



[1]

EU-TYPE EXAMINATION CERTIFICATE

 [2] **Equipment intended for use in potentially explosive atmospheres Directive 2014/34/EU – Annex III**

 [3] Certificate Number: **EPT 17 ATEX 2870 X issue 2**

 [4] Equipment: **SOLDO™ Limit switch box series
SF (SIF), SS (SIS)**

 [5] Manufacturer: **ROTORK INSTRUMENTS ITALY S.R.L.**

 [6] Address: **Via Portico 17 - 24050 Orio al Serio (BG) - Italy**

[7] This equipment and its accepted variations are specified in the annex to this Certificate.


[8] Eurofins Product Testing Italy S.r.l., Notified Body n. 0477 in accordance with Article 21 of the Directive 2014/34/EU of the European Parliament and of the Council of 26th February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II of the Directive. The examination and test results are recorded in the confidential Report N°EPT.23.REL.03/2313046

[9] Compliance with the essential health and safety requirements is assured through the verification of them and by compliance with the following harmonized standards:

EN IEC 60079-0:2018, EN 60079-11:2012, EN 60079-31:2014

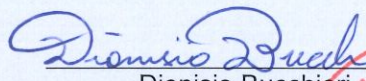
[10] If the sign "X" is placed after the Certificate number, it indicates that the equipment is subject to the special conditions for safe use specified in the annex to this Certificate.

 [11] This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, the exam and the tests of the specified equipment.
Further requirements of the Directive 2014/34/EU apply to the manufacture and supply of this equipment. These requirements are not object of this Certificate.

 [12] The equipment shall include the sign  and the following strings:

II 1 GD		II 2 GD		II 2 D
Ex ia IIC T6...T4 Ga	or	Ex ib IIC T6...T4 Gb	or	Ex tb IIIC T85°C...T120°C Db
Ex ia IIIC T20045°C...T200118°C Da		Ex ib IIIC T45°C...T135°C Db		

 Place and date of issue:
(DD-MM-YYYY)

Torino, 27-07-2023

 Dionisio Bucchieri
 Directive Responsible


 Paolo Trisoglio
 Managing Director

 Notified Body N. 0477

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This Certificate has 9 pages and it is reproducible only in its entirety. Conditions of validity are reported below.



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[15] Equipment description

The limit switch box series SS with body in stainless steel and SF with body in aluminium alloy material (also referred to SIS and SIF respectively) are electrical devices used to indicate the position, for example in valves and actuators, by means of electrical signal and visual indicator. These are mounted on actuator or manual valve with external lever or gear.

The cable entries are machined according metric ISO 965-1 thread (M20x1.5 or M25x1.5), NPT thread ($\frac{1}{2}$ " or $\frac{3}{4}$ "") or alternatively can be plain.

The limit switch boxes can be configured by the manufacturer according one of the following main configurations:

- **Main Configuration 1:** Box with simple apparatus switches.

Up to four contacts SPDT (or 2 x DPDT) electromechanical or reed type.

- **Main Configuration 2:** Box with simple apparatus switches + SMT End of Line monitoring encapsulated resistors

Up to four contacts SPDT (or 2 x DPDT) electromechanical or reed type.

- **Main Configuration 3:** Box with simple apparatus switches + THT End of Line monitoring (not encapsulated) resistors

Up to four contacts SPDT (or 2 x DPDT) electromechanical or reed type.

- **Main Configuration 4:** Box with Ex certified inductive proximity switches

Up to four proximity switches.

- **Main Configuration 5:** Box with Ex certified transmitter and potentiometer.

Up to one position transmitter mechanically connected to the internal camshaft and the potentiometer.

- **Main Configuration 6:** Box with simple apparatus switches, Ex certified transmitter and potentiometer.

Up to two contacts SPDT (or 1 x DPDT) electromechanical or reed type, and one position transmitter mechanically connected to the internal camshaft and the potentiometer.

- **Main Configuration 7:** Box with Ex certified inductive proximity switches, Ex certified transmitter and potentiometer.

Up to two proximity switches and one position transmitter mechanically connected to the internal camshaft and the potentiometer.

Configurations with a lower number of switches can be realized. The limit switches are mounted on circuit board or dedicated support plate and are interfaced to the camshaft; this component intervenes mechanically (or electromagnetically) on the switches changing their state.

Some PCBs used in the above mentioned configurations can also include resistors used to draw a small quantity of current from the associated apparatus and then allowing to identify remotely a potential wiring interruption or short circuit (this technique is called End of Line monitoring).

When the equipment is marked according the intrinsically safe requirements it can be powered up only by means of intrinsic safety barriers (associated apparatus).

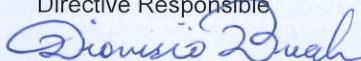
In this case each switch has to be connected to an individual channel of intrinsic safety barrier and in case of presence of double throw contact (e.g. SPDT and DPDT switch) only one contact at time



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can be used and then the common connection of two intrinsically safe barriers is forbidden.

Depending on the ambient temperature range all the above mentioned configurations can be also provided with a maximum number of two surge protectors (up to two independent channels each one) connected in parallel with the limit switches; the reactive safety related electrical parameters Li and Ci of these devices are taken into account by the manufacturer in the final input parameters marked on the Ex equipment.

The limit switch boxes can also be used without their connection to the intrinsically safe apparatus only for use in Zone 21 and in this case the protection type is "tb" and EPL is "Db".

The equipment can be manufactured with different o-rings and gaskets materials, these variants define the extension of the equipment ambient temperature ranges as follows:

EPDM gaskets: -50°C ÷ +80°C.

Silicone gaskets: -60°C ÷ +105°C.

Electrical parameters

Safety related electrical parameters applicable to the intrinsically safe type of protection:

• *Box with simple apparatus switches.*

Ui: 30 V li: 100 mA Pi: 750 mW Li ≈ 0 uH Ci ≈ 0 uF

• *Box with simple apparatus switches + SMT End of Line monitoring encapsulated resistors*

Ui: 30 V li: 100 mA Pi: 300 mW Li ≈ 0 uH Ci ≈ 0 uF

• *Box with simple apparatus switches + THT End of Line monitoring (not encapsulated) resistors*

Ui: 30 V li: 100 mA Pi: 280 mW Li ≈ 0 uH Ci ≈ 0 uF

• *Box with Ex certified inductive proximity switches and/or Box with Ex certified transmitter and potentiometer.*

The safety related electrical parameters correspond to those defined for each individual already certified Ex Equipment internally installed.

Note: Ci and Li parameters related to the channels where switches are wired are higher respect to those above mentioned if surge protectors are involved; in this case the parameters of the surge protector are summed to the parameters of the switch to which it is wired.

Dust-tight type of protection (Ex tb):

U: 250 Vac; I: 1A; P: 2.47W

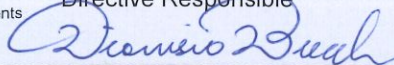
Note: Surge protectors are not allowed in this version.



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Warning label

- Do not open in a gas/dust explosive atmosphere
- Due to risk of static hazard the enclosure must be only cleaned with a damp cloth
- Do not open when energized
- For safety instruction refers to IOM

Routine tests

None.

Relationships between materials, ambient temperature range, temperature limits and electrical parameters

• Box with simple apparatus switches.

Material	Extended ambient temperature range (°C)	Marking (EPLs Ga and/or Da)	Marking (EPLs Gb and/or Db)	Electrical parameters	Surge Protector allowed
Al / SS	-50°C ≤ Ta ≤ +40°C for EPDM gasket -60°C ≤ Ta ≤ +40°C for silicone gasket	Ex ia IIC T6 Ga Ex ia IIIC T ₂₀₀ 45°C Da	Ex ib IIC T6 Gb Ex ib IIIC T45°C Db	Ui: 30 V; li: 100 mA; Pi: 750 mW; Li= 0 uH; Ci= 0 uH	Y but upper Ta is limited as follow: Ta +40°C @ T6/T85°C Ta +55°C @ T5/T100°C Ta +75°C @ T4/T135°C
	-50°C ≤ Ta ≤ +55°C for EPDM gasket -60°C ≤ Ta ≤ +55°C for silicone gasket	Ex ia IIC T5 Ga Ex ia IIIC T ₂₀₀ 60°C Da	Ex ib IIC T5 Gb Ex ib IIIC T60°C Db	Ui: 30 V; li: 100 mA; Pi: 750 mW; Li= 0 uH; Ci= 0 uH	
	-50°C ≤ Ta ≤ +80°C for EPDM gasket	Ex ia IIC T4 Ga Ex ia IIIC T ₂₀₀ 85°C Da	Ex ib IIC T4 Gb Ex ib IIIC T85°C Db	Ui: 30 V; li: 100 mA; Pi: 750 mW; Li= 0 uH; Ci= 0 uH	Lower Ta is limited to -40°C, for Dust marking the EPL is restricted to Db
	-60°C ≤ Ta ≤ +105°C for silicone gasket	Ex ia IIC T4 Ga Ex ia IIIC T ₂₀₀ 110°C Da	Ex ib IIC T4 Gb Ex ib IIIC T110°C Db	Ui: 30 V; li: 100 mA; Pi: 750 mW; Li= 0 uH; Ci= 0 uH	

• Box with simple apparatus switches + SMT End of Line monitoring potted resistors

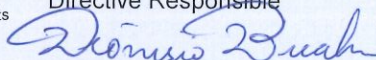
Material	Extended ambient temperature range (°C)	Marking (EPLs Ga and/or Da)	Marking (EPLs Gb and/or Db)	Electrical parameters	Surge Protector allowed
Al / SS	-40°C ≤ Ta ≤ +40°C for EPDM gasket -40°C ≤ Ta ≤ +40°C for silicone gasket	Ex ia IIC T6 Ga Ex ia IIIC T ₂₀₀ 55°C Da	Ex ib IIC T6 Gb Ex ib IIIC T55°C Db	Ui: 30 V; li: 100 mA; Pi: 300 mW; Li= 0 uH; Ci= 0 uH	N
	-40°C ≤ Ta ≤ +55°C for EPDM gasket -40°C ≤ Ta ≤ +55°C for silicone gasket	Ex ia IIC T5 Ga Ex ia IIIC T ₂₀₀ 70°C Da	Ex ib IIC T5 Gb Ex ib IIIC T70°C Db	Ui: 30 V; li: 100 mA; Pi: 300 mW; Li= 0 uH; Ci= 0 uH	N
	-40°C ≤ Ta ≤ +70°C for EPDM gasket	Ex ia IIC T4 Ga Ex ia IIIC T ₂₀₀ 85°C Da	Ex ib IIC T4 Gb Ex ib IIIC T85°C Db	Ui: 30 V; li: 100 mA; Pi: 300 mW; Li= 0 uH; Ci= 0 uH	N
	-40°C ≤ Ta ≤ +100°C for silicone gasket	Ex ia IIC T4 Ga Ex ia IIIC T ₂₀₀ 115°C Da	Ex ib IIC T4 Gb Ex ib IIIC T115°C Db	Ui: 30 V; li: 100 mA; Pi: 300 mW; Li= 0 uH; Ci= 0 uH	N



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• Box with simple apparatus switches + THT End of Line monitoring resistors (not potted)

Material	Extended ambient temperature range (°C)	Marking (EPLs Ga and/or Da)	Marking (EPLs Gb and/or Db)	Electrical parameters	Surge Protector allowed
Al / SS	-50°C ≤ Ta ≤ +40°C for EPDM gasket -60°C ≤ Ta ≤ +40°C for silicone gasket	Ex ia IIC T6 Ga Ex ia IIIC T ₂₀₀ 56°C Da	Ex ib IIC T6 Gb Ex ib IIIC T56°C Db	Ui: 30 V; li: 100 mA; Pi: 280 mW; Li= 0 uH; Ci= 0 uH	N
	-50°C ≤ Ta ≤ +55°C for EPDM gasket -60°C ≤ Ta ≤ +55°C for silicone gasket	Ex ia IIC T5 Ga Ex ia IIIC T ₂₀₀ 71°C Da	Ex ib IIC T5 Gb Ex ib IIIC T71°C Db	Ui: 30 V; li: 100 mA; Pi: 280 mW; Li= 0 uH; Ci= 0 uH	N
	-50°C ≤ Ta ≤ +70°C for EPDM gasket	Ex ia IIC T4 Ga Ex ia IIIC T ₂₀₀ 86°C Da	Ex ib IIC T4 Gb Ex ib IIIC T86°C Db	Ui: 30 V; li: 100 mA; Pi: 280 mW; Li= 0 uH; Ci= 0 uH	N
	-60°C ≤ Ta ≤ +100°C for silicone gasket	Ex ia IIC T4 Ga Ex ia IIIC T ₂₀₀ 116°C Da	Ex ib IIC T4 Gb Ex ib IIIC T116°C Db	Ui: 30 V; li: 100 mA; Pi: 280 mW; Li= 0 uH; Ci= 0 uH	N

• Box with certified inductive switches

Material	Extended ambient temperature range (°C)	Marking (EPLs Ga and/or Da)	Marking (EPLs Gb and/or Db)	Electrical parameters	Surge Protector allowed
Al / SS	-50°C ≤ Ta ≤ +76°C for EPDM gasket -60°C ≤ Ta ≤ +104°C for silicone gasket	Ex ia IIC T6...T4 Ga Ex ia IIIC T ₂₀₀ (Ta+14)°C Da	-	Input parameters are based on components certificates.	Y but upper Ta is limited as follow: Ta +54°C @ T6/T85°C Ta +69°C @ T5/T100°C Ta +75°C @ T4/T135°C Lower Ta is limited to -40°C, for Dust marking the EPL is restricted to Db
Al	-50°C ≤ Ta ≤ +80°C for EPDM gasket -60°C ≤ Ta ≤ +105°C for silicone gasket	-	Ex ib IIC T6...T4 Gb Ex ib IIIC T(Ta+7)°C Db		
SS	-50°C ≤ Ta ≤ +80°C for EPDM gasket -60°C ≤ Ta ≤ +105°C for silicone gasket	-	Ex ib IIC T6...T4 Gb Ex ib IIIC T(Ta+7)°C Db		

• Box with certified inductive switches (Inductive slot sensors type)

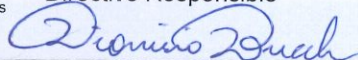
Material	Extended ambient temperature range (°C)	Marking (EPLs Ga and/or Da)	Marking (EPLs Gb and/or Db)	Electrical parameters	Surge Protector allowed
Al / SS	-50°C ≤ Ta ≤ +76°C for EPDM gasket -60°C ≤ Ta ≤ +104°C for silicone gasket	Ex ia IIC T6...T4 Ga Ex ia IIIC T ₂₀₀ (Ta+14)°C Da	-	Input parameters are based on components certificates.	N
	-50°C ≤ Ta ≤ +80°C for EPDM gasket -60°C ≤ Ta ≤ +105°C for silicone gasket	-	Ex ib IIC T6...T4 Gb Ex ib IIIC T(Ta+7)°C Db		



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• Box with certified position transmitter

Material	Extended ambient temperature range (°C)	Marking (EPLs Ga and/or Da)	Marking (EPLs Gb and/or Db)	Electrical parameters	Surge Protector allowed
Al / SS	-50°C ≤ Ta ≤ +80°C for EPDM gasket -50°C ≤ Ta ≤ +85°C for silicone gasket	Ex ia IIC T6...T4 Ga Ex ib IIIC T(Ta+7)°C Db <i>Note: When position transmitter is involved EPL Da is not allowed</i>	-	Input parameters are based on components certificates.	N

• Box with certified position transmitter and simple apparatus switches

Material	Extended ambient temperature range (°C)	Marking (EPLs Ga and/or Da)	Marking (EPLs Gb and/or Db)	Electrical parameters	Surge Protector allowed
Al / SS	-50°C ≤ Ta ≤ +75°C for EPDM gasket -50°C ≤ Ta ≤ +85°C for silicone gasket	Ex ia IIC T4 Ga Ex ib IIIC T(Ta+20)°C Db <i>Note: When position transmitter is involved EPL Da is not allowed</i>	-	Input parameters are based on components certificates.	N

• Box with certified inductive switches and position transmitter

Material	Extended ambient temperature range (°C)	Marking (EPLs Ga and/or Da)	Marking (EPLs Gb and/or Db)	Electrical parameters	Surge Protector allowed
Al / SS	-50°C ≤ Ta ≤ +64°C for EPDM gasket -50°C ≤ Ta ≤ +85°C for silicone gasket	Ex ia IIC T6...T4 Ga Ex ib IIIC T(Ta+20)°C Db <i>Note: When position transmitter is involved EPL Da is not allowed</i>	-	Input parameters are based on components certificates.	Y but upper Ta is limited as follows: Ta +42°C @ T6/T85°C Ta +57°C @ T5/T100°C Ta +75°C @ T4/T135°C Lower Ta is limited to -40°C, for Dust marking the EPL is restricted to Db

• Box having type of protection Ex tb

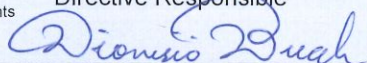
Material	Extended ambient temperature range (°C)	Marking (EPLs Ga and/or Da)	Marking (EPLs Gb and/or Db)	Electrical parameters	Surge Protector allowed
Al / SS	-50°C ≤ Ta ≤ +70°C for EPDM gasket	-	Ex tb IIIC T85°C Db	The equipment can be used within the rated parameters of the internal components without ever exceeding the following values: U: 250 Vac I: 1 A Pd: 2.47W	N
	-60°C ≤ Ta ≤ +70°C for silicone gasket				N
	-50°C ≤ Ta ≤ +80°C for EPDM gasket -60°C ≤ Ta ≤ +85°C for silicone gasket				Ex tb IIIC T100°C Db
	-60°C ≤ Ta ≤ +105°C for silicone gasket		Ex tb IIIC T120°C Db		



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Notes:

Note 1 - The equipment temperature range is delimited by the worst component ambient temperature range.

Example: Box with certified position transmitter and certified inductive switches.

Transmitter ambient temperature range: -40°C ÷ +85°C

Inductive switches ambient temperature range: -60°C ÷ +100°C

The equipment temperature range in this case is -40°C ÷ +85°C (the version with silicone gasket has to be selected).

Note 2 - When the surge protector is installed the safety related input electrical parameters marked on the limit switch box include the reactances parameter Ci and Li as given by the surge protector certificate (summed to those of the inductive switches when present).

Note 3 - When the equipment contains switches, these have to be of the same type.

Note 4 - When already certified proximity switches/transmitters are involved in the equipment, the marked temperature class is related to the maximum ambient temperature as described by the certificate of these devices. Furthermore, when more than one already certified proximity (with eventually one transmitter) are included, the marked ambient temperature values for each temperature class/maximum surface temperature and group of supply parameters are reduced to take into consideration the local ambient temperature inside the limit switch box.

[16] **Assessment Report n° EPT.23.REL.03/2313046**

This EU-Type Examination Certificate is released after the positive result of the conformity assessment of the Council Directive 2014/34/EU and to harmonized technical standards listed in this certificate performed by the Notified Body Eurofins Product Testing Italy S.r.l., and reported in the Assessment Report above cited.

[17] **Special condition for a safe use**

Applicable to all versions:

- Potential electrostatic charging hazard, see instruction manual for details.

Applicable only to intrinsically safe version:

- SF enclosures are mainly made of aluminium material and then a proper installation has to be observed when placed in environment classified as Zone 0 and Zone 20 to avoid an ignition hazard due to impact or friction.

- Each switch involved in the equipment has to be powered only by a single channel of certified intrinsic safety barrier. Where changeover contacts are included in switches, only one contact at time can be used and then no common electrical connection of two intrinsic safety barrier can be achieved.

[18] **Essential Health and Safety Requirements**

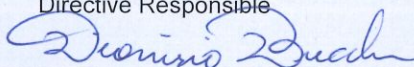
Assured by compliance with harmonized standards.



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[19] Descriptive documents

The equipment object of this Certificate are described by the following documents that are scheduled documents and therefore they cannot be modified without the explicit authorization of the Notified Body.

Type of document	Document identification	Rev.	Date
*Technical note	171220	3	14-07-2023
*Drawing and scheme (Schedule drawing and related drawing)	A05	2	14-07-2023
*Installation & Operating Manual Intrinsically safe / Dust tight	2025896	3	-
List of type of switches, components and certificates	A12	-	01-03-2022
*Templates of labels	A13	2	21-07-2023
Wiring diagrams	A14	1	25-03-2022
*Configurations Chart	A15	2	19-07-2023
Clearance distance between bare conducting parts	A16	0	08-07-2022

Note: An * is included before the title of documents that are new or revised.

[20] Terms and conditions

The product liability rests with the Manufacturer, his representative or, in the absence of a representative, with the importer, in accordance with the General Product Safety Directive 2001/95/EC.

The following conditions may render this certificate invalid:

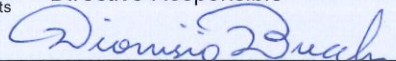
- changes in the design or construction of the product;
- changes or amendments to the Directive;
- changes or amendments in the standards which form the basis for documenting compliance with the essential requirements of the 2014/34/EU Directive.



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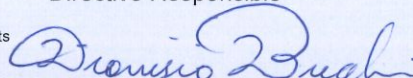
[21] History

Issue	Description	Date
0	First Emission.	20-12-2017
1	<ul style="list-style-type: none"> - The equipment has been assessed according to the standard EN IEC 60079-0:2018. - A new limit switch box configuration that includes SMT End of Line monitoring encapsulated resistors has been added. - A new limit switch box configuration featuring surge protectors has been added. - Position transmitters have been included in the list of already certified devices that can be mounted inside the limit switch box. - The temperature classes and the maximum surface temperatures have been added in relation to the ambient temperature range and power supply parameters for greater flexibility. 	09-09-2022
2	A new limit switch box configuration featuring slot-type proximity switches has been added.	27-07-2023


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