Fluidcontrol

Mechanical Pressure Switch

MDS

Installation and Operation Instructions

Original instructions

BE130006
03/2019

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Read this instruction carefully prior to installation and/or use. Pay attention particularly to all advises and safety instructions to prevent injuries. Bühler Technologies can not be held responsible for misusing the product or unreliable function due to unauthorised modifications.

Document information
Document No.....BE130006
Version.....03/2019

Contents

1 Introduction

1.1 Intended Use

The operating instructions apply to MDSxxx series mechanical pressure switches.

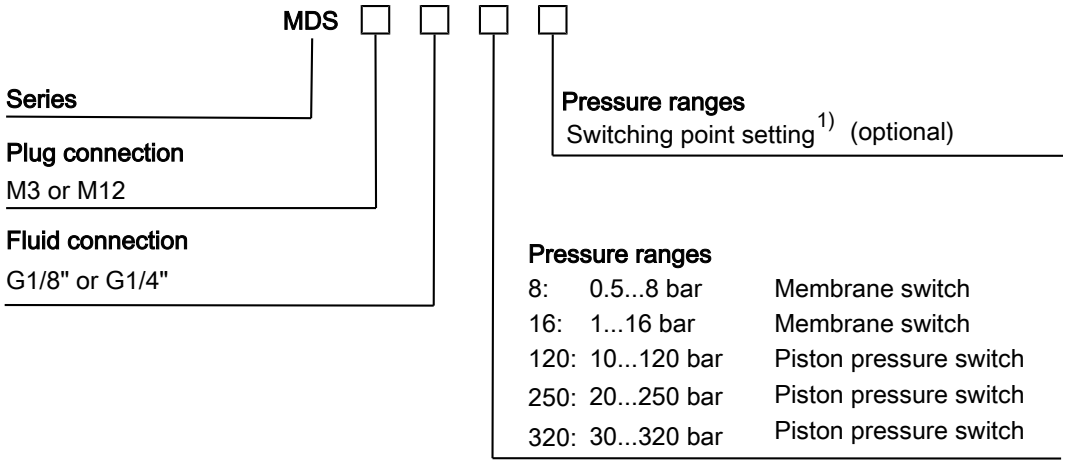
The pressure switches are used to monitor the pressure in a fluid system under normal ambient conditions. As electromechanical signal converter they convert the pressure into electrical signals with high precision. They detect pressure ranges from 0.5 bar to max. 320 bar in different combinations. Depending on the version, the process connection is a G1/8" or G1/4" external thread, a G1/4" internal thread, or a flange (VF). They connect to power via M3 cubic plug (DIN EN 175301-803) or M12x1 plug (electric line box not included).

1.2 Contents

- MDS Mechanical Pressure Switch
- Product Documentation

1.3 Ordering instructions

1.3.1 Model key MDS



[1] If necessary, the switching point can be set at the factory. The switching point must be selected with the pressure rising or falling, i.e. switching point from 0 bar to switching point (rising) or from the max. operating pressure to the switching point (falling). Please refer to the following example for the switching logic:

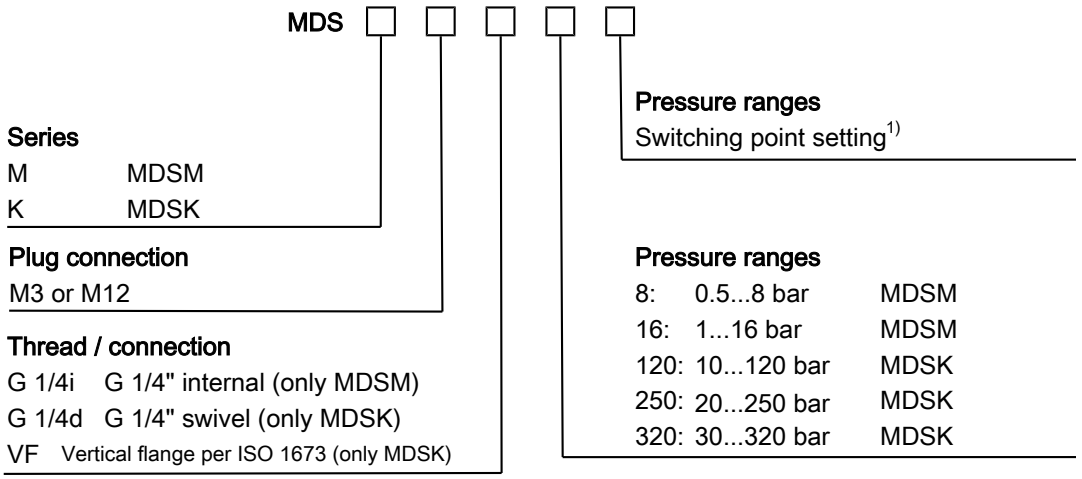
MDS-M3-G1/4-120-80R (switching point 80 bar rising):

Pin3-2 closed when switching point reached

MDS-M3-G1/4-120-80F (switching point 80 bar falling):

Pin3-1 closed when switching point reached

1.3.2 Model key MDSM and MDSK



[1] If necessary, the switching point can be set at the factory. The switching point must be selected with the pressure rising or falling, i.e. switching point from 0 bar to switching point (rising) or from the max. operating pressure to the switching point (falling). Please refer to the following example for the switching logic:

MDSK-M3-G1/4-120-80R (switching point 80 bar rising)

PIN1-3 closed when switching point reached

MDSK-M3-G1/4-120-80F (switching point 80 bar falling)

PIN1-2 closed when switching point reached

2 Safety instructions

2.1 Important advice

Operation of the device is only valid if:

- the product is used under the conditions described in the installation- and operation instruction, the intended application according to the type plate and the intended use. In case of unauthorized modifications done by the user Bühler Technologies GmbH can not be held responsible for any damage,
- when complying with the specifications and markings on the nameplates.
- the performance limits given in the datasheets and in the installation- and operation instruction are obeyed,
- monitoring devices and safety devices are installed properly,
- service and repair is carried out by Bühler Technologies GmbH,
- only original spare parts are used.

This manual is part of the equipment. The manufacturer keeps the right to modify specifications without advanced notice. Keep this manual for later use.

Signal words for warnings

DANGER	Signal word for an imminent danger with high risk, resulting in severe injuries or death if not avoided.
WARNING	Signal word for a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.
CAUTION	Signal word for a hazardous situation with low risk, resulting in damaged to the device or the property or minor or medium injuries if not avoided.
NOTICE	Signal word for important information to the product.

Warning signs

These instructions use the following warning signs:


Warns of a general hazard


General information


Voltage warning


Unplug from mains


High pressure warning

2.2 General hazard warnings

The equipment must be installed by a professional familiar with the safety requirements and risks.

Be sure to observe the safety regulations and generally applicable rules of technology relevant for the installation site. Prevent malfunctions and avoid personal injuries and property damage.

The operator of the system must ensure:

- Safety notices and operating instructions are available and observed,
- The respective national accident prevention regulations are observed,
- The permissible data and operational conditions are maintained,
- Safety guards are used and mandatory maintenance is performed,
- Legal regulations are observed during disposal,
- compliance with national installation regulations.

Maintenance, Repair

Please note during maintenance and repairs:

- Repairs to the unit must be performed by Bühler authorised personnel.
- Only perform conversion-, maintenance or installation work described in these operating and installation instructions.
- Always use genuine spare parts.

Always observe the applicable safety and operating regulations in the respective country of use when performing any type of maintenance.

3 Transport and storage

Only transport the product inside the original packaging or a suitable alternative.

The equipment must be protected from moisture and heat when not in use. It must be stored in a covered, dry, dust-free room at room temperature.

4 Installation and connection

4.1 Area of application

WARNING

All device models are solely intended for industrial applications. They are **not safety components**. The devices must not be used if failure or malfunction thereof jeopardises the safety and health of persons.
Use in explosive areas is **prohibited**.

DANGER

Explosion hazard when used in Ex explosive areas

Use in explosive areas is prohibited.

Before installing the device, please verify the listed technical data meet the application parameters. Further verify all contents are complete.

4.2 Installation

The device must be connected and installed by a trained professional. Always observe the applicable safety regulations for the operating site!

DANGER

Electric voltage

Risk of electric shock

a) Disconnect all poles of the unit from the mains for any maintenance on electric components.

b) Secure the equipment from accidental restarting.

c) The unit may only be opened by trained, competent personnel.

d) Ensure the correct voltages supply.

WARNING

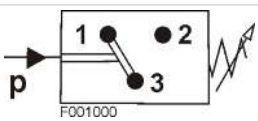
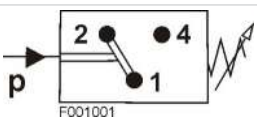
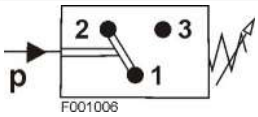
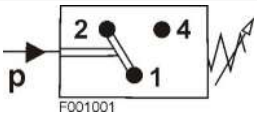
Gases or liquids discharged under pressure

Depressurise the system before installing or removing the pressure switch.

The process connects as specified:

MDS	G1/8" or G1/4" external thread
MDSM	G1/4" internal thread
MDSK	G1/4" swivel or vertical flange (VF)

It connects to electricity via M3 or M12 plug connection with the following assignment:

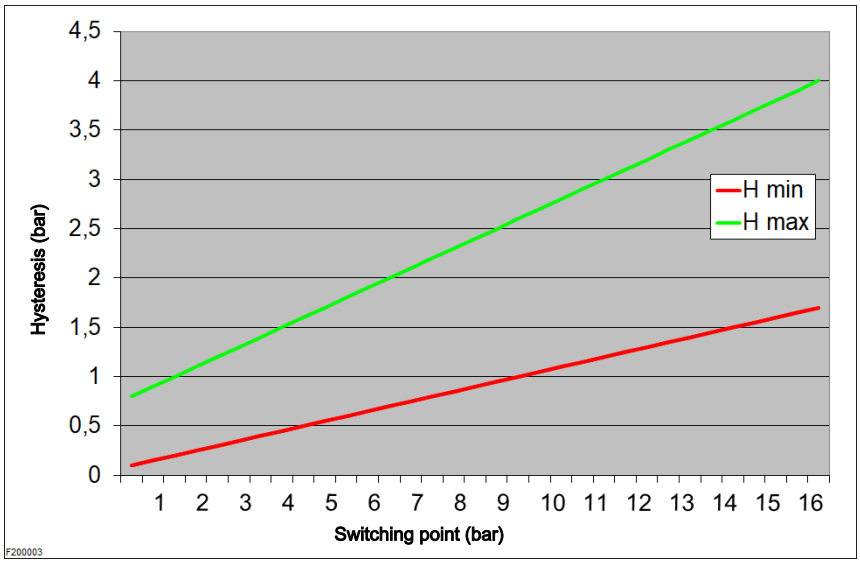
Plug connection	M3 (DIN EN 17505-803), 3-pin + PE	M12 (base) 4-pin
Max. voltage	250 V	28 V
IP rating	IP65	IP67 (with suitable line socket)
Cable fitting	PG9	
Pin assignment MDS	 F001000	 F001001
Pin assignment MDSM MDSK	 F001006	 F001001

5 Operation and control

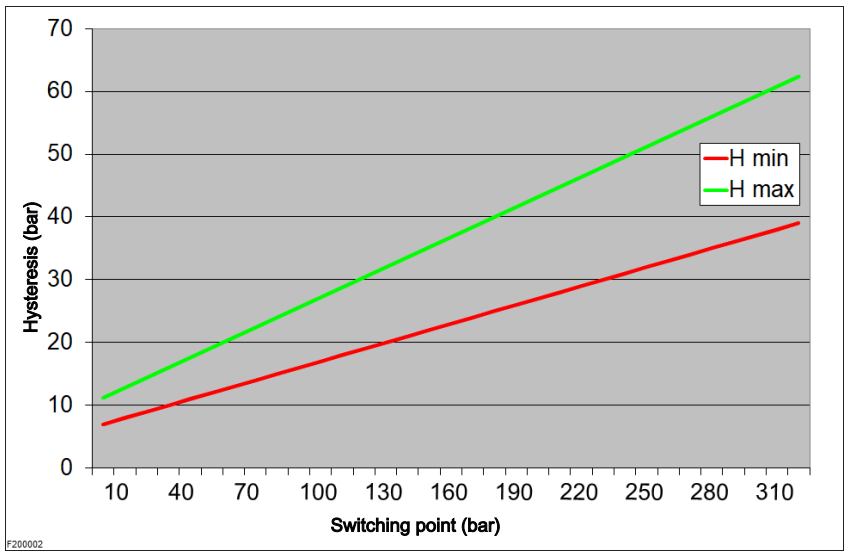
5.1 Setting the switching point and hysteresis on model MDS

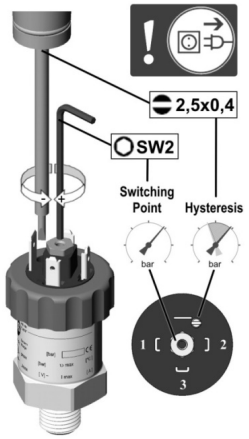
The hysteresis is defined as the difference between the switching point and switch-back point. It is the result of mechanical friction of the pressure sensor caused by flow forces and the spring.

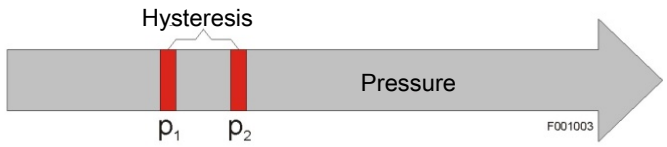
Hysteresis on membrane version MDS



Hysteresis on piston version MDS







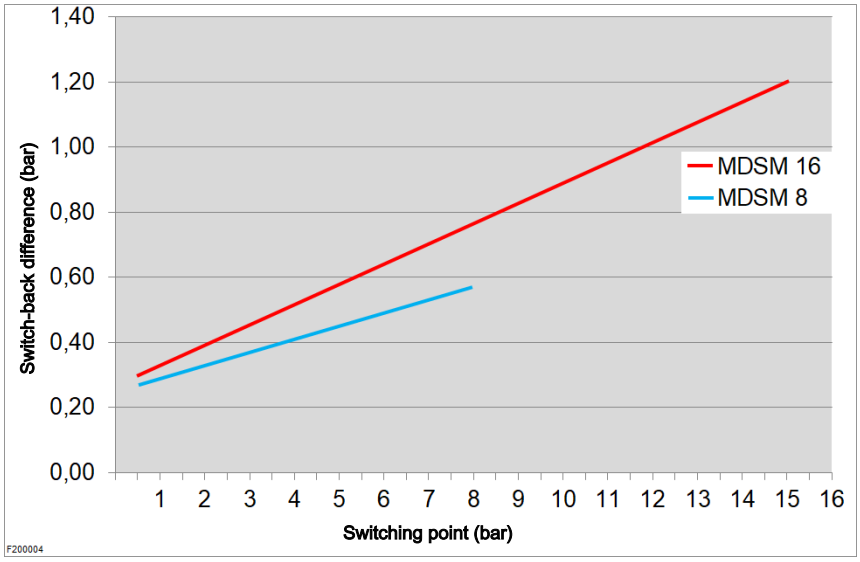
Switch-back point
Switching point or
Switching point with rising pressure
Switch-back point with falling pressure

– Disconnect the pressure switch from the power supply
– Whilst monitoring the pressure gauge on the system, set the switching point with a hexagon key.
– Adjust the hysteresis with a screwdriver. Turning clockwise increases, turning anti-clockwise decreases the value.
– Reconnect the power plug.

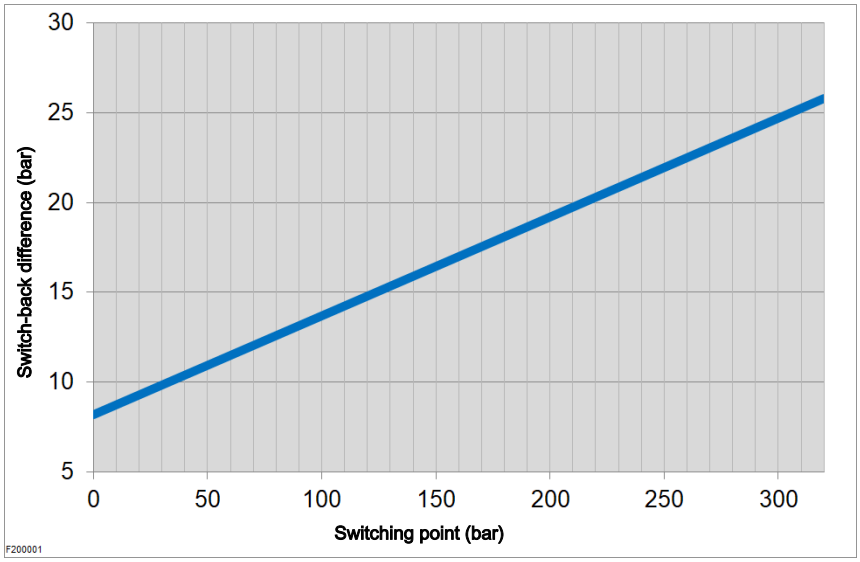
5.2 Setting the switching point on models MDSM and MDSK

With models MDSM and MDSK, the switch-back difference depends on the switching point setting. The diagrams illustrate the correlation.

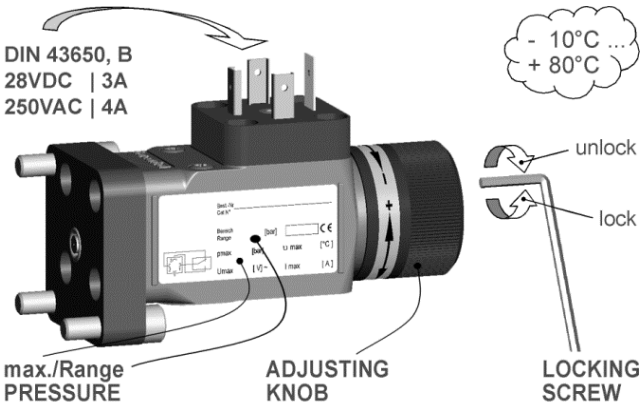
Model MDSM:



Model MDSK:



Setting the switching point:



- Loosen the set screw with a socket head wrench
- Whilst monitoring the pressure gauge on the system, adjust the switching point with the adjusting screw
- Tighten the set screw

6 Service and repair

This chapter contains information on troubleshooting and correction should an error occur during operation.

Repairs to the unit must be performed by Bühler authorised personnel.

Please contact our Service Department with any questions:

Tel.: +49-(0)2102-498955 or your agent

If the equipment is not functioning properly after correcting any malfunctions and switching on the power, it must be inspected by the manufacturer. Please send the equipment inside suitable packaging to:

Bühler Technologies GmbH

- Reparatur/Service -

Harkortstraße 29

40880 Ratingen

Germany

Please also attach the completed and signed RMA decontamination statement to the packaging. We will otherwise be unable to process your repair order.

You will find the form in the appendix of these instructions, or simply request it by e-mail:

service@buehler-technologies.com.

7 Disposal

Dispose of parts so as not to endanger the health or environment. Follow the laws in the country of use for disposing of electronic components and devices during disposal.

8 Appendices

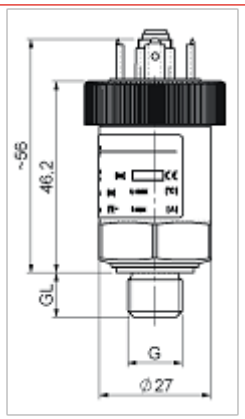
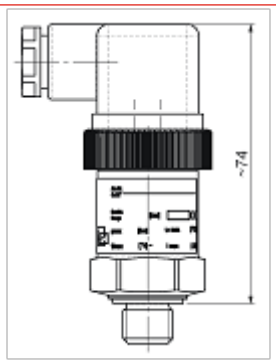
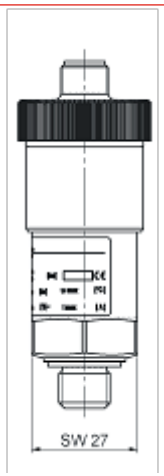
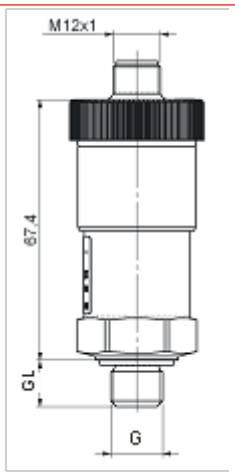
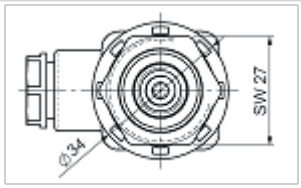
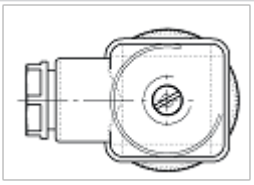
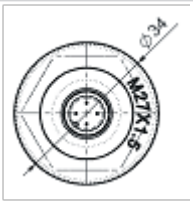
8.1 Technical Data MDS

MDS		
Mediums	Self-lubricating fluids hydraulic fluid and lubricating oils, compressed air	
Process connection	G 1/8"	G 1/4"
Seal	Based on DIN3852-E	
Torque	20 Nm	25 Nm
Principle of Measurement	**Membrane**	**Piston**
	spring-loaded	spring-loaded
	≤ 16 bar	≥ 10 bar
max. working pressure	60 bar	350 bar
Materials	Membrane: NBR	Piston: Steel
Seal	---	PTFE, NBR
Housing	Steel, galvanised	Steel, galvanised
Switching output	Changeover contact	
Quantity	1	
Switching element	Microswitch with silver-plated contacts	
max. switching frequency	100/min	
Switching capacity using plug	M3	M12
DC up to 28 V	2 A	2 A
AC up to 250 V	4 A	---
Mounting position	Any	
Response	min. rate of pressure rise 0.01 bar/s	
Switching point / accuracy	± 2% from end value at room temperature	
Switching point / reproducibility	same as accuracy	
Ambient / operating temperature range	-20... +80°C	
Vibration resistance	A-10G / 10-500 Hz	
Shock resistance	I-100G/6 ms	

8.2 Technical Data MDSM and MDSK

	MDSM		MDSK	
Mediums	Neutral fluids, compressed air		Self-lubricating fluids such as hydraulic fluids and lubricating oils	
Process connection	G1/4" internal		G1/4" swivel, vertical flange, DIN ISO 16873, torque: 25 Nm	
Mounting position	Any		Any	
Principle of Measurement	Spring-loaded membrane		Spring-loaded piston	
max. working pressure	60 bar		350 bar	
min. rate of pressure rise	0.01 bar/s		0.01 bar/s	
Switching point				
Accuracy/reproducibility	± 2% upper range value at room temp.		± 2% upper range value at room temp.	
Materials				
Measuring element	Membrane: NBR		Piston: Stainless steel 1.4305	
Pressure connection	Zinc diecasting (G1/4" internal)		Galvanised steel (G1/4" swivel), zinc diecasting (vertical flange)	
Housing	Zinc diecasting		Zinc diecasting	
Switching output	Changeover contact		Changeover contact	
Quantity	1, adjustable with fastener		1, adjustable with fastener	
Switching element	Microswitch with silver-plated contacts		Microswitch with silver-plated contacts	
max. switching frequency	200 / min.		200 / min.	
max. switching capacity				
with plug	M3	M12	M3	M12
DC up to 28V	3 A	3A	3 A	3A
AC up to 250V	6 A	---	6 A	---
Ambient conditions				
Ambient / operating temperature range	-10 °C...+80 °C		-10 °C...+80 °C	
Vibration resistance	A-10G/10-500 Hz		A-10G/10-500 Hz	
Shock resistance	I-100G/6 ms		I-100G/6 ms	
Weight	0.3 kg		0.33 kg	

8.3 Dimensions MDS

M3 version		M12 version	
			
			

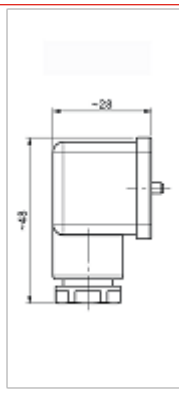
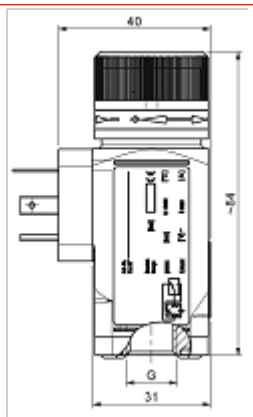
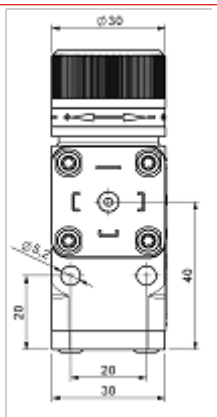
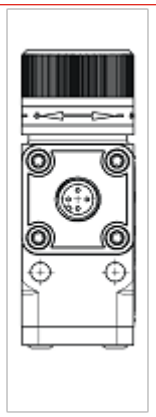
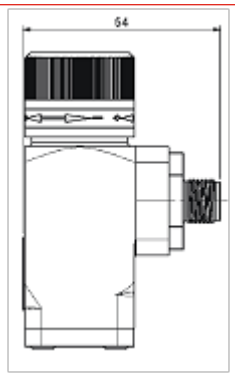
G	GL
1/8	10 mm
1/4	12 mm

Accessories:

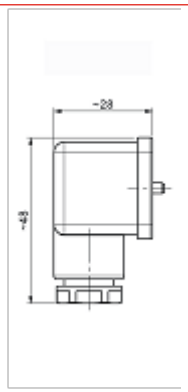
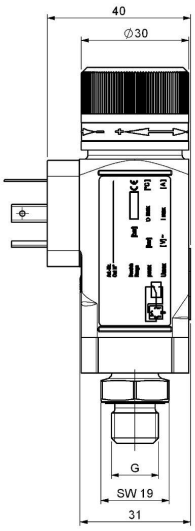
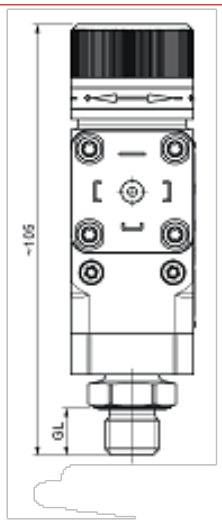
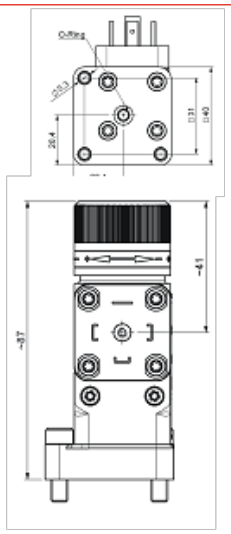
Item no.: 9144050047	Connecting cable M12x1, 4-pin plug, L=5m
Item no. 9146100159	Electric line box M12x1, 90° angle

8.4 Dimensions MDSM and MDSK

Dimensions MDSM

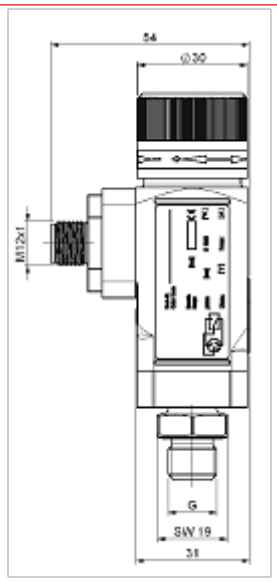
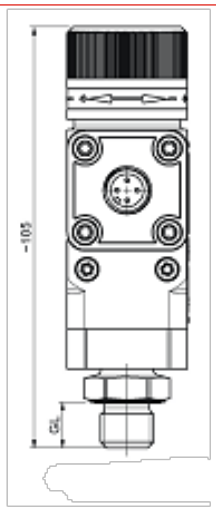
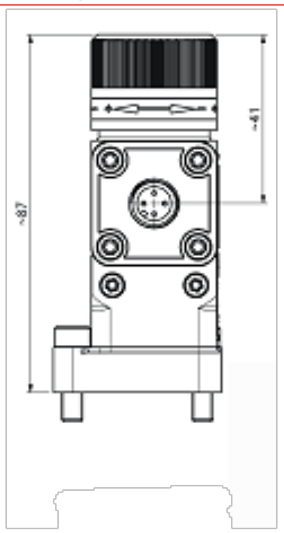
M3 version			M12 version	
				
Electric line box included		Rigid internal thread	Rigid internal thread	

Dimensions MDSK

M3 version with thread			M3 version with vertical flange DIN ISO 16873
			
Electric line box included		External thread swivel	

G
1/4

GL
92 mm

M12 version with thread		M12 version with vertical flange DIN ISO 16873
		
	Swivel external thread	

Accessories:

Item no.: 9144050047	Connecting cable M12x1, 4-pin plug, L=5m
Item no.: 9146100159	Electric line box M12x1, 90° angle
Item no.: 9008429	Double nipple G1/4, stainless steel

9 Attached documents

- Declaration of conformity: KX130022
- RMA - Decontamination Statement

EU-Konformitätserklärung
EU-declaration of conformity

Hiermit erklärt Bühler Technologies GmbH, dass die nachfolgenden Produkte den wesentlichen Anforderungen der Richtlinie

Herewith declares Bühler Technologies GmbH that the following products correspond to the essential requirements of Directive

2014/35/EU

(Niederspannungsrichtlinie / *low voltage directive*)

in ihrer aktuellen Fassung entsprechen.

in its actual version.

Produkt / products: Mechanischer Druckschalter / *Mechanical Pressure Switch*
Typ / type: MDSxxx
MDSMxxx
MDSKxxx

Die Betriebsmittel dienen zur Überwachung des Drucks in einem Fluidsystem unter normalen Umgebungsbedingungen.
The equipment i used to monitor the pressure in a fluid system under normal ambient conditions.

Das oben beschriebene Produkt der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union:
The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

EN 60947-1:2007 **EN 60947-5-1:2004**

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.
This declaration of conformity is issued under the sole responsibility of the manufacturer.

Dokumentationsverantwortlicher für diese Konformitätserklärung ist Herr Stefan Eschweiler mit Anschrift am Firmensitz.
The person authorized to compile the technical file is Mr. Stefan Eschweiler located at the company's address.

Ratingen, den 20.04.2016

Stefan Eschweiler
Geschäftsführer – *Managing Director*

Frank Pospiech
Geschäftsführer – *Managing Director*

KX 13 0023

Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen,
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Internet: www.buehler-technologies.com

RMA-Formular und Erklärung über Dekontaminierung
RMA-Form and explanation for decontamination

RMA-Nr./ RMA-No.

Die RMA-Nummer bekommen Sie von Ihrem Ansprechpartner im Vertrieb oder Service./ You may obtain the RMA number from your sales or service representative.

Zu diesem Rücksendeschein gehört eine Dekontaminierungserklärung. Die gesetzlichen Vorschriften schreiben vor, dass Sie uns diese Dekontaminierungserklärung ausgefüllt und unterschrieben zurücksenden müssen. Bitte füllen Sie auch diese im Sinne der Gesundheit unserer Mitarbeiter vollständig aus./ This return form includes a decontamination statement. The law requires you to submit this completed and signed decontamination statement to us. Please complete the entire form, also in the interest of our employee health.

Firma/ Company

Firma/ Company
Straße/ Street
PLZ, Ort/ Zip, City
Land/ Country

Ansprechpartner/ Person in charge

Name/ Name
Abt./ Dept.
Tel./ Phone
E-Mail

Gerät/ Device
Anzahl/ Quantity
Auftragsnr./ Order No.

Serien-Nr./ Serial No.
Artikel-Nr./ Item No.

Grund der Rücksendung/ Reason for return

- ☐ Kalibrierung/ Calibration
- ☐ Modifikation/ Modification
- ☐ Reklamation/ Claim
- ☐ Reparatur/ Repair
- ☐ andere/ other

bitte spezifizieren/ please specify

Ist das Gerät möglicherweise kontaminiert?/ Could the equipment be contaminated?

☐ Nein, da das Gerät nicht mit gesundheitsgefährdenden Stoffen betrieben wurde./ No, because the device was not operated with hazardous substances.

☐ Nein, da das Gerät ordnungsgemäß gereinigt und dekontaminiert wurde./ No, because the device has been properly cleaned and decontaminated.

☐ Ja, kontaminiert mit:/ Yes, contaminated with:

☐ explosiv/ explosive	☐ entzündlich/ flammable	☐ brandfördernd/ oxidizing	☐ komprimierte Gase/ compressed gases	☐ ätzend/ caustic	☐ giftig, Lebensgefahr/ poisonous, risk of death	☐ gesundheitsgefährdend/ harmful to health	☐ gesundheitsschädlich/ health hazard	☐ umweltgefährdend/ environmental hazard

Bitte Sicherheitsdatenblatt beilegen!/ Please enclose safety data sheet!

Das Gerät wurde gespült mit:/ The equipment was purged with:

Diese Erklärung wurde korrekt und vollständig ausgefüllt und von einer dazu befugten Person unterschrieben. Der Versand der (dekontaminierten) Geräte und Komponenten erfolgt gemäß den gesetzlichen Bestimmungen.

This declaration has been filled out correctly and completely, and signed by an authorized person. The dispatch of the (decontaminated) devices and components takes place according to the legal regulations.

Falls die Ware nicht gereinigt, also kontaminiert bei uns eintrifft, muss die Firma Bühler sich vorbehalten, diese durch einen externen Dienstleister reinigen zu lassen und Ihnen dies in Rechnung zu stellen.

Should the goods not arrive clean, but contaminated, Bühler reserves the right, to comission an external service provider to clean the goods and invoice it to your account.

Firmenstempel/ Company Sign

Datum/ Date

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rechtsverbindliche Unterschrift/ Legally binding signature

Die Analyse defekter Baugruppen ist ein wesentlicher Bestandteil der Qualitätssicherung der Firma Bühler Technologies.

Um eine aussagekräftige Analyse zu gewährleisten muss die Ware möglichst unverändert untersucht werden. Es dürfen keine Veränderungen oder weitere Beschädigungen auftreten, die Ursachen verdecken oder eine Analyse unmöglich machen.

Bei elektronischen Baugruppen kann es sich um elektrostatisch sensible Baugruppen handeln. Es ist darauf zu achten, diese Baugruppen ESD-gerecht zu behandeln. Nach Möglichkeit sollten die Baugruppen an einem ESD-gerechten Arbeitsplatz getauscht werden. Ist dies nicht möglich sollten ESD-gerechte Maßnahmen beim Austausch getroffen werden. Der Transport darf nur in ESD-gerechten Behältnissen durchgeführt werden. Die Verpackung der Baugruppen muss ESD-konform sein. Verwenden Sie nach Möglichkeit die Verpackung des Ersatzteils oder wählen Sie selber eine ESD-gerechte Verpackung.

Beachten Sie beim Einbau des Ersatzteils die gleichen Vorgaben wie oben beschrieben. Achten Sie auf die ordnungsgemäße Montage des Bauteils und aller Komponenten. Versetzen Sie vor der Inbetriebnahme die Verkabelung wieder in den ursprünglichen Zustand. Fragen Sie im Zweifel beim Hersteller nach weiteren Informationen.

Analysing defective assemblies is an essential part of quality assurance at Bühler Technologies.

To ensure conclusive analysis the goods must be inspected unaltered, if possible. Modifications or other damages which may hide the cause or render it impossible to analyse are prohibited.

Electronic assemblies may be sensitive to static electricity. Be sure to handle these assemblies in an ESD-safe manner. Where possible, the assembles should be replaced in an ESD-safe location. If unable to do so, take ESD-safe precautions when replacing these. Must be transported in ESD-safe containers. The packaging of the assemblies must be ESD-safe. If possible, use the packaging of the spare part or use ESD-safe packaging.

Observe the above specifications when installing the spare part. Ensure the part and all components are properly installed. Return the cables to the original state before putting into service. When in doubt, contact the manufacturer for additional information.

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