

Limit value switches

Inductive contacts

General

Inductive limit value switches in pointer-type measuring instruments are equipped with electrical distance sensors (proximity sensors) in accordance with DIN EN 60947-5-6 (NAMUR).

The output signal is governed by the presence or absence of a control vane moved by the actual value pointer in the magnetic field of the proximity sensor.

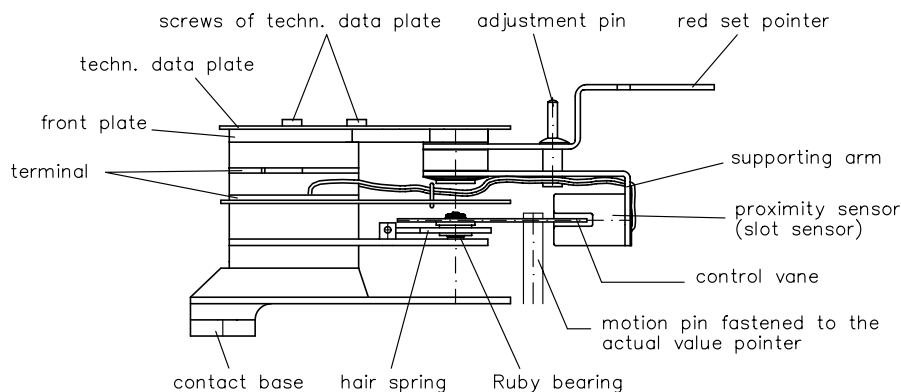
Inductive contacts essentially comprise

- an adjustable red set pointer
- a supporting arm which is connected with the red set pointer and carries the proximity sensor, and
- a control vane moved by the actual value pointer.

An adjusting lock provided with a separate or fixed key is used for external adjustment of the set pointers of the built-in limit value switches to set the value at which the switching operation is to take place.

Our limit value switches are designed in such a way that the actual value pointer can move past the adjusted red set pointer after the contact has been made, but the switching condition will be maintained.

In our limit value switches, we use a non wearing jewel bearing consisting of a stainless steel shaft and 2 axially arranged synthetic rubies. This bearing is easy running, resistant against aggressive media, and guarantees optimum safety even under extreme conditions of application.





Mode of operation

The electrical distance sensors (proximity sensors) acc. to EN 50227 or NAMUR respectively, used in our inductive contacts are simple two wire DC switches merely containing the transistor oscillator.

We use proximity sensors type N which are also called slot sensors due to the slot design. The electromagnetic field is concentrated between two axially opposed coils. The switch operates when the aluminium control vane moved by the actual value pointer enters into the space or slot between the two coils. The signal is transmitted without a time lag analogous to the movement of the actual value pointer.

If no material is present around the slot, the oscillator will vibrate. In this condition, the impedance of the whole system is very low (approx. 1 k Ω).

The coil system is attenuated as soon as the control vane enters into the air gap, the oscillator stops vibrating and the impedance of the whole system becomes relatively high (approx. 7 k Ω).

Current consumption: ≥ 3 mA (active face uncovered) 
 ≤ 1 mA (active face covered) 

The difference in the current consumption of vibrating and non vibrating oscillators is used to drive a switching amplifier which turns the input signal into a binary output signal. This is why the switching operation of inductive contacts is not only governed by the slot proximity sensor, but also by the switching amplifier.

In indicating the switching function, we always follows the „working current principle“, i.e.

- control vane out of the slot sensor - relay energised
- control vane inside the slot sensor - relay de-energised

A technically perfect function will, of course, require an optimum adjustment of the contact. Kindly refer to our recommendations on catalogue page K 14-10.040.

Application

Due to their proximity type of switching, their switching accuracy and their high service life, inductive contacts may be used for almost all industrial applications, and should be given special preference for oil filled measuring instruments and in areas under a risk of an occasional explosive atmosphere.

If suitable isolating amplifiers, e.g. WE 77/Ex.. are used (re. catalogue group K 12), the operating material complies with the „i“ type of protection, i.e. intrinsically safe which is marked with Ex II 2 G EEx ia IIC T6 resp.

Ex II 1 G EEx ia IIC T6 and permitted in areas which are under a risk of explosion. For general information on protection against explosion, re.catalogue pages K 14-30.010 to K 14-30.013.

ATEX certificates please see catalogue group K 20

For installation in normal industrial equipment which does not require any ex-protection, we recommend our low priced multifunctional relay of the „MSR-I“ type series (re. catalogue group K-11).

Available models

Inductive contacts are supplied in standard series together with the following slot sensors:

DN 63 - 100 (2 mm slot width)

SJ 2 N	(green)	-standard	(re. catalogue page K 03-00.030)
Si 2-K08-Y1	(yellow)	alternative to the SJ2N	(re. catalogue page K 03-00.035)
SJ 2 SN	(green)	-safety sensors	(re. catalogue page K 03-00.040)
SJ 2 S1N	(green)	-safety sensors reversed direction of action	(re. catalogue page K 03-00.040)

DN 160 (3,5 mm slot width)

SJ 3,5 N	(green)	-standard	(re. catalogue page K 03-00.030)
SJ 3,5 SN	(green)	-safety sensors	(re. catalogue page K 03-00.040)
SJ 3,5 S1N	(green)	-safety sensors reversed direction of action	(re. catalogue page K 03-00.040)

The DN 160 inductive contacts may likewise be equipped with small slot sensors type SJ 2, if these are required or wanted for reasons of size (modular height). Safety sensors may be used together with safety amplifiers (KHA6-SH-Ex1) to set up self monitoring control systems (re. catalogue group 12).

Free shoulder screws to fasten the contacts will be supplied upon request (re. catalogue page K 13-40.020).

Technical data:

Nominal voltage:	8 V= ($R_i \approx 1\text{k}\Omega$)	
Operating voltage:	5 - 25 V	
Current consumption:	$\geq 3\text{ mA}$ (active face uncovered)	$\leq 1\text{ mA}$ (active face covered)
Switching accuracy:	approx. 0.5 % of the full scale value	
Ambient temperature:	-20° C to +70° C	
Adjusting range:	280° max.	
Regulations:	EN 60947-5-2	

Quality and operation of the contacts are subject to supervision within the scope of our internal inspections.

Availability:

- DN 63 up to double
- DN 100 up to quadruple
- DN 160 up to quadruple

Types I-1, I-2, and I-12 of DN 100 and DN 160 may also be supplied with a centre vane which has almost no effect on the measuring instrument.