

# Limit Switch Contact Assemblies



Models **MS**

## Mechanical Contacts

### Standard Contacts • Magnetic (Fast Make - Fast Break) Contacts

This data sheet contains important details of the available make/break operations and electrical connections of standard- and magnetic contact assemblies.

Detailed information about the method of operation and application of mechanical, inductive and pneumatic limit switch contact assemblies are given in our **general information leaflet 9000**.

For pressure gauges with built-in limit switch contact assemblies special data sheets with dimensional drawings and details of the ordering codes can be found under the different catalogue headings, ending on number ..90, ..91 or ..19.1

## Make/Break Operations

The available make/break operations of single and double contacts are shown in the table below.

**Code letter S** = standard contact, **M** = magnetic contact

### Code number 1, making contact:

closes when the set point is passed in the clockwise direction (i.e. opens in counterclockwise direction)

### Code number 2, breaking contact:

opens when the set point is passed in the clockwise direction (i.e. closes in counterclockwise direction)

**Code number 3:** changeover contact



### Manifold Contact Assemblies

With 3 and 4 contacts see special options, reverse side

### Contact Pins

Silver-nickel 10 µ gold-plated (AG80Ni20Au10µ)

### Adjustment

Depending on pressure gauge model and version

- Cast into the acrylic glass window, or
- Nickel plated brass, built into the window, removable key

### Electrical Connections

Depending on pressure gauge model and version

- 1 m (3 ft) connecting cable, passing through the case's back
  - European universal plug connector mounted to the case;
- The precise location of the lead through hole or the plug connector can be found in the data sheets for the individual pressure gauge models.

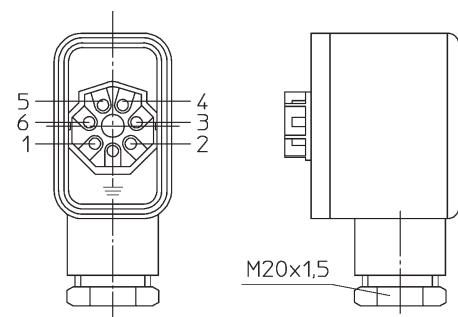
### Connecting Cable

We use screwed cable glands M12x1.5 with strain relief for fixing the cable. The free ends of the cable are marked as shown in the circuit diagram; with green/yellow ground wire.

### European Universal Plug Connector

The terminals in the connecting box are also numbered as shown in the circuit diagrams. A ground terminal is provided. The universal plug connector is delivered with a screwed cable gland M20x1.5 with strain relief.

Circuit Diagram	Make/Break Operation with Pointer Moving Clockwise	Type	
		Standard	Magnetic
<b>Contact assembly with one contact:</b>			
	Breaking	S 2	M 2
	Making	S 1	M 1
<b>Contact assembly with change - over contact:</b>			
	Connection 1 and 4: making Connection 2 and 4: breaking	S 3	M 3
<b>Contact assembly with double contacts:</b>			
	1 <sup>st</sup> and 2 <sup>nd</sup> contacts both breaking	S 22	M 22
	1 <sup>st</sup> contact breaking 2 <sup>nd</sup> contact making	S 21	M 21
	1 <sup>st</sup> and 2 <sup>nd</sup> contacts both making	S 11	M 11
	1 <sup>st</sup> contact making 2 <sup>nd</sup> contact breaking	S 12	M 12



### CE-marking

According to EMC Directive, restricted to max. 5 switchings/minute

**Special options** see overleaf.



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# Load Tables for Limit Switch Contact Assemblies

## Standard and Magnetic Contacts

Recommended contact load under ohmic and inductive load and operation in air							
Voltage acc. to DIN IEC 38		Standard (low-action) contact			Magnetic (snap-action) contact		
		Ohmic load		Inductive load $\cos \varphi > 0,7$	Ohmic load		Inductive load $\cos \varphi > 0,7$
D.C. V	A.C. V	D.C. mA	A.C. mA	A.C. mA	D.C. mA	A.C. mA	A.C. mA
220	230	40	45	25	100	120	65
110	110	80	90	45	200	240	130
48	48	120	170	70	300	450	200
24	24	200	350	100	400	600	250

Limit values for contact load under ohmic load and operation in air (acc. to EN 60947-5-1)		
	Standard contact	Magnetic contact
Nominal insulation voltage $U_i$	$60 < U_i \leq 250$ V	$60 < U_i \leq 250$ V
Nominal operating voltage $U_{on}$ max.	max. 250 V	max. 250 V
Nominal operating current:	.7 A	1.0 A
Making current	.7 A	1.0 A
Breaking current	.6 A	.6 A
Permanent current		
Switching capacity	10 W 18 VA	30 W 50 VA <sup>1)</sup>

For contacts with light hair springs the nominal operating currents must be reduced to 50% of these values due to the narrow cross section of the hair spring.

<sup>1)</sup> only valid for UNFILLED gauges; instruments with case filling max. **20 W / 20 VA**

To guarantee a highest possible switching security for the singular application the detailed knowledge of the complete electrical system with all its relevant parameter is required.

## Special Options

### ● Material

During application the contacts of limit switch assemblies are subject to a greater or lesser amount of wear depending on the mechanical stresses and the heating effect of current, and the arcing.

Because of the wide range of applications, the standard contact material we use is silver-nickel, 10  $\mu$  gold-plated (A80Ni20Au10 $\mu$ ), which is highly resistant to the effects of arcing. The gilding strengthens the corrosion resistance and impedes the development of an oxide film. This increases the switching security for low current switchings.

For particularly severe applications **contact pins made of alloys of precious metals (gold and platinum alloys, silver-palladium)** can be supplied. We will be pleased to give advise for any particular case.

### ● Manifold Contact Assemblies

We can supply pressure gauges with up to 4 contacts. There are restrictions for gauges with bayonet ring case (RB.. and RCh..) and screw ring case (RK..), because of the depth required to fit multiple contacts into the gauge, compare data sheets for the individual gauge models for the relevant details. For pressure gauges with 3 or 4 contacts it is not always possible to set all set points one above the other. You should therefore always state where the set points are. Circuit diagrams of three and four contacts are available upon request. Make/break operations must be stated also in this cases for clockwise pointer movement: e.g.

1<sup>st</sup> contact: breaking

2<sup>nd</sup> contact: breaking

3<sup>rd</sup> contact: making = **S221** or **M221**

### ● Separate Circuits

Separate circuits are available for limit switch contact assemblies with two or more contacts (also with 2 „changeover“ contacts).

● Contact assemblies with 2 contacts can be delivered with **coupled contacts**, or with one set pointer and 2 contacts in a **fixed distance** (e.g. contact distance of  $\sphericalangle$  3° or more) upon request.

● Adjustment device with **non removable key** nickel plated brass; Adjustment device **stainless steel with** removable or non removable key upon request.

● Other types of electrical connections upon request

## How to Order

Please consider the ordering information that is to find in the data sheets of the pressure gauges or thermometers.

Additional ordering information for the limit switch contact assembly:

- Model code letter **S** (standard) or **M** (magnetic contact)
- Code number for the switching function, always to state for clockwise pointer movement, e.g. **1, 2, 11, 12, 21, 22** (compare page 1)
- Possibly required special options, such as contact pin material gold/silver

## Multifunctional Relays

### Impulse controlled type MSR, with additional direct voltage output

Multifunctional relays serve to increase the switching capacity, as the control circuit is connected to low voltage.

The switching capacity of electromechanical limit switch contact assemblies is frequently exceeded, causing faster wear and tear of the contact pins, and because of that possibly dangerous functional disturbances.

The operation of these contacts in oil causes additional difficulties concerning its switching safety, the service life of the contacts, and the occurrence of oil pollution.

The MSR relay operates on an impulse voltage of 35...40 VDC. This guarantees an optimal protection of the contacts. The relay also has an additional direct voltage output on two separate terminals of 24 VDC ( $I_{max} = 20$  mA) to feed external pressure sensors or temperature sensors etc. This is an advantage e.g. on pressure gauges with contacts and transmitters, as for example our integrated pressure transmitter DMU.

When the case of the pressure gauge or thermometer is oil filled, the switching spark burns the oil, makes it cloudy, and causes coking of the contacts. Our impulse controlled multifunctional relays solve these problems far-reaching. The service life of the contacts is considerably extended, as 99% of the opening and closing of the contacts happen under idle conditions, i.e. free of voltage. In addition, our relays operate under a specific time response which almost completely excludes fluttering. Only the multifunctional relay "Interval" (model MSR 011) has due to its function no switching delay.

The multifunctional relays model MSR (MSR 010 = 1 limit value, MSR 020 = 2 limit values, and MSR 011 = interval) fulfill the EMC-directives and will be marked with **CE**-sign.

For further information see data sheet **9521**.



The information in this leaflet is given in good faith, but we reserve the right to make changes without notice.

