



## GENERAL SPECIFICATIONS OF INDUCTIVE AND CAPACITIVE SENSORS - EN50032

### ACTIVE FACE

The active face of proximity sensor is the surface from which emits an oscillating field where a metallic object (inductive) or any material (capacitive) results in a change of state of the sensor without entering in contact with it.

### EMBEDDABLE (FLUSH MOUNTING) SENSORS (TS)

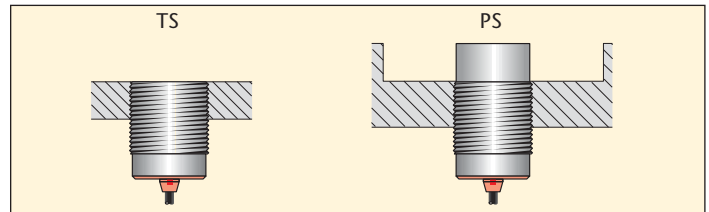
The metal body covers the sensing area on all sides allows the unit to be installed in metal parts or next to other sensors without causing problems of reciprocal interference.

### NOT EMBEDDABLE (NON FLUSH MOUNTING) SENSORS (PS)

The metal body leaves uncovered part of the sensing area resulting in an

increased sensing distance. During installation it is important to remember the minimum distances from metallic parts in the case of inductive units and from any type of material in the case of capacitive units.

It is not possible to mount more than one sensor side by side.



INDUCTIVE SENSORS	
Aq 37	1 x Sn
Stainless steel	0,9 x Sn
Brass-bronze	0,5 x Sn
Aluminium	0,4 x Sn
Copper	0,4 x Sn

CAPACITIVE SENSORS		
Metals	≈	1 x Sn
Water	≈	1 x Sn
Plastic	≈	0,5 x Sn
Glass	≈	0,5 x Sn
Wood	≈	0,4 x Sn

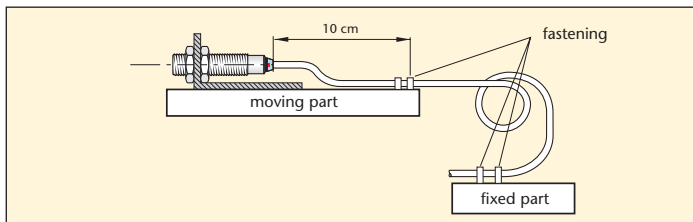
### REDUCTION FACTORS IN INDUCTIVE AND CAPACITIVE SENSORS

If the object to be sensed is not Fe37 (inductives) or material other than metal (capacitives) the intervention distance reduces.

Futhermore if the object to be sensed has dimensions and thickness less than those indicated then the intervention distance will be further reduced.

### SUGGESTIONS FOR MOUNTING

- Follow the indications listed in the technical characteristics for the various families of sensors.
- Take note of the temperature limits indicated for each family of sensors. Incorrect installation may result in a modification in the switching distance causing a change in equipment performance.
- When using sensors in areas where chemicals are present it is advised that they be installed so as not to come in direct contact with these substances as it may be difficult to establish their corrosiveness. Generally speaking the plastic parts have a high resistance to oil, salts, petrol and other hydrocarbons. It is recommended that further information be requested from our technical department.
- Do not pull the cable with excessive force and if necessary use protective tubing.
- Avoid repetitive movements between cable and sensor if necessary follow the instructions in the diagram.



- All AECO sensors, in standard version, are supplied with cable in PVC and can also be supplied with pur or silicon cable.
- The standard length of the cable is 2 mtrs, but upon request can also be supplied in lengths of 3.5 - 7.5 - 10 mtrs.
- Pay attention to the protection of the sensing face avoiding shock or mechanical pressure in order to avoid irreparable damage (particularly in the case of inductive sensors).
- Use suitable tools on the sensitivity regulation trimmer.
- Install both inductive and capacitive sensors in such a way as to avoid that any kind of material becomes deposited on the active surface.
- When installing sensor using locknuts do not overtighten them in order to

avoid damage to the body of the sensor and the internal circuit. Particular attention should be given to sensors with a diameter equal to or less than 12 mm. Attention should all be given to avoid the installation of a sensor into a hole with the same diameter as this may cause irreparable damage.

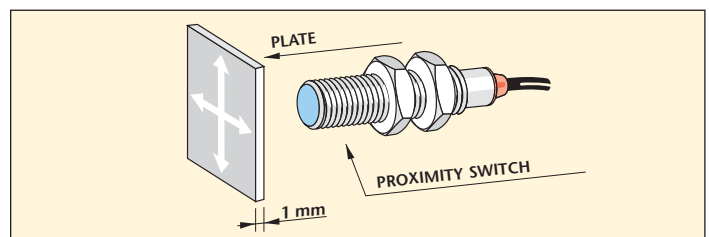
- When preparing threaded holes for the fixing of sensors the following diameters should be followed:

M8 x 1 =  $\varnothing 7$  o M12 x 1 =  $\varnothing 11$  o M18 x 1 =  $\varnothing 17$  o M30 x 1.5 =  $\varnothing 28.4$

### DESCRIPTION OF TECHNICAL TERMS

#### SWITCHING DISTANCE (Sn)

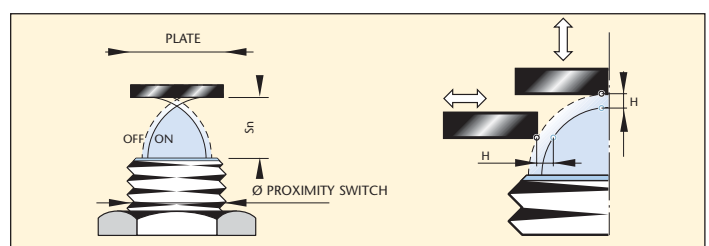
This is the switching distance measured at 20°C and nominal supply voltage, using a square piece of Fe 37 (EN50010) steel of 1 mm. thickness the side of which must be equal to or greater than the diameter of the active surface. In this condition the sensor switches in a Sn range of  $\pm 10\%$  Sn.



#### HYSTERESIS

Hysteresis is the distance between switching in both directions at nominal voltage and temperature values.

The value is expressed as a percentage of the switching distance.



# GENERAL SPECIFICATIONS OF INDUCTIVE AND CAPACITIVE SENSORS - EN50032

## REPEATABILITY

This indicates the intervention point variation of the sensor operated at the same conditions and in the same way.

## SWITCHING FREQUENCY

The switching frequency is the maximum possible number of impulse repetitions per second. This is determined by the measurement method according to din EN 50010 (right drawing). The max. values of the switching frequency of each sensor are indicated on the technical characteristics.

## RATED VOLTAGE (Vn)

The rated voltage indicates the power supply values where the sensor works perfectly.

## RESIDUAL RIPPLE

Ripple is the alternating voltage superimposed on the D.C. voltage (peak-peak) in %.

## MAXIMUM OUTPUT CURRENT

Is the maximum current the sensor can generate in continuous operation.

## MINIMUM OUTPUT CURRENT

It is the minimum current value which should flow through the sensor in order to guarantee a safe working.

## PEAK CURRENT

The peak current indicates the maximum current value that the sensor can bear in a limited period of time.

## RESIDUAL CURRENT

It is the residual current which flows through the sensor when it is open.

## ABSORPTION

Is the maximum current absorption of the sensor in relation to the maximum off load voltage.

## VOLTAGE DROP

It is the voltage drop measured across the sensor.

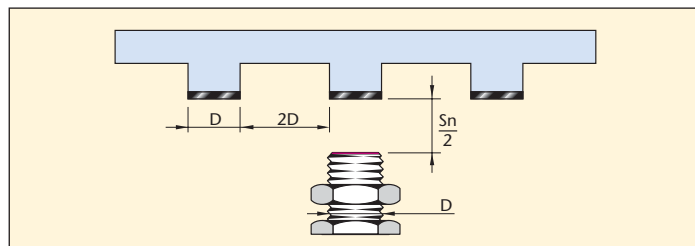
## SHORT CIRCUIT PROTECTION

Most of the D.C. sensors have incorporated a protection which prevents the internal circuit from being damaged by a short circuit or overload of the output.

When the short circuit is removed the sensor is automatically reactivated.

## PROTECTION AGAINST REVERSAL OF POLARITY

All the sensors are protected against reversal of polarity, this prevents the internal components from being damaged by incorrect power-supply connection.



## PROTECTION AGAINST INDUCTIVE PEAKS

All the sensors are protected against damage caused by the disconnection of inductive loads. It is advisable to keep the cable of the power conductors separate.

## ISOLATION RESISTANCE

Expressed in ohm between the sensor circuit and the metal body, applying a voltage of 500 VCA.

## DEGREE OF PROTECTION

This is the degree of protection of the body which contains the electrical parts expressed in IP followed by two numbers. In the case of inductive and capacitive switches the first is always 6 (complete protection against dust) and the second can be 5 (protected against jets of water) or 7 (protection against immersion for a fixed time).

## TEMPERATURE LIMITS

Range of temperature within which the functions is guaranteed as per the technical characteristics.

## TEMPERATURE VARIATION

Maximum variation in the intervention distance (Sn) within the limits of temperature allowed expressed as a percentage of  $\pm 10\%$  Sn.

## TYPE OF OUTPUT

All the inductive and capacitive sensors are of the different types N-B-C-A specified in page 5 and 57.

## TYPE OF OUTPUT

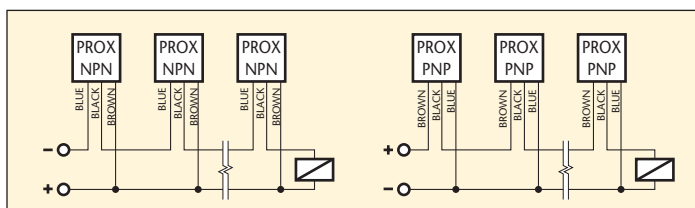
For all AECO sensors the standard definitions are used N.O. normally open N.C. normally closed. This refers to the state of the sensor in the absence of switching material.

Most sensors can be supplied in the N.O. + N.C. output.

## CONNECTION FOR INDUCTIVE AND CAPACITIVE SENSORS

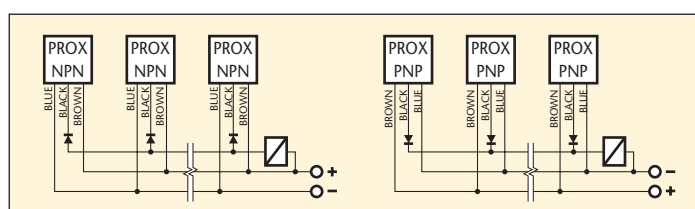
### CONNECTION OF D.C. TYPES IN SERIES (AND LOGIC)

In some applications it is necessary to obtain two corresponding signals before an action is carried out. Two sensors connected in this way will activate one output when they are excited simultaneously. When D.C. amplified types are used it is necessary to take into account the voltage drop present at the output of each sensor ( $<1,8V$ ) the maximum load current of the sensors used and the current absorption of each single sensor ( $<10mA$ ) as well as the final load.



### CONNECTION OF D.C. TYPES IN PARALLEL (OR LOGIC)

Connected in this way all sensors can activate the common output independently when excited. When amplified D.C. types are used it is necessary to take into account that each sensor has as an additional load of the resistance of the other sensors (collector resistances). Any inconvenience caused by this can be overcome by asking specifically for sensors with the final stage which has an open collector or by adding disconnecting diodes as indicated by the drawing.



### CONNECTION OF A.C. TYPES IN SERIES OR IN PARALLEL

A.C. sensors can be connected in series taking into account the voltage drop ( $\leq 6V$ ) present in the sensor when connected in parallel. The off load current ( $\leq 4mA$ ) should be summed and attention should be given when in the minimum load condition (high load impedance).

Such connections should in any case not be done as a function anomalous to the sensor can be generated. The "voltage drop" and the "residual current" is important in this type of connection.

### 24V A.C. POWER SUPPLY

In sensors supplied with 24V A.C. the voltage drop ( $\leq 6V$ ) existing in the sensor and the possible voltage drop due to the connecting wires between the sensor and the load should be taken into account.

In order to maintain an adequate voltage it is recommended that the supply voltage be increased by at least 6V.

# PROXIMITY CAPACITIVE SENSORS SC SERIES



## WORKING PRINCIPLE

Capacitive sensors contain an oscillator transistor in the front section. The oscillating circuit R-C (resistor-capacitor) is influenced by variations in capacity in fact when any material, solid or liquid (water, wood, metals, coffee, powders, etc.) come into contact with the active surface of the sensor the capacitance increases putting into action the oscillator up until the threshold of trigger inverts. By introducing a change in the condition of the final stage and therefore in the command of the external load a potentiometer makes fine adjustments to the switching distance.

All the sensors are protected against a change of polarity and electrical disturbances of inductive origin, and they are protected against short circuits.

They can be supplied with rapid or delayed switching. The plastic parts of the AECO capacitive sensors (body, plugs, outlets and locknuts) are made of makrolon which is not toxic, non static and resistant to abrasives.

## CHOICE OF A CAPACITIVE SENSOR

When choosing a capacitive sensor the final use should be kept in mind, that is the material to be controlled, its form and composition.

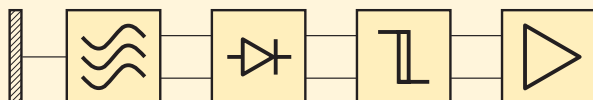
The reduction factors related to every material should be remembered and also their physical mass.

If possible it is recommended to use partially screened model, that is not mounted flush with the surface as it is possible to take advantage of the much greater sensitive field, this means that the sensor need not be set to the maximum where it would be more prone to effects from temperature variations, humidity, powder deposits, etc.

If it is necessary to install the sensor flush with the surface it is advised to make a setting which is not too close to the maximum.

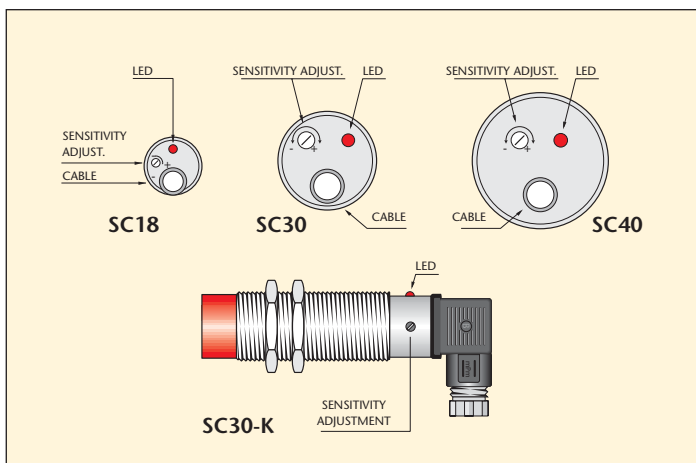
The main difference between the totally screened and partially screened types of sensors is that at equal intervention distances the former requires a sensitivity of about the double of the latter and therefore functions under more critical conditions.

BLOCK DIAGRAM OF AMPLIFIED CAPACITIVE SENSOR



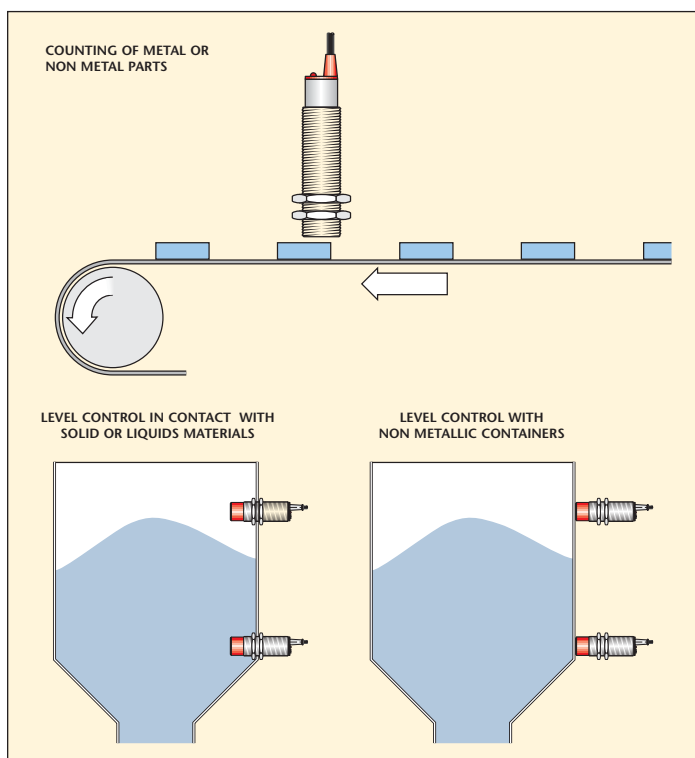
## SENSITIVITY ADJUSTMENT

It is advisable that the sensitivity adjustment be carried out when the sensor is connected in the definite operational position and should be adjusted at the intermediate position between the minimum and maximum values. In the working of the capacitive sensor the air acts as dielectric and it is necessary to take into account that strong variation of humidity can cause, if the adjustment is very fine, a variation of the same. The sensing range is determined in respect to the material and object dimensions to be controlled and can change in respect to the variation of the temperature of about 10% at a temperature of  $-20 \div +70^{\circ}\text{C}$ . The sensitivity increases when the trimmer is rotated in the clockwise direction and decreases in the anti-clockwise direction. The adjustment can be carried out once the plastic protection screw is removed. If the sensor is mounted on a metallic support it is necessary to make an earth connection in order to avoid alterations in the sensing distance of the sensor.



## APPLICATIONS

Capacitive sensors are used widely as limit switches which are sensitive to all types of materials, as limit controls for sensing the maximum and minimum levels of liquids, powders, granules, etc. in silos and various containers. They can also be used for sensing or counting metallic and non metallic objects.



# PROXIMITY CAPACITIVE SENSORS SC SERIES

## DELAYED MODELS

These are capacitive sensors which give an output signal to the load which can have an adjustable time delay up to 15 min. To its energization and deenergization switching in both N.O. and N.C. types.

They are supplied only in the Ø 40 mm model A.C.

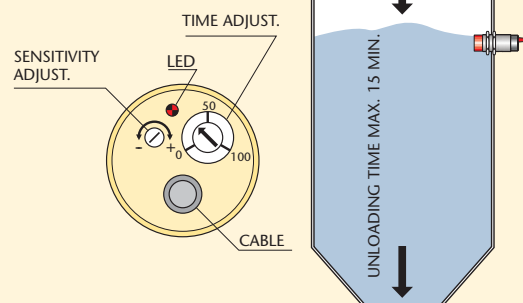
The available ranges of delay are the following:

1 sec. to 1 min. - 15 sec. to 15 min.

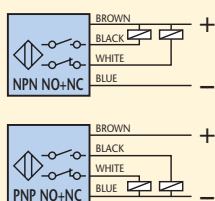
A trimmer for adjusting the time has a scale of 0 to 100. These sensors are used in different industrial applications, particularly in the food industry as level controls where a time delay is specifically required without having to install an external timer between the sensor and the load.

In order to carry out the adjustment of the sensitivity the timer trimmer should be zeroed. (See page 64).

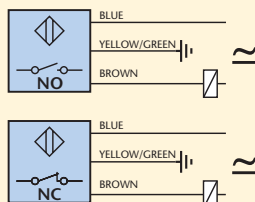
## BACK VIEW OF THE DELAYED SENSOR



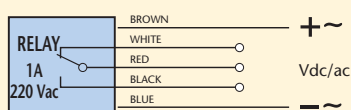
## VERSION C



## VERSION A



## VERSION R



## SPECIFICATIONS OF C - A - R VERSIONS

### SENSORS VERSION C FOR DIRECT VOLTAGE (4 WIRES)

These are amplified D.C. sensors which contain an output amplifier in addition to the oscillator. They are supplied as 4 wires with antiphase outputs in the types NPN and PNP.

As standard, this version of sensor is protected against short circuit, absolutely protected against polarity inversion and current peaks created by the disconnection of inductive loads. These sensors can be supplied with power supplies: ALNC - ALTP. They are adapted for inputs of programmable controllers.

### SENSORS VERSION FOR ALTERNATING OR DIRECT VOLTAGE (2 WIRES)

These are amplified sensors with two wires which function both in A.C. and D.C., these products as well as having an oscillator have a mosfet output amplifier incorporated which is able to open and close a load very quickly.

The load which is connected in series with the sensor is passed through by the same residual current that it is supplied by. It is particularly important to pay attention to the low consumption relay, in fact it is important to ensure that:

- the required current for the switching of the relay is EQUAL to or SUPERIOR to the minimum output current required by the sensor;
- the current required of the secure releasing of the

relay is SUPERIOR to the residual current of the sensor.

If these parameters are not respected there will be an uncertain switching of the relay.

Furthermore attention must be given to high impedance input connections of electronic commands as the residual current in the sensor could be sufficient to cause activation.

In the closed state a voltage drop can be found this should be taken into account especially when there is a low voltage supply.

All AC/DC capacitive sensors are short circuit protected (up to 50 Vdc and 250 Vac).

They are also protected against voltage transients coming from the power supply or generated by the load. They are compatible with P.L.C. units.

### SENSORS VERSION R WITH RELAY (5 WIRES)

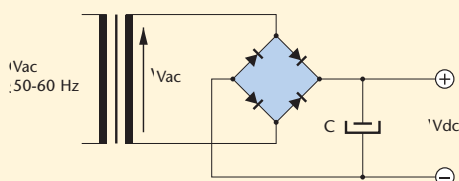
These are amplified sensors which can operate with both AC and DC power supplies.

The sensors as well as the oscillator and amplifier have incorporated a relay which provides one changeover output contact from 1Amp. at 220 Vac. The external load can be connected to the NO or NC contact of the relay, this solution guarantees greater security in the presence of high loads (up to 1A) which is different to sensors with output.

Types with instantaneous intervention are available (page 62) or delayed with programmable functions (page 64).

## SUGGESTION FOR SUPPLYING VOLTAGE TO CAPACITIVE SENSORS

### EXAMPLE A

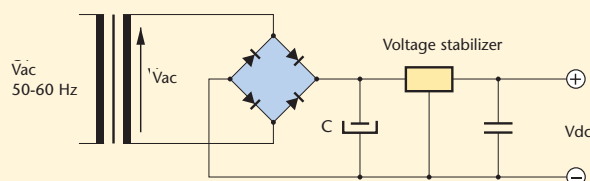


The supply voltage should be adjusted according to the characteristics of the sensor used. It is recommended to use a transformer with secondary voltage Vac lower than the direct voltage Vdc required.

The secondary voltage Vac is found as follows:

$$V_{ac} = (V_{dc} + 1) : 1,41$$

### EXAMPLE B



The supply voltage Vdc of the sensor should be filtered with a capacity C at least 470 µF for each 200 mA used.

If the supply voltage Vdc is high it is recommended to follow the diagram B with a proper voltage stabilizer.



# CAPACITIVE SENSORS M18 x 1



CYLINDRICAL HOUSING PLASTIC OR METALLIC  
4 WIRES D.C.  
VERSION-C

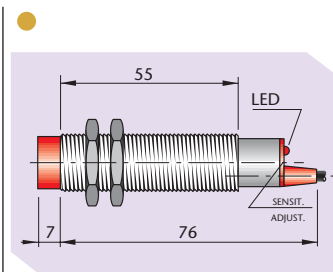
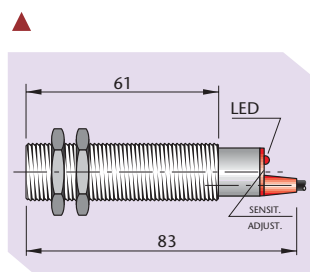
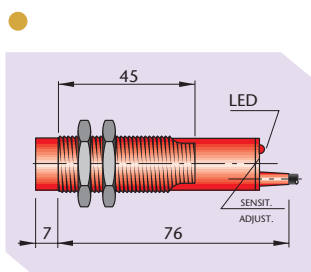
▲ **EMBEDDABLE** (FLUSH MOUNTING)

● **NOT EMBEDDABLE**  
(NON FLUSH MOUNTING)

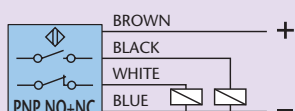
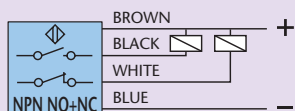
## TECHNICAL CHARACTERISTICS

Dimensions mm

AMPLIFIED 4 WIRES D.C. ANTIPHASE	NPN	NO+NC	SC18P - CE10 NPN NO + NC	SC18M - C5 NPN NO + NC	SC18M - CE10 NPN NO + NC
	PNP	NO+NC	SC18P - CE10 PNP NO + NC	SC18M - C5 PNP NO + NC	SC18M - CE10 PNP NO + NC
Switching distance (Sn) adjustable	mm		0 ÷ 10	0 ÷ 5	0 ÷ 10
Continuous voltage (residual ripple ≤10%)	V			10 ÷ 30	
Hysteresis (%Sn)	mm			In relation to Sn	
Switching frequency	Hz			10	
Repeatability (at constant temperature) mm				< 0.5	
Max output current	mA			200	
Absorption at 24Vdc	mA			≤ 10	
Voltage drop (sensor ON)	V			< 1.8	
Short circuit protection				Incorporated	
Led				Incorporated	
Temperature limits	°C			- 20 ÷ + 70	
Degree of protection	IP			65	
Housing			Red plastic makrolon	Nickelled brass	
Cable PVC	2m			4 x 0.25 mm <sup>2</sup>	
Connector plug			-	H (On request)	
Protection housing					

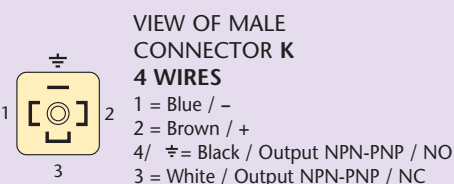
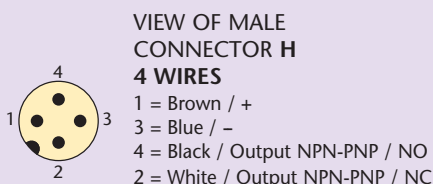


## WIRING DIAGRAMS



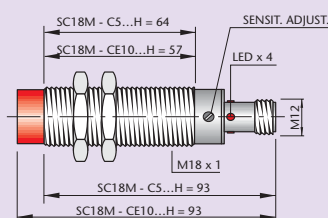
N.B.: On request is available cable for sensors with different length  
3.5 - 7.5 - 5 - 10 metres.

## CONNECTION WITH H - K PLUGS FOR THE CONNECTORS SEE PAGE 85

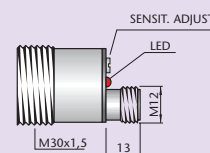


## MODELS AVAILABLE WITH H PLUG FOR M12 CONNECTORS

SC18M-C5...H  
SC18M-CE10...H



SC30P-CE25...H  
SC30M-C20...H  
SC30M-CE25...H

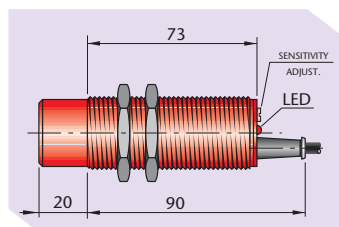


# CAPACITIVE SENSORS M30 x 1.5

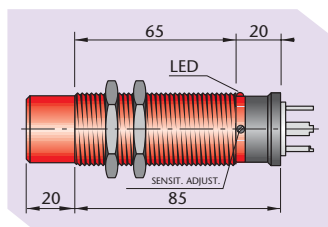
CYLINDRICAL HOUSING PLASTIC OR METALLIC  
4 WIRES D.C.  
VERSION-C



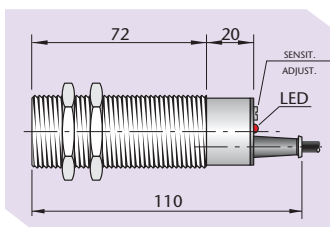
● \*



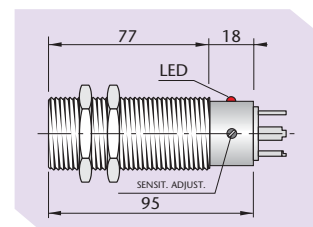
●



▲



▲



SC30P - CE25 NPN NO + NC\*

SC30P - CE25 PNP NO + NC\*

0 ÷ 25

SC30P - CE25 NPN NO + NC K

SC30P - CE25 PNP NO + NC K

0 ÷ 25

SC30M - C20 NPN NO + NC

SC30M - C20 PNP NO + NC

0 ÷ 20

SC30M - C20 NPN NO + NC K

SC30M - C20 PNP NO + NC K

0 ÷ 20

10 ÷ 55

In relation to Sn

10

< 1

300

≤ 10

< 1.8

Incorporated

Incorporated

- 20 ÷ + 70

67

65

67

65

Red plastic makrolon

Nickelled brass

4 x 0.25 mm<sup>2</sup>

4 x 0.25 mm<sup>2</sup>

H (on request)

K (type 12)

H (on request)

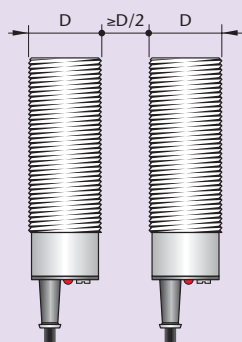
K (type 12)

Possible mounting (SCM-P)

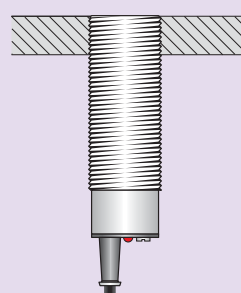
Possible mounting (SCM-K)

## INSTRUCTIONS FOR CORRECT INSTALLATION

### EMBEDDABLE

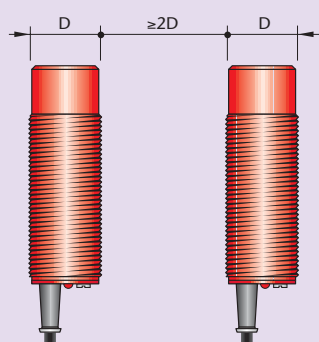


Side by side mounting

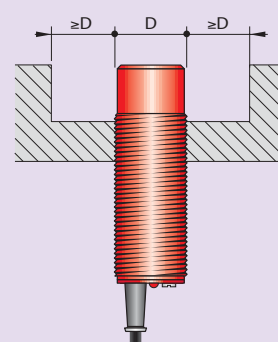


Flush mounting

### NOT EMBEDDABLE



Side by side mounting



Non flush mounting

\* This models can be supplied with protection ESD=27KV. When ordering add 27KV to the description.

CAPACITIVE

# CAPACITIVE SENSORS M30 x 1.5



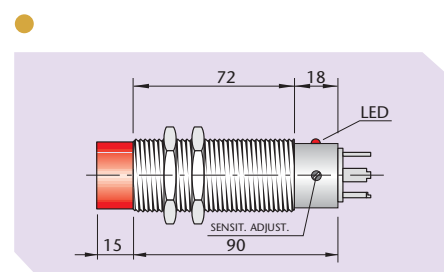
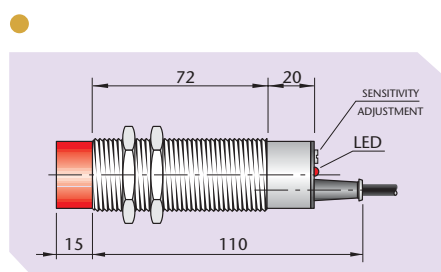
CYLINDRICAL HOUSING METALLIC  
4 WIRES D.C.  
VERSION-C

▲ **EMBEDDABLE** (FLUSH MOUNTING)

● **NOT EMBEDDABLE**  
(NON FLUSH MOUNTING)

## TECHNICAL CHARACTERISTICS

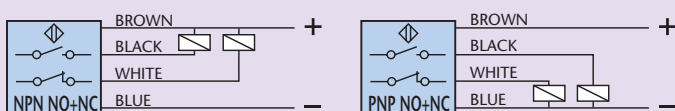
Dimensions mm



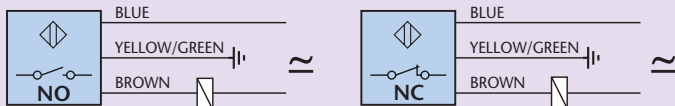
AMPLIFIED 4 WIRES D.C. ANTIPHASE	NPN	NO+NC	SC30M - CE25 NPN NO + NC	SC30M - CE25 NPN NO + NC K
	PNP	NO+NC	SC30M - CE25 PNP NO + NC	SC30M - CE25 PNP NO + NC K
AMPLIFIED 2 WIRES A.C./D.C.		NO		
		NC		
Switching distance (Sn) adjustable	mm	0 ÷ 25	0 ÷ 25	0 ÷ 25
Continuous voltage (residual ripple ≤10%)	V	10 ÷ 55	10 ÷ 55	10 ÷ 55
Alternating voltage 50÷60 Hz	V			
Hysteresis (%Sn)	mm	In relation to Sn	In relation to Sn	In relation to Sn
Switching frequency	Hz	10	10	10
Repeatability (at constant temperature)	mm	< 1	< 1	< 1
Max output current	mA	300	300	300
Min output current	mA			
Max peak current for 20 ms	A			
Absorption at 24Vdc	mA	≤ 10	≤ 10	≤ 10
Residual current	mA			
Voltage drop (sensor ON)	V	< 1.8	< 1.8	< 1.8
Short circuit protection		Incorporated	Incorporated	Incorporated
Led		Incorporated	Incorporated	Incorporated
Temperature limits	°C	- 20 ÷ + 70	- 20 ÷ + 70	- 20 ÷ + 70
Degree of protection	IP	67	67	65
Housing		Nickelled brass	Nickelled brass	Nickelled brass
Cable PVC	2m	4 x 0.25 mm <sup>2</sup>	4 x 0.25 mm <sup>2</sup>	4 x 0.25 mm <sup>2</sup>
Connector plug		H (on request)	H (on request)	K (type 12)
Protection housing				Possible mounting (SCM-K)

## WIRING DIAGRAMS

### VERSION C



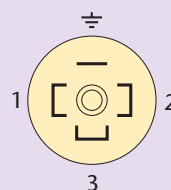
### VERSION A



N.B.: On request is available cable for sensors with different length  
3.5 - 7.5 - 5 - 10 metres.

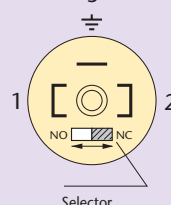
## CONNECTION WITH K PLUG

FOR CONNECTORS TYPE 12 (PAGE 85)



### VIEW OF MALE CONNECTOR K

1 = Blue / -  
2 = Brown / +  
4 / ÷ = Black / Output NPN - PNP / NO  
3 = White / Output NPN - PNP / NC

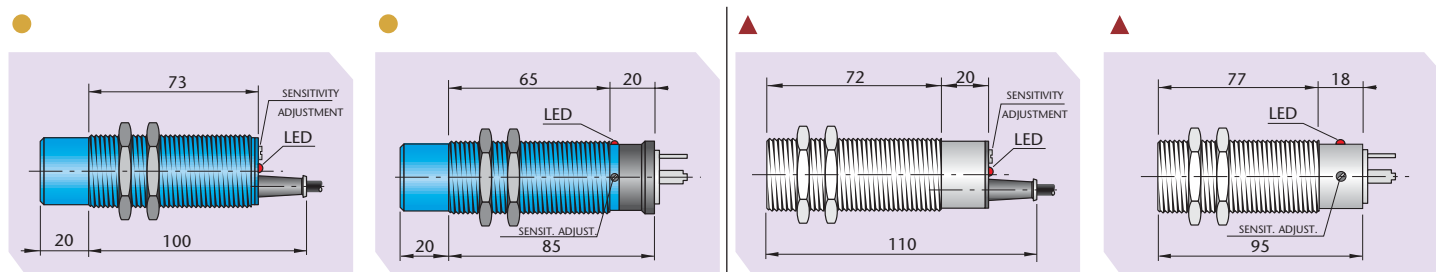


### VIEW OF MALE CONNECTOR K

1 / 2 = NO - NC Programmable

# CAPACITIVE SENSORS M30 x 1.5

CYLINDRICAL HOUSING PLASTIC OR METALLIC  
2 WIRES A.C./D.C.  
VERSION-A

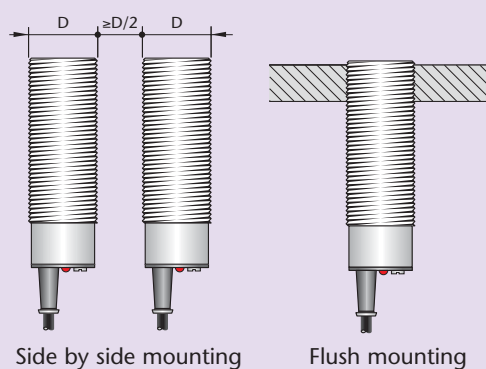


SC30P - AE25 NO*	SC30P - AE25 NO/NC K	SC30M - A20 NO*	SC30M - A20 NO/NC K
SC30P - AE25 NC*	PROGRAMMABLE	SC30M - A20 NC*	PROGRAMMABLE
0 ÷ 25	0 ÷ 25	0 ÷ 20	0 ÷ 20
20 ÷ 250			
20 ÷ 250			
In relation to Sn			
10			
< 1			
500			
10 (Min. release current)			
1.5			
≤ 2			
< 6			
Incorporated (Up to 50V in d.c.)			
Incorporated			
- 20 ÷ + 70			
67	65	67	65
Blue plastic makrolon		Nickelled brass	
3 x 0.50 mm <sup>2</sup>		3 x 0.50 mm <sup>2</sup>	
Possible mounting (SCM-P)		Possible mounting (SCM-K)	
		K (type 12)	

CAPACITIVE

## INSTRUCTIONS FOR CORRECT INSTALLATION

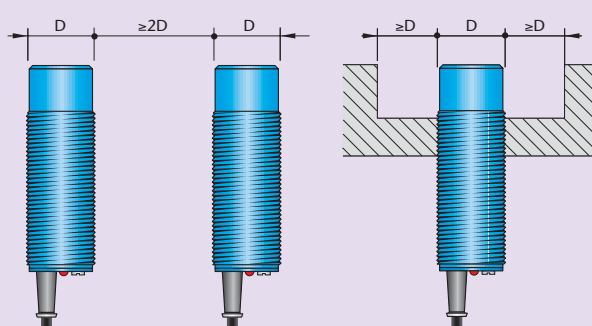
### EMBEDDABLE



Side by side mounting

Flush mounting

### NOT EMBEDDABLE



Side by side mounting

Non flush mounting

\* Models with NO/NC programmable output are available on request.



# CAPACITIVE SENSORS M30 x 1.5

CYLINDRICAL HOUSING METALLIC  
2 WIRES A.C./D.C.  
VERSION-A

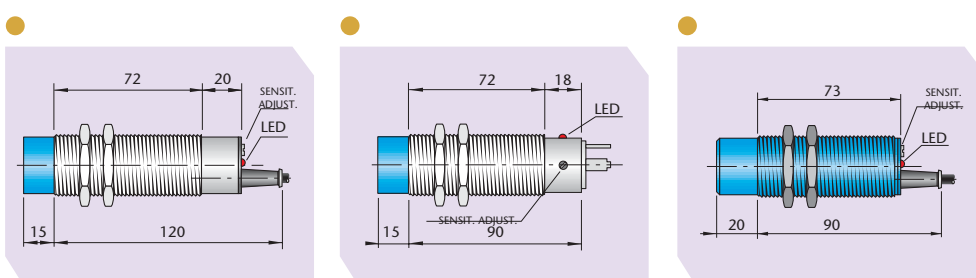
CYLINDRICAL HOUSING PLASTIC  
RELAY OUTPUT  
VERSION-R



● **NOT EMBEDDABLE**  
(NON FLUSH MOUNTING)

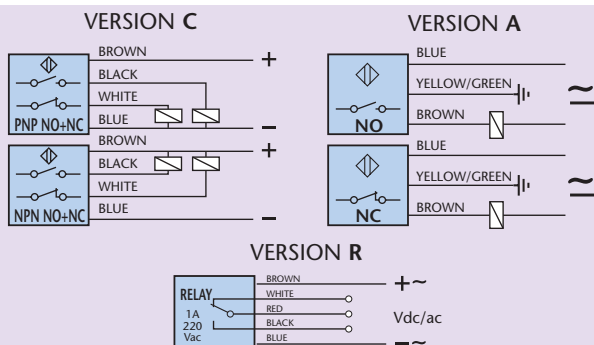
## TECHNICAL CHARACTERISTICS

Dimensions mm



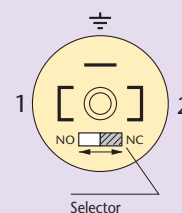
AMPLIFIED 4 WIRES D.C. ANTIPHASE	NPN	NO+NC			
	PNP	NO+NC			
AMPLIFIED 2 WIRES A.C./D.C.		NO	SC30M - AE25 NO*	SC30M - AE25 NO/NC K	SC30P - RE 25
		NC	SC30M - AE25 NC*	PROGRAMMABLE	RELAY CHANGEOVER
Switching distance (Sn) adjustable	mm		0 ÷ 25		0 ÷ 25
Continuous voltage (residual ripple ≤10%)	V		20 ÷ 250		18 ÷ 50
Alternating voltage 50÷60 Hz	V		20 ÷ 250		18 ÷ 240
Hysteresis (%Sn)	mm		In relation to Sn		In relation to Sn
Switching frequency	Hz		10		10
Repeatability (at constant temperature)	mm		< 1		< 1
Max output current	mA		500		Changeover 1A - 220Vac
Min output current	mA		10 (Min. release current)		
Max peak current for 20 ms	A		1.5		
Absorption	mA				< 20 Relay on
Residual current	mA		≤ 2		
Voltage drop (sensor ON)	V		< 6		
Short circuit protection			Incorporated (Up to 50V in d.c.)		
Led			Incorporated		Incorporated
Temperature limits	°C		- 20 ÷ + 70		- 20 ÷ + 70
Degree of protection	IP		67	65	67
Housing			Nickelled brass		Red plastic makrolon
Cable PVC	2m		3 x 0.50 mm <sup>2</sup>		5 x 0.35 mm <sup>2</sup>
Connector plug				K (type 12)	
Protection housing				Possible mounting (SCM-K)	Possible mounting (SCM-P)

## WIRING DIAGRAMS



N.B.: On request is available cable for sensors with different length  
3.5 - 7.5 - 5 - 10 metres.

## CONNECTION WITH K PLUG FOR CONNECTOR TYPE 12 (PAGE 85)



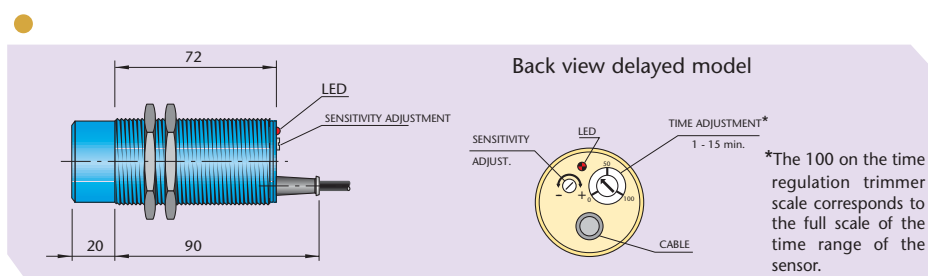
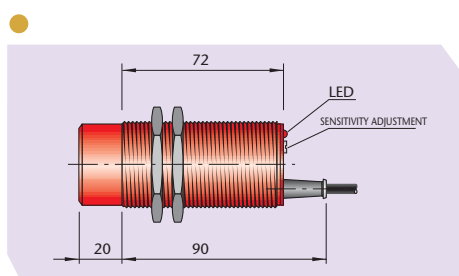
VIEW OF MALE CONNECTOR K  
1 / 2 =  $\approx$  NO - NC Programmable

\* Models with NO/NC programmable output are available on request.

## CAPACITIVE SENSORS M40 x 1.5

CYLINDRICAL HOUSING PLASTIC  
4 WIRES D.C.  
VERSION-C

CYLINDRICAL HOUSING PLASTIC  
2 WIRES A.C./D.C.  
STANDARD AND DELAYED MODELS  
VERSION-A



SC40P - CE35 NPN NO + NC

SC40P - CE35 PNP NO + NC

SC40P - AE35 NO

SC40P - AE35 NC

SC40P - AE35 TE/TD NO

SC40P - AE35 TE/TD NC

0 ÷ 35

10 ÷ 55

In relation to Sn

10

< 2

300

< 10

< 1.8

Incorporated

Incorporated

- 20 ÷ + 70

67

Red plastic makrolon

4 x 0.25 mm<sup>2</sup>

0 ÷ 35

20 ÷ 250

20 ÷ 250

In relation to Sn

10

In relation to delay

< 2

500

300

10 (Min. release current)

20

1.5

≤ 2

< 3

< 6

Incorporated (Up to 50V in d.c.)

Incorporated

- 20 ÷ + 70

67

65

Blue plastic makrolon

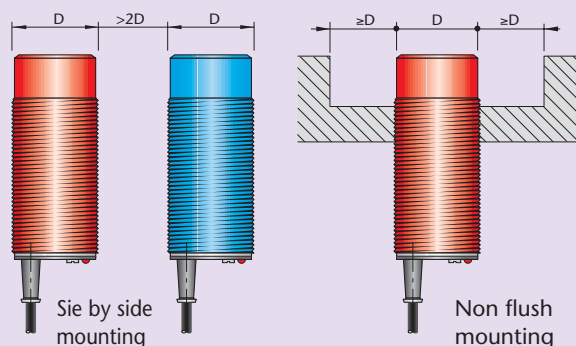
3 x 0.50 mm<sup>2</sup>

2 x 0.50 mm<sup>2</sup>

On request protection housing with 2 inch fixing

### INSTRUCTIONS FOR CORRECT INSTALLATION

#### NOT EMBEDDABLE



### SC40P-AE35 DELAYED - AVAILABLE RANGE

#### SC40P-AE35 TE NO, delay on energization N.O. contact.

In the absence of material the sensor has an open contact. When the material enters the sensing area, the delay set starts. At the end of this time the contact closes. When the material leaves the sensing area, the contact opens instantaneously.

#### SC40P-AE35 TE NC, delay on energization N.C. contact.

In the absence of material the contact of the sensor is closed. When material enters the sensing area, the contact opens. When material leaves the area, the delay set starts, after which the contact closes.

#### SC40P-AE35 TD NO, delay on de-energization N.O. contact.

In the absence of material the contact of the sensor is open. When material enters the sensing area, the contact closes. When material leaves the area, the delay set starts, after which the contact opens.

#### SC40P-AE35 TD NC, delay on de-energization N.C. contact.

In the absence of material the contact of the sensor is closed. When material enters the sensing area, the delay set starts, after which the contact opens. When material leaves the area, the contact closes instantaneously.

#### RANGE OF STANDARD TIME DELAY

FROM 1 to 15 minutes.

# DELAYED PROGRAMMABLE CAPACITIVE SENSOR SC30P-RE25T TYPE



## SPECIFICATIONS

This proximity sensor belongs to the capacitive sensor family, it supplies a signal to the external load which can be delayed up to 10 min. when any material solid or liquid (water, glass, wood, metal, coffee, powders etc.) come into the sensing area, it is used principally as a level control.

This model is completely programmable regarding the delay in energization and de-energization with open or closed output, the sensor does in fact contain a 1A 220V changeover relay.

Due to its versatility, programmability and high power output compared to a normal electronic sensor, the stocking of product for the wholesaler is simplified as is the adaptability of the switch to any application.

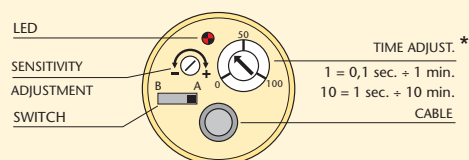
This sensor can be used with the protection housing SCM-R which is of POM and therefore satisfies the most severe abrasion resistance requirements.

When used as a level control, this housing allows for the sensor to be substituted whenever required.

## TECHNICAL CHARACTERISTICS

Switching distance $S_n$ adjustable	mm	0 ÷ 25
Multivoltage power supply	V	18 ÷ 50 Vdc 18÷240 Vac (50÷60 Hz)
Hysteresis (% $S_n$ )	mm	Depending on $S_n$
Max. switching frequency	Hz	Depending on delay
Repeatability (at a constant temper.)	mm	< 1
Max. output current	mA	Changeover 1 A - 220 Vac
Absorption (relay activated)	mA	20
LED		Incorporated
Temperature limit	°C	-20 ÷ +70
Degree of protection	IP	65
Standard range of delay	min.	1 - 10 (on request higher)
Housing		Plastic (Makrolon)
Cable PVC	2 m	5 x 0,35 mm <sup>2</sup>
Protection housing		Possible mounting

## BACK VIEW

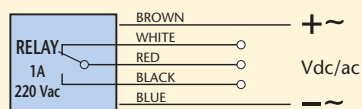


\* The 100 on the time regulation trimmer scale corresponds to the full scale of the time range of the sensor.

## PROGRAMMABLE FUNCTION TABLE

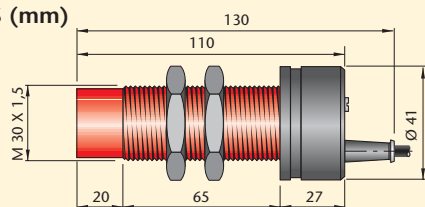
FUNCTION	SWITCH POS.	RELAY OUTPUT WIRES COLOUR
TE NO	B	Red / Black
TE NC	A	Red / Black
TD NO	A	Red / White
TD NC	B	Red / White

## WIRING DIAGRAM



Multivoltage power supply 18÷50 Vdc / 18÷240 Vac.

## DIMENSIONS (mm)



## PROGRAMMABLE FUNCTIONS

### FUNCTION TE NO - delay on energization N.O. contact.

In the absence of material the sensor has an open contact. When the material enters the sensing area, the delay set starts. At the end of this time the contact closes. When the material leaves the sensing area, the contact opens instantaneously.

### FUNCTION TE NC - delay on energization N.C. contact.

In the absence of material the contact of the sensor is closed. When material enters the sensing area, the contact opens. When material leaves the area, the delay set starts, after which the contact closes.

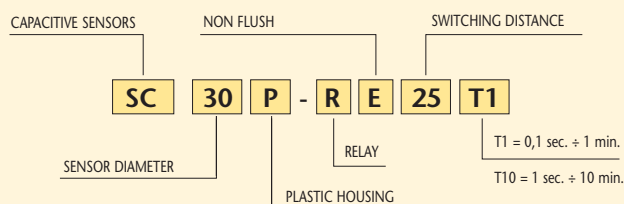
### FUNCTION TD NO - delay on de-energization N.O. contact.

In the absence of material the contact of the sensor is open. When material enters the sensing area, the contact closes. When material leaves the area, the delay set starts, after which the contact opens.

### FUNCTION TD NC - delay on de-energization N.C. contact.

In the absence of material the contact of the sensor is closed. When material enters the sensing area, the delay set starts, after which the contact opens. When material leaves the area, the contact closes instantaneously.

## IDENTIFICATION REFERENCE



N.B.: On request is available cable for sensors with different length 3.5 - 5 - 7.5 - 10 metres.

# PROTECTION HOUSING FOR CAPACITIVE SENSORS SCM

## SPECIFICATIONS

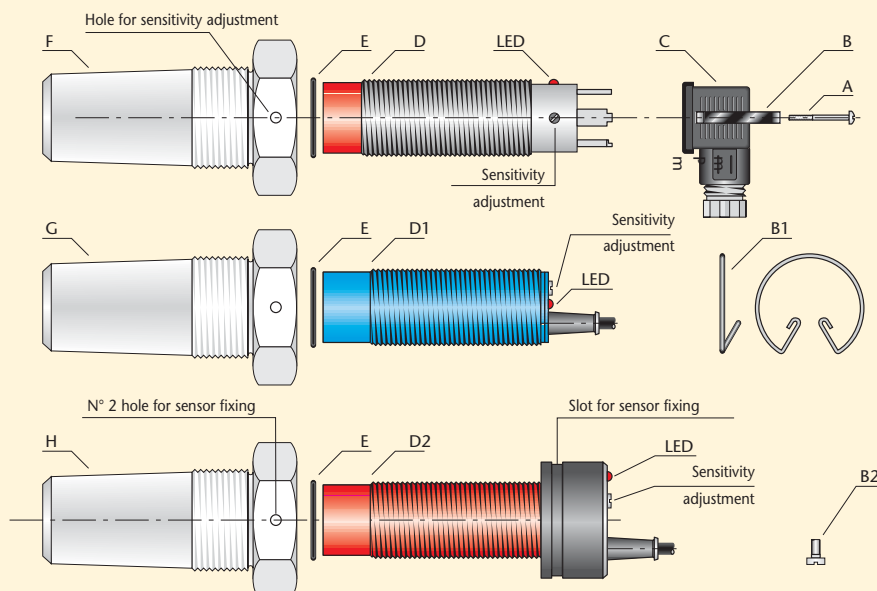
This is used as a waterproof protective cover for the SC30M series with connector and SC30P series with cable output both for A.C. and D.C. supply. The SCM housing is of non toxic material (POM) and is provided with a 1 1/2" GAS thread which allows for its installation by using a standard fitting. This type of installation means that the sensor can be rapidly removed for testing without allowing the loss material from the container and protects the sensor from abrasion. Furthermore the use of the housing eliminates to a large degree variation in the sensitivity of the sensor due to deposits of material. It is also available the protection housing for SC40P capacitive sensors.



## INSTALLATION PROCEDURE: HOUSING + SENSOR

### DESCRIPTION:

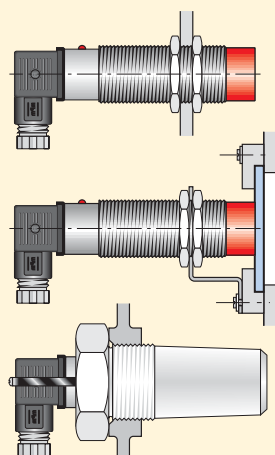
- A - Screw
- B - Fixing spring  
K type
- B1 - Fixing spring  
P type
- B2 - N° 2 screw M4x8 mm
- C - Connector
- D - Capacitive sensor  
with connector
- D1 - Capacitive sensor  
with cable
- D2 - Capacitive sensor  
with relay output
- E - Packing ring
- F - SCM-K housing
- G - SCM-P housing
- H - SCM-R housing



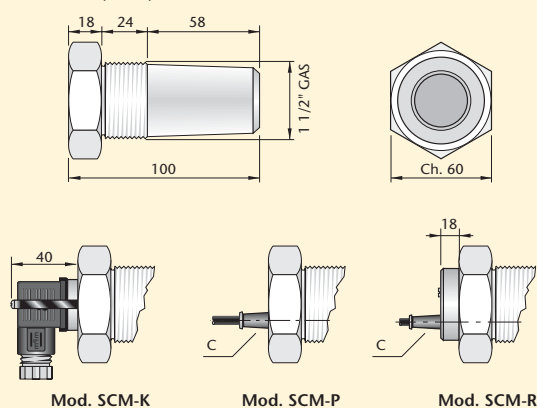
**N.B:**  
There are two types of housing available depending on the type of spring used, **SCM-K** for sensors with connector (SC30P-CE25K / SC30P-AE25K / SC30M-AE25K), **SCM-P** for sensors with cable or H plug M12 (SC30P-CE25 / SC30P-AE25), **SCM-R** for sensors with relay output and cable (SC30P-RE25T).  
The protection is supplied with complete accessories for mounting.

## EXAMPLE

- 1  
TRADITIONAL  
INSTALLATION  
IN THE CONTAINER WALL
- 2  
INSTALLATION WITH  
A PLASTIC WINDOW  
(THICKNESS ≤ 6mm)
- 3  
INSTALLATION WITH  
SCM PROTECTION  
HOUSING



## DIMENSIONS (mm)



C = flexible rubber cable exit



# HIGH TEMPERATURE CAPACITIVE SENSORS ALSC - SC18M-HT/SC30M-HT



## GENERAL DETAILS

The high temperature sensors should be considered as part of the traditional range of sensors with the difference that electronic portion is completely separate from the sensing part which is in the form of an extension and can withstand temperature up to 250°C.

These products are used to control the levels of hot materials such as liquids, oil, powder and plastic granules.

They also sense solid metallic and non-metallic bodies positioned in areas of high temperature.

The connecting cable between the sensor and the amplifier must be of standard length (2M or 5M). It is not capacitive, it resists to temperatures from -200 to +250°C it is connected to the sensor and it is provided with a screened connector for connection to the amplifier.

The amplifier is supplied in two different types, model ALSC-1CH which is suitable for one sensor and model ALSC-2CH which is suitable for two sensors, the model ALSC-1CH can be supplied with delayed sensing.

The sensors can be supplied in the following formats M18x1 and M30x1.5 made of stainless steel and PTFE.

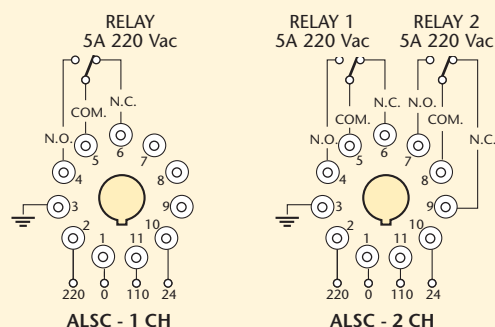
## AMPLIFIERS TECHNICAL CHARACTERISTICS

TYPES		ALSC - 1CH	ALSC - 2CH
Sensors	N°	1	2
A.c. power supply	V	24 or 110/220	50-60 Hz
Absorption	VA	3	
Operation indicator		Yellow led x 1	Yellow led x 2
Temperature range	°C	-20 ÷ +60	
Output relay - changeover		1 relay - 5 A at 220 Vac	2 relay - 5 A at 220 Vac
Housing		Plastic	
Degree of protection	IP	40	
Sensitivity adjustment		Incorporated	Incorporated x 2 sensors

## TECHNICAL CHARACTERISTICS SENSOR SC18M-HT / SC30M-HT

- Housing and fixing nuts in stainless steel AISI 303.
- Sensible part in PTFE.
- Cable length 2 m or 5 m.
- Plug connector for wiring to the amplifiers.
- Min./max. temperature range: -200 ÷ +250°C.
- Switching distance (Sn) type SC18M-HT: 5 mm.
- Switching distance (Sn) type SC30M-HT: 15 mm.
- Degree of protection: IP68.

## WIRING DIAGRAMS



## INSTALLATION INSTRUCTIONS

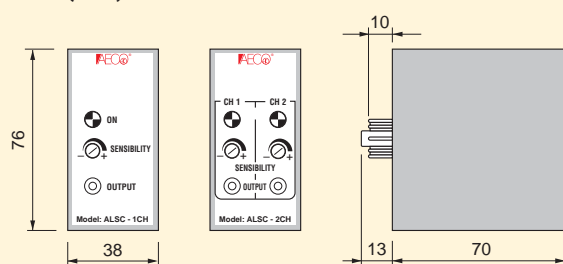
If the material to be controlled is in a metallic container check that it is earthed and connect terminal 3 of the amplifier to the earth.

If the container is not metallic, connect terminal 3 of the amplifier and the body

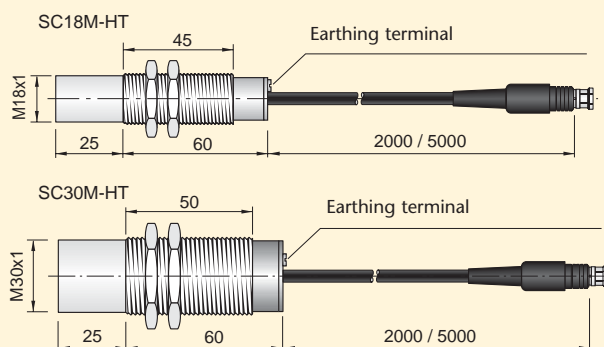
of the sensor SC... M-HT to the earth by using the relative terminal.

The connection wire between the sensor and the amplifier must be separated from the power supply.

## DIMENSIONS (mm)



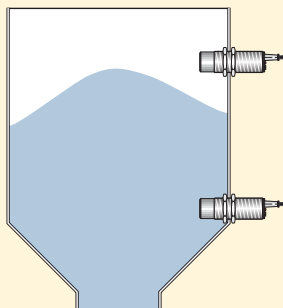
N.B.: For a correct fixing of the amplifiers it is recommended to use socket type B11 e and fixing spring type MF (Page 102).



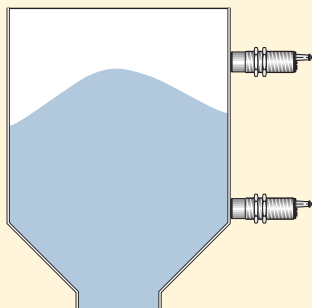
# CAPACITIVE SENSORS - APPLICATION EXAMPLES



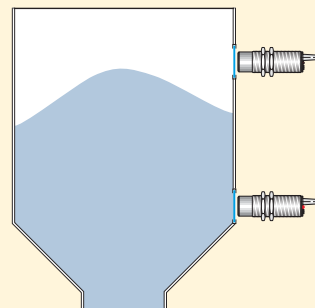
CONTACT LEVEL CONTROL  
FOR SOLIDS OR LIQUIDS



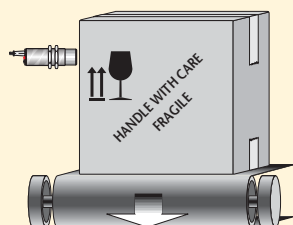
LEVEL CONTROL FOR NON  
METALLIC CONTAINERS



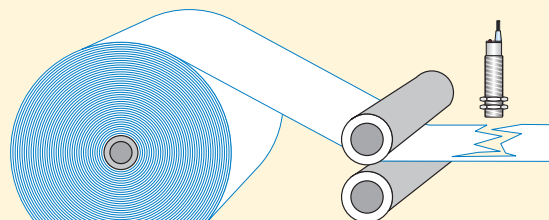
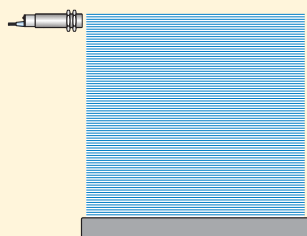
LEVEL CONTROL FOR METAL CONTAINERS  
USING PLASTIC OR GLASS WINDOWS



SOLID OR LIQUID MATERIAL PRESENCE  
CONTROL WHICH ARE INSIDE PACKAGING  
OR NON METALLIC CONTAINERS



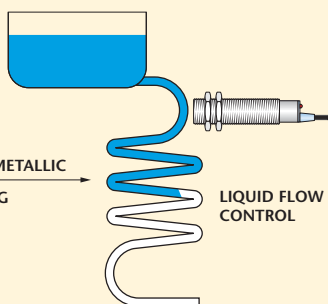
CONTROLLING THE HEIGHT  
OF A PAPER STACK



CONTROLLING THE BREAKAGE IN REELS  
OF NON METALLIC MATERIAL (PAPER,  
PLASTIC ETC.)

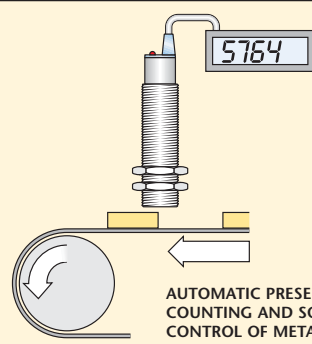
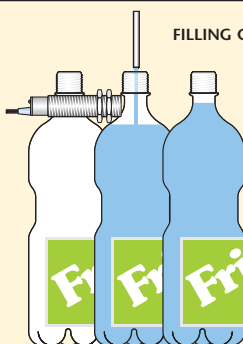
CAPACITIVE

NON METALLIC  
TUBING



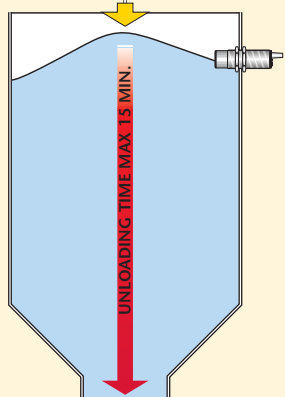
LIQUID FLOW  
CONTROL

FILLING CONTROL

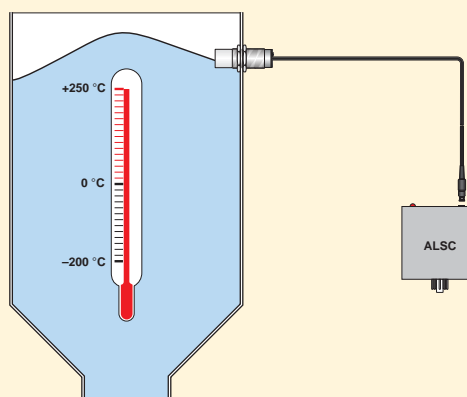


AUTOMATIC PRESENCE  
COUNTING AND SORTING  
CONTROL OF METALLIC  
AND NON METALLIC ARTICLES

LOADING



LEVEL CONTROL WITH DELAYED SENSOR  
(IN THE EXAMPLE SC40P - AE35 TE15' NC)



CONTROL IN TANKS WITH MATERIAL -200C° +250C°  
(IN THE EXAMPLE: SC30M-HT WITH SEPARATE ALSC AMPLIFIER)