



**Operating Instructions**  
**For**  
**Capacitance Level**

**Model: NSC**



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### Manufactured by:

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Fax: +34 93 460 38 76  
E-Mail: info.es@kobold.com  
Internet: www.kobold.com

june 2017

## **2. Note**

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Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to health & safety and prevention of accidents.

## **3. Instrument Inspection**

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Instruments are inspected before shipping and sent out in perfect condition.

### **Scope of delivery**

The standard delivery includes:

- Capacitive Level Monitor NSC
- Cable gland 1x M20x1,5 ( 2 atex version )
- Operating Instructions

## **4. Description**

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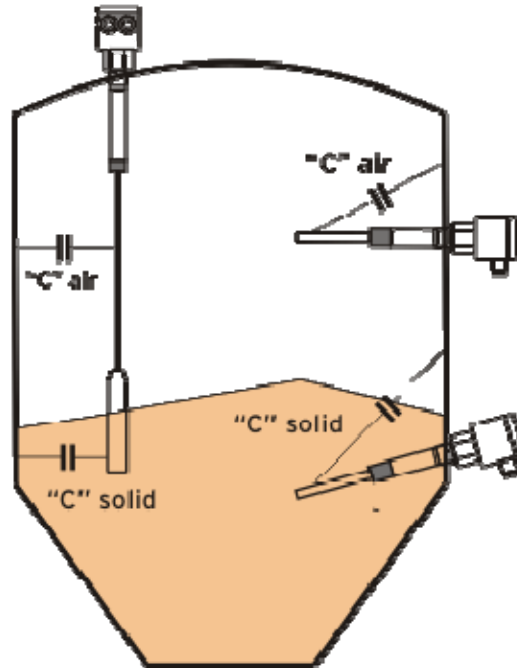
This level switch instruments for solids NSC, has been designed to be used in all applications where the level of the solid must be detected in tanks and silos.

## **5. Operating principle**

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The NSC sensor together with the wall of the tank is a capacitor.

The dielectric constant of this capacitor is the air when the product (media) doesn't reach the sensor. When the product covers the sensor, the dielectric constant is the product one. The electronic circuit of the NSC detects this change and activates an output relay.



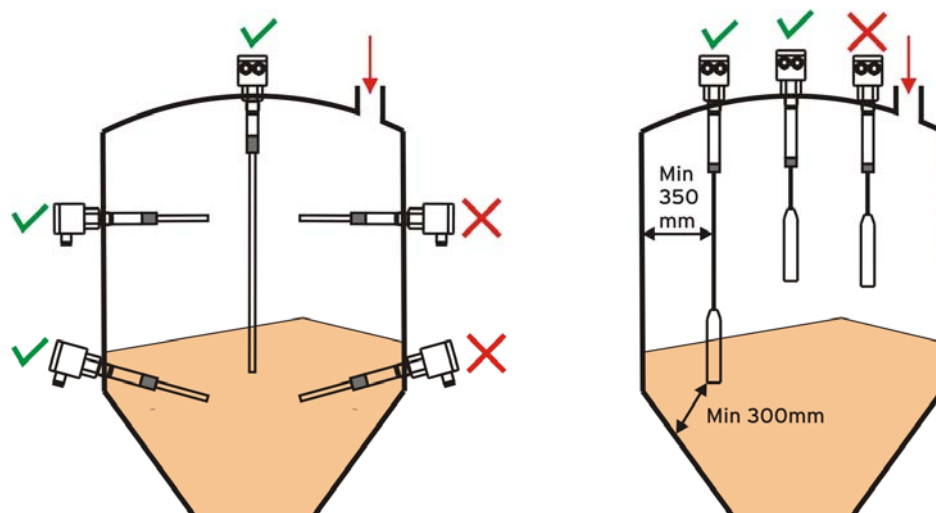
## 6. Mechanical connection

The NSC has a thread of 1" BSP male. The sensitive part of the probe goes from the PP isolator to the end of the probe.

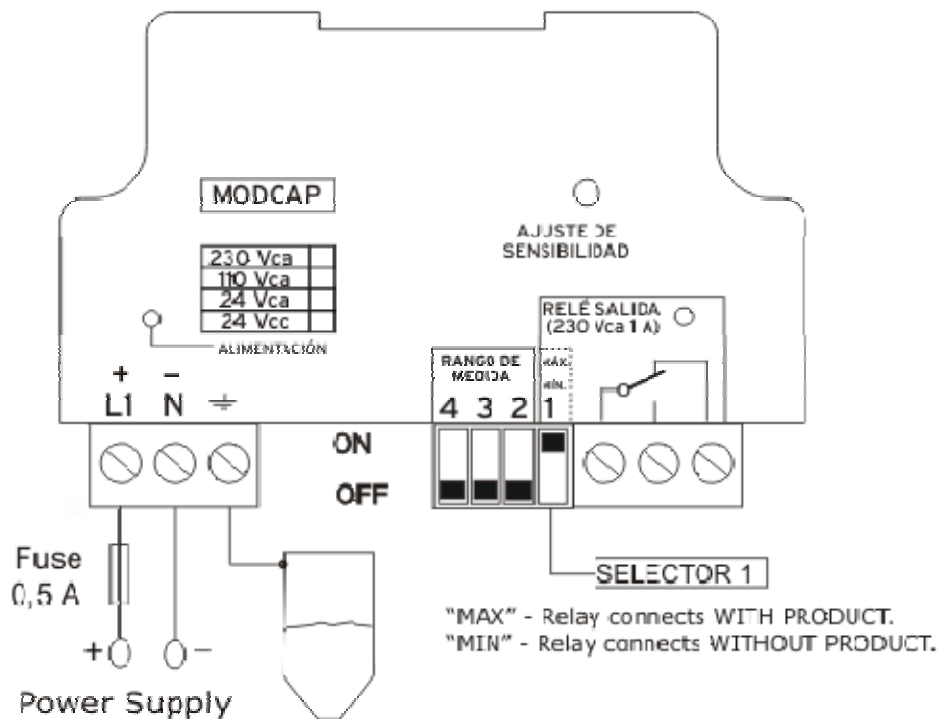
Check that length of probe is according the level to be detected.

When the housing is installed in the outdoor it is recommended to protect it against sun radiation and rain by means of a small roof.

When installing the probe of the NSC by means of an extension sleeve, the max. length of this sleeve must be 70mm to avoid short-circuit in between the tank and the probe due to product accumulation inside the sleeve.



## 7. Electrical connection



### VERY IMPORTANT

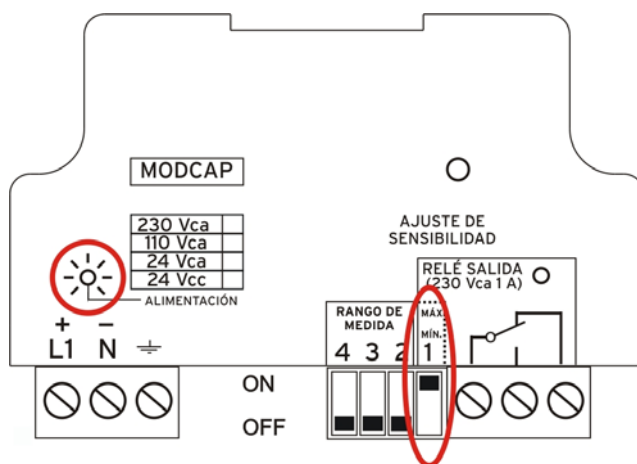
- Be sure that power supply corresponds with the indicated in the equipment's label.
- GREEN led lighting indicates that equipment is powered
- RED led lighting indicates that output relay is activated.
- Using SELECTOR 1, you can choose relay operation NO or NC when the product covers the probe.
- Protection fuse of 0.5mA must be put in serial with supply line.
- Ground terminal is internally tied to the connection thread.
- Be sure that ground line has same potential than ground of tank.
- If you are not sure, please do not connect the ground terminal since the instrument could be damaged.

## 8. Adjustment

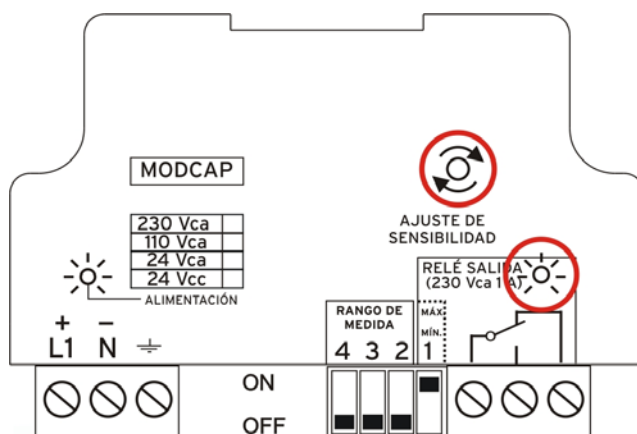
After installation and connection verification, we proceed to AJUST SENSITIVITY to fit the NSC with the tank and the product to measure.

Check that product doesn't reach the probe. Power supply GREEN LED must be ON

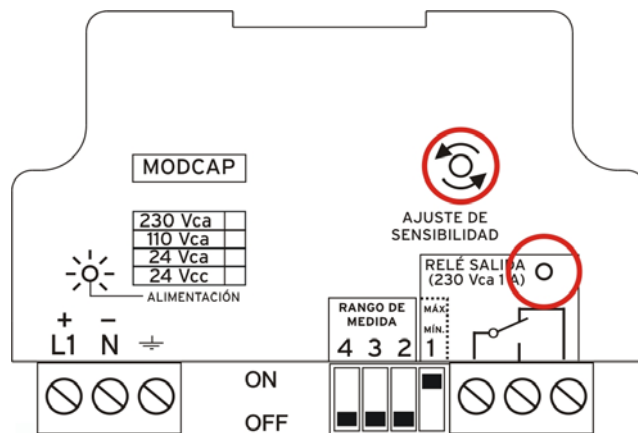
1. Put DIP-SWITCH 1 to "MAX" position.



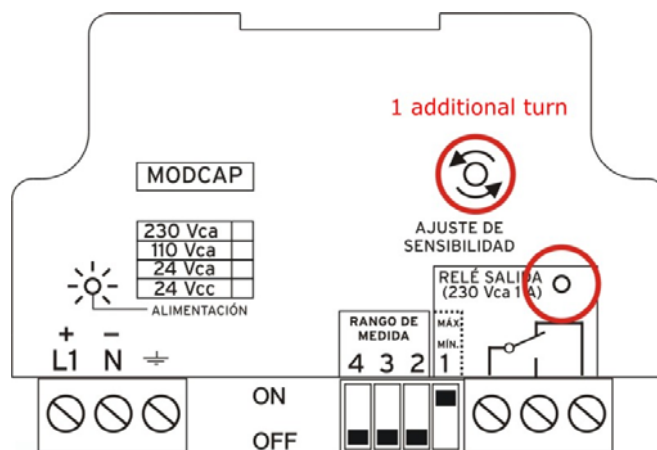
2. Turn the "SENSITIVITY ADJUSTMENT screw" clockwise until RED LED lights.



- Turn slowly the “SENSITIVITY ADJUSTMENT screw” counter clockwise until RED LED switches off.



- Turn 360° more counter clockwise to avoid a critical adjustment. In case of sticky products it is recommended to increase this adjustment.



The instrument is now adjusted. When product will reach the probe relay will be activated and RED LED will light.

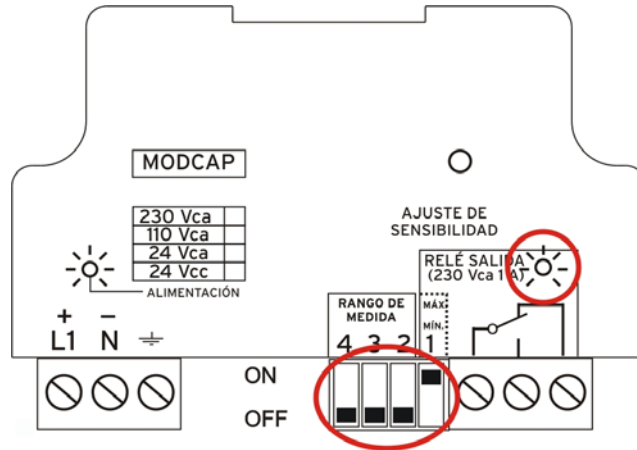
If we want the relay to work the REVERSE, put DIP-SWITCH 1 to “MIN”.

Check that no product remains on the probe when unloading the tank.

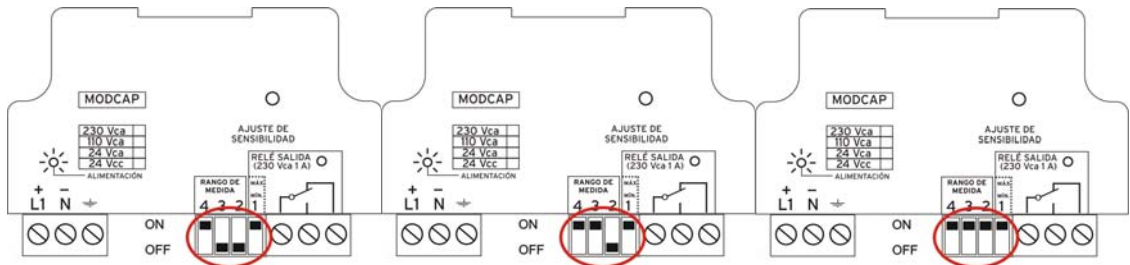
## 8.1 Module replacement

MODCAP modules are delivered with DIP-SWITCHES 2, 3 and 4 adjusted with its own probe. In case of replacement, following procedure must be done with the probe free of product:

1. With DIP-SWITCH 1 to “MAX” and 2, 3 and 4 to “MIN”, turn the multiturn potentiometer totally to clockwise (20 turns). RED LED will switch ON.



2. In case that RED LED doesn't lights, move DIP-SWITCH 4 (drawing 1) to ON. If RED LED still remains OFF, do same with DIP SWITCH 3 (drawing 2) and finally with DIP-SWITCH 2 (drawing 3) until RED LED finally lights.



Drawing 1

Drawing 2

Drawing 3

3. Once DIP-SWITCHES are correctly settled the SENSITIVITY ADJUSTMENT must be done (chapter 8).



## 9. Models

There are 2 basic models of NSC:

### NSC..R

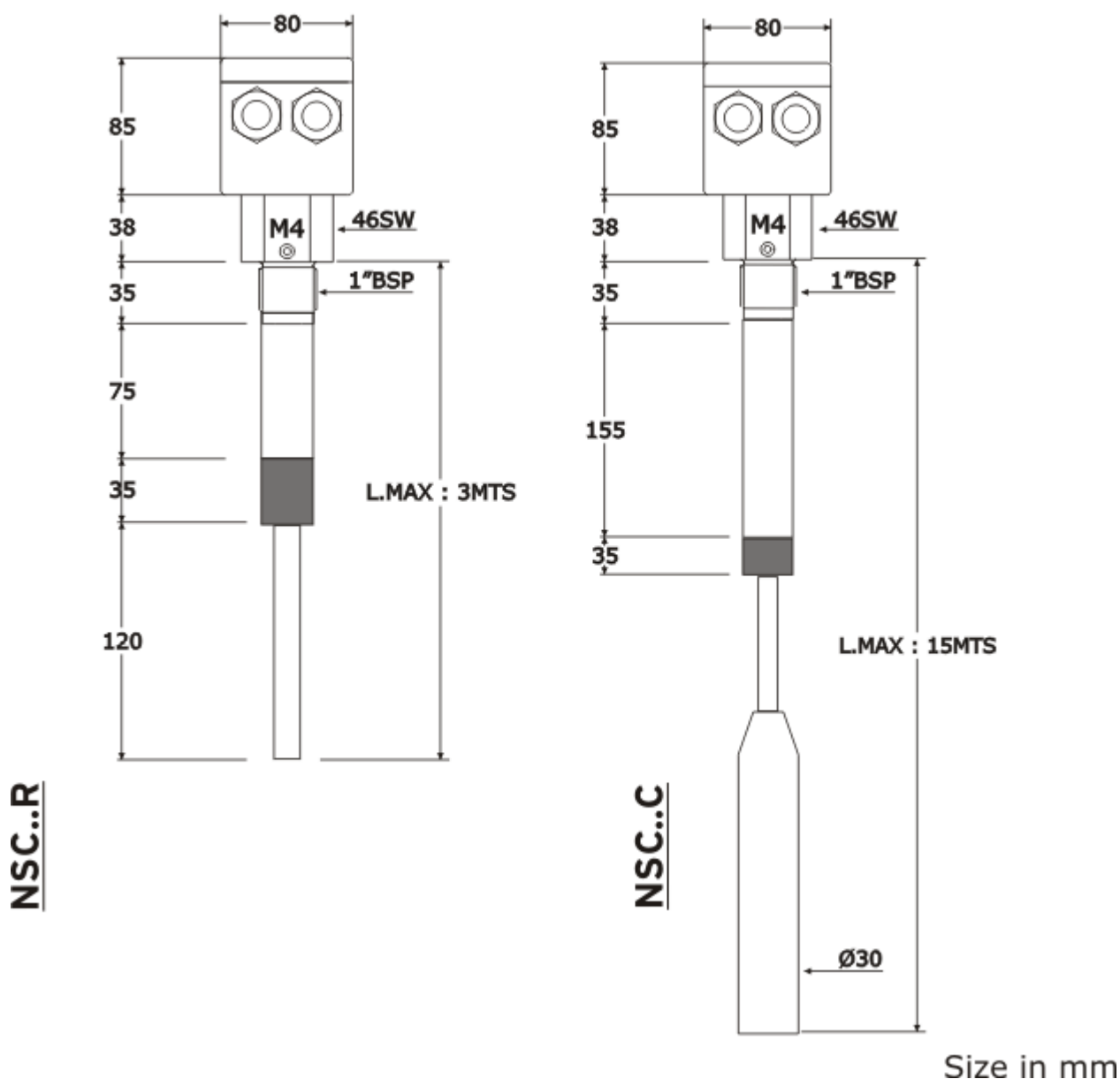
The probe is a rod made of st.st. and covered with PTFE.

It is used for minimum and intermediate level detection.

It is produced a Standard version with a sensor of a maximum length of 3000mm

### NSC..C

The probe is a flexible cable covered with PP, with a st.st. weight at the end. It is used for maximum level detection.



## 10. Technical Data

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Note: Kobold Mesura makes every attempt to ensure the accuracy of these specifications but reserves the right to change them at any time.

- Supply: 24, 110, 230 Vac ó 18 a 36 Vdc.
- Max. Power: 1 VA
- Process connection: 1G
- Other connections: DIN Flange, clamp, etc.
- Power supply and relay status LED.
- Polycarbonate housing IP.65.
- Ambient Temperature: -20...+60 °C.
- Process Temperature: -20...+80°C.
- Cable gland: 1 x M20x1,5 ( standard version ), 2 x M20x1,5 ( atex version ).
- Relay Output: max. 250 Vca 1 A.
- Sensitivity adjustment by multi-turn trimmer.
- Vdc polarity reverse protection.
- Minimum or maximum security adjustment.
- Rod version probe (NSC.R) covered with PTFE. Flexible cable st.st. probe (NSC.C) or steel covered with PP.

### ONLY ATEX VERSION:

- Certified:  
ATEX II 2/1 tD[jaD]iaD A21/20 IP65 T85 °C Ta: -20°C/+60°C
- Aluminium housing IP.65

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## **11. Safety Instructions (ATEX)**

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### 1. Validity

This security considerations must be applied to all level switches NSC...EX when used in explosive atmospheres under CE certificate type LOM 05ATEX2060 X.

### 2. General considerations.

Operating principle of level switches NSC...EX is the capacity variation of the media when product is present. They are used for level control in hazardous zones.

They can be used in hazardous zones group II and category 1/2D.

Probe of the instrument can be installed in hazardous zones category 1D.

The connection element of the instrument is mounted in the border of zones 2D and 1D.

All instructions and recommendations must be followed during the installation of the instrument in hazardous areas. Also the ones mentioned on this manual.

Cable glands must be selected according to the required certification.

Verify that label contents fits requirements of application.

All requirements of the ATEX2014/34/EU Directive must be correctly followed and also the national rules related to measurement instruments used in hazardous areas. For instance: EN 60079-0, EN 60079-31, EN 60079-11 and all the other ones related to the required certification.

Remove power supply before opening cover of the housing or at least be sure that no explosion risk is present.

Check that cover of housing is correctly mounted before applying power to the instrument.

Verify that there is no mechanical stress due to installation on the tank.

It is very important to verify that the instrument ground and the system ground are correctly connected.

The installation of instruments in hazardous areas must be exclusively done by trained people.

### 3. Protection against electrostatic discharge

Level switches with plastic parts that can acquire electrostatic charges, must have a corresponding warning label.

Avoid situations of electrostatic discharges like:

-Avoid friction on plastic parts.

-Avoid cleaning with a dry cloth

-Avoid installing close the steam sources or pneumatic product sources.

4. Chemical resistance:

Verify that materials of the instrument are chemically compatible with the product to measure and application.

5. Special conditions for safe use:

It is required for safety the adequate connection of protective conductor and the bonding to earth of the head box.

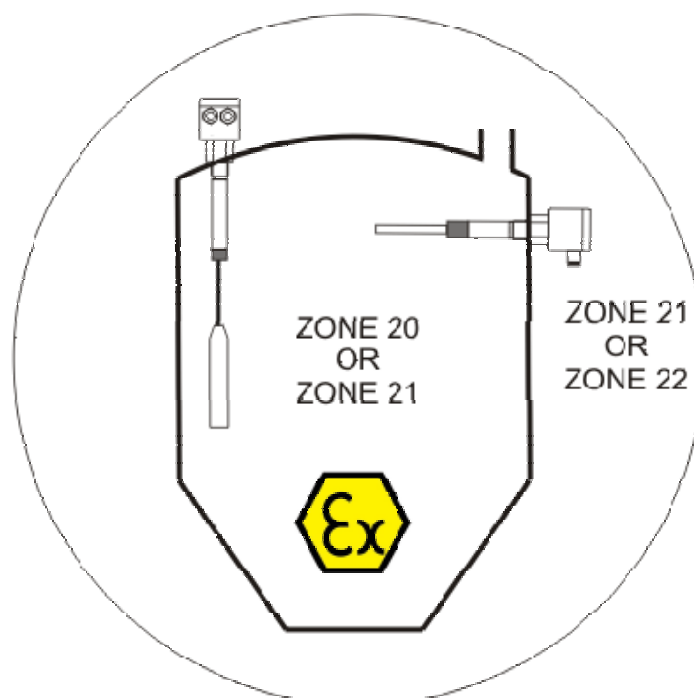
## 12. Installation in classified zone (ATEX)

In classified zones, NSC. ATEX version, must be installed with the housing in zone 21,22 (category 2) or NOT CLASSIFIED.

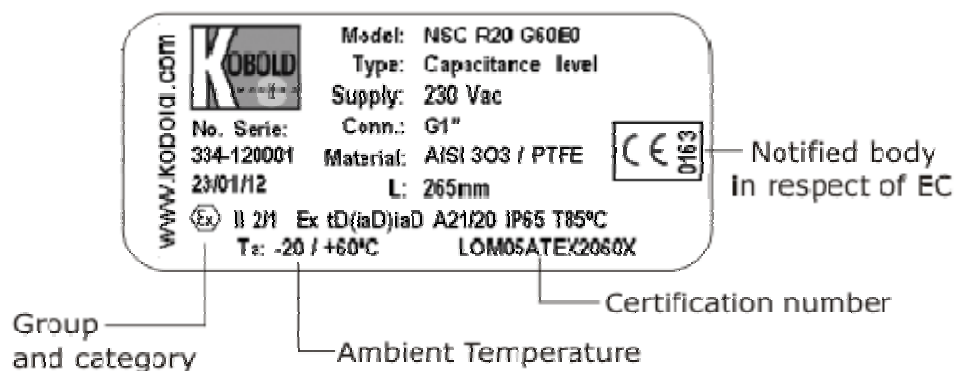
Process connection is mounted in the border wall between areas of category 2 and 1.

Probe can be mounted in ZONE20 (Category 1).

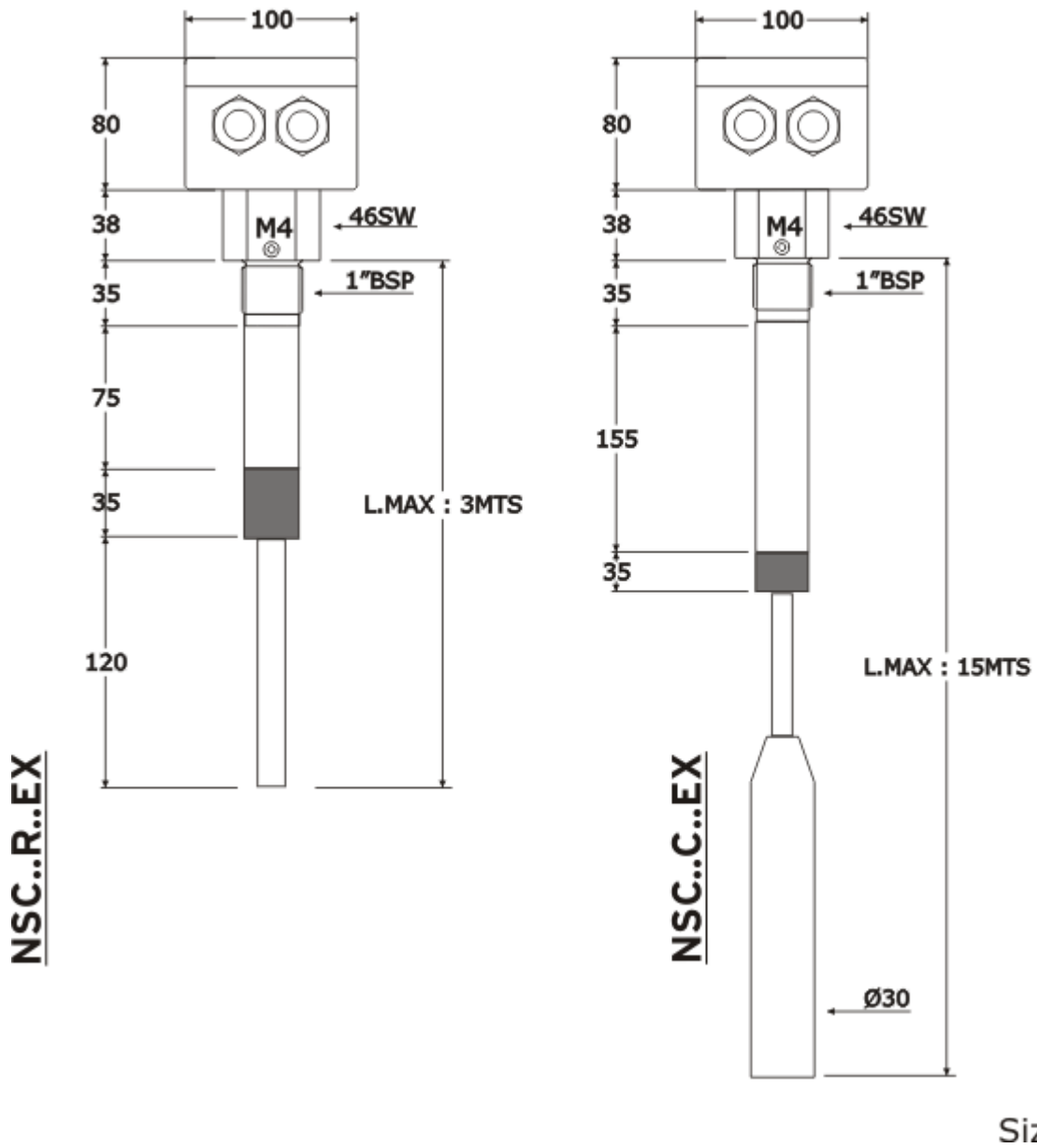
Installation must be done by people trained in ATEX environments.



## 13. Label Description (ATEX)



## 14. Models ATEX



## 15. Declaration of conformance ( ATEX )

DT0329

### DECLARACIÓN DE CONFORMIDAD EU

EU DECLARATION OF CONFORMITY  
EU-KONFORMITÄTSEKTLÄRUNG  
DÉCLARATION DE CONFORMITÉ  
DICHIARAZIONE DI CONFORMITÀ EU

**KOBOLD MESURA SLU**  
Avda. Conflent, 68 nave 15 08915 Badalona (España)

#### Declara, bajo la propia responsabilidad, que el producto

Declares under our sole responsibility, that the product  
Erklärt in alleiniger Verantwortung, dass das Produkt  
Déclare sous sa seule responsabilité, que le produit  
Dichiara sotto la propria responsabilità, che il prodotto

SOLICAP.400...EX  
NSC...EX...

#### A los cuales se refiere esta declaración, son conformes a las siguiente Directivas Europeas:

To which this declaration relates is in conformity with the following European Directives:  
Mit folgenden Richtlinien konform ist:  
À auxquels se réfère cette déclaration, ils sont conformes aux Directives Européennes suivant :  
A ai quali si riferisce questa dichiarazione, sono conformi alle direttive europee seguente:

**EMC2014/30/EU LVD2014/35/EU ATEX2014/34/EU RoHS2011/65/EU**

#### Normas armonizadas y documentos de la normativa aplicados:

Applied harmonised standards and normative documents:  
Angewandte harmonisierte Normen oder normativer Dokumente:  
Normes harmonisées et documents normatifs appliqués :  
Norme armonizzate e documenti normativi applicati:

EN61010-1 :2011      EN61241-0:2006 (acc. EN60079-0:2013)  
EN61000-6-2 :2006      EN61241-1:2004 (acc. EN60079-31:2016)  
EN61241-11:2006 (acc. EN60079-11:2013)

#### Certificado de examen CE de tipo

EC-type examination certificate  
EG-Baumusterprüfbescheinigung  
Attestation d'examen CE de type  
Certificazione per esame di tipo CE

#### Marcado

Marking  
Markierung  
Inscription  
Marcatura

LOM05ATEX2060X



II 2/1 Ex tD[iaD]iaD A21/20 IP65 T85°C Ta:-20°C/+60°C

**Fabricado en:** KOBOLD MESURA SLU Avda. Conflent, 68 nave 15 08915 BADALONA (Spain)

Made in:  
Hergestellt in:  
Fabriqué dans:  
Fabbricato in:

**Organismo notificado :** LOM 0163

Notified organism  
Zertifizierungsstelle  
Organization annoncée  
Organismo informato

**Número notificación :** LOM 05ATEX9070

Number notification  
Zertifikatsnummer  
Nombre notification  
Notifica di numero

Badalona june 2017

Azzam Charmand ( Gerente )

## 16. Declaration of conformance

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DT0329

### **DECLARACIÓN DE CONFORMIDAD EU**

*EU DECLARATION OF CONFORMITY  
EU-KONFORMITÄTSEKTLÄRUNG  
DÉCLARATION DE CONFORMITÉ  
DICHIARAZIONE DI CONFORMITÀ EU*

**KOBOLD MESURA SLU**  
**Avda. Conflent, 68 nave 15 08915 Badalona (España)**

#### **Declara, bajo la propia responsabilidad, que el producto**

*Declares under our sole responsibility, that the product  
Erklärt in alleiniger Verantwortung, dass das Produkt  
Déclare sous sa seule responsabilité, que le produit  
Dichiara sotto la propria responsabilità, che il prodotto*

**SOLICAP-400...**  
**NSC-...**

#### **A los cuales se refiere esta declaración, son conformes a las siguiente Directivas Europeas:**

*To which this declaration relates is in conformity with the following European Directives:  
Mit folgenden Richtlinien konform ist:  
À auxquels se réfère cette déclaration, ils sont conformes aux Directives Européennes suivant :  
A ai quali si riferisce questa dichiarazione, sono conformi alle direttive europee seguente:*

**EMC2014/30/EU LVD2014/35/EU RoHS2011/65/EU**

#### **Normas armonizadas y documentos de la normativa aplicados:**

*Applied harmonised standards and normative documents:  
Angewandte harmonisierte Normen oder normative Dokumente:  
Normes harmonisées et documents normatifs appliqués :  
Norme armonizzate e documenti normativi applicati:*

EN61010-1 :2011  
EN61000-6-2 :2006

**Fabricado en: KOBOLD MESURA SLU Avda. Conflent, 68 nave 15 08915 BADALONA (Spain)**

*Made in:  
Hergestellt in:  
Fabriqué dans:  
Fabbricato in:*

Badalona june 2017

Azzam Charmand ( Gerente )





# 17. ATEX Certificate



LABORATORIO OFICIAL J. M. MADARIAGA



(1) **EC-TYPE EXAMINATION CERTIFICATE**

(2) Equipment or protective system intended for use in potentially explosive atmospheres  
Directive 94/9/EC

(3) EC-Type Examination Certificate number: **LOM 05ATEX2060 X**

(4) Equipment or Protection System      Capacitive level detector  
Type Solicap.400\_-EX

(5) Applicant:                                      CONTROL INSTRUMENTS MESURA S.L.

(6) Address    Guifré, 665 1°  
08912 BADALONA(BARCELONA)  
SPAIN

(7) This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.


(8) Laboratorio Oficial J.M. Madariaga (LOM), notified body number 0163 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in confidential report nr. **LOM 04.225 NP**


(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:  
- Standards                      **EN 50014:1997 + A1:1999 + A2:1999**  
    **EN 50020:2002**  
    **EN 50281-1-1:1998 + A1:2002**

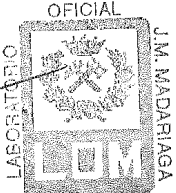
(10) If the sign X is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.


(11) This EC-Type Examination Certificate relates only to the design and construction of this specified equipment or protective system in accordance with the Directive 94/9/EC. Further requirements of the Directive applies to the manufacture and supply of this equipment or protective system. These are not covered by this certificate.

(12) The marking of the equipment or protective system shall include the following:  
 II 2/1 D    EEx [ia]ia IIA T6    IP65    T85 °C    Ta:-20 /+ 60 °C

Madrid, 13rd May 2005

  
 Carlos Fernández Ramón  
 DIRECTOR OF THE LABORATORY



  
 Angel Vega Remesal  
 Head of ATEX area

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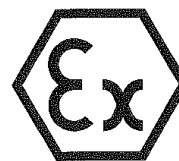
UNIVERSIDAD POLITÉCNICA DE MADRID  
ENSAYOS E INVESTIGACIONES DE MATERIALES Y EQUIPOS PARA ATMÓSFERAS EXPLOSIVAS Y MINERÍA  
( Real Decreto 334/1992 de 3 de Abril - BOE 1992-04-29 - )  
Alenza, 2 - 28003-MADRID • ☎ (34) 91 4421366/ 91 3387009 • Fax.(34) 91 4419933 • ✉ lom@lom.upm.es





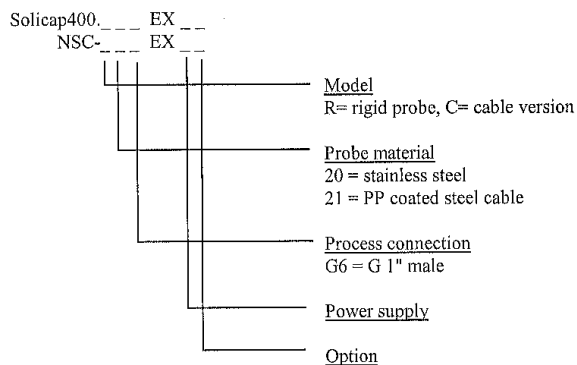


LABORATORIO OFICIAL J. M. MADARIAGA

(1) **EC-TYPE EXAMINATION CERTIFICATE SUPPLEMENT**

- (2) Equipment or protective system intended for use in potentially explosive atmospheres  
Directive 94/9/EC
- (3) Supplement nr. 1 to EC-Type Examination Certificate number **LOM 05ATEX2060 X**
- (4) Equipment or Protection System      Capacitive level detector  
Type Solicap.400.-EX / NSC-...EX...
- (5) Applicant                                      KOBOLD MESURA, S.L.U.
- (6) Address                                        Guifré, 665  
08918 BADALONA(BARCELONA)  
SPAIN
- (7) Report nr.                                 **LOM 07.059 NP**
- (8) Variations included in this certificate
- Change of the manufacturer name, before CONTROL INSTRUMENTS MESURA S.L.
  - Alternative reference of type as NSCR20G60E0
  - Update of applied standards to: EN 61241-0:2006, EN 61241-1:2004 y EN 61241-11:2006

Type codification



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ENSAYOS E INVESTIGACIONES DE MATERIALES Y EQUIPOS PARA ATMÓSFERAS EXPLOSIVAS Y MINERÍA  
( Real Decreto 334/1992 de 3 de Abril - BOE 1992-04-29 - )




Alenza, 1 - 28003-MADRID • ☎ (34) 91 4421366/ 91 3367009 • Fax.(34) 91 4419933 • ✉ lom@lom.upm.es



LABORATORIO OFICIAL J. M. MADARIAGA

(3) Supplement nr. 1 to EC-Type Examination Certificate number **LOM 05ATEX2060 X**


(9) Marking variations

 II 2/1      Ex tD[iaD]iaD A21/20 IP65 T85 °C Ta: -20°C / + 60 °C


(10) Descriptive documents

|                          | <u>Rev.</u> | <u>Date</u> |
|--------------------------|-------------|-------------|
| - Drawings nr.: DT0096R2 | 2           | 2007-07-17  |

OFICIAL  
LABORATORIO  J.M. MADARIAGA

  
Carlos Fernández Ramón  
DIRECTOR OF THE LABORATORY

Madrid, 10th September, 2007

  
Angel Vega Remesal  
Head of ATEX area

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**18. NOTES**

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[www.kobold.com](http://www.kobold.com)

Technical data  
Subject to change without prior notice

