

Service intended:

Electrical alarm contacts make or brake an electric control circuit relative to the position of the instrument pointer. They are built into case Ø 100 and 160.

General features:

Points of contact actuation are adjustable over the full extension of the scale graduation and will usually be arranged below the dial plate (on top of the dial plate sometimes possible).

Pointer deflection is not obstructed by the contact mechanism.

Wiring depends on the model and is made by either a flying lead of 1 metre cable (cross-section 0.75 mm²) or by means of a junction box at side of the case (clamps for cross-section max. 2.5 mm²).

Contact setting:

The cases feature a hub in the window into which a key inserts. Normally all contacts may set at exactly the same scale value. Contact actuation is made when the instrument pointer sweeps the contact indicator from either side.

TYPES OF CONTACTS

Sliding contacts of type: S

Application:

The sliding contact provides for accurate switching with almost no hysteresis and very little force required.

However, this type is rather sensitive to vibration and not suitable for liquid filled instruments.

Very slowly changing indication may also involve the risk of excessive electric arcing. For this we recommend inductive alarm contacts type I.

Technical data:**Maximum voltage:**

DC/AC 250V

Maximum load:

10W / 18VA

Current rating:

0.7A (ohmic load)

Contact material:

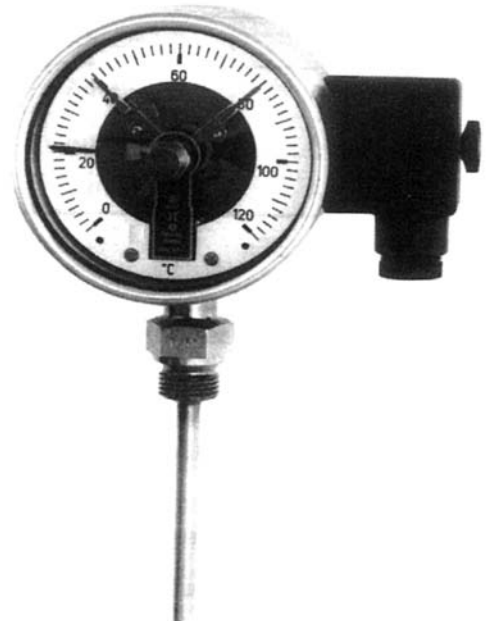
Silver-nickel alloy (80% Ag / 20% Ni)

Operating temp.:

TMIN -20°C, TMAX +70°C

Number of contacts:

(max.) 4



Magnetic snap-action contacts of type: M

This is the universal type of contacts to provide reliable service also with liquid filled instruments.

Technical data:

Maximum voltage:	DC/AC 250V
Maximum load:	30W / 50VA
Current rating:	1A (ohmic load)
Contact material:	Silver-nickel alloy (80% Ag / 20% Ni)
Operating temperature:	TMIN -20°C TMAX +70°C
Number of contacts:	(max.) 4

The magnetically assisted contact features a small magnet attached to the setting hand. The magnet provides for a snap-action characteristic which considerably improves contact rating and service life, and also makes this typeless sensitive to vibration. The force required to break the attraction of the magnet results in a certain hysteresis of the switch point when the same contact is alternatively approached with rising and falling pressure (or temperature). The value of this hysteresis reflects a minimum of 2% and a maximum of 5% depending on scale range and instrument.

Special features and optional extras

- Double throw (SPDT) function.
- Switch point calibrated and immobilised.
- Two contacts linked at a specified distance.
- Contacts with "live zero" shunt to monitor circuit continuity.
- Thyristor to improve rating (max. 65VA).
- Self cleaning contacts.
- Contact setting mechanism with provisions to attach a lead seal.
- Contact setting knob non-detachable.
- Wiring by means of plug and socket instead of junction box or flying lead.
- Contact points of special materials (see below).

Approval documents of a variety of instruments are existing to be used within intrinsically safe circuits in hazardous or fire damp areas.

Contact ratings

The contact rating values are given in consideration of many years of reliable service. Unlimited power switching may be obtained by using the instrument contacts to trip a relay or contactor of appropriate size (type MSR). Ratings below 24V line voltage are to be individually established upon inquiry.

Type S - sliding contacts

V	ohmic load DC	ohmic load AC	inductive load cos. φ > 0.7
220 / 230	40mA	45mA	25mA
110	80mA	90mA	45mA
48	120mA	170mA	70mA
24	200mA	350mA	100mA

Type M - magnetic snap-action contacts

V	ohmic load DC		ohmic load AC		inductive load cos. φ > 0.7	
	dry	liquid filled	dry	liquid filled	dry	liquid filled
220 / 230	100mA	65 mA	120mA	90mA	65 mA	40mA
110	200mA	130mA	240mA	180mA	130mA	85mA
48	300mA	200mA	450mA	330mA	200mA	130mA
24	400mA	250mA	600mA	450mA	350mA	150mA

Contact points of special material

Contacts made of special materials are available to either improve resistance against wear failure or corrosion failure in long-term service.

Optionally available are:

Silver-nickel alloy (80% silver, 20% nickel)

- This is the standard material used and features:
- Excellent hardness and strength
 - Good resistance against formation of arcs
 - Good resistance against contact welding
 - Low contact resistance

Gold-silver alloy (80% gold / 20% silver)

This alloy is particularly resistant against long-term corrosion and surface oxydation.

contact resistance is very low. Contacts made of this material are preferred for fail-safe circuits where the alarm condition only occasionally occurs at low current rating.

Platinum-iridium alloy (75% platinum / 25% iridium)

This alloy is very hard with excellent resistance against formation of arcs and excellent performance in corrosive environments. It is preferred where switching of rather high current rating frequently occurs as part of regular process control.

In order to maintain acceptable mean-time-between-failure rating it is recommended to maintain a line voltage no less than the values given below:

Silver-nickel alloy and platinum-iridium alloy	24V
Gold-silver alloy	12V

Contact functions of sliding contacts type: S
resp. magnetic snap-action contacts type: M
with index

Generally the functions of contact type S
resp. type M are:








Index 1 contact makes when the instrument
pointer approaches the set point in
clockwise direction. (NO contact)

Index 2 contact breaks when the instrument
pointer approaches the set point in
clockwise direction. (NC contact)

Index 3 Contact breaks first and makes second
circuit when the instrument pointer
approaches the set point in clockwise
direction. (SPDT contact)

BITHERMA-contacts are identified by a type code.
The capital letter indicates the type of contacts
whereas the number indicates the contact function
with rising pressure (or temperature), respectively
clockwise pointer motion.

If pointer moves towards clockwise the contact
function will turn.

Single contacts			
Wiring scheme	clockwise pointer motion	Type code function and index of contacts	
	Contact function	Sliding contact	Magnetic snap-action
	Contact makes when pointer reaches set point	S 1	M 1
	Contact breaks when pointer reaches set point	S 2	M 2
Double contacts			
	1st and 2nd contact make when pointer reaches set point	S 11	M 11
	1. contact makes 2. contact breaks when pointer reaches set point	S 12	M 12
	1. contact breaks 2. contact makes when pointer reaches set point	S 21	M 21
	1st and 2nd contact break when pointer reaches set point	S 22	M 22
Tripple contacts			
	1st contact breaks 2nd contact makes 3rd contact breaks when pointer reaches set point	S 212	M 212

Wiring terminals are identified as per above wiring schemes.
Earth (ground) lead is identified green-yellow.

Inductive alarm sensor contacts of typ I

BITHERMA inductive contacts are certified for use in hazardous areas of Zone 1 and Zone 2. Power supply must be made by means of a power source certified intrinsically safe such as model 904.15.

Inductive contacts are also recommended for critical non-hazardous applications where an utmost of fail-safe heavy duty operation is required.

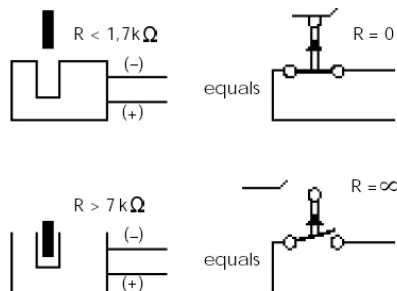
In combination with liquid filled instruments these contacts are particularly suited for process control circuits in the chemical and petroleum industry.

Operating principle

Heart of the inductive contact system is a non-contact sensor attached to an indicating device. Both sensor and indicator are adjustable over the full length of the scale.

Contact actuation is achieved by means of a metal flag linked to the pointer of the instrument. The metal flag affects the electric field of the sensor when the instrument pointer overlaps with the contact indicator. Contact actuation is made without any mechanical force that would affect accuracy of the instrument.

Below scheme reflects the operating principle in comparison with conventional mechanical contacts:



Dimensions of the basic instrument and provisions for contact adjustment are identical to contacts of type S and M.

Operating temperature:
TMIN -25°C, TMAX + 70°C

Components of the inductive contact system

Operation of the inductive contact system requires an appropriate electronic power supply and control unit.

The control unit consists of

- Line transformer
- Amplifier circuit
- Relay to switch external circuits

The isolated line transformer provides for power supply whereas the amplifier conditions the signal of the inductive sensor to energize the output relay.

Available are two versions:

- Ex-approved intrinsic safety
- Standard for non-certified service

The intrinsically safe version is offered with PTB certificate of conformity to EN 50 014 and EN 50 020 to be used with inductive contacts installed in hazardous areas of Zone 1 or Zone 2.

It may be noted that the control unit itself must be installed outside the hazardous area.

The characteristic of the relay excitation may be changed by means of jumpers on the circuit board:

· Open circuit causes alarm

- Flag matches sensor - Relay energized
- Flag outside sensor - Relay de-energized

· Closed circuit causes alarm

- Flag matches sensor - Relay de-energized
- Flag outside sensor - Relay energized

· Open circuit alarm with continuity detector

- Relay excitation as with open circuit alarm characteristic. In addition, continuity of the sensor circuit is monitored.
- Interrupted circuit will de-energize the relay.

The standard non-intrinsically safe version is equipped with permanently fixed operating characteristic.

The relay is de-energized when the flag matches the sensor or when the circuit is interrupted. This unit additionally provides a 24V/20mA DC power source for auxiliary use.