1mm

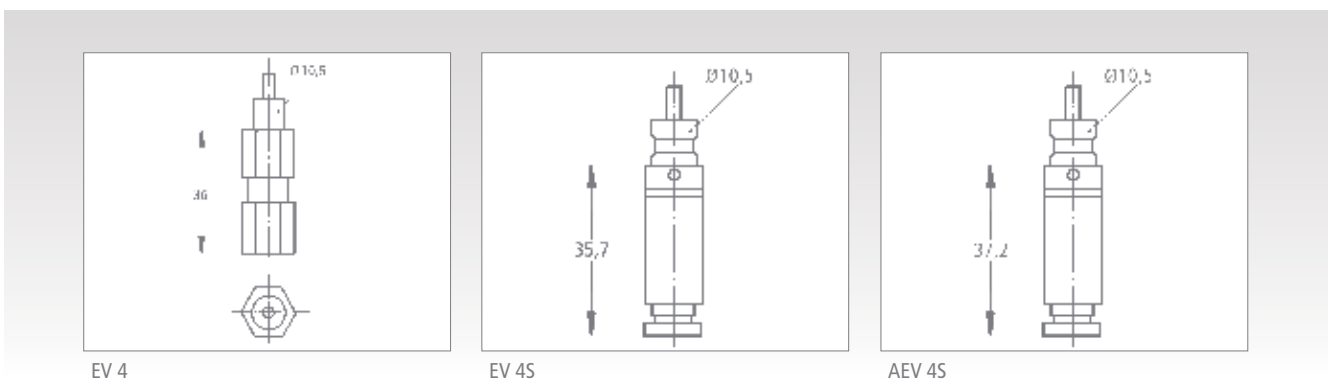
Unloader valves / Delayed unloader valves



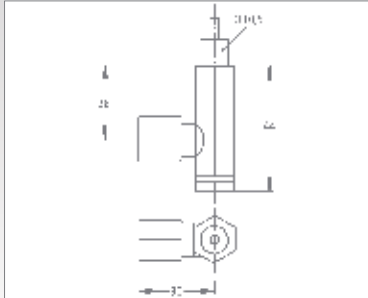
Wall-mounting bracket / Cable glands MDR 4



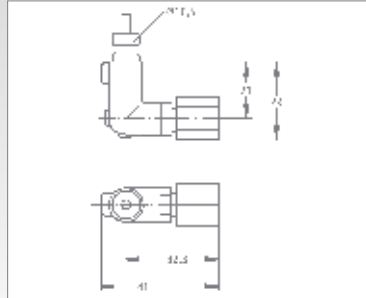
Dimensions, Accessories MDR 4



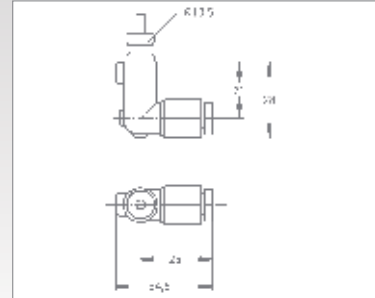
Dimensions, Accessories MDR 4



EV 4

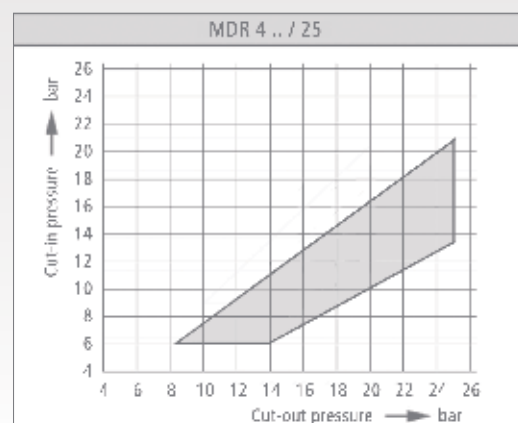
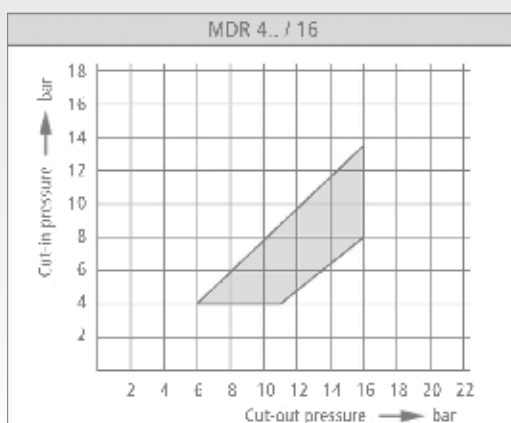
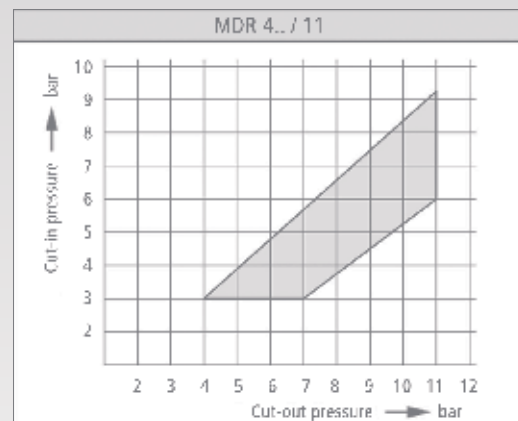
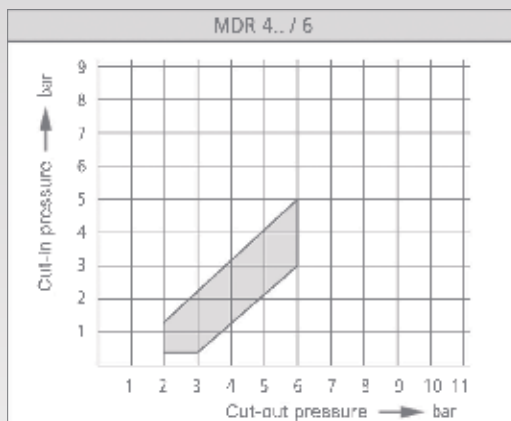


EV 4S



AEV 4S

Pressure Diagrams MDR 4



Pressure switch MDR 5



- 3-phase
- Switching capacity 5.5 kW
- Available with overload relay
- Max. cut-out pressure 45 bar
- 3-pole (N.C.)
- Acc. to EN 60947
- Flange = Die-cast aluminium



Video - Pressure switch settings
MDR 5 /8

Order reference	Type code	ON / OFF Rotary knob	Pressure range P _{OFF} in bar	Flange	Weight (in g)	Part No.
MDR 5/5	MDR-5 CAA BAAA 015A030 XXX XXX	-	1,5 - 5	G 1/2" Alu	820	212850
MDR 5/5-K	MDR-5 CAA AAAA 015A030 XXX XXX	K*	1,5 - 5	G 1/2" Alu	860	212867
MDR 5/5	MDR-5 COA BAAA 015A030 XXX XXX	-	1,5 - 5	G1/2" + G1/4" Alu	860	212874
MDR 5/5-K	MDR-5 COA AAAA 015A030 XXX XXX	K*	1,5 - 5	G1/2" + G1/4" Alu	900	212881
MDR 5/8	MDR-5 EAA BAAA 070A080 XXX XXX	-	2 - 8	G 1/2" Alu	820	212898
MDR 5/8-K	MDR-5 EAA AAAA 070A080 XXX XXX	K*	2 - 8	G 1/2" Alu	860	212904
MDR 5/8	MDR-5 EOA BAAA 070A080 XXX XXX	-	2 - 8	G 1/2" + G 1/4" Alu	860	212911
MDR 5/8-K	MDR-5 EOA AAAA 070A080 XXX XXX	K*	2 - 8	G 1/2" + G 1/4" Alu	900	212928
MDR 5/11	MDR-5 GAA BAAA 090A110 XXX XXX	-	2 - 11	G 1/2" Alu	820	212935
MDR 5/11-K	MDR-5 GAA AAAA 090A110 XXX XXX	K*	2 - 11	G 1/2" Alu	860	212942
MDR 5/11	MDR-5 GOA BAAA 090A110 XXX XXX	-	2 - 11	G1/2" + G1/4" Alu	860	212959
MDR 5/11-K	MDR-5 GOA AAAA 090A110 XXX XXX	K*	2 - 11	G1/2" + G1/4" Alu	900	212966
MDR 5/16	MDR-5 HAA BAAA 130A160 XXX XXX	-	2,5 - 16	G 1/2" Alu	820	212973
MDR 5/16-K	MDR-5 HAA AAAA 130A160 XXX XXX	K*	2,5 - 16	G 1/2" Alu	860	212980
MDR 5/16	MDR-5 HOA BAAA 130A160 XXX XXX	-	2,5 - 16	G1/2" + G1/4" Alu	860	212997
MDR 5/16-K	MDR-5 HOA AAAA 130A160 XXX XXX	K*	2,5 - 16	G1/2" + G1/4" Alu	900	213000
MDR 5/45	MDR-5 KAA BAAA 300 A400 XXX XXX	-	13 - 45	G 1/2" Alu	820	256182
MDR 5/45-K	MDR-5 KAA AAAA 300 A400 XXX XXX	K*	13 - 45	G 1/2" Alu	860	258513

*For these switches, a thermal, 3-pole overload relay has to be ordered separately, the ON/OFF mechanism will only work with an additional relay
Unloader valves and cable glands for retrofitting, see accessories!

Special model IP 65



- Applications: e.g. pump shafts
- 3-phase
- Switching capacity 5.5 kW
- Max. cut-out pressure 16 bar
- Incl. cable glands PG 16/13,5 ZK
- 3-pole (N.C.)
- Acc. to EN 60947
- Degree of protection IP 65
- Flange: Galvanised steel, **NEW!** Stainless steel or brass



MDR 5/5 - G 1/2" Stainless steel

Order reference	Type code	ON / OFF Rotary knob	Pressure range P _{OFF} in bar	Flange	Weight (in g)	Part No.
MDR 5/5 NEW	MDR 5 CYA BAAA 015A030 X00 XXZ	-	1,5 - 5	G 1/2" galv. steelt	775	279273
MDR 5/8 NEW	MDR-5 EYA BAAA 070A080 X00 XXZ	-	2 - 8	G 1/2" galv. steel	775	279280
MDR 5/5	MDR-5 CVA BAAA 150A030 XNN XXZ	-	1,5 - 5	G 1/2" SS	775	275152
MDR 5/8	MDR-5 EVA BAAA 070A080 XNN XXZ	-	2 - 8	G 1/2" SS	775	257169
MDR 5/5	MDR-5 CRA BAAA 015A030 XNN XXZ	-	1,5 - 5	G 1/2" brass	775	275176
MDR 5/8	MDR-5 ERA BAAA 070A080 XNN XXZ	-	2 - 8	G 1/2" brass	775	275183

Pressure switch MDR 5

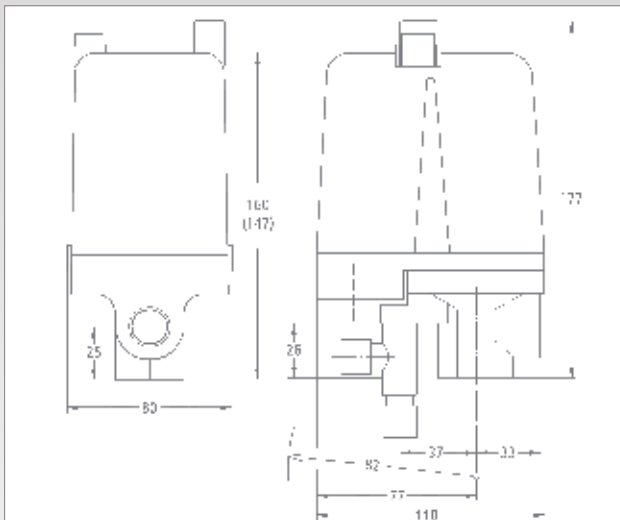
Technical Data MDR 5 acc. to EN 60947	
Rated insulation voltage U_i	500 V
Motor switching capacity (AC 3) $U_e=240$ V (1~)	2,5 kW
Motor switching capacity (AC 3) $U_e=230$ V (3~)	4,0 kW
Motor switching capacity (AC 3) $U_e=400$ V (3~)	5,5 kW
Motor switching capacity (AC 3) $U_e=500$ V (3~)	4,0 kW
Electrical life (AC 3) Cycles	$> 1 \times 10^5$
Mechanical life Cycles	$> 5 \times 10^5$
Max. electrical cycles Cycles/h	120
Max. mechanical cycles Cycles/h	600
Rated operational current I_e at 400 V AC 3 / 500 V AC 3	16 A / 12 A

Technical Data MDR 5 acc. to EN 60947		
Bursting strength P_z	up to 16 bar up to 45 bar	> 40 bar > 60 bar
Permissible medium temperature Air		- 5...+ 80 °C
Permissible medium temperature Water		+ 80 °C
Degree of Protection acc. to EN 60529		IP 54 / IP 65
Conductor cross-section 1 ... fine stranded cable 1 x / 2 x		2,5 / 2,5 mm ²
Conductor cross-section 1 ... rigid cable 1 x / 2 x		4 / 4 mm ²

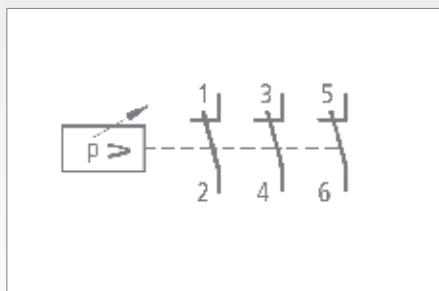
Diaphragm media resistance MDR 5
A detailed overview of diaphragm media resistance for all pressure switches can be found on page 22. Please read the information carefully.

High performance
Pressure switches

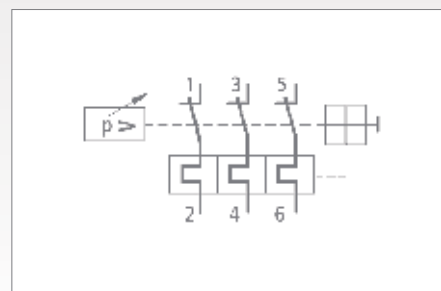
Dimensions MDR 5



Pressure switch MDR-5 G1/2" + Gauge connection G1/4"



MDR 5



MDR 5K - R5

Accessories MDR 5

Order reference	Description	Weight (in g)	Part No.
Unloader valves			
EV 5 ¹⁾	With screw connection for 6 mm plastic or copper discharge tubes, screw connection for vent port	30	201878
EV 5i ¹⁾	With screw connection for 1/4" plastic or copper discharge tubes	30	201885
EV 5E ¹⁾	With screw connection for 6 mm plastic or copper discharge tubes	25	201892
EV 5Ei ¹⁾	With screw connection for 1/4" plastic or copper discharge tubes	25	201908
EV 5H	High pressure relief valve from 16 bar with screw connection for 6 mm copper relief line	30	201915
Delayed unloader valves			
AEV 5	With screw connection for 6 mm plastic or copper discharge tubes	25	201939
AEV 5i	With screw connection for 1/4" plastic or copper discharge tubes	25	201946
Cable glands			
WN M20	Grommet	6	269496
VS-M20	Screw plug M20		269502
M20 Z	With strain relief, clamping range 6-12 mm	12	269533
M20 ZK	With strain relief and cable support, clamping range 6-12 mm	12	269540
M20 L	With strain relief, clamping range 10-14 mm	12	269519
M20 LK	With strain relief and cable support, clamping range 10-14 mm	12	269526
MW 5	Mounting bracket	120	230045
Cover			
H5 (Cover MDR 5)	Cover without push-buttons	130	230052
H5-K (Cover MDR 5+K)	Cover with On/Off push-buttons (Only functions together with the thermal R5 overload relay)	150	217527
Thermal, 3-pole overload relay			
R 5/1,5	0,86 - 1,50 A	150	202028
R 5/2,45	1,50 - 2,45 A	150	202035
R 5/4,2	2,40 - 4,20 A	150	202042
R 5/7,0	4,00 - 7,00 A	150	202059
R 5/10,3	6,10 - 10,3 A	150	202066
R 5/14,0	9,00 - 14,0 A	150	202073
R 5/18,0	11,0 - 18,0 A	150	202080

¹⁾ bis ≤ 16 bar

Unloader valves / Delayed unloader valves



EV 5, EV 5i, EV 5H



EV 5E / EV 5Ei



AEV 5 / AEV 5i

Cable glands MDR 5



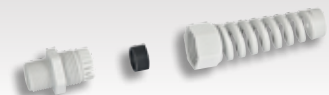
WN-M 20



VS - M 20

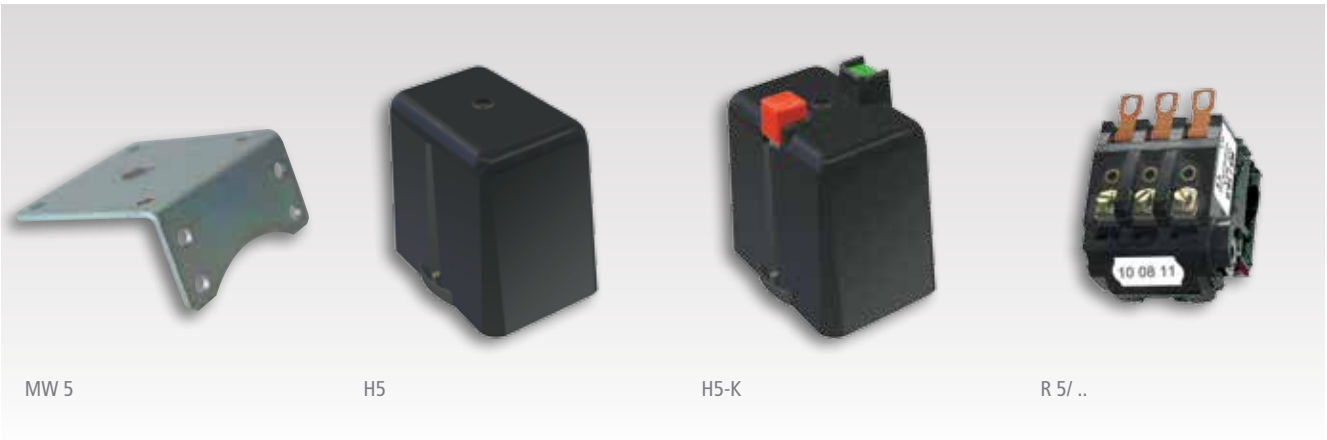


M 20 Z / M 20 L



M 20 ZK / M 20 LK

Accessories, Miscellaneous MDR 5



MW 5

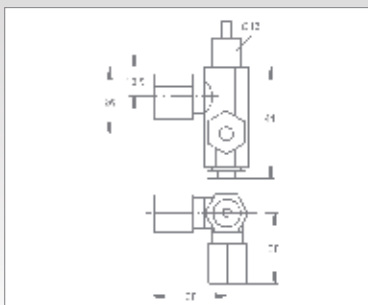
H5

H5-K

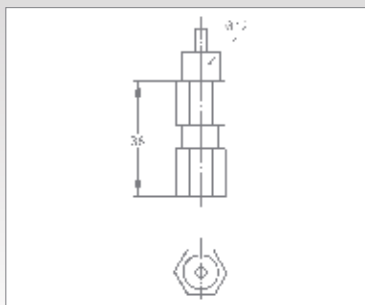
R 5/..

High performance
Pressure switches

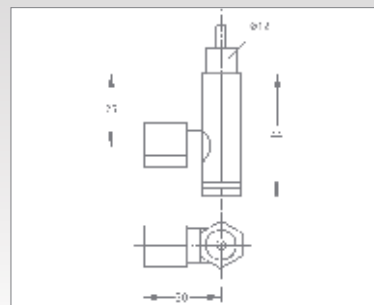
Dimensions, Accessories



EV 5 / EV 5i / EV 5H

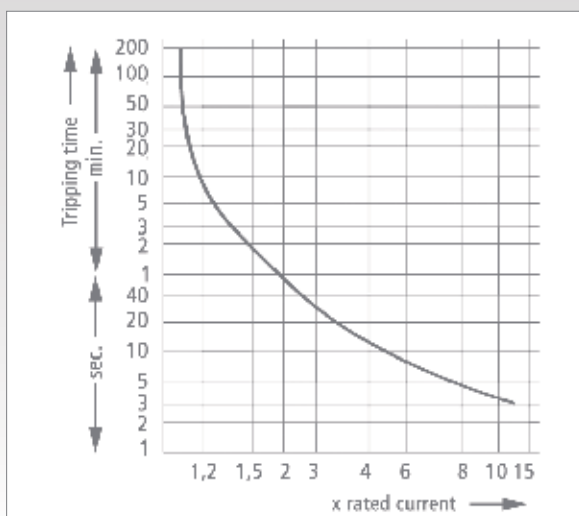


EV 5E / EV 5Ei

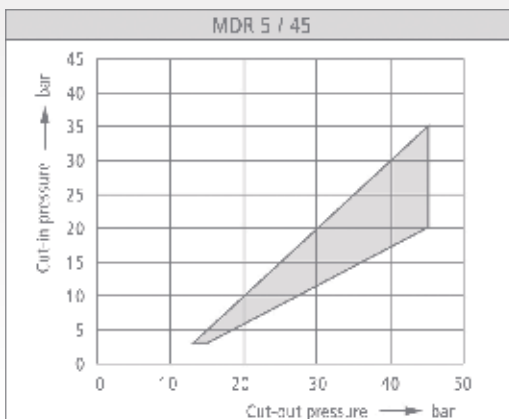
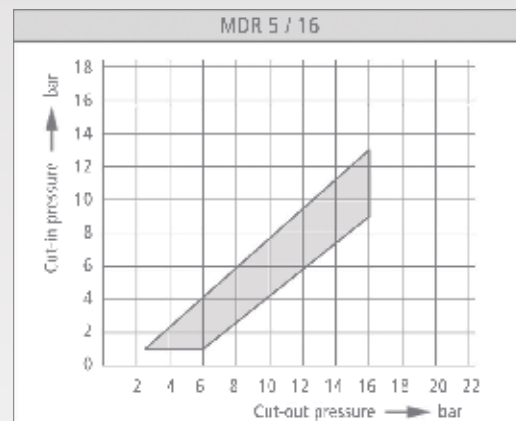
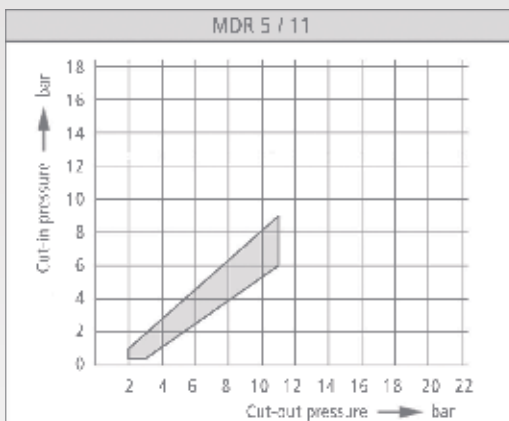
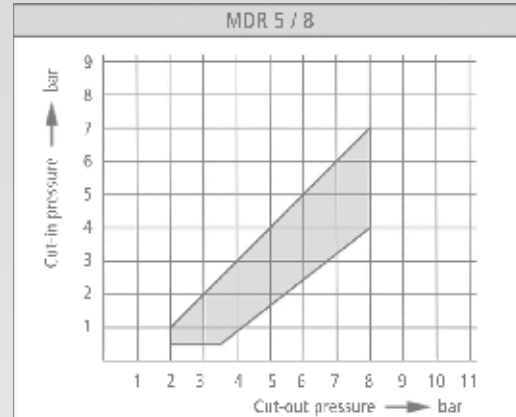
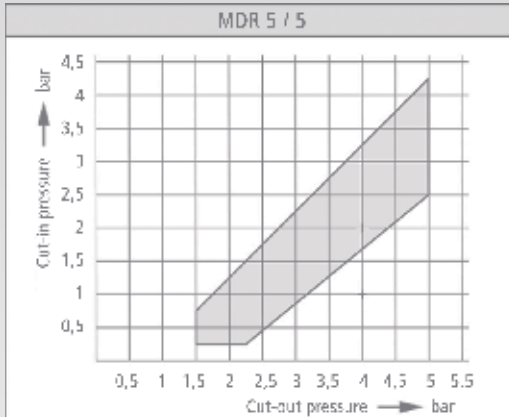


AEV 5 / AEV 5i

Tripping curves R5 (average)



Pressure Diagrams MDR 5





MDR 3 in installed condition



MDR-F...H-S



MDR-P



MDR-K



MDR 43



MDR 53

Control pressure switches

Industries



MDR-F

1 SPDT / 2 DPDT
Normally Closed / Normally Open (NO/NC)
Pressure range up to 250 bar
ATEX / GL / VdS / UL approvals -optional
Scale for simple adjustments
Wide range of variations
Acc. to EN 60947

P. 57

Air pressure technology, water pressure technology, construction machinery, water-based extinguishing systems, fire protection units, oil pressure monitoring, mining, chemical, industry, railway vehicles, offshore, shipping, vacuum technology, calibration technology, heating systems

MDR-P

1 SPDT
Pressure range up to 16 bar
Compact pressure switch with coupling DIN EN 175301
Fixed pressure setting, **OEM applications**

P. 72

For the series production, perfect for industrial customers!
Air pressure technology, water pressure technology, construction machinery, breweries, heating systems, calibration technology

MDR-K

2 DPDT
Pressure range up to 11 bar
Bayonet coupling ISO 15170-1
OEM applications

P. 75

For the series production, perfect for industrial customers!
Air pressure technology, water pressure technology

MDR 43

1 N.O. + 1 N.C.
Pressure range up to 16 bar

P. 78

Air pressure technology, water pressure technology

MDR 53

1 SPDT
Maximum shut-off pressure setting 16 bar
CSA approval optional
Pressure adjustment without tools

P. 80

Air pressure technology, water pressure technology

Control pressure switch MDR - F



- 1 SPDT / 2 DPDT - Normally Open / Normally Closed (NO/NC)
- Pressure range up to 250 bar
- ATEX / GL / VdS / UL approvals -optional
- Scale for simple adjustments
- Wide range of variations
- Acc. to EN 60947

Applications:

Air pressure technology, water pressure technology, construction machinery, water-based extinguishing systems, fire protection units, oil pressure monitoring, mining, chemical, industry, railway vehicles, offshore, shipping, vacuum technology, calibration technology, heating systems

Specific applied approval



MDR – F ..H-S

Application

The Condor pressure switch series MDR-F can be **universally used** and are suitable for:

- **Monitoring and controlling the pressure of liquids or gaseous media** in pipelines, tanks, vats, pressure vessels and installations.
- **Tasks 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, fire-fighting equipment and on compressed air systems.

Mode of operation:

The pressure of the monitored medium operates against a diaphragm, bellows or a plunger all of which have different media resistance. Switching operation is carried out with the use of a micro switch ensuring flutter-free switching

When the pressure reaches the upper switching point, the micro switch contacts change position. In normal cases e.g. a connected motor is switched off (up to 550 watts direct or using additional switches like a contactor etc.). Should the pressure fall below the lower switch point, then the micro switch contact returns to its default position and the motor is switched on.

The upper and lower switching points can be set independently using a screw driver. Both switching points can be read off the scale.

Pressure connection, pressure sensing element and electrical connections are all fitted on to a die-cast aluminum base. The sealable transparent, polycarbonate cover protects the scales and switch against environmental effects.

Standard scope of delivery:

- rubber grommets
- MDR-F..H Die-cast aluminum flange
- MDR-F..Y Plastic flange (in particular for use in water technology applications)
- **With industrial screw connection**
(Industrial clamp version available upon request)

Besides the standard types with Perbunan diaphragms, the following new types are available:

- **Pressure switch with stainless steel pressure sensing element** e.g. for liquid fuels, oils up to 200°C etc.
- **High pressure switch with plastic plunger press. sensing element** with stainless steel connection up to 250 bar
- **Pressure switch with manual reset function and die-cast aluminum flange** for oil, water and air etc.
- **Pressure switch with Viton diaphragm and die-cast aluminum flange** for increased media resistance
- **Pressure switch with VdS approval** for fire-extinguishing systems / fire protection-installations
- **Pressure switch with GL approval** for ship building and applications intended for use at sea
- **Pressure switch with Atex approval** in mining and chemicals plants that are at risk of explosion
- **Pressure switch with UL approval** for the North American market
- **Vacuum**
- **DPDT**

The MDR-F pressure switch program is extended continuously. A current status of the existing designs and approvals is available on our homepage.

Control pressure switch MDR - F

MDR-F standard version with die-cast aluminium flange



MDR-F standard version with die-cast aluminium flange and Perbunan diaphragm - for oil, water and air etc. . Pressure switch with industrial cage clamp version.
 Connection: H G 3/8" inner thread **
 - suffix "G" for gold-flashed contacts

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 2H-S	MDR-F 2 HAA SAA A 005A015	0,04 ... 1,89	0,07 0,11	0,11 ... 2	460	253501
MDR-F 2HG-S	MDR-F 2 HAA SBA A 005A015	0,04 ... 1,89	0,07 0,11	0,11 ... 2	460	253518
MDR-F 4H-S	MDR-F 4 HAA SAA A 010A030	0,07 ... 3,75	0,15 0,25	0,22 ... 4	460	253525
MDR-F 4HG-S	MDR-F 4 HAA SBA A 010A030	0,07 ... 3,75	0,15 0,25	0,22 ... 4	460	253532
MDR-F 8H-S	MDR-F 8 HAA SAA A 020A060	0,2 ... 7,5	0,3 0,5	0,5 ... 8	460	253549
MDR-F 8HG-S	MDR-F 8 HAA SBA A 020A060	0,2 ... 7,5	0,3 0,5	0,5 ... 8	460	253556
MDR-F 10H-S	MDR-F 10 HAA SAA A 040A050	0,3 ... 9,2	0,4 0,8	0,7 ... 10	460	253563
MDR-F 10HG-S	MDR-F 10 HAA SBA A 040A050	0,3 ... 9,2	0,4 0,8	0,7 ... 10	460	253570
MDR-F 16H-S	MDR-F 16 HAA SAA A 040A120	0,4 ... 15	0,6 1,0	1 ... 16	460	253587
MDR-F 16HG-S	MDR-F 16 HAA SBA A 040A120	0,4 ... 15	0,6 1,0	1 ... 16	460	253594
MDR-F 32H-S	MDR-F 32 HAA SAA A 100A200	0,8 ... 30	1,2 2,0	2 ... 32	460	253600
MDR-F 32HG-S	MDR-F 32 HAA SBA A 100A200	0,8 ... 30	1,2 2,0	2 ... 32	460	253617

* lower ... upper end of range
 ** G 1/4" + G 1/2" innerthread - on demand

MDR-F standard version with plastic flange



MDR-F standard version with plastic flange and Perbunan diaphragm - e.g. for demineralized water. Pressure switch with industrial cage clamp version.
 Pressure connection: Y G 3/8" inner thread ** - suffix "G" for gold-flashed contacts

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 2Y-S	MDR-F 2 YAA SAA A 005A015	0,04 ... 1,89	0,07 0,11	0,11 ... 2	410	253624
MDR-F 2YG-S	MDR-F 2 YAA SBA A 005A015	0,04 ... 1,89	0,07 0,11	0,11 ... 2	410	253631
MDR-F 4Y-S	MDR-F 4 YAA SAA A 010A030	0,07 ... 3,75	0,15 0,25	0,22 ... 4	410	253648
MDR-F 4YG-S	MDR-F 4 YAA SBA A 010A030	0,07 ... 3,75	0,15 0,25	0,22 ... 4	410	253655
MDR-F 8Y-S	MDR-F 8 YAA SAA A 020A060	0,2 ... 7,5	0,3 0,5	0,5 ... 8	410	253662
MDR-F 8YG-S	MDR-F 8 YAA SBA A 020A060	0,2 ... 7,5	0,3 0,5	0,5 ... 8	410	253679
MDR-F 10Y-S	MDR-F 10 YAA SAA A 040A050	0,3 ... 9,2	0,4 0,8	0,7 ... 10	410	253686
MDR-F 10YG-S	MDR-F 10 YAA SBA A 040A050	0,3 ... 9,2	0,4 0,8	0,7 ... 10	410	253693
MDR-F 16Y-S	MDR-F 16 YAA SAA A 040A120	0,4 ... 15	0,6 1,0	1 ... 16	410	253709
MDR-F 16YG-S	MDR-F 16 YAA SBA A 040A120	0,4 ... 15	0,6 1,0	1 ... 16	410	253716

* lower ... upper end of range
 ** G 1/4" + G 1/2" innerthread - on demand

Control pressure switch MDR - F

MDR-F features Pressure connection and pressure transducer element stainless steel



MDR-F features Pressure connection and pressure transducer element
Stainless steel for liquid fuels, oils up to 200 ° C, etc..
Pressure switch equipped with industry-screw
Pressure connection: G 1/4 "female thread - suffix " G
"for gold-plated contacts."

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 12HE-S	MDR-F 12 HEC SAA A 060A070	0,5 ... 11,2	0,5 0,8	1 ... 12	520	253723
MDR-F 12HEG-S	MDR-F 12 HEC SBA A 060A070	0,5 ... 11,2	0,5 0,8	1 ... 12	520	253730
MDR-F 30HE-S	MDR-F 30 HEC SAA A 160A200	1 ... 26,4	3,0 3,6	4 ... 30	520	253747
MDR-F 30HEG-S	MDR-F 30 HEC SBA A 160A200	1 ... 26,4	3,0 3,6	4 ... 30	520	253754

* lower ...upper end of range

MDR-F high-pressure switch version (up to 250 bar)



MDR-F high-pressure switch version (up to 250 bar)
with plastic plunger press. sensing element with stainless steel
connection and Industrial cage clamp version for oil, water and air
etc. .
Pressure connection: HH G 3/8" inner thread - suffix " G"
for gold-flashed contacts

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 60HH-S	MDR-F 60 HHA SAA A 200A400	4 ... 52	4 8	8 ... 60	570	253761
MDR-F 60HHG-S	MDR-F 60 HHA SBA A 200A400	4 ... 52	4 8	8 ... 60	570	253778
MDR-F 120HH-S	MDR-F 120 HHA SAA A 200A800	8 ... 104	8 16	16 ... 120	570	253785
MDR-F 120HHG-S	MDR-F 120 HHA SBA A 200A800	8 ... 104	8 16	16 ... 120	570	253792
MDR-F 250HH-S	MDR-F 250 HHA SAA A 100B200	14 ... 226	12 24	26 ... 250	570	253808
MDR-F 250HHG-S	MDR-F 250 HHA SBA A 100B200	14 ... 226	12 24	26 ... 250	570	253815

* lower ...upper end of range

MDR-F version with reset function (Hmin / Hmax and Htro) with die-cast aluminium flange



MDR-F version with reset function (Hmin / Hmax and Htro) with die-cast aluminium flange and Perbunan diaphragm - for oil, water and air etc. Pressure switch with industrial cage clamp version. Pressure connection: H G 3/8" inner thread

MDR-F .. Hmax (SPDT with manual reset max.)

When pressure rises above the upper setting value, contact 11-12 opens and contact 11-14 closes and latches. When the pressure falls below the upper setting value, the contact can be released with the manual reset button.

MDR-F .. Hmin (SPDT with manual reset min.)

After pressure rises above the lower setting value, the function is activated by pressing the manual reset button. When the pressure falls, contact 11-12 closes and opens contact 11-14 when reaching the lower cut-in value. Since the upper switching point (cut-out pressure) of the reset pressure switch must lie above the maximum cut-out pressure of the apparatus, the switching state remains until the manual reset button is pressed again.

MDR-F .. Htro (SPDT with manual reset as run-dry protection)

Typically, the switch is connected in series with the control circuit. For pressure increase, the manual reset button must be held until the pressure lies beyond the monitoring point. When the pressure falls below the monitoring point, contact 11-12 closes and contact 11-14 opens. When the pressure automatically rises above 10% of the monitored pressure, contact 11-12 opens and contact 11-14 closes again automatically, otherwise, a restart using the manual reset button must be carried out again. NOTICE: Should there not be a rise in pressure when pressing the button, discontinue pressing the button as a fault in the system must be present.

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 2Hmax-S	MDR-F 2 HAA SAH A XXXA015	-	-	0,11 ... 2	430	254065
MDR-F 4Hmax-S	MDR-F 4 HAA SAH A XXXA030	-	-	0,22 ... 4	430	254072
MDR-F 8Hmax-S	MDR-F 8 HAA SAH A XXXA060	-	-	0,5 ... 8	430	254089
MDR-F 10Hmax-S	MDR-F 10 HAA SAH A XXXA075	-	-	0,7 ... 10	430	254096
MDR-F 16Hmax-S	MDR-F 16 HAA SAH A XXXA120	-	-	1 ... 16	430	254102
MDR-F 32Hmax-S	MDR-F 32 HAA SAH A XXXA240	-	-	2 ... 32	430	254119
MDR-F 2Hmin-S *1	MDR-F 2 HAA SAL A 005A015	0,04 ... 1,89	0,07 0,11	0,11 ... 2	430	254126
MDR-F 4Hmin-S *1	MDR-F 4 HAA SAL A 010A030	0,07 ... 3,75	0,15 0,25	0,22 ... 4	430	254133
MDR-F 8Hmin-S *1	MDR-F 8 HAA SAL A 020A060	0,2 ... 7,5	0,3 0,5	0,5 ... 8	430	254140
MDR-F 10Hmin-S *1	MDR-F 10 HAA SAL A 025A075	0,3 ... 9,2	0,4 0,8	0,7 ... 10	430	254157
MDR-F 16Hmin-S *1	MDR-F 16 HAA SAL A 040A120	0,4 ... 15	0,6 1,0	1 ... 16	430	254164
MDR-F 32Hmin-S *1	MDR-F 32 HAA SAL A 080A240	0,8 ... 30	1,2 2,0	2 ... 32	430	254171
MDR-F 2Htro-S	MDR-F 2 HAA SAG A 005AXXX	0,04 ... 1,89	-	-	430	254188
MDR-F 4Htro-S	MDR-F 4 HAA SAG A 010AXXX	0,07 ... 3,75	-	-	430	254195
MDR-F 8Htro-S	MDR-F 8 HAA SAG A 020AXXX	0,2 ... 7,5	-	-	430	254201
MDR-F 10Htro-S	MDR-F 10 HAA SAG A 025AXXX	0,3 ... 9,2	-	-	430	254218
MDR-F 16Htro-S	MDR-F 16 HAA SAG A 040AXXX	0,4 ... 15	-	-	430	254225
MDR-F 32Htro-S	MDR-F 32 HAA SAG A 080AXXX	0,8 ... 30	-	-	430	254232

* lower ... upper end of range

*1 The minimum-pressure to be overseen and the operating-pressure must be in the pressure-spectrum of the cut-in-pressure.

Additional MDR-F pressure switch versions .. Reset function are available on request (e.g. as stainless steel bellows version, with gold-flashed contacts, as high pressure switch etc.).

MDR-F

LARGE NUMBER OF ALTERNATIVES &

UNIVERSAL APPLICATIONS



MDR-F version with die-cast aluminium flange and Viton diaphragm

for **enhanced media resistance**. Pressure switch with industrial cage clamp version.
Pressure connection: H G 3/8" inner thread

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 2HV-S	MDR-F 2 HVA SAA A 005A015	0,04 ... 1,89	0,07 0,11	0,11 ... 2	410	253884
MDR-F 4HV-S	MDR-F 4 HVA SAA A 010A030	0,07 ... 3,75	0,15 0,25	0,22 ... 4	410	253891
MDR-F 8HV-S	MDR-F 8 HVA SAA A 020A060	0,2 ... 7,5	0,3 0,5	0,5 ... 8	410	253907
MDR-F10 HV-S	MDR-F 10 HVA SAA A 040A050	0,3 ... 9,2	0,4 0,8	0,7 ... 10	410	253914
MDR-F 16HV-S	MDR-F 16 HVA SAA A 040A120	0,4 ... 15	0,6 1,0	1 ... 16	410	253921
MDR-F 32HV-S	MDR-F 16 HVA SAA A 100A200	0,8 ... 30	1,2 2,0	2 ... 32	410	253938

* lower ... upper end of range

Additional MDR-F pressure switch versions MDR-F.HV are available on request (e. g. with reset function, with gold-flashed contacts, with plastic flange etc.)

VdS pressure switches for water extinguishing systems / fire-fighting equipments



These pressure switches are primarily conceived for the use in firmly installed water extinguishing systems / fire-fighting equipments and approved from the VdS damage-prevention under the NO. G 4090008.

In particular, selective examinations, the request-profiles, the quality and the functionality intensively are tested.

Dependent on the use there are:

- Alarm pressure switches (MDR-F 2...VdS...), which are manufactured with a pressure range from 0,35 to 1 bar with minimal difference, and
- Pressure switches (MDR-F X...VdS...), with 10, 12,5 or 16 bar set for X, which limit the maximum pressure



VdS pressure switches for water extinguishing systems / fire-fighting equipments

difference between cut-in and cut-out pressure to 1,5 bar.

As MDR-F...VdS with reset function, standard only the alarm pressure switch is as max.-Reset listed. However, it is all VdS pressure switch with each reset function (see overview MDR-F with reset function), alternatively a Viton diaphragm and / or also a flange with 3/8" inner-screw threads on inquiry available.

Moreover, customer-specific boards with own circuits and LED in integrated design are available as well as realisable. Further information can be seen on our homepage: www.condor-cpc.com.

Please take into account that the use of the pressure switch with plastic flange is restricted up to 10 bar.

MDR-F VdS version for water-based extinguishing systems / fire protection with die-cast aluminium flange

and Perbunan diaphragm for water extinguishing systems. Pressure switch with industrial cage clamp version.
Pressure connection: H G 1/2" inner thread

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 2H-S VdS	MDR-F 2 HAB SAA A XXXA007 A		0,1	0,35 ... 1	460	259060
MDR-F 2Hmax-S VdS	MDR-F 2 HAB SAH A XXXA007 A		0,1	0,35 ... 1	460	259077
MDR-F 10H-S VdS	MDR-F 10 HAB SAA A 040A050 A	0,3 ... 8,5	0,4 1,5	0,7 ... 10	460	259084
MDR-F 12H-S VdS	MDR-F 12 HAB SAA A 080A090 A	0,4 ... 11	0,6 1,5	1 ... 12,5	460	259091
MDR-F 16H-S VdS	MDR-F 16 HAB SAA A 110A120 A	0,4 ... 14,5	0,6 1,5	1 ... 16	460	259107

MDR-F VdS overview for water-based extinguishing systems / fire protection MDR-F .. Y...with plastic flange

and Perbunan diaphragm for water extinguishing systems / fire-fighting equipments. Pressure switch with industrial cage clamp version.
Pressure connection: H G 1/2" inner thread

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 2Y-S VdS	MDR-F 2 YAB SAA A XXXA007 A		0,1	0,35 ... 1	410	259145
MDR-F 2Ymax-S VdS	MDR-F 2 YAB SAH A XXXA007 A		0,1	0,35 ... 1	410	259152
MDR-F 10Y-S VdS	MDR-F 10 YAB SAA A 040A050 A	0,3 ... 8,5	0,4 1,5	0,7 ... 10	410	259169

GL Pressure Switch for Ship Building and Applications Intended for Use at Sea



These pressure switches are mostly used in the field of shipping technology, particularly in ship and plant engineering, and are approved by GL (Germanischer Lloyd); one of the largest classification societies in the field of shipping, under No. 86884-10 HH.

The requirement profiles, quality and functionality have been intensively tested by means of specialized, demanding tests.

Our GL pressure switches can be used up to a maximum of 250 bar. Pressure switches fitted with plastic flanges are approved up to 12.5 bar.

All GL pressure switches can also be fitted with a reset button.

Because of the variety of possible pressure switch configurations, please feel free to simply contact us if you have queries regarding special applications or technical requests.



Condor Pressure Switch for ship Building and Applications Intended for Use at Sea are approved by GL (Germanischer Lloyd).

MDR-F GL version GL - MDR-F..H..GLf - with die-cast aluminium flange

and Perbunan diaphragm, GL cable gland, **for shipbuilding and seaworthy applications**. Pressure switch with industrial cage clamp version. Pressure connection: G 3/8" inner thread

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 2H-S GL	MDR-F 2 HAA SAA H 005A015 G	0,04 ... 1,89	0,07 0,11	0,11 ... 2	540	261766
MDR-F 4H-S GL	MDR-F 4 HAA SAA H 010A030 G	0,07 ... 3,75	0,15 0,25	0,22 ... 4	540	261773
MDR-F 8H-S GL	MDR-F 8 HAA SAA H 020A060 G	0,2 ... 7,5	0,3 0,5	0,5 ... 8	540	261780
MDR-F 10H-S GL	MDR-F 10 HAA SAA H 040A050 G	0,3 ... 9,2	0,4 0,8	0,7 ... 10	540	261797
MDR-F 12H-S GL	MDR-F 12 HAA SAA H 080A090 G	0,4 ... 11	0,6 1,5	1 ... 12,5	540	261896
MDR-F 16H-S GL	MDR-F 16 HAA SAA H 040A120 G	0,4 ... 15	0,6 1,0	1 ... 16	540	261803
MDR-F 32H-S GL	MDR-F 32 HAA SAA H 100A200 G	0,8 ... 30	1,2 2,0	2 ... 32	540	261810

* lower ...upper end of range

MDR-F overview GL - MDR-F .. HH..GL - High pressure switch (up to 250 bar) with plastic plunger

sensing element with stainless steel connection, GL Cable gland, **for shipbuilding and seaworthy applications**. Pressure switch with industrial cage clamp version. Pressure Connection: HH G 3/8" inner thread

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 60HH-S GL	MDR-F 60 HHA SAA H 200A400 G	4 ... 52 bar	4 8	8 ... 60 bar	570	261858
MDR-F 120HH-S GL	MDR-F 120 HHA SAA H 200A800 G	8 ... 104 bar	8 16	16 ... 120 bar	570	261865
MDR-F 250HH-S GL	MDR-F 250 HHA SAA H 100B200 G	14 ... 226 bar	12 24	26 ... 250 bar	570	261872

* lower ...upper end of range



You need more information? - Request our special catalog - "GL" -products!



Control pressure switch MDR - F

MDR-F ATEX version in explosion-risk units for mining and chemical industries



The pressure switch MDR-F serves as a on and off switch for intrinsically safe circuits dependant upon the pressure of various media.

This switch can be used in firedamp-susceptible mines, explosive gas atmospheres and explosive dust atmospheres. (Groups I, II, III)

Because we, as a recognized ATEX production plant, are able to manufacture pressure switches with a wide variety of configurations, please feel free to simply contact us if you have queries regarding special applications or technical requests.

Application: Mining (firedamp, coal dust) Ex I M2 Ex ia I Mb

MDR-F overview ATEX - MDR-F .. JG...Ex - with zinc die-cast flange

and NBR diaphragm. Pressure switch with industrial cage clamp version and plastic cover. Pressure connection: G 3/8" inner thread

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 2JG-S Ex I M2	MDR-F 2 JAA SBA J 005A015 B2XX ---1pce.a	0,04...1,89	0,07 0,11	0,11...2	610	262204
MDR-F 4JG-S Ex I M2	MDR-F 4 JAA SBA J 010A030 B2XX ---1pce.a	0,07...3,75	0,15 0,25	0,22...4	610	262213
MDR-F 8JG-S Ex I M2	MDR-F 8 JAA SBA J 020A060 B2XX ---1pce.a	0,2...7,5	0,3 0,5	0,5...8	610	262220
MDR-F 10JG-S Ex I M2	MDR-F 10 JAA SBA J 040A050 B2XX ---1pce.a	0,3...9,2	0,4 0,8	0,7...10	610	262237
MDR-F 16JG-S Ex I M2	MDR-F 16 JAA SBA J 040A120 B2XX ---1pce.a	0,4...15	0,6 1	1...16	610	262251
MDR-F 32JG-S Ex I M2	MDR-F 32 JAA SBA J 100A200 B2XX ---1pce.a	0,8...30	1,2 2	2...32	610	262268

MDR-F overview ATEX - MDR-F .. JHG...Ex - High pressure switch (up to 250 bar) with plastic plunger

and stainless steel and zinc die-cast flange. Pressure switch with industrial cage clamp version and plastic cover. Pressure connection: G 3/8" inner thread with choke

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 60JHG-S Ex I M2	MDR-F 60 JHA SBA J 200A400 B2XX ---1pce.a	4...52	4 8	8...60	620	262275
MDR-F 120JHG-S Ex I M2	MDR-F 120 JHA SBA J 200A800 B2XX ---1pce.a	8...104	8 16	16...120	620	262282
MDR-F 250JHG-S Ex I M2	MDR-F 250 JHA SBA J 100B200 B2XX ---1pce.a	14...226	12 24	26...250	620	262299

MDR-F overview ATEX - MDR-F .. JEG...Ex - with zinc die-cast flange

Pressure switch with stainless steel pressure transducer with stainless steel and zinc die-cast flange. Pressure switch with industrial cage clamp version and plastic cover. Pressure connection: G 1/4" inner thread

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 12JEG-S Ex I M2	MDR-F 12 JEC SBA J 060A070 B2XX ---1pce.a	0,5...11,2	0,5 0,8	1...12	670	262503
MDR-F 30JEG-S Ex I M2	MDR-F 30 JEC SBA J 160A200 B2XX ---1pce.a	1...26,4	3,0 3,6	4...30	670	262510

MDR-F overview ATEX - MDR-F .. JG...Ex - for Vacuum monitoring with zinc die-cast flange

and Perbunan diaphragm. Pressure switch with industrial cage clamp version and plastic cover. Pressure connection: H G 1/4" inner thread

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 03JG-S Ex I M2	MDR-F 03 JAC SBA J 010V030 B2XX ---1pce.a	-0,9...0,15	0,15	-0,75...0,3	658	262558
MDR-F 3JG-S Ex I M2	MDR-F 3 JAC SBA J 100V150 B2XX ---1pce.a	-0,9...2,6	0,2 0,4	-0,7...3	672	262565

Control pressure switch MDR - F

Application: Industry (gases, fumes) Ex II 2G Ex ia IIC T6 Gb and industry (dust) Ex II 2D Ex ia IIIC T85°C Db

MDR-F overview ATEX - MDR-F .. HG...Ex - with zinc die-cast flange

and NBR diaphragm. Pressure switch with industrial cage clamp version and aluminium die-cast cover.
Pressure connection: G 3/8" inner thread

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 2JG-S Ex II 2 GD	MDR-F 2 JAA SBA J 005A015 C2XX ---1pce.a	0,04...1,89	0,07 0,11	0,11...2	815	278060
MDR-F 4JG-S Ex II 2 GD	MDR-F 4 JAA SBA J 010A030 C2XX ---1pce.a	0,07...3,75	0,15 0,25	0,22...4	815	278072
MDR-F 8JG-S Ex II 2 GD	MDR-F 8 JAA SBA J 020A060 C2XX ---1pce.a	0,2...7,5	0,3 0,5	0,5...8	815	278085
MDR-F 10JG-S Ex II 2 GD	MDR-F 10 JAA SBA J 040A050 C2XX ---1pce.a	0,3...9,2	0,4 0,8	0,7...10	815	278092
MDR-F 16JG-S Ex II 2 GD	MDR-F 16 JAA SBA J 040A120 C2XX ---1pce.a	0,4...15	0,6 1	1...16	815	278108
MDR-F 32JG-S Ex II 2 GD	MDR-F 32 JAA SBA J 100A200 C2XX ---1pce.a	0,8...30	1,2 2	2...32	815	278115

MDR-F overview ATEX - MDR-F .. HHG...Ex - High pressure switch (up to 250 bar) with plastic plunger

and with stainless steel and zinc die-cast flange. Pressure switch with industrial cage clamp version and aluminium die-cast cover.
Pressure connection: G 3/8" inner thread with choke

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 60JHG-S Ex II 2 GD	MDR-F 60 JHA SBA J 200A400 C2XX ---1pce.a	4...52	4 8	8...60	910	278122
MDR-F 120JHG-S Ex II 2 GD	MDR-F 120 JHA SBA J 200A800 C2XX ---1pce.a	8...104	8 16	16...120	910	278139
MDR-F 250JHG-S Ex II 2 GD	MDR-F 250 JHA SBA J 100B200 C2XX ---1pce.a	14...226	12 24	26...250	910	278146

MDR-F overview ATEX - MDR-F .. HEG - Pressure switch with stainless steel pressure transducer

and with stainless steel and zinc die-cast flange. Pressure switch with industrial cage clamp version and aluminium die-cast cover.
Pressure connection: G 1/4" inner thread

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 12JEG-S Ex II 2 GD	MDR-F 12 JEC SBA J 060A070 C2XX ---1pce.a	0,5...11,2	0,5 0,8	1...12	860	278153
MDR-F 30JEG-S Ex II 2 GD	MDR-F 30 JEC SBA J 160A200 C2XX ---1pce.a	1...26,4	3,0 3,6	4...30	860	278160

MDR-F overview ATEX - MDR-F .. HG...Ex - for monitoring vacuum with zinc die-cast flange

and with NBR diaphragm. Pressure switch with industrial cage clamp version and aluminium die-cast cover.
Pressure connection: G 1/4" inner thread

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 03JG-S Ex II 2 GD	MDR-F 03 JAC SBA J 010V030 C2XX ---1pce.a	-0,9...0,15	0,15	-0,75...0,3	848	278177
MDR-F 3JG-S Ex II 2 GD	MDR-F 3 JAC SBA J 100V150 C2XX ---1pce.a	-0,9...2,6	0,2 0,4	-0,7...3	862	278184



You need more information? -
Request our special catalog - "ATEX" -products!



Control pressure switch MDR - F

MDR-F UL version for the North American market



Pressure switches are designed for the North American market and were approved by Underwriters Laboratories, Inc. (UL) under the approval number E86689. During special high-demanding examinations, requirements, quality and functionality

were tested intensively. Due to the variety of possible pressure switch versions, please simply contact us for questions about special applications or technical requests.

MDR-F overview UL - MDR-F .. H...UL - Pressure switch with aluminium die-cast flange

and with NBR diaphragm. Pressure switch with industrial cage clamp version.
Pressure connection: G 3/8" inner thread*)

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (psi)	Adjustable cut-out pressure (psi)	Weight (in g)	Part No.
MDR-F 2H-S UL	MDR-F 2 HAA SAA A 008D020 EXXX ---1pce.a	0,6...27	1 2	1,6...29	460	269885
MDR-F 4H-S UL	MDR-F 4 HAA SAA A 015D040 EXXX ---1pce.a	1...54	2 4	3...58	460	269892
MDR-F 8H-S UL	MDR-F 8 HAA SAA A 030D060 EXXX ---1pce.a	3...108	4 8	7...116	460	269908
MDR-F 10H-S UL	MDR-F 10 HAA SAA A 060D075 EXXX ---1pce.a	4...133	6 12	10...145	460	269915
MDR-F 16H-S UL	MDR-F 16 HAA SAA A 080D160 EXXX ---1pce.a	6...217	9 15	15...232	460	269922
MDR-F 32H-S UL	MDR-F 32 HAA SAA A 145D290 EXXX ---1pce.a	12...435	18 29	30...464	460	269939

*) 1/4"NPT on request

MDR-F overview UL - MDR-F .. HH...UL - High pressure switch (up to 3625 psi) with plastic plunger

with stainless steel and aluminium die-cast flange. Pressure switch with industrial cage clamp version.
Pressure connection: G 3/8" inner thread with choke

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (psi)	Adjustable cut-out pressure (psi)	Weight (in g)	Part No.
MDR-F 60HH-S UL	MDR-F 60 HHA SAA A 290D580 EXXX ---1pce.a	58...754	58 116	116...870	570	269946
MDR-F 120HH-S UL	MDR-F 120 HHA SAA A 058E116 EXXX ---1pce.a	116...1508	116 232	232...1740	570	269953
MDR-F 250HH-S UL	MDR-F 250 HHA SAA A 145E290 EXXX ---1pce.a	203...3277	174 348	377...3625	570	269960

MDR-F overview UL - MDR-F .. H...UL - for monitoring vacuum with aluminium die-cast flange

and with NBR diaphragm. Pressure switch with industrial cage clamp version.
Pressure connection: G 1/4" inner thread

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (psi)	Adjustable cut-out pressure (psi)	Weight (in g)	Part No.
MDR-F 03H-S UL	MDR-F 03 HAC SAA A 010V030 EXXX ---1pce.a	-13 ... 2,2	2,2	-10,9...4,4	508	269977
MDR-F 3H-S UL	MDR-F 3 HAC SAA A 100V150 EXXX ---1pce.a	-13 ... 37,7	2,9 5,8	-10,2...43,5	522	269984

Control pressure switch MDR - F

MDR-F vacuum monitoring version

These pressure switches can be used as vacuum switches for compressible materials (gases), but also for liquids, within the normal pressure range.

Their range of application includes, for example, the fields of automation, transportation, heating, climate-control and ventilation.

They have been designed primarily for use in the rough vacuum range (technical vacuum) and are distinguished by their small pressure differences and high level of switching precision.

They offer universal application potential as openers, closers or changers.

MDR-F overview - MDR-F .. H (G) - for Vacuum monitoring with aluminium die-cast flange

and with Perbunan diaphragm - for oil, water and air etc. . Pressure switch with industrial cage clamp version.
Pressure connection: H G 1/4" inner thread - suffix "G" for gold-flashed contacts

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 03H-S	MDR-F 03 HAC SAA A 010V030 XXXX	-0,9 ... 0,15	0.15	-0.75 ... 0.3	508	264019
MDR-F 03HG-S	MDR-F 03 HAC SBA A 010V030 XXXX	-0,9 ... 0,15	0.15	-0.75 ... 0.3	508	264026
MDR-F 3H-S	MDR-F 3 HAC SAA A 100V150 XXXX	-0,9 ... 2.6	0.2 0.4	-0,7 ... 3	522	264057
MDR-F 3HG-S	MDR-F 3 HAC SBA A 100V150 XXXX	-0,9 ... 2.6	0.2 0.4	-0,7 ... 3	522	264064

MDR-F DPDT version

This pressure switch is characterized by being equipped with a DPDT. As a result, the switch is even more flexible in its range of applications. Due to the variety of possible

pressure switch versions, please simply contact us for questions about special applications or technical requests.

MDR-F overview - MDR-F .. H...LF - with aluminium die-cast flange

and with NBR diaphragm - for oil, water and air etc. . Pressure switch with industrial cage clamp version.
Pressure connection: G 3/8" inner thread

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 2H-2W-S	MDR-F 2 HAA LFA D 005A015 XXXX ---1pce.a	0.04 ... 1.84	0.08 ... 0.16	0.12 ... 2	460	269717
MDR-F 4H-2W-S	MDR-F 4 HAA LFA D 010A030 XXXX ---1pce.a	0.07 ... 3.65	0.18 0.35	0.25 ... 4	460	269724
MDR-F 8H-2W-S	MDR-F 8 HAA LFA D 020A060 XXXX ---1pce.a	0.2 ... 7.3	0.35 0.7	0.55 ... 8	460	269731
MDR-F 10H-2W-S	MDR-F 10 HAA LFA D 040A050 XXXX ---1pce.a	0.3 ... 8.9	0.45 1.1	0.75 ... 10	460	269748
MDR-F 16H-2W-S	MDR-F 16 HAA LFA D 040A120 XXXX ---1pce.a	0.4 ... 14.6	0.7 1,4	1.1 ... 16	460	269755
MDR-F 32H-2W-S	MDR-F 32 HAA LFA D 100A200 XXXX ---1pce.a	0.8 ... 29.2	1.4 2.8	2.2 ... 32	460	269762

MDR-F Type overview - MDR-F .. H...LF - with plastic flange

and with NBR diaphragm - for example, for purified water. Pressure switch with industrial cage clamp version.
Pressure connection: G 3/8" inner thread

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-F 2Y-2W-S	MDR-F 2 YAA LFA D 005A015 XXXX ---1pce.a	0.04 ... 1.84	0.08 0.16	0.12 ... 2	410	269779
MDR-F 4Y-2W-S	MDR-F 4 YAA LFA D 010A030 XXXX ---1pce.a	0.07 ... 3.65	0.18 0.35	0.25 ... 4	410	269786
MDR-F 8Y-2W-S	MDR-F 8 YAA LFA D 020A060 XXXX ---1pce.a	0.2 ... 7.3	0.35 0.7	0.55 ... 8	410	269793
MDR-F 10Y-2W-S	MDR-F 10 YAA LFA D 040A050 XXXX ---1pce.a	0.3 ... 8.9	0.45 1.1	0.75 ... 10	410	269709
MDR-F 16Y-2W-S	MDR-F 16 YAA LFA D 040A120 XXXX ---1pce.a	0.4 ... 14.6	0.7 1,4	1.1 ... 16	410	269716



Control pressure switch MDR - F

Technical data MDR-F standard version	
Rated operational current I_e AC 1 $U_e=240\text{ V (1~)}$	10 A
Rated operational current I_e AC 15 $U_e=240\text{ V (1~)}$	4 A
Rated operational current I_e DC 13 $U_e=240\text{ V (1~)}$	0,1 A
Permissible motor rating 1~ 230 V	0,55 kW
Motor switching capacity (UL 508, CSA 22.2) $U_e=125\text{ VAC}$	0,5 HP
Motor switching capacity (UL 508, CSA 22.2) $U_e=250\text{ VAC}$	0,5 HP
Rated operational current I_e (UL 508, CSA 22.2) $U_e=250\text{ VAC}$	15 A
Rated operational current I_e (UL 508, CSA 22.2) $U_e=12\text{ VDC}$	6 A

Technical data MDR-F... Ex	
Maximum switching voltage U_i	200 V
Maximum switching strength I_i	3 A
Maximum internal capacity C_i	negligible
Maximum internal conductivity I_i	negligible
Ambient temperature T_a	$-30\text{ °C} \leq T_a \leq +65\text{ °C}$
Only for connection to a separately examined and certified intrinsically safe circuit in the protection type: Ex ia I Mb (MDR-F... JG... Ex) Ex ia IIC Ex ia IIA, IIB, IIC T6 Gb (MDR-F ... HG...Ex) Ex ia IIIC T85°C Db (MDR-F ... HG...Ex)	

Technical data MDR-F.(G) - gold-flashed contact	
Rated operational current I_e $U_e=30\text{ V (1~)}$	400 mA
Permissible motor rating 1~ 30 V	12 VA
Motor switching capacity (UL 508, CSA 22.2) $U_e=125 - 250\text{ VAC}$	0,5 HP
Rated operational current I_e (UL 508, CSA 22.2) $U_e=250\text{ VAC}$	10 A
Rated operational current I_e (UL 508, CSA 22.2) $U_e=12\text{ VDC}$	6 A

Technical data MDR-F		
Bursting strength / bar	MDR-F.H	4 x max. cut-out pressure
	MDR-F.HE	1,3 x max. cut-out pressure
	MDR-F.Y ($\leq 12,5\text{ bar}$)	4 x max. cut-out pressure
	MDR-F.Y ($> 12,5\text{ bar}$)	2,5 x max. cut-out pressure

Technical data MDR-F	
Vibration resistance 10 bis 1000 Hz	4 g
Degree of protection acc. to DIN 40 050/IEC 529 With rubber grommets	IP 54
Degree of protection acc. to DIN 40 050/IEC 529 With cable glands M20	IP 65
Ambient temperature range	$-20\text{ °C} \dots +70\text{ °C}$
Cross-sections Cage clamp (without cable end sleeve)	1,5 mm ²
Cross-sections Screw clamp	2,5 mm ²

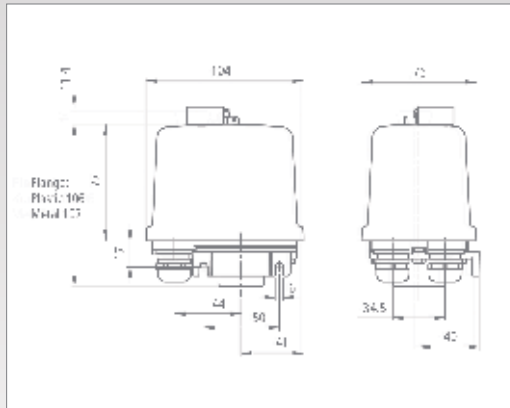
Technical data MDR-F		
Perm. media temperature:	MDR-F.H / HH	+ 70 °C
	MDR-F.HV	+ 130 °C
	MDR-F.HE	+ 200 °C
	MDR-F.Y	+ 50 °C
Repeatability	<2% FS	

Attention: Please, regard the MDR-F instructions enclosing the pressure switch for the max. operating pressure and the max. inspection pressure.

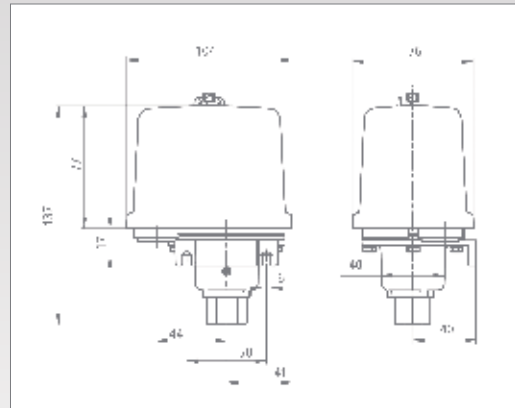
Media resistance MDR-F.	
A detailed overview of diaphragm media resistance for all pressure switches can be found on page 22. Please read the information carefully	

Control pressure switch MDR - F

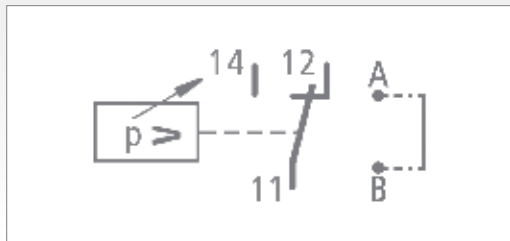
Dimensions MDR - F / Circuit diagram MDR-F



Pressure switch MDR – F.H / ..Y / ..HV



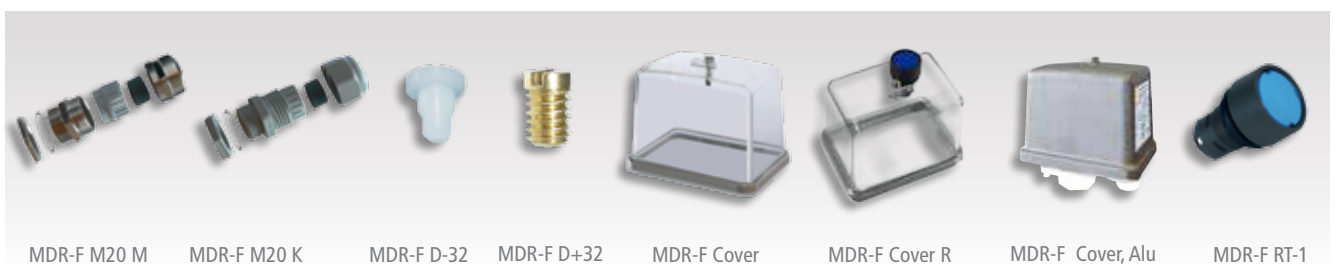
Pressure switch MDR – F.. HH / ..HE



Accessories

Order reference	Description	Weight (in g)	Part No.
Cable glands			
MDR-F M20 M	Cable gland M20 metal	35	254249
MDR-F M20 K	Cable gland M20 plastic	18	259503
Throttle			
MDR-F D-32	MDR-F up to 32 bar	1	254256
MDR-F D+32	MDR-F as of 32 bar	2	254263
Covers			
MDR-F Cover	MDR-F Cover, transparent, Standard	90	254270
MDR-F Cover R	MDR-F Cover, transparent, with Reset push-button - for manual reset	115	254287
MDR-F Cover Alu	MDR-F Cover, Aluminium	252	265436
Reset push-button			
MDR-F RT-1	Reset push-buttons for mounting on cover R	25	254294

Additional accessories (e.g. pressure connectors) on demand



MDR-F M20 M

MDR-F M20 K

MDR-F D-32

MDR-F D+32

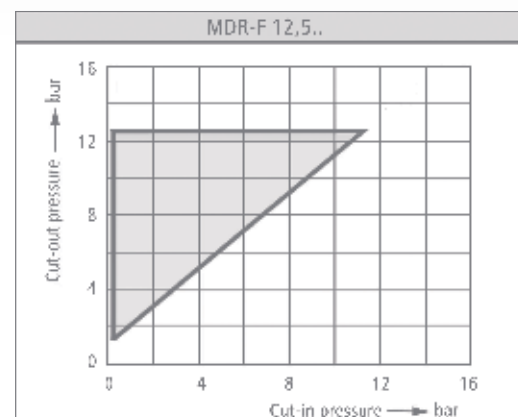
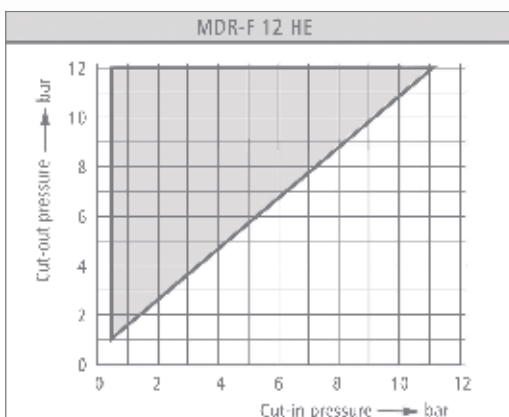
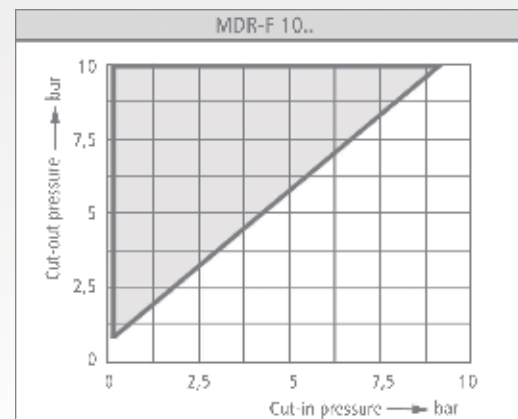
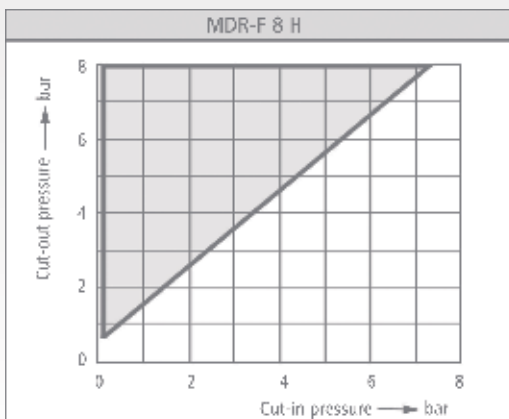
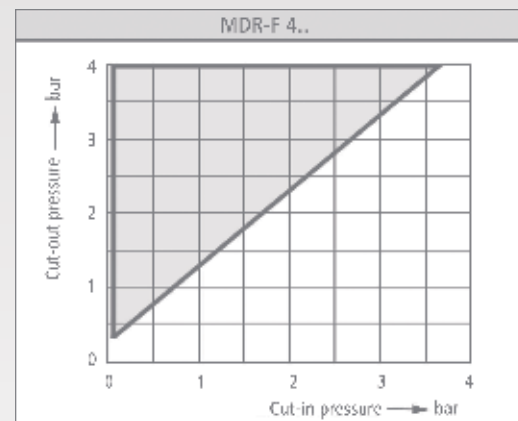
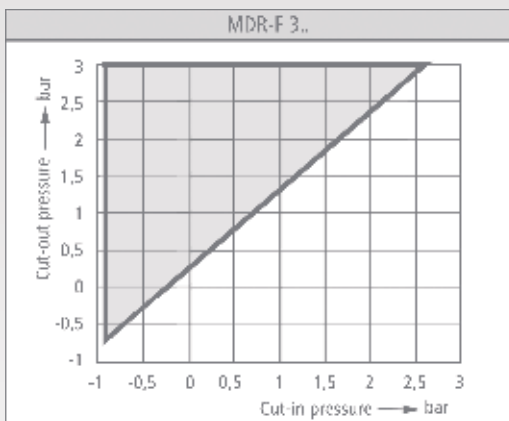
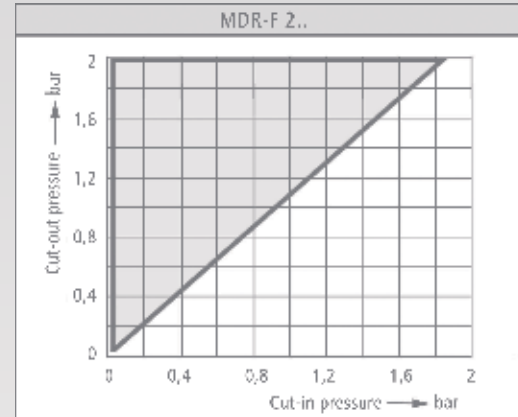
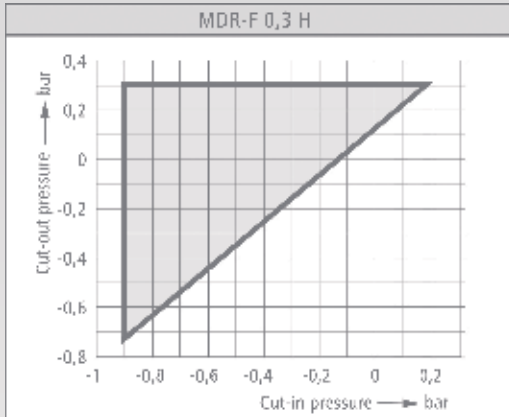
MDR-F Cover

MDR-F Cover R

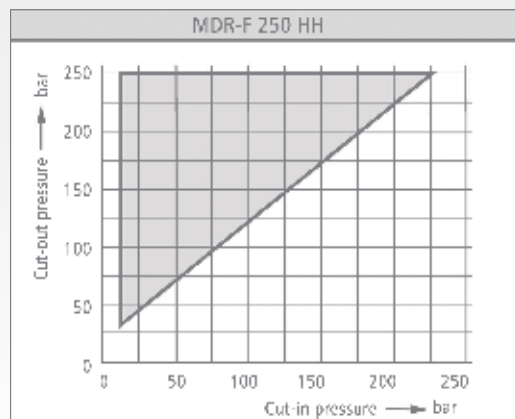
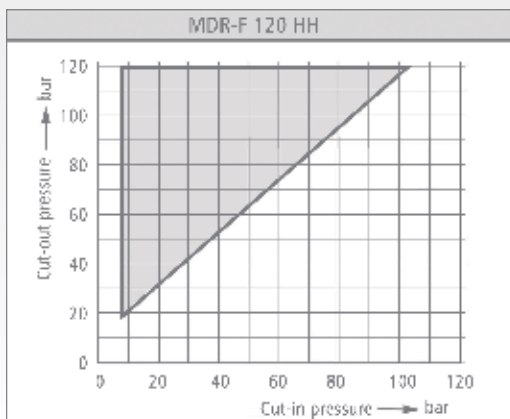
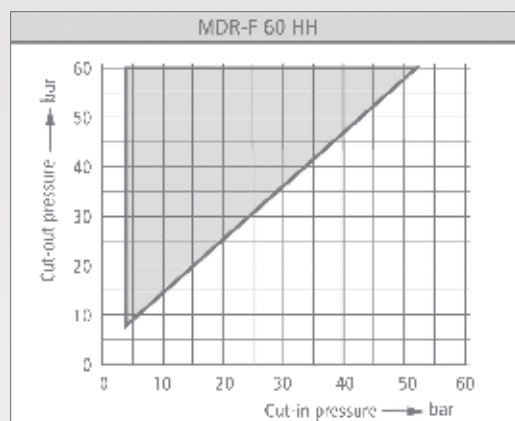
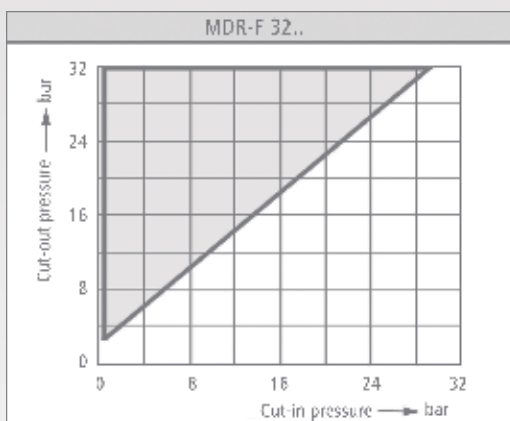
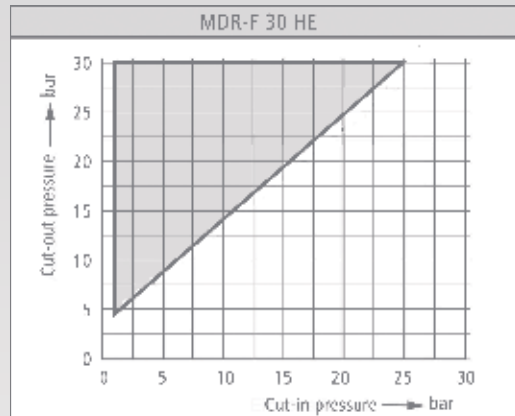
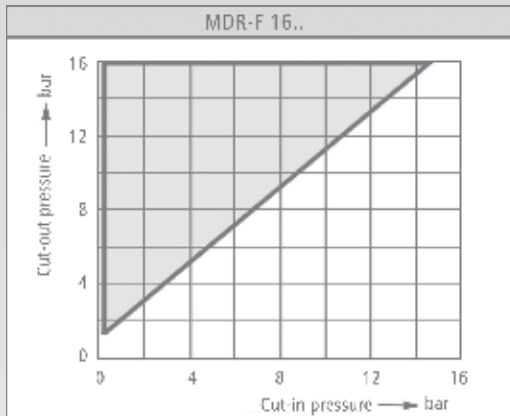
MDR-F Cover, Alu

MDR-F RT-1

Pressure diagrams MDR-F



Pressure diagrams MDR-F



Note: All pressure diagrams do not apply to the "DPDT" version and not for "NO / NC". If needed, upon request.

Control pressure switch MDR - P

...for the mass production, perfect for industrial customers!



- Compact pressure switch - compact and therefore easy to install
- Factory fixed pressure settings (by customer's requirements)
- High repeatability
- Customer-specific configuration
- 1 SPDT
- Acc. to EN 60947
- Degree of Protection IP 65
- Flange = brass

Primarily for mass production, perfect for industrial customers!

The CONDOR MDR-P control pressure switch can be universally used. Due to compact design, standardized electrical plug-and-socket connection and high IP protection, this switch is a suitable application for mass productions. The MDR-P is provided with change-over contacts (SPDT) and is suitable for

monitoring and controlling the pressure of liquids or gaseous media. The cut-in and cut-out pressure settings are set at our factory according to the customer's requirements.

Technical data MDR P acc. to EN 60947	
Rated operating current I_e AC 1 $U_e=240\text{ V (1~)}$	10 A
Rated operating current I_e AC 15 $U_e=240\text{ V (1~)}$	4 A
Rated operating current I_e DC 13 $U_e=240\text{ V (1~)}$	0,1 A
Permissible motor rating 1~ 230 V	0,55 kW
Mechanical life (AC 15) Cycles	$> 1 \times 10^6$
Mechanical life Cycles	$> 1 \times 10^6$
Max. electrical cycles Cycles/h	600
Max. mechanical cycles Cycles/h	600
Bursting strength P_z	$> 60\text{ bar}$

Technical data MDR P acc. to EN 60947	
Vibration resistance:	4 g (bei 10 bis 1000 Hz)
Temperature range:	- 25 C°** bis + 70 C°
Protection acc. to EN 60529	IP 65

** lower temperatures on request

Media resistance MDR-P
A detailed overview of diaphragm media resistance for all pressure switches can be found on page 22. Please read the information carefully.

MDR-P

Because the MDR-P was essentially conceived for our product line by the customer, there should be no need to adjust the pressure settings after manufacture.

For the pressure switch to be configured in the CONDOR-factory, the start-up and shutdown pressures are required.

The switching points can be established in two ways, according to the following diagram:

1. Calculation of the possible shutdown pressure with a stated start-up pressure (blue line)

For example, with a start-up pressure of 8 bar, a horizontal line will be plotted in the pressure diagram at the level of the start-up pressure.

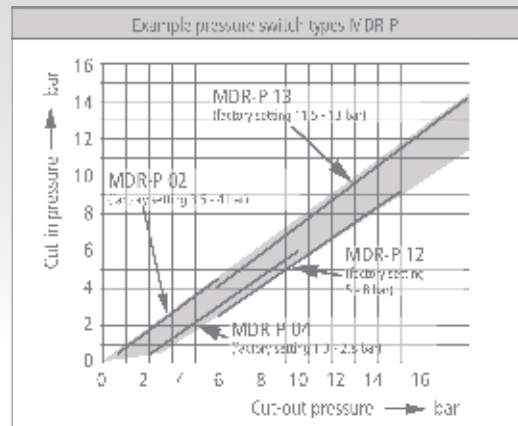
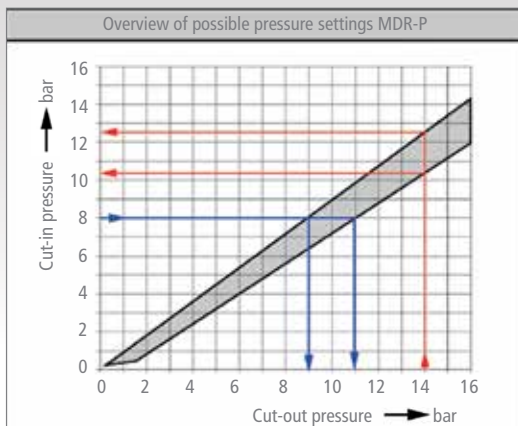
All shutdown pressures in the diagram located on this line, which can be calculated with a vertical line on the coordinates axis, can then be configured. In this case you can select shutdown pressures between 9 and 11 bar.

2. Calculation of the possible start-up pressure with a stated shutdown pressure (red line)

For example, with a shutdown pressure of 14 bar, a vertical line will be plotted in the pressure diagram at the level of the shutdown pressure.

All start-up pressures in the diagram located on this line, which can be calculated with a horizontal line on the coordinates axis, can then be configured.

In this case you can select start-up pressures between 10.4 and 12.5 bar.



Type Overview MDR-P with brass flange

Pressure Switch with NBR diaphragm, 1 SPST, 10-piece packing unit

Pressure connection: G 1/4" outer thread brass, connection configuration according to DIN

Order reference	Adjustable cut-in pressure (bar)	Pressure difference (bar)*	Adjustable cut-out pressure (bar)	Factory setting (bar)	Weight in g pro 10 Stück	Article number
MDR-P 23	0,2...4,5	0,3 ... 0,5	0,5...5	3,5 - 4,0	1050	270027
MDR-P 24	0,5...6	1,5 ... 2,5	2...8,5	1,3 - 2,8	1050	270034
MDR-P 12	2,5...9,2	2,5 ... 3,8	5...13	5,0 - 8,0	1050	270041
MDR-P 13	4...14,2	1,0 ... 1,8	5...16	11,5 - 13	1050	270058

* lower ... upper end of range
More pressure settings on request.

Sample order:

MDR-P

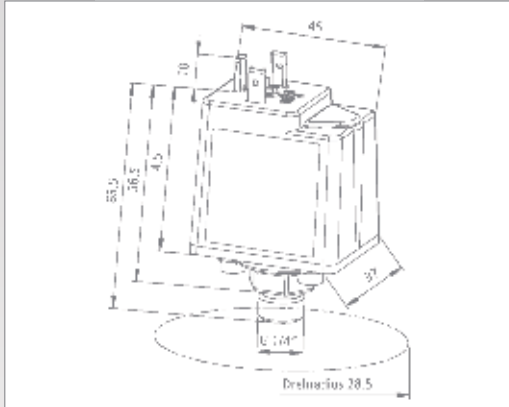
Cut-in pressure setting 1.3 bar or also known as:

Cut-out pressure setting 2.8 bar Article No. 270034

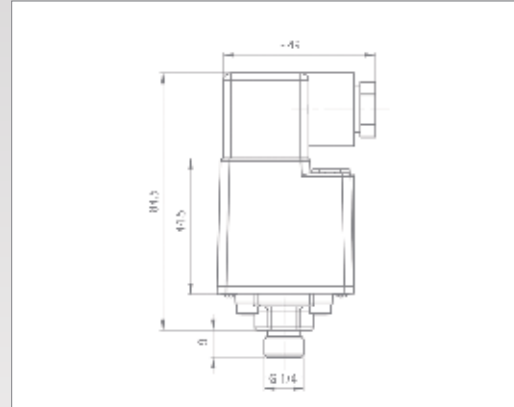
Plug connector according to DIN

Further diaphragm materials and changers with gold contacts available upon request. An available alternative for a DIN plug connection is a special variation (see next page).

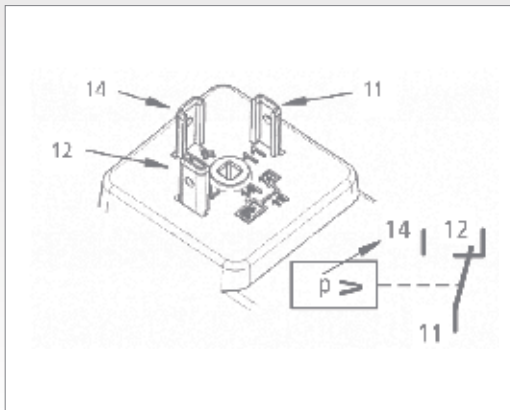
Dimensions / Circuit diagram MDR-P



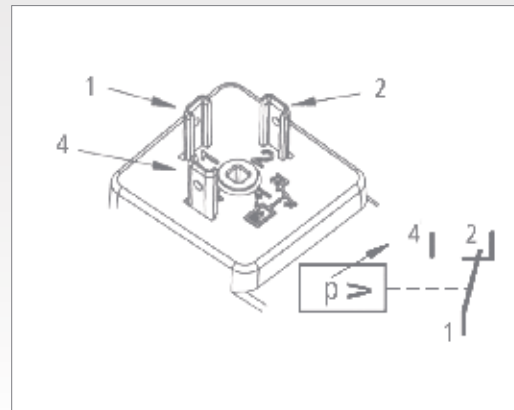
Pressure switch MDR-P



Pressure switch MDR-P



Standard version MDR-P



Special version MDR-P

Accessories MDR-P

Order reference	Description	Weight (in g)	Part No.
	Connection		
MDR-P LD	MDR-P cable socket, 10 pieces (DIN EN 175301-803)	220 g	263951



MDR-P cable socket

Control pressure switch MDR - K

Control pressure switch MDR - K

...for the mass production, perfect for industrial customers!



- OEM applications
- Robust control pressure switch
- Simple assembly
- With bayonet coupling
- 2 SPDT's
- Acc. to EN 60947
- Degree of Protection IP 67
- Flange = aluminium die-cast
- **Factory fixed pressure settings (by customer's requirements)**

The MDR-K control pressure switch is distinguished by its robust construction and the fact that it is fitted with 2 sets of change-over contacts. It is ideally suited for applications for which two galvanically isolated contacts are required, regardless of whether they are openers or closers.

This pressure switch was specially designed for use in critical areas (water) or for use outdoors, as it has the highest possible protection rating, IP 67, combined with an electrical connection in the form of a bayonet coupling.

Type overview MDR-K with aluminium die-cast flange

and NBR diaphragm. Pressure switch with bayonet coupling.
Pressure connection: G 3/8" inner thread

Order reference	Type Code	Adjustable cut-in pressure (bar)	Smallest pressure diff. (bar)*	Adjustable cut-out pressure (bar)	Weight (in g)	Part No.
MDR-K 2	MDR-K 2 HAK KCA X 010A020	0,4 ... 1,8	0,1 0,2	0,5 ... 3		264514
MDR-K 6	MDR-K 6 HAK KCA X 030A040	1,3 ... 5,5	0,2 0,5	1,5 ... 7		264521
MDR-K 11	MDR-K 11 HAK KCA X 080A090	5,3 ... 10,4	0,4 0,6	5,7 ... 12		264539

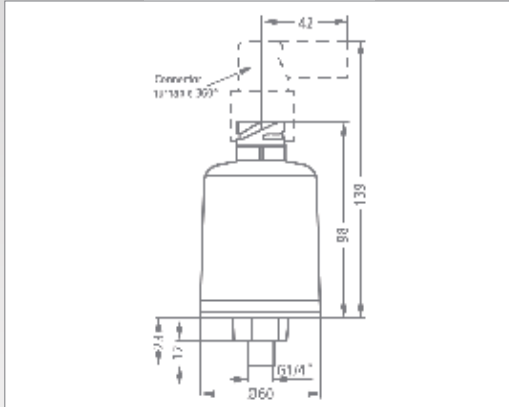
Note: More pressure settings on request.

Technical data MDR K acc. to EN 60947	
Rated operating current I_e AC 1 $U_e=240$ V (1~)	10 A
Rated operating current I_e AC 15 $U_e=240$ V (1~)	4 A
Rated operating current I_e DC 13 $U_e=240$ V (1~)	0,1 A
Permissible motor rating 1~ 230 V	0,55 kW
Mechanical life (AC 15) Cycles	> 1 x 10 ⁶
Mechanical life Cycles	> 1 x 10 ⁶
Max. electrical cycles Cycles/h	600
Max. mechanical cycles Cycles/h	600
Bursting strength Pz	> 60 bar

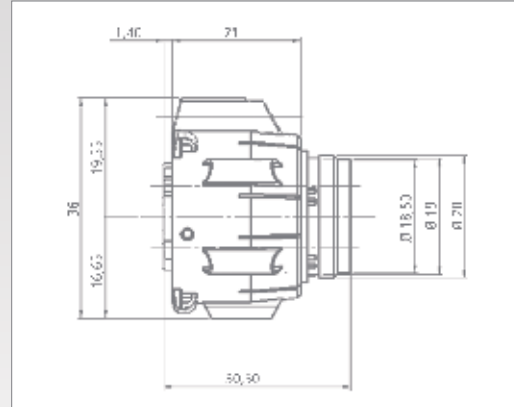
Technical data MDR K acc. to EN 60947	
Vibration resistance	4 g (bei 10 bis 1000 Hz)
Temperature range	- 40 C° bis + 70 C°
Protection acc. to EN 60529	IP 67

Media resistance MDR-K	
A detailed overview of diaphragm media resistance for all pressure switches can be found on page 22. Please read the information carefully.	

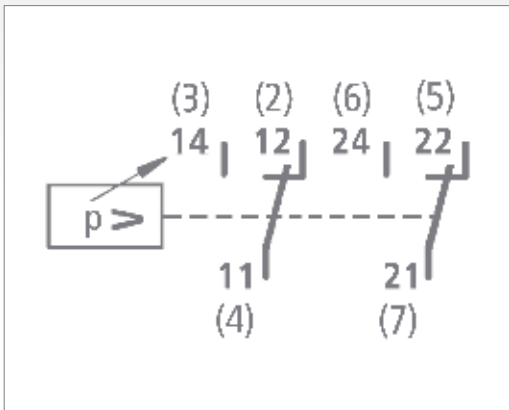
Dimensions / Circuit diagram MDR - K



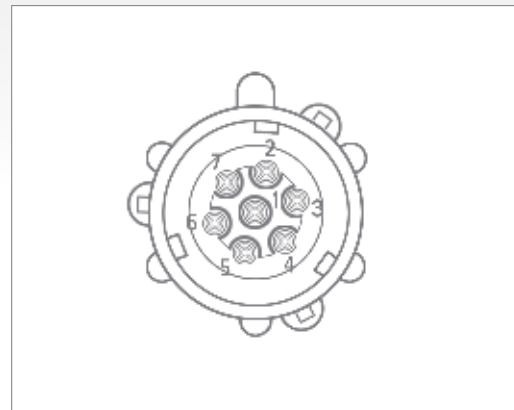
Pressure switch MDR - K



MDR-K bayonet coupling



Circuit diagram MDR - K



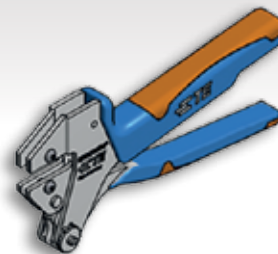
MDR-K bayonet coupling

Accessories MDR-K

Order reference	Description	Weight (in g)	Part No.
	Connection		
MDR-K BK	MDR-K bayonet coupling (ISO 15170-1)	20 g	264545



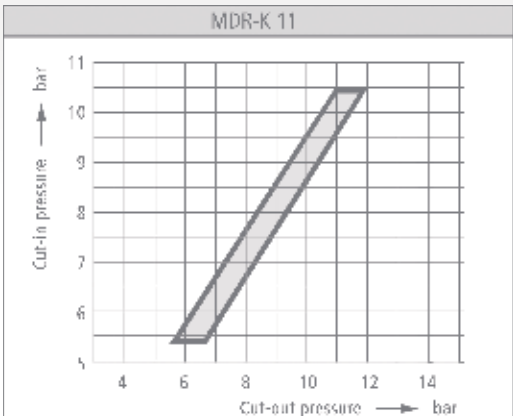
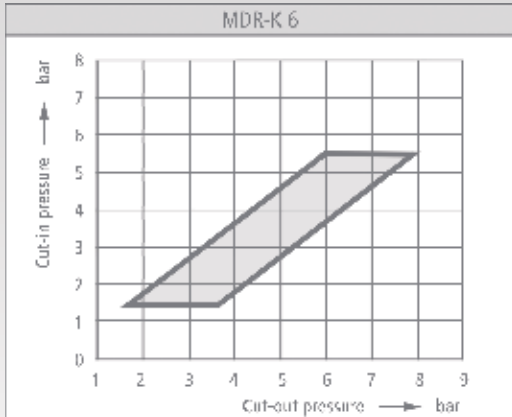
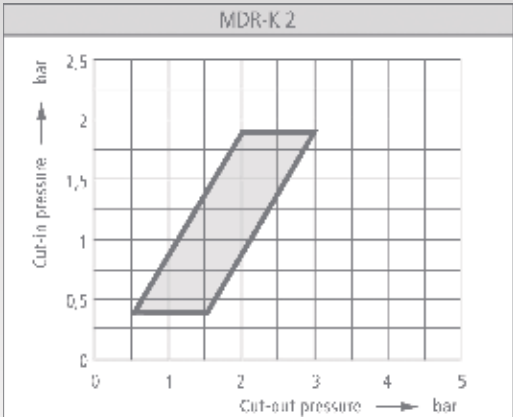
MDR-K bayonet coupling



"Crimping tool"

To connect the six single-core cables 0,75 mm² at the bayonet coupling, a crimping tool is needed (z. Ex. Crimping Hand tool PN539635-1 / Tyco Electronics).

Pressure diagrams MDR - K



Control pressure switch MDR 43



- Max. cut-out pressure 16 bar
- Transparent cover
- 1 N.C. + 1 N.O.
- Acc. to EN 60947
- Flange = Die-cast aluminium

Order reference	Type Code	ON / OFF Rotary knob	Pressure range P _{OFF} in bar	Flange	Weight (in g)	Part No.
MDR 43/3	MDR-43 BAA BAAA xxxA020 XAA XXX	-	0,5 - 3	G 1/2" Alu	420	212775
MDR 43/3	MDR-43 BBA BAAA xxxA020 XAA XXX	-	0,5 - 3	G 1/4" Alu	420	212782
MDR 43/6	MDR-43 DAA BAAA xxxA040 XAA XXX	-	2,5 - 6	G 1/2" Alu	420	212799
MDR 43/6	MDR-43 DBA BAAA xxxA040 XAA XXX	-	2,5 - 6	G 1/4" Alu	420	212805
MDR 43/11	MDR-43 GAA BAAA xxxA090 XAA XXX	-	5 - 11	G 1/2" Alu	420	212812
MDR 43/11	MDR-43 GBA BAAA xxxA090 XAA XXX	-	5 - 11	G 1/4" Alu	420	212829
MDR 43/16	MDR-43 HAA BAAA xxxA120 XAA XXX	-	8 - 16	G 1/2" Alu	420	212836
MDR 43/16	MDR-43 HBA BAAA xxxA120 XAA XXX	-	8 - 16	G 1/4" Alu	420	212843

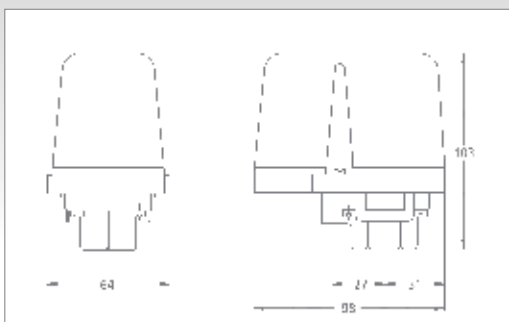
Cut-in pressure is tightest possible pressure differential The cut-out pressure is preset
 Cable glands for retrofit assembly to be ordered separately, see accessories

Technical Data MDR 43 acc. to EN 60947	
Rated insulation voltage U _i	500 V
Rated insulation voltage U _e (AC 15)	250 V
Rated insulation voltage I _{the} (AC 15)	8 A
Rated insulation voltage I _e (max.)	10 A
Mechanical life (AC 15) Cycles	> 1,5 x 10 ⁵
Mechanical life Cycles	> 1 x 10 ⁶
Max. electrical cycles Cycles/h	120
Max. mechanical cycles Cycles/h	600
Bursting strength P _z	> 60 bar

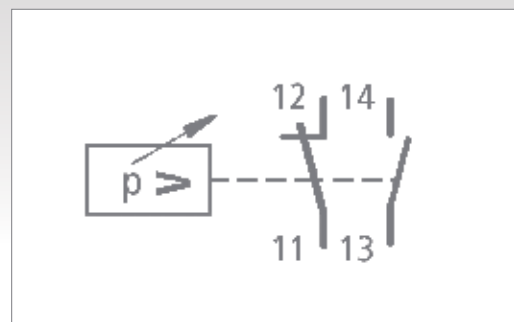
Technical Data MDR 43 acc. to EN 60947	
Permissible medium temperature Air	- 30...+ 80 °C
Permissible medium temperature Water	+ 80 °C
Conductor cross-section 1 .. flexible cable 1 x / 2 x	2,5 / 2,5mm ²
Conductor cross-section 1 ... rigid cable 1 x / 2 x	2,5 / 2,5mm ²
Protection acc. to EN 60520	IP 44

Diaphragm media resistance MDR 43
A detailed overview of diaphragm media resistance for all pressure switches can be found on page 22. Please read the information carefully.

Dimensions / Circuit Diagrams MDR 43



Pressure switch MDR 43

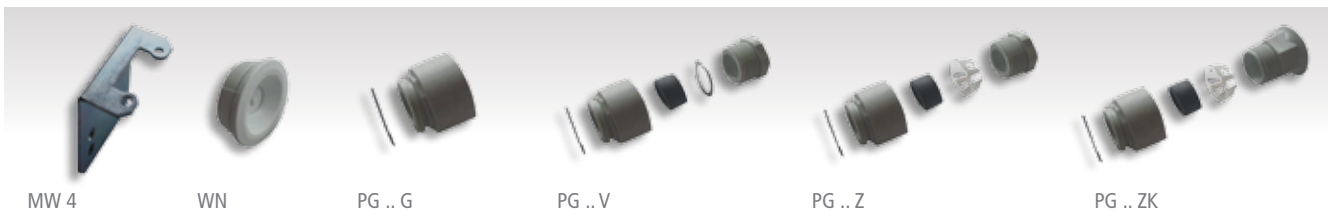


Control pressure switch MDR 43

Accessories MDR 43

Order reference	Description	Weight (in g)	Part No.
	Cable glands		
WN	Grommet	6	200888
PG 11 G	Conduits for mounting cable glands (inner thread)	6	200895
PG 11 V	Cable glands complete	12	200901
PG 11 Z	With strain relief	12	200925
PG 11 ZK	With strain relief and cable support	12	200918
PG 13,5 G	Conduits for mounting cable glands (inner thread)	6	200963
PG 13,5 V	Cable glands complete	12	200932
PG 13,5 Z	With strain relief	12	200956
PG 13,5 ZK	With strain relief and cable support	12	200949
MW 4	Mounting bracket for MDR 4 and MDR 43	65	230021
	Cover		
H43 (Cover MDR 43)	Cover (Transparent)	70	230038

Wall-mounting bracket / Cable glands MDR 43



MW 4

WN

PG .. G

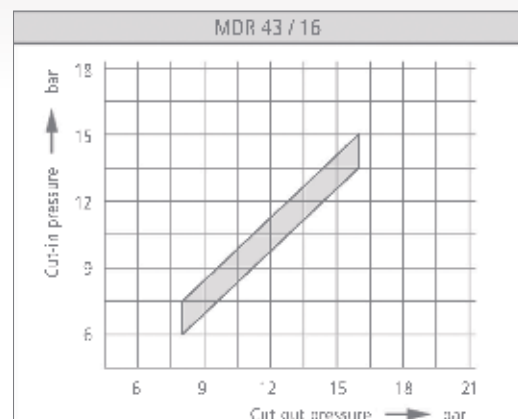
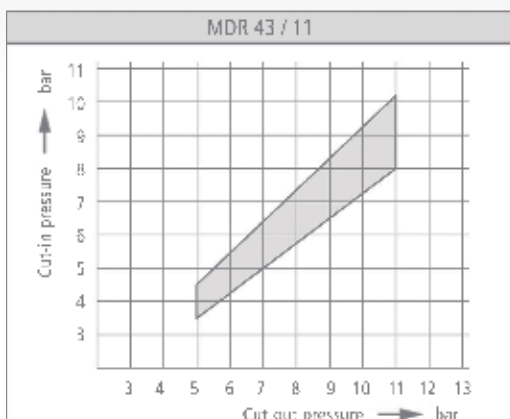
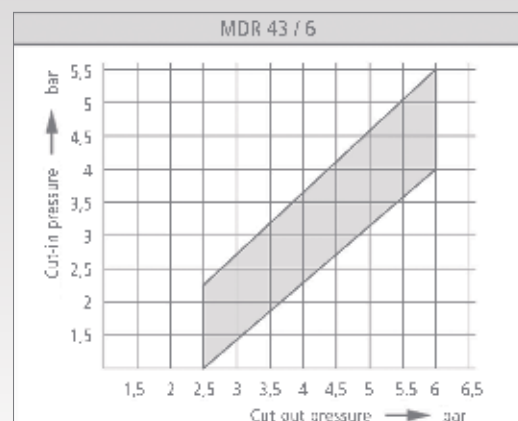
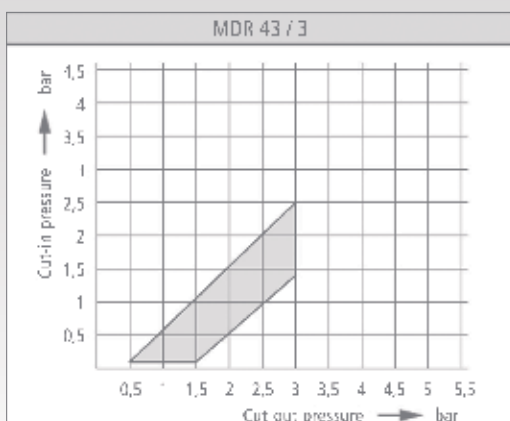
PG .. V

PG .. Z

PG .. ZK

Control pressure switches

Pressure Diagrams MDR 43



Control pressure switch MDR 53



- Max. cut-out pressure 16 bar
- Ample wiring room
- High switching accuracy
- 1 SPDT
- Acc. to EN 60947
- Flange = Die-cast aluminium

Order reference	Type Code	ON / OFF Rotary knob	Pressure range P _{OFF} in bar	Flange	Weight (in g)	Part No.
MDR 53/8	MDR-53 EAA BAAA xxxA080 XAA XXX	-	0,5 - 8	G 1/2" Alu	740	213079
MDR 53/11	MDR-53 GAA BAAA xxxA110 XAA XXX*	-	6 - 11	G 1/2" Alu	780	216919
MDR 53/16	MDR-53 HAA BAAA xxxA160 XAA XXX	-	6 - 16	G 1/2" Alu	780	213086
MDR 53/25 SO3	MDR-53 NAA BAAA xxxA030 XAA XXX**	-	bis 3	G 1/2" Alu	740	213130
MDR 53/25 SO8	MDR-53 OAA BAAA xxxA080 XAA XXX**	-	bis 8	G 1/2" Alu	740	213147

* xxx = Cut-out pressure is preset, cut-in pressure is the tightest possible pressure differential.

** xxx = Cut-out pressure is preset, cut-in pressure is the tightest possible pressure differential and pressure-resistant up to 25 bar, SO-Type.

A screw plug is also supplied.

Cable glands for retrofit assembly to be ordered separately, see accessories!

Technical Data MDR 53 acc. to EN 60947	
Rated insulation voltage U _i	500 V
Rated insulation voltage U _e (AC 15)	250 V
Rated insulation voltage I _e (AC 15)	4 A
Rated insulation voltage I _{the} (max.)	10 A
Electrical life (AC 15) Cycles	> 2 x 10 ⁵
Mechanical life Cycles	> 2 x 10 ⁶
Max. electrical cycles Cycles/h	120
Max. mechanical cycles Cycles/h	1200
Bursting strength P _z	> 40 bar
Protection acc. to EN 60529	IP 54

Technical Data MDR 53 acc. to EN 60947	
Permissible medium temperature Air	- 30...+ 80 °C
Permissible medium temperature Water	+ 80 °C
Conductor cross-section 1 .. flexible cable 1 x / 2 x	2,5 / 2,5mm ²
Conductor cross-section 1 ... rigid cable 1 x / 2 x	2,5 / 2,5mm ²

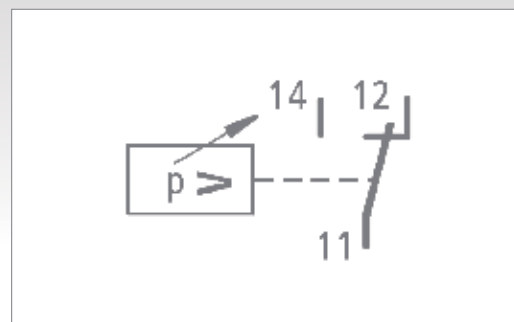
Diaphragm media resistance MDR 53	
A detailed overview of diaphragm media resistance for all pressure switches can be found on page 22. Please read the information carefully.	

A detailed overview of diaphragm media resistance for all pressure switches can be found on page 22.

Dimensions / Circuit Diagrams MDR 53



Pressure switch MDR-53



Control pressure switch MDR 53

Accessories MDR 53

Order reference	Description	Weight (in g)	Part No.
	Cable glands		
WN-M20	Grommet	6	269496
VS-M20	Screw plug M20		269502
M20 Z	With strain relief, clamping range 6-12 mm	12	269533
M20 ZK	With strain relief and cable support, clamping range 6-12 mm	12	269540
M20 L	With strain relief, clamping range 10-14 mm	12	269519
M20 LK	With strain relief and cable support, clamping range 10-14 mm	12	269526
MW 5	Mounting bracket	120	230045
	Cover		
H5 (Cover MDR 5)	Cover without On/Off push-buttons	130	230052

Cable glands MDR 53



WN-M 20

VS - M 20

M 20 Z / M20 L

M 20 ZK / M 20 LK

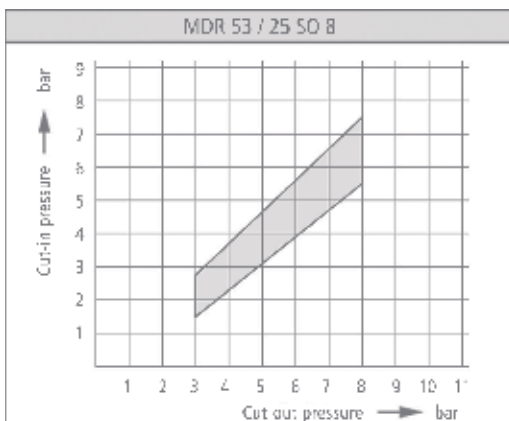
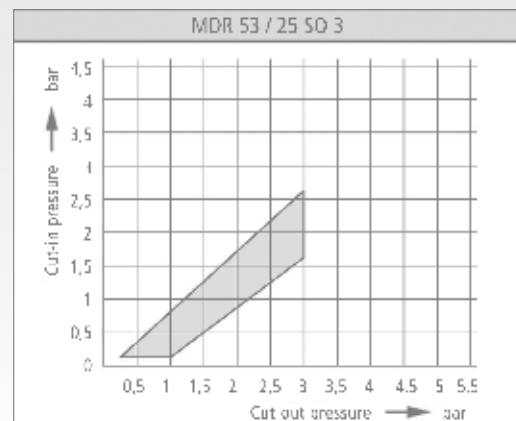
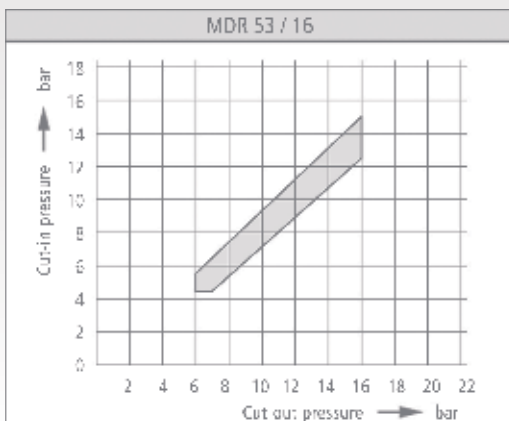
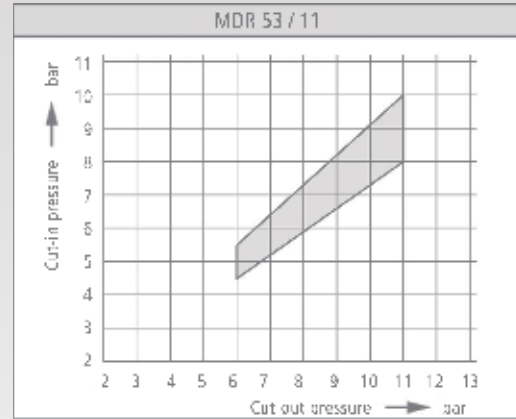
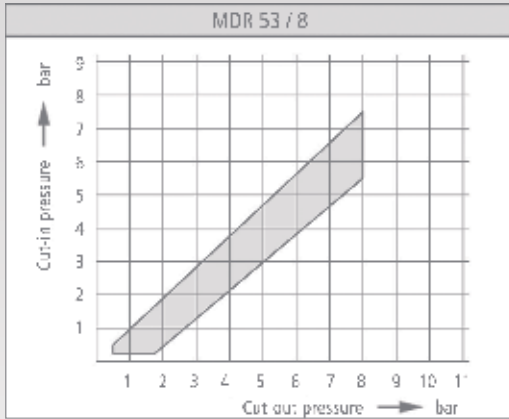
Accessories, Wall-mounting bracket / Cover MDR 53

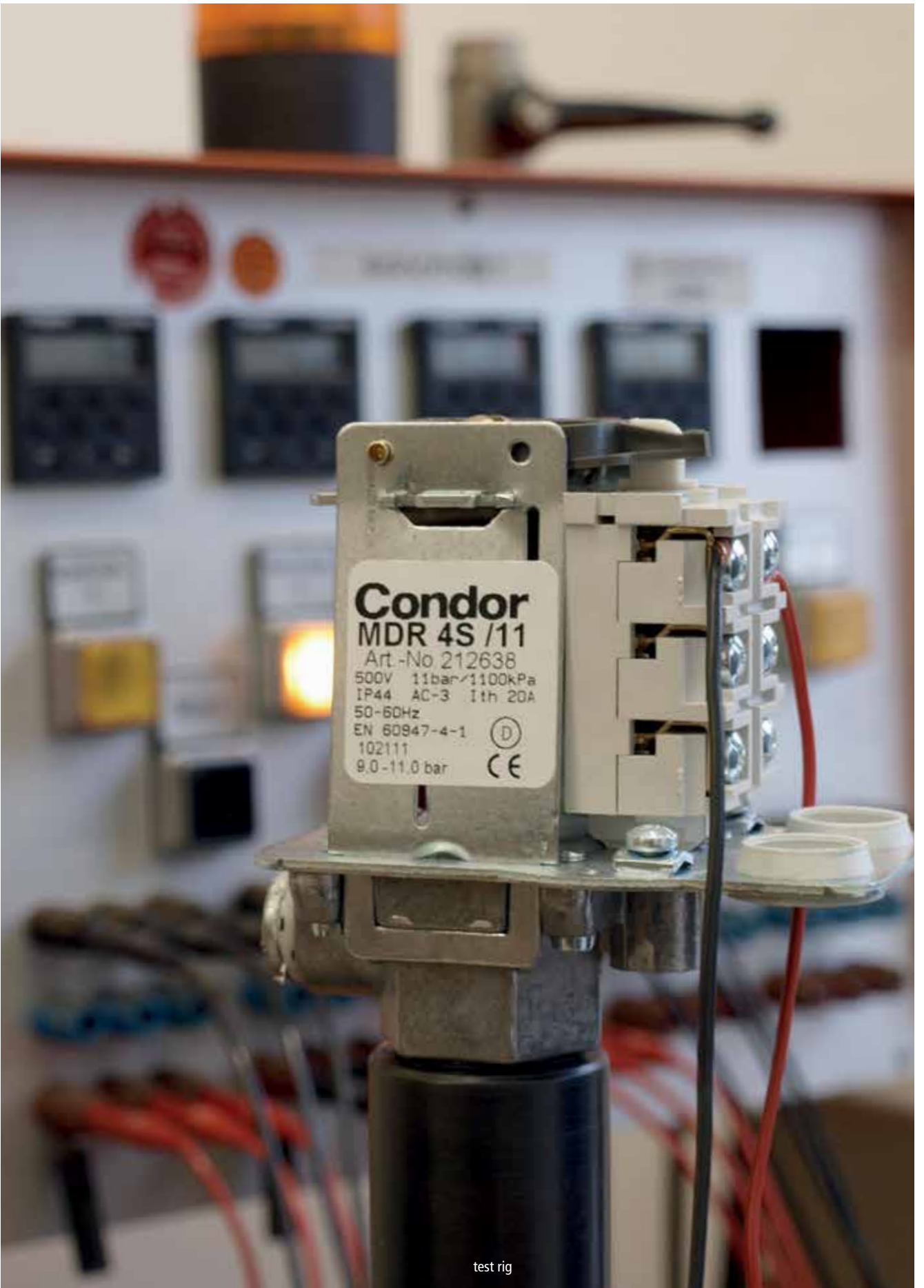


MW 5

H5

Pressure Diagrams MDR 53

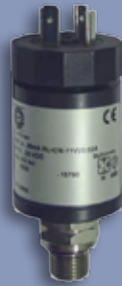




test rig



EDI



EDS



EDR



EDRA

Electronic pressure transducers / sensors and controls /

Industries



EDI	Electronic pressure transducer Pressure range up to 16 bar Output signal 4 - 20 mA	P. 85	Compressors gaseous media
EDS	Electronic pressure sensor Pressure range up to 16 bar Output signal 4 - 20 mA	P. 86	Compressors gaseous media
EDR	Electronic pressure control Pressure range up to 16 bar Output signal 0 - 10 V	P. 87	Compressors gaseous media
EDRA	Electronic pressure control with digital display Pressure range up to 16 bar Relay output	P. 89	Compressors gaseous media



GLW 4

Compressors

Industries



GLW 4	Electronic staging and sequencing control	P. 92	Compressors
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Electronic pressure transducer EDI

Pressure transducer EDI



- Pressure range up to 16 bar
- for panel board mounting
- Output signal: 4 - 20 mA

Electronic pressure transducer with integrated relative pressure sensor for panel board mounting, quick-connect for pneumatic tube, analogue output 4 to 20 mA and operating voltage 12...30 V-DC.

Function: the device converts the pressure applied to the sensor into a proportional DC-current (2 - wire technology).

Order reference	Measuring range (bar)*	Max. perm. pressure (bar)	Max. inaccuracy at 25° C	Operating voltage U _B (V-DC)	Weight (in g)	Part No.
EDI 10	0 - 10	25	2,5 %	12...30	85	260219
EDI 16	0 - 16	25	2,5 %	12...30	85	260226

*4 mA = 0 bar / 20 mA = measuring range end value

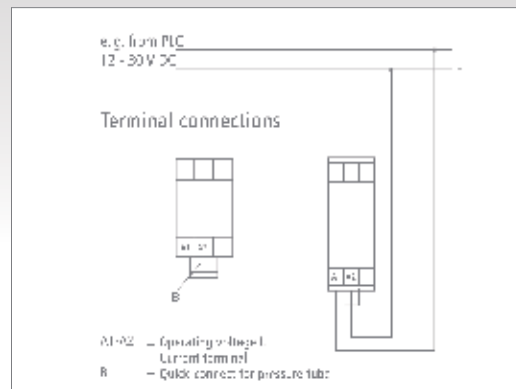
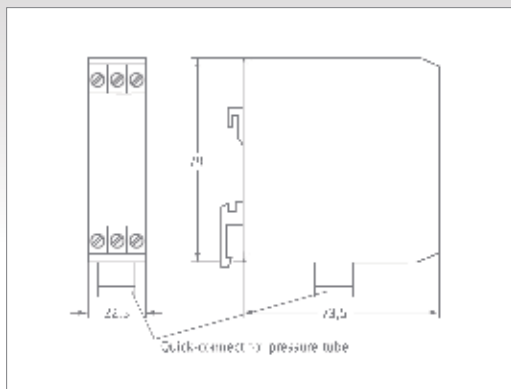
Technical operating data	
Permissible operating voltage range	± 10 %
Operating voltage influence at ± 10% operating voltage fluctuation	< 0,1%
Duty factor ED	100 %
Permissible ambient and media temperature	-20°C bis +60°C
Permissible ambient humidity rel. humidity, non-condensing	10 % bis 90 %
Permissible storage temperature	-40°C bis +80°C
Clearance and creepage distances	VDE 0110
Working position	beliebig
Power consumption	max. 1 VA

Pressure connection	
Quick-connect suitable pneumatic tube	6 x 1 mm Festo PAN

Output signal	
Analogue output	4 - 20 mA

Enclosure	
Material	ABS flameproof, UL-approved
Mounting	snap on 35 mm DIN-rail connector acc. to EN 50 035
Enclosure-protection	IP 40
Protection against shock	acc. VBG 4
Terminals	Cage clamps
Cross section	2,5 mm ²
Weight	85 g

Dimensions- / Circuit Diagrams EDI



Pressure sensor EDS



- Pressure range up to 16 bar
- Output signal: 4 - 20 mA

Electronic pressure control with relative pressure sensor for direct installation either on or within a device, G 1/4" connection, analogue output 4 - 20 mA and operating voltage supply 11 ... 30 V DC. Electrical connection is effected in a straight forward and service-friendly manner - via a DIN.

A plug whereby a degree of protection IP 65 is realized.

Function: the device converts the pressure applied to the sensor into a proportional DC current (2 - wire technology).

Order reference	Measuring range (bar)*	Max. perm. pressure (bar)	Max. inaccuracy at 25° C	Operating voltage U_B (V-DC)	Weight (in g)	Part No.
EDS 6	0 - 6	32	2,5 %	11...30	150	260233
EDS 10	0 - 10	32	2,5 %	11...30	150	260240
EDS 16	0 - 16	32	2,5 %	11...30	150	260257

*4 mA = 0 bar / 20 mA = measuring range end value

Accessories EDS

Order reference	Description	Weight (in g)	Part No.
EDS-ST	connection socket EDS, DIN 43650-A	110	260264

Technical operating data

Permissible operating voltage range	± 10 %
Operating voltage influence at ± 10% operating voltage fluctuation	< 0,1 %
Duty factor ED	100 %
Permissible ambient and media temperature	15°C bis +80°C
Permissible ambient humidity rel. humidity, non-condensing	10 % bis 90 %
Permissible storage temperature	-40°C bis +80°C
Clearance and creepage distances	VDE 0110
Working position	any position
Power consumption	max. 1 VA

Pressure connection

Flange	G 1/4"
Outer thread	

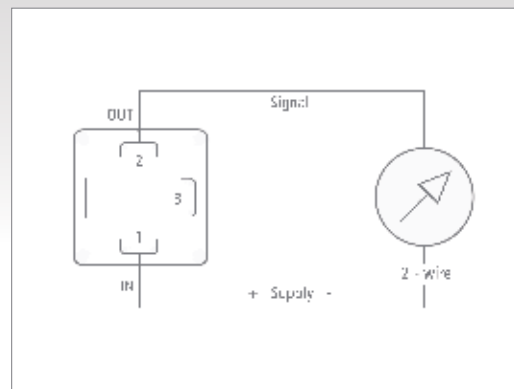
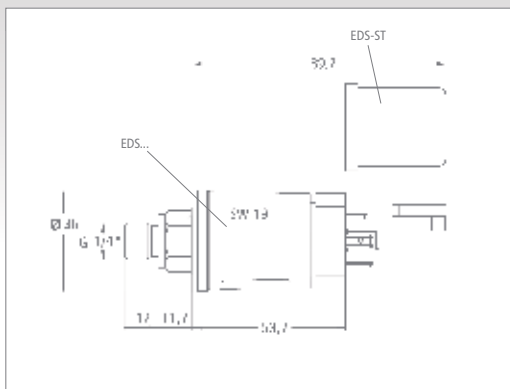
Output signal

Analogue output	4 - 20 mA
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Enclosure

Enclosure-protection	max. IP 65
Terminals	Flachstecker 4,5 mm
Cross section	EDS-ST 1,5 mm ²
Weight	150 g

Dimensions- / Circuit Diagrams EDS



Electronic pressure control EDR



- Pressure range up to 16 bar
- For panel board mounting
- Relay output
- Output signal: 0 – 10 V

Electronic pressure switch with integrated relative pressure sensor for panel board mounting, quick-connect for pneumatic tube, two fixed adjustable switching points, relay output (isolated SPDT), analogue

voltage output 0-10 V via jack plug (look at accessories) and isolating transformer acc. to VDE 0550.

Function: The device evaluates the applied pressure. On exceeding an upper threshold the relay is deactivated; when falling below a lower threshold the relay is activated again. Both thresholds are adjustable.

Order reference	Measuring range (bar)*	Max. perm. pressure (bar)	Max. inaccuracy at 25° C	Operating voltage U _B (V-DC)	Weight (in g)	Part No.
EDR 2	0,2 - 2	3	2,5 %	230	135	260271
EDR 16	1 - 16	25	2,5 %	230	135	260288

*adjustable in 0.1 bar steps

0 V = 0 bar / 10 V = measuring range end value

Accessories EDR

Order reference	Description	Weight (in g)	Part No.
KL-S	Jack 2.5 mm for analogue output connection (cable length 5 m)	15	260332

Technical operating data

Permissible operating voltage range	± 10 %
Operating voltage influence at ± 10% operating voltage fluctuation	< 0,1 %
Duty factor ED	100 %
Permissible ambient and media temperature	-20°C bis +60°C
Permissible ambient humidity rel. humidity, non-condensing	10 % bis 90 %
Permissible storage temperature	-40°C bis +80°C
Clearance and creepage distances	VDE 0110
Working position	any position
Power consumption	max. 1 VA

Pressure connection

Quick-connect suitable pneumatic tube e.g.	6 x 1 mm Festo PAN
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Output signal

Analogue voltage signal max. 5 mA short-circuit proof	0 - 10 V
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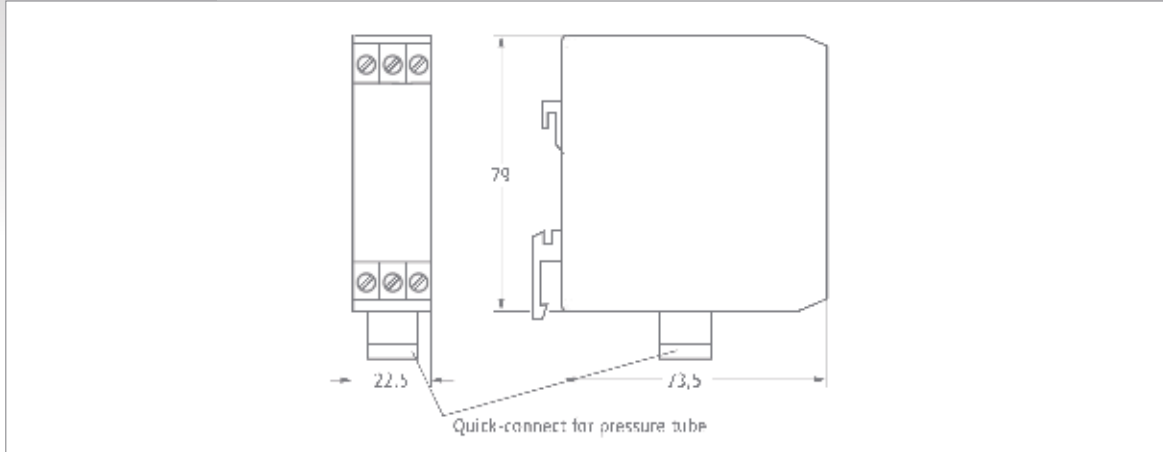
Enclosure

Material	ABS flameproof, UL-approved
Mounting	snap on 35 mm DIN-rail connector acc. to EN 50 035
Enclosure-protection	IP 40
Protection against shock	acc. VBG 4
Terminals	Cage clamps
Cross section	2,5 mm ²
Weight	135 g
Male jack plug Jack 2,5 mm	2,5 mm

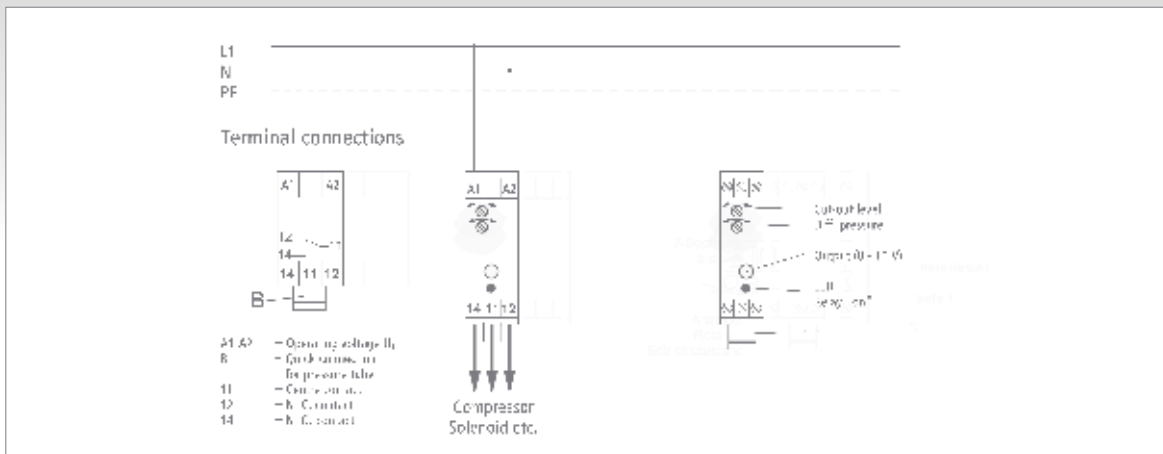
Power section

Series voltage acc. to VDE 0660 and VDE 0110 Group C	250 V-AC
Maximum continuous current per contact	6 A-AC
Maximum switching capacity per contact	1.500 VA (AC) 50 W (DC)
Mechanical life Cycles	ca. 1 x 10 ⁷
Electrical life (max. load) Cycles	ca. 2 x 10 ⁵

Dimensions EDR



Circuit Diagram EDR



Pressure control EDRA



- Pressure range up to 16 bar
- For panel board mounting
- Relay output
- Digital display

Electronic pressure switch with integrated relative pressure sensor for panel board mounting, quick-connect for pneumatic tube, digital display for mains pressure indication and threshold programming (two switching points), relay output (isolated SPDT) and isolating transformer acc. to VDE 0550.

Function: The device evaluates the applied pressure to the sensor. On exceeding an upper threshold the relay is deactivated; when falling below a lower threshold the relay is activated again. Both thresholds also are adjustable without medium. The on/off thresholds can be programmed via the display during operation - the actual pressure status is shown on the display.

Order reference	Measuring range (bar)*	Max. perm. pressure (bar)	Max. inaccuracy at 25° C	Operating voltage U _B (V-DC)	Weight (in g)	Part No.
EDRA 16	1 - 16	25	2,5 %	230	255	260295

*adjustable in 0.1 bar steps

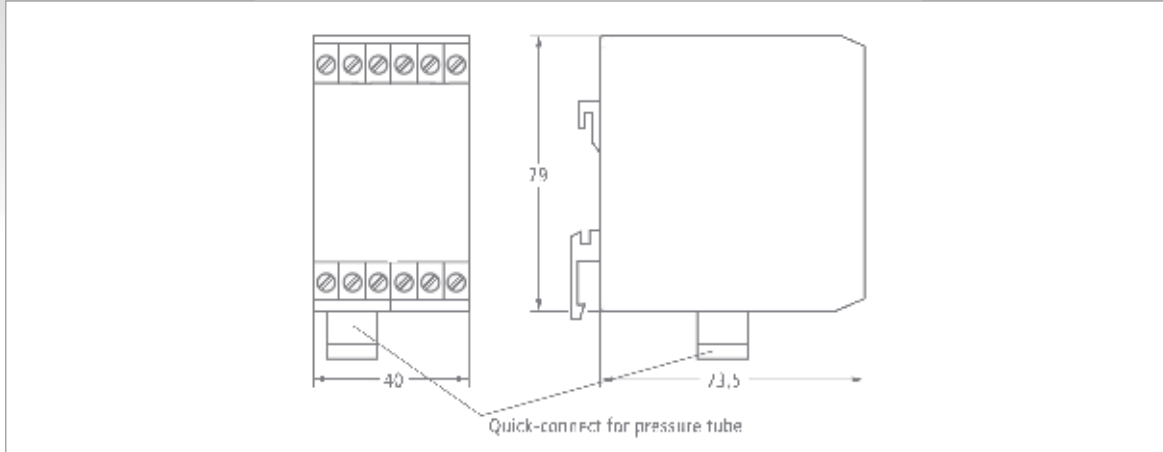
Technical operating data	
Permissible operating voltage range	± 10 %
Operating voltage influence at ± 10% operating voltage fluctuation	< 0,1 %
Duty factor ED	100 %
Permissible ambient and media temperature	-20°C bis +60°C
Permissible ambient humidity rel. humidity, non-condensing	10 % bis 90 %
Permissible storage temperature	-40°C bis +80°C
Clearance and creepage distances	VDE 0110
Working position	any position
Power consumption	max. 1 VA

Pressure connection	
Quick-connect suitable pneumatic tube e.g	6 x 1 mm Festo PAN

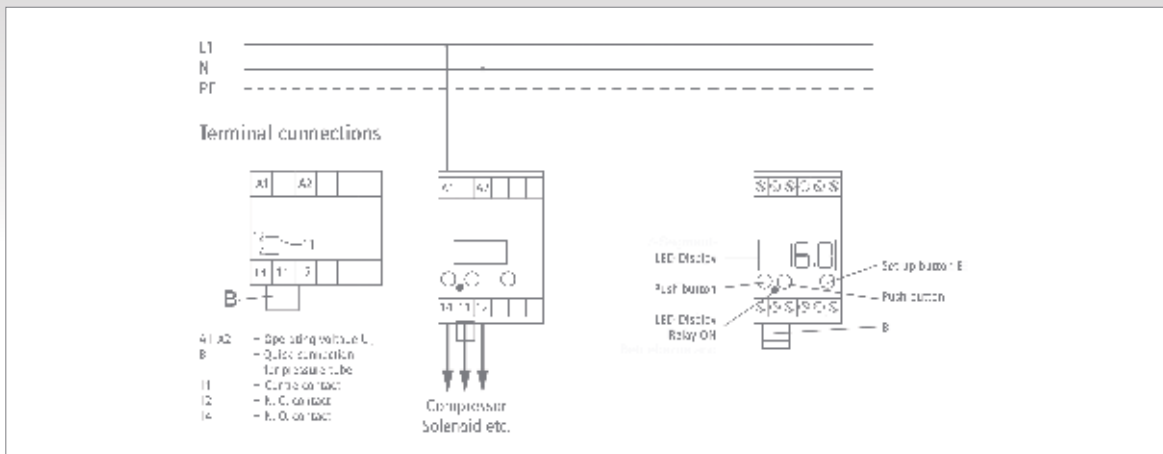
Enclosure	
Material	ABS flameproof, UL-approved
Mounting	snap on 35 mm DIN-rail connector acc. to EN 50 035
Enclosure-protection	IP 40
Protection against shock	acc. VBG 4
Terminals	Cage clamps
Cross section	2,5 mm ²
Weight	255 g

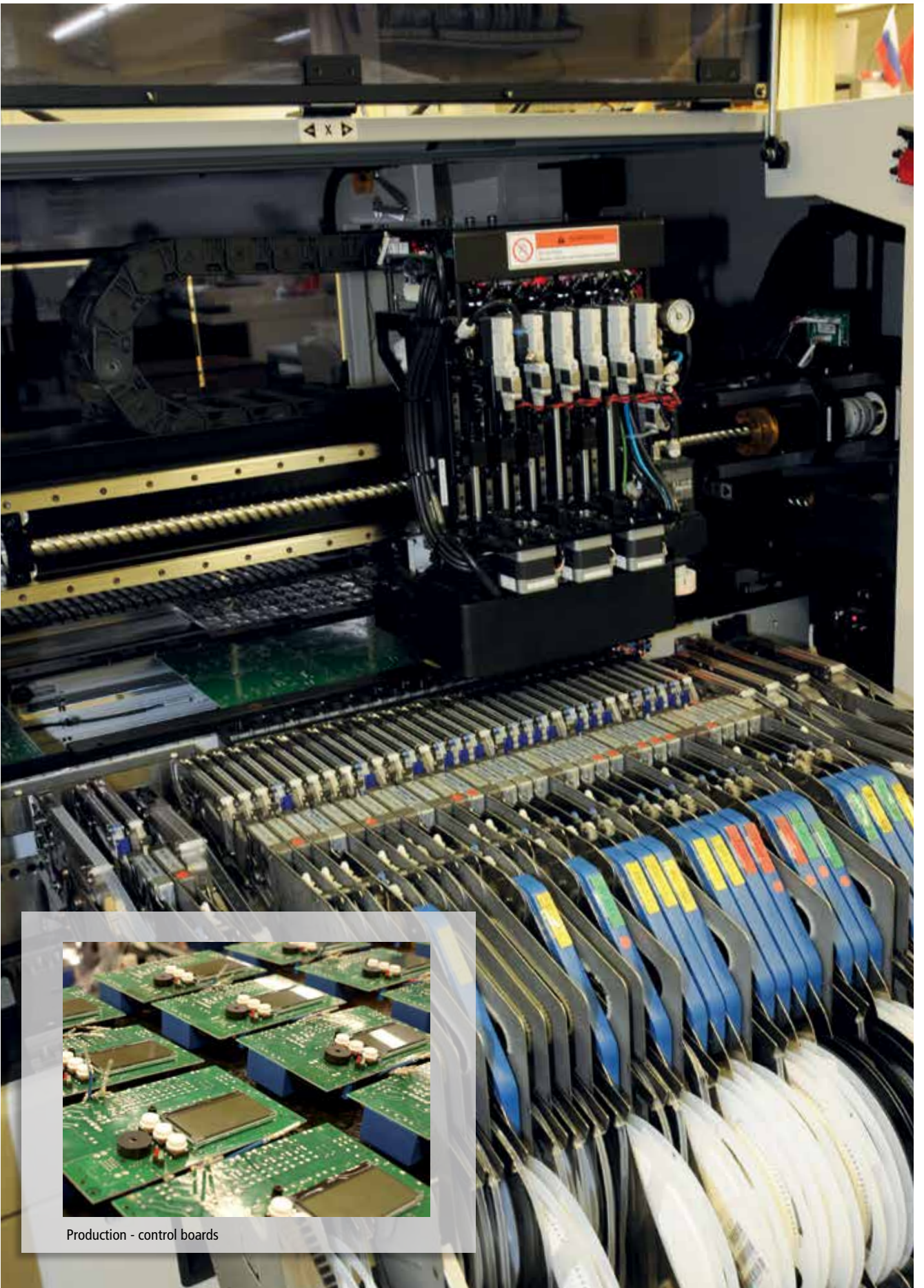
Power section	
Series voltage acc. to VDE 0660 and VDE 0110 Group C	250 V-AC
Maximum continuous current per contact	6 A-AC
Maximum switching capacity per contact	1.500 VA (AC) 50 W (DC)
Mechanical life Cycles	approx. 1 x 10 ⁷
Electrical life (max. load) Cycles	approx. 2 x 10 ⁵

Dimensions EDRA



Circuit Diagram EDRA





Production - control boards

Staging and Sequencing Control for Compressors



More and more companies today need an economic operating air pressure system.

an internal timer is available e.g. shift work applications.

Thereby, several compressors are often connected to each other. Since 1995 Condor GLW controls have been used to monitor up to 4 compressors in primary load set up.

The GLW 4 evaluates the mains pressure and rotates the connected compressors on a time-dependent basis. If desired,

Following functions can be activated:

- Internal pressure transducer 0 to 16 bar
- Connection of an external pressure transducer, two-wire 4 to 20mA
- Programmable internal time switch (controls up to 6 profiles)
- Programmable primary load and load changeover functions, allowing for the primary load compressor to operate without taking part in the rotation process. Only the load changeover compressors are rotated.
- Programmable ball valve control with max. 3 compressors
- Direct switchover after the load changeover time has elapsed.
- Four digital inputs (e.g. for hourmeter)
- Input: bridge time switch
- Input: remote release
- Parameter password protection
- Units reversible bar/psi

Type overview GLW 4

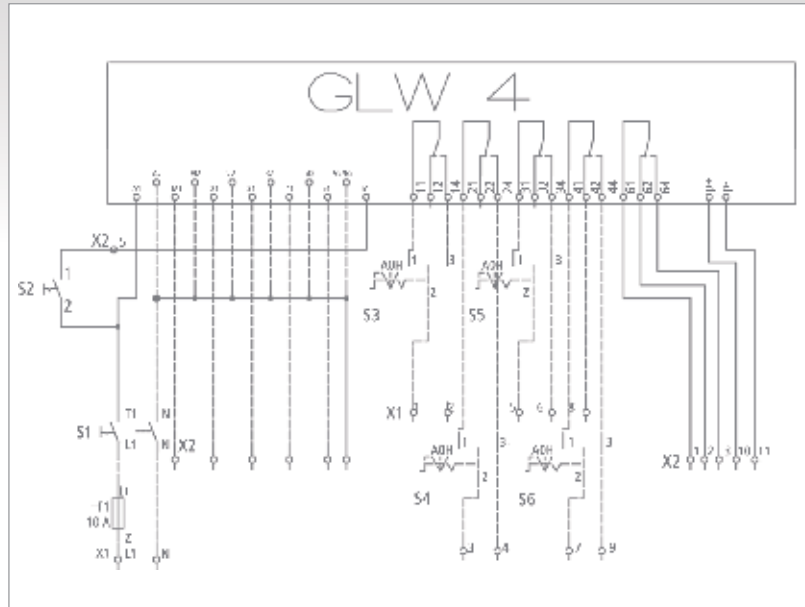
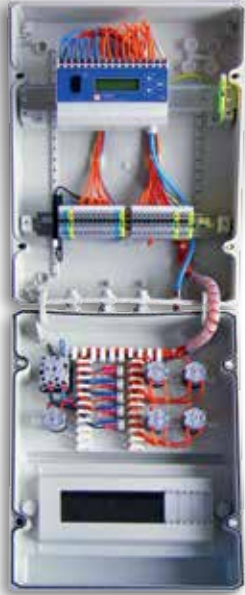


Order reference	Description	Weight (in g)	Part No.
GLW 4	GLW 4 without wiring, enclosure	520	237761
GLW 4-S	GLW 4 in pre-wired plastic enclosure, (dimensions: 420x300 x170mm), DIN-Rail mounting, internal terminal blocks and wiring diagram.	2350	255475
GLW 4-S kompl.	GLW 4 in pre-wired plastic enclosure, (dimensions: 420x300 x170mm), DIN-Rail mounting, internal terminal blocks and wiring diagram. Additionally wired for 4 compressors: isolator, rotary switch „bridge timer“, rotary switch compressor 1 - 4, indicator lamps for voltage supply and compressors 1 – 4.	3550	255482

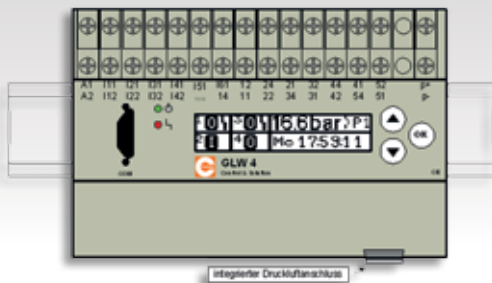
Additional styles on demand!

Electronic staging and sequencing control GLW 4

Wiring diagram GLW 4-S (completely assembled)

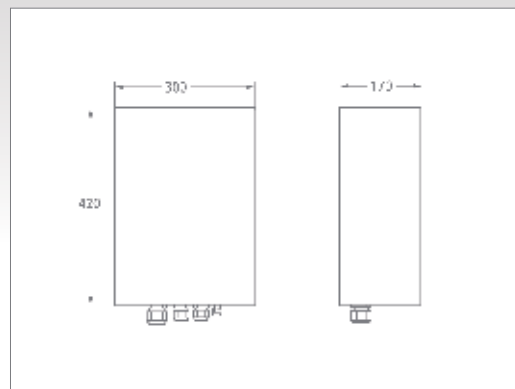
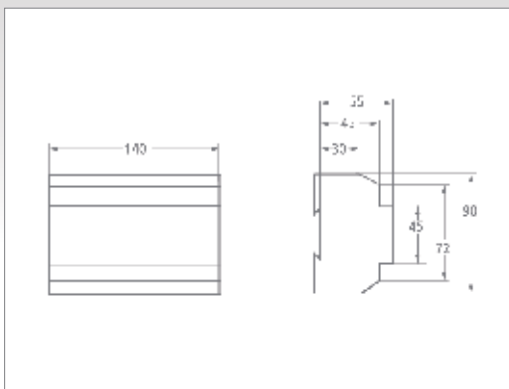


Housing GLW 4 Terminal connections



- A1 / A2 = Mains voltage supply 90 – 265 V AC; 50/60 Hz
- I 11 bis I 42 = 4 digital inputs, 250V AC1, e. g. operating hours
- I 51 = External release input, 250V AC1
- I 61 = Bridge time switch input, 250V AC 1
- O 11 bis O 44 = Isolated SPDT outputs for max. 4 compressors 230V AC, max. 5A AC1
- O 51, O 52, O 54 = Isolated alarm relay 230V AC, max. 5A AC1
- p+ / p- = External analogue connection 4..20mA Two wire
 $U_b = 18-21V$ DC
- COM = V 24-Interface for PC programming

Dimensions GLW 4 / GLW 4-S



Technical operating data	
Permissible operating voltage range U_B	90 – 265 V AC 50 – 60 Hz
Operating voltage influence at $\pm 10\%$ operating voltage fluctuation	< 0,1 %
Duty factor ED	100 %
Permissible ambient and media temperature	0°C up to +40°C
Permissible ambient humidity rel. humidity, non-condensing	10 % up to 90 %
Permissible storage temperature	-40°C up to +80°C
Clearance and creepage distances	VDE 0110
Working position	Any position
Power consumption Control	10 VA

Power section	
Series voltage acc. to VDE 0660 and VDE 0110 Group C	250 V-AC
Maximum continuous current per contact	6 A-AC
Maximum switching capacity per contact	1.500 VA (AC) 50 W (DC)
Mechanical life Cycles	approx. 1×10^7
Electrical life (max load) Cycles	approx. 2×10^5

Measuring accuracy and Requirements	
Input external pressure transducer	$\pm 2\%$ of end value
Internal pressure transducer	$\pm 2\%$ of end value
EM-Directive	89 / 336 / EWG
Low Voltage Directive	73 / 23 / EW

Digital in- and outputs	
4 Relay outputs isolated SPDT's	230V-AC; 5 A (AC1)
1 Alarm relay isolated SPDT	230V-AC; 5 A (AC1)
Internal buzzer	typical 70dBA
4 digital inputs 250V	AC 1 (I11/I12 I41/I42)
Input 250V-AC1 (I51/52)	External release signal
Bridge time switch	250V-AC1 (I61/62)

Analogue Interface	
Input analogue pressure transducer U_B 4...20mA wire	18 – 21V-DC
Integrated pressure transducer With quick connect	0...16 bar

Enclosure	
Material	ABS flameproof, UL-approved
Mounting	snap on 35 mm DIN-rail connector acc. to EN 50 035
Enclosure-protection	IP 40
Protection against shock	acc. VBG 4
Terminals	Cage clamps
Cross section	2,5 mm ²
Weight	520 g

Pressure connection	
Pneumatic tube diameter suitable pneumatic tube e.g.	6 x 1 mm Festo PAN



Pump control CPS B1



Float switch
PSN



Electronic pump control
ENP



Electronic level relay
ENR



Electronic level relay
HRH-5



Stainless steel
level sensor ENS

Level control

Industries



→	Level measurement methods	P. 97	
PSN	Float switches which turns On and Off depending on the cable length	P. 101	Fill level switch in wastewater pumping stations, used water tanks, stormwater utilization systems, sump pits, etc. for direct and indirect control of pumps.
ENP	Electronic pump control Single and dual pump control with monitoring functions	P. 107	Electronic level controls are used where fill levels in tanks and pits have to be kept at an exact level or where fluids should be pumped out.
ENR	Electronic level relay Measuring range 0,1 – 2 m Output signal 0 - 10 V	P. 109	
HRH-5	Electronic level relay For level monitoring	P. 111	Electrode relays monitor the fill levels of conductive fluids by means of rod or dipped electrodes in tanks.
ENS	Stainless steel level sensor Output signal 4 - 20 mA	P. 113	For constant detection of minimal changes in water level in shafts and pits, larger pump stations for wastewater or stormwater drainage, with and without the risk of explosions.
→	Accessories: Bells and accessories for Level Monitoring	P. 115	Bell plungers: robust and maintenance-friendly solution for detecting fill levels in pressurized drainage systems, small pump stations, sewage collection shafts. Approved for use in explosion-risk areas.



Type "WASTE"
waste water



Typ "ACS"
Drinkable



Typ "SiHF"
High Temperature



Typ "FEP"
Chemical Ambient



Typ "ATEX-Schutz"
II 1G Ex ia IIC T6 Explosive*

Suspended float switch

Industries

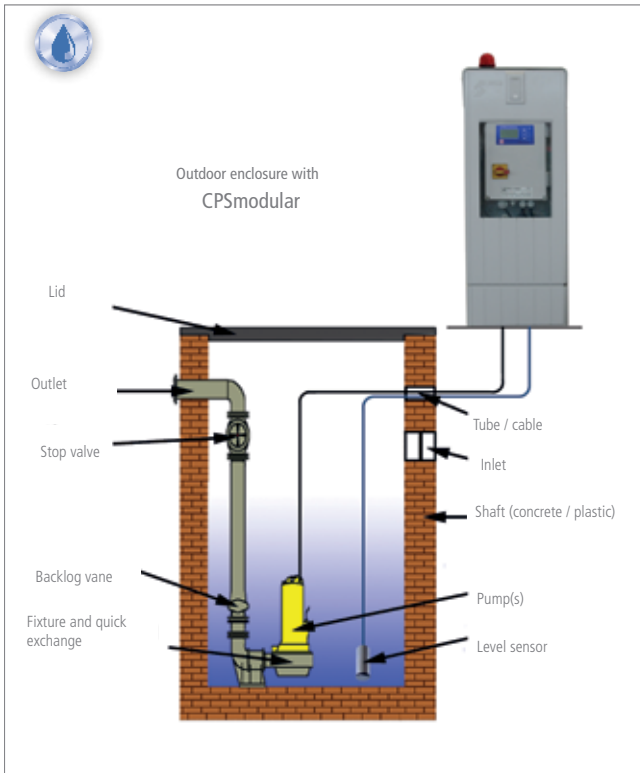


→	"WASTE" / "ACS" / "SiHF" / "FEP" / "ATEX"	Suspended float switch - "T" series	P. 105	Used in domestic , industrial or municipal sector , for waste water , drinking water , chemical substances and environment for use in explosive areas (ATEX) . Ideal for level control in drainage systems , pumping stations , wastewater systems , drinkable water fountains , drinks an foodstuffs , ship building , ...
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**others on request

* The rules of the DIN EN 60079 to be observed!

For level measurement there are different methods that can be used



1. Level measurement method using float switches or suspended float switch
2. Impact pressure
 - 2.1 Impact pressure method in closed systems
 - 2.2 Impact pressure method in open systems
 - 2.2.1 Open system method with air replenishment
 - 2.2.2 Open system method with bubblers
3. Conductivity measurement method
4. Hydrostatic measurement method (ENS)

1. Description float switches - Digital Measurement method



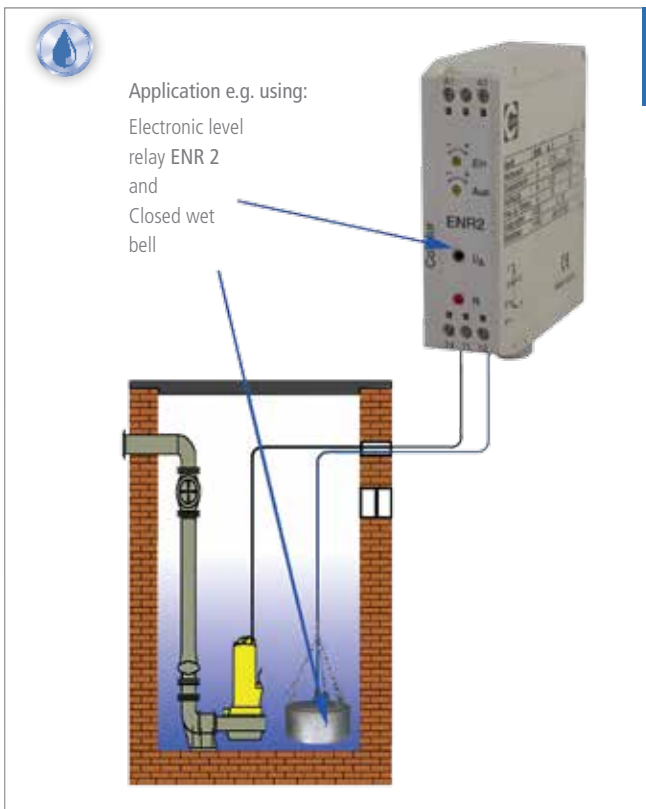
In this application, contacts placed within a floating enclosure are closed / opened depending on the inclination angle of the float switch.



Application e.g. using:

- Float switches
- PSN - O
- Suspended float switch ((series "T"))

2.1 Impact pressure method, closed system

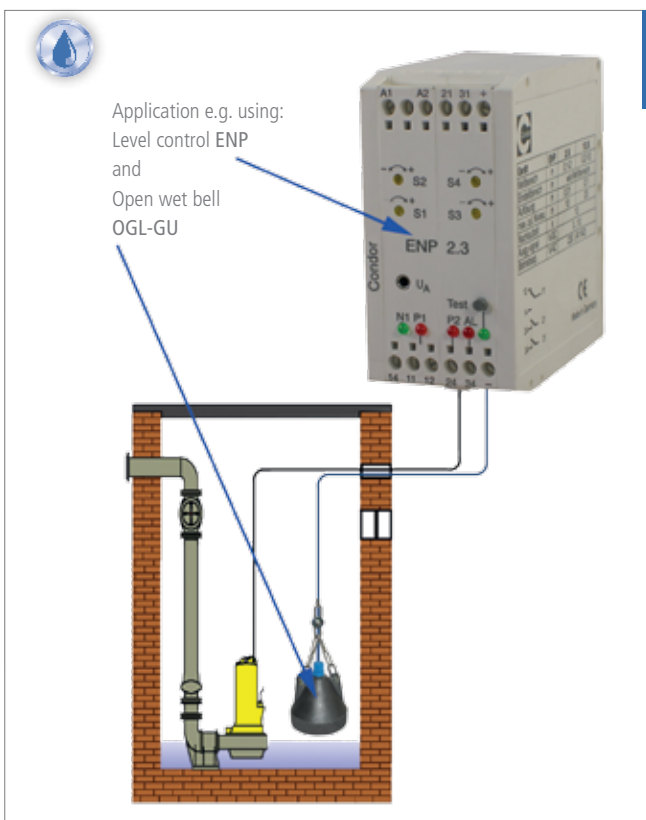


In this application the level change is transmitted via a pneumatic tube to the sensor and evaluated. The two types of systems - closed and open - are described in more detail below:

Closed system

For the use of a closed system, a completely sealed measuring system is an absolute necessity. A leak in the system, through which air can diffuse, leads to a drop in pressure and subsequently a malfunction of the device. The sealed bell GGL-8 (see accessories section) placed into the medium seals the measurement system at the "measuring point".

2.2.1 Impact pressure method, open system with air replenishment



Open systems

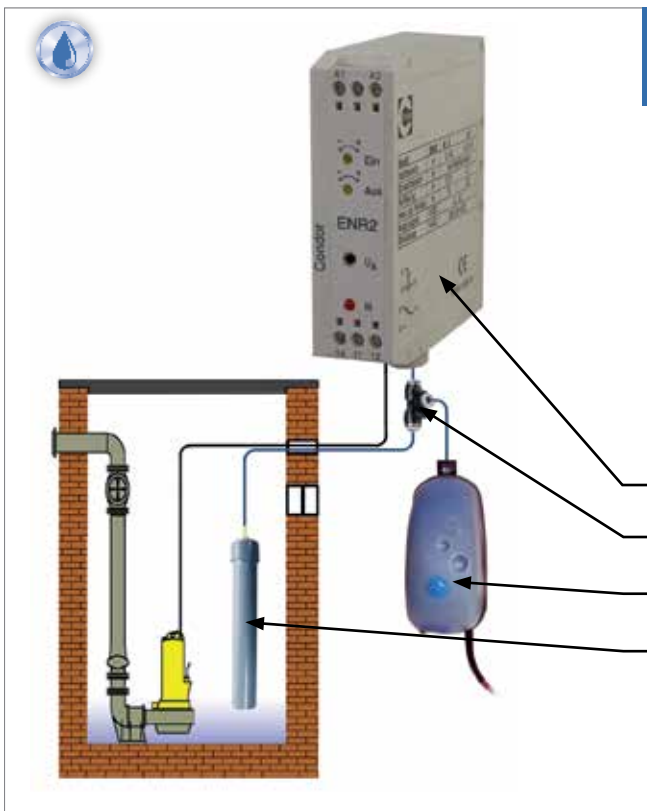
In open systems, the medium to be monitored creates pressure inside the pneumatic tube which is then electronically evaluated. Any leaks, which could lead to false measurement results, can be compensated for by suitable aeration or by bubbler operation.

Air replenishment operation

Open systems which function without aeration must achieve a regeneration of pressure within the system - this can be reached by an increase in volume and temporary operation in air replenishment mode. Any air losses in the measurement system will thereby be compensated for which, during the emptying process, causes the level to drop so far at regular intervals that the bell becomes exposed and air can therefore penetrate into the system (air replenishment).

In addition, with the help of a wet bell, the air volume within the measuring system should be increased.

2.2.2 Impact pressure method, open system using bubblers



In this application, the aid of a small compressor is necessary, whereby in either continuous or periodic operation, air is fed into the system. The pressure within the measuring system (pneumatic tube) therefore remains constant. Only when a change in the level occurs is the pressure altered in the measuring system, which is subsequently detected by the evaluating unit.

Application e.g. using:

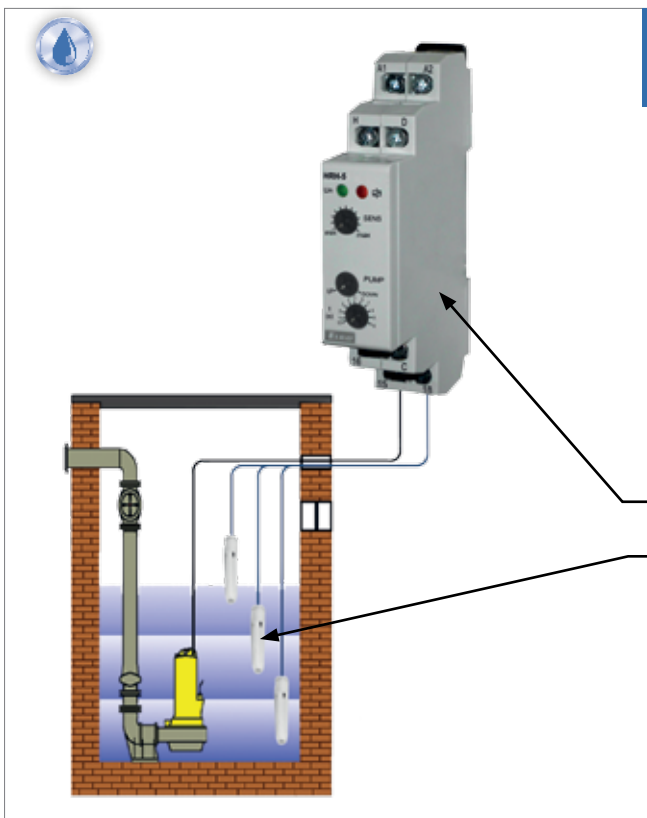
Electronic level relay ENR 2

T-connector for pneumatic tube

Small air compressor Rena Air 100

Open wet bell OGL

3. Conductivity measuring method



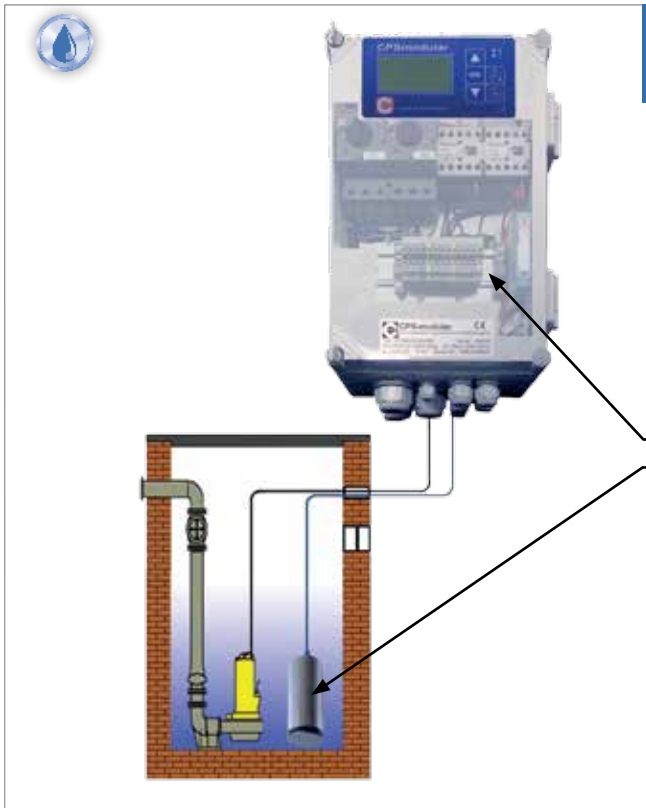
In this application, immersion electrodes are connected to an electronic analyser. When the electrodes are moistened by the liquid being measured, their conductivity alters correspondingly. One or two variable threshold values can then be adjusted.

Application e.g. using:

Electronic level relay HRH-5 and

Electrodes TEL - ..

4. Hydrostatic measurement method



In this application, a level sensor is lowered into the medium within a sealed enclosure, whereby ceramic or piezoresistive sensors are used. The filling level pressure then acts directly on the ceramic or piezoresistive sensor and the subsequent value is then transmitted as a 4-20 mA signal via the connecting lead.

Application e.g. using:

Electronic pump control CPS modular 2 and
Level sensor ENS

Float switches which turns ON or OFF depending on the cable length.

Type Designations

- PSN-O** Float switches for emptying. On reaching the upper switching threshold the switching mechanism activates the pump. On reaching the lower switching threshold the pump is switched off. This float switch can also be used as run dry protection.
- PSN-F** Float switches for filling. On reaching the lower switching threshold the switching mechanism activates the pump. On reaching the upper switching threshold the pump is switched off.
- PSN-X** Float switches for filling and emptying.
- PSN-.. + ST** Float switch with plug and socket for pump connection.
- PSN-O DB** Float switches for emptying with integrated cable breakage and short-circuit monitoring, with gold flashed contacts.
- PSN-X-SP** Float switches for filling and emptying for PLC application and for intrinsically safe circuits, with gold flashed contacts.

Neoprene Insulated Lead

Highly flexible lead acc. to VDE 282 Part 4 resp. HD 22.4 S3 guarantees a long service life.

Protective Conductor Connection acc. to VDE 0631 Part 1 protection class 1 resp. EN 60730-1

A metal shield connected to the protective conductor of the lead ensures additional protection against electrical shock.

Perfect Casing

The inner chamber with the switch mechanism and lead are seamlessly enclosed by isolating polypropylene.

Contact Rating

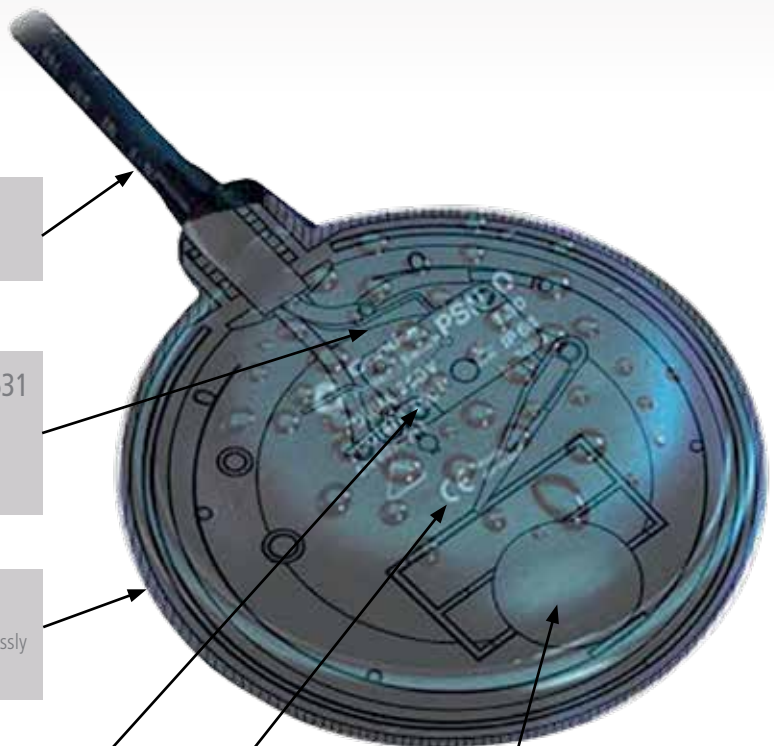
Motors with a switching capacity of up to 1.1 kW (at 250 V~) may be switched directly.

High Quality HR-Foam Floating Body

Physical properties and chemical resistance of the polypropylene body are extraordinarily high, so that damages due to mechanical impact or chemical influence may be ruled out.

KLS Ball Guiding System

The new ball guiding system KLS ensures an even higher switching accuracy within the tolerance range.



Type overview float switches PSN



Float switch PSN- ...

Order reference	Description	Cable length	Weight in g	Part No.
PSN-O 3 m	for emptying	3 m	500	234166
PSN-O 5 m		5 m	650	234173
PSN-O 10 m		10 m	1000	234180
PSN-O 15 m		15 m	1350	234197
PSN-O 20 m		20 m	1700	234203
PSN-O 30 m		30 m	2400	237082
PSN-F 3 m	for filling	3 m	500	234210
PSN-F 5 m		5 m	650	234227
PSN-F 10 m		10 m	1000	234234
PSN-F 15 m		15 m	1350	234241
PSN-F 20 m		20 m	1700	234258
PSN-F 30 m		30 m	2400	258421



Float switch PSN- ...+ ST

Order reference	Description	Cable length	Weight in g	Part No.
PSN-X 3 m	for filling and emptying export-version without protective conductor 1 SPDT	3 m	500	234265
PSN-X 5 m		5 m	650	234272
PSN-X 10 m		10 m	1000	234289
PSN-X 15 m		15 m	1350	234296
PSN-X 20 m		20 m	1700	234302
PSN-X 30 m		30 m	2400	237174
PSN-O + ST 5 m	Float switch with plug and socket for pump connection	5 m	750	234319
PSN-O + ST 10 m		10 m	1100	234326
PSN-F + ST 5 m		5 m	750	234333
PSN-F + ST 10 m		10 m	1100	234340
PSN-O DB 5 m	for emptying with integrated cable breakage and short-circuit monitoring, with gold flashed contacts	5 m	650	234357
PSN-O DB 10 m		10 m	1000	234364
PSN-X SP 5 m	for filling and emptying	5 m	650	234371
PSN-X SP 10 m	for PLC application and for intrinsically safe circuits, with gold flashed contacts, export-version without protective conductor, 1 SPDT	10 m	1000	234388
PSN-X SP 15 m		15 m	1350	236092
PSN-X SP 20 m		20 m	1700	236115
PSN-X SP 30 m		30 m	2400	245254
PSN-X SP 40 m		40 m	3100	245261

Accessories for Float switches PSN



Weight BG - PS



Cable support K - PS



Zener barrier

Order reference	Description	Weight in g	Part No.
BG-PS	Weight for float switch, color of body blue (for free setting of the switching differences)	400	236658
IG-PS	Weight for float switch, color of body yellow (for free setting of the switching differences)	180	234401
K-PS	Cable support for float switch PSN, (fixing by means of a standard clip)	5	234418
Zener barrier MTL7778 28 V AC	Zener barrier for use e.g. of float switches in areas that are at risk of explosion	110	283072
Zener barrier MTL7787 28 V DC	Attention: The input voltage of the zener barrier mustn't exceed 28 V (AC / DC).	110	260479

Float switch PSN - Digital measurement procedure

Technical Data PSN-O/F/X (ST/SP)			
Rated operational voltage U_e (AC)	PSN-O/F/X	PSN...+ST...	PSN-X SP
		250 V ~ 400 V ~	250 V ~
Rated operational current I_e (AC)	10(8) A (250 V ~)	10(8) A	max. 400 mA
	10(4) A (400 V ~)		
Contact rating		1,1 kW	
Max. cycles Cycles 50 E3		≥ 50.000	
Temperature resistance Cable VDE 282 T 4 12/95 Body		60 °C 85 °C	
Temperature resistance gem. VDE PSN-O / PSN-F * PSN-O / PSN-F PSN-O / PSN-F PSN-X SP		10 A – T 45 °C 8 A – T 50 °C 6 A – T 60 °C T 60 °C	
Protection watertight, depth 10 m		IP 68	
Wire cross sections VDE 0631 T 1 01/96		3 x 1 mm ²	
Lead - black		H 07 RN-F	

Technical Data PSN-O DB	
Rated operational voltage U_e	< 30 V-DC
Rated operational current I_e	11 mA (R=2,7k) 2,4 mA (R=12,7k)
Rated switching capacity* Thermal switching capacity	250 V AC, 1 mA 250 V AC, 6 A
Max. cycles Cycles 50 E3	≥ 50.000
Temperature resistance Cable VDE 282 T 4 12/95 Body	60 °C 85 °C
Protection watertight, depth 10 m	IP 68
Wire cross sections VDE 0631 T 1 01/96	3 x 1 mm ²
Lead black	H 07 RN-F

* These models were conceived so that they can be used in circuits with a low switching capacity (min. 1mA / 4V) and with a middle switching capacity (max. 5A).
The respective product may be used only in one of these circuit types during his complete use duration.

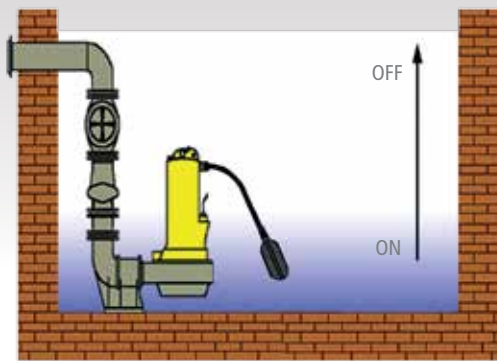
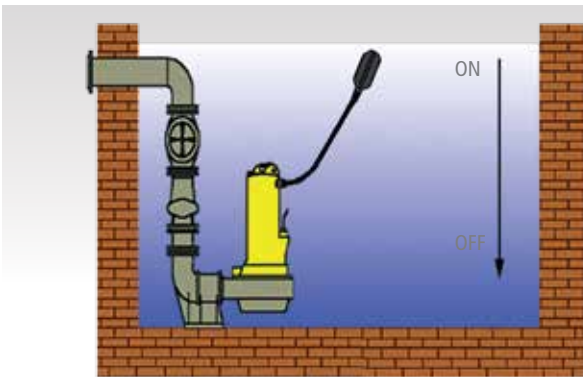
Resistance Body / Cable

Resistance
Formic acid (hydrous 10%), Gasoline (normal), Diesel, Formaldehyde (hydrous 40%), Glycerine, Fuel oil, Lactic acid (hydrous 10%), Phosphoric acid (hydrous 10%), Nitric acid (hydrous 10%), Sulfuric acid (hydrous 35%), Washing powder

Limited resistance
Acetic acid (hydrous 10%), Nitric acid (hydrous 10%), Chlorinated water, Hydrogen peroxide *

*No approval for use in drinking water...

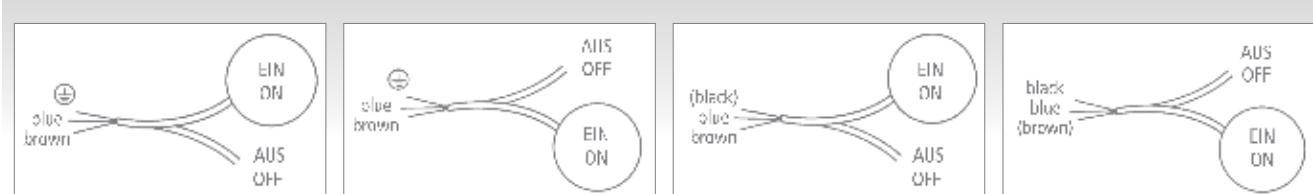
Types



PSN-O Float switch for emptying
Contact closes in upper position and switches the pump on.
PSN-X Float switch for filling and emptying
Export-version with 1 SPDT without protective conductor and VDE-Approval mark.

PSN-F Float switch for filling
Contact opens in upper position and switches the pump off.

Circuit Diagrams Float switch PSN



Float switch PSN-O for emptying

Float switch PSN-F for filling

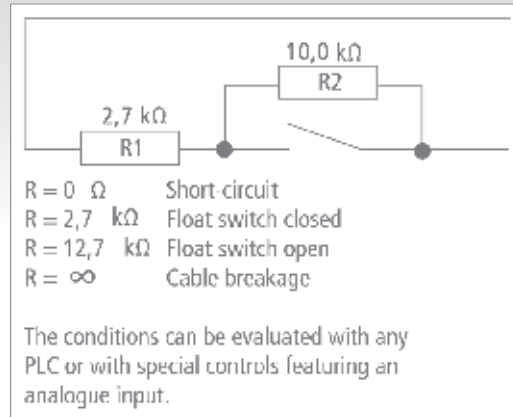
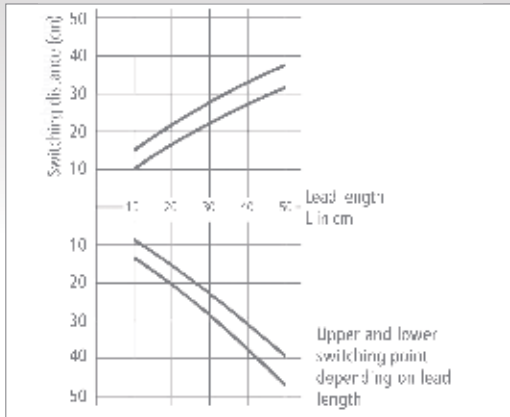
Float switch PSN-X here in function for emptying

Float switch PSN-X here in function for filling

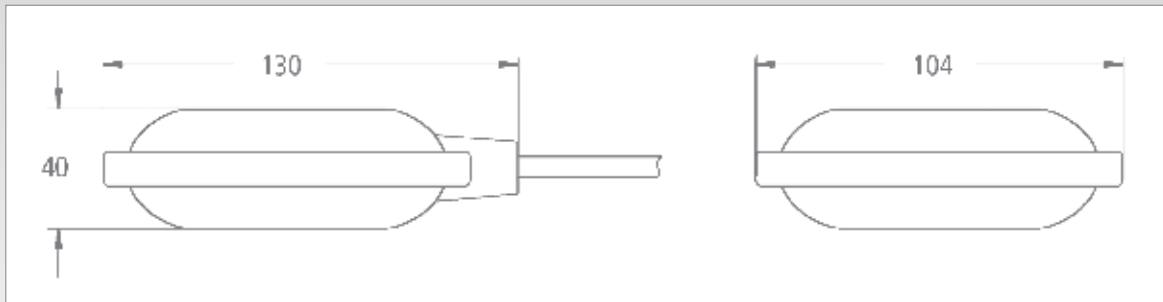
Level control technology

Switching Diagram PSN

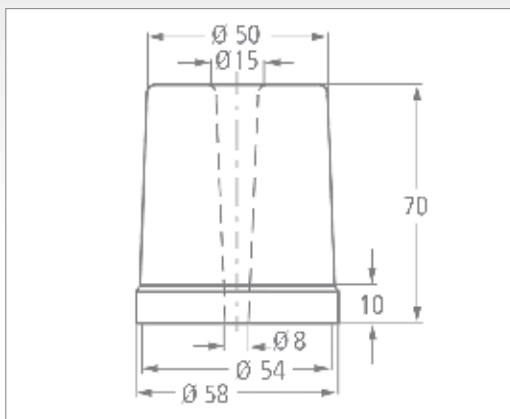
Inner wiring PSN-O DB



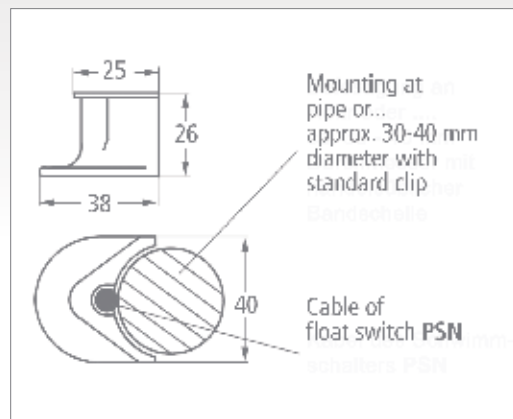
Dimensions PSN / Accessories



Float switch PSN

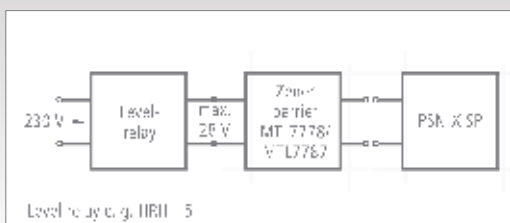


Weight BG-PS / IG-PS



Cable support K-PS

Atex-connecting of the PSN with the zener barrier MTL 7778 / MTL 7787



Technical Data MTL 7778 / MTL 7787	
Max. input voltage U	28 V AC (MTL7778) 28 V DC (MTL7787)
Contact resistance R	600 Ω (MTL7778) 300 Ω (MTL7787)
Operating current	47 mA (MTL7778) 93 mA (MTL7787)

A exceeding the input voltage at the zener barrier leads to the destruction

Suspended float switch - „T“ series

...the patented level controller



Suspended float switch „WASTE“ - for use in waste water systems.

The hanging float switch of series „T“ are ideal for level control in drainage systems , pumping stations and wastewater systems.

Used in domestic, industrial or municipal sector, for wastewater, drinking water, chemical substances and environment for use in explosive areas (ATEX)* - (type variety - More on request).

The float switch is hanging freely regulated to the desired level.

By increase or decrease in the liquid level , the situation of the float switch changed, whereby the micro switch opens the circuit or closes (Principle of operation).

Selection (others on request)



„T“ Series / Type: „ACS“
Application: Drinkable



„SiHF“
High Temperature



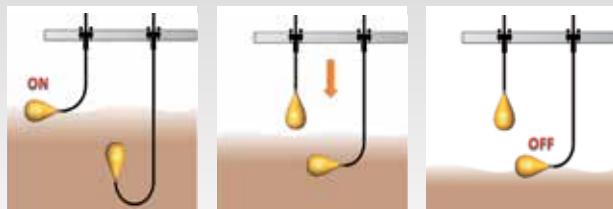
„FEP“
Chemical Ambient



Atex-Schutz
II 1G Ex ia IIC T6
Explosive *



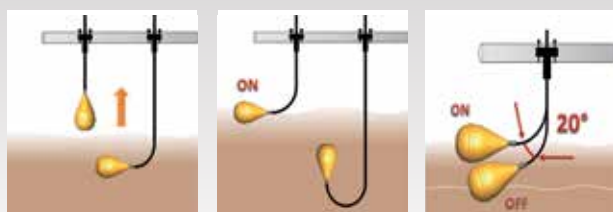
Principle of operation



The high level starts the pump...

...the tank drains...

...the low level stops the pump..



...the tank fills...

..and the high level starts the pump.

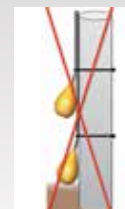
activation angle: 20°

Used in couple with another of the same type allows you to adjust the levels of minimum and maximum. It's also possible to use a third and fourth regulator respectively for minimum and maximum alarm.

Fixing



CORRECT - hanging freely!



WRONG



Fixing kit - Straining clamp, Art. 282396

Advantages

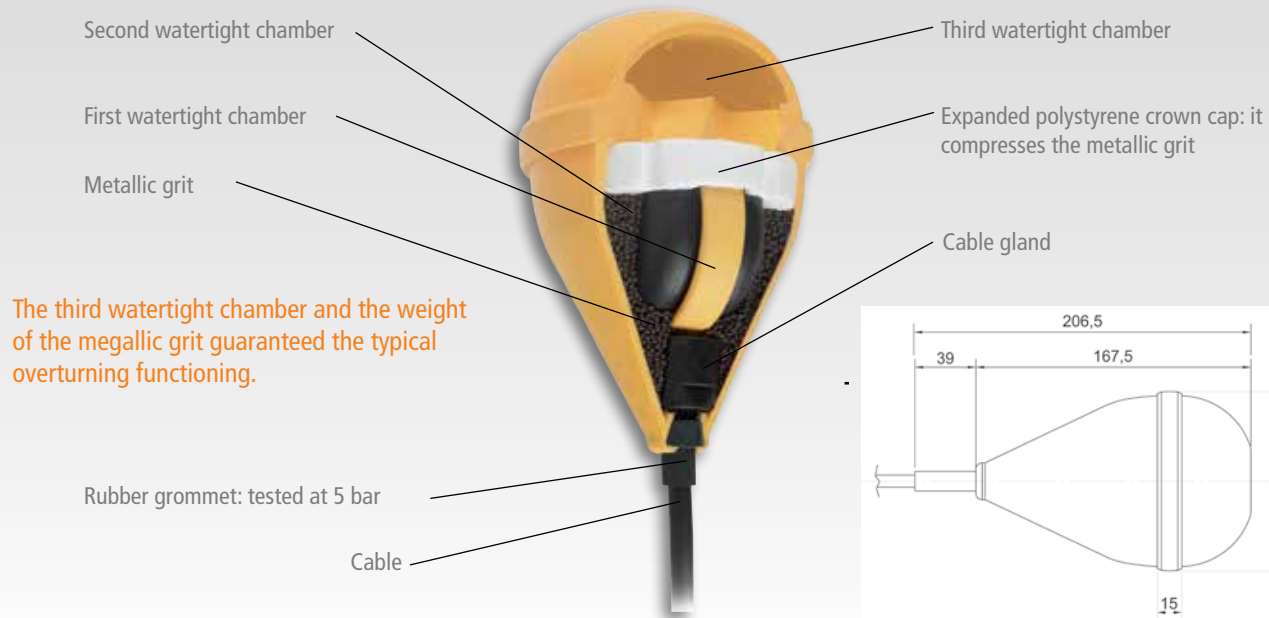
- Used in couple with another of the same type allows you to adjust the levels of minimum and maximum. It's also possible to use a third and fourth regulator respectively for minimum and maximum alarm.
- Three watertight chambers level regulator with freely suspended trim variation.
- Unlike traditional floats that float on the water surface, the float switch of „T“ series thanks to its special construction with integrated counterweight, remains underwater.
- Float switch of „T“ series produced without chemicals, mercury free, 100% recyclable - patented.

* The rules of the DIN EN 60079 to be observed!

Suspended float switch - „T“ series

- Technical Details -

Adjustable control parameters:



Technical Details:

Type	„WASTE“	„ACS“	„SiHF“	„FEP“	„ATEX“
Artikelnummer	286431	286448	286455	286462	285618
Application areas	Dirty water systems, drainage plants, pumping stations...	Water main, drinkable water fountains, drinks and foodstuffs, aquarium, fishponds, swimming pool...	Resistant to heat and severe temperature changes. Can be used primarily in steel producing industry, aviation industry, ship building, cement, glass factories, ceramic factories...	Suitable for immersion in: hydrocarbons, medical and scientific plants, purification plants, air conditioning equipment..	For use in explosive environments*. Suitable for level regulation in drainage plants, pumping stations and dirty water systems...
Cable**	H07 RN-F 3x1 - Ø 8,8mm (2 functions); H05 RN-F 3X1 - Ø 7,4mm (2 functions); H07 RN8-F 3G1 - Ø 8,8mm (1 function) H07 RN-F 3G1 oil resistant - Ø 8,8mm (1 function) ; 10 - 20 m	ACS + AD8 3X1 - Ø 8,8mm (2 functions) (10 m - 20 m) - (32,8 ft - 65,6 ft)	SiHF 4G1,5 - Ø 8,8mm (2 functions) (10 m - 20 m) - (32,8 ft - 65,6 ft)	FEP - FFR105OPR5F 4G0.75 - Ø 8,8mm (2 functions) (10 m - 20 m) - (32,8 ft - 65,6 ft)	H05RN-F 4G0,75 (RN8-F mix) Ø 8,8mm (2 functions) (10 m - 20 m) - (32,8 ft - 65,6 ft)
Grommet	EPDM Santoprene	Megol	Viton	Viton	EPDM
Casing	Polypropylene	Polypropylene	Polypropylene	Polypropylene	Composite Mat. - Carbon Black
Power Supply	20(8)A 250 V	20(8)A 250 V	20(8)A 250 V	20(8)A 250 V	max. 4-40 Vac /max 100 mA
Activation Angle	20°	20°	20°	20°	20°
Depth	20 m - 65,6 ft	20 m - 65,6 ft	20 m - 65,6 ft	20 m - 65,6 ft	20 m - 65,6 ft
Temperature	min. -15°C - max. +60°C	min. -15°C - max. +40°C	max. +80°C	max. +80°C	min. -20°C - max. +80°C
Protection Grade	IP 68	IP 68	IP 68	IP 68	IP 68
Class	I - II	II	I	I	I
Specific Gravity	0,95 - 1,05 kg/dm ³	0,95 - 1,05 kg/dm ³	0,95 - 1,05 kg/dm ³	0,95 - 1,05 kg/dm ³	0,95 - 1,05 kg/dm ³
Certificates / Approvals	Straining clamp (stainless steel) , part no. 282396				
Fixing kit (optional)	CE	CE	CE	CE	CE Ex II 1GEx ia IIC T6 2010ATEX 2328 (TecnoPlastic)*

**Other cable materials are available on request

***Technical changes and mistakes reserve.

Electronic pump control ENP



Electronic single/dual pump control with monitoring features
Electronic pump control for filling and emptying a tank with integrated relative pressure transducer for panel board mounting, connection for pneumatic tube, four adjustable switching points, three relay outputs, staging and sequencing control, isolating transformer acc. to VDE 0550.

Function: The device analyses the pressure applied to the sensor.
Two pumps for emptying a tank are connected to terminals 11/14 and 21/24 on alarm can be connected to terminals 31/34.

All levels are adjustable.

The LED's illuminate when the pumps or the alarm are switched on. The relays are activated. The tripping delay for the alarm is fixed, preset value

Order reference	Type Code	Measuring range (m)	Max. inaccuracy at 25°C	Resolution	Operating voltage U_B (V-AC)	max. perm. level	Weight (in g)	Part No.
ENP 2.3 oN		0,1–2 m	2,5 %	0,01 m	230	10 m	295	260486
ENP 2.3		0,1–2 m	2,5 %	0,01 m	230	10 m	295	260493
ENP 4.3		0,1–4 m	2,5 %	0,01 m	230	10 m	295	260509
ENP 10.3		0,1 – 10 m	2,5 %	0,10 m	230	20 m	295	260516

* oN = without Follow-up time *¹ Other voltages are also available upon request. *² 0 V = 0,1m / 10 V = measuring range end value

*³ Accessories see page 115

Technical operating data	
Permissible operating voltage range	±10 %
Operating voltage influence at ± 10% operating voltage fluctuation	< 0,1 %
Duty factor ED	100 %
Permissible ambient and media temperature	-20°C up to +60°C
Permissible ambient humidity rel. humidity, non-condensing	10 % up to 90 %
Permissible storage temperature	-40°C up to 80°C
Clearance and creepage distances	VDE 0110
Working position	any position
Power consumption	max. 1,5 VA

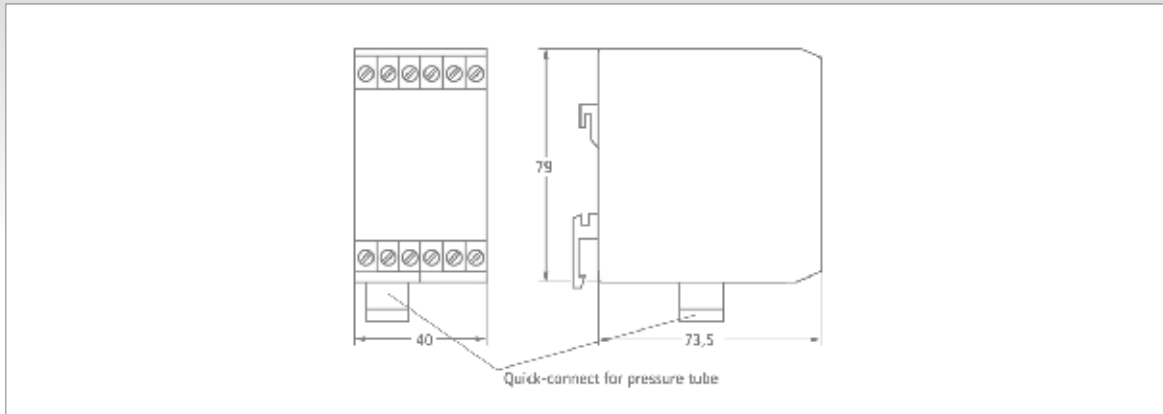
Pressure connection	
Quick connect suitable pneumatic tube e.g.	6 x 1 mm Festo PAN

Analogue output	
Analogue voltage signal max. 5 mA short-circuit proof	0 - 10 V

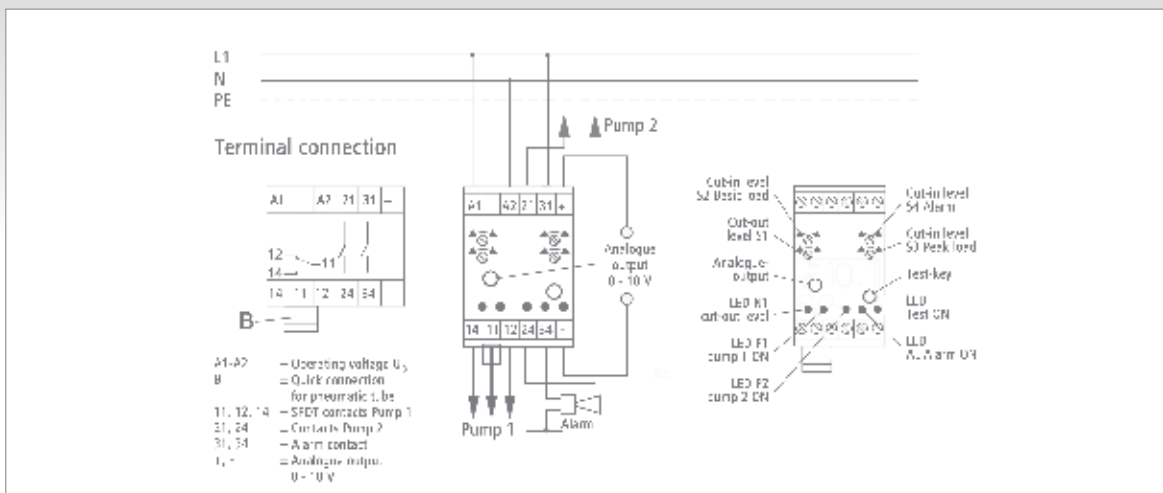
Enclosure	
Material	ABS flameproof, UL-approved
Mounting	snap on 35 mm DIN-rail connector acc. to EN 50 035
Enclosure protection	IP 40
Protection against shock	acc. VBG 4
Terminals	Cage clamps
Cross section	2,5 mm ²
Weight	295 g
Male jack plug Jack 2.5 mm	2,5 mm

Power section	
Series voltage acc. to VDE 0660 and VDE 0110 Group C	250 V-AC
Maximum continuous current per contact	6 A-AC
Maximum switching capacity per contact	1.500 VA (AC) 50 W (DC)
Mechanical life Schaltspiele	approx. 1 x 10 ⁷
Electrical life (max. load) Cycles	approx. 1 x 10 ⁵

Dimensions ENP

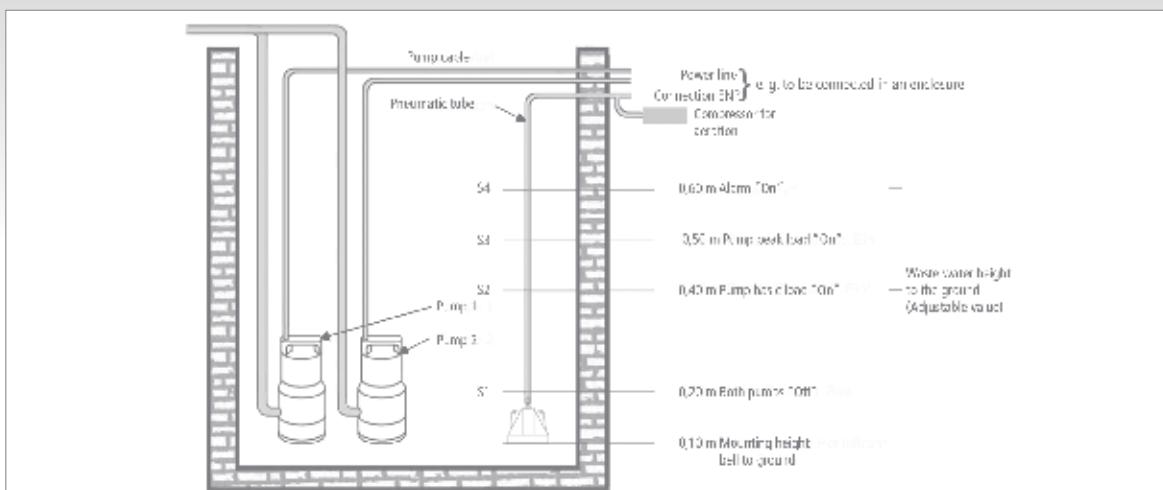


Wiring Diagram ENP



ENP as single or dual-pump control

Wiring diagrams ENP



Electronic level relay ENR



- Electronic level relay for all ranges from 0.1 – 2 m
- For panel board mounting
- Measurement according to impact pressure method
- Relay output
- Output signal: 0 – 10 V

Electronic level relay with integrated relative pressure transformer for panel board mounting, quick-connect for pneumatic tube, two adjustable thresholds, relay output and isolating transformer according to VDE 0550.

Function: The device evaluates the pressure applied to the sensor. Should a pump for emptying a tank be connected to terminals 11 and 12, then the pump is switched on when the upper threshold is exceeded. The pump is switched off when falling below the lower threshold. Both thresholds are adjustable. The LED illuminates when the pump is running, whereby the relay is deactivated.

Order reference	Type Code	Measuring range (m)	Max. inaccuracy at 25°C	Resolution	Operating voltage U_B (V-AC)	max. perm. level	Weight (in g)	Part No.
ENR 2		0,1–2 m	2,5 %	0,01 m	230	10 m	100	260523

Accessories see page 115

0 V = 0,1m / 10 V = measuring range end value

Technical operating data	
Permissible operating voltage range	±10 %
Operating voltage influence at ± 10% operating voltage fluctuation	< 0,1 %
Duty factor ED	100 %
Permissible ambient and media temperature	-20°C up to +60°C
Permissible ambient humidity rel. humidity, non-condensing	10 % up to 90 %
Permissible storage temperature	-40°C up to 80°C
Clearance and creepage distances	VDE 0110
Working position	any position
Power consumption	max. 1 VA

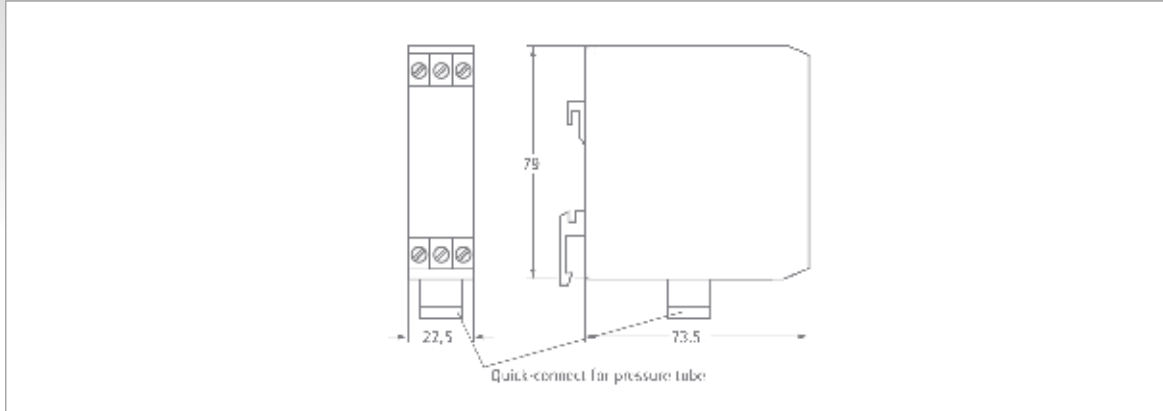
Pressure connection	
Quick connect suitable pneumatic tube e.g.	6 x 1 mm Festo PAN

Analogue output	
Analogue voltage signal max. 5 mA short-circuit proof	0 - 10 V

Enclosure	
Material	ABS flameproof, UL-approved
Mounting	snap on 35 mm DIN-rail connector acc. to EN 50 035
Enclosure protection	IP 40
Protection against shock	acc. VBG 4
Terminals	Cage clamps
Cross section	2,5 mm ²
Weight	100 g
Male jack plug Jack 2.5 mm	2,5 mm

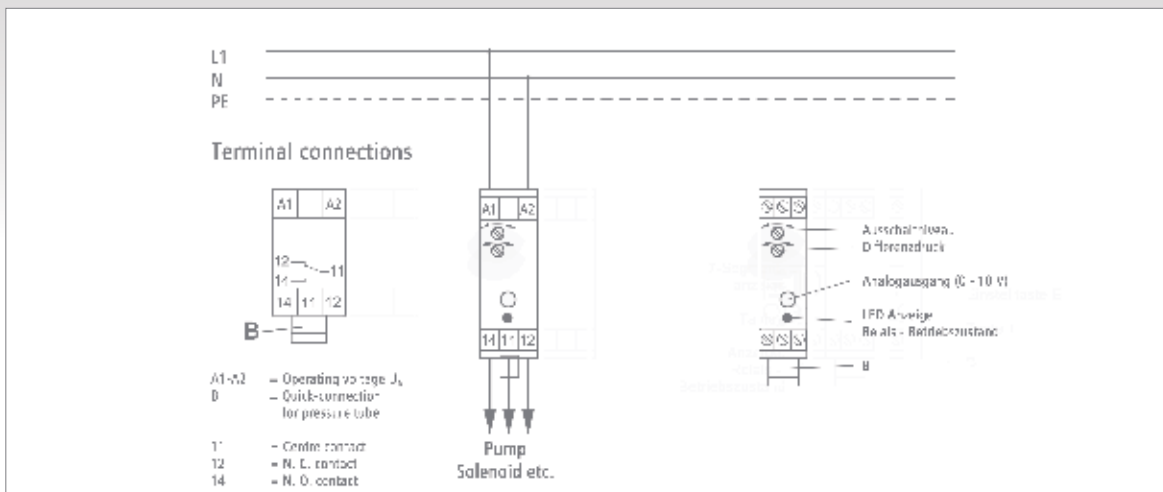
Power section	
Series voltage acc. to VDE 0660 and VDE 0110 Group C	250 V-AC
Maximum continuous current per contact	6 A-AC
Maximum switching capacity per contact	1.500 VA (AC) 50 W (DC)
Mechanical life Schaltspiele	approx. 1 x 10 ⁷
Electrical life (max. load) Cycles	approx. 1 x 10 ⁵

Dimensions ENR



Dimensions in mmr

Wiring Diagram ENR



Electronic measurement method - Electronic level relay HRH-5

Electronic level relay HRH-5



Level relay for level monitoring, using 2 or 3 electrodes
1 SPDT

Standard relay for level monitoring with 1 and 2 threshold values, infinitely variable limit values, 1 SPDT and isolating transformer according to VDE 0550.

Function: The electrodes are connected to the relay. Should the tank be made of a conductive material, it can be used as a third electrode (For connection see wiring diagram).

AC current is used in order to avoid polarisation, electrolysis and undesired oxidation of the electrodes.

To minimize false relay switching (e.g. pollution of the probes, humidity ...), the switching sensitivity can be adjusted to the conductivity of the respective media.

Ordering reference	Type Code	adjustable hysteresis (kΩ)	Time reaction	Adjustable delay time	Operating voltage (V-AC / DC)	Weight (in g)	Part No.
ENR 2 HRH-5		5 - 100 kΩ	< 400 ms	0,5 - 10 s	24...240 V-AC / DC	92	250203

Accessories, electrodes for HRH-5



Ordering reference	Description	Applica-tion	Part No.
TEL-00	Single electrode with screw version		236467
TEL-05	Single electrode, 5m cabel H07 RN-F 1x1,5 mm ²		260684
TEL-10	Single electrode, 10 m cabel H07 RN-F 1x1,5 mm ²		260691
TEL-20	Single electrode, 20 m cabel H07 RN-F 1x1,5 mm ²		260707
TEL-TW-05	Single electrode, 5 m cabel TML-B 1x1,5 mm ² Waquasan Reg. Nr. 11156/09564	Suitable for use with potable water. Temperature range 0 ... 90°C	260714
TEL-TW-10	Single electrode, 10 m cabel TML-B 1x1,5 mm ² Waquasan Reg. Nr. 11156/09564		260721
TEL-TW-20	Single electrode, 20 m cabel TML-B 1x1,5 mm ² Waquasan Reg. Nr. 11156/09564		260738

Level control technology

Dipped elektrodes TEL	
Electrode and screw	stainless steel (1.4301 or higher)
plastic coat	polyethylene
seal	brass
Cable optional	1-conductor cable, for example Rubber Cable H07 RN-F

Dipped elektrodes TEL-TW (suitable for drinking water)		
Electrode and screw	stainless steel 1.4305	
plastic coat	ISO-LEN® 1000	Food law-tion statement from the manufacturer
seal	NBR	KTW and DVGW W 270
Cable optional	FACAB DRINCABLE + 07 KTW-W270-acs 1x1,5 mm ² ARISTONCAVI 2010	KTW and DVGW W 270

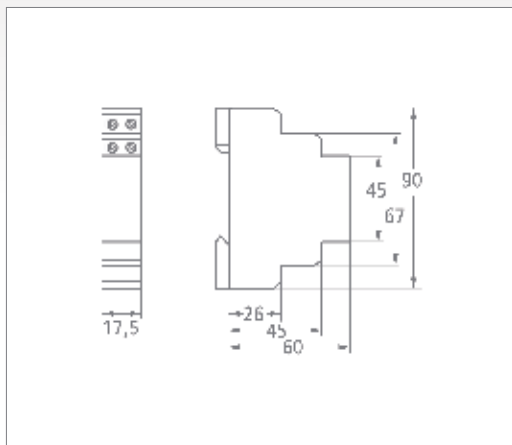
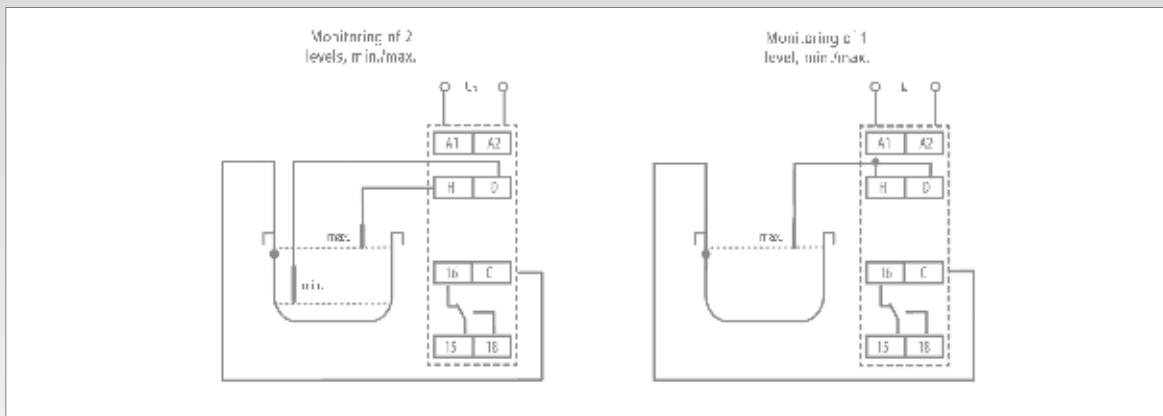
Enclosure	
Material	ABS flameproof, UL-approved
Mounting	snap on 35 mm DIN-rail connector acc. to EN 50 035
Degree of Protection	IP 40
Shock protection	acc. to VBG 4
Connection Box	Box-type terminals
Max. cross-section with cable end sleeves	max, 1 x 4, 2 x 2,5 mm ² max, 1 x 2,5, 2 x 1,5 mm ²

Output contacts	
Series voltage acc. to VDE 0660 and VDE 0110 Group C	24...240 V-AC/DC
Maximum continuous current per contact	8 A AC1
max. switching capacity (240V AC1/ 24 V DC)	2.500 VA, 240 W
min. switching capacity (24 V DC)	500 mW
Mechanical life Cycles	approx. 1 x 10 ⁷
Electrical life (max load) Cycles	approx. 1 x 10 ⁵
Weight	72 g

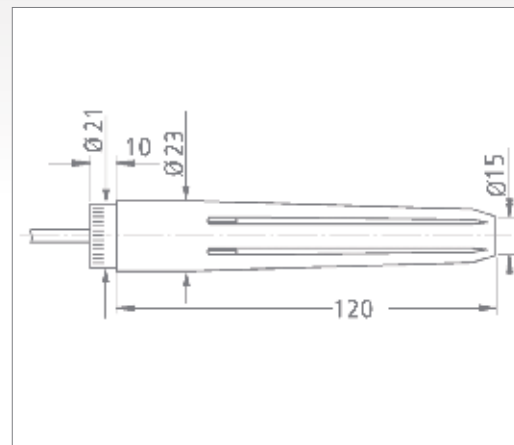
Technical operating data	
Permissible operating voltage range	-15 % +10 %
Operating voltage influence at ± 10% operating voltage fluctuation	< 0,1 %
Duty factor ED	100 %
Permissible ambient temperature	-20°C bis 55°C

Technical operating data	
Permissible storing temperature	- 30°C bis 70°C
Clearance and creepage distances	VDE 0110
Working position	any position
Power consumption	max. 2,0 VA

Wiring Diagram HRH-5 (Sample with a conducting tank)



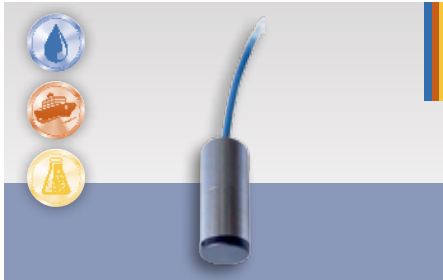
Electronic level relay HRH-5



Electrode TEL-05-..

Hydrostatic measurement method - Stainless steel level sensor ENS

Stainless steel level sensor ENS



With ceramic measuring cell, shielded cable and a specially designed stainless steel enclosure, Condor offers a precision level sensor for all different types of applications, like e.g. wastewater. The sensor offers extremely high media resistance and the especially large membrane makes the sensor insensitive to pollution.

The ENS level sensor is also available with ATEX (explosive atmosphere) approval.

The shielded cable protects the output signal (4 – 20 mA) against electromechanical influences.

Order reference	Type Code	Measuring range	Cable length	EX Approval	Weight (in g)	Part No.
ENS 1/10		bis 1,0 m	10 m		1000	245414
ENS 4/10		bis 4,0 m	10 m		1000	290193
ENS 10/15		bis 10,0 m	15 m		1250	290049
ENS 1/10 EX		bis 1,0 m	10 m	X	1000	245421
ENS 1/15 EX		bis 1,0 m	15 m	X	1250	245438
ENS 1/20 EX		bis 1,0 m	20 m	X	1500	290025
ENS 1/25 EX		bis 1,0 m	25 m	X	1750	245445
ENS 1/30 EX		bis 1,0 m	30 m	X	2000	245452
ENS 4/10 EX		bis 4,0 m	10 m	X	1000	242673
ENS 4/15 EX		bis 4,0 m	15 m	X	1250	242680
ENS 4/20 EX		bis 4,0 m	20 m	X	1500	290209
ENS 4/25 EX		bis 4,0 m	25 m	X	1750	290216
ENS 4/30 EX		bis 4,0 m	30 m	X	2000	290230
ENS 4/40 EX		bis 4,0 m	40 m	X	2500	290247
ENS 10/10 EX		bis 10,0 m	10 m	X	1000	242703
ENS 10/15 EX		bis 10,0 m	15 m	X	1250	242697

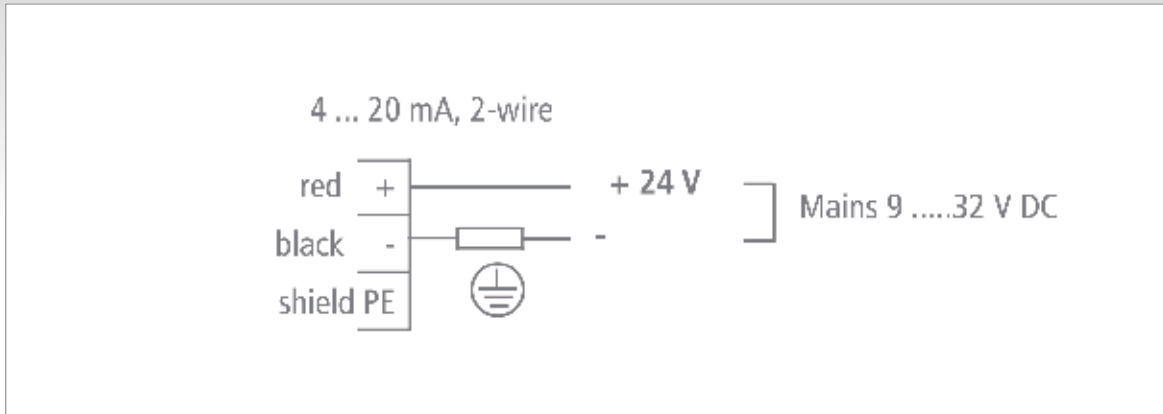
Accessories ENS

Description	Weight (in g)	Part No.
Galvanized fixing clamp for level sensor	165	290223
Stainless steel fixing clamp for level sensor	170	282396
Protective cap for level sensor as replacement	12	282372
Terminal box ENS - to extend the connection line of electronic immersion sensors -	30 g	282389

Technical operating data	
Measuring range	0 – 25 mbar (0 - 0,254 mWs) up to 0 – 60 bar (0 - 612 mWs)
Output signal	4 – 20 mA, 2-wire
Accuracy	< 0,2 % v. M.E.
Adjustment time	200 ms (other values on demand)
Auxiliary voltage	9...32 V DC, max. 30 mA (12...30 V for EX-type)
Temperature range	-25...80 °C (-25...70 °C for EX-type)

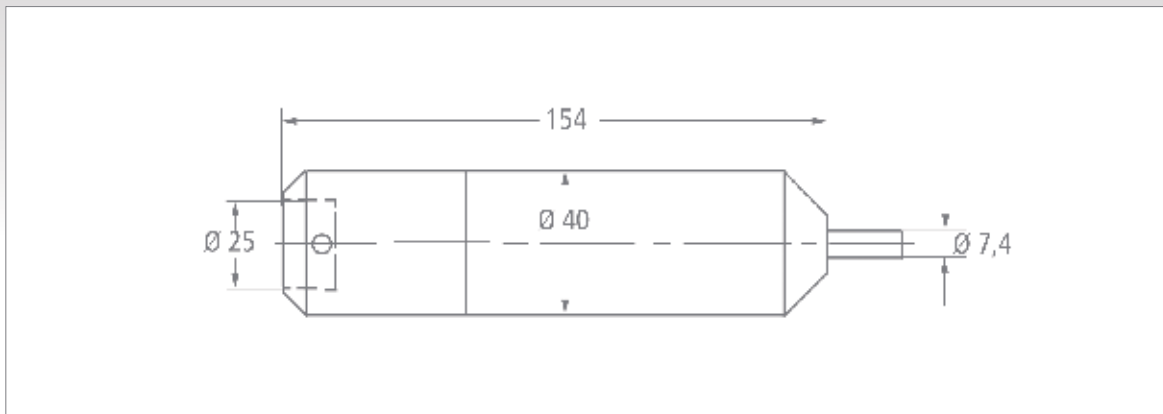
Technical operating data	
Temperature influence	< 0,015 %/K of measuring range
Housing	Stainless steel, 1.4571
Degree of Protection	IP 68
Electrical connection	Kevlar braided PE cable, wire cross-section 0,34 mm ² , with pressure compensation
EX-protection	EEx ia IIC T6

Wiring diagram ENS



Level Sensor ENS

Dimensions ENS



Level Sensor ENS

Application example:



Level sensor ENS
Monitors e.g. Wastewater/Water level in a pump shaft

Bells and Accessories for Level Monitoring



Bell OGL



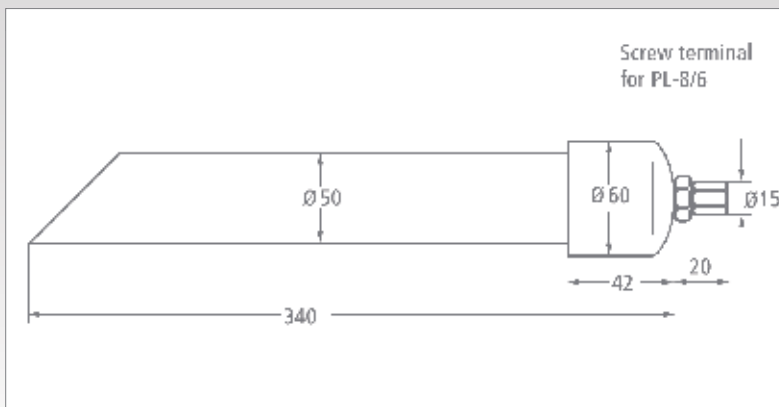
Bell OGL-GU



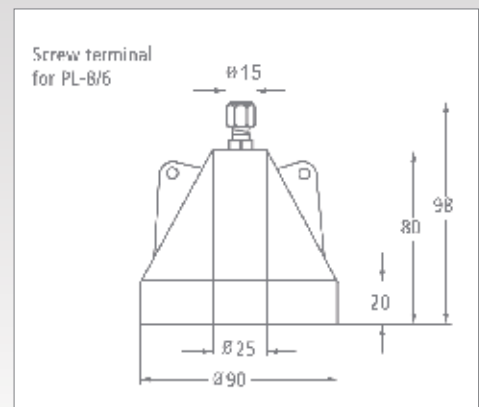
Small air compressor in plastic casing

Order reference	Description	Weight (in g)	Part No.
	Wet bells		
OGL-8	Open wet bell with screw connection for PL-8/6	250	260530
OGL Installation kit	Installation kit for OGL-8, stainless steel, screw tube clamp and Stockschraube	150	282198
OGL-8 GU	Open wet bell (gray cast iron with stainless steel chain) with screw connection for PL-8/6, chain length 2,9 m	1100	290117
	Pneumatic tube (PL) PL-8/6 – 8 mm outer-ø, 6 mm inner-ø PL-6/4 – 6 mm outer-ø, 4 mm inner-ø		
PL-8/6, 10 m	10m rope PL-8/6	225	260554
PL-8/6, 20 m	20m rope PL-8/6	450	260561
PL-8/6, 1 m	Length > 20 m, each m (max. length per rope 100 m)	23	260578
PL-6/4, 1 m	Pneumatic tube PL-6 (price / m)	20	260585
	Screw connections		
Screw connection 1/8"	Screw connection 1/8" for OGL-8 GU / GGL-8	20	260592
R-SCH	Reducing screw connector for PL from PL-8/6 to PL-6/4	22	260615
T-ST 6	T-plug connector für PL-6/4 for aeration	11	260622
T-SCH 8	T-screw connector for PL-8/6 for aeration	14	260639
	Small compressors		
Rena-Air 100	for aeration, incl. check and security valve with T-screw connector for PL-8/6 (120 L/h; 150 mb; 3W; 230 V AC IP X4), e.g. usable with open wet bells	315	260646
Rena-Air 100 in casing	for aeration, incl. check and security valve with T-screw connector for PL-8/6 (120 L/h; 150 mb; 3W; 230 V AC IP X4), e.g. usable with open wet bells	720	260653

Bell Dimensions



Bell OGL



Bell OGL – GU



CPS-L



CPS-B new generation



CPS-B with soft starter new generation



CPS-M PLUS

Level control technology

Industries



CPS-L

The CPS-L pump control is designed for the automatic control of one pump (max. 4 KW / 9A)

P. 118

Level control technology, this pump control can be ideally used for pumping systems in the field of domestic waste and sewage water as well as rain water.

CPS-B new generation

Compact pump controls CPS-B1 and -B2 of the latest generation for more system transparency. They are designed for the automatic control of one or two pumps (max. 4 kW/9A)

NEW!

P. 120

Level control technology, this pump control can be ideally used for pumping systems in the field of domestic waste and sewage water as well as rain water.

CPS-B SA new generation

Compact pump control CPS-B1 and -B2 with soft starter of the latest generation, are designed for the automatic control of one or two pumps (max. 11 kW/25A)

NEW!

P. 122

Level control technology, this pump control can be ideally used for pumping systems in the field of domestic waste and sewage water as well as rain water.

CPS-M PLUS

Modular pump control CPS-M PLUS of the latest generation for more system transparency and function. They are designed for the automatic control for the operation of up to four pumps (max. 75 kW)

P. 124

Level control technology, for use in municipal, industrial, commercial and domestic applicatons.



**Condor products
application areas:**

- Waste water management
- Air pressure technology
- Compressor control and monitoring
- Level measurement
- Pump control
- Rain water utilization
- Pumping stations
- Control system for riding surfaces
- Small sewage treatment plants

Pump control CPS-L

... for price sensitive applications



Pump control CPS-L

For many price sensitive applications with limited available space, cost-effective but powerful pump controls are needed.

pumping systems in the field of domestic waste and sewage water as well as rain water.

Condor's pump control CPS-L handily fulfills these requirements. The CPS-L pump control is designed for the automatic control of one pump (max. 4 KW / 9A).

With its compact design, but with no essential concessions in terms of functions, this pump control can be ideally used for

Advantages

- Compact housing (w200xh220xd140mm, incl. accessories). The CPS-L can be nearly used too broad
- Extensive basic equipment includes membrane keypad for operation / programming, LED displays for pump condition, illuminated display and extensive functionality / adjustability (see detailed description).
- Suitable for the control of pumps and sensors in explosive areas (ATEX) in accordance with DIN EN 60079-14, DIN VDE 0660 and EN 60947 (relay for manual motor starters is optional).
- Option available for serial PC-interface and software "WaterTel" .



Technical details

Adjustable control parameter

- Alarm level
- ATEX-mode
- Date / time
- Phase sequence monitoring
- Turn on delay
- On / off switch levels
- Failure display
- Short start against pump sticking
- Max. operating time
- Follow-up time
- Switching function of the potential-free alarm relay
- Language (G, E, F, I...)
- Maintenance display
- Cyclical emptying

Options

- 2 x 9 V battery (power failure alarm)
- 230V (2,3 kW/9A) operating voltage is available
- MCB optional
- Overload relay (BI-metal) can be added
- Cylinder lock for the cover
- Pressure sensor (measuring range 0-2 meters w.c.) can be added

Operation and Display

- Display 2x16 illuminated symbols
- Menu with membrane keypad
- Manual-OFF-Automatic – mode selection
- LED display for pump status
- LED display for pump readiness
- Both buzzer and LED alarm indication
- Open cover interlock
- Detailed menu with all relevant setting options
- Maintenance display
- ATEX-mode
- Phase sequence monitoring
- Display of operating hours and switching cycles

Available connections

- Thermal contact (zero voltage safe)
- 1 X 230V / 1A output for possibly small compressor
- Potential-free alarm relay
- NC aux-contact

Level monitoring

- 1 or 2 float switches
- Impact pressure method (optional: plug-on modul)
- 4-20 mA analog input e.g. for level sensor
- Separate high water float switch

Technical data CPS-L

Housing	ABS
Dimensions	w 200 x h 220 x d 140 mm, incl. accessories
Cable glands	2 x M25 x 1,5 3 x M16 x 1,5 1 x M12 x 1,5
Protection class	IP54
Max. protection on site	16A
Max. power of the pump	4KW
Number of pumps	1 pump
Control voltage	230V AC

Technical data CPS-L

Operating voltage / supply line	3x 400V 50 Hz (L1, L2, L3, N, PE)
Temperature range	0...+50°C
Potential-free alarm contact	5A (2A inductive)
Rated current	1,0 bis 1,6A 1,6 bis 2,5 A 2,5 bis 4,0 A 4,0 bis 6,0 A 5,5 bis 8,0 A 7,0 bis 9,0 A

Pump control CPS-B

... high quality & compact pump control



pump control CPS-B1 and CPS B2 - new generation

Compact pump controls CPS-B1 and -B2 of the latest generation for more system transparency. They are designed for the automatic control of one or two pumps (max. 4 kW/9A)

This pump control can be ideally used for pumping systems **in the field of domestic waste and sewage water as well as rain water**. For use in municipal, industrial, commercial and domestic applications.

With **high quality basic equipment in standard version** (main circuit breaker, manual motor starter, new QVGA color touch screen...).

Advantages

- compact housing (w265xh270xd145mm) - especially suitable for the installation in exterior columns
- high quality basic equipment in standard execution (main circuit breaker, manual motor starter, Manual-0-Automatic function, **new QVGA color touch screen**, **USB interface**, connection systems different level monitoring...)
- free-selectable level monitoring
- all control functions are performed via the QVGA touch screen
- suitable for the operation of pumps and sensors in explosive areas (ATEX) **
- for the use of 230V or 400V AC pumps
- telecontrol system with Ethernet-Modul or GSM-Modem (optional)
- pressure sensor (measuring range 0-2 meters w.c.) can be added



Pump control CPS-B new generation

Technical details

Adjustable control parameter

- alarm relay, programmable function
- ATEX-Mode
- date / time
- phase sequence monitoring and phase drop monitoring
- turn-on delay
- on / off switch levels
- integrated buzzer (can be switched on and off)
- integrated time switch for compressor function
- short pump start against locking
- load changeover time for pumps (CPS-B2)
- max. pump operating time
- minimum pressure monitoring
- password protection
- pump follow-up time
- compressor or agitator activation
- installed languages: DE, EN, FR, NL, IT (other languages on request)
- power monitoring (electrical)
- power monitoring (thermal-magnetic)
- delay time / high water alarm
- delay time between pump 1 and pump 2 (CPS-B2)
- maintenance display
- periodic emptying

Options

- battery 6AA NiMH 1,2V (power failure alarm)
- execution - voltage 230V (2,2kW/9A)
- installation in exterior columns
+ panel heater, + flashing light, + small compressor
- Ethernet module or GSM Modem retrofittable in the control unit
- pressure sensor (measuring range 0-2 meters w.c.)
- sep. housing for PTC relais, RCD, etc.
- cylinder lock for the cover
- zener barrier (1 or 2 pieces integrable)

Operation and Display

- ATEX-mode
- menu navigation via backlit QVGA color touch screen:
- graphical display and plain text display
- graphical display - for level states
- graphical display - for operating states (pumps)
- graphical display - operational fault
- phase sequence monitoring and phase drop monitoring
- error list (20 fields saved retentively)
- Manual-OFF-Automatic - mode selection
- main circuit breaker
- internal buzzer
- transparent cover (locks in the open status)
- motor current indication
- manual motor starter (operable from outside)
- date / time adjustable
- maintenance display

Available connections

- 1 pump (CPS-B1) or 2 pumps (CPS-B2)
- thermal contact (zero voltage safe)
ATEX, standard, ON / OFF function can be selected
- 2 x 230V / 2A output for possible small compressor
- 3 x potential-free alarm relays
(3x change-over contact)
- float switch terminal for emergency operation function
- USB interface for software update
- connecting terminal
- terminal blocks for network supply
- plug-in terminals for level measurement
- pump connection - on the contactor

Level monitoring

- 1, 2 (CPS-B1) or 3 float switches (CPS-B2)
- impact pressure sensor (measuring 0-2mWs)
can be retrofitted
- 4-20 mA analog input e.g. for level sensor
- separate high water float switch

Technical Details CPS-B

Housing	ABS-plastic housing
Dimensions	w 265 x h 270 x d 145 mm, incl. accessories
Cable glands	3x M25 x 1,5 5x M16 x 1,5 1x M12 x 1,5
Protection class	IP54
Max. protection on site	25A
Max. power of the pump	4kW
Number of pumps	1 pump (-B1); 2 pumps (-B2)
Control voltage	230V AC / 24 V DC

Technical Details CPS-B

operating voltage	400V / 230 AC 50/60 Hz
temperature range	0...+50°C
potential-free alarm relay	5A (2A inductive)
storage temperature	-20 + 70°C

* Photo shows optional accessories. Please refer to the back!

** The rules of the DIN EN 60079 to be observed! The pump control is only in provided for the „safe area“.

***Technical changes and mistakes reserve.

Pump control CPS-B with soft starter

... gentle on material!



ump control CPS-B2 - soft starter - new generation

Compact pump control CPS-B1 and -B2 with soft starter of the latest generation, are designed for the **automatic control of one or two pumps (max. 11 kW/25A)**

With high quality basic equipment in standard execution (main circuit breaker, manual motor starter, Manual-0-Auto, new QVGA color touch screen for operating conditions of the pumps, soft start, ...) optionally equipped with additional accessories.

This pump control can be among other things for the operation of pumps and sensors in explosive areas (ATEX). **

Advantages

- **compact housing** (w400xh390xd170mm)
- **high quality basic equipment** in standard execution (main circuit breaker, manual motor starter, soft start, Manual-0-Auto, **QVGA color touch screen for operating conditions** of the pumps, external serial PC-interface, display illuminated, extensive functionality and adjustability - see detailed description)
- **Soft starter (three phase systems)** - the soft starter controls the voltage steps from a selectable initial value to one hundred percent - this allows a stepless acceleration of under load motors from standstill
- **Soft start** - this cuts maintenance costs and extends the pump's lifetime
- suitable for the operation of **pumps (EEx d) in explosive areas (ATEX)** **
- **free installation areas** e.g. for two zener barriers (operation of measuring and control technology as safe electrical circuits)**



Pump control CPS-B with soft starter

Technical details

Adjustable control parameter

- alarm relay, programmable function
- ATEX-Mode
- date / time
- phase sequence monitoring and phase drop monitoring via soft start
- turn-on-delay
- on / off switch levels of the pumps
- reading errors
- integrated buzzer (can be turned on/off)
- integrated time switch for compressor function
- short pump start against locking
- load changeover time for pumps
- max. pump operating time
- follow-up time
- password protection
- pump power monitoring (electronic)
- soft start - adjustable parameters (start / stop ramp, kick start, starting voltage, current monitoring, Line or Delta)
- compressor or agitator activation
- installed languages: DE, EN, FR, NL, IT (other languages on request)
- power monitoring (themal-magnetic)
- delay time between pump 1 and pump 2 (CPS-B2)
- maintenance display
- periodic emptying

Options

- battery 12 V / 1,2 Ah + cable set (buffering power failure alarm)
- installation in exterior columns
+ panel heater, + flashing light, + small compressor
- pressure sensor (measuring range 0-2 meters w.c.)
- cylinder lock for the cover
- zener barrier (1 or 2 pieces integrable)
- additional cable glands

Operation and Display

- ATEX-mode
- display of operationg hours and switching cycles
- error list (20 fields saved retentively)
- manual-OFF-Automatic - mode selection
- main circuit breaker
- transparent cover locks in the open status
- menu navigation via backlit QVGA color touch screen:
- graphical display and plain text display
- graphical display - for level states
- graphical display - for operating states (pumps)
- graphical display - operational fault
- motor current indication - LCD display
- from outside operable manual motor starter
- date / time adjustable
- maintenance display

Available connections

- 1 pump (CPS-B1) or 2 pumps (CPS-B2)
- thermal contact (zero voltage safe)
- connection for external maintenance switch
- 2x 230V / 2A output for possibly small compressor
- 3x potential-free alarm relays (3x change-over contact)
- float switch terminal for emergency operation function
- RS232- connection for software update
- terminal blocks for network supply
- plug-in terminals for level measurement
- terminal blocks for pump connection (Line / Delta)

Level monitoring

- 1, 2 (CPS-B1) or 3 float switches (CPS-B2)
- dynamic pressure measuring system (modular optional attachable)
- 4-20 mA analog input e.g. for level sensor
- separate high water float switch

Technical Details CPS-B SA	
Housing	ABS-plastic housing
Dimensions	w 400 x h 390 x d 170 mm, incl. accessories
Cable glands	3x M32 x 1,5 2x M25 x 1,5 6x M16 x 1,5 1x M12 x 1,5
Protection class	IP54
Max. protection on site	50A
Max. power of the pump	7,5 kW / 11 kW
Number of pumps	1 pump (-B1); 2 pumps (-B2)
Control voltage	230V AC / 24 V DC

Technical Details CPS-B SA	
operating voltage / supply line	400V / 230 AC 50/60 Hz (3L, N, PE)
temperature range	0...+50°C
potential free alarm contact	5A (2A inductive)
power: rated current:	4 - 7,5 kW 5,3 - 16 A
power: rated current:	7,5 - 11 kW 8,3 - 25 A

* Photo shows optional accessories. Please refer to the back!

** The rules of the DIN EN 60079 to be observed! The pump control is only in provided for the „safe area“.

***Technical changes and mistakes reserve.

Pump control CPS-M PLUS

... for up to 4 pumps!



Pump control CPS-M PLUS

Modular pump control CPS-M PLUS of the latest generation for more system transparency and function. They are designed for the automatic control for the operation of up to four pumps (max. 75 kW).

This pump control can be ideally used for pumping systems in the field of domestic waste and sewage water as well as rain water. For use in municipal, industrial, commercial and domestic applicatons.

By connecting the **optional Ethernet module** and the web server authorized users can log in anytime, anywhere via the Internet in the control CPS-M PLUS. **The pumps and systems can be monitored and operated remotely.**

Advantages

- **variable enclosure concepts**
- **high quality basic equipment in standard execution** (QVGA color touch screen, „manual-OFF-Automatic“, manual motor starter, float switch operation, level sensor or impact pressure method,.. see detailed description)
- customized solutions - **if desired, completely assembled and wired in an outer enclosure**
- suitable for the **operation of pumps and sensors in explosive areas (ATEX) ****
- **Telecontrol system** - Ethernet modul or GSM-modem for data transmission in the control unit can be retrofitted
- Simple operation via software and / or web server. USB interface for software updates or data readout via USB stick
- **different pump start-up phases** - direct starting, star/delta starting, soft starting, frequency drive



Technical details

Adjustable control parameter

- alarm relay, programmable function
- ATEX-Mode
- date / time
- phase sequence monitoring and phase drop monitoring
- turn-on delay
- on / off switch levels for each pump (alarm level)
- integrated buzzer (can be switched on and off)
- integrated time switch for compressor function
- short pump start against locking
- load changeover time for pumps
- max. pump operating time
- minimum and maximum current monitoring
- password protection
- compressor or agitator activation
- installed languages: DE, EN, FR, NL, IT, PL (other languages on request)
- power monitoring (electronical)
- power monitoring (thermal-magnetic)
- delay time / high water alarm
- delay time between pump „1“ and pump „2“
- maintenance display
- periodic emptying

Options

- alarm system 6 A5 NiMH 1,2V (power failure alarm)
- operating voltage 230V pumps
- installation in exterior columns
 - + panel heater, + flashing light, + small compressor
- MCB
- „manuell-OFF-Automatic“ (rotary or toggle switch)
- LED display for operating states (pumps)
- PTC Relais, RCD, Line protection, overvoltage protection,... integrable
- pressure sensor (measuring range 0-2 meters w.c.)
- cylinder lock for the cover
- zener barrier (for safe circuits)**

Operation and Display

- ATEX-Mode
- backlit QVGA color touch screen
- display of operating hours and switching cycles
- phase sequence monitoring and phase drop monitoring
- error list (20 fields saved retentively)
- menu navigation via backlit QVGA color touch screen:
 - graphical display and plain text display
 - graphical display - for level states
 - graphical display - for operating states (pumps)
 - graphical display - operational fault
- „manual-OFF-Automatic“ - mode selection
- plain text display
- motor current indication
- manual motor starter
- key lock
- date / time adjustable
- detailed menu with all relevant setting options
- maintenance display

Available connections

- 1 - 4 pumps
- per pump 1 thermal contact (zero voltage safe) and 1 thermal contact (automatically resetting)
- 2 x 230V / 1A output for possible small compressor
- 3 x potential-free alarm relays (3x change-over contact)
- connecting terminal (24 VDC)
- terminal blocks for network measurement
- screw terminals for level measurement
- terminal blocks for pump connection
- screw terminals for 4-20 mA analog output

Level monitoring

- 1 or 4 float switches
- impact pressure sensor (measuring 0-2 mWs) - refitted at any time
- 4-20 mA analog input e.g. for level sensor
- separate high water float switch

Technical Details CPS-M PLUS

housing	metall- / ABS-plastic housing
dimensions	depending on the equipment
cable glands	depending on the equipment
protection class	min. IP54
max. protection on site	depending on the equipment
max. power of the pump	depending on the equipment
number of pumps	1 - 4 pumps
control voltage	230V AC / 24 V DC

Technical Details CPS-M PLUS

operating voltage	400V / 230 AC 50/60 Hz (special voltages possible)
temperature range	0...+50°C
potential-free alarm relay	5A (2A induktiv)
analog output	4 20 mA

* Photo shows optional accessories. Please refer to the back!

** The rules of the DIN EN 60079 to be observed! The pump control is only provided for the „safe area“.

***Technical changes and mistakes reserve.



Equipment features CPS-L/ CPS-B / CPS-B SA & CPS-M PLUS

Connection Systems	CPS-L	CPS-B	CPS-B SA	CPS-M PLUS
Number of Pumps	1	1 / 2	1 / 2	1 / 2 / 3 / 4
Number of inputs for thermo contact monitoring per pump	1 per pump	1 per pump	1 per pump	2 per pump
230V / AC output e.g. for heater or small compressor	•	•	•	•
Number of potential-free alarm relays	1 x	3 x 1 pump 3 x 2 pump	3 x 1 pump 3 x 2 pump	3 x 1-2 pump/ 6 x 3-4 pump
Float switch terminal for emergency operation function	○	•	•	○
Modular terminals for main supply	•	•	•	•
Modular terminals for pump connection	-	-	•	•
Possible level monitoring	CPS-L	CPS-B	CPS-B SA	CPS-M PLUS
1 float switch	•	•	•	1-2 pump
2 float switches	•	•	•	1-2 pump
3 float switches	-	•	•	1-2 pump
Separate high water float switch (positive pump actuation)	•	•	•	•
4-20mA analog input	•	•	•	•
Impact pressure method 0-2 m	○	○	○	○
Pressure switch connection	-	-	-	-
Adjustable control parameters	CPS-L	CPS-B	CPS-B SA	CPS-M PLUS
Run-dry monitoring	-	•	•	•
On / off switch levels	•	•	•	•
High water level / alarm level	•	•	•	•
Pump follow-up time	•	•	•	•
Load changeover time for pumps	-	•	•	•
Max. pump operating time (STOP + ALARM / ALARM)	•	•	•	•
Delay time between pump 1 and pump 2	-	•	•	•
Current measurement per pump	○	•	•	•
Turn on delay after a power failure	•	•	•	•
Short pump start against locking	•	•	•	•
Periodic emptying	•	•	•	•
Delay time high water	•	•	•	•
ATEX-Mode	•	•	•	•
Unit of measurement (mm, cm, mbar,...) selectable	-	•	•	•
Language selection	D / GB / NL / F / I	D / GB / NL / F / I	D / GB / NL / F / I	D / GB / NL / F / I
Date / time adjustable	•	•	•	•
Maintenance display	•	•	•	•
Compressor or agitator activation	-	•	•	•
Integrated time switch for compressor function	-	•	•	•
Phase drop monitoring (Ue=0V)	•	•	•	•
Phase sequence detection	•	•	•	•
Integrated buzzer (disconnectable)	•	•	•	•
Alarm relay, programmable function	-	•	•	•
Monitoring of the current limit value of the pump	○	•	•	•
Password protection	•	•	•	•
Operation and indication	CPS-L	CPS-B	CPS-B SA	CPS-M PLUS
LCD Display 2x16 illuminated signs Display	•	-	-	-
Backlit QVGA color touch screen	-	•	•	•
Graphics display / Icons	-	•	•	•
Plain text display	•	•	•	•
Menu navigation via QVGA touch screen	-	•	•	•
Menu navigation via 4 sensor keys	•	-	-	-
Hand-0-Automatic sensor keys for mode selection of the pumps	•	-	-	-
Hand-0-Automatic via touch screen	-	•	•	•
LED display for idle state	•	•	•	•
LED display for operating pump status	•	-	-	-
Operational fault LED display / buzzer	•	•	•	•
Display of all operating conditions via TFT-display	-	•	•	•
From outside operable manual motor starter	-	•	•	-
Transparent cover (lockable version available)	-	•	•	-
Cover locks in the open status	-	•	•	-
Motor current measurement and monitoring	○	•	•	•
Display operationg hours and switching cycles	•	•	•	•
Error list	•	•	•	•
Key lock	•	•	•	•
Operating and connection instructions	-	•	•	-
Connection diagram in the terminal compartment!	-	•	•	-

• Standard / ○ Option / - Not available

PUMP CONTROLS

OF THE LATEST GENERATION



Accessories	CPS-L	CPS-B	CPS-B SA	CPS-M PLUS
Battery modul (2x lithium battery)	-	○	○	○
Battery (2 x 9 V)	○	-	-	-
Number of Zener barriers	-	max. 2	max. 2	any number
LED module	-	-	-	○
Internal heater	-	-	○	○
Overload relays	○	-	-	-
Manual motor starter	-	●	●	●
Power contactors	●	●	●	●
Leak testing for pumps	-	-	-	○
Residual current devices (each pump / whole plant)	-	x ¹	x ¹	○
Voltmeter / Ammeter	-	-	-	○
Larger ABS-plastic housing	-	-	-	○
Metal housing	-	-	-	○
Key switch	-	-	-	○
Operating hour meter	-	-	-	○
Control transformer 400/230 VAC	-	-	-	○
H-O-A (manual mode - off- automatic mode)function by menu-oper	-	-	-	○
Telecontrol system - GSM-modem	-	○	○	○
Main circuit-breaker MCP	○	●	●	○
Telecontrol system - Ethernet Modul	-	○	○	○
Control module to control a compressor	-	○	○	○
With additional exit (400V)	-	-	-	○
PTC-Relais each pump control - analysis by the thermal contact.	-	x ¹	x ¹	○
Phase drop relay with undervoltage control	-	x ¹	x ¹	○
Analog output 4-20 mA	-	-	-	●
Different LED signal lamps	-	-	-	○
Lightning protection (fine, medium, large)	-	-	-	○
Emergency voltage supply	-	-	-	○
Input terminals greater than 4qmm	-	-	○	○
Pump start-up phase - direct starting	●	●	-	●
Pump start-up phase - star/delta starting	-	-	-	●
Pump start-up phase - soft starting	-	-	●	●
Pump start-up phase - frequency drive	-	-	-	○

● Standard / ○ Option / - Not available / x¹ on request

Level control technology



OKE2



MKE2



TFE2



TFA2



OKN



CSDU

Motor Technology

Industries



OKE2

Manual motor starters with push-button
3-pole operation
Thermal trip
Setting range 1.0 – 25.0 A; 500 V AC
Switching capacity 11 kW
Switching operations 60/h

P. 129

Motor Technology,
cost-saving device for standard tasks;
separate auxiliary switch is available!

MKE2

Manual motor starters with push-button
3-pole operation
Thermal/magnetic trip
Setting range 1.0 – 25.0 A; 500 V AC
Switching capacity 11 kW
Switching operations 60/h

P. 129

Motor Technology,
works with high short-circuit currents;
separate auxiliary switch is available!

TFE2

Manual motor starters with push-button
2-pole operating
Thermal/magnetic trip
Thermal contact
Operating range 0.40 – 10.0 A; 230 V AC

P. 135

Motor Technology, ventilation, agricultural technology:
thermocline monitoring for alternating current; separate
auxiliary switch is available!

TFA2

Manual motor starters with push-button
3-pole operation
Electronic release
Thermal contact
Operating range 0.10 – 25.0 A; 400 V AC

P. 135

Motor Technology, ventilation, agricultural technology:
thermocline monitoring for direct current; separate
auxiliary switch is available!

OKN

Manual motor starters with rotary knob
3-pole operation
Thermal trip with phase drop protection Setting
range 0.25 – 27.0 A; 500 V AC
Switching capacity 7.5 kW
Switching operations 30/h

P. 139

Motor Technology,
A motor protection switch in a compact design –
high-pressure washer

CSDU

Star/delta connection CSDU

P. 142

Motor Technology

Manual Motor Starter OKE2, 3-pole



- Thermal trip
- Setting range 1.0 – 25.0 A; 500 V AC
- Switching capacity 11 kW
- Switching operations 60/h
- Including PE/N bar (left side)
- short-circuit release

Order reference	Description Rated current setting range (A)	Packing (units)	Weight (in g)	Part No.
OKE2 016	1,00 – 1,60 A	1	280	202 721
OKE2 025	1,60 – 2,50 A	1	280	202 738
OKE2 040	2,50 – 4,00 A	1	280	202 745
OKE2 063	4,00 – 6,30 A	1	280	202 752
OKE2 100	6,30 – 10,00 A	1	280	202 769
OKE2 160	10,00 – 16,00 A	1	280	202 776
OKE2 250	16,00 – 25,00 A	1	280	202 783

Manual Motor Starter MKE2, 3-pole



- Thermal/magnetic trip
- Setting range 0.10 – 25.0 A; 500 V AC
- Switching capacity 11 kW
- Switching operations 60/h
- Including PE/N bar (left side)
- short-circuit release

Order reference	Description Rated current setting range (A)	Packing (units)	Weight (in g)	Part No.
MKE2 001	0,10 – 0,16 A	1	300	202 158
MKE2 002	0,16 – 0,25 A	1	300	202 165
MKE2 004	0,25 – 0,40 A	1	300	202 172
MKE2 006	0,40 – 0,63 A	1	300	202 189
MKE2 010	0,63 – 1,0 A	1	300	202 196
MKE2 016	1,0 – 1,6 A	1	300	202 202
MKE2 025	1,6 – 2,5 A	1	300	202 219
MKE2 040	2,5 – 4,0 A	1	300	202 226
MKE2 063	4,0 – 6,3 A	1	300	202 233
MKE2 100	6,3 – 10,0 A	1	300	202 240
MKE2 160	10,0 – 16,0 A	1	300	202 257
MKE2 250	16,0 – 25,0 A	1	300	202 264



Manual Motor Starters OKE2 / MKE2

Technical Data OKE2 / MKE2	
Rated insulation voltage U_i acc. to IEC 947-4-2 / VDE 0110	500 V AC
Permissible ambient temperature Storage temperature open	-25...+ 70 °C
enclosed type	-25...+ 60 °C
Temperature compensation	no
Climatic resistance	IEC 68 T2-3, 2-30
Glow wire resistance acc. to IEC 695-2-1	Intensity 850°C
Working position any position	preferably vertical
Permissible altitude	3000 m
Permissible vibration resistance IEC 68-2-6	25 Hz b./- 1 mm Amplitude (2,5 g)
Permissible impact direction sine impact (critical direction IEC 68-2-27)	5 g (11 ms)
Surface mounting screws DIN-rail	2 x M4** integrated
Mechanical life in cycles	100.000
Maximum switching operations Cycles/hour	60

**not included in the scope of delivery

Conductor cross-section OKE2 / MKE2		
Manual motor starters	rigid cable 1 x	1 ... 6,0 mm ²
	rigid cable 2 x	1 ... 4,0 mm ²
	flexible cable* 1 x	1 ... 6,0 mm ²
	flexible cable* 2 x	1 ... 2,5 mm ²
Auxiliary contact	rigid cable 1 x	1 ... 2,5 mm ²
	rigid cable 2 x	1 ... 2,5 mm ²
	flexible cable* 1 x	1 ... 2,5 mm ²
	flexible cable* 2 x	1 ... 2,5 mm ²
Undervoltage/ shunt release	rigid cable 1 x	1 ... 2,5 mm ²
	rigid cable 2 x	1 ... 2,5 mm ²
	flexible cable* 1 x	1 ... 2,5 mm ²
	flexible cable* 2 x	1 ... 2,5 mm ²
Enclosure/ PE/N terminal	rigid cable 1 x	1 ... 4,0 mm ²
	rigid cable 2 x	1 ... 4,0 mm ²
	flexible cable* 1 x	1 ... 2,5 mm ²
	flexible cable* 2 x	1 ... 2,5 mm ²
Degree of Protection acc. to DIN 40050 open type enclosed type	IP 20 IP 55...65	

* with cable end sleeve

Undervoltage release OKE2 / MKE2	
Energizing voltage % von U_c	≥ 85
De-energizing voltage % von U_c	35 .. 70
Relative Duty factor % von U_c	100
Power consumption Closing Holding	6,0 VA 3,0 VA

Technical Data OKE2 / MKE2	
Main current paths Number	3
Rated operational voltage U_e bis	16 A 550 V AC 25 A 500 V AC
Rated operational current I_e	25 A
Permissible frequency only for magnetic short-circuit release	40...60 Hz
Current setting ranges I_e OKE2 / MKE2 acc. to VDE 0660 Part 102 A, IEC 947-4-1	1-25 / 0,1-25
Numbers of ranges OKE2 / MKE2	7 / 12
Current dissipation loss Main current paths at I_e max./Phase	1,9...3,7 W 2,6...4,2 W
Tripping curves	10A
Electro-magnetic trip	8 - 13 x I_n

Auxiliary contact OKE2 / MKE2	
Auxiliary current paths Rated insulation voltage IEC 947	230 V
Thermal current I_{th2}	6 A
Short-circuit protection back-up fuse gL MCB B 6 A	10 A B 6 A

Max. switching capacity OKE2 / MKE2	
Auxiliary contact I_e at AC 15 up to	
24 V AC	6 A
230 V AC	4 A
400 V AC	3 A
500 V AC	1 A
may be used for low voltage and PLC inputs acc. to DIN 19240	

Shunt release OKE2 / MKE2	
Energizing voltage % von U_c	ca. 70
Power consumption Closing Holding	6,0 VA 3,0 VA

Manual Motor Starters OKE2 / MKE2

Short circuit switching capacity OKE2 / MKE2	
40 ... 60 Hz P1 / I _{cn} acc. to VDE 0660 / IEC 155-1 Taking the mains back-up fuse into consideration	
230 V	6 kA
400 V	3 kA
440 V	3 kA
500 V	1 kA

Correction factor OKE2 / MKE2	
Ambient temperature	Correction factor
5° C	1,12
+ 20° C	1,00
+ 40° C	0,89

Setting ranges, intrinsic safety and max. back-up fuse OKE2		
Order reference	Setting ranges A	Max. back-up fuse gl (A) 440 / 500 V
OKE2 016	1,0 – 1,6	16
OKE2 025	1,6 – 2,5	25
OKE2 040	2,5 – 4,0	35
OKE2 063	4,0 – 6,3	50
OKE2 100	6,3 – 10,0	63
OKE2 160	10,0 – 16,0	63
OKE2 250	16,0 – 25,0	50

Setting ranges, intrinsic safety and max. back-up fuse MKE2					
Order reference	Setting ranges A	Actuating current of the magn. short-circuit release (A)	max. back-up fuse gl (A)		
			230 V	400 V	500 V
MKE2 001	0,10 – 0,16	1,3	No back-up fuse required		
MKE2 002	0,16 – 0,25	2,0			
MKE2 004	0,25 – 0,40	3,5			
MKE2 006	0,40 – 0,63	5			
MKE2 010	0,63 – 1,0	8			
MKE2 016	1,0 – 1,6	13			
MKE2 025	1,6 – 2,5	20			
MKE2 040	2,5 – 4,0	32			
MKE2 063	4,0 – 6,3	50	63	50	50
MKE2 100	6,3 – 10,0	80	63	63	50
OKE2 160	10,0 – 16,0	128	63	63	50
OKE2 250	16,0 – 25,0	200	63	63	50

Permissible wire protection MKE2					
Order reference	Min. protected cross-section at 400 / 500 V AC, Cu mm ²				
	4	2,5	1,5	1,0	0,75
MKE2					
I _n (A)					
0,16 bis 6,3	X	X	X	X	X
10	X	X	X	X	
16	X	X	X		
25	X	X			

Protection of PVC-insulated cables against thermal overload due to short-circuit:

According to VDE 0100 Parts 430 and 523, cables and wires have to be protected against overload and short-circuit.

The table shows which cable cross-sections are protected against short circuit by the MKE 2.

Accessories OKE2 / MKE2

Order reference	Description	Packing (units)	Weight (in g)	Part No.
Auxiliary contacts *				
Hi 10	Auxiliary contact 1 N.O., right	1	7,5	202 288
Hi 01	Auxiliary contact 1 N.C., right	1	7,5	202 301
Hi 11	Auxiliary contact 1 N.O./1 N.C.	1	7,5	202 325
Shunt release				
AS 230-50	Shunt release 230 V / 50 Hz	1	60	202 479
AS 400-50	Shunt release 400 V / 50 Hz	1	60	202 486
Undervoltage release				
US 110-50	Undervoltage release 110 V / 50 Hz	1	60	202 370
US 230-50	Undervoltage release 230 V / 50 Hz	1	60	202 387
US 400-50	Undervoltage release 400 V / 50 Hz	1	60	202 400
Enclosure/Special accessories				
A IP 41	Enclosure, protection IP 41, up to 16 A	1	285	202 547
A IP 55	Enclosure, protection IP 55, up to 16 A	1	210	202 554
B IP 55	Enclosure with large terminal box, protection IP 55	1	450	202 561
C IP 54	Enclosure, protection IP 54, 5-pole, CEE-plug 16 A	1	375	202 585
E IP 54	Front plate, protection IP 54	1	125	202 622
Enclosure-accessories				
NAK	Emergency-OFF-device IP 55	1	55	202 653
V	Padlock blockade device IP 55	1	40	202 660

*Auxiliary contacts, shunt and undervoltage releases must be factory installed.

Manual Motor Starters



Manual motor starter
MKE2 + AS



Manual motor starter
MKE2 + US



Front plate E IP-54

Enclosure



Enclosure A



Enclosure A +
Emergency-OFF-device NAK

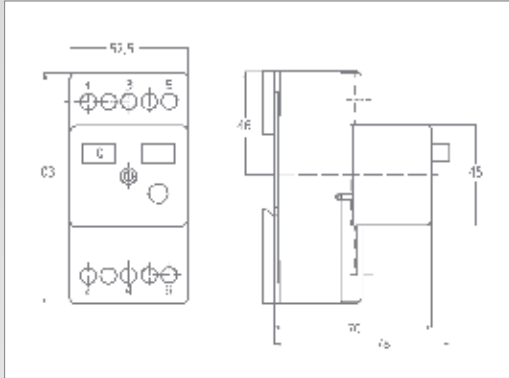


Enclosure B + Padlock
blockade device V

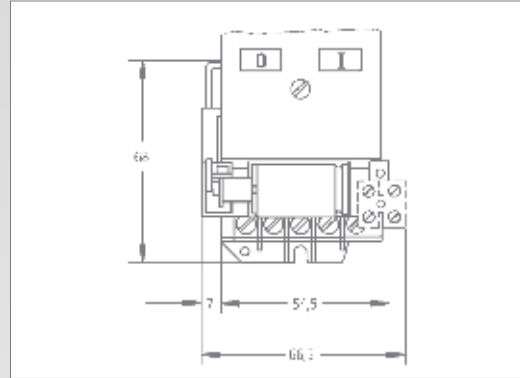


Enclosure C

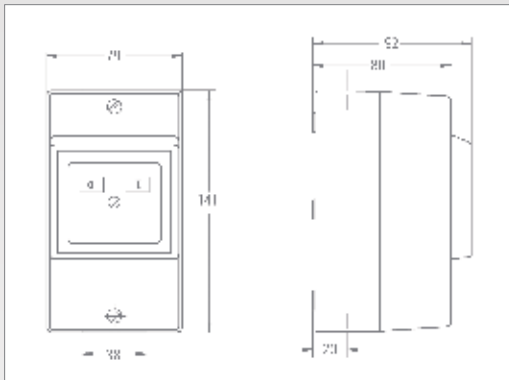
Manual Motor Starters OKE2 / MKE2



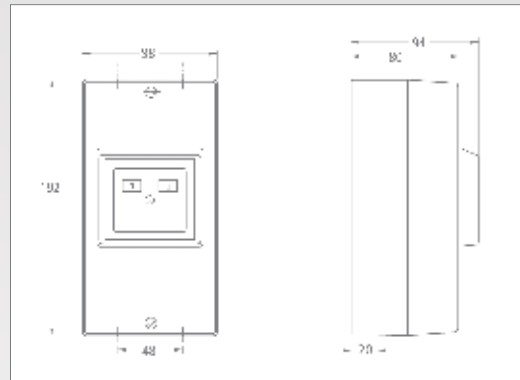
Manual motor starter OKE2 / MKE2



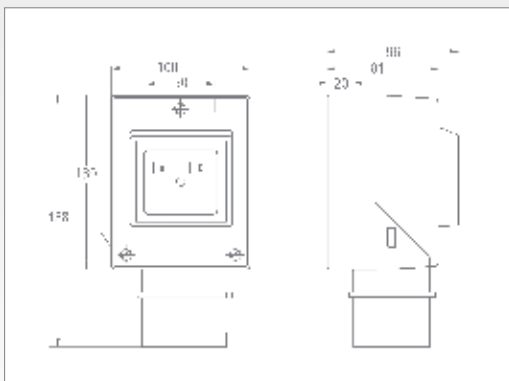
Undervoltage release US, Shunt release AS



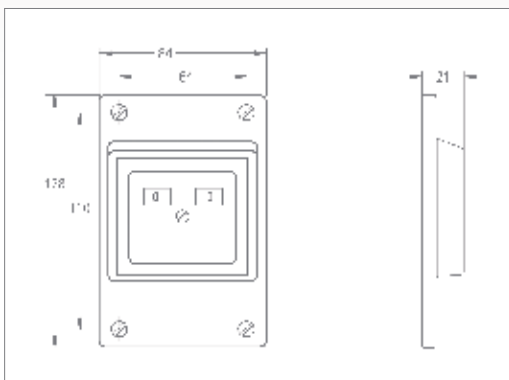
Enclosure A



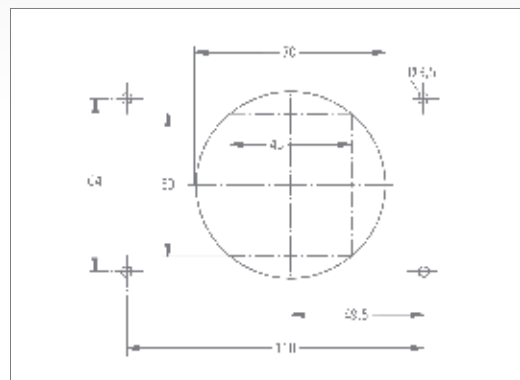
Enclosure B



Enclosure C

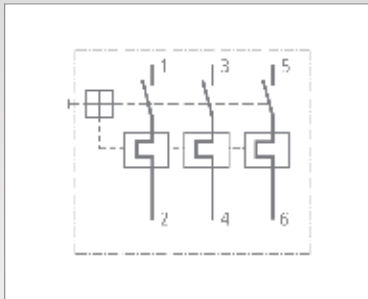


Front plate, protection E

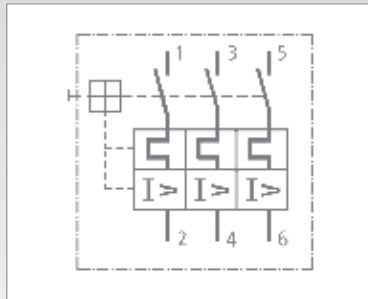


Mounting template for Front plate E

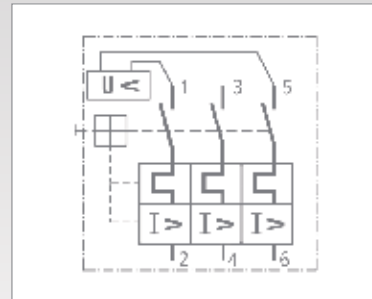
Circuit Diagrams OKE2 / MKE2



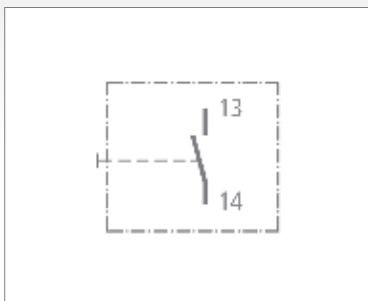
Manual motor starter OKE2



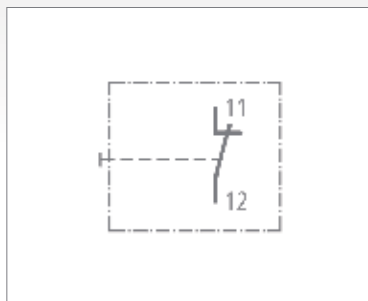
Manual motor starter MKE2



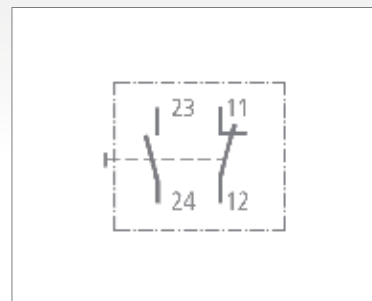
Manual motor starter MKE2 with undervoltage release



Auxiliary contact Hi 10 (1 N.O.)

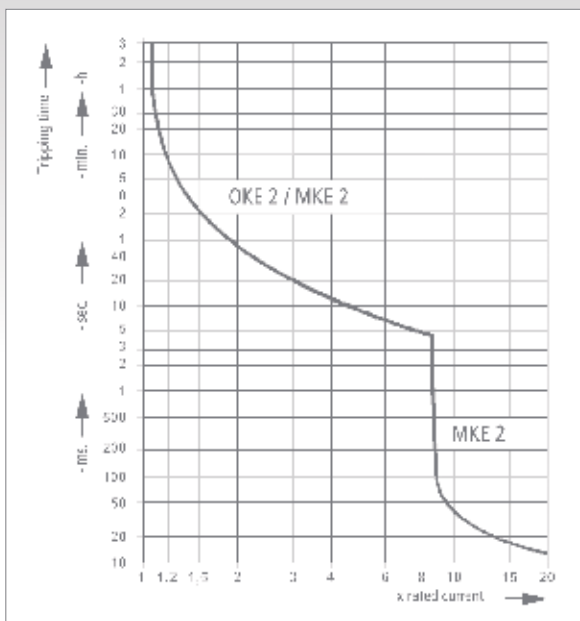


Auxiliary contact Hi 01 (1 N.C.)



Auxiliary contact Hi 11 (1 N.O. / 1 N.C.)

Tripping curves OKE2 / MKE2



Motor starter for motors with integrated thermal contacts TFE



- 1-phase version 230 V (1~)
- Thermal/magnetic trip
- Thermal contact
- Operating range 0.4 – 10.0 A; 230 V AC

Order reference	Type Code	Description Rated operational current setting range	Packing (units)	Weight (in g)	Part No.
TFE2 230		Standard unit 0,40 – 10,0 A	1	280	210 078

Motor starter for motors with integrated thermal contacts TFA



- 3-phase version 400 V (3~)
- Electronic trip
- Thermal contact
- Operating range 0.10 – 25.0 A; 400 V AC

Order reference	Type Code	Description Rated operational current setting range	Packing (units)	Weight (in g)	Part No.
TFA2 400		Standard unit 0,10 – 25,0 A	1	340	210 061

Use and function

The manual motor starters of the series TFA and TFE protect the electronic motors from damages caused by thermal overload.

Contrary to the manual motor starters of the series MKE2 / OKE 2 the adapted motor current is not monitored but the coil temperature.

For this the motor needs to be equipped with a thermal contact (Klixon, PTC-resistance). When critical temperatures are achieved these will get highly resistive. As a result the motor protection stops the power supply.

The applications are motors which are used in very dusty environments (e.g. fans, saws...). The motor cooling is often effected by deposits.



Manual Motor Starters TFE2 / TFA2

Technical Data TFE2 / TFA2	
Rated insulation voltage U_i acc. to IEC 947-4-2 / VDE 0110	500 V AC
Permissible ambient temperature	
Storage temperature	-25...+ 70 °C
open	-25...+ 60 °C
enclosed type	-25...+ 40 °C
Temperature compensation	no
Climatic resistance	IEC 68 T2-3, 2-30
Glow wire resistance acc. to IEC 695-2-1	Intensity 850°C
Working position any position	preferably vertical
Permissible altitude	3000 m
Permissible vibration resistance IEC 68-2-6	25 Hz b./- 1 mm Amplitude (2,5 g)
Permissible impact direction sine impact (critical direction IEC 68-2-27)	5 g (11 ms)
Surface mounting screws DIN-rail	2 x M4** integrated
Mechanical life in cycles	100.000
Maximum switching operations Cycles/hour	60

**not included in the scope of delivery

Conductor cross-section TFE2 / TFA2		
Manual motor starters	rigid cable 1 x	1 ... 6,0 mm ²
	rigid cable 2 x	1 ... 4,0 mm ²
	flexible cable* 1 x	1 ... 6,0 mm ²
	flexible cable* 2 x	1 ... 2,5 mm ²
Auxiliary contact	rigid cable 1 x	1 ... 2,5 mm ²
	rigid cable 2 x	1 ... 2,5 mm ²
	flexible cable* 1 x	1 ... 2,5 mm ²
	flexible cable* 2 x	1 ... 2,5 mm ²
Undervoltage/ shunt release	rigid cable 1 x	1 ... 2,5 mm ²
	rigid cable 2 x	1 ... 2,5 mm ²
	flexible cable* 1 x	1 ... 2,5 mm ²
	flexible cable* 2 x	1 ... 2,5 mm ²
Enclosure/ PE/N terminal	rigid cable 1 x	1 ... 4,0 mm ²
	rigid cable 2 x	1 ... 4,0 mm ²
	flexible cable* 1 x	1 ... 2,5 mm ²
	flexible cable* 2 x	1 ... 2,5 mm ²
Degree of Protection acc. to DIN 40050 open type enclosed type		IP 20 IP 55...65

* with cable end sleeve

Undervoltage release OKE2 / MKE2		
Energizing voltage % von U_c	≥ 85	
De-energizing voltage % von U_c	35 .. 70	
Relative Duty factor % von U_c	100	
Power consumption	Closing	6,0 VA
	Holding	3,0 VA

Technical Data TFE2 / TFA2	
Main current paths Number	3
Rated operational voltage U_e up to	16 A 550 V AC 25 A 500 V AC
Rated operational current I_e	25 A
Permissible frequency only for magnetic short-circuit release	40...60 Hz
Current setting ranges I_e TFE2 / TFA2 Acc to VDE 0660 Part 102 A, IEC 947-4-1	0,4-10 / 0,1-25
Numbers of ranges TFE2 / TFA2	1 / 1
Current dissipation loss Main current paths at I_e max./Phase	ca. 4,2 W
Tripping curves	10A
Electro-magnetic trip	8 - 13 x I_n

Auxiliary contact OKE2 / MKE2	
Auxiliary current paths Rated insulation voltage IEC 947	230 V
Thermal current I_{th2}	6 A
Short-circuit protection back-up fuse gL MCB B 6 A	10 A B 6 A

Max. switching capacity TFE2 / TFA2	
Auxiliary contact I_e at AC 15 up to	
24 V AC	6 A
230 V AC	4 A
400 V AC	3 A
500 V AC	1 A
may be used for low voltage and PLC inputs acc. to DIN 19240	

Shunt release OKE2 / MKE2		
Energizing voltage % von U_c	approx. 70	
Power consumption	Closing	6,0 VA
	Holding	3,0 VA

Manual Motor Starters TFE2 / TFA2

Accessories TFE2 / TFA2

Order reference	Description	Packing (units)	Weight (in g)	Part No
Auxiliary contacts*				
Hi 10	Auxiliary contact 1 N.O., right	1	7,5	202 288
Hi 01	Auxiliary contact 1 N.C., right	1	7,5	202 301
Hi 11 (nur TFE)	Auxiliary contact 1 N.O./1 N.C.	1	7,5	202 325
Enclosure/Special accessories				
A IP 55	Enclosure, protection IP 55, up to 16 A	1	210	202 554
B IP 55	Enclosure with large terminal box, protection IP 55	1	450	202 561
E IP 54	Front plate, protection IP 54	1	125	202 622
Enclosure-accessories				
NAK	Emergency-OFF-device IP 55	1	55	202 653
V	Padlock blockade device IP 55	1	40	202 660
AZ	Supplementary set for enclosure, protection IP 41 to IP 55	1	25	216 742

*Auxiliary contacts, shunt and undervoltage releases must be factory installed.

Enclosure / Padlock



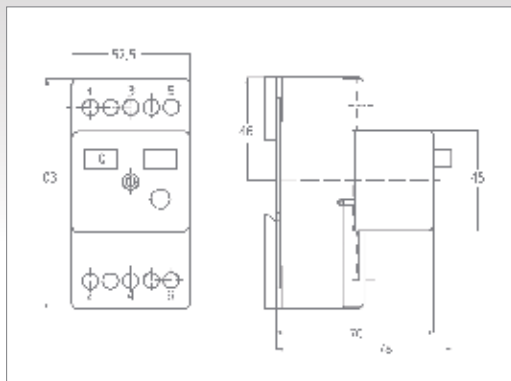
Enclosure A

Enclosure A +
Emergency-OFF-device NAK

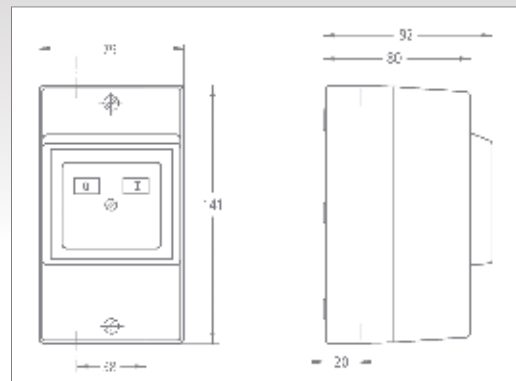
Enclosure B +
Padlock blockade device V

Front plate E

Dimensions / Circuit Diagrams TFE2 / TFA2

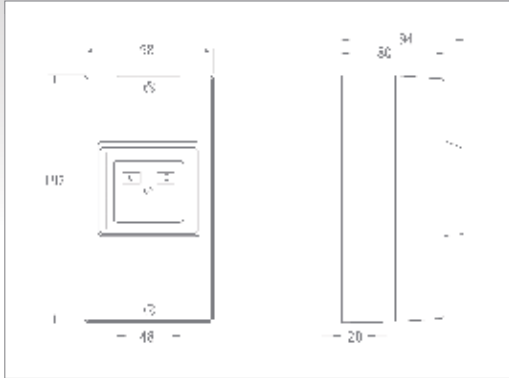


Manual motor starter TFE2 / TFA2

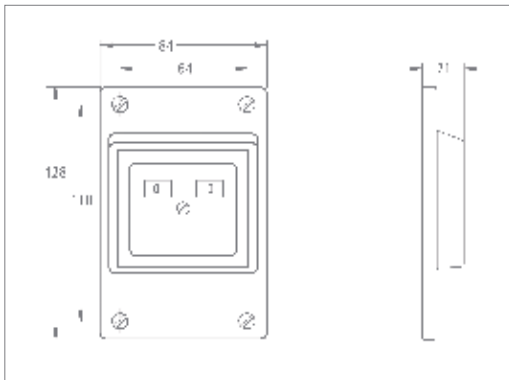


Enclosure A

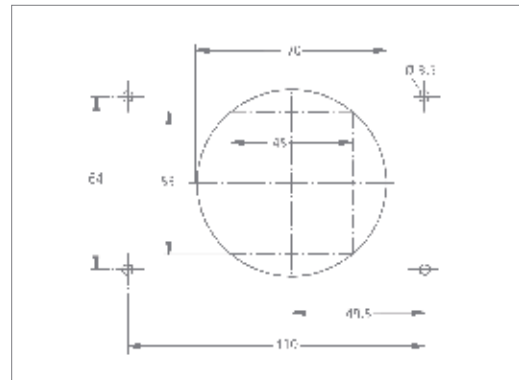
Dimensions / Circuit Diagrams TFE2 / TFA2



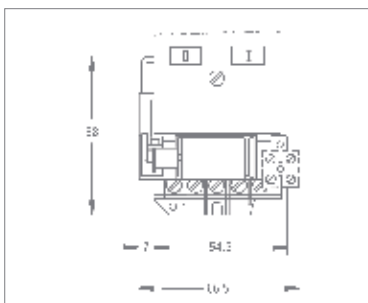
Enclosure B



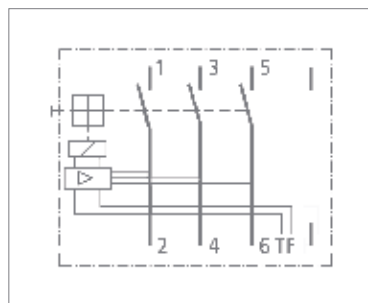
Front plate E



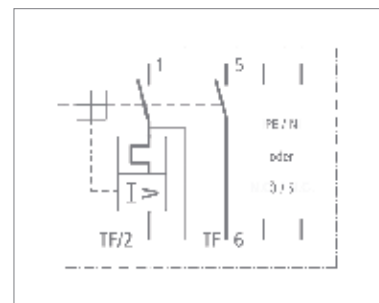
Mounting template for Front plate E



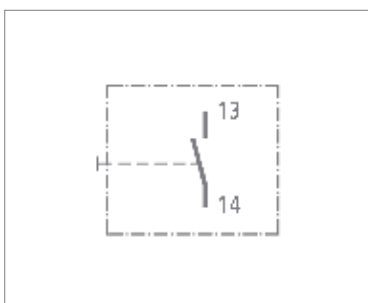
Undervoltage release US (TFA2)



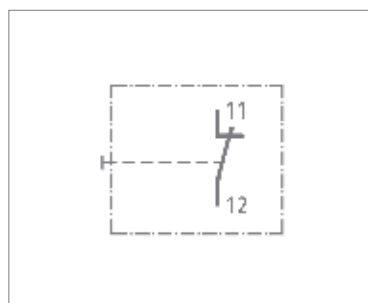
Manual motor starter TFA2



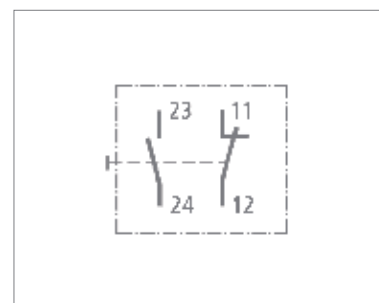
Manual motor starter TFE2
optional 1N.O. and/or 1N.C.



Auxiliary contact Hi 10 (1 N.O.)



Auxiliary contact Hi 01 (1 N.C.)



Auxiliary contact Hi 11 (1 N.O. / N.C.)

Manual motor starter with rotary knob, 2/3-pole



- Thermal trip with phase-drop protection
- Manual motor starters with rotary knob
- Setting range 0.25 – 27.0 A; 500 V AC
- Switching capacity 7.5 kW
- Switching operations 30/h

Order reference	Type Code	Description Rated current setting range (A)	Packing (units)	Weight (in g)	Part No.
OKN 0,4		0,25 – 0,40 A	1	170	203 391
OKN 0,63		0,40 – 0,63 A	1	170	203 407
OKN 1,0		0,63 – 1,00 A	1	170	203 414
OKN 1,6		1,00 – 1,60 A	1	170	203 421
OKN 2,5		1,60 – 2,50 A	1	170	203 438
OKN 4,0		2,50 – 4,00 A	1	170	203 445
OKN 6,3		4,00 – 6,30 A	1	170	203 452
OKN 10,0		6,30 – 10,0 A	1	170	203 469
OKN 16,0		10,0 – 16,0 A	1	170	203 476
OKN 22,0		16,0 – 22,0 A	1	170	203 483
OKN 27,0		22,0 – 27,0 A	1	170	203 490
OKN 30,0		22,0 – 30,0 A (2-pole)	1	170	203 506
OKN 37,0		28,0 – 37,0 A (2-pole)	1	170	236 665

Technical Data OKN	
Rated insulation voltage U_i acc. to IEC 947-4-7 / VDE 0110	500 V AC
Permissible ambient temperature Storage temperature open enclosed type	-25...+ 70 °C -25...+ 60 °C -25...+ 40 °C
Temperature compensation	yes
Climatic resistance	IEC 68 T2-3, 2-30
Glow wire resistance acc. to IEC 695-2-1	Intensity 850°C
Working position	preferably vertical
Permissible altitude	3000 m
Permissible vibration resistance IEC 68-2-6	25 Hz b.+/- 1 mm Amplitude (2,5 g)
impact (critical direction IEC 68-2-27)	5 g (11 ms)

Technical Data OKN	
Surface mounting Screw mounting	2 x M4*
Mechanical life in cycles	100.000
Maximum switching operations Cycles/hour	30
Main current paths Number	2 / 3
Rated operational voltage U_e up to	37 A / 250 V 27 A / 500 V
Thermal current I_{th} Rated operational current I_e	37 A, 2-pol / 27 A, / 3-pol
Current setting ranges I_e acc. to VDE 0660 Teil 102 A, IEC 947-4-1	22 – 37 A, 2-pol 0,25 – 27 A, 3-pol
Numbers of ranges	2 / 11
Current dissipation loss Main current paths at I_e max./Phase	1,8...3,2 W
Trip class	10A

*not included

Conductor cross-section OKN		
Manual motor starters	rigid cable 1 x	1 ... 6,0 mm ²
	rigid cable 2 x	1 ... 4,0 mm ²
	flexible cable* 1 x	1 ... 4,0 mm ²
	flexible cable* 2 x	1 ... 2,5 mm ²
Enclosure/ PE/N terminal	rigid cable 1 x	1 ... 6,0 mm ²
	rigid cable 2 x	1 ... 4,0 mm ²
	flexible cable* 1 x	1 ... 4,0 mm ²
	flexible cable* 2 x	1 ... 2,5 mm ²
Degr. of protection acc. to DIN 40050		IP 20
open type / enclosed type		IP 54

* with cable end sleeve

Contact rating at AC 3 OKN	
230 V	- 7,5 kW
400 V	- 11,5 kW
500 V	- 14 kW

Switching capacity OKE2 / MKE2	
40 ... 60 Hz P1 / I _{CN} acc. to VDE 0660 / IEC 155-1 allowing for the mains back-up fuse	
230 V	6 kA
400 V	3 kA
440 V	3 kA
500 V	1 kA

Setting ranges, intrinsic safety and max. back-up fuses OKN

Order reference	Setting range A	max. back-up fuse gL (A)	
		1 x 250 V	3 x 230 V, 3 x 500 V
OKN 0,4	0,25 – 0,40 A	-	2
OKN 0,63	0,40 – 0,63 A	-	6
OKN 1,0	0,63 – 1,00 A	-	10
OKN 1,6	1,00 – 1,60 A	-	16
OKN 2,5	1,60 – 2,50 A	-	25
OKN 4,0	2,50 – 4,00 A	-	35
OKN 6,3	4,00 – 6,30 A	-	63
OKN 10,0	6,30 – 10,0 A	-	63
OKN 16,0	10,0 – 16,0 A	-	63
OKN 22,0	16,0 – 22,0 A	-	35
OKN 27,0	22,0 – 27,0 A	-	35
OKN 30,0	22,0 – 30,0 A	50	-
OKN 37,0	28,0 – 37,0 A	50	-

Accessories OKE2 / MKE2

Order reference	Description	Packing (units)	Weight (in g)	Part No
	Enclosure-accessories			
H	Enclosure H, protection IP 41	1	225	203 513

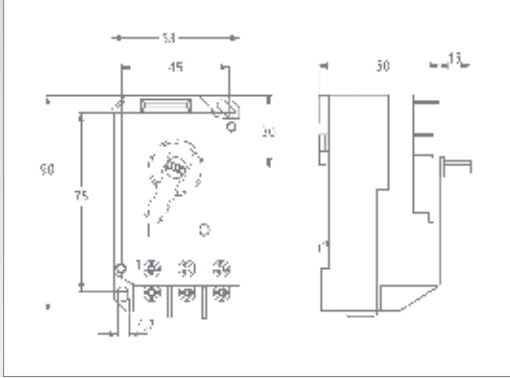
Enclosure



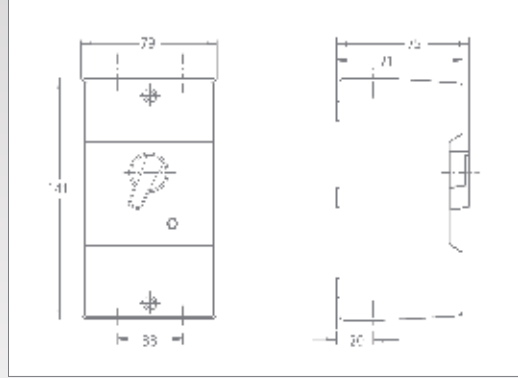
Enclosure H

OKN + Enclosure H

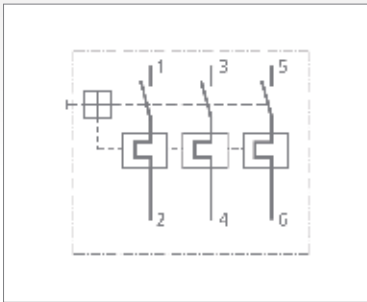
Dimensions OKN



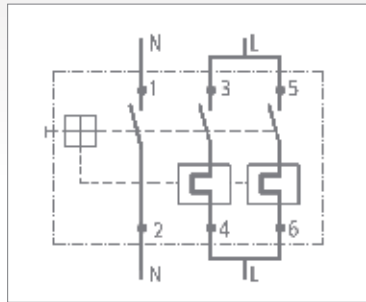
Manual motor starter OKN



Enclosure H

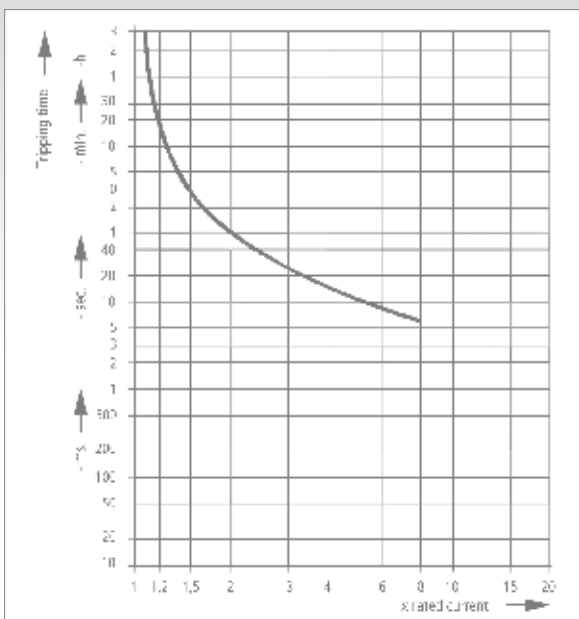


Manual motor starter OKN



Manual motor starter
OKN 30 u. OKN 37 (2-pol.)

Tripping curves OKN



Star/delta connection for the protective start of the motor



Fig. CSDU 7,5 complete

The Condor Pressure Control GmbH CSDU Star/delta connection offers, in due consideration of the relevant standards, the possibility of economically operating motors with a switching capacity greater than 4 kW using public mains networks.

With this 2-stage starter the inrush current (star circuit) is reduced by 1/3 of the height to be expected when starting the motor directly. The torque is equally reduced during start-up phase.

During the start-up phase (1 – 32 seconds), a special change-over relay with a contact switching time of 50 ms, guarantees reliable change over from star to delta operation.

During continuous operation, all motors connected to the Star/delta connection are protected by a manual motor starter with thermal and magnetic trip.

Standard executions contain a manual motor starter and an on / off switch for the control circuit. Complete star/delta connections additionally have a main circuit-breaker with enclosure locking, an emergency button, an hour meter and an operating LED.

Star/delta connections as standard-version with an additional transformer are used, if there is no neutral leader connected.

Type overview CSDU

Order reference	Description	Weight (in g)	Part No.
Complete version			
CSDU 5,5 complete	5,5 kW, Ue: 400V AC / 50 Hz, Supply line: 3L/N/PE Manual motor starter: 9 - 13 A (Rated current) Enclosure 200 x 400 x 140 mm (width x height x depth)	4100	256601
CSDU 7,5 complete	7,5 kW, Ue: 400V AC / 50 Hz, Supply line: 3L/N/PE Manual motor starter 14 - 20 A (Rated current) Enclosure 200 x 400 x 140 mm (width x height x depth)	4250	256618
CSDU 11,0 complete	11 kW, Ue: 400V AC / 50 Hz, Supply line: 3L/N/PE Manual motor starter 19 - 25 A (Rated current) Enclosure 200 x 400 x 140 mm (width x height x depth)	4400	256625
CSDU 15,0 complete	15 kW, Ue: 400V AC / 50 Hz, Supply line: 3L/N/PE Manual motor starter 28 - 40 A (Rated current) Enclosure 300 x 400 x 140 mm (width x height x depth)	4550	256632
Standard version			
CSDU 5,5 standard	5,5 kW, Ue: 400V AC / 50 Hz, Supply line: 3L/N/PE Manual motor starter 9 - 13 A (Rated current) Enclosure 200 x 400 x 140 mm (width x height x depth)	3500	256656
CSDU 7,5 standard	7,5 kW, Ue: 400V AC / 50 Hz, Supply line: 3L/N/PE Manual motor starter 14 - 20 A (Rated current) Enclosure 200 x 400 x 140 mm (width x height x depth)	3650	256663
CSDU 11,0 standard	11 kW, Ue: 400V AC / 50 Hz, Supply line: 3L/N/PE Manual motor starter 19 - 25 A (Rated current) Enclosure 200 x 400 x 140 mm (width x height x depth)	3800	256670
CSDU 15,0 standard	15 kW, Ue: 400V AC / 50 Hz, Supply line: 3L/N/PE Manual motor starter 28 - 40 A (Rated current) Enclosure 300 x 400 x 140 mm (width x height x depth)	3950	256687
Standard version with transformer (trafo)			
CSDU 5,5 trafo	5,5 kW, Ue: 400V AC / 50 Hz, Supply line: 3L/N/PE Manual motor starter 9 - 13 A (Rated current) Enclosure 200 x 400 x 140 mm (width x height x depth)	4300	256717
CSDU 7,5 trafo	7,5 kW, Ue: 400V AC / 50 Hz, Supply line: 3L/N/PE Manual motor starter 14 - 20 A (Rated current) Enclosure 200 x 400 x 140 mm (width x height x depth)	4450	256724
CDU 11,0 trafo	11 kW, Ue: 400V AC / 50 Hz, Supply line: 3L/N/PE Manual motor starter 19 - 25 A (Rated current) Enclosure 200 x 400 x 140 mm (width x height x depth)	4600	256731
CSDU 15,0 trafo	15 kW, Ue: 400V AC / 50 Hz, Supply line: 3L/N/PE Manual motor starter 28 - 40 A (Rated current) Enclosure 300 x 400 x 140 mm (width x height x depth)	4750	256748

Other manual motor starters on request.



VARIOTEST



ROTATEST



CSG420

Test devices

- VARIOTEST** The Condor-VARIOTEST is a universal test instrument featuring acoustic signals for:
- ROTATEST** The Condor-ROTATEST is a Phase-sequence indicator with optical display
- CSG420** The Condor-CSG420 is an adjustable sensor simulator 4-20 mA

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P. 148

Industries

- Testing technology
- Testing technology
- Testing technology



Multifunctions timer relay FMF



Multifunction timer relais IMF

Multifunction timer relay

- FMF** Multifunction timer relay in compact industrial standard casing
8 switchable time ranges
universal current
- IMF** Multifunction timer relay featuring installation type dimensions
4 switchable time ranges
universal current

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Industries

- Controls
- Controls

VARIOTEST



The Condor-Variotest is a universal test instrument featuring acoustic signals for:

Continuity and/or resistance testing up to 20 kΩ



Direct and alternating voltage checking up to 500 V



Polarity test for D.C. from 6 V to 500 V



Phase checking (outer conductor) Mp conductor and protective conductor



Checking function of RCCB's with IΔN max. 30 mA



Semi-conductor testing

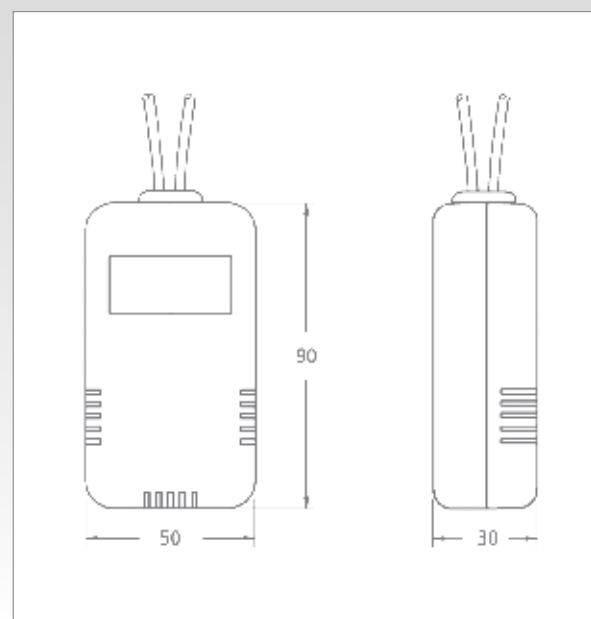
The Condor-VARIOTEST

- is protected against external voltages up to 500 V and limits the current input to max. 4 mA. Destruction as a result of incorrect handling is practically impossible.
- distinguishes between D.C. and A.C. voltages or a resistance value by sound pitch and frequency change respectively.
- is equipped with an ON-OFF switch.
- is supplied with the battery inserted and is ready for immediate use.
- Measuring probes and leads acc. to IEC 1010 Part 2-031.

Order reference	Packing (units)	Weight (in g)	Part No.
VARIOTEST	1	115	260301

Technical Data / Dimensions

Technical Data Variotest	
Test range	0 – 20 kΩ 0 – 500 V
Audio frequency	up to 20 kHz
Leads	80 cm
Measuring probes	crush proof
Protection	protective double insulation
Clearance and creepage distances	acc. to VDE 0110
Power supply	Battery 9 V Block
Included in the scope of supply	IEC 6F22



ROTATEST



The Condor-Rotatest indicates the phase sequence in a three-phase mains circuit and thus the direction of rotation for electromotive appliances.

The additional phase monitoring glow lamps also indicate whether all the outer conductors are live and ensure that the neutral and outer conductors have not been interchanged.

VDE 0100 stipulates:

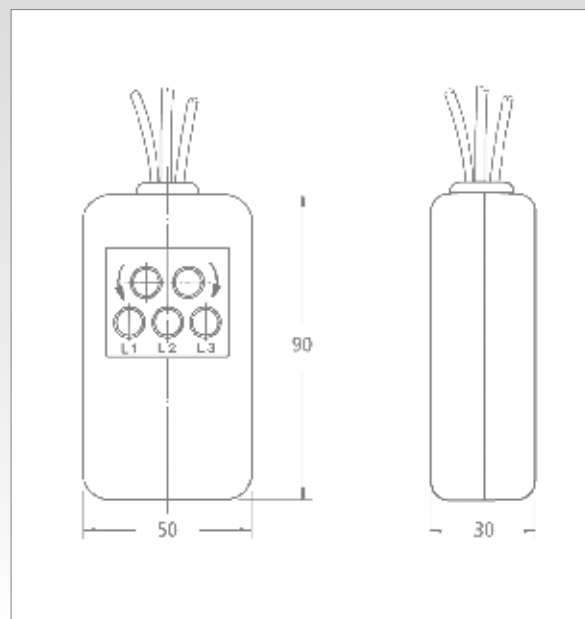
Three-phase sockets shall be connected in such a manner that a rotation field to the right is reached when looking at the front of the sockets clockwise.

Measuring probes and leads acc. to IEC 1010 Part 2-031.

Order reference	Packing (units)	Weight (in g)	Part No.
ROTATEST	1	195	260318

Technical Data / Dimensions

Technical Data Rotatest	
Voltage range	250 V up to max. 650 V
Current consumption at 380 V	5 mA
Duty factor ED at 380 V	100 %
Leads	80 cm
Measuring probes	crush proof
Clearance and creepage distances	acc. to VDE 0110





CSG420

The sensor simulator Condor-CSG420 is used to simulate a level sensor (4 – 20 mA) on an electronic control unit

Functions:

Adjustable DC current 4 – 20 mA
Measurement of the terminal voltage

Features

LCD – Display
Functions selector switch
Potentiometer for current adjustment

Applications

- Commissioning
- Repairs
- Trouble shooting

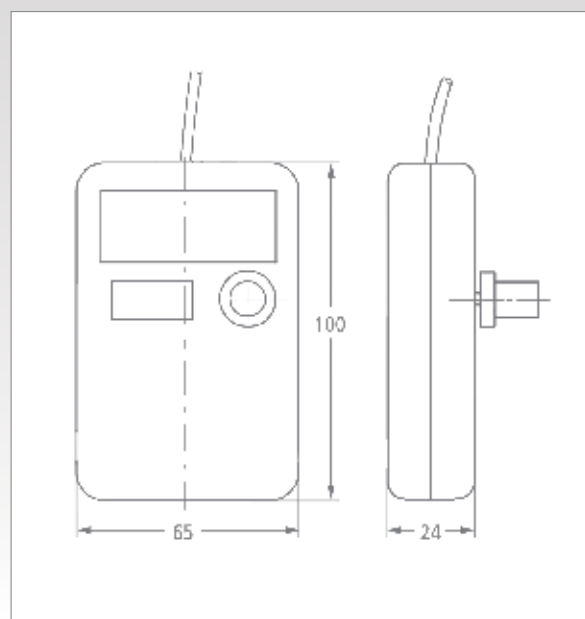
Operational after aiming of the supply-tension.



Order reference	Packing (units)	Weight (in g)	Part No.
CSG420	1	220	249634

Technical Data / Dimensions

Technical Data CSG420	
Adjustable current range	3,5 mA up to 25,5 mA
Terminal voltage measuring range	8,5V up to 32 V
Display accuracy	2 % v. E. ± 1 Digit
Leads	ca. 100 cm
Clearance and creepage distances	acc. to VDE 0110
Power supply Included in the scope of supply	Battery 9 V Block IEC 6F22



Multifunction timer relay FMF



- Multifunction relay in compact industrial standard casing
- 8 selectable time ranges
- Universal current
- 2 SPDT's
- Remote-control terminal
- Voltage activation

The multifunction timer relay FMF is specifically designed for rough industrial environments. All inputs and outputs are both interference free and non-destructive at voltage surges of up to 2 kV. Contact activation may be carried out not only by conventional means such as an isolated contact (between A1 and B1) but also by applying the operating voltage to B1. This helps to reduce wiring and contact requirements of the control and prevents destruction of the devices due to faulty wiring.

Adjustable functions:

- delay on make
- delay on break
- on-delay single shot
- flashing

Remote control:

A remote control can be realized with 2 wires connected to the terminals Z1 / Z2 and a 100 kΩ potentiometer, whereby the FMF potentiometer must be set to 0.

Order reference	Time	Operating voltage U_B (V-AC/DC)	SPDT's	Part No.
FMF	0,1 s – ca. 7 h	22,5 – 240	2	230403

Technical Data

Technical Data FMF	
Permissible operating voltage range	± 10%
Operating voltage influence at ± 10% operating voltage fluctuation	< 0,5 %
Duty factor ED	100%
Permissible ambient and media temperature	- 20°C up to +60°C
Permissible ambient humidity rel. humidity, non-condensing	10% up to 90%
Permissible storage temperature	- 40°C up to +80°C
Clearance and creepage distances	VDE 0110
Working position	any position
Power consumption	max. 2 VA

Output contacts FMF	
Series voltage acc. to VDE 0660 and VDE 0110 Group C	250 V-AC
Maximum continuous current 1-change-over, 2-change-over	6 A-AC
Maximum switching capacity per contact	1.500 VA (AC) 50 W (DC)
Mechanical life Cycles	approx. 1×10^7
Electrical life (max. load) Cycles	approx. 2×10^5
Resistance of remote-control Standard	100 kΩ

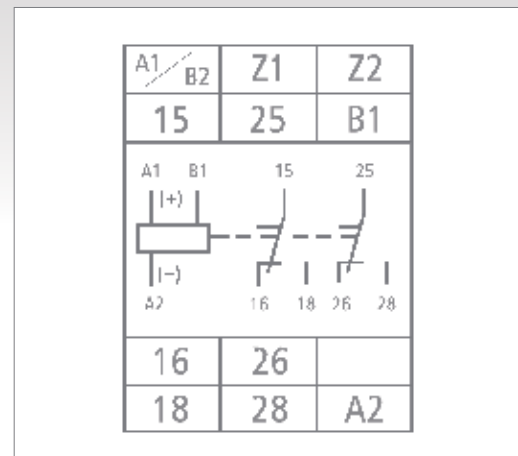
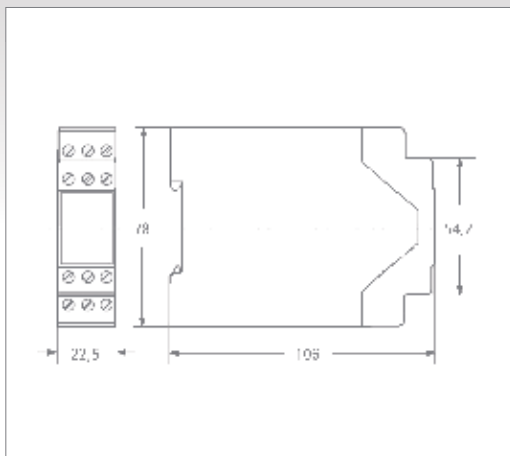
Multifunction timer relay FMF

Enclosure data	
Material	ABS flameproof, UL-approved
Mounting	snap on 35 mm DIN-rail connector acc. to EN 50 035
Enclosure-protection	IP 40
Protection against shock	acc. VBG 4
Terminals	Screw terminals with self-lifting clamps
Cross-section	2 x 1,5 mm ²
Weight	200 g

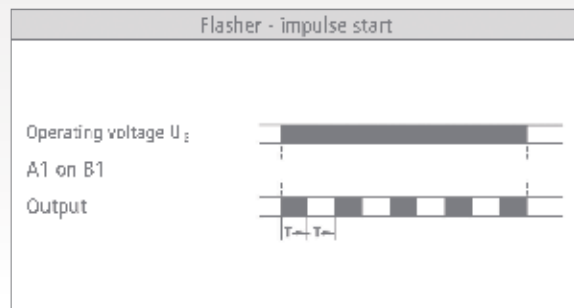
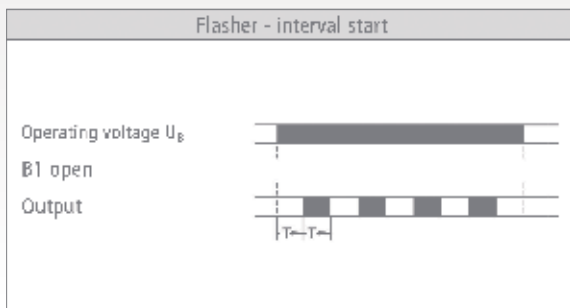
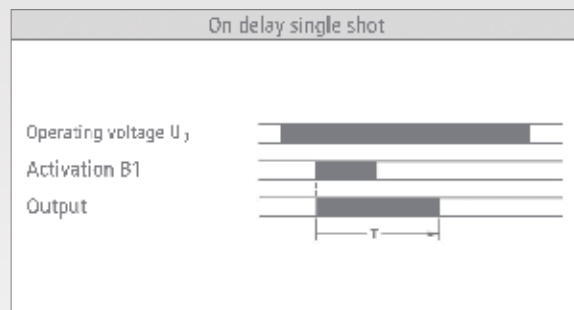
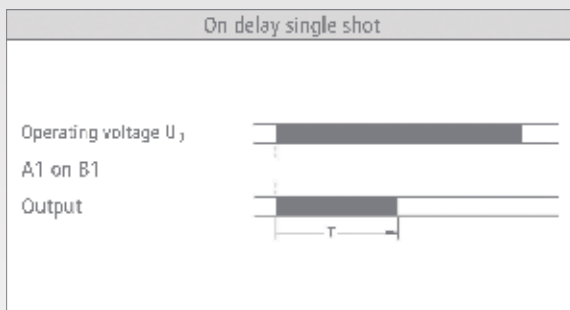
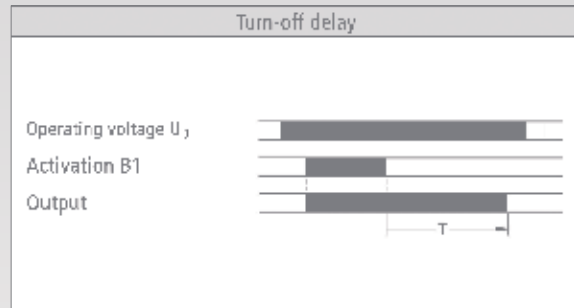
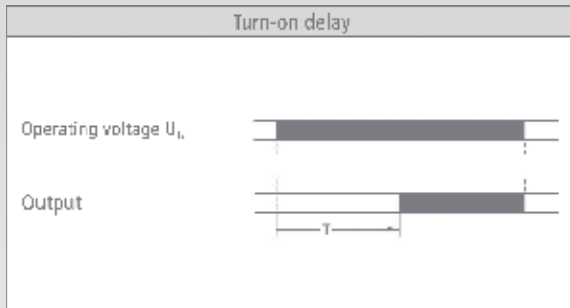
General data	
Tolerance range	± 10%
Repeatability	± 0,5 %
Temperature range	approx. 0,2 % / °C
Recovery time	< 100 ms

Time ranges	
Initial value	End value
0,05 s	1 s
0,2 s	4 s
1,6 s	32 s
12,5 s	250 s
5 s	100 s
20 s	400s
160 s (ca. 2,7 min)	3200 s (ca. 53 min)
1250 s (ca. 21 min)	25000 s (ca. 417 min)

Dimensions- / Circuit Diagram FMF



Functional Overview FMF



Multifunction timer relay IMF

- Multifunction relay featuring installation type dimensions
- 4 selectable time ranges
- Universal current
- 1 SPDT
- Contact activation



The multifunction timer relay IMF is specifically designed for rough industrial environments. All inputs and outputs are both interference free and non-destructive at voltage surges of up to 2.000 V. Contact activation may be carried out not only by conventional means such as a voltage-free contact (between A1 and B1), but also by applying the operating voltage to B1. This helps to reduce wiring and contact requirements of the control and prevents destruction of the devices due to faulty wiring.

Adjustable functions:

- delay on make
- delay on break
- on-delay single shot
- flashing

Order reference	Time	Operating voltage U_B (V-AC/DC)	SPDT's	Part No.
IMF	0,6 s – 60 min	12 – 240 \pm 10 %	1	230410

Technical Data

Technical Data IMF	
Permissible operating voltage range	\pm 10%
Operating voltage influence at \pm 10% operating voltage fluctuation	< 0,5 %
Duty factor ED	100%
Permissible ambient and media temperature	- 20°C up to +60°C
Permissible ambient humidity rel. humidity, non-condensing	10% up to 90%
Permissible storage temperature	- 40°C up to +80°C
Clearance and creepage distances	VDE 0110
Working position	any position
Power consumption	max. 2 VA

Output contacts IMF	
Series voltage acc. to VDE 0660 and VDE 0110 Group C	250 V-AC
Maximum continuous current 1-change-over, 2-change-over	6 A-AC
Maximum switching capacity per contact	1.500 VA (AC) 50 W (DC)
Mechanical life Cycles	approx. 1×10^7
Electrical life (max. load) Cycles	approx. 2×10^5

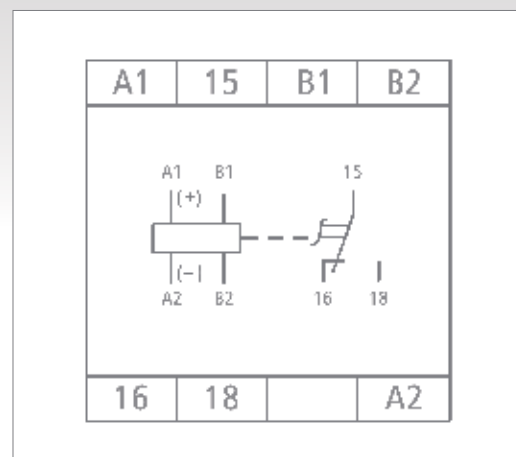
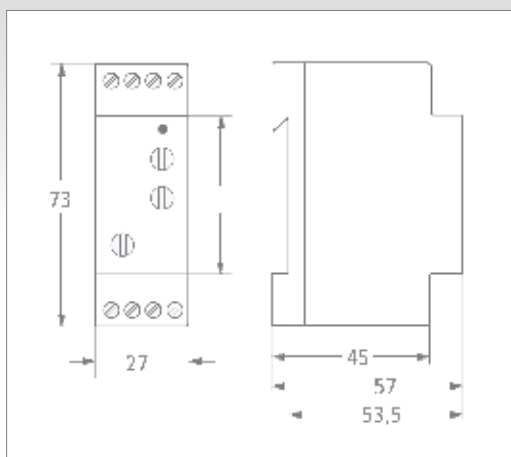
Multifunction timer relay IMF

Enclosure data	
Material	ABS flameproof, UL-approved
Mounting	snap on 35 mm DIN-rail connector acc. to EN 50 035
Enclosure-protection	IP 40
Protection against shock	approx VBG 4
Terminals	elevator clamp
Cross-section	2,5 mm ²
Weight	75 g

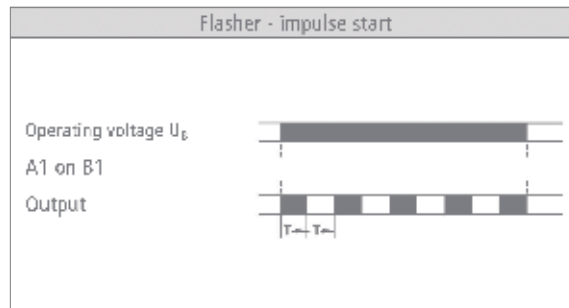
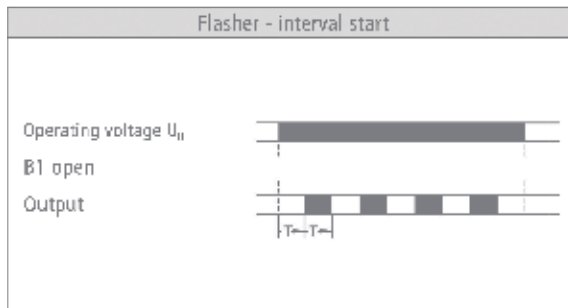
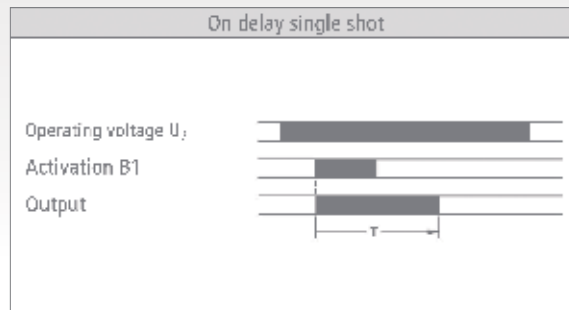
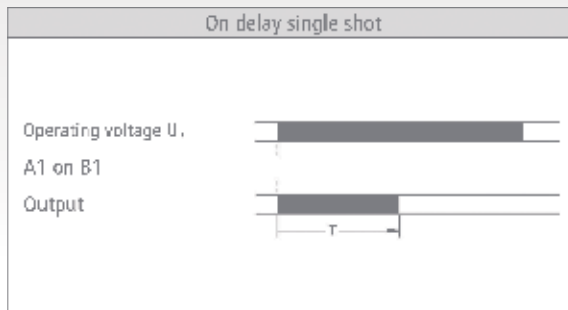
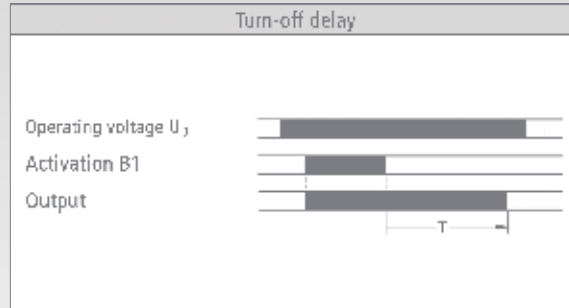
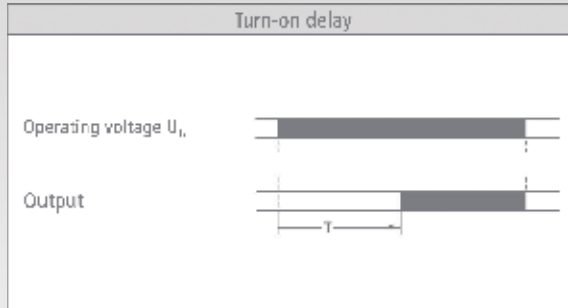
General data	
Tolerance range	± 10%
Repeatability	± 0,5 %
Temperature range	ca. 0,2 % / °C
Recovery time	< 100 ms

Time ranges	
Initial value	End value
0,6 s	6 s
6 s	60 s
0,6 min	6 min
6 min	60 min

Dimensions- / Circuit Diagram IMF



Functional Overview IMF





Condor Catalogue Overview



Ask for our main catalogue as well as speciality catalogues for water technology, GL and ATEX products and our individual pump control flyer!

You will find the catalogues in our Download Center - www.condor-cpc.com





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Condor

More information and contact details about our representatives can be found on our website www.condor-werke.com

CONDOR PRODUCTS

WORLDWIDE





Condor Werke USA, Inc.

A Condor-Werke Company



In 1999 Condor Werke USA, Inc. was founded for the distribution of Condor products, with its headquarters in Charlotte, North Carolina.

Its own development department offers support in the manufacturing of special products and product variations for the unique requirements of the American market.

Following intensive tests in the testing laboratory, the distribution of the product line began via our centrally located logistics center in Kentucky

In this location, custom devices and special product variations are also produced by our assembly department.

This enables us to work with the flexibility required to react to customer requests at any time.

Condor Werke USA today counts a number of notable manufactures in North-, Central- and South America among its clientele.

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Scharco Electronics

A Condor Werke Company



In 1961 Scharco was founded as a manufacturer of time-, measuring and monitoring relays. With 50 years of experience in the field of control technology, today Scharco develops and manufactures customer-specific solutions in a variety of areas of industrial electronics.

Working together – from idea to product

In keeping with this motto, Scharco offers a comprehensive range of services; from product concept and development right up to manufacturing on our production line, Scharco provides its customers with complete, proactive support in the development of custom-made control solutions.

Scharco's expertise includes, for example, the following key areas:

- Water technology,
- Compressed air technology,
- Cash desk control (check-out),
- Vehicle workshop equipment

Scharco's knowledge of its customer's requirements with regard to applications enables them to provide effective consultation and to work together with the customer in developing products that are attractive and in keeping with the current market.

Given this specialist knowledge of the requirements of certain market sectors, it is not without reason that Scharco is one of Europe's leading manufacturers.

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Condor

Terms of Delivery

MORE

SERVICE / QUALITY

AND PERFORMANCE

Terms of Delivery

During handling of orders the General Terms and Conditions (AGB) of the Condor Pressure Control GmbH are determining. These conditions can be seen under www.condor-cpc.com.

The retention of title also applies if our goods are finished or already worked on, as well as with mixture or blending with other goods.

For demands from far sales of supplied goods the extended retention of title applies.

You find the current price list on our homepage www.condor-cpc.com as pdf-file for downloading.

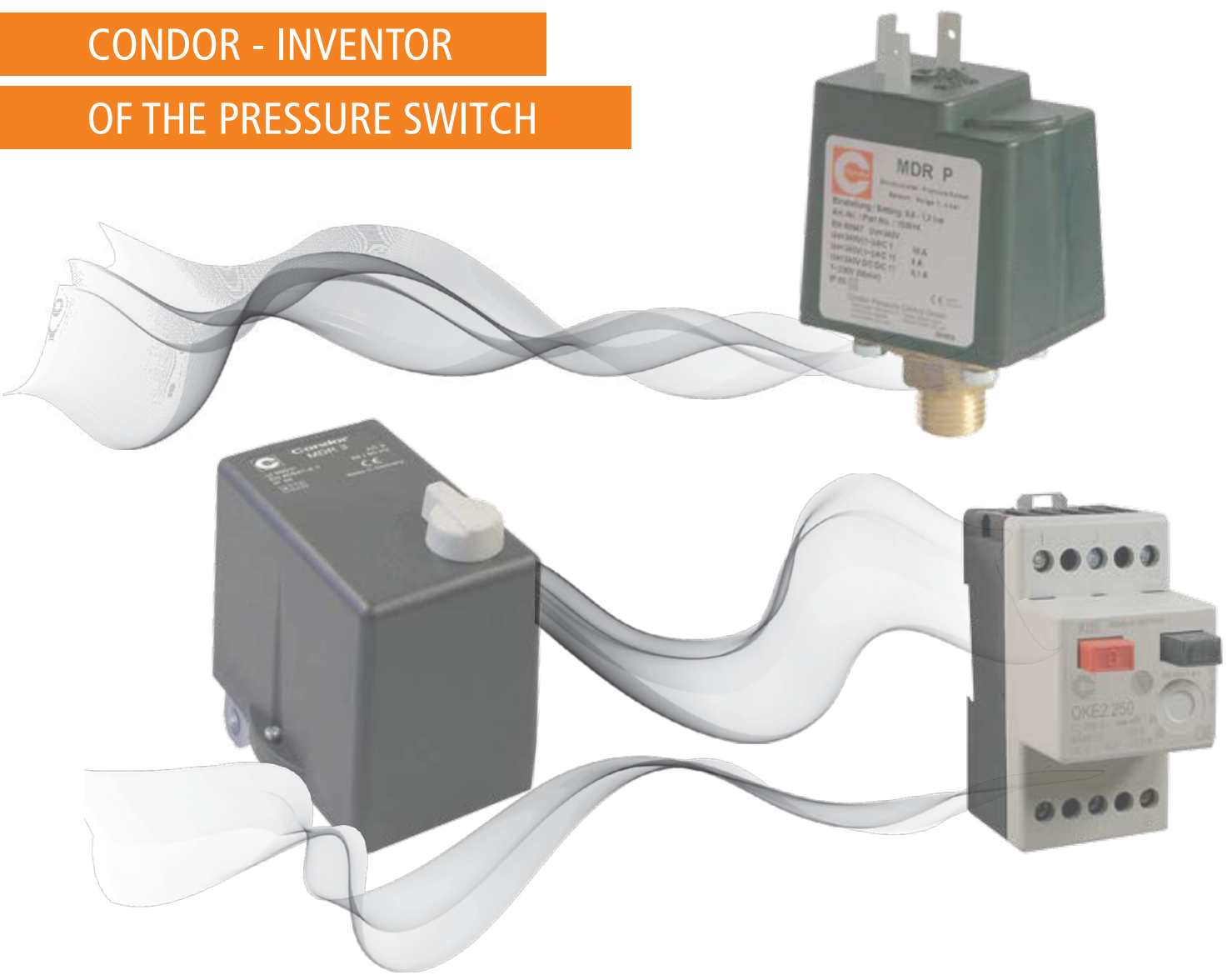
Place of delivery and area of jurisdiction is Warendorf in Germany.

Impressum

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CONDOR - INVENTOR
OF THE PRESSURE SWITCH



The background features a blue and white globe of the Earth, overlaid with a complex network of thin grey lines and small black and orange dots, representing a global network or data flow. A hand is visible on the right side, interacting with the network.

CONDOR PRODUCTS

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